FOREWORD

This manual contains an introductory description on the SUZUKI VL800 and procedures for its inspection/service and overhaul of its main components. Other information considered as generally known is not included.
Read the GENERAL INFORMATION section to familiarize yourself with the motorcycle and its maintenance. Use this section as well as other sections to use as a guide for proper inspection and service.
This manual will help you know the motorcycle better so that you can assure your customers of fast and reliable service.

- ** This manual has been prepared on the basis of the latest specifications at the time of publication. If modifications have been made since then, differences may exist between the content of this manual and the actual motorcycle.*
- ** Illustrations in this manual are used to show the basic principles of operation and work procedures. They may not represent the actual motorcycle exactly in detail.*
- ** This manual is written for persons who have enough knowledge, skills and tools, including special tools, for servicing SUZUKI motorcycles. If you do not have the proper knowledge and tools, ask your authorized SUZUKI motorcycle dealer to help you.*

⚠ WARNING

Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual. Improper repair may result in injury to the mechanic and may render the motorcycle unsafe for the rider and passenger.

IMPORTANT *(For USA)*

All street-legal Suzuki motorcycles with engine displacement of 50 cc or greater are subject to Environmental Protection agency emission regulations. These regulations set specific standards for exhaust emission output levels as well as particular servicing requirements. This manual includes specific imformation required to properly inspect and service VL800 in accordance with all EPA regulations. It is strongly recommended that the chapter on Emission Control, Periodic Servicing and Carburetion be thoroughly reviewed before any type of service work is performed.
Further information concerning the EPA emission regulations and U.S. Suzuki's emission control program can be found in the U.S. SUZUKI EMISSION CONTROL PROGRAM MANUAL/SERVICE BULLETIN.

SUZUKI MOTOR CORPORATION

GROUP INDEX

Revised 09/07

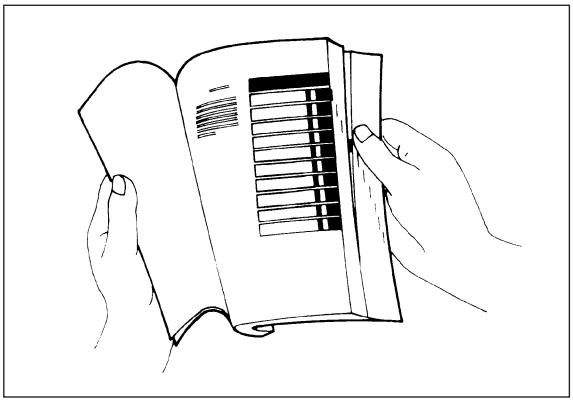
99500-38047-01E

SUPPLEMENTS

HOW TO USE THIS MANUAL

TO LOCATE WHAT YOU ARE LOOKING FOR:

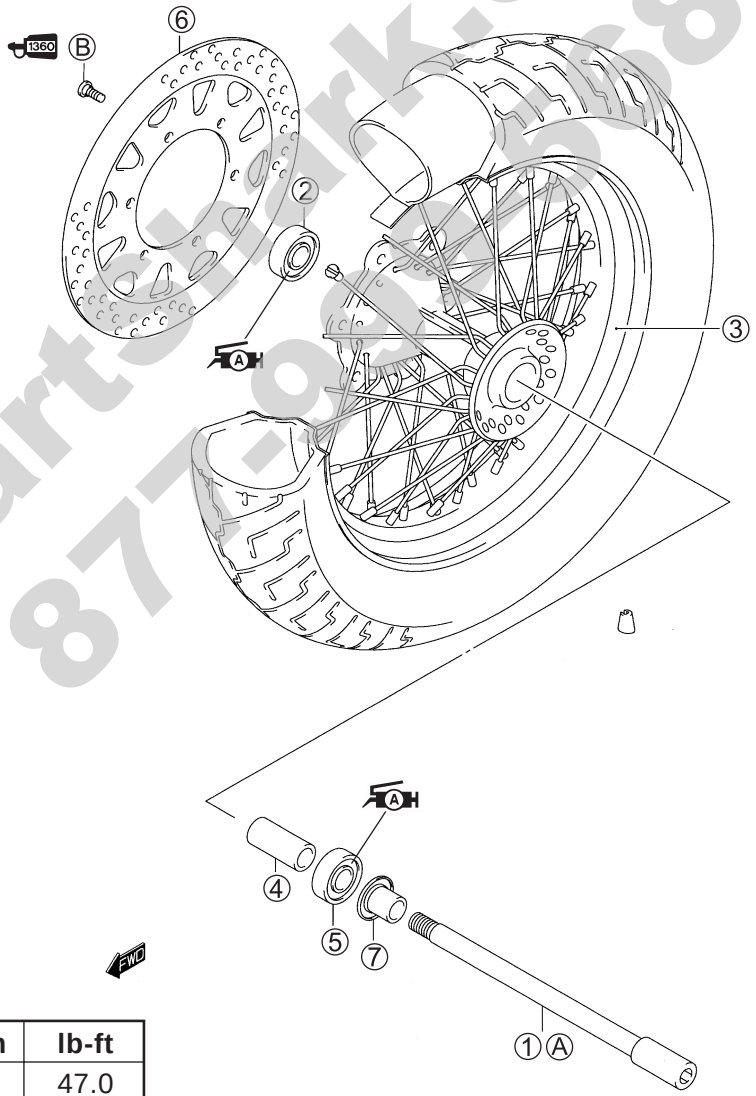
1. The text of this manual is divided into sections.
2. The section titles are listed in the GROUP INDEX.
3. Holding the manual as shown at the right will allow you to find the first page of the section easily.
4. The contents are listed on the first page of each section to help find the item and page you need.



COMPONENT PARTS AND WORK TO BE DONE

Under the name of each system or unit, is its exploded view. Work instructions and other service information such as the tightening torque, lubricating points and locking agent points, are provided.

Example: Front wheel



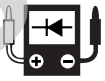
① Front axle
② Bearing (R)
③ Front wheel
④ Spacer
⑤ Bearing (L)
⑥ Brake disc
⑦ Spacer

Ⓐ Front axle
Ⓑ Brake disc mounting bolt

ITEM	N·m	kgf·m	lb-ft
Ⓐ	65	6.5	47.0
Ⓑ	23	2.3	16.5

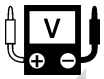
SYMBOL (For USA)

Listed in the table below are the symbols indicating instructions and other information necessary for servicing. The meaning of each symbol is also included in the table.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque.		Use engine coolant. 99000-99032-11X
	Apply oil. Use engine oil unless otherwise specified.		Use fork oil. 99000-99001-SS8
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1:1)		Apply or use brake fluid.
	Apply SUZUKI SUPER GREASE “A”. 99000-25030		Measure in voltage range.
	Apply SUZUKI MOLY PASTE. 99000-25140		Measure in resistance range.
	Apply SUZUKI BOND “1207B”. 99104-31140		Measure in current range.
	Apply SUZUKI BOND “1216”. 99104-31160		Measure in diode test range.
	Apply THREAD LOCK SUPER “1303”. 99000-32030		Measure in continuity test range.
	Apply THREAD LOCK “1342”. 99000-32050		Use special tool.
	Apply THREAD LOCK SUPER “1360”. 99000-32130		Indication of service data.

SYMBOL (For the other countries)

Listed in the table below are the symbols indicating instructions and other information necessary for servicing. The meaning of each symbol is also included in the table.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque.		Use engine coolant. 99000-99032-11X
	Apply oil. Use engine oil unless otherwise specified.		Use fork oil. 99000-99001-SS8
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1:1)		Apply or use brake fluid.
	Apply SUZUKI SUPER GREASE “A”. 99000-25010		Measure in voltage range.
	Apply SUZUKI MOLY PASTE. 99000-25140		Measure in resistance range.
	Apply SUZUKI BOND “1207B”. 99000-31140		Measure in current range.
	Apply SUZUKI BOND “1216”. 99104-31160		Measure in diode test range.
	Apply THREAD LOCK SUPER “1303”. 99000-32030		Measure in continuity test range.
	Apply THREAD LOCK “1342”. 99000-32050		Use special tool.
	Apply THREAD LOCK SUPER “1360”. 99000-32130		Indication of service data.

GENERAL INFORMATION

1

CONTENTS

WARNING/CAUTION/NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the symbol and the words WARNING, CAUTION and NOTE have special meanings. Pay special attention to the messages highlighted by these signal words.

⚠ WARNING

Indicates a potential hazard that could result in death or injury.

⚠ CAUTION

Indicates a potential hazard that could result in motorcycle damage.

NOTE:
Indicates special information to make maintenance easier or instructions clearer.

Please note, however, that the warnings and cautions contained in this manual cannot possibly cover all potential hazards relating to the servicing, or lack of servicing, of the motorcycle. In addition to the WARNINGS and CAUTIONS stated, you must use good judgement and basic mechanical safety principles. If you are unsure about how to perform a particular service operation, ask a more experienced mechanic for advice.

GENERAL PRECAUTIONS

⚠ WARNING

- **Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the motorcycle.**
- **When two or more persons work together, pay attention to the safety of each other.**
- **When it is necessary to run the engine indoors, make sure that exhaust gas is forced outdoors.**
- **When working with toxic or flammable materials, make sure that the area you work in is well-ventilated and that you follow all of the material manufacturer's instructions.**
- **Never use gasoline as a cleaning solvent.**
- **To avoid getting burned, do not touch the engine, engine oil, radiator and exhaust system until they have cooled.**
- **After servicing the fuel, oil, engine coolant, exhaust or brake systems, check all of the lines and fittings related to the system for leaks.**

⚠ CAUTION

* **If parts replacement is necessary, replace the parts with Suzuki Genuine Parts or their equivalent.**
* **When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order.**
* **Be sure to use special tools when instructed.**
* **Make sure that all parts used in reassembly are clean. Lubricate them when specified.**
* **Use the specified lubricants, bonds, or sealants.**
* **When removing the battery, disconnect the ⊖ battery lead wire first and then the ⊕ battery lead wire.**
* **When reconnecting the battery, connect the ⊕ battery lead wire first, then the ⊖ battery lead wire. Finally, cover the ⊕ battery terminal with the terminal cover.**
* **When performing service to electrical parts, disconnect the ⊖ battery lead wire, unless the service procedure requires the battery power.**
* **When tightening cylinder head and crankcase nuts and bolts, tighten the larger sizes first. Always tighten the nuts and bolts from the inside working out, diagonally and to the specified torque.**
* **Whenever you remove oil seals, gaskets, packing, O-rings, self-locking nuts, locking washers, cotter pins, circlips, and other specified parts, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces.**
* **Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure it is completely seated in its groove and securely fitted.**
* **Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them.**
* **After reassembling, check parts for tightness and proper operation.**

* **To protect the environment, do not unlawfully dispose of used motor oil, engine coolant, all other fluids, batteries, and tires.**
* **To protect the earth's natural resources, properly dispose of used motorcycles and parts.**

SUZUKI VL800K1 (2001-MODEL)

RIGHT SIDE

LEFT SIDE

* Difference between photograph and actual motorcycle depends on the markets.

SERIAL NUMBER LOCATION

The frame serial number or V.I.N. (Vehicle Identification Number) ① is stamped on the right side of the steering head pipe. The engine serial number ② is located on the right side of the crankcase. These numbers are required especially for registering the machine and ordering spare parts.

FUEL, OIL AND ENGINE COOLANT RECOMMENDATION

FUEL (For USA and CANADA)

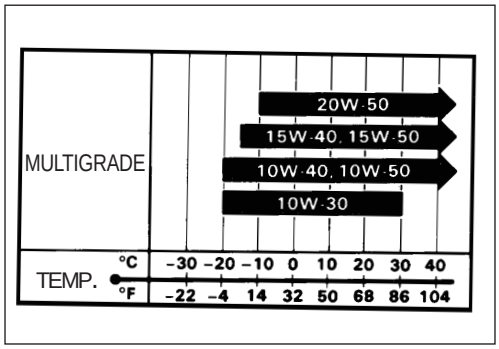
1. Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) method or 91 octane or higher rated by the Research Method.
2. Suzuki recommends that customers use alcohol-free unleaded gasoline whenever possible.
3. Use of blended gasoline containing MTBE (Methyl Tertiary Butyl Ether) is permitted.
4. Use of blended gasoline/alcohol fuel is permitted, provided that the fuel contains not more than 10% ethanol. Gasoline/alcohol fuel may contain up to 5% methanol if appropriate cosolvents and corrosion inhibitors are present in it.
5. If the performance of the vehicle is unsatisfactory while using blended gasoline/alcohol fuel, you should switch to alcohol-free unleaded gasoline.
6. Failure to follow these guidelines could possibly void applicable warranty coverage. Check with your fuel supplier to make sure that the fuel you intend to use meets the requirements listed above.

FUEL (For the other countries)

Use unleaded gasoline that is graded 91 octane or higher by the Research Method.

ENGINE OIL (For USA)

SUZUKI recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL or an oil which is rated SF or SG under the API (American Petroleum Institute) service classification. The recommended viscosity is SAE 10W/40. If an SAE 10W/40 oil is not available, select an alternative according to the right chart.



ENGINE OIL (For the other countries)

Use a premium quality 4-stroke motor oil to ensure longer service life of your motorcycle. Use only oils which are rated SF or SG under the API service classification. The recommended viscosity is SAE 10W-40. If an SAE 10W-40 motor oil is not available, select an alternative according to the right chart.

GEAR OIL (FINAL DRIVE GEAR OIL)

Use SAE 90 hypoid gear oil which is reted GL-5 under API classification system. If you operate the motorcycle where ambient temperature is below 0°C (32°F), use SAE 80 hypoid gear oil.

BRAKE FLUID

Specification and classification: DOT 4

⚠ WARNING

- *** This motorcycle uses a glycol-based brake fluid. Do not use or mix other types of brake fluid such as silicone-based and petroleum-based fluids for refilling the system, otherwise serious damage will result to the brake system.**
- *** Do not use any brake fluid taken from old, used, or unsealed containers.**
- *** Do not re-use brake fluid left over from last servicing or which has been stored for a long period of time.**

FRONT FORK OIL

Use SUZUKI FORK OIL SS-08 (#10) or an equivalent fork oil.

ENGINE COOLANT

Since antifreeze also has corrosion- and rust-inhibiting properties, always use engine coolant containing antifreeze, even if the atmospheric temperature does not go below the freezing point.
Use an antifreeze designed for aluminum radiators. Suzuki recommends the use of SUZUKI COOLANT antifreeze. If this is not available, use an equivalent antifreeze for aluminum radiators.
Mix only distilled water with the antifreeze. Other types of water can corrode and clog the aluminum radiator.

Mix distilled water and antifreeze at a ratio of 50 : 50 – 40 : 60.

For more information, refer to cooling system section. (☞ 6-2)

⚠ CAUTION

The percentage of antifreeze in the coolant should be between 50 to 60%. If the percentage of antifreeze is above or below this range the coolant's frost protection and rust-inhabiting capacities will be reduced. Always keep the antifreeze content above 50% even if the atmospheric temperature does not go below the freezing point.

BREAK-IN PROCEDURES

During manufacturing only the best possible materials are used and all machined parts are finished to a very high standard. It is still necessary to allow the moving parts to “BREAK-IN” before subjecting the engine to maximum stresses. The future performance and reliability of the engine depends on the care and restraint exercised during its early life. Refer to the following break-in engine speed recommendations.

• Keep to these break-in throttle positions during the break-in period.

Break-in throttle operation

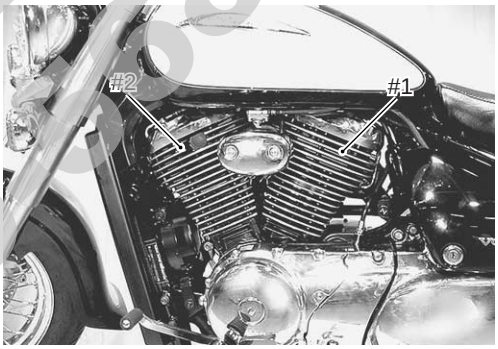
Initial 800 km (500 miles): Less than ½ throttle

Up to 1 600 km (1 000 miles): Less than ¾ throttle

• Upon reaching an odometer reading of 1 600 km (1 000 miles) you can subject the motorcycle to full throttle operation.

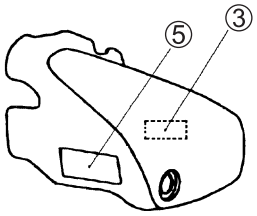
CYLINDER IDENTIFICATION

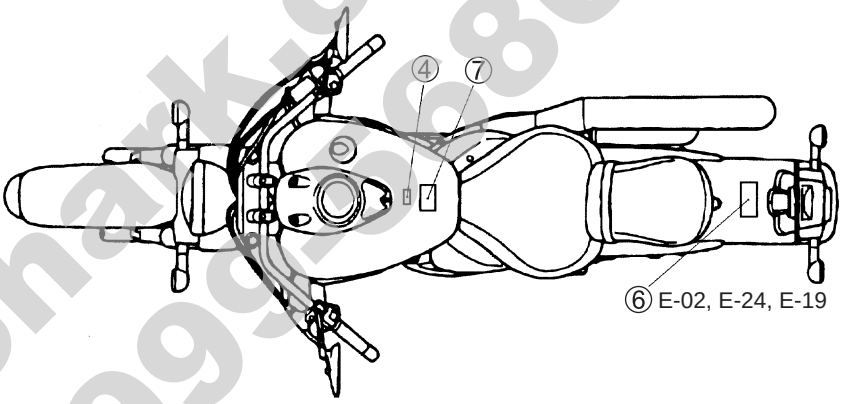
The engine cylinders are identified as #1 and #2, as counted from rear to front (as viewed by the rider on the seat).

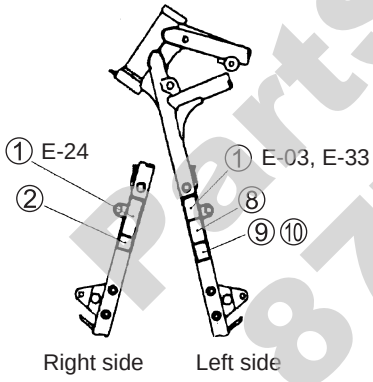


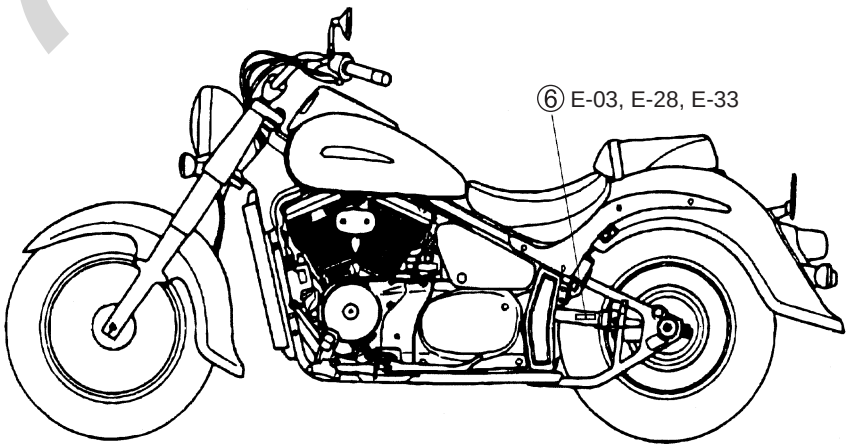
INFORMATION LABELS

NO.	LABEL or PLATE NAME	APPLIED SPECIFICATION					
		E-02	E-03	E-19	E-24	E-28	E-33
①	Noise label	–	○	–	○	–	○
②	Information label	–	○	–	–	○	○
③	Vacuum hose routing label	–	–	–	–	–	○
④	Fuel caution label	○	–	–	○	–	–
⑤	Manual notice label	–	○	–	–	–	○
⑥	Tire air pressure label	○	○	○	○	○	○
⑦	Warning safety label	○	○	○	○	○	○
⑧	ICES Canada label	–	–	–	–	○	–
⑨	ID plate	○	–	○	○	–	–
⑩	Safety plate	–	○	–	–	○	○









SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 510 mm (98.818 in)
Overall width	985 mm (38.779 in)
Overall height	1 110 mm (43.700 in)
Wheelbase	1 650 mm (64.960 in)
Ground clearnce	140 mm (5.511 in)
Seat height	700 mm (27.559 in)
Dry mass	239 kg (53.727 lbs)

ENGINE

Type	Four-stroke, Liquid-cooled, OHC
Number of cylinders	2
Bore	83 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Carburetor	BDSR34
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

TRANSMISSION

Clutch		Wet multi-plate type
Transmission		5-speed, constant mesh
Gearshift pattern		1-down, 4-up
Primary reduction ratio		1.690 (71/42)
Secondary reduction ratio		1.133 (17/15)
Final reduction ratio		3.090 (34/11)
Gear ratios,	Low	2.461 (32/13)
	2nd	1.631 (31/19)
	3rd	1.227 (27/22)
	4th	1.000 (25/25)
	Top	0.814 (22/27)
Drive system		Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Link type, coil spring, oil damped, spring pre-load 7-way adjustable
Steering angle	38° (right & left)
Caster	33° 20’
Trail	141 mm (3.55 in)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake
Rear brake	Drum brake
Front tire size	130/90-16 67H, tube or 130/90-16M/C 67H, tube
Rear tire size	170/80-15M/C 77H, tube
Front fork stroke	140 mm (5.5 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	5° B.T.D.C. at 1 110 r/min
Spark plug	NGK: DPR8EA-9 or DENSO: X24EPR-U9
Battery	12 V 36 kC (10 Ah)/10HR
Generator	Three-phase A.C. Generator
Main fuse	30 A
Fuse	15/15/10/10/10/10 A
Headlight	12 V 60/55 W
Position/parking light	12 V 4 W ..... Except for E-03, 24, 28, 33
Front turn signal light	12 V 21 W E-02, 19, 24
	12 V 21/5 W E-03, 28, 33
Rear turn signal light	12 V 21 W
Brake light/Taillight	12 V 21/5 W
Speedometer light	LED
Neutral indicator light	LED
High beam indicator light	LED
Turn signal indicator light	LED
Oil pressure light	LED

CAPACITIES

Fuel tank	17.0 L (4.5/3.7 US/lmp gal)
Engine oil, oil change	3 000 ml (3.2/2.6 US/lmp qt)
with filter change	3 400 ml (3.6/3.0 US/lmp qt)
overhaul	3 700 ml (3.9/3.3 US/lmp qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/lmp qt)
Engine coolant	1 500 ml (1.5/1.3 US/lmp qt)
Front fork oil (each leg)	412 ml (13.9/14.5 US/lmp oz)

These specifications are subject to change without notice.

COUNTRY AND AREA CODES

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

CODE	COUNTRY or AREA
E-02	England (UK)
E-03	USA
E-19	EU
E-24	Australia
E-28	Canada
E-33	California

PERIODIC MAINTENANCE

CONTENTS

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. Maintenance intervals are expressed in terms of kilometer, miles and months, whichever comes first.

IMPORTANT (USA only):

The periodic maintenance intervals and service requirements have been established in accordance with EPA regulations. Following these instructions will ensure that the motorcycle will not exceed emission standards and it will also ensure the reliability and performance of the motorcycle. 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 kilometer, miles and time for your convenience.

NOTES:

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	15 000
	months	1	6	12	18	24
Air cleaner element		-	I	I	R	I
Spark plugs		-	I	R	I	R
Valve clearance		I	-	I	-	I
Engine oil		R	R	R	R	R
Engine oil filter		R	-	-	R	-
Fuel line		-	I	I	I	I
		Replace fuel hose every 4 years.				
Idle speed		I	I	I	I	I
Evaporative emission control system		-	-	I	-	I
(E-33 only)		Replace vapor hose every 4 years.				
PAIR (air supply) system		-	-	I	-	I
Throttle cable play		I	I	I	I	I
Clutch		-	I	I	I	I
Radiator hoses		-	I	I	I	I
Engine coolant		Replace every 2 years.				
Final gear oil		R	-	I	-	I
Brakes		I	I	I	I	I
Brake hoses		-	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
Exhaust pipe bolts and muffler bolt and nut		T	-	T	-	T
Chassis bolts and nuts		T	T	T	T	T

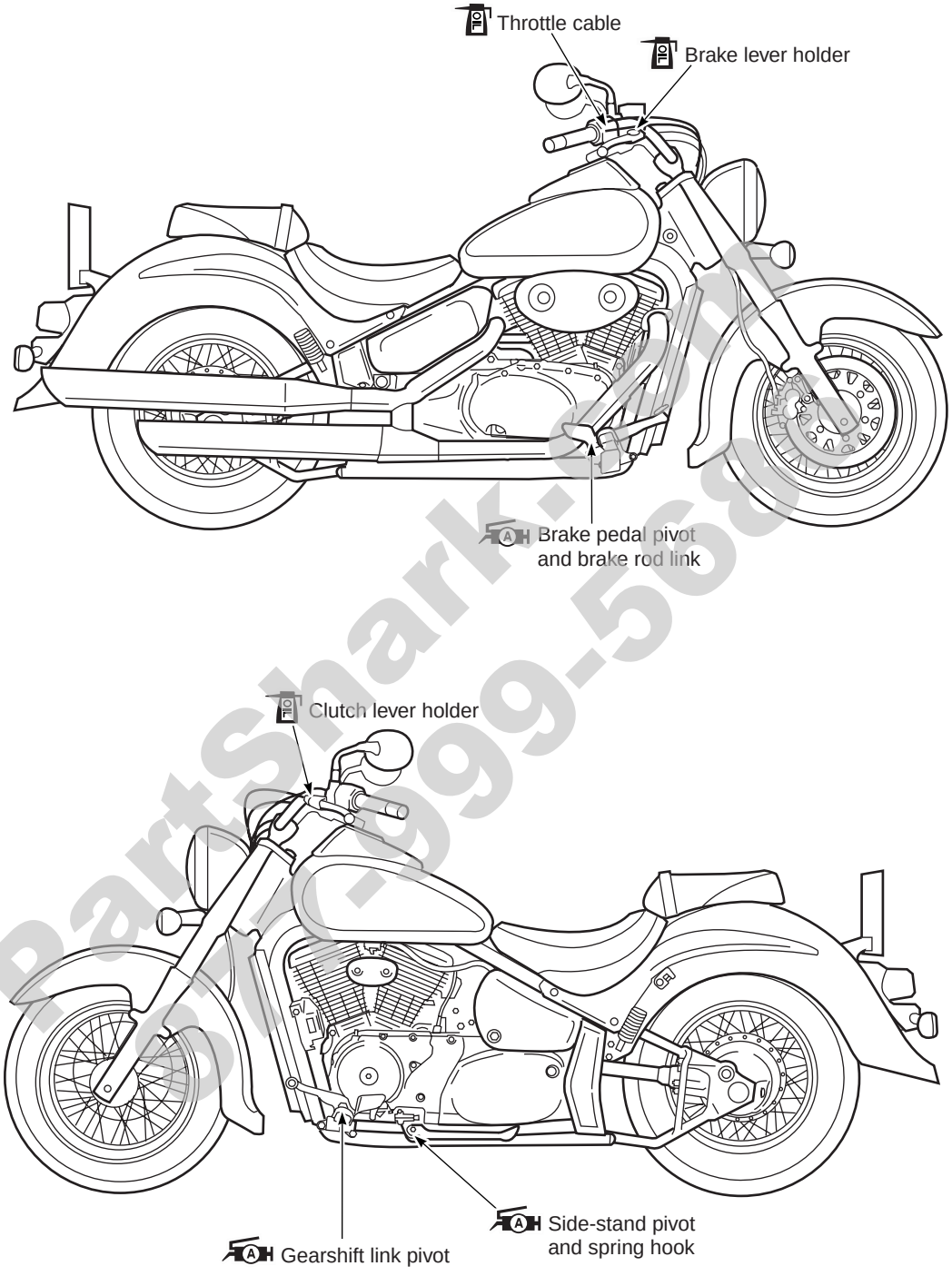
I = Inspect and adjust, clean, lubricate or replace as necessary.

R = Replace

T = Tighten

LUBRICATION POINTS

Proper lubrication is important for smooth operation and long life of each working part of the motorcycle. Major lubrication points are indicated below.



NOTE:

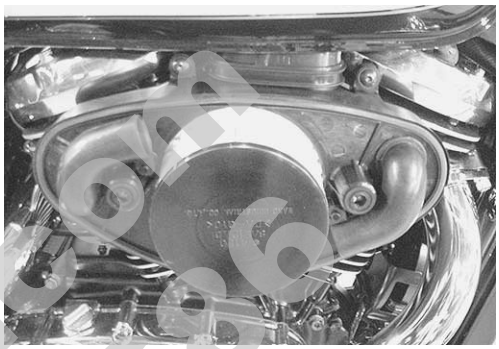
* *Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime.*
* *Lubricate exposed parts which are subject to rust, with a rust preventative spray, especially whenever the motorcycle has been operated under wet or rainy conditions.*

MAINTENANCE AND TUNE-UP PROCEDURES

This section describes the servicing procedures for each item mentioned in the Periodic Maintenance chart.

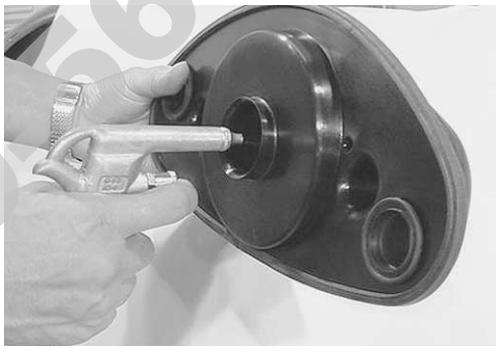
AIR CLEANER

- Remove the screws and air cleaner case cover.
- Remove the air cleaner element.



- Carefully use air hose to blow the dust from the cleaner element.

NOTE:
Always apply air pressure on the engine side of the air cleaner element. If air pressure is applied improperly, dirt will be forced into the pores of the air cleaner element thus restricting air flow through the air cleaner element.



- Reinstall the cleaned or new air cleaner element in the reverse order of removal.

NOTE:
If driving under dusty conditions, clean the air cleaner element more frequently. Make sure that the air cleaner is in good condition at all times. The life of the engine depends largely on this component.

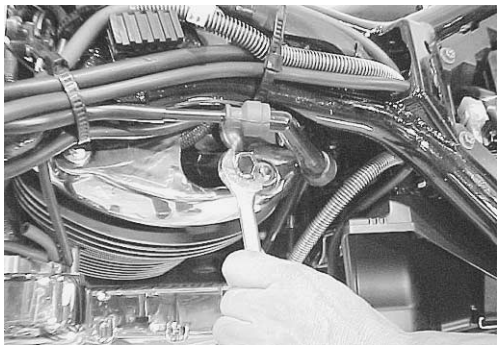
- Remove the drain plugs from the air cleaner box to allow any water to drain out.

SPARK PLUG

SPARK PLUG AND IGNITION COIL/PLUG CAP REMOVAL

- Remove the front and rear seat. (☞7-2)
- Remove the fuel tank. (☞5-3)

- Remove the spark plug caps.
- Remove the spark plugs with a spark plug wrench.

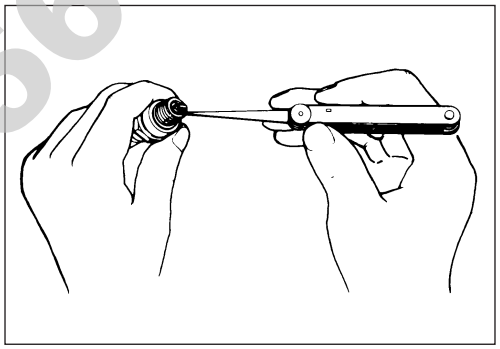


HEAT RANGE

- Check spark plug heat range by observing electrode color. If the electrode of the spark plug is wet appearing or dark color, replace the spark plug with hotter type one. If it is white or glazed appearing, replace the spark plug with colder type one.

	NGK	DENSO
Standard	DPR7EA-9	X22EPR-U9
Colder type	DPR8EA-9	X24EPR-U9

NOTE:
"R" type spark plug has a resistor located at the center electrode to prevent radio noise.



CARBON DEPOSITS

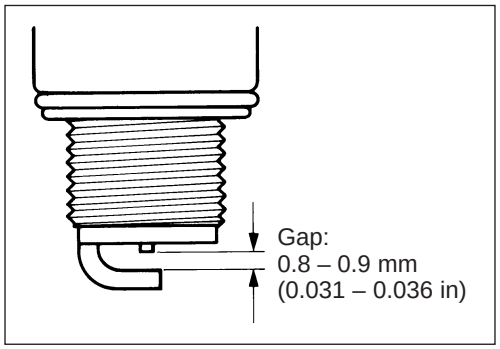
- Check carbon deposits on the spark plug.
- If carbon is deposited, remove it using a spark plug cleaner machine or carefully use a tool with a pointed end.

SPARK PLUG GAP

- Measure the spark plug gap with a thickness gauge.
- Adjust the spark plug gap if necessary.

DATA Spark plug gap:
Standard: 0.8 – 0.9 mm (0.031 – 0.036 in)

TOOL 09900-20803: Thickness gauge



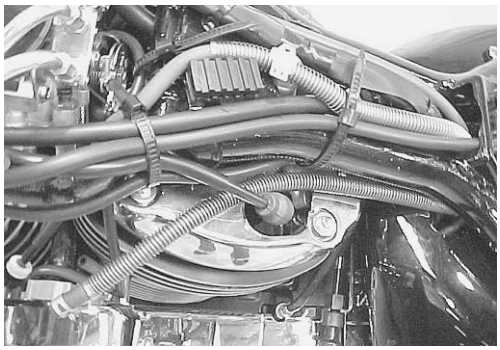
ELECTRODE'S CONDITION

- Check the condition of the electrode.
- If it is extremely worn or burnt, replace the spark plug. Replace the spark plug if it has a broken insulator, damaged thread, etc.

⚠ CAUTION

Check the thread size and reach when replacing the spark plug. If the reach is too short, carbon will be deposited on the screw portion of the spark plug hole and engine damage may result.

SPARK PLUG AND IGNITION COIL/PLUG CAP INSTALLATION



- Install the spark plugs to the cylinder head with fingers, and then tighten them to the specified torque with a wrench.

Spark plug: 11 N·m (1.1 kgf·m, 8.0 lb-ft)

⚠ CAUTION

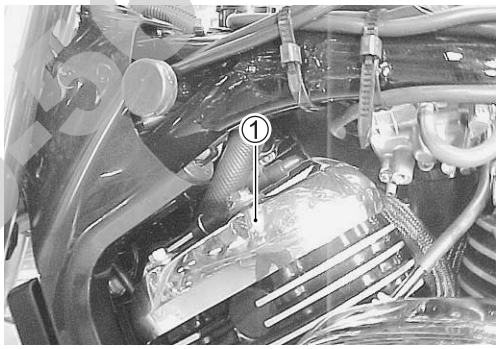
Do not crossthread or over tighten the spark plug, or the spark plug will damage the aluminum threads of the cylinder head.

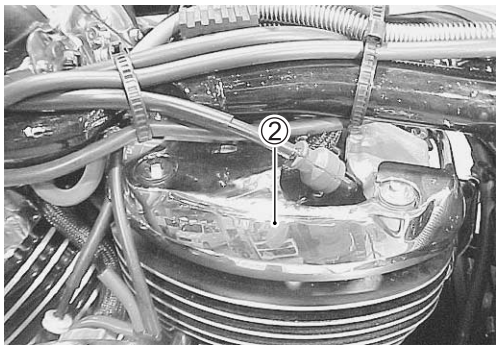
- Install the spark plug caps.

VALVE CLEARANCE

Valve clearance must be checked and adjusted when:
(1) the valve mechanism is service, and
(2) the camshafts are serviced.
Check and adjust the clearance to the specification.

DATA Valve clearance (when cold): IN. 0.08 – 0.13 mm (0.003 – 0.005 in)
EX. 0.17 – 0.22 mm (0.007 – 0.009 in)

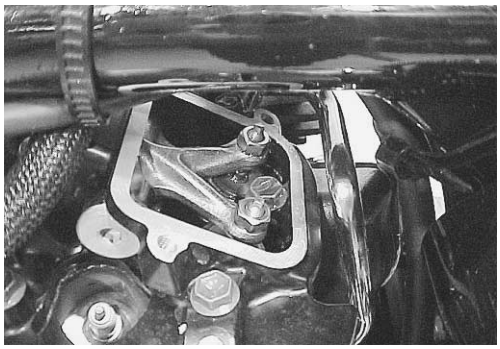




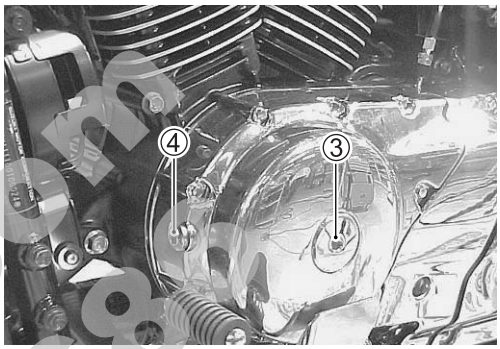
NOTE:
* *The clearance specification is for COLD state.*
* *Both intake and exhaust valves must be checked and adjusted when the piston is at Top Dead Center (TDC) of the compression stroke.*

- Remove the front and rear seats. (☞7-2)
- Remove the fuel tank. (☞5-3)
- Remove the cylinder head cover caps (①, ②).
- Remove the spark plug caps.

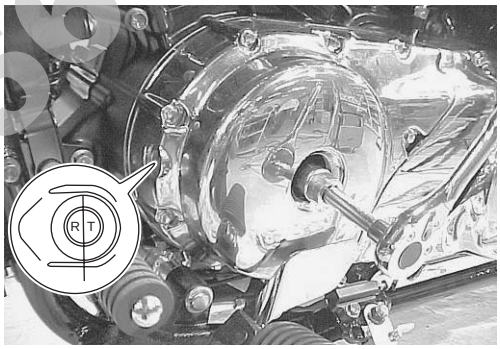
- Remove all the inspection caps.
- Remove all the spark plugs.



- Remove the generator cover plug ③ and the timing inspection plug ④.



- Rotate the generator rotor to set the No.1 engine's piston at TDC of the compression stroke. (Rotate the rotor until the "R I T" line on the rotor is aligned with the center of hole on the generator cover.

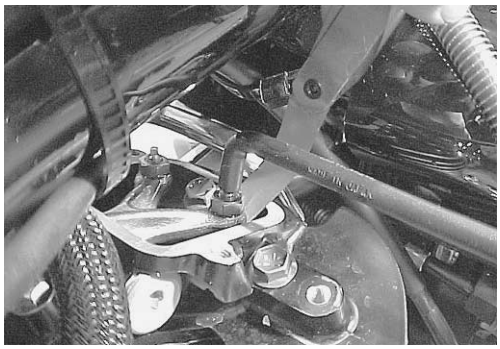


- To inspect the No.1 engine's valve clearance, insert the thickness gauge to the clearance between the valve stem end and the adjusting screw on the rocker arms.

TOOL 09900-20806: Thickness gauge

- If the clearance is out of the specification, bring it into the specified range by using the special tool.

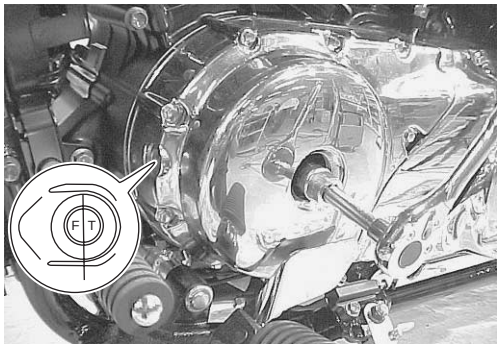
TOOL 09917-10410: Valve adjust driver



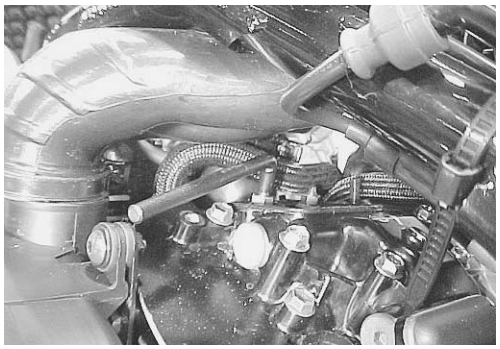
⚠ CAUTION

Both right and left valve clearances should be as closely set as possible.

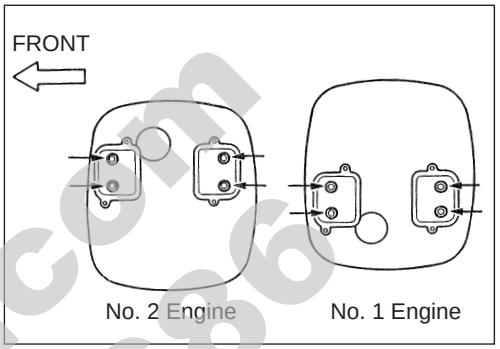
- Rotate the generator rotor 450 degrees (1-¼ turns) and align the "F I T" line on the rotor with the center of hole on the generator cover.



Inspect the No.2 engine's valve clearance as the same manner above.



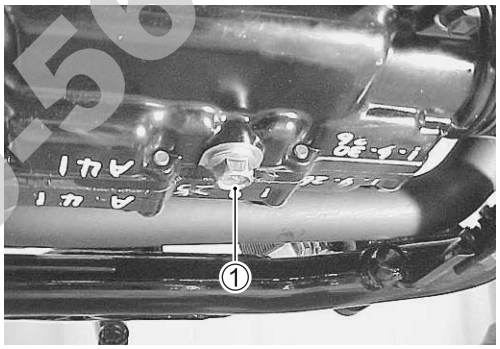
NOTE:
Use the thickness gauge from the arrow marks as shown in the illustration.



ENGINE OIL AND OIL FILTER

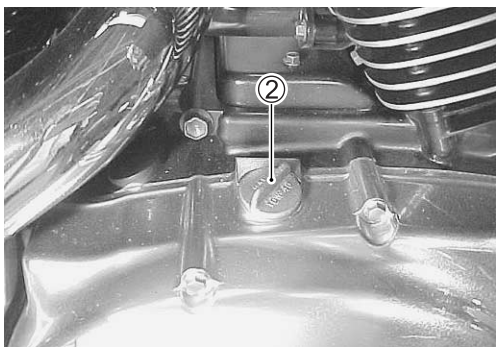
ENGINE OIL REPLACEMENT

- Keep the motorcycle upright.
- Place an oil pan below the engine, and drain oil by removing the oil drain plug ① and filler cap ②.

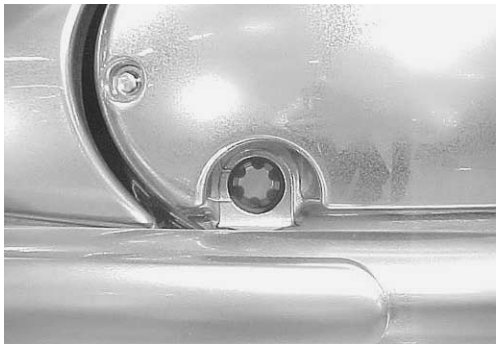


- Tighten the drain plug ① to the specified torque, and pour fresh oil through the oil filler. The engine will hold about 3.0 L (3.2/2.6 US/Imp qt) of oil. Use an API classification of SF or SG oil with SAE 10W/40 viscosity.

Oil drain plug: 23 N·m (2.3 kgf·m, 16.5 lb-ft)



- Start up the engine and allow it to run for several minutes at idling speed.
- Turn off the engine and wait about three minutes, then check the oil level through the inspection window. If the level is below mark "L", add oil to "F" level. If the level is above mark "F", drain oil to "F" level.



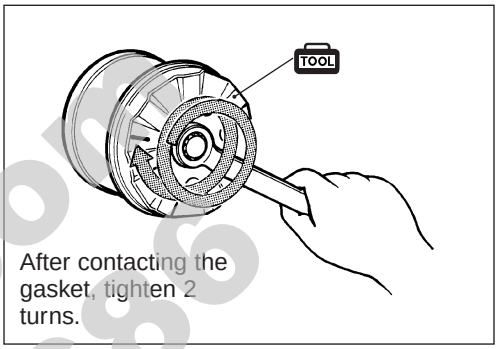
OIL FILTER REPLACEMENT

- Drain the engine oil as described in the engine oil replacement procedure.
- Remove the oil filter with the special tool.

TOOL 09915-40610: Oil filter wrench

- Apply engine oil lightly to the gasket of the new oil filter before installation.

- Install the new oil filter. Turn it by hand until you feel that the oil filter gasket contacts the oil filter mounting surface. Then, tighten the oil filter two full turns with the special tool.



After contacting the gasket, tighten 2 turns.

NOTE:
To properly tighten the oil filter, use the special tool. Never tighten the oil filter by hand.

- Add new engine oil and check the oil level as described in the engine oil replacement procedure.

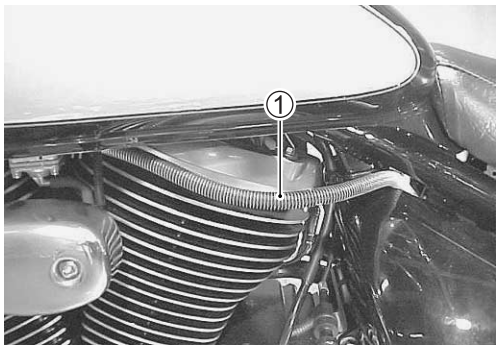
DATA NECESSARY AMOUNT OF ENGINE OIL:
Oil change: 3.0 L (3.2/2.6 US/Imp qt)
Oil and filter change: 3.4 L (3.6/3.0 US/Imp qt)
Engine overhaul: 3.7 L (3.9/3.3 US/Imp qt)

⚠ CAUTION

ONLY USE A GENUINE SUZUKI MOTORCYCLE OIL FILTER. Other manufacturer's oil filters may differ in thread specifications (thread diameter and pitch), filtering performance and durability which may lead to engine damage or oil leaks. Also, do not use a genuine Suzuki automobile oil filter on this motorcycle.

FUEL HOSE

Inspect the fuel hose ① for damage and fuel leakage. If any defects are found, replace the fuel hose.

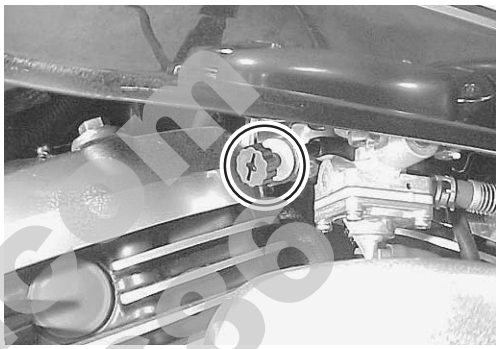


ENGINE IDLE SPEED

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

- Start the engine, turn the throttle stop screw and set the engine idle speed as follows.

DATA **Engine idle speed: 1 100 ± 100 rpm**

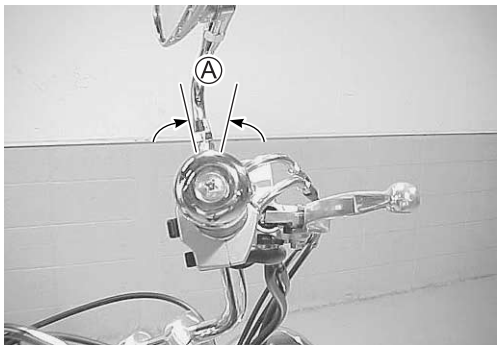


PAIR (AIR SUPPLY) SYSTEM

Inspect the PAIR (air supply) system periodically. (☞5-27)

THROTTLE CABLE PLAY

Adjust the throttle cable play Ⓐ as follows.



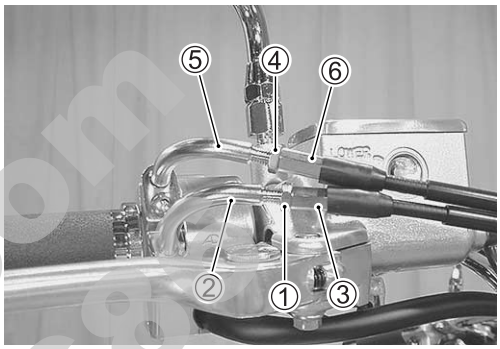
MINOR ADJUSTMENT

1st step:

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

2nd 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.



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

3rd 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.

⚠ 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.

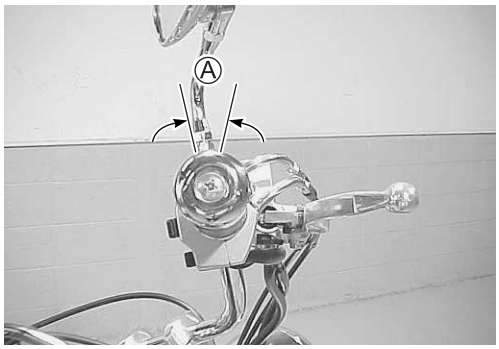
NOTE:

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

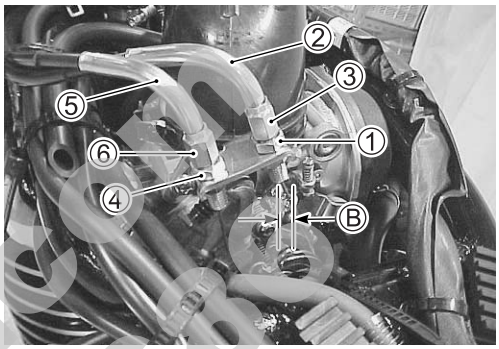
MAJOR ADJUSTMENT

- Remove the fuel tank. (☞5-3)
- Loosen the lock nuts ① of the throttle returning cable ②.
- Turn the returning cable adjuster ③ to obtain proper cable play.
- Loosen the lock nuts ④ of the throttle pulling cable ⑤.
- Turn the pulling cable adjuster ⑥ in or out until the throttle cable play Ⓐ should be 2.0 – 4.0 mm (0.08 – 0.16 in) at the throttle grip.
- Tighten the lock nuts ④ securely while holding the adjuster ⑥.

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 ③ to obtain a cable slack Ⓑ of 1.0 mm (0.04 in).
- Tighten the lock nuts ① securely.

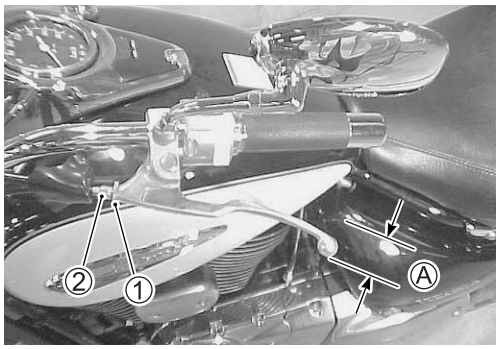


⚠ WARNING

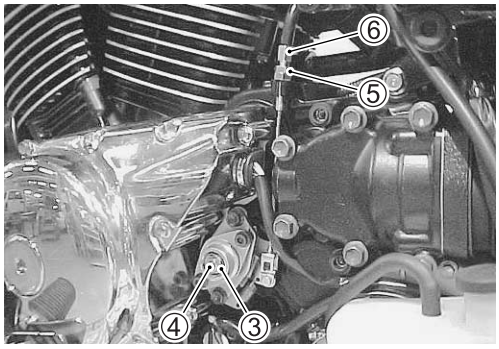
After the adjustment is completed, check that handlebar movement does not raise the engine idle speed and that the throttle grip returns smoothly and automatically.

CLUTCH

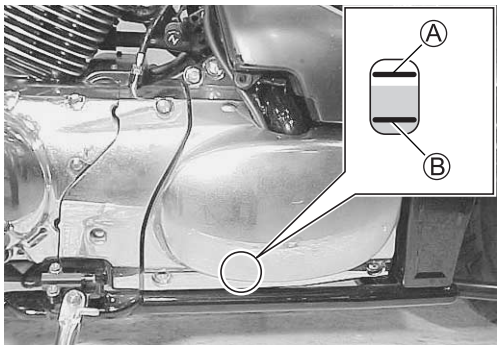
- Loosen the lock nut ①.
- Turn in the adjuster ② all the way into the clutch lever assembly.
- Remove the clutch release cover.
- Loosen the lock nut ③ and turn out the adjusting screw ④ two or three rotations.
- From that position, slowly turn in the adjusting screw ④ to feel resistance.
- From this position, turn out the adjusting screw ④ ¼ rotations, and tighten the lock nut ③.
- Loosen the lock nut ⑤, and turn the cable adjuster ⑥ to obtain 10 – 15 mm (0.4 – 0.6 in) of free play Ⓐ at the clutch lever end.
- Tighten the lock nuts ⑤.
- Tighten the lock nut ①.



DATA Clutch lever play Ⓐ: 10 – 15 mm (0.4 – 0.6 in)
Clutch release screw: ¼ turn out



COOLING SYSTEM

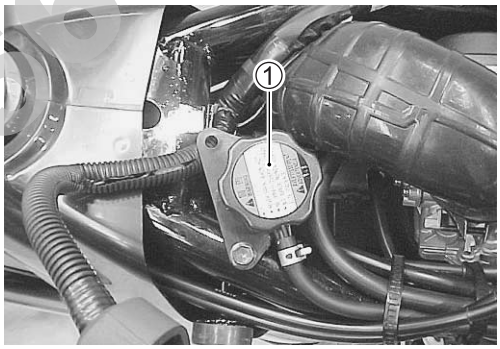


ENGINE COOLANT LEVEL CHECK

- Keep the motorcycle upright.
- Check the engine coolant level by observing the full and lower lines on the engine coolant reservoir.

  Ⓐ Full line Ⓑ Lower line
- If the level is below the lower line, add engine coolant to the full line from the engine coolant reservoir filler.

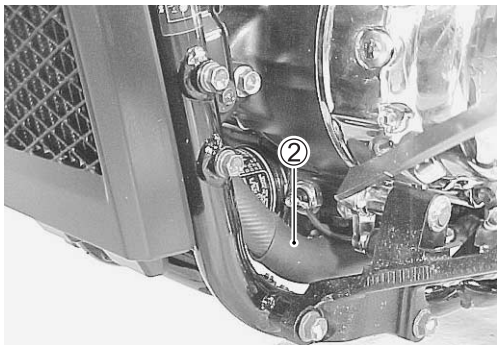
ENGINE COOLANT CHANGE



- Remove the fuel tank.
- Remove the radiator cap ①.
- Drain engine coolant by disconnecting the radiator hose ② from the pump.

⚠ WARNING

*** Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.**
*** Engine coolant may be harmful if swallowed or if it comes in contact with skin or eyes. If engine coolant gets into the eyes or in contact with the skin, flush thoroughly with plenty of water. If swallowed, induce vomiting and call physician immediately!**

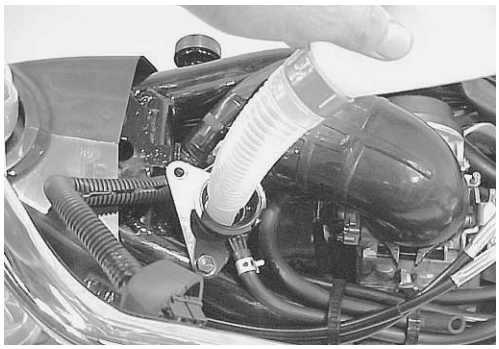


- Flush the radiator with fresh water if necessary.
- Connect the radiator hose ② securely.
- Pour the specified engine coolant up to the radiator inlet.

LLC Engine coolant capacity (without reservoir):
1 500 ml (1.6/1.3 Us/Imp qt)

ENGINE COOLANT INFORMATION: ☞6-2

AIR BLEEDING THE COOLING CIRCUIT



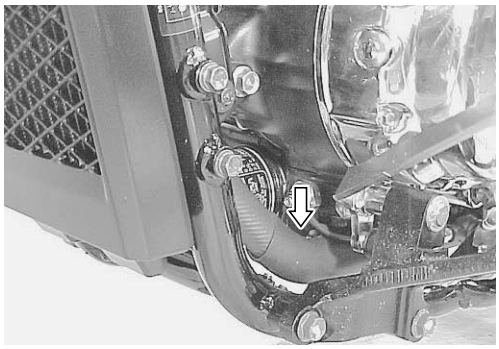
- Add engine coolant up to the radiator inlet.
- Support the motorcycle upright.
- Slowly swing the motorcycle, right and left, to bleed the air trapped in the cooling circuit.
- Add engine coolant up to the radiator inlet.
- Start up the engine and bleed air from the radiator inlet completely.
- Add engine coolant up to the radiator inlet.
- Repeat the above procedure until bleed no air from the radiator inlet.
- Close the radiator cap securely.
- After warming up and cooling down the engine several times, add the engine coolant up to the full level of the reservoir.

⚠ CAUTION

Repeat the above procedure several times and make sure that the radiator is filled with engine coolant up to the reservoir full level.

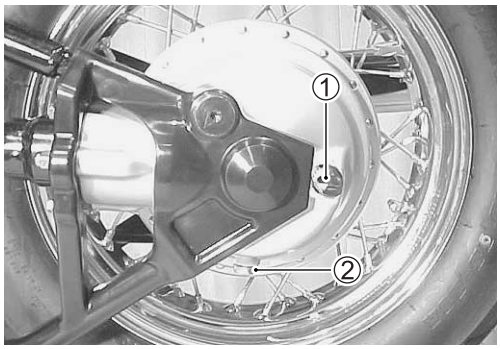
LLC Engine coolant capacity (Without reservoir):
1 500 ml (1.6/1.3 US/Imp qt)

RADIATOR HOSES



- Check to see the radiator hoses for crack, damage or engine coolant leakage.
- If any defects are found, replace the radiator hoses with new ones.

FINAL GEAR OIL

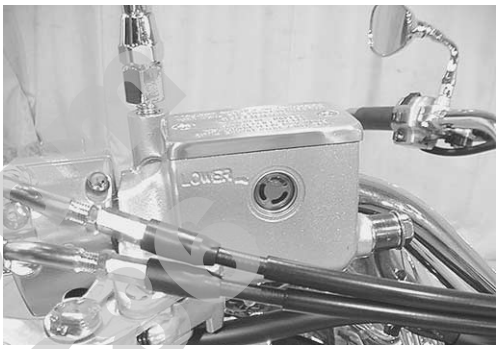


- Keep the motorcycle upright.
- Place an oil pan under the final gear case.
  Remove the filler cap ① and drain plug ② to drain oil.
- Refit the drain plug ②. Pour the specified oil (SAE 90 hypoid gear oil with GL-5 under API classification) through the filler hole until the oil level reaches the filler hole.
- Refit the filler cap ①.

DATA Final gear oil: 200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)

BRAKE

BRAKE FLUID LEVEL CHECK



- Keep the motorcycle upright and place the handlebars straight.
- Check the brake fluid level by observing the lower limit lines on the front and rear brake fluid reservoirs.
- When the level is below the lower limit line, replenish with brake fluid that meets the following specification.

BF Specification and Classification: DOT 4

⚠ WARNING

*** The brake system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based fluids. Do not use any brake fluid taken from old, used or unsealed containers. Never re-use brake fluid left over from the last servicing or stored for a long period of time.**

*** Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and fluid leakage before riding.**

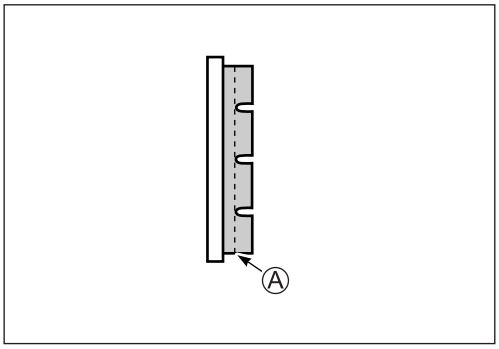
BRAKE PADS

FRONT BRAKE

- The extent of brake pad wear can be checked by observing the grooved limit line Ⓐ on the pad. When the wear exceeds the grooved limit line, replace the pads with new ones. (☞7-10)

⚠ CAUTION

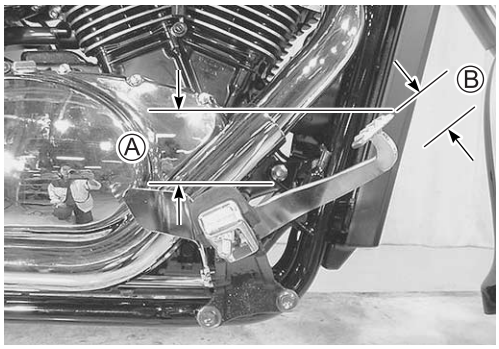
Replace the brake pads as a set, otherwise braking performance will be adversely affected.

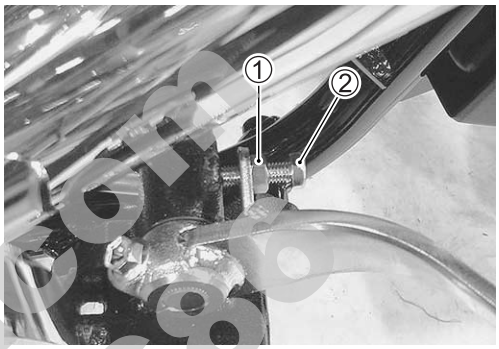


REAR BRAKE PEDAL HEIGHT

- Loosen the lock nut ①.
- Adjust the brake pedal height Ⓐ by turning the adjuster ②.

DATA **Rear brake pedal height : 75 – 85 mm**

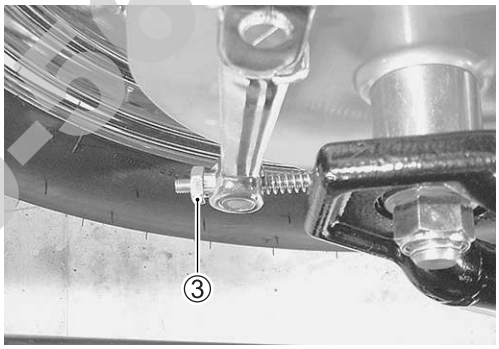




REAR BRAKE ADJUSTING

- Adjust the free travel Ⓑ to 20 – 30 mm by turning the adjusting nut ③.

DATA **Rear brake pedal free travel Ⓑ: 20 – 30 mm**

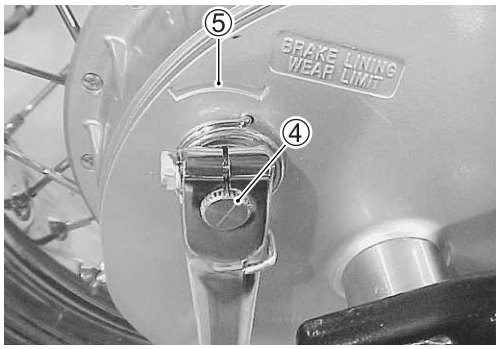


REAR BRAKE SHOE WEAR

This motorcycle is equipped with brake lining wear limit indicator on the rear brake.

To check brake lining wear, perform the following steps.

- Make sure that the rear brake is properly adjusted.
- Depress the rear brake pedal. Make sure that the index mark ④ is within the range ⑤ embossed on the brake panel.
- If the index mark goes beyond the range, the brake shoe assembly should be replaced with a new set of shoes.



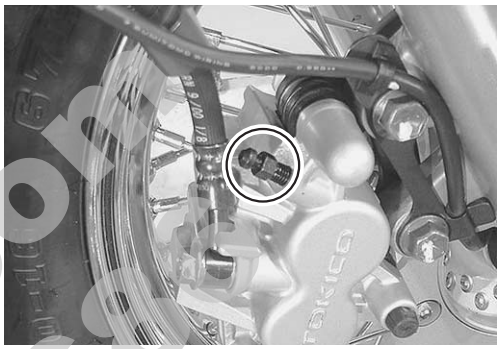
BRAKE LIGHT SWITCH

- Adjust the rear brake light switch so that the brake light will come on just before pressure is felt when the brake pedal is depressed.

AIR BLEEDING THE BRAKE FLUID CIRCUIT

Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by "sponginess" of the brake lever and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner:

FRONT BRAKE



- Fill the master cylinder reservoir to the top of the inspection window. Replace the reservoir cap to prevent dirt from entering.
- Attach a hose to the air bleeder valve and insert the free end of the hose into a receptacle.
- Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it. Loosen the air bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip. Then, close the air bleeder valve, pump and squeeze the lever, and open the valve. Repeat this process until fluid flowing into the receptacle no longer contains air bubbles.

NOTE:
While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.

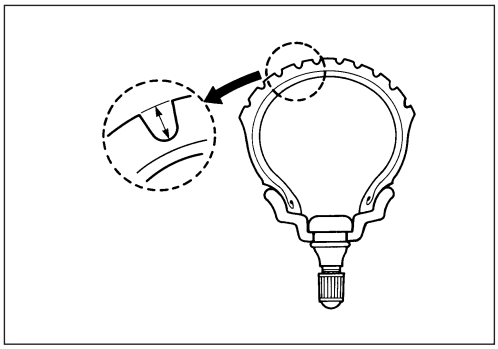
- Close the air bleeder valve and disconnect the hose. Fill the reservoir with brake fluid to the top of the inspection window.

Air bleeder valve: 8 N·m (0.8 kgf·m, 6.0 lb-ft)

⚠ CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials, etc.

TIRES



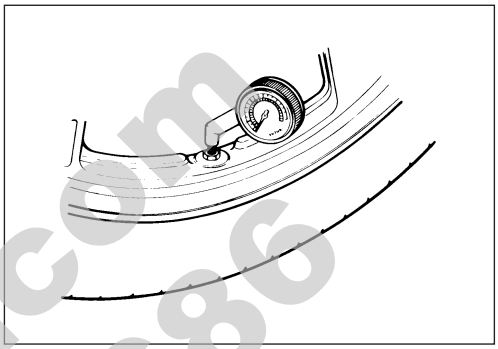
TIRE TREAD CONDITION

Operating the motorcycle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highly recommended to replace a tire when the remaining depth of tire tread reaches the following specification.

TOOL 09900-20805: Tire depth gauge

DATA Tire tread depth:

Service Limit: FRONT 1.6 mm (0.06 in)
REAR 2.0 mm (0.08 in)



TIRE PRESSURE

If the tire pressure is too high or too low, steering will be adversely affected and tire wear will increase. Therefore, maintain the correct tire pressure for good roadability and a longer tire life. Cold inflation tire pressure is as follows.

DATA Cold inflation tire pressure

Solo riding:	**Front:**	**200 kPa (2.00 kgf/cm², 29 psi)**
	Rear:	**250 kPa (2.50 kgf/cm², 36 psi)**
Dual riding:	**Front:**	**200 kPa (2.00 kgf/cm², 29 psi)**
	Rear:	**250 kPa (2.50 kgf/cm², 36 psi)**

⚠ CAUTION

The standard tire fitted on this motorcycle is a 130/90-15 67H for the front and a 170/80-15 H/C 77H for the rear. The use of tires other than those specified may cause instability. It is highly recommended to use the specified tires.

DATA TIRE TYPE

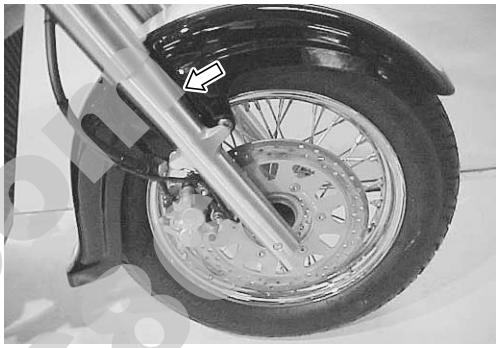
IRC
FRONT: GS-23F
REAR : GS-23R

STEERING

The steering should be adjusted properly for smooth turning of the handlebars and safe operation. Overtight steering prevents smooth turning of the handlebars and too loose steering will cause poor stability. Check that there is no play in the front fork. Support the motorcycle so that the front wheel is off the ground. With the wheel facing straight ahead, grasp the lower fork tubes near the axle and pull forward. If play is found, readjust the steering. (☞7-35)

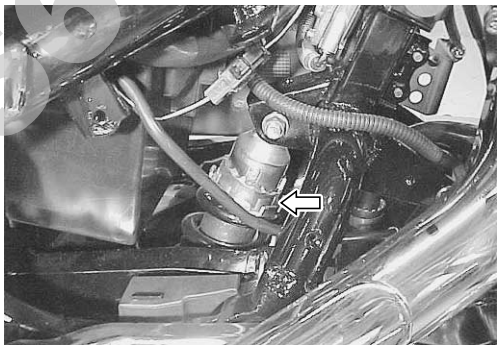
FRONT FORK

Inspect the front forks for oil leakage, scoring or scratches on the outer surface of the inner tubes. Replace any defective parts, if necessary. (☞7-18)



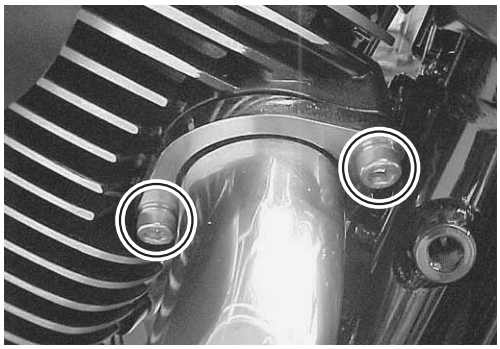
REAR SUSPENSION

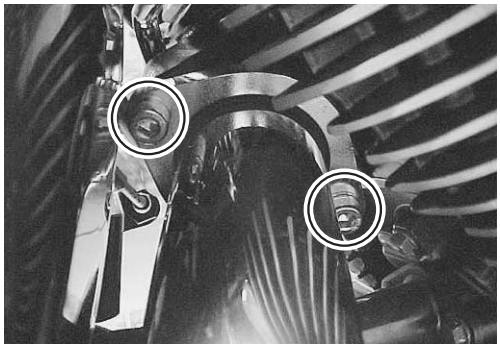
Inspect the rear shock absorbers for oil leakage and check that there is no play in the swingarm. Replace any defective parts if necessary. (☞7-46)



EXHAUST PIPE BOLT AND NUT

Tighten the exhaust pipe bolts and muffler bolts and nuts.

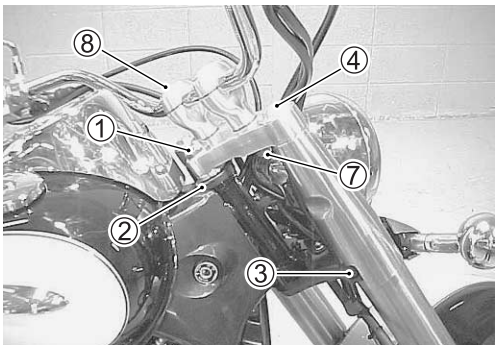


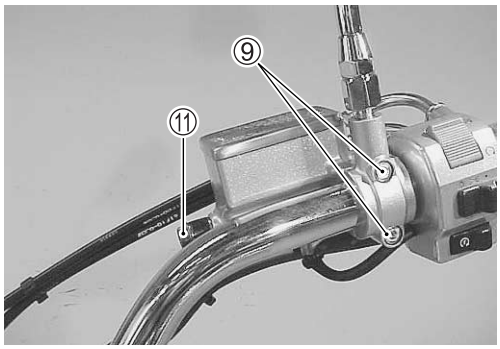


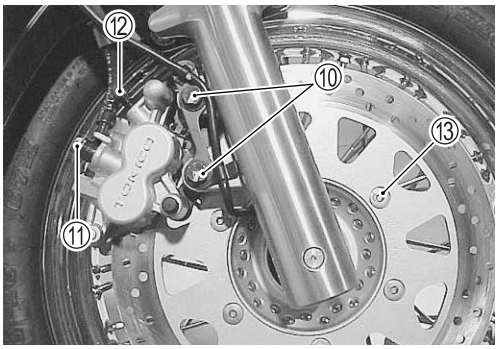
CHASSIS BOLTS AND NUTS

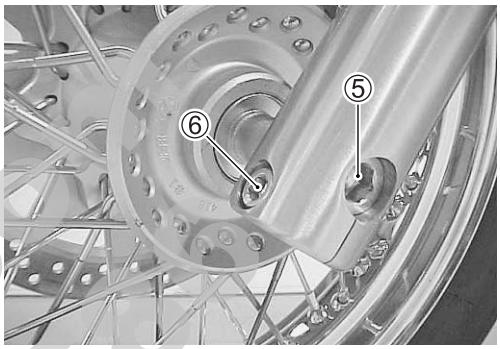
Check that all chassis bolts and nuts are tightened to their specified torque. The locations of the following nuts and bolts on the motorcycle.

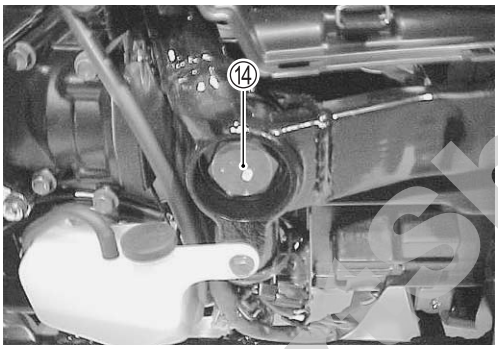
Item	N·m	kgf·m	lb-ft
① Steering stem head nut	90	9.0	65.0
② Steering stem lock nut	80	8.0	58.0
③ Front fork lower clamp bolt	33	3.3	24.0
④ Front fork cap bolt	35	3.5	25.5
⑤ Front axle	65	6.5	47.0
⑥ Front axle pinch bolt	33	3.3	24.0
⑦ Handlebar set bolt	70	7.0	50.5
⑧ Handlebar clamp bolt	23	2.3	16.5
⑨ Front brake master cylinder mounting bolt	10	1.0	7.0
⑩ Front brake caliper mounting bolt	39	3.9	28.0
⑪ Brake hose union bolt	23	2.3	16.5
⑫ Caliper air bleeder valve	8	0.8	6.0
⑬ Brake disc bolt	23	2.3	16.5
⑭ Swingarm pivot nut	100	10.0	72.5
⑮ Torque link bolt and nut (Front)	35	3.5	25.5
⑯ Torque link bolt and nut (Rear)	25	2.5	18.0
⑰ Rear shock absorber mounting bolt/nut (Upper & Lower)	50	5.0	36.0
⑱ Rear cushion lever/rod mounting nut	78	7.8	56.5
⑲ Rear axle nut	65	6.5	47.0
⑳ Brake cam lever nut	10	1.0	7.0

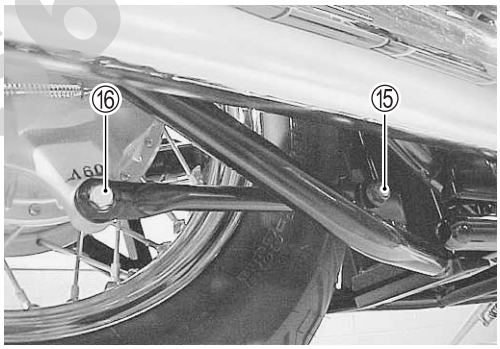


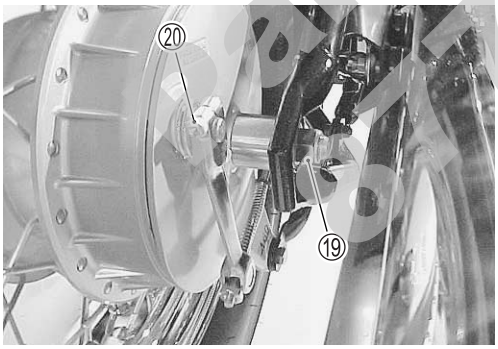


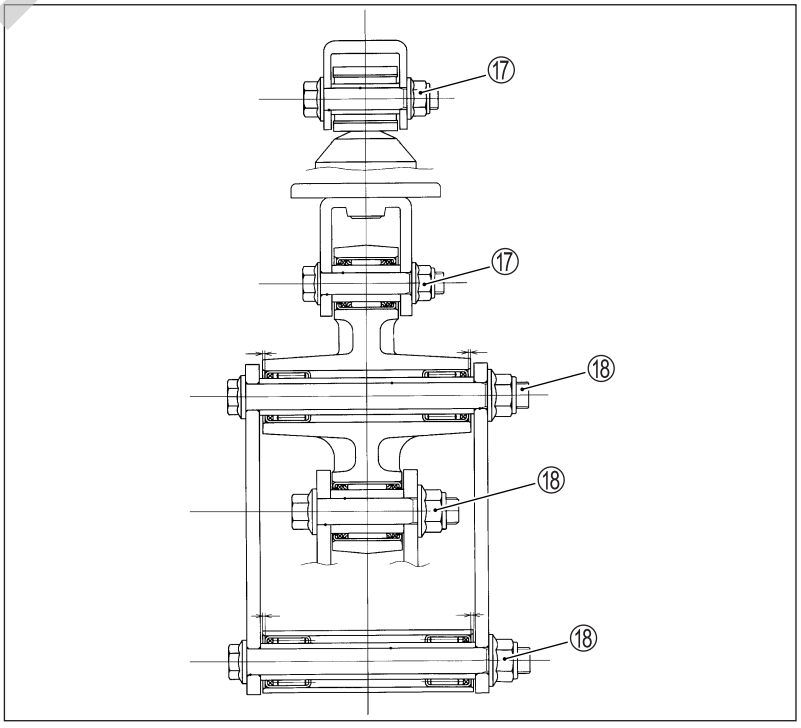












COMPRESSION PRESSURE CHECK

The compression pressure reading of a cylinder is a good indicator of its internal condition.
The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.

COMPRESSION PRESSURE SPECIFICATION

Standard	Limit	Difference
1 300 – 1 700 kPa (13 – 17 kgf/cm^2 185 – 242 psi)	1 100 kPa (11 kgf/cm^2 156 psi)	200kPa (2 kgf/cm^2 28 psi)

Low compression pressure can indicate any of the following conditions:

* Excessively worn cylinder walls
* Worn piston or piston rings
* Piston rings stuck in grooves
* Poor valve seating
* Ruptured or otherwise defective cylinder head gasket

Overhaul the engine in the following cases:

* Compression pressure in one of the cylinders is less than 900 kPa (9 kgf/cm^2, 128 psi).
* The difference in compression pressure between any two cylinders is more than 200 kPa (2 kgf/cm^2, 28 psi).
* All compression pressure readings are below 1 100 kPa (11 kgf/cm^2, 156 psi) even when they measure more than 900 kPa (9 kgf/cm^2, 128 psi).

COMPRESSION TEST PROCEDURE

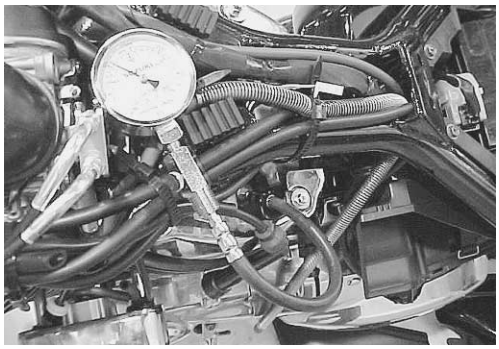
NOTE:

* *Before testing the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque values and the valves are properly adjusted.*
* *Have the engine warmed up before testing.*
* *Make sure that the battery is fully-charged.*

Remove the related parts and test the compression pressure in the following manner.

- Remove the fuel tank. (☞5-3)
- Remove all the spark plugs. (☞2-4)
- Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.
- Keep the throttle grip in the fully opened position.
- Press the starter button and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.
- Repeat this procedure with the other cylinders.

TOOL **09915-64510: Compression gauge set**
09915-63210: Adaptor



OIL PRESSURE CHECK

Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

OIL PRESSURE SPECIFICATION

350 – 650 kPa (3.5 – 6.5 kgf/cm², 50 – 92 psi) at 3 000 r/min., Oil temp. at 60°C (140°F)

If the oil pressure is lower or higher than the specification, the following causes may be considered.

LOW OIL PRESSURE

* Clogged oil filter
* Oil leakage from the oil passage
* Damaged O-ring
* Defective oil pump
* Combination of the above items

HIGH OIL PRESSURE

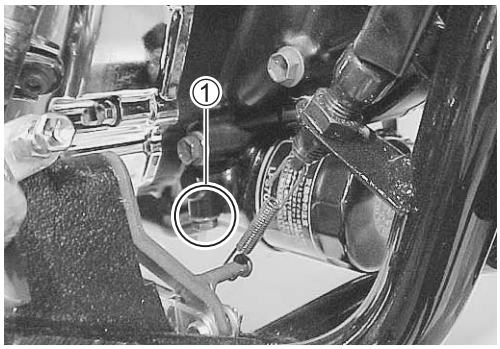
* Engine oil viscosity is too high
* Clogged oil passage
* Combination of the above items

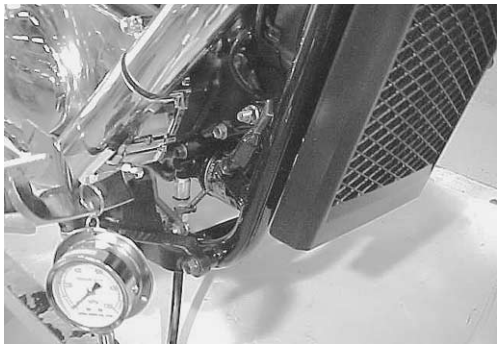
OIL PRESSURE TEST PROCEDURE

Start the engine and check if the oil pressure indicator light is turned on. If the light stays on, check the oil pressure indicator light circuit. If the circuit is OK, check the oil pressure in the following manner.

- Remove the main oil gallery plug ①.
- Install the oil pressure gauge and adaptor into the main oil gallery.
- Warm up the engine as follows:
  Summer: 10 min. at 2 000 r/min.
  Winter: 20 min. at 2 000 r/min.
- After warming up, increase the engine speed to 3 000 r/min. (observe the tachometer), and read the oil pressure gauge.

TOOL **09915-74510: Oil pressure gauge hose**
09915-74531: Oil pressure gauge attachment
09915-77330: Meter (for high pressure)





ENGINE

CONTENTS

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 this section for removal and reinstallation instructions.

ENGINE CENTER

PARTS	REMOVAL	INSTALLATION
Inspection cap	3-11	3-71
PAIR pipe	3-11	3-71
Starter motor	3-14	3-64
Oil filter	3-17	3-59

ENGINE LEFT SIDE

PARTS	REMOVAL	INSTALLATION
Neutral switch	3-18	3-58
Generator	3-18	3-57
Water pump	3-19	3-56
Secondary driven bevel gear	3-19	3-55

ENGINE RIGHT SIDE

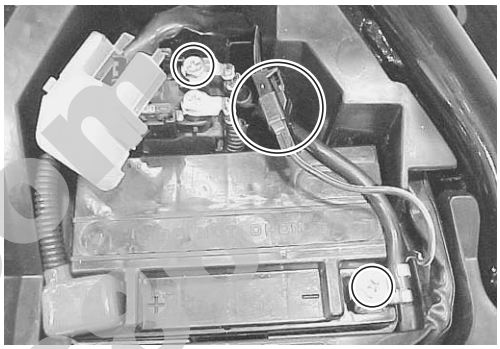
PARTS	REMOVAL	INSTALLATION
Clutch	3-14	3-61
Oil pump	3-16	3-60
Gearshift	3-16	3-59
Primary drive gear	3-17	3-59
Driveshaft bolt/Secondary driven gearshaft nut	3-17	3-56

ENGINE REMOVAL AND INSTALLATION

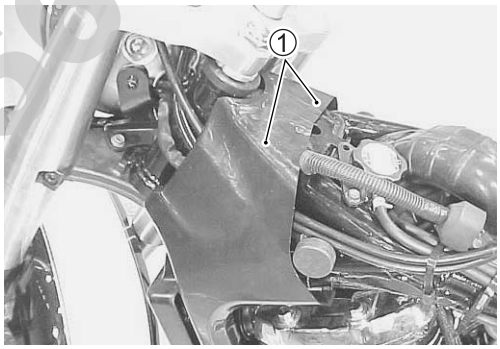
ENGINE REMOVAL

Before taking the engine out of the frame, wash the engine using a steam cleaner. Engine removal is sequentially explained in the following steps. Reinstall the engine by reversing the removal procedure.

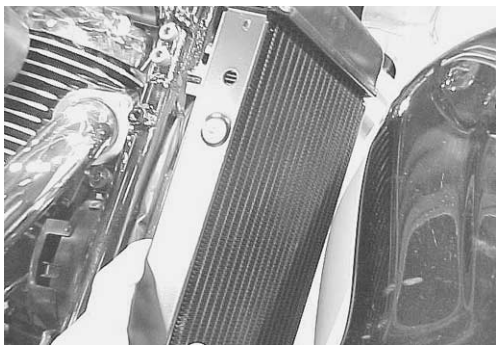
- Drain engine oil. (☞2-8)
- Drain engine coolant. (☞2-13)
- Remove the seats. (☞7-2)
- Remove the fuel tank. (☞ 5-3)
- Disconnect the battery ⊖ lead wire.



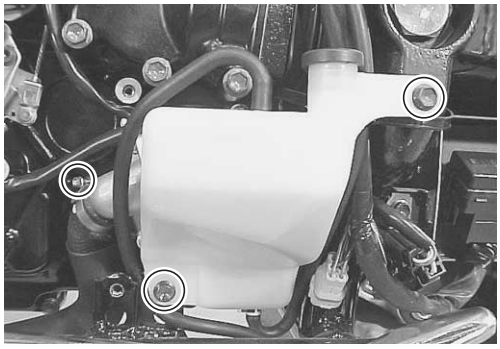
- Remove the frame head covers ①.



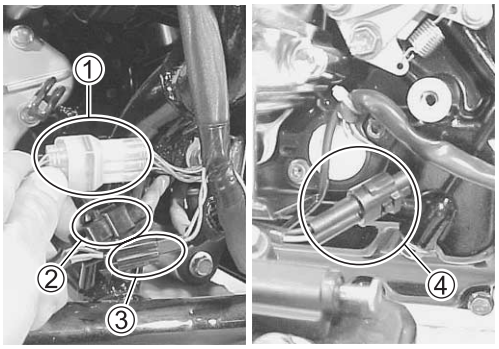
- Remove the radiator. (☞ 6-4)



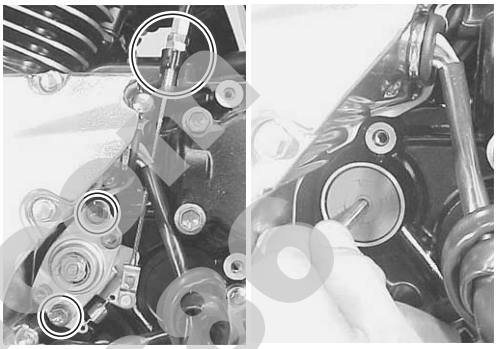
- Remove the left frame cover and the secondary gear case cover.
- Remove the engine coolant reservoir tank.



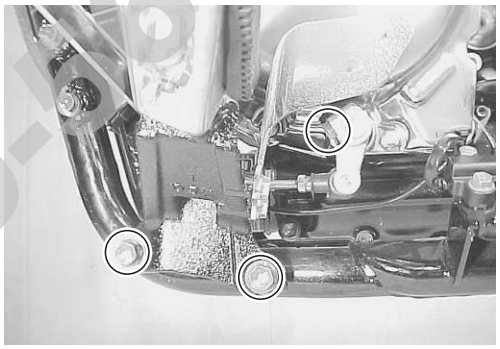
- Disconnect the neutral switch lead wire coupler ①.
- Disconnect the generator lead wire coupler ② and the signal generator lead wire coupler ③.
- Disconnect the side-stand switch lead wire coupler ④.



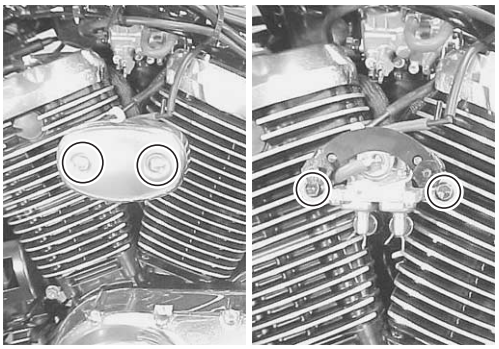
- Remove the clutch release mechanism.
- Remove the push rod.



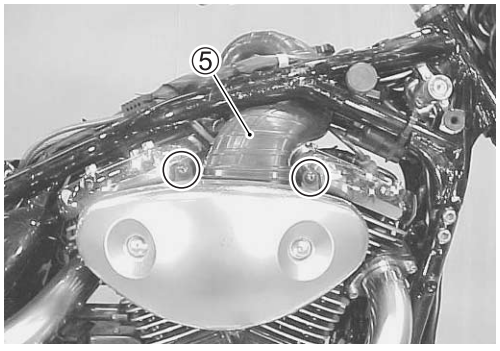
- Remove the left footrest and the gearshift lever.



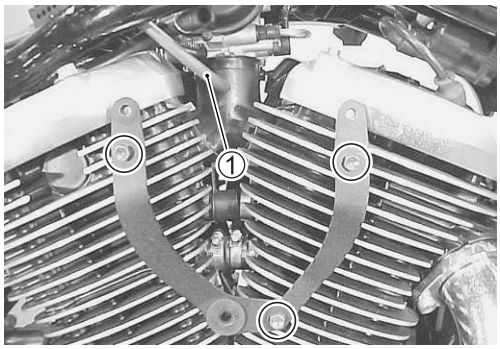
- Remove the PAIR (AIR SUPPLY) cover.
- Remove the PAIR system.



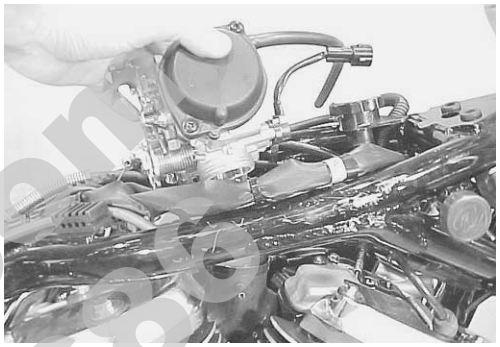
- Remove the air cleaner box and the outlet tube ⑤.



- Remove the air cleaner box bracket.
- Disconnect the negative pressure hose ①.

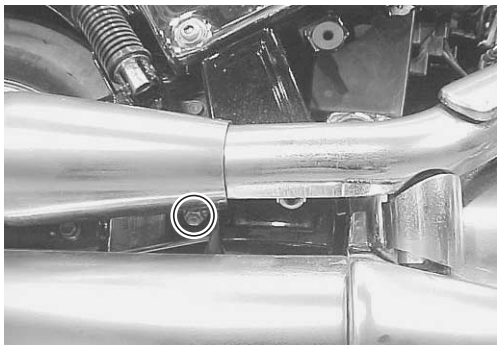


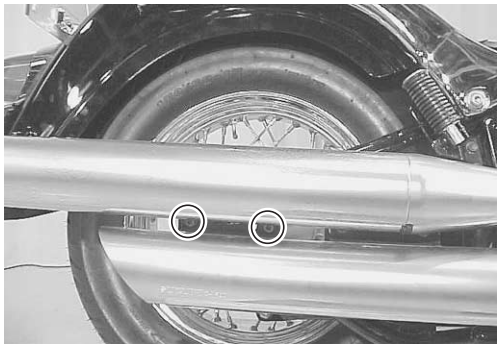
- Remove the carburetor.
  Caburetor removal ☞5-15
- Remove the spark plug caps.



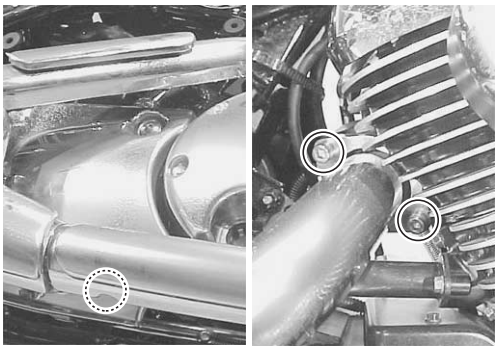
- Remove the right frame cover.

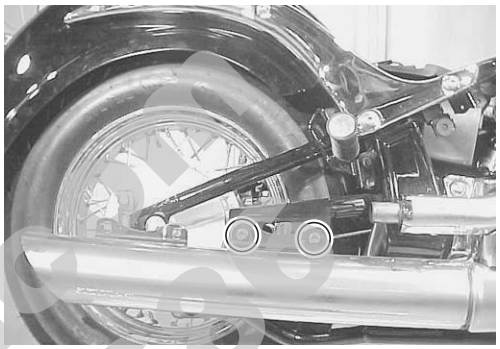
- Remove the No. 1 muffler.





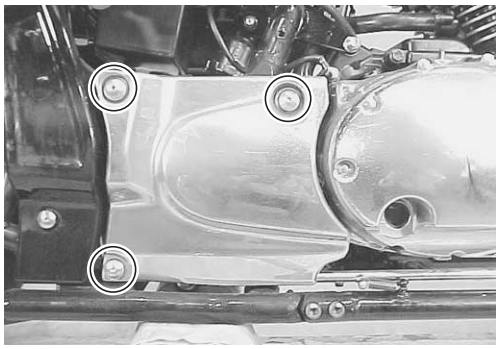
- Remove the No. 1 exhaust pipe and the No. 2 muffler.



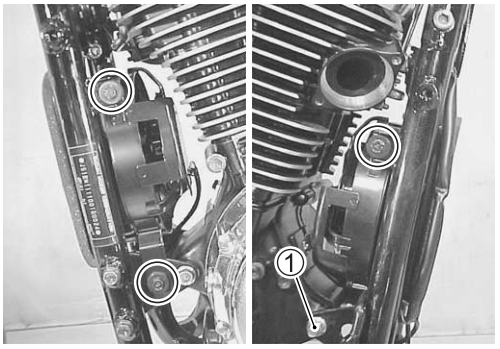


- Remove the No.2 exhaust pipe.

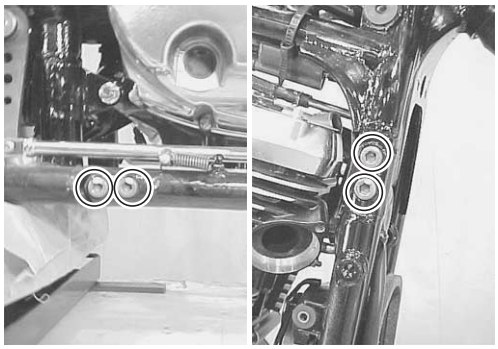
- Remove the rear clutch cover.

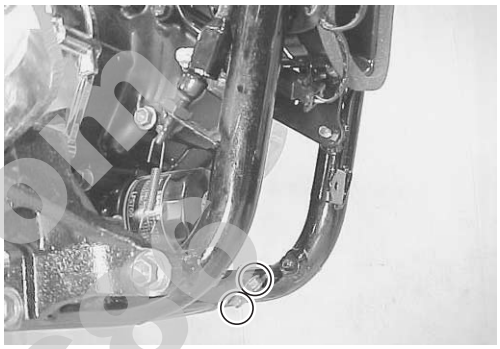


- Remove the cooling fan mounting bolts.
- Remove the engine mounting bolt ①.



- Remove the frame down tube.





- Support the engine with an engine jack.
- Remove the engine mounting bolts and nuts.
- Gradually lower the engine.

ENGINE INSTALLATION

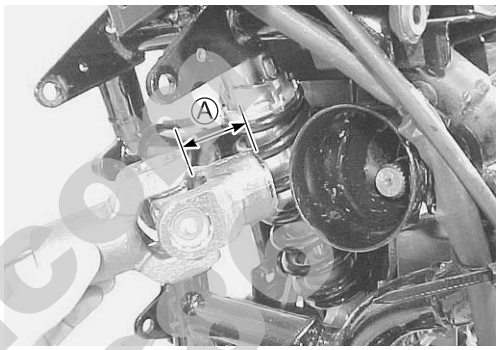
Install the engine in the reverse order of engine removal.

Pay attention to the following points:

- Install the universal joint.

NOTE:

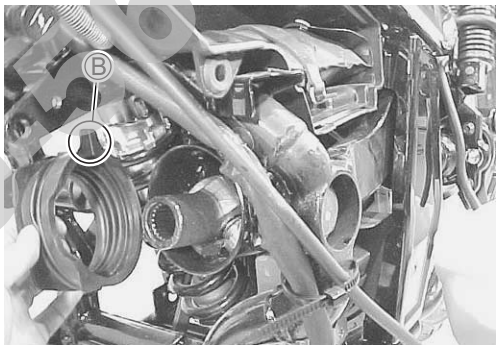
Be sure to face the short portion Ⓐ backward when installing it.



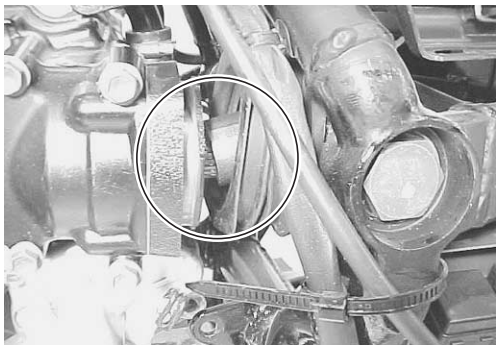
- Install the boot.

NOTE:

Make sure that the "UP" mark Ⓑ faces up.



- Gradually raise the engine, and then engage the secondary driven gear shaft to the universal joint.

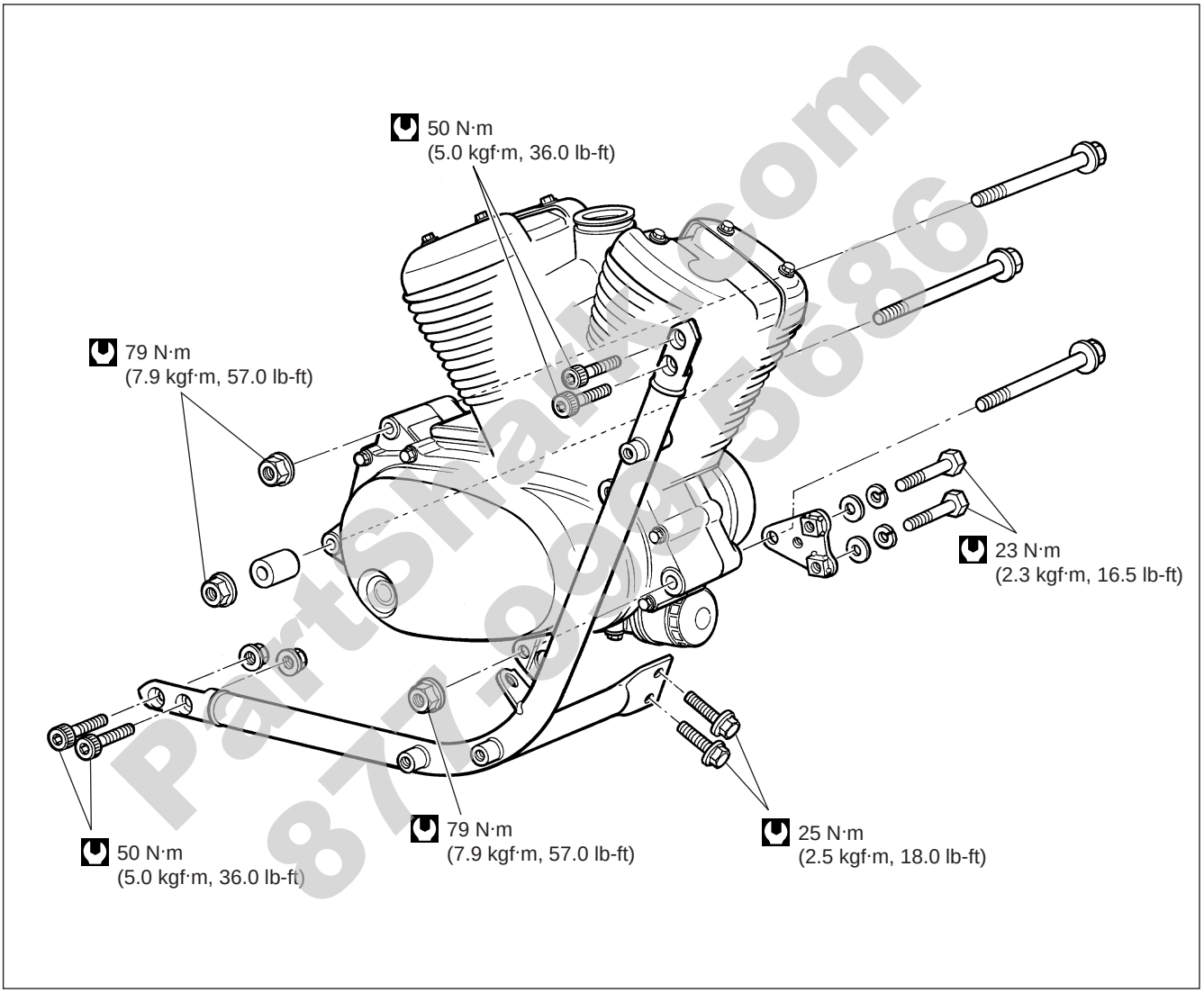


- Install the engine mounting bolts and nuts and tighten them.

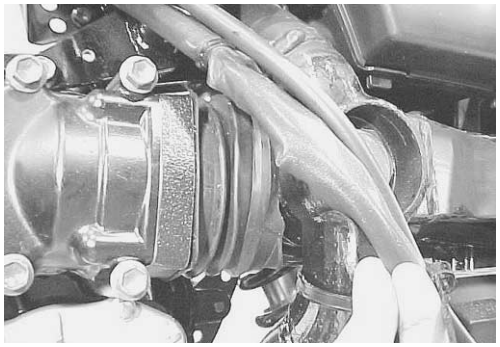
NOTE:

** The engine mounting nuts are self-locking. Once the nut has been removed, they are no longer of any use.*

** Be sure to use new nuts and tighten them to the specified torque.*

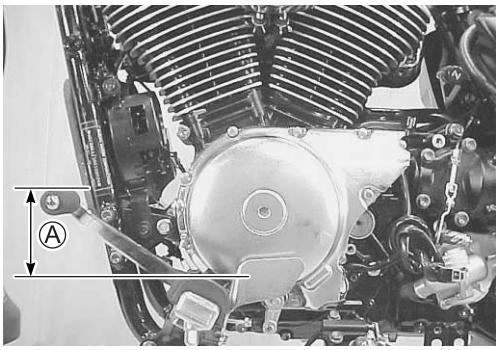


- Properly fit the boot onto the engine and the swingarm.



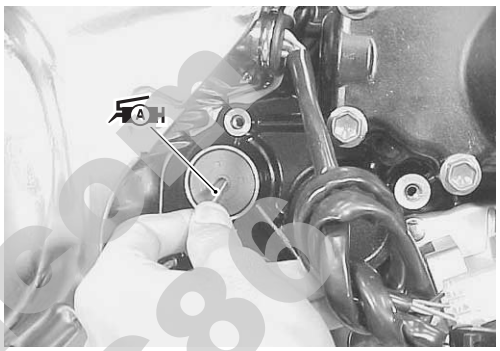
• Install the gearshift lever and the footrest in the correct position.

DATA **Gearshift lever height Ⓐ**
Standard: 90 mm (3.5 in)



• Apply grease to the push rod and install it.

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A" (For the others)

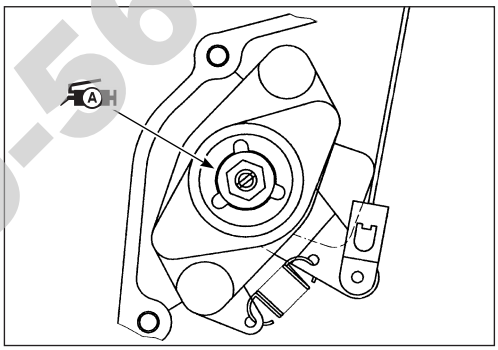


• Apply grease to the clutch release mechanism and install it.

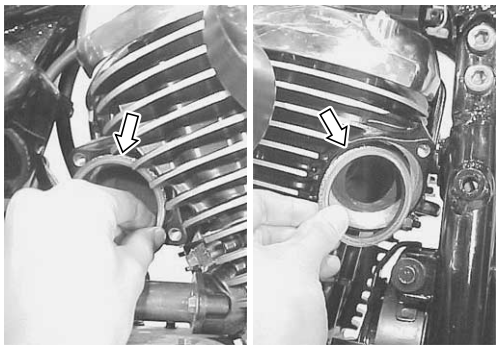
99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A" (For the others)

DATA **Clutch release screw**
Standard: ¼ turn back

CLUTCH CABLE ADJUSTMENT ☞2-12



• Install the new gaskets.
• Install the exhaust pipes and mufflers.

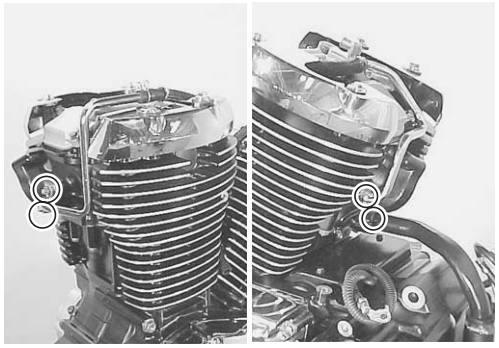


• Apply gas sealer to the exhaust pipe connecters.
EXHAUST GAS SEALER: PERMATEX 1372
• Adjust the following items.
* Engine oil ☞2-8
* Engine coolant ☞2-13
* Idling adjustment ☞2-10
* Throttle cable play ☞2-11
* Rear brake pedal height ☞2-16

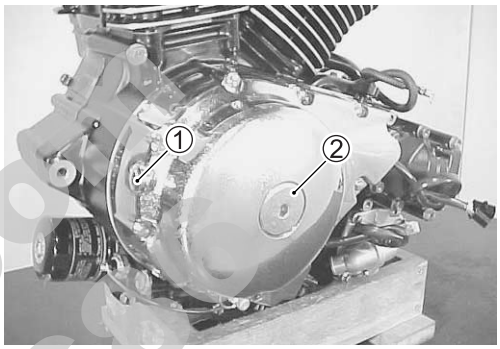
ENGINE DISASSEMBLY

- Remove the PAIR pipes.
- Remove the spark plugs.

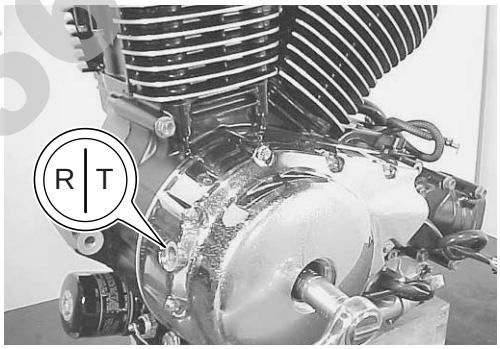
TOOL 09930-10121: Spark plug wrench set



- Remove the valve timing inspection plug ① and the generator cover cap ②.

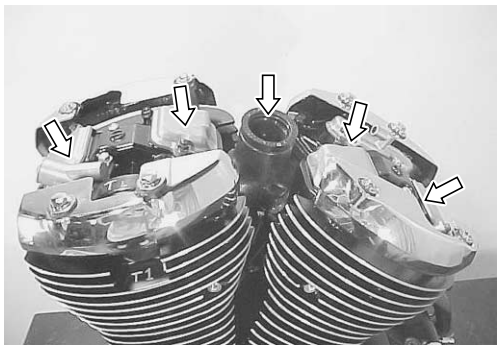


- Position "RIT" mark on the generator with the center of the valve timing inspection hole.



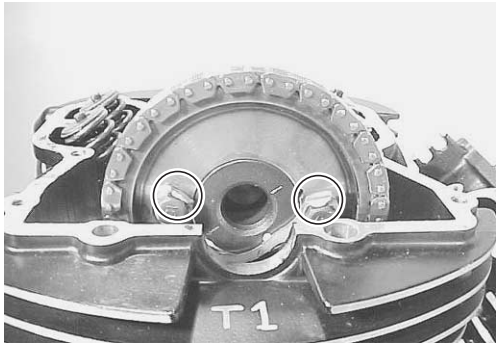
CYLINDER HEAD COVER

- Remove the intake pipe.
- Remove the inspection caps.
- Remove the cylinder head covers.



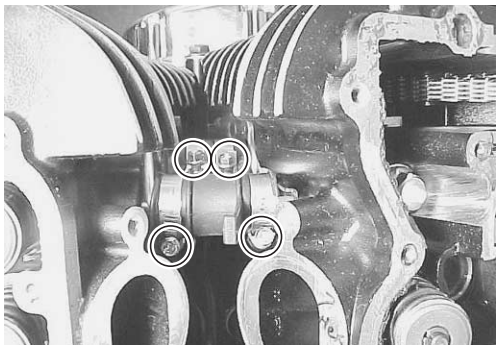
CAMSHAFT

- Flatten the lock washer.
- Remove the cam sprocket and camshaft. (Front and rear cylinders)

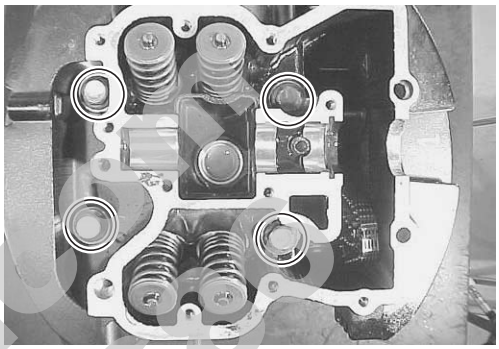


CYLINDER HEAD/CYLINDER

- Loosen the water hose clamp screws.



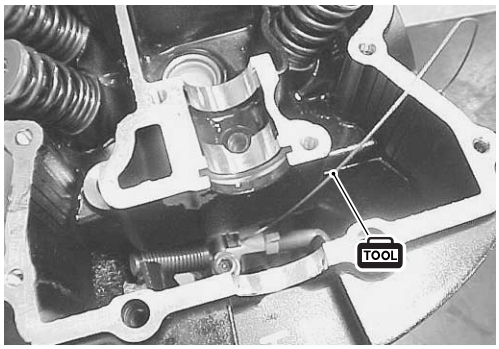
- Remove the cylinder head bolts. (Front cylinder)



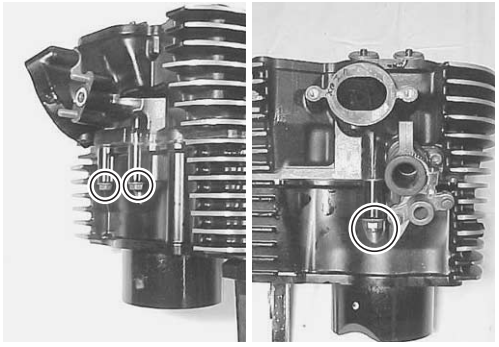
- Remove the cylinder head and cylinder. (Front cylinder)

- After unlocking the ratchet, push the cam chain tension adjuster rod fully.
- Insert the special tool between the ratchet and the adjuster body.

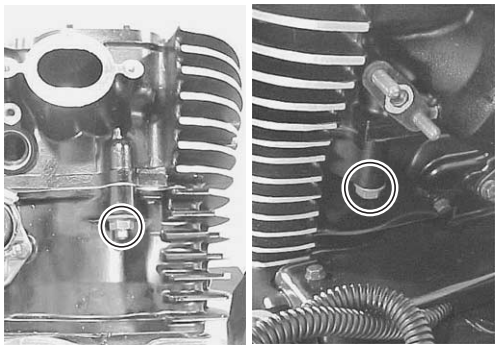
TOOL **09918-53810: Chain tensioner lock tool**



- Separate the cylinder head/cylinder assembly. (Front cylinder)



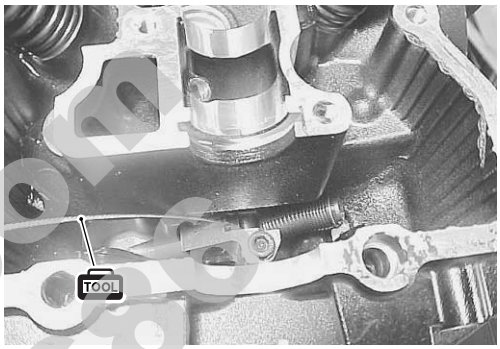
- Remove the cylinder head bolt and nut. (Rear cylinder)



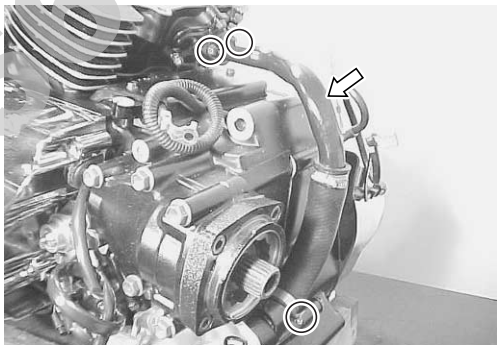
- Push the cam chain tension adjuster rod and insert the special tool.

TOOL 09918-53810: Chain tensioner lock tool

- Remove the cylinder head by removing the cylinder head bolts.



- Remove the water hose and pipe.

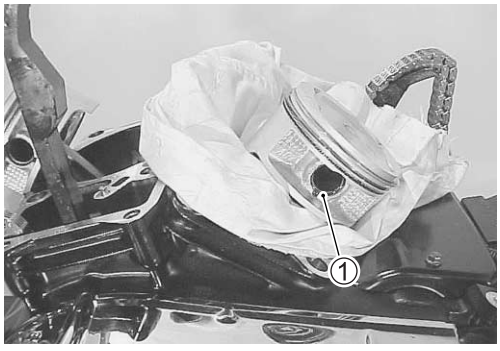


- Remove the cylinder. (Rear cylinder)

PISTON

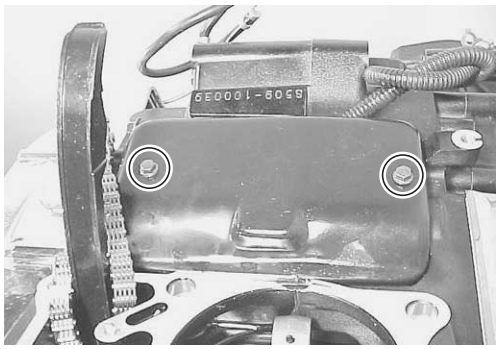
- Place a clean rag under the piston to prevent any parts from falling into the clankcase.
- Remove the piston pin circlip ① using long-nose pliers.
- Draw out each piston pin and remove the pistons.

NOTE:
Scribe the cylinder position on the head.

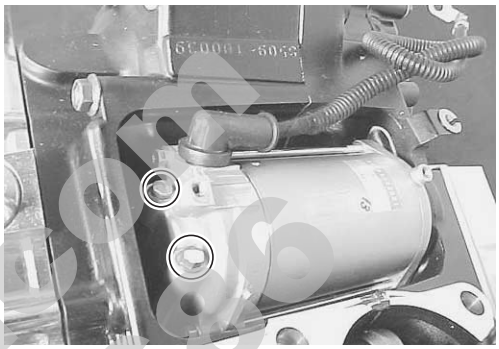


STARTER MOTOR

- Remove the starter motor cover.

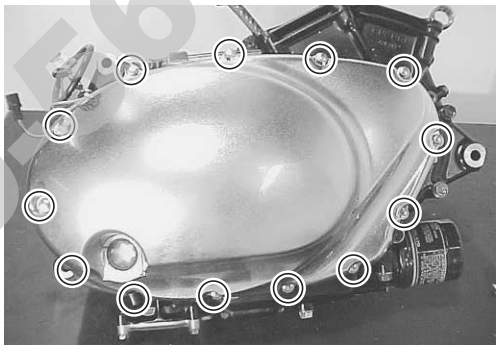


- Remove the starter motor.

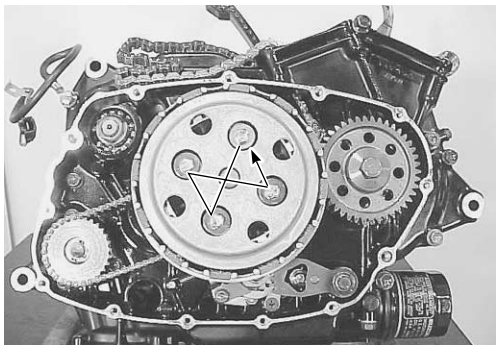


CLUTCH

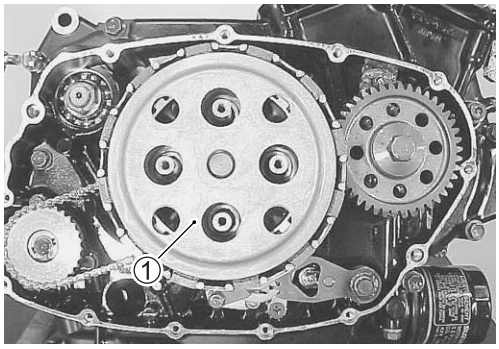
- Remove the clutch cover.



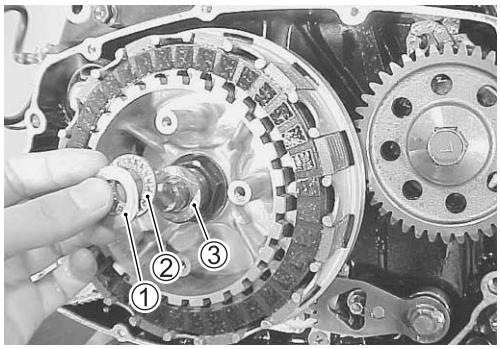
- Remove the clutch spring mounting bolts and springs diagonally.



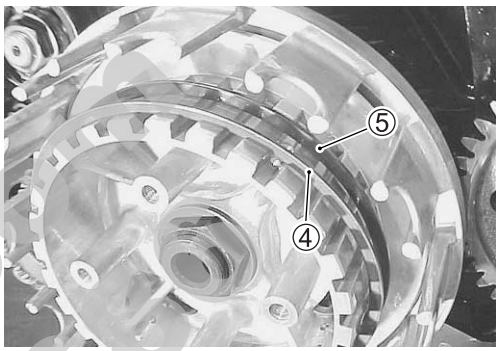
- Remove the pressure plate ①.



- Remove the thrust washer ①, bearing ②, push piece ③ and push rod.
- Remove the clutch drive and driven plates.

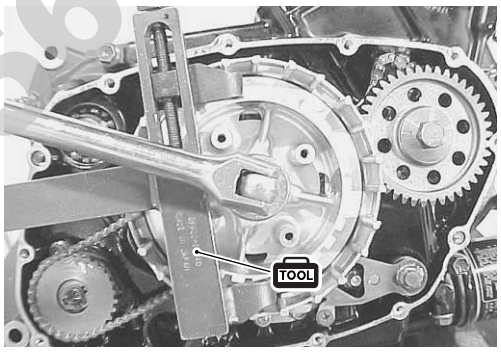


- Remove the spring washer ④ and spring washer seat ⑤.

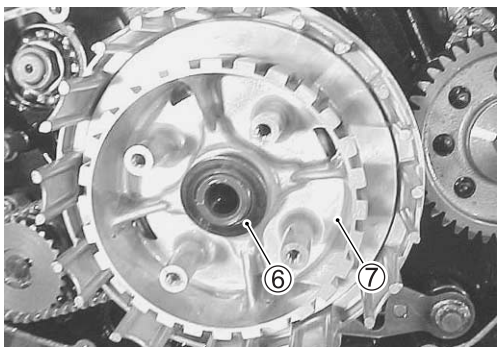


- Remove the clutch sleeve hub nut with the special tool.

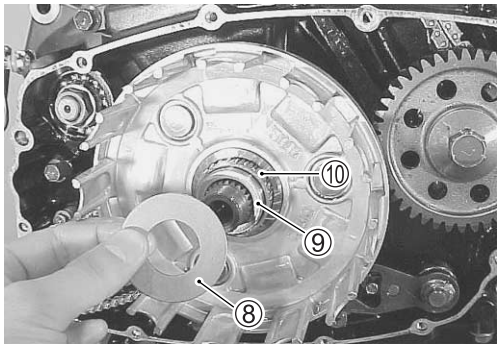
TOOL 09920-53740: Clutch sleeve hub holder



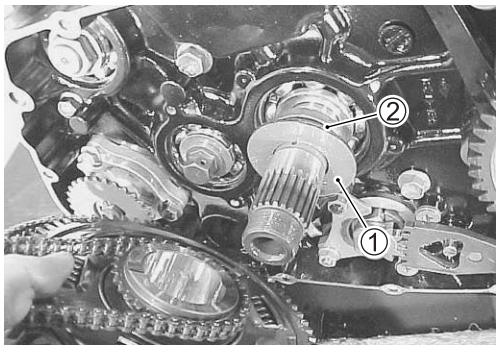
- Remove the washer ⑥ and the clutch sleeve hub ⑦.



- Remove the thrust washer ⑧, spacer ⑨, and needle roller bearing ⑩.



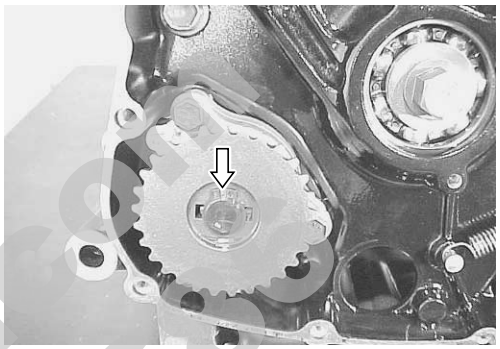
- Remove the primary driven gear assembly and the oil pump drive chain.
- Remove the thrust washer ① and spacer ②.



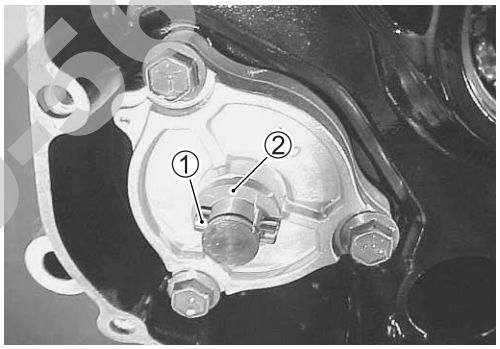
OIL PUMP

- Remove the oil pump by removing the circlip.

TOOL 09900-06107: Snap ring pliers

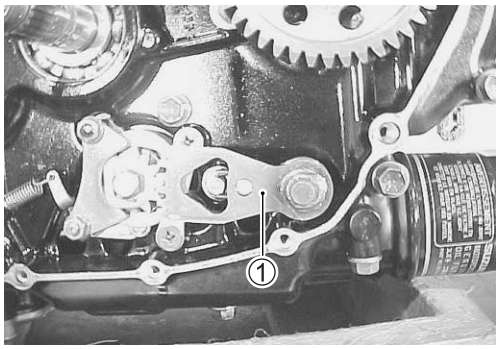


- Remove the pin ① and washer ②.

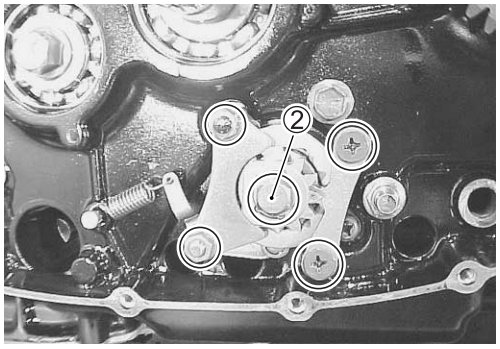


GEARSHIFT

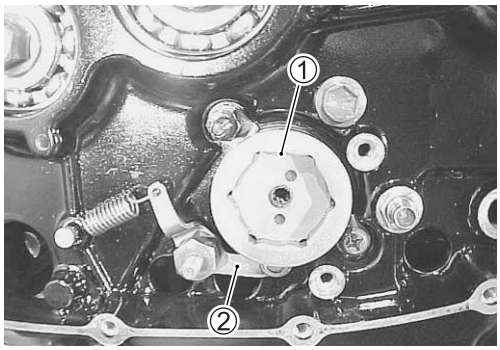
- Draw out the gearshift shaft ①.



- Remove the cam guide and the pawl lifter.
- Remove the cam driven gear assembly by removing the gearshift cam stopper bolt ②.



- Remove the gearshift cam plate ①.
- Remove the gearshift cam stopper ②.



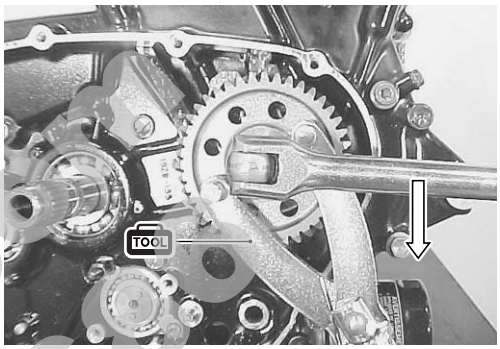
PRIMARY DRIVE GEAR

Remove the primary drive gear by removing the primary drive gear bolt with the special tool.

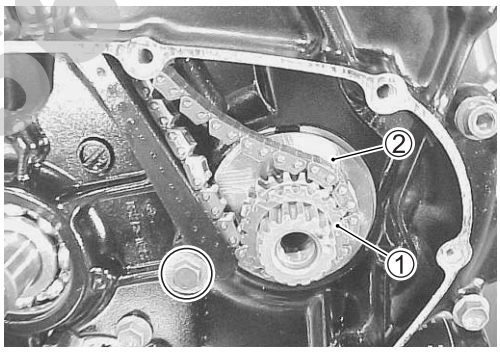
TOOL 09930-40113: Rotor holder

⚠ CAUTION

This bolt has left-hand thread.
Turning it counter-clockwise may cause damage.



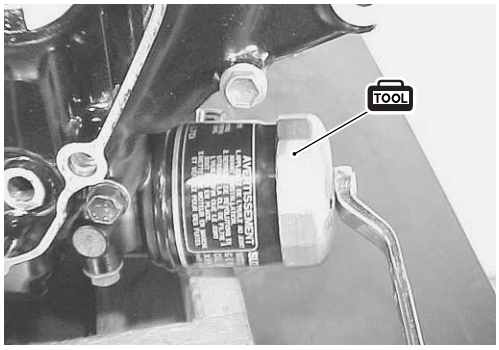
- Remove the cam chain tensioner and the chain.
- Remove the cam chain drive sprocket ① and the thrust washer ②.



OIL FILTER

- Remove the oil filter with the special tool.

TOOL 09915-40610: Oil filter wrench

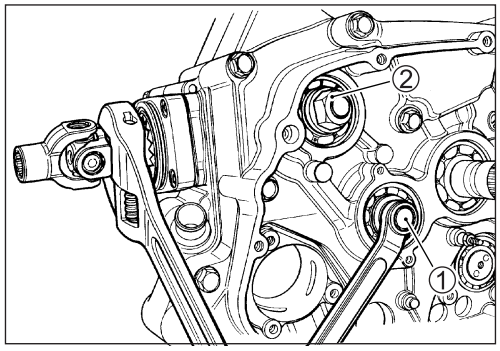


DRIVESHAFT BOLT/SECONDARY DRIVEN GEAR SHAFT NUT

- Install the universal joint on the secondary driven gear shaft.
- While holding the universal joint with an adjustable wrench, remove the driveshaft bolt ① and the secondary drive gear shaft nut ②.

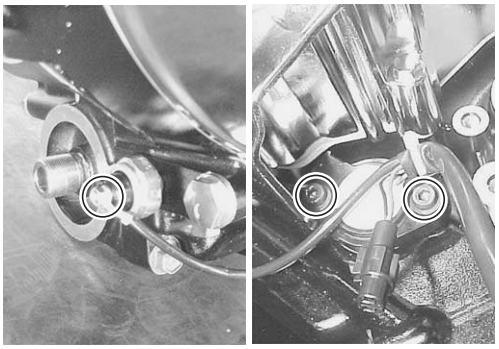
⚠ CAUTION

The driveshaft bolt ① has left-hand thread.
Turning it counter-clockwise may cause damage.



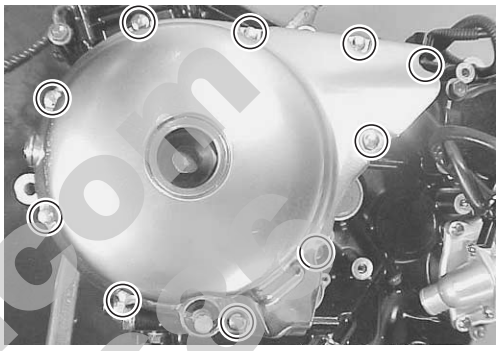
NEUTRAL SWITCH

- Remove the neutral switch assembly.
- Remove the oil pressure switch lead wire.

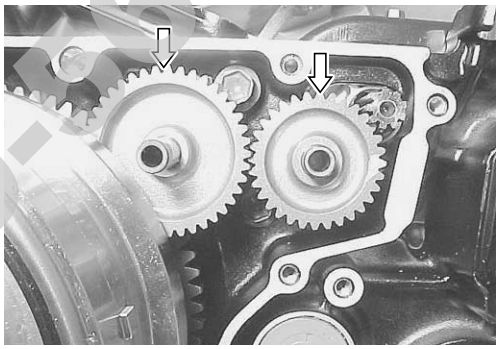


GENERATOR

- Remove the generator cover.

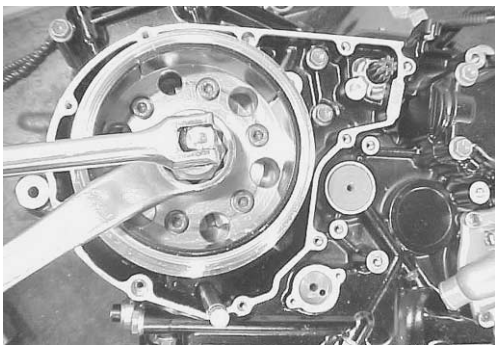


- Remove the starter motor driven gear and the idle gear.



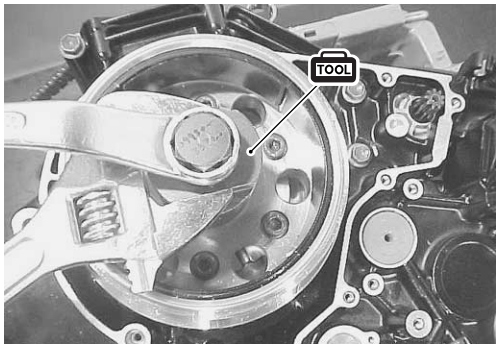
- Loosen the generator rotor bolt.

NOTE:
When loosen the rotor bolt, do not remove it. The rotor bolt is used in conjunction with the rotor remover when removing the rotor.

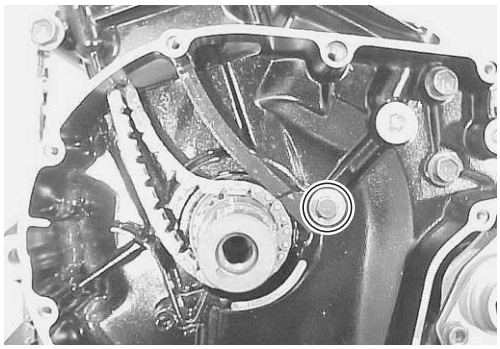


- Remove the generator rotor assembly with the special tool.
- Remove the key.

09930-33730: Rotor remover

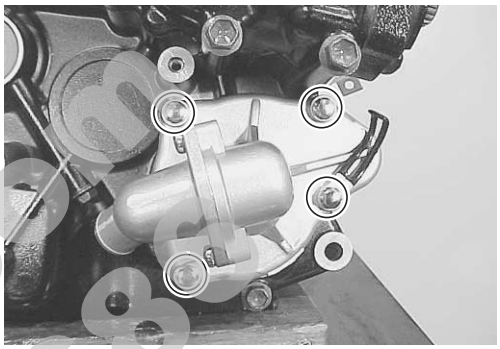


- Remove the cam chain tensioner and the chain.

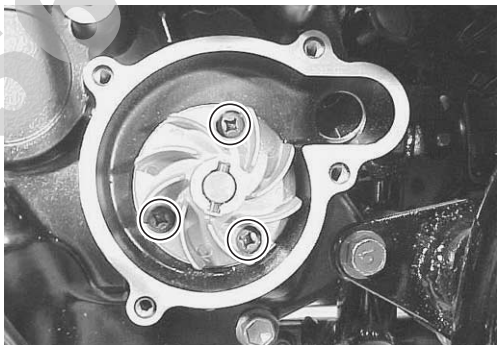


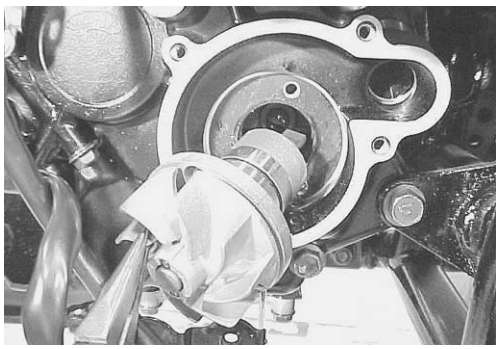
WATER PUMP

- Remove the water pump cover.



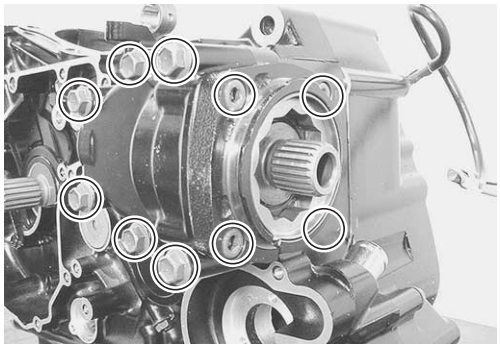
- Remove the water pump assembly.





SECONDARY DRIVEN GEAR

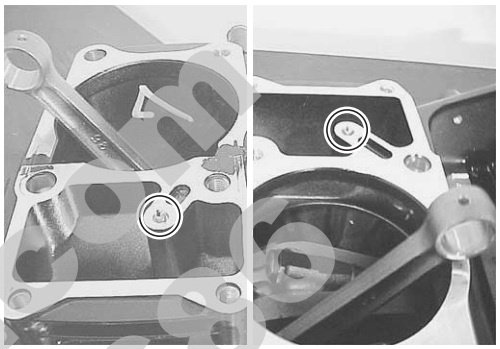
- Remove the secondary driven gear housing bolts.
- Remove the secondary driven gear case.



- Remove the secondary driven gear assembly.
- Remove the bearing ①.
- Remove the oil jet ②.

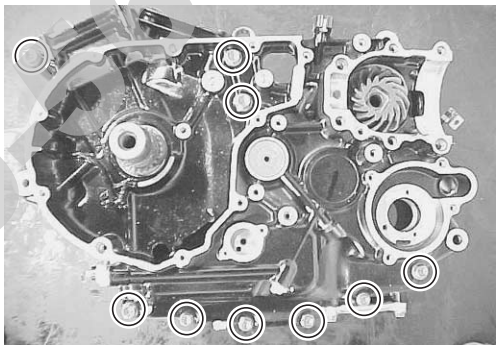
OIL JET

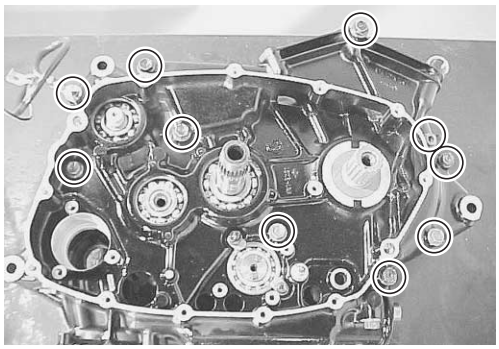
- Remove the oil jets.



CRANKCASE

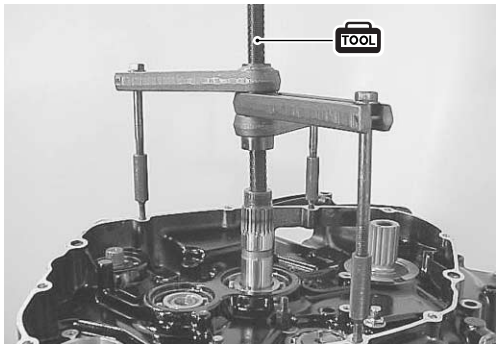
- Remove the crankcase bolts.



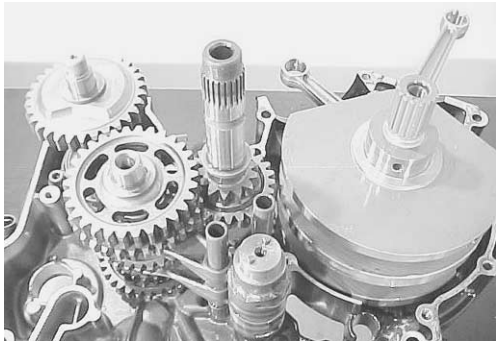


- Separate the crankcase into two parts with the special tool.

TOOL 09920-13120: Crankcase separator

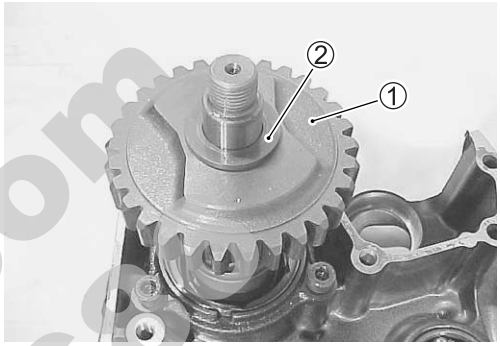


- Remove the crankshaft.
- Remove the gearshift fork shafts and gearshift forks.
- Remove the transmission.

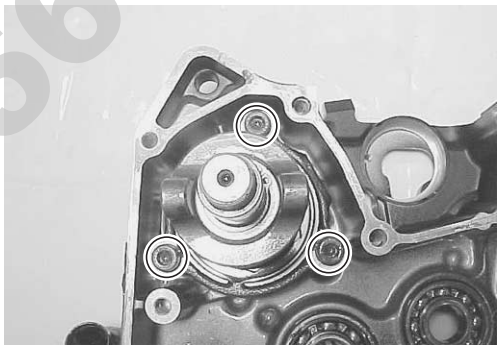


SECONDARY DRIVE BEVEL GEAR

- Remove the over driving gear ① and bush ②.



- Remove the secondary drive bevel gear assembly.



ENGINE COMPONENTS INSPECTION AND SERVICING

CYLINDER HEAD COVER

DISASSEMBLY

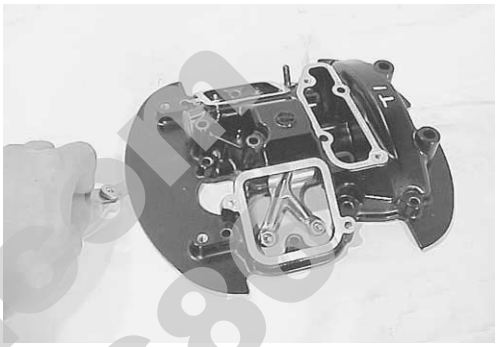
⚠ CAUTION

Be sure to identify each removed part as to its location, and lay the parts out in groups designated as "No.1 cylinder", "No.2 cylinder", "Exhaust", "Intake", so that each will be restored to the original location during assembly.

- Loosen the rocker arm shafts and pull out the rocker arm shafts.

CYLINDER HEAD COVER DISTORTION

After removing sealant from the fitting surface of the cylinder head cover, place the cylinder head cover on a surface plate and check for distortion with a thickness gauge.



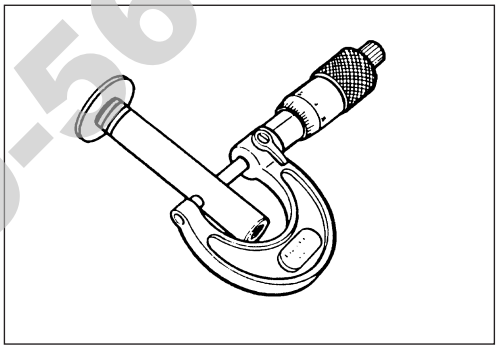
DATA Cylinder head cover distortion
Service Limit: 0.05 mm (0.002 in)

TOOL 09900-20803: Thickness gauge

If the distortion exceeds the limit, replace the cylinder head cover.

ROCKER ARM SHAFT O.D.

Measure diameter of rocker arm shaft.

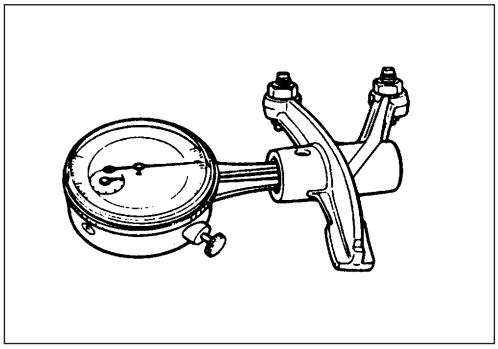


DATA Rocker arm shaft O. D. (IN & EX)
Standard: 11.966 – 11.984 mm
(0.4711 – 0.4718 in)

TOOL 09900-20205: Micrometer (0 – 25 mm)

ROCKER ARM I.D.

When checking the valve rocker arm, the inside diameter of the valve rocker arm and wear of the camshaft contacting surface should be checked.

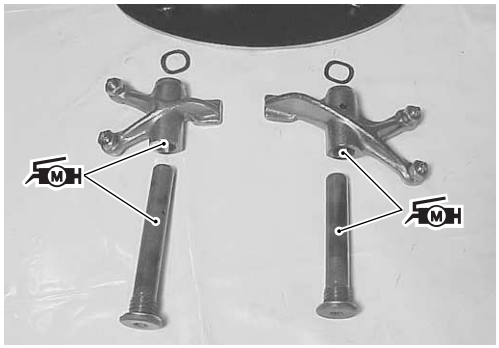


DATA Rocker arm I.D.
Standard: 12.000 – 12.018 mm
(0.4724 – 0.4731 in)

TOOL 09900-20605: Dial calipers

REASSEMBLY

- Apply SUZUKI MOLY PASTE to the rocker arms and their shafts.

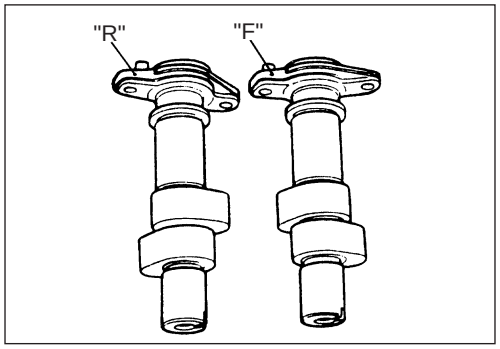


M 99000-25140: SUZUKI MOLY PASTE

Rocker arm shaft: 27 N·m (2.7 kgf·m, 19.5 lb-ft)

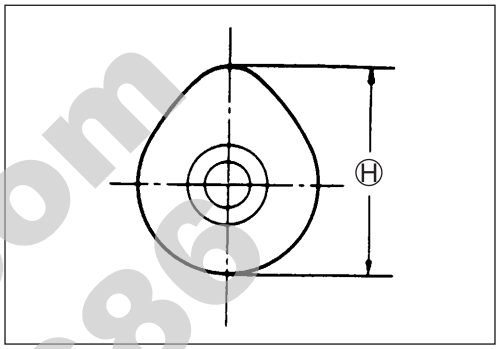
CAMSHAFT

The camshafts should be checked for wear and also for runout of cams and journals if the engine has been noted to produce abnormal noise or vibration or to lack output power. Any of these malconditions could be caused by a worn camshafts.
The camshaft can be distinguished by the embossed-letters, “F” and “R”, on the camshaft.
“F” : Front (No. 2) camshaft
“R” : Rear (No. 1) camshaft



CAMSHAFT CAM WEAR

Worn-down cams are often the cause of mistimed valve operation resulting in reduced output power. The limit of cam wear is specified for both intake and exhaust cams in terms of cam height Ⓗ, which is to be measured with a micrometer. Replace camshafts if found worn down to the limit.

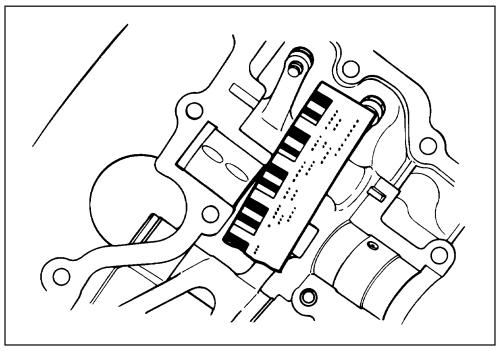


DATA Cam height Ⓗ
Service Limit: Front (IN) : 35.65 mm (1.404 in)
(EX): 36.62 mm (1.442 in)
Rear (IN) : 35.20 mm (1.386 in)
(EX): 36.28 mm (1.428 in)

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

CAMSHAFT JOURNAL WEAR

Determine whether each journal is worn down to the limit or not by measuring camshaft journal oil clearance with the camshaft installed. Use plastigauge to read the clearance, which is specified as follows:



DATA Camshaft journal oil clearance
Service Limit: 0.150 mm (0.0059 in)

TOOL 09900-22302: Plastigauge

NOTE:
To properly measure the oil clearance with plastigauge, all gasket material must be removed from fitting surfaces of cylinder head and cover. Do not apply SUZUKI BOND “1216B” until after the oil clearance has been determined.

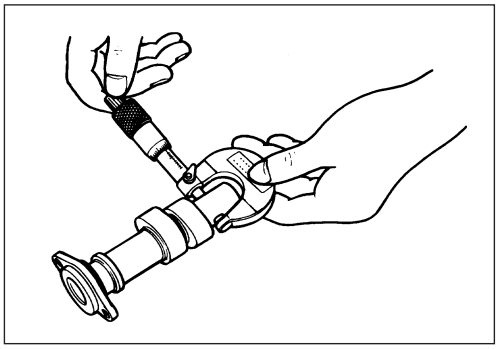
- Tighten the cylinder head cover bolts evenly and diagonally to the specified torque.

Cylinder head cover bolts
(M6): 10 N·m (1.0 kgf·m, 7.3 lb-ft)
(M8): 24.5 N·m (2.45 kgf·m, 18.0 lb-ft)

NOTE:
Do not rotate the camshafts with the plastigauge in place.

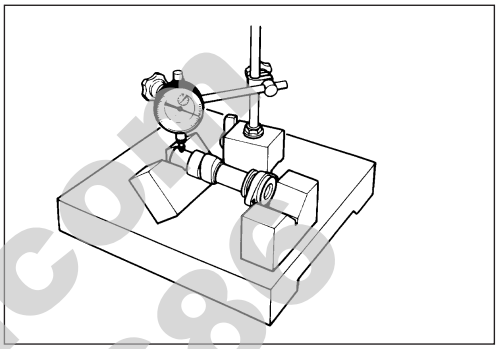
Remove the cylinder head cover, and read the width of the compressed plastigauge with envelop scale. This measurement should be taken at the widest part.

If the camshaft journal oil clearance measured exceeds the limit, measure the outside diameter of camshaft.
Replace either the cylinder head set or the camshaft if the clearance is incorrect.



DATA Camshaft journal O.D.
(Sprocket side): 24.959 – 24.980 mm (0.9826 – 0.9835 in)
(Other side) : 19.959 – 19.980 mm (0.7858 – 0.7866 in)

TOOL 09900-20205: Micrometer (0 – 25 mm)



CAMSHAFT RUNOUT

Measure the runout with a dial gauge. Replace the camshaft if the runout exceeds the limit.

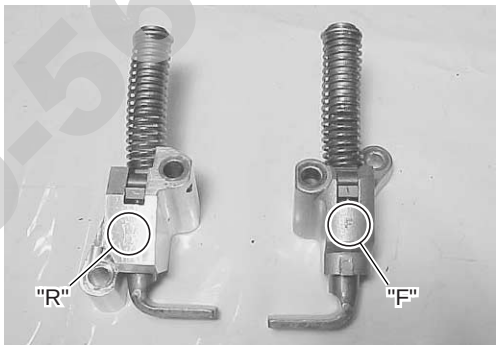
DATA Camshaft runout (IN & EX)
Service Limit: 0.10 mm (0.004 in)

TOOL 09900-20606: Dial gauge (1/100, 10 mm)
09900-20701: Magnetic stand
09900-21304: V-block (100 mm)

CAM CHAIN TENSIONER AND GUIDE

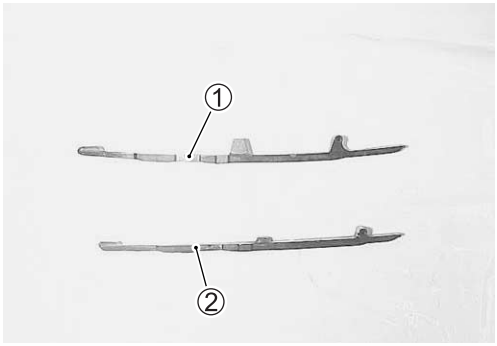
CAM CHAIN TENSIONER

For driving the camshafts, two cam chain tensioners are used on the respective cam drive chains. Unlock the ratchet mechanism, and move the push rod in place to see if it slides smoothly. If any stickiness is noted or ratchet mechanism is faulty, replace the cam chain tensioner assembly with a new one.
The cam chain tensioner can be distinguished by the embossed-letters, “F” and “R”, on the cam chain tensioners.
“F”: Front (No. 2) cam chain tensioner
“R”: Rear (No. 1) cam chain tensioner



CAM CHAIN GUIDE

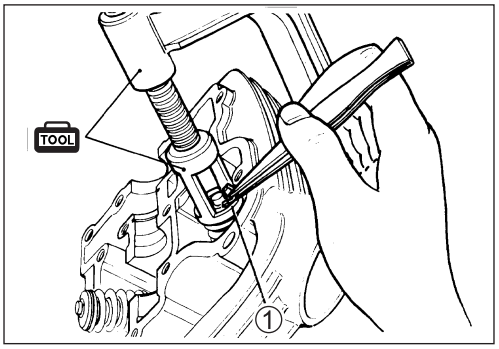
Check the contacting surface of the cam chain guide for wear and damage. If it is found to be damaged, replace it with a new one.
Two kinds of cam chain guide are used on the respective cam drive chains.
①: For front cylinder
②: For rear cylinder



CYLINDER HEAD

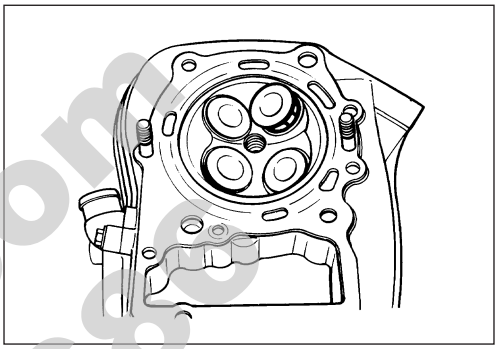
VALVE AND VALVE SPRING DISASSEMBLY

- Using special tools, compress the valve springs and remove the two cotter halves ① from valve stem.



TOOL **09916-14510: Valve spring compressor**
09916-14910: Valve spring compressor attachment
09916-84511: Tweezers

- Remove the valve spring retainer, inner spring and outer spring.
- Pull out the valve from the other side.
- Remove the valve stem seal and valve spring seat.

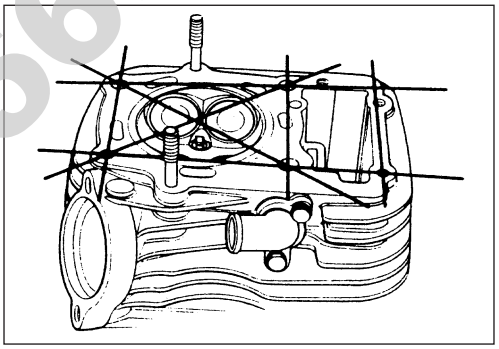


NOTE:
Removal of valves completes ordinary disassembling work. If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide servicing. (☞3-27)

CYLINDER HEAD DISTORTION

- Decarbonize the combustion chambers.

Check the gasketed surface of the cylinder head for distortion with a straightedge and thickness gauge, taking a clearance reading at several places indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.

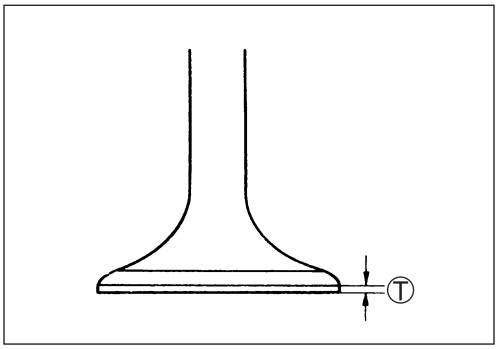


DATA **Cylinder head distortion**
Service Limit: 0.05 mm (0.002 in)

TOOL **09900-20803: Thickness gauge**

VALVE FACE WEAR

Visually inspect each valve for wear of its seating face. Replace any valve with an abnormally worn face.
The thickness Ⓣ decreases as the wear of the face advances. Measure the thickness and, if the thickness is found to have been reduced to the limit, replace it.

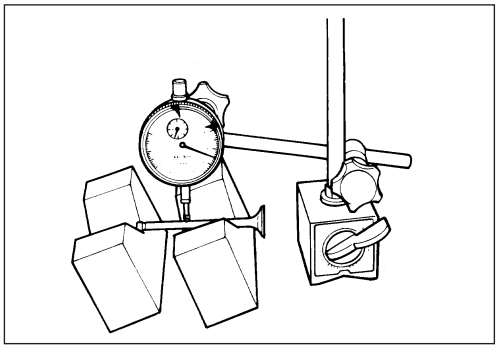


DATA **Valve head thickness**
Service Limit Ⓣ: 0.5 mm (0.02 in)

TOOL **09900-20102: Vernier calipers**

VALVE STEM RUNOUT

Support the valve with "V" blocks, as shown, and check its runout with a dial gauge.
The valve must be replaced if the runout exceeds the limit.

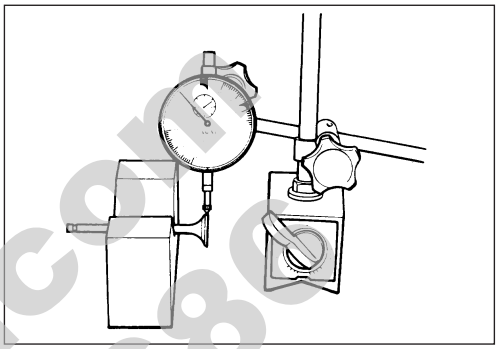


DATA Valve stem runout
Service Limit: 0.05 mm (0.002 in)

TOOL 09900-20701: Magnetic stand
09900-20606: Dial gauge (1/100 mm)
09900-21304: V-block

VALVE HEAD RADIAL RUNOUT

Place the dial gauge at right angles to the valve head face, and measure the valve head radial runout.
If it measures more than limit, replace the valve.

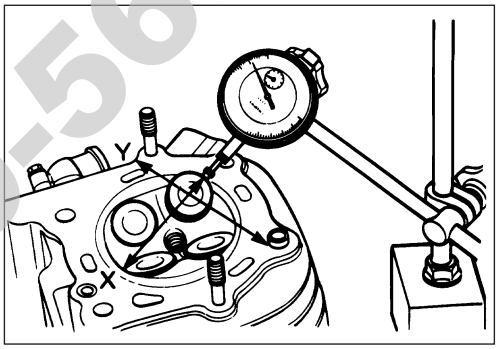


DATA Valve head radial runout
Service Limit: 0.03 mm (0.001 in)

TOOL 09900-20701: Magnetic stand
09900-20606: Dial gauge (1/100 mm)
09900-21304: V-block

VALVE STEM DEFLECTION

Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, "X" and "Y", perpendicular to each other, by positioning the dial gauge as shown. If the deflection measured exceeds the limit, (see below) then determine whether the valve or the guide should be replaced with a new one.

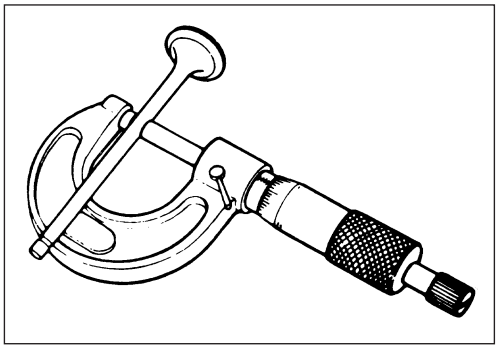


DATA Valve stem deflection (IN & EX)
Service Limit: 0.35 mm (0.14 in)

TOOL 09900-20606: Dial gauge (1/100 mm)
09900-20701: Magnetic stand

VALVE STEM WEAR

If the valve stem is worn down to the limit, as measured with a micrometer, where the clearance is found to be in excess of the limit indicated replace the valve, if the stem is within the limit, then replace the guide. After replacing valve or guide, be sure to re-check the clearance.



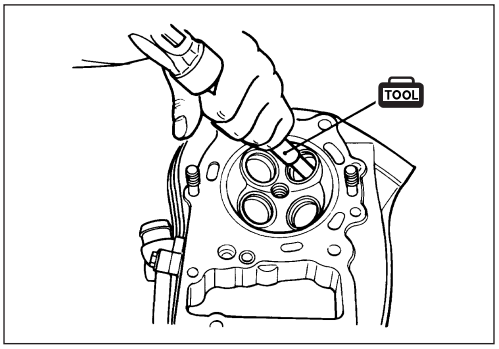
DATA Valve stem O.D.
Standard (IN) : 5.475 – 5.490 mm (0.2156 – 0.2161 in)
(EX) : 5.455 – 5.470 mm (0.2148 – 0.2154 in)

TOOL 09900-20205: Micrometer (0 – 25 mm)

VALVE GUIDE SERVICING

- Using the valve guide remover, drive the valve guide out toward the intake or exhaust rocker arm side.

TOOL 09916-44910: Valve guide remover/installer



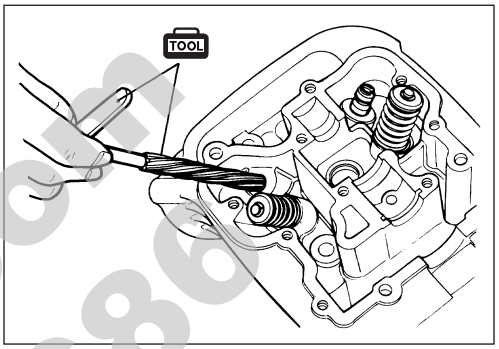
NOTE:

** Discard the removed valve guide subassemblies.*

** Only oversized valve guides are available as replacement parts. (Part No. 11115-38A71)*

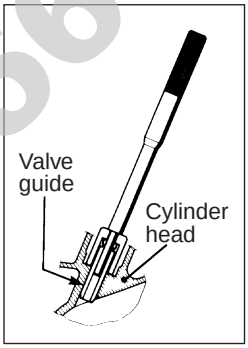
- Re-finish the valve guide holes in cylinder head with a 10.8 mm reamer and handle.

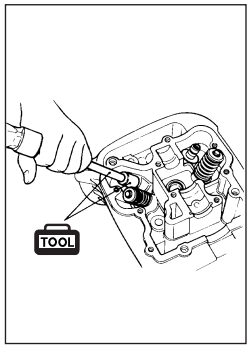
TOOL 09916-34580: Valve guide hole reamer
09916-34542: Reamer handle



- Oil the stem hole, too, of each valve guide and drive the guide into the guide hole with the valve guide installer and attachment.

TOOL 09916-44910: Valve guide remover/installer
09916-44920: Valve guide installer attachment



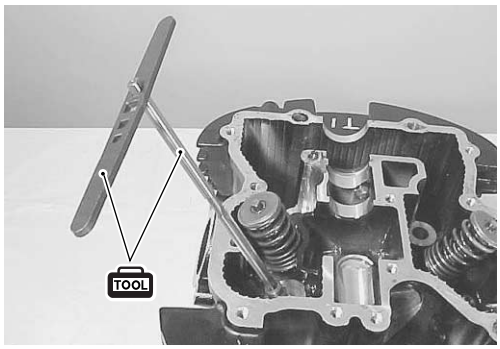


⚠ CAUTION

Failure to oil the valve guide hole before driving the new guide into place may result in a damage guide or head.

- After fitting all valve guides, re-finish their guiding bores with a 5.5 mm reamer. Be sure to clean and oil the guide after reaming.

TOOL 09916-34550: Valve guide reamer
09916-34542: Reamer handle

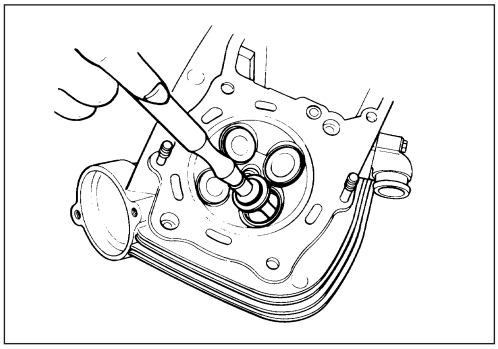


NOTE:

Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.

VALVE SEAT WIDTH

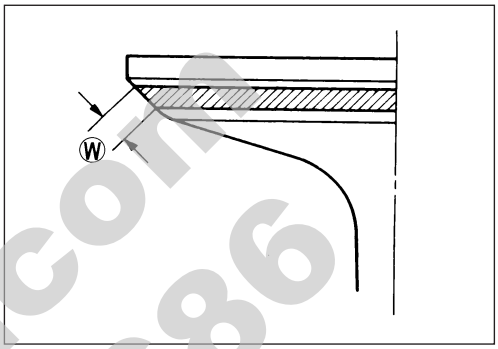
- Coat the valve seat with prussian blue uniformly. Fit the valve and tap the coated seat with the valve face in a rotating manner, in order to obtain a clear impression of the seating contact. In this operation, use the valve lapper to hold the valve head.
- The ring-like dye impression left on the valve face must be continuous – without any break. In addition, the width of the dye ring, which is the visualized seat "width", must be within the following specification:



DATA Valve seat width Ⓦ
Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)

TOOL 09916-10911: Valve lapper set

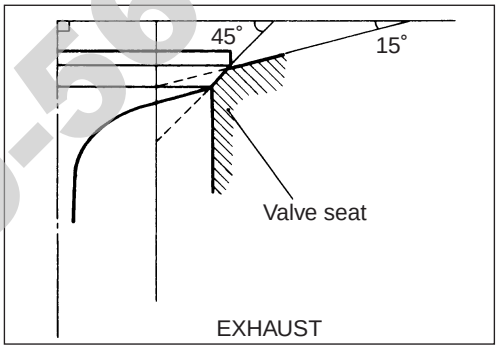
If either requirement is not met, correct the seat by servicing it as follows:



VALVE SEAT SERVICING

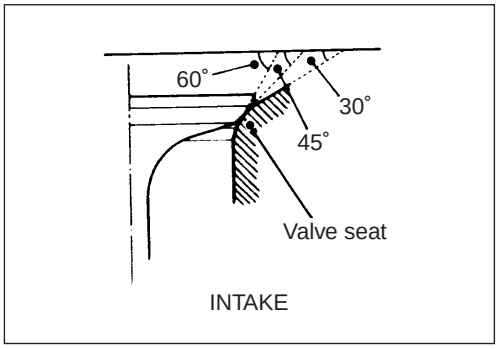
The valve seats for intake and exhaust valves are machined to four different angles. The seat contact surface is cut at 45°.

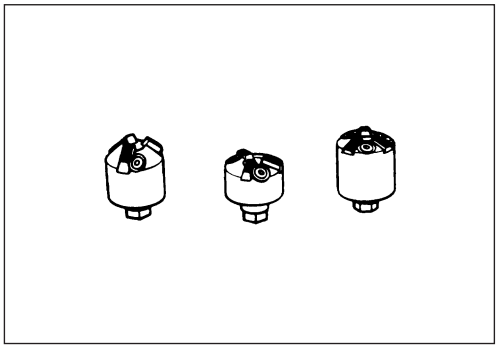
	INTAKE	EXHAUST
15°		N-121
30°	N-128	
45°	N-128	N-122
60°	N-111	



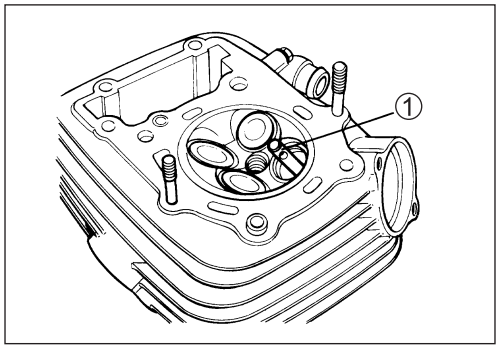
NOTE:
The valve seat contact area must be inspected after each cut.

TOOL 09916-21111: Valve seat cutter set
09916-22430: Valve seat cutter (N-128)



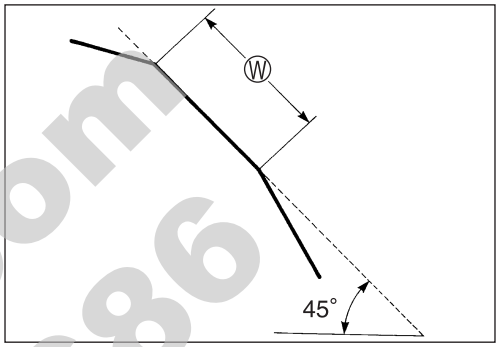


- Insert the solid pilot ① (09916-24450: N-100-5.52) with a slight rotation. Seat the pilot snugly. Install the 45° cutter, attachment and T-handle.



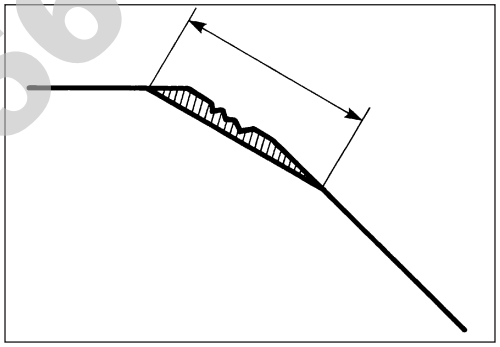
INITIAL SEAT CUT

- Using the 45° cutter, descale and clean up the seat. Rotate the cutter one or two turns.
- Measure the valve seat width Ⓦ after every cut.



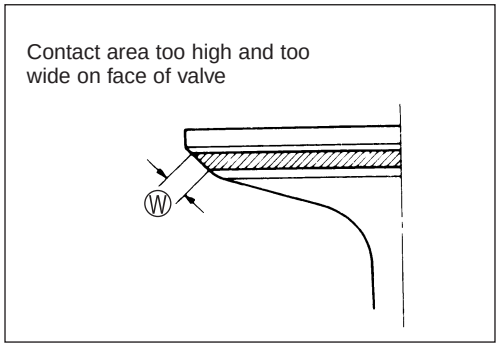
- If the valve seat is pitted or burned, use the 45° cutter to condition the seat some more.

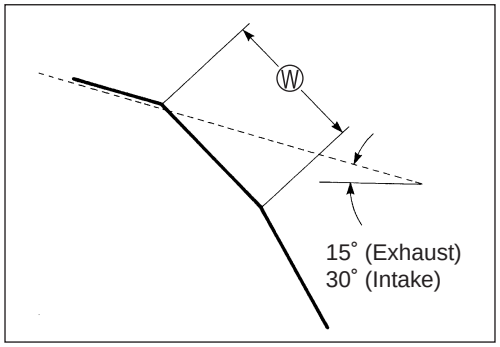
NOTE:
Cut only the minimum amount necessary from the seat to prevent the possibility of the valve stem becoming too close to the camshaft.



TOP NARROWING CUT

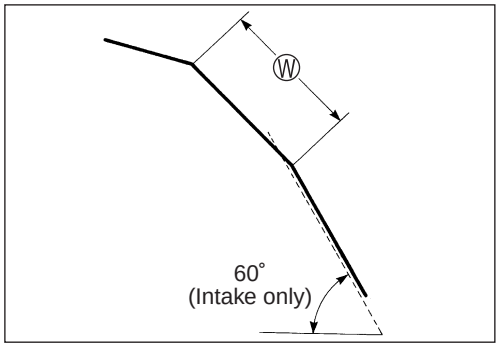
- If the contact area Ⓦ is too high on the valve, or if it is too wide, use the 15° (for the exhaust side) and the 30° (for the intake side) to lower and narrow the contact area.





BOTTOM NARROWING CUT

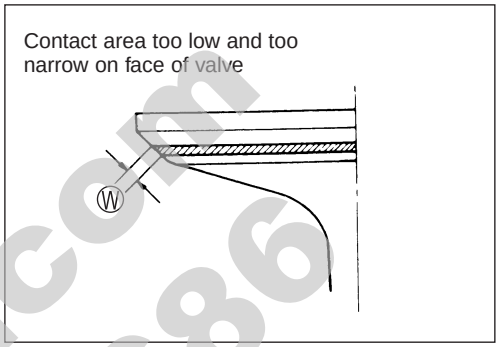
- If the contact area Ⓦ is too wide or too low, use the 60° (intake side only) to narrow and raise the contact area.

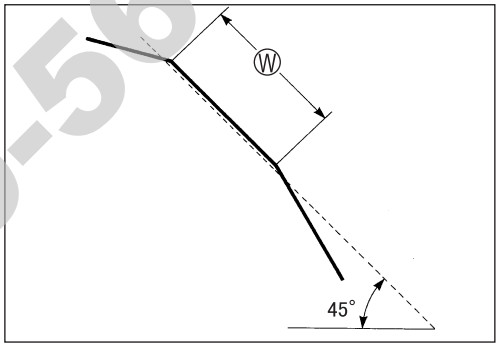


FINAL SEAT CUT

- If the contact area Ⓦ is too low or too narrow, use the 45° cutter to raise and widen the contact area.

NOTE:
After cutting the 15°, 30° and 60° angles, it is possible that the valve seat (45°) is too narrow. If so, re-cut the valve seat to the correct width.

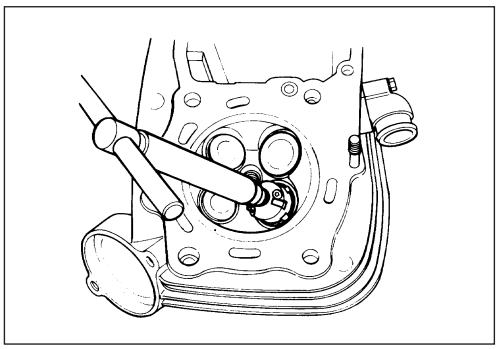




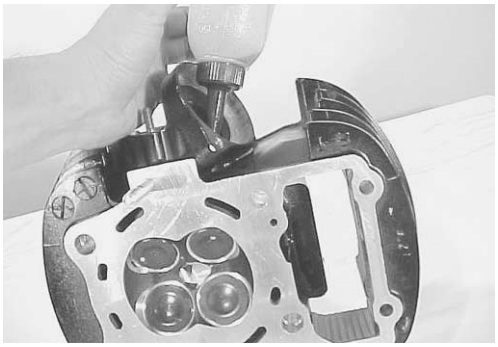
- After the desired seat position and width is achieved, use the 45° cutter very lightly to clean up any burrs caused by the previous cutting operations.

⚠ CAUTION

Do not use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish but not a highly polished or shiny finish. This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.



NOTE:
After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. (☞2-6)



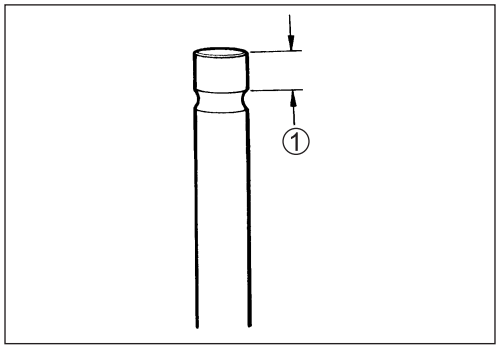
- Clean and assemble the head and valve components. Fill the intake and exhaust ports with gasoline to check for leaks.
- If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing.

⚠ WARNING

Always use extreme caution when handling gasoline.

VALVE STEM END CONDITION

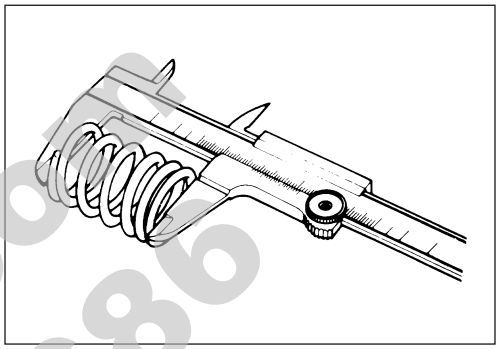
Inspect the valve stem end face for pitting and wear. If pitting or wear of the stem end face are present, the valve stem end may be resurfaced, providing that the length ① will not be reduced to less than the service limit. If this length becomes less than the service limit, the valve must be replaced.



DATA Valve stem end length
Service Limit: 3.1 mm (0.12 in)

VALVE SPRING

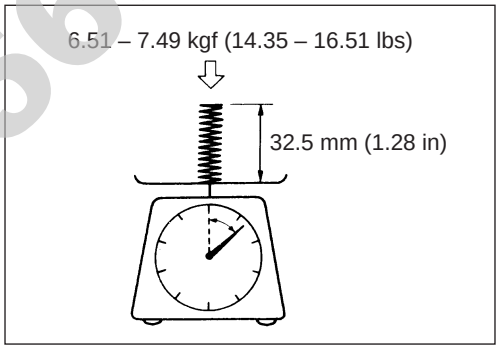
The force of the coil spring keeps the valve seat tight. Weakened spring result in reduced engine power output, and often account for the chattering noise coming from the valve mechanism.
Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit, or if the force required to compress the spring does not fall within the range specified, replace both the inner and outer springs as a set.



TOOL 09900-20102: Vernier calipers

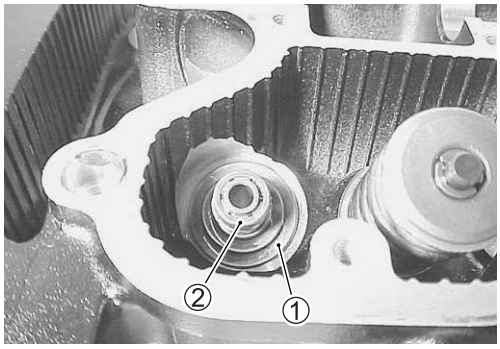
DATA Valve spring free length (IN & EX)
Service Limit INNER : 38.3 mm (1.51 in)
OUTER : 40.1 mm (1.58 in)

DATA Valve spring tension (IN & EX)
Standard INNER : 6.51 – 7.49 kgf/32.5 mm
(14.35 – 16.51 lbs/1.28 in)
OUTER : 12.09 – 13.91 kgf/36.0 mm
(26.65 – 30.67 lbs/1.42 in)



VALVE AND VALVE SPRING REASSEMBLY

- Fit the valve spring lower seats ①.
- Oil each oil seal, and press-fit the oil seal ② into position with the valve guide installer.



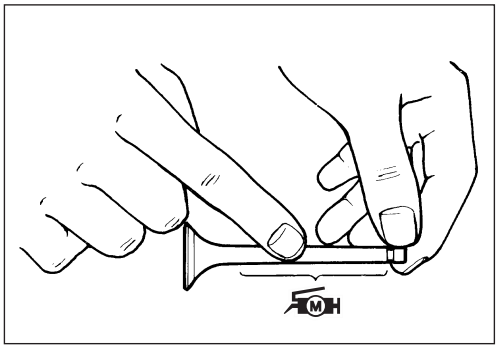
TOOL 09916-44910: Valve guide remover/installer

⚠ CAUTION

Do not reuse the oil seal.

- Insert the valves, with their stems coated with high quality molybdenum disulfide lubricant (SUZUKI MOLY PASTE) all around and along the full stem length without any break.

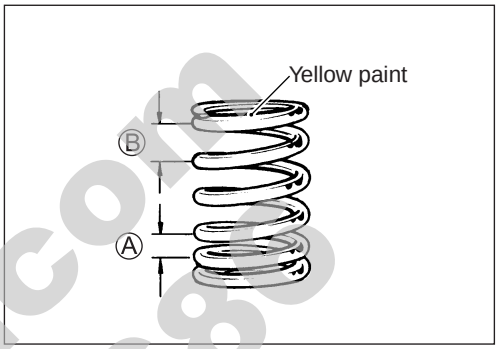
99000-25140: SUZUKI MOLY PASTE



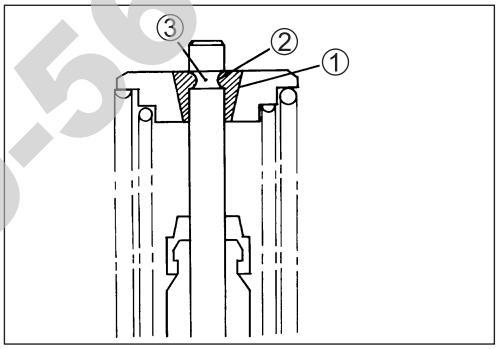
⚠ CAUTION

When inserting each valve, take care not to damage the lip of the stem seal.

- Install the valve springs with the small-pitch portion Ⓐ facing cylinder head.
  Ⓑ: Large-pitch portion.



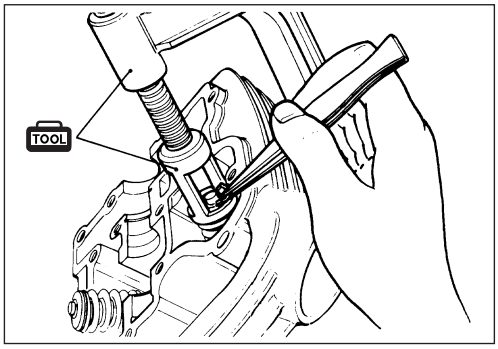
- Put on the valve spring retainer using the valve spring compressor, press down the spring, fit the two cotter halves to the stem end, and release the compressor to allow the cotter ① to wedge in between seat and stem. Be sure that the rounded lip ② of the cotter fits snugly into the groove ③ in the stem end.



09916-14510: Valve spring compressor
09916-14910: Valve spring compressor attachment
09916-84511: Tweezers

⚠ CAUTION

Be sure to restore each spring, valve and spring retainer to their original positions.



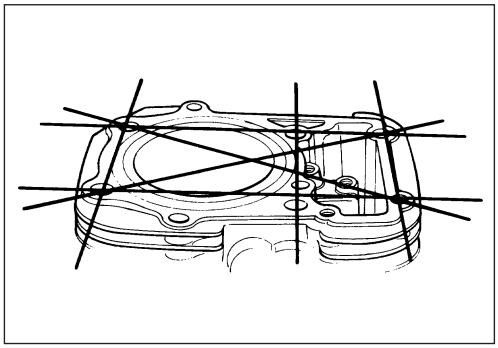
CYLINDER

CYLINDER DISTORTION

Check the gasketed surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

Cylinder distortion
Service Limit: 0.05 mm (0.002 in)

09900-20803: Thickness gauge

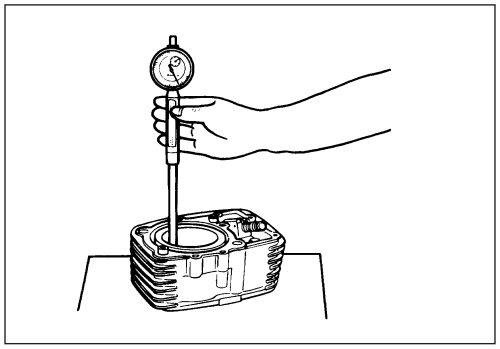


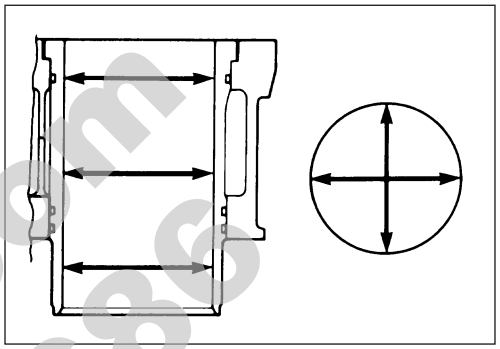
CYLINDER BORE

Measure the cylinder bore diameter at six places. If any one of the measurements exceeds the limit, overhaul the cylinder and replace the piston with an oversize, or replace the cylinder. Once the reboring is done on any one cylinder which measurements is beyond the limit, the remaining cylinders must be also rebored accordingly. Otherwise the imbalance might cause excess vibration.

DATA Cylinder bore
Service Limit: 83.085 mm (3.2711 in)

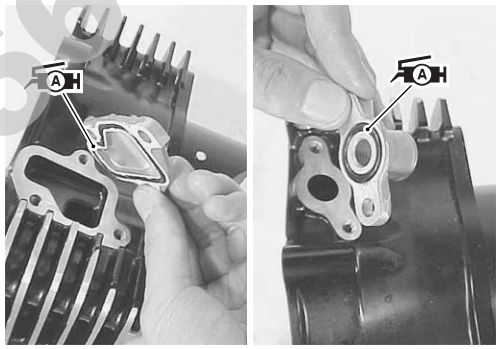
TOOL 09900-20508: Cylinder gauge set

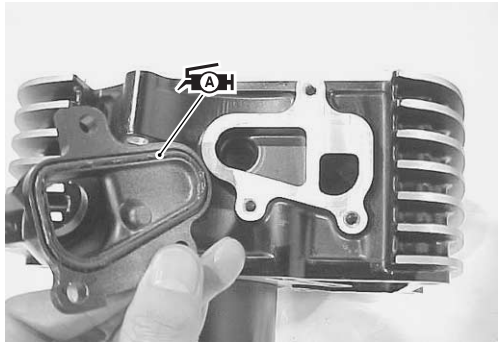




NOTE:
When installing the water union to the cylinder, apply grease to the new O-rings.

A 99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A"
(For the others)





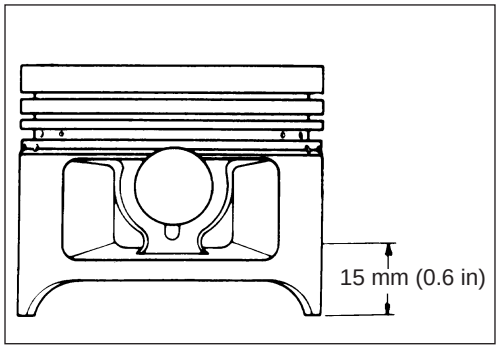
PISTON

PISTON DIAMETER

Using a micrometer, measure the piston outside diameter at the place shown in Fig. If the measurement is less than the limit, replace the piston.

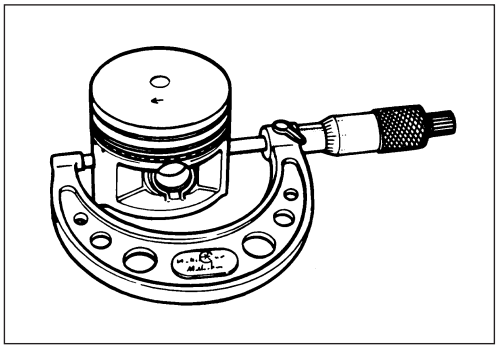
DATA Piston diameter
Service Limit: 82.880 mm (3.2630 in)

TOOL 09900-20204: Micrometer (75 – 100 mm)



PISTON-TO-CYLINDER CLEARANCE

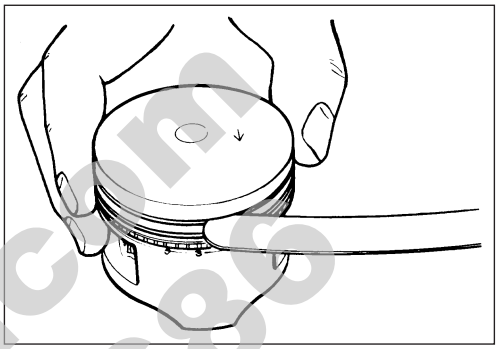
As a result of the aforesaid measurement, if the piston to cylinder clearance exceeds the following limit, overhaul the cylinder and use an oversize piston, or replace both cylinder and piston.



DATA **Piston to cylinder clearance**
Service Limit: 0.12 mm (0.0047 in)
Piston oversize: 0.5, 1.0 mm

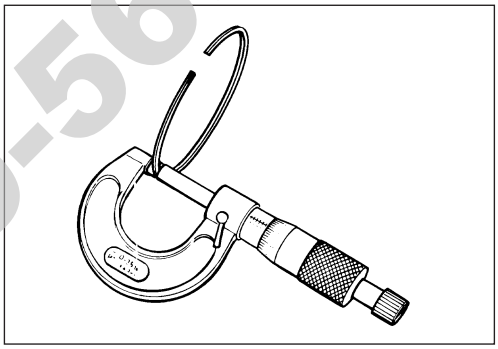
PISTON RING TO GROOVE CLEARANCE

Using a thickness gauge, measure the side clearances of the 1st and 2nd rings. If any of the clearances exceeds the limit, replace both piston and piston rings.



DATA **Piston ring-groove clearance**
Service Limit (1st) : 0.18 mm (0.0071 in)
(2nd) : 0.15 mm (0.0059 in)

DATA **Piston ring groove width**
Standard (1st) : 1.01 – 1.03 mm (0.0398 – 0.0406 in)
(2nd): 1.21 – 1.23 mm (0.0476 – 0.0484 in)
(Oil) : 2.51 – 2.53 mm (0.0988 – 0.0996 in)

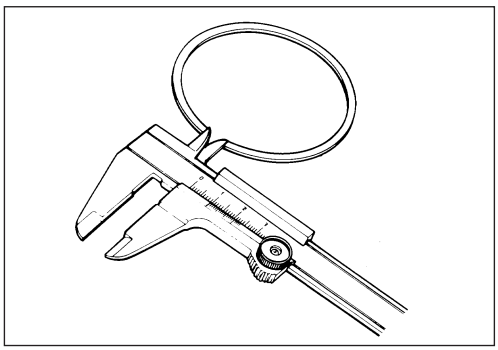


DATA **Piston ring thickness**
Standard (1st) : 0.970 – 0.990 mm (0.0382 – 0.0390 in)
(2nd): 1.170 – 1.190 mm (0.0461 – 0.0469 in)

TOOL **09900-20803: Thickness gauge**
09900-20205: Micrometer (0 – 25 mm)

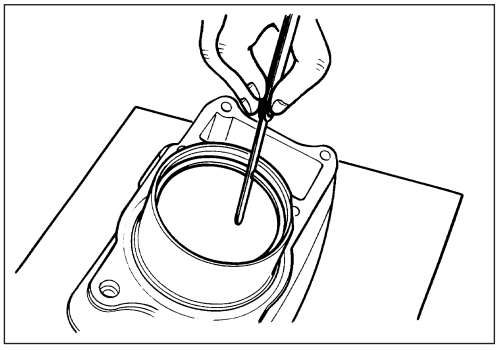
PISTON RING FREE END GAP AND END GAP

Before installing piston rings, measure the free end gap of each ring using vernier calipers. Next, fit the ring in the cylinder, and measure each ring end gap using a thickness gauge.
If any ring has an excess end gap, replace the ring.



DATA **Piston ring free end gap**
Service Limit (1st) : 7.7 mm (0.30 in)
(2nd) : 9.4 mm (0.37 in)

DATA **Piston ring end gap**
Service Limit (1st) : 0.70 mm (0.028 in)
(2nd) : 0.70 mm (0.028 in)



TOOL **09900-20102: Vernier calipers**
09900-20803: Thickness gauge

Oversize piston ring

The following two types of oversize piston rings are used. They bear the following identification numbers.

SIZE	1st	2nd
0.5 mm O.S.	50	50
1.0 mm O.S.	100	100

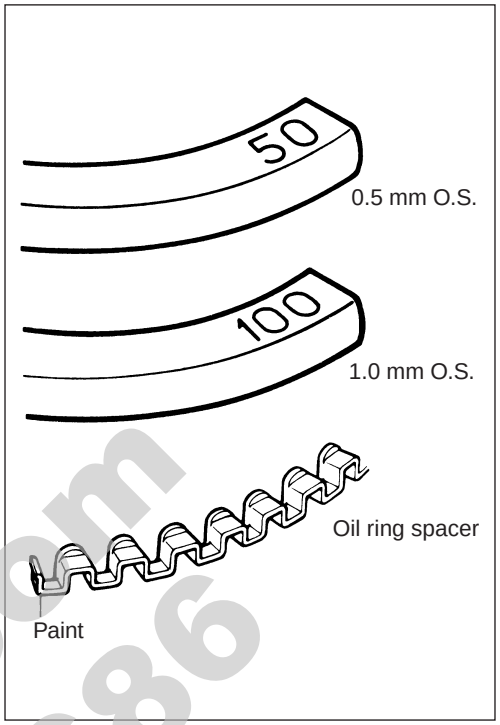
Oversize oil ring

The following two types of oversize oil rings are available as optional parts. They bear the following identification marks.

SIZE	COLOR
STD	NIL
0.5 mm O.S.	Painted Red
1.0 mm O.S.	Painted Yellow

Oversize side rail

Just measure outside diameter to identify the side rail as there is no mark or numbers on it.

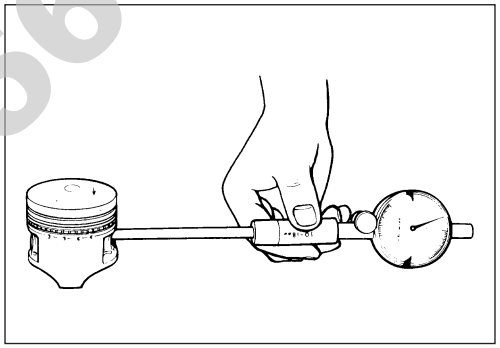


PISTON PIN AND PIN BORE

Using a small bore gauge, measure the piston pin bore inside diameter, and using a micrometer, measure the piston pin outside diameter. If the reading exceeds following limit, replace both piston and piston pin.

DATA **Piston pin bore I.D.**
Service Limit: 20.030 mm (0.7886 in)

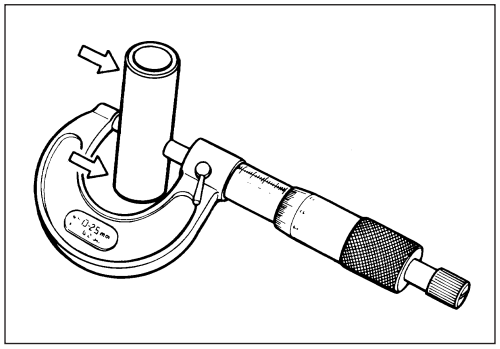
TOOL **09900-20602: Dial gauge (1/1000 mm, 1 mm)**
09900-22403: Small bore gauge (18 – 35 mm)



Using a micrometer, measure the piston pin outside diameter at three positions.

DATA **Piston pin O.D.**
Service Limit: 19.980 mm (0.7866 in)

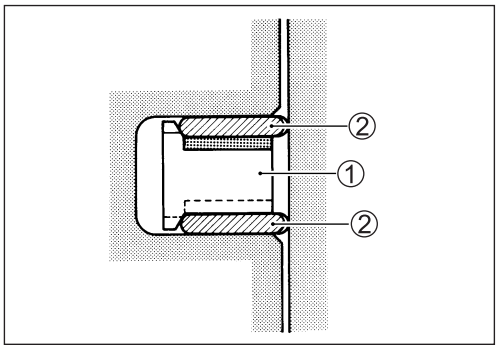
TOOL **09900-20205: Micrometer (0 – 25 mm)**



PISTON RING REASSEMBLY

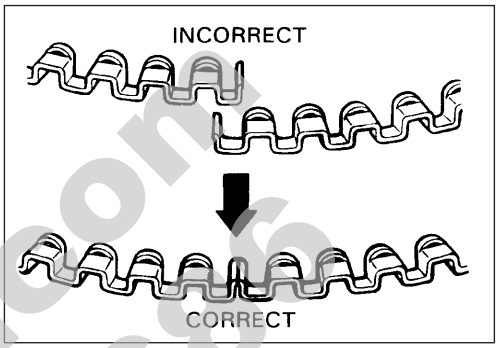
- Install the piston rings in the order of oil ring, 2nd ring and 1st ring.
- The first member to go into the oil ring groove is a spacer ①. After placing the spacer, fit the two side rails ②.

NOTE:
Side designations, top and bottom, are not applied to the spacer and side rails: you can position each either way.



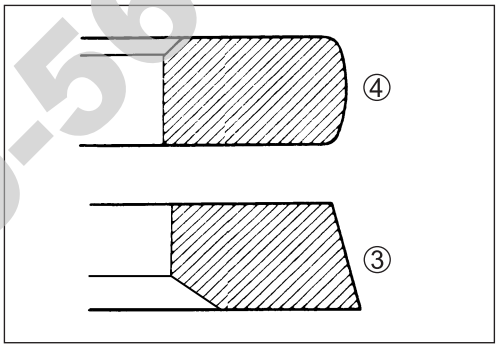
⚠ CAUTION

When installing the spacer, be careful not to allow its two ends to overlap in the groove.

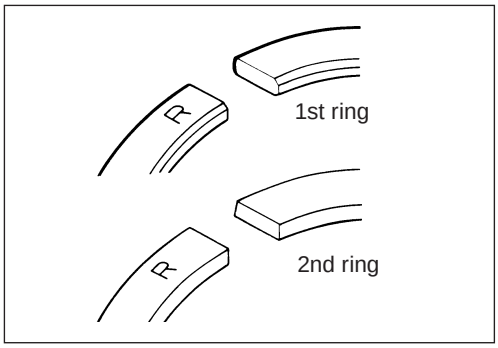


- Install the 2nd ring ③ and the 1st ring ④.

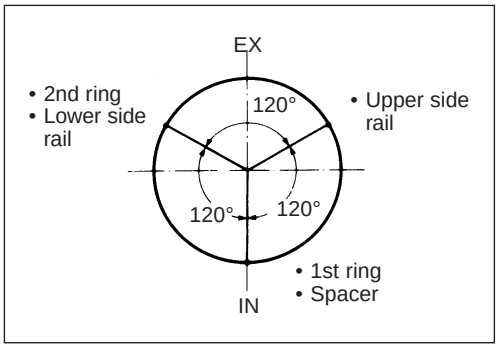
NOTE:
1st ring and 2nd ring differ in shape.



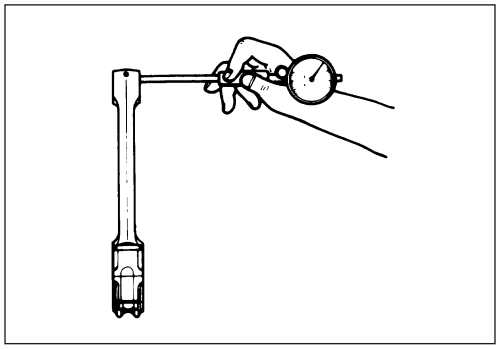
- 1st ring and 2nd ring have letter “R” marked on the side. Be sure to bring the marked side to the top when fitting them to the piston.



- Position the gaps of the three rings as shown. Before inserting each piston into the cylinder, check that the gaps are so located.



CONROD/CRANKSHAFT



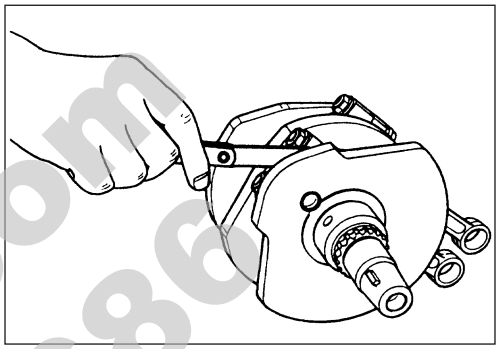
CONROD SMALL END I.D.

Using a small bore gauge, measure the conrod small end inside diameter.

DATA Conrod small end I.D.
Service Limit: 20.040 mm (0.7890 in)

TOOL 09900-20602: Dial gauge (1/1000 mm, 1 mm)
09900-22403: Small bore gauge (18 – 35 mm)

If the conrod small end inside diameter exceeds the above mentioned limit, replace the conrod.



CONROD BIG END SIDE CLEARANCE

Check the conrod thrust clearance by using a thickness gauge. If the clearance exceeds the limit, replace conrod or crankshaft.

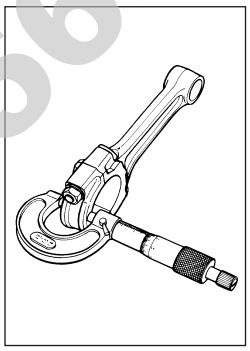
DATA Conrod big end side clearance
Service Limit: 0.30 mm (0.012 in)

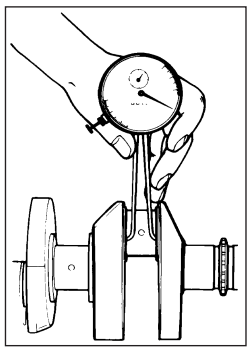
TOOL 09900-20803: Thickness gauge

DATA Conrod big end width
Standard: 21.95 – 22.00 mm (0.864 – 0.866 in)

DATA Crank pin width
Standard: 22.10 – 22.15 mm (0.870 – 0.872 in)

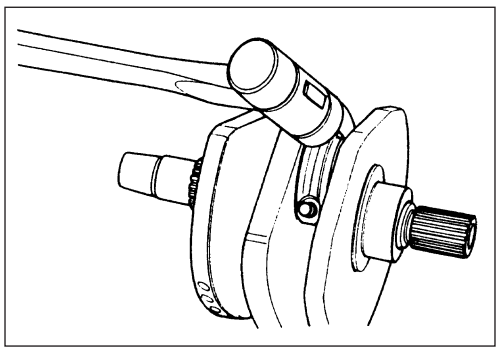
TOOL 09900-20205: Micrometer (0 – 25 mm)
09900-20605: Dial calipers (10 – 34 mm)





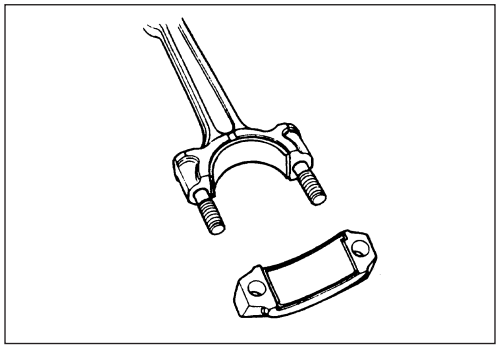
CONROD-CRANK PIN BEARING SELECTION

- Loosen the bearing cap nuts and tap the bolt end lightly with plastic hammer to remove the bearing cap.



- Remove the rods and mark them to identify the cylinder position.
- Inspect the bearing surfaces for any sign of fusion, pitting, burn, or flaws. If any, replace them with a specified set of bearings.

NOTE:
Never try to remove or loosen the conrod cap bolts due to their possible loosening in the rod. Once displaced, the bearing cap will not be fitted properly.



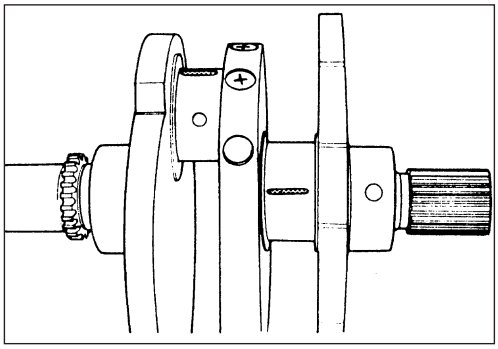
- Place plastigauge axially on the crank pin avoiding the oil hole, at TDC or BDC side as shown.
- Tighten the bearing cap with two-step torque values.

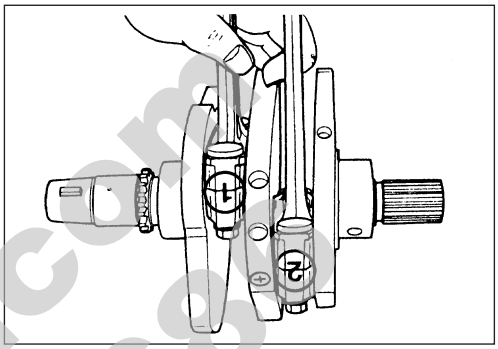
NOTE:
When fitting the bearing cap to crank pin, be sure to discriminate between its two ends, I.D. code side and the other.
I.D. code always faces intake valve side.

Conrod nut
Initial tightening torque : 25 N·m (2.5 kgf·m, 18.0 lb-ft)
Final tightening torque : 51 N·m (5.1 kgf·m, 37.0 lb-ft)

09900-22302: Plastigauge

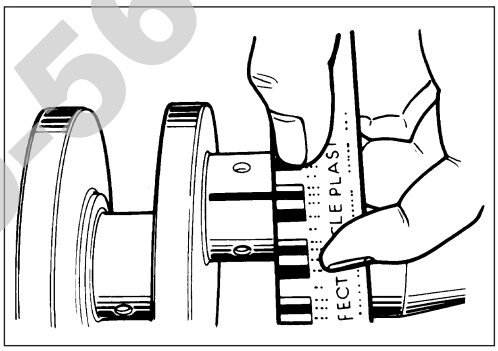
NOTE:
Never rotate the crankshaft or conrod when a piece of plastigauge is in the clearance.



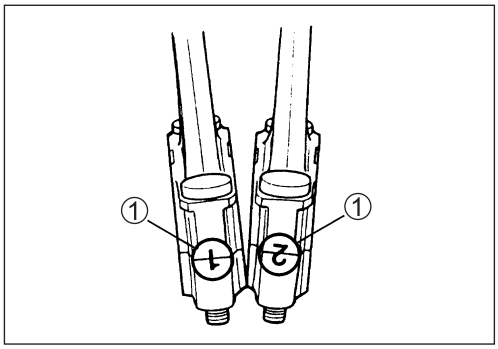


- Remove the caps and measure the width of compressed plastigauge with envelope scale. This measurement should be taken at the widest part.

Conrod big end oil clearance
Standard: 0.024 – 0.042 mm (0.0009 – 0.0017 in)
Service Limit: 0.080 mm (0.0031 in)

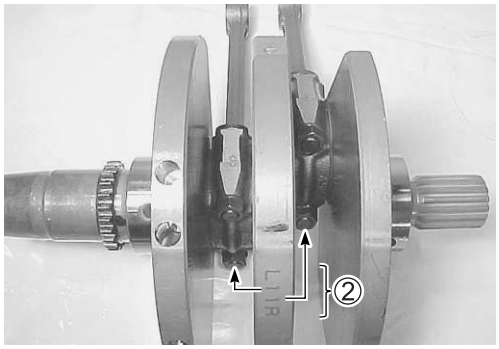


- If oil clearance exceeds the service limit, select the specified bearings from the following table.
- Check the corresponding conrod I.D. code number ① , "1", "2" or "3".
- Check the corresponding crank pin O.D. code number ② , "1", "2" or "3".
- The crank pin O.D. code number ②, "1", "2" or "3" which are stamped on the left crank web.



Bearing selection table

		Crank pin O.D. ②		
	Code	1	2	3
Conrod I.D. code ②	1	Green	Black	Brown
	2	Black	Brown	Yellow
	3	Brown	Yellow	Blue



Conrod I.D. specification

Code ①	I.D. specification
1	44.000 – 44.006 mm (1.7323 – 1.7325 in)
2	44.006 – 44.012 mm (1.7325 – 1.7328 in)
3	44.012 – 44.018 mm (1.7328 – 1.7330 in)

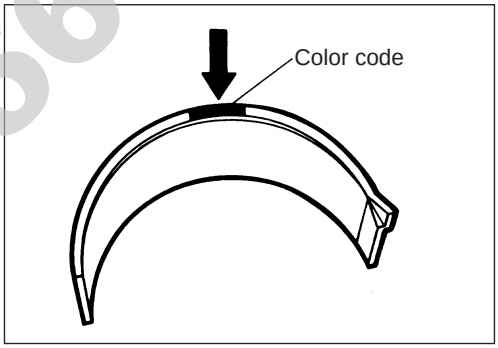
Crank pin O.D. specification

Code ②	O.D. specification
1	40.994 – 41.000 mm (1.6139 – 1.6142 in)
2	40.988 – 40.994 mm (1.6137 – 1.6139 in)
3	40.982 – 40.988 mm (1.6135 – 1.6137 in)

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

Bearing thickness specification

Color (Part No.)	Thickness
Green (12164-38E00-0A0)	1.485 – 1.488 mm (0.0585 – 0.0586 in)
Black (12164-38E00-0B0)	1.488 – 1.491 mm (0.0586 – 0.0587 in)
Brown (12164-38E00-0C0)	1.491 – 1.494 mm (0.0587 – 0.0588 in)
Yellow (12164-38E00-0D0)	1.494 – 1.497 mm (0.0588 – 0.0589 in)
Blue (12164-38E00-0E0)	1.497 – 1.500 mm (0.0589 – 0.0591 in)

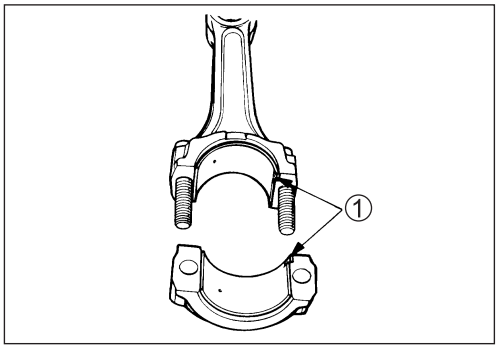


⚠ CAUTION

The bearings should be replaced as a set.

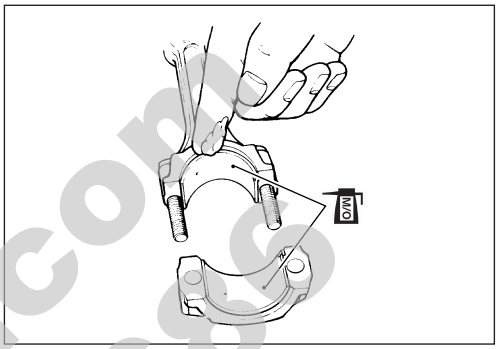
CONROD/CRANK PIN BEARING ASSEMBLY

- When fitting the bearing to the bearing cap and conrod, be sure to fix the stopper part ① first and press in the other end.



- Apply molybdenum oil solution to the crank pin and bearing surface.

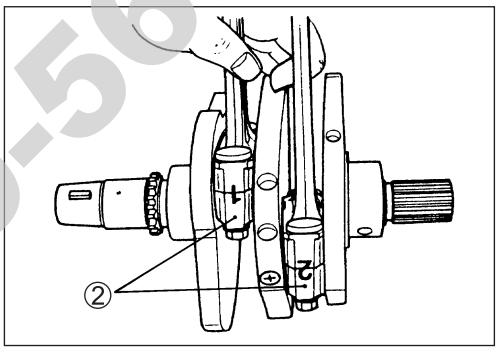
99000-25140: SUZUKI MOLY PASTE



- When mounting the conrod on the crankshaft, make sure that I.D. code ② of the conrod faces rearward.
- Tighten the conrod fitting nuts with specified torque after applying engine oil to the nut thread.

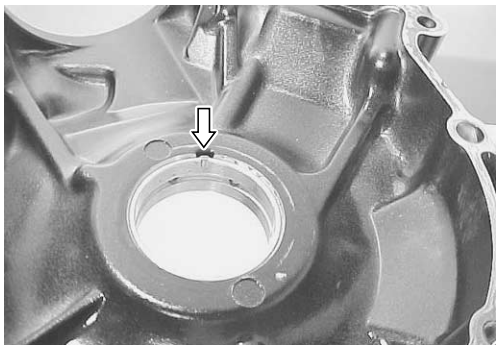
Conrod nut
Initial tightening torque: 25 N·m (2.5 kgf·m, 18.0 lb-ft)
Final tightening torque: 51 N·m (5.1 kgf·m, 37.0 lb-ft)

- Check the conrod movement for smooth turning.



CRANKCASE/CRANKSHAFT BEARING SELECTION

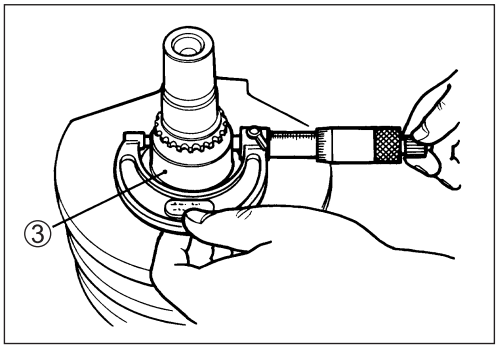
- Inspect the crankshaft and crankshaft journal bearings for any damage.



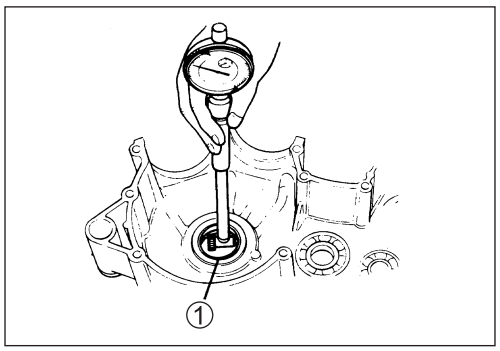
- Measure the crankshaft journal O.D. ③ by using the special tool.

Crankshaft journal O.D. ③
Standard: 47.965 – 47.980 mm (1.8884 – 1.8890 in)

09900-20202: Micrometer (25 – 50 mm)



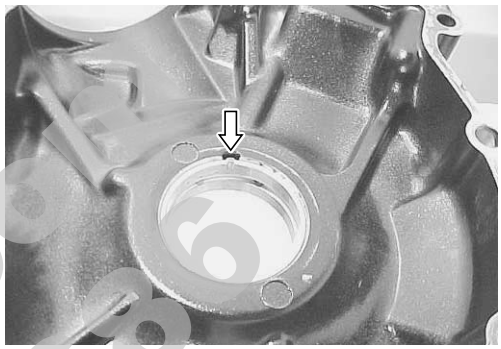
- Measure the crankshaft journal bearing I.D. ① by using the special tool.



DATA Crankshaft journal bearing I.D. ①
Standard: 48.000 – 48.015 mm (1.8898 – 1.8904 in)

TOOL 09900-20508: Cylinder gauge set

If each crankshaft journal bearing I.D. is not within the standard range, replace them with new ones.



- Remove the crankshaft bearing with taking care not to damage the crankcase journal bearing hole.
- Inspect the journal bearing hole of crankcase for any sign of pitting or flaw.
  If any, repair it with emery paper.
- Install the new journal bearings into the crankcases by hydraulic press.
- Hone the new journal bearings with the specified value by honing machine.

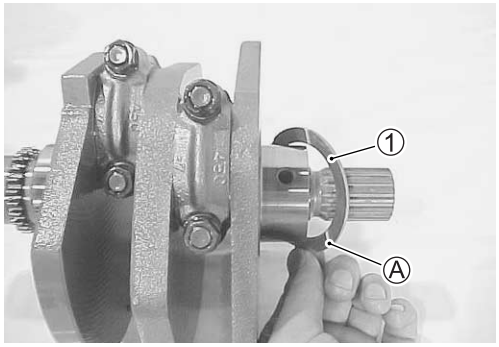
⚠ CAUTION

When honing the new journal bearings, be sure to mate the left and right crankcases.

CRANKSHAFT THRUST CLEARANCE

Install the crankshaft in the right crankcase half after installing the thrust shim on the crankshaft.

NOTE:
The oil grooved face Ⓐ of thrust shim ① is faced to crankshaft web side.



- Place the thrust washer, camshaft drive sprocket and primary drive gear on the right end of the crankshaft and tighten primary drive gear bolt to the specified torque. (☞3-59)

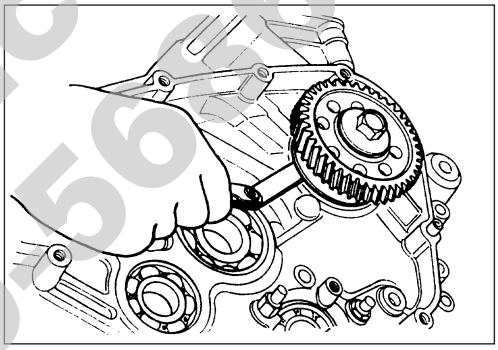
TOOL 09930-40113: Rotor holder

Primary drive gear bolt: 95 N·m (9.5 kgf·m, 68.5 lb-ft)

- Use a thickness gauge to measure the thrust clearance between right cankcase and thrust washer.

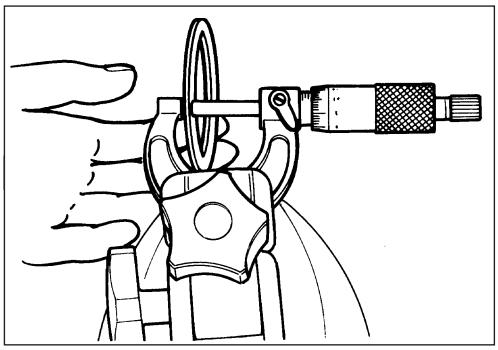
DATA Crankshaft thrust clearance
Standard: 0.05 – 0.10 mm (0.002 – 0.004 in)

TOOL 09900-20803: Thickness gauge



If the thrust clearance exceeds the standard range, adjust the thrust clearance by the following procedures:

- Remove the thrust shim, and measure its thickness with a micrometer.
- Change the thrust shim with the other shim if the thrust clearance is incorrect.
- Perform the thrust clearance measurement described above once again.



TOOL 09900-20205: Micrometer (0 – 25 mm)

Checking to make sure it is within standard

Unit: mm (in)

Part number	Thrust shim thickness
09160-48001	1.925 – 1.950 (0.0758 – 0.0768)
09160-48002	1.950 – 1.975 (0.0768 – 0.0778)
09160-48003	1.975 – 2.000 (0.0778 – 0.0787)
09160-48004	2.000 – 2.025 (0.0787 – 0.0797)
09160-48005	2.025 – 2.050 (0.0797 – 0.0807)
09160-48006	2.050 – 2.075 (0.0807 – 0,0817)
09160-48007	2.075 – 2.100 (0.0817 – 0.0827)
09160-48008	2.100 – 2.125 (0.0827 – 0.0837)
09160-48009	2.125 – 2.150 (0.0837 – 0.0846)
09160-48010	2.150 – 2.175 (0.0846 – 0.0856)

CLUTCH

CLUTCH DRIVE AND DRIVEN PLATES

NOTE:
Wipe off the engine oil from the drive and driven plates with a clean rag.

Measure the thickness of drive plates with a vernier calipers. If each drive plate is not within the standard range, replace it with a new one.

DATA Clutch drive plate thickness
Standard (No.1): 2.92 – 3.08 mm (0.115 – 0.121 in)
(No.2): 3.42 – 3.58 mm (0.135 – 0.141 in)

TOOL 09900-20102: Vernier calipers

Measure the claw width of drive plates with a vernier calipers. Replace the drive plates found to have worn down to the limit.

DATA Clutch drive plate claw width (No. 1 & No. 2)
Service Limit: 15.1 mm (0.594 in)

TOOL 09900-20102: Vernier calipers

Measure each driven plate for distortion with a thickness gauge and surface plate.
Replace driven plates which exceed the limit.

DATA Clutch driven plate distortion
Service Limit: 0.1 mm (0.004 in)

TOOL 09900-20803: Thickness gauge

CLUTCH SPRING FREE LENGTH

Measure the free length of each coil spring with a vernier calipers, and compare the elastic strength of each with the specified limit. Replace all the springs if any spring is not within the limit.

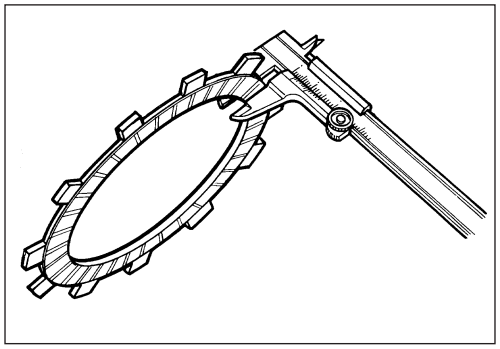
DATA Clutch spring free length
Service Limit: 46.8 mm (1.84 in)

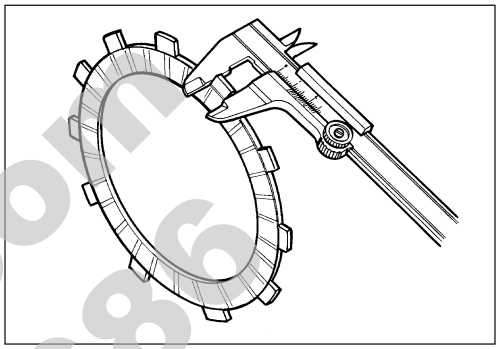
TOOL 09900-20102: Vernier calipers

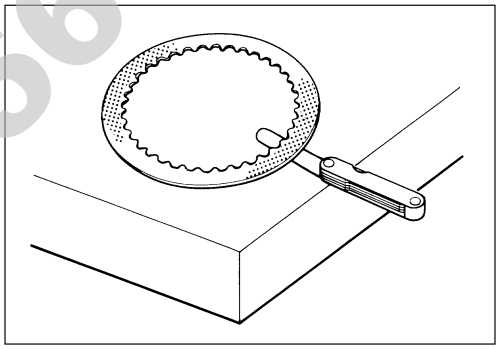
CLUTCH BEARING

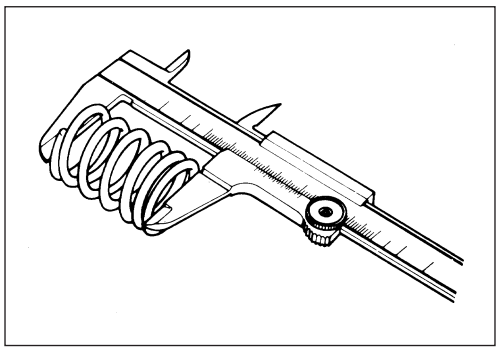
Inspect the clutch release bearing for any abnormality, particularly cracks, upon removal from the clutch, to decide whether it can be reused or should be replaced.
Smooth engagement and disengagement of the clutch depends much on the condition of this bearing.

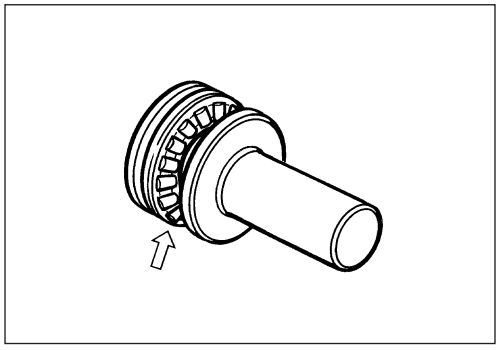
NOTE:
Thrust washer is located between the pressure plate and thrust bearing.









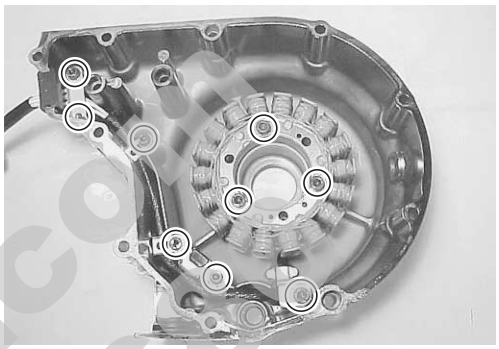


GENERATOR/SIGNAL GENERATOR/ STARTER CLUTCH

GENERATOR STATOR AND SIGNAL GENERATOR STATOR INSPECTION☞8-8, 19, 20

GENERATOR STATOR AND SIGNAL GENERATOR STATOR SERVICING

When replacing the generator stator or signal generator stator, route the wire properly.

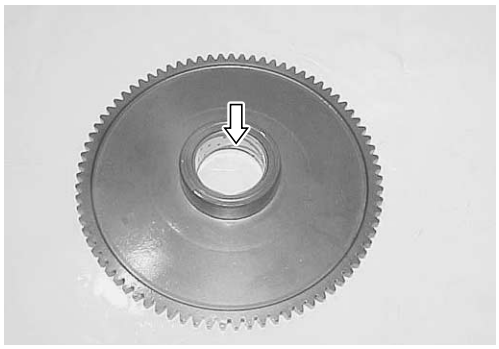


STARTER CLUTCH INSPECTION

Install the starter driven gear onto the starter clutch and turn the starter driven gear by hand to inspect the starter clutch for a smooth movement. The gear turns one direction only. If a large resistance is felt to rotation, inspect the starter clutch for damage or inspect the starter clutch contacting surface of the starter driven gear for wear or damage.
If they are found to be damaged, replace them with new ones.

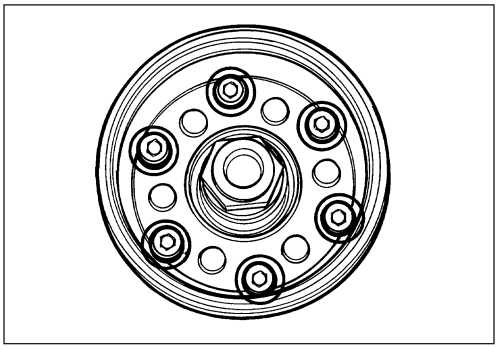
STARTER DRIVEN GEAR BEARING INSPECTION

Inspect the starter driven gear bearing for any damages.

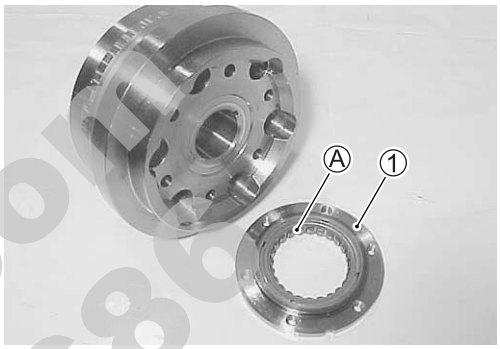


STARTER CLUTCH SERVICING

- Hold the rotor with off-set wrench and remove the starter clutch securing bolts.



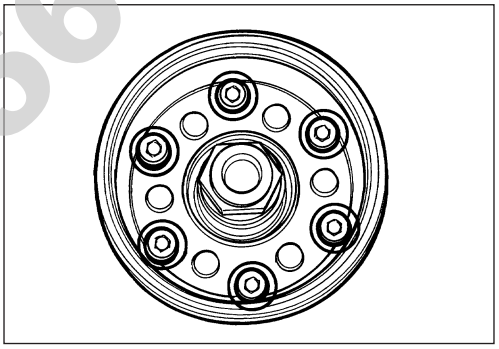
- When fitting the one way clutch to the guide ①, position flange side Ⓐ of one way clutch to the rotor side.



- Apply THREAD LOCK SUPER "1303" to the securing bolts and tighten them to the specified torque while holding the rotor with off-set wrench.

1303 99000-32030: THREAD LOCK SUPER "1303"

Starter clutch securing bolt: 26 N·m (2.6 kgf·m, 19.0 lb-ft)



OIL PUMP

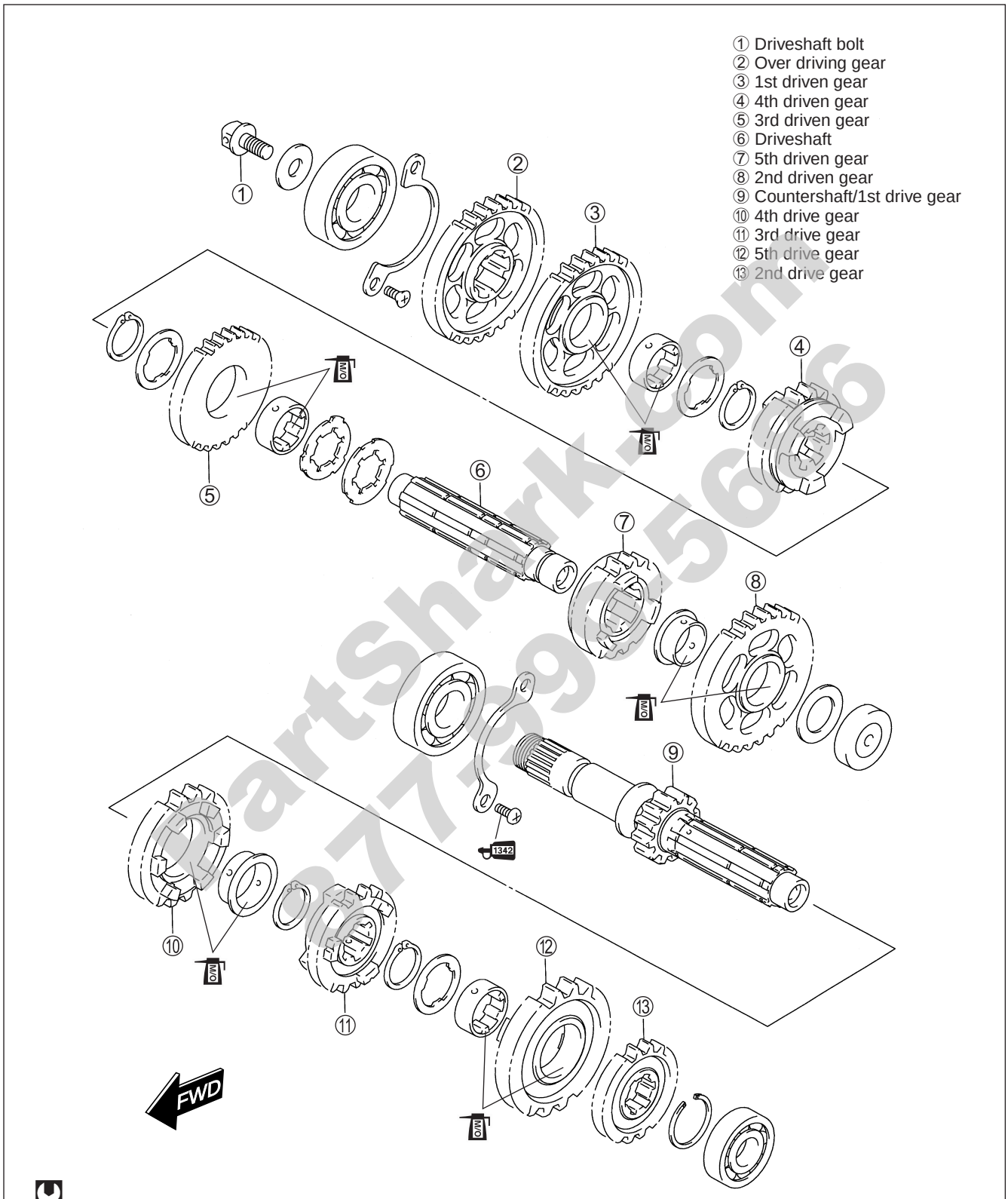
- Rotate the oil pump by hand and check that it moves smoothly.
- If it does not move smoothly, replace the oil pump assembly.

Do not attempt to disassemble the oil pump assembly. The oil pump is available only as an assembly.

TRANSMISSION

DISASSEMBLY

• Disassemble the transmission gears as shown in the illustration.



ITEM	N·m	kgf·m	lb-ft
①	65	6.5	47.0

REASSEMBLY

Assemble the countershaft and driveshaft in the reverse order of disassembly. Pay attention to following points:

NOTE:
Always use new circlips.

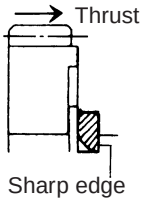
NOTE:
Before installing the gears, coat lightly moly paste or engine oil to the driveshaft and countershaft.

99000-25140: SUZUKI MOLY PASTE

⚠ CAUTION

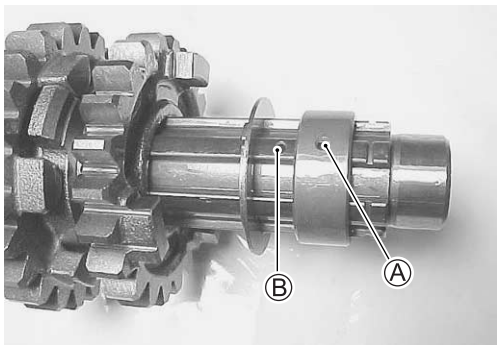
*** Never reuse a circlip. After a circlip has been removed from a shaft, it should be discarded and a new circlip must be installed.**
*** When installing a new circlip, care must be taken not to expand the end gap larger than required to slip the circlip over the shaft.**
*** After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.**

- When installing a new circlip, pay attention to the direction of the circlip. Fit it to the side where the thrust is as shown in figure.

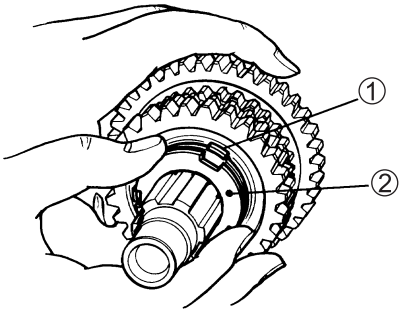


⚠ CAUTION

When installing the top drive gear bushing, align the bushing oil hole Ⓐ with the countershaft hole Ⓑ.

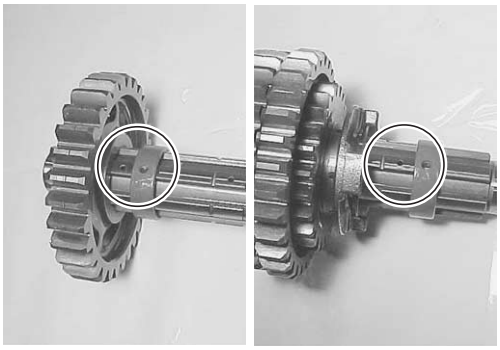


When installing the 3rd driven gear onto the driveshaft, install the lock washer No.2 ① onto the driveshaft, and turn and fit it into the groove.
Then, fit the lock washer No.1 ② in the lock washer No.2 ①.

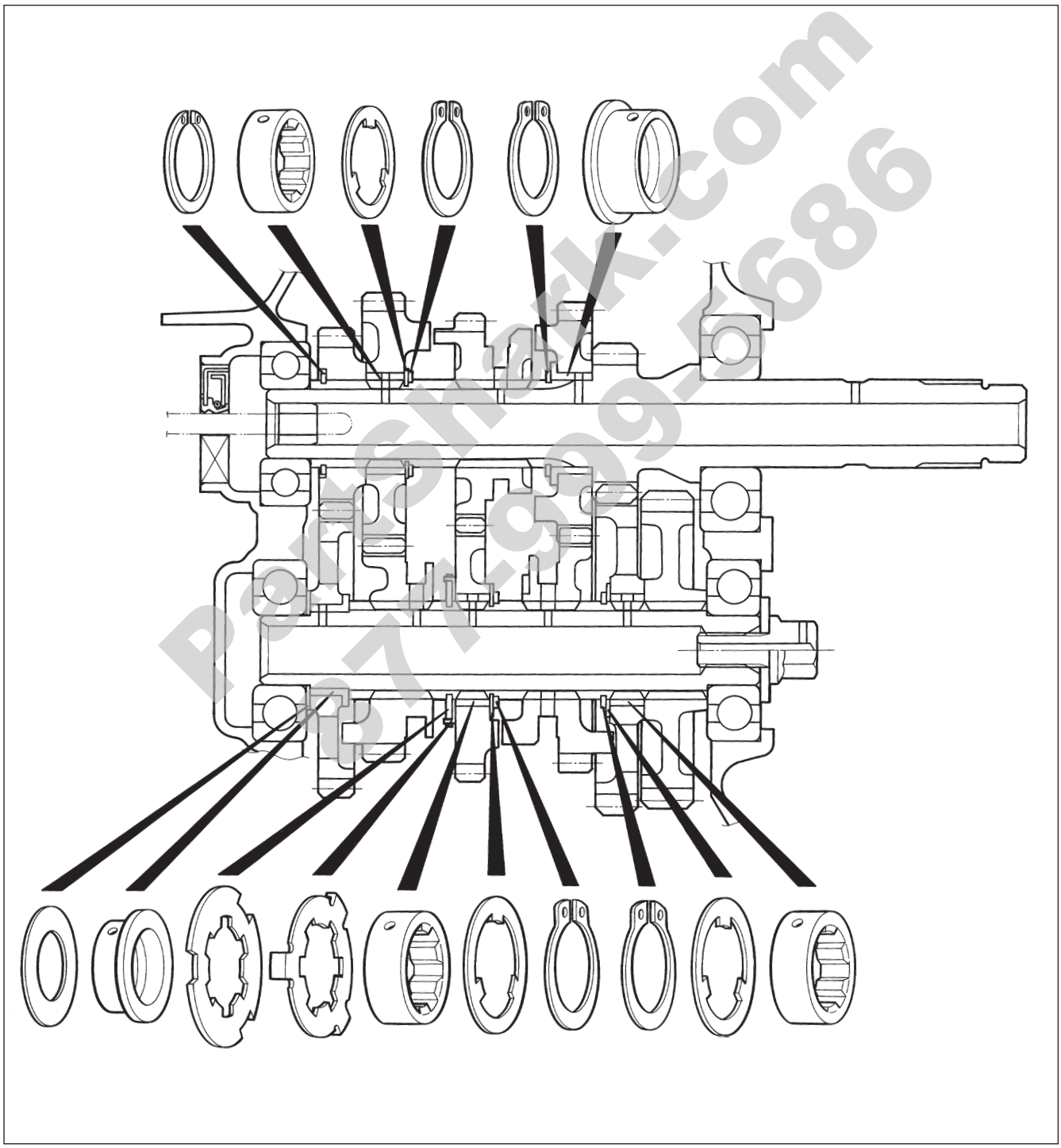


⚠ CAUTION

When installing the 1st and 3rd driven gear bushings, align the bushing oil hole with the driveshaft oil hole.



TRANSMISSION GEARS AND RELATED PARTS



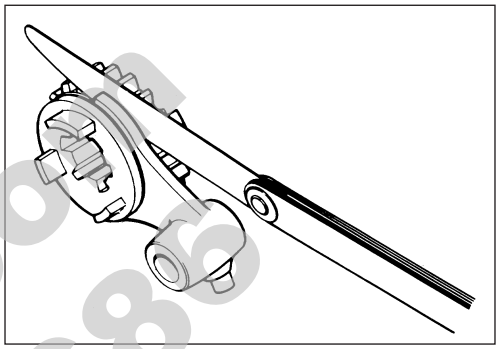
GEARSHIFT FORK

GEARSHIFT FORK TO GROOVE CLEARANCE

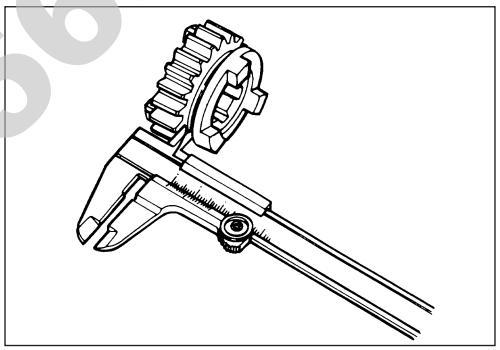
Using a thickness gauge, check the shifting fork clearance in the groove of its gear.
The clearance for each of the three shifting forks plays an important role in the smoothness and positiveness of shifting action.
If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

DATA Gearshift fork to groove clearance
Standard: 0.10 – 0.30 mm (0.004 – 0.012 in)
Service Limit: 0.50 mm (0.020 in)

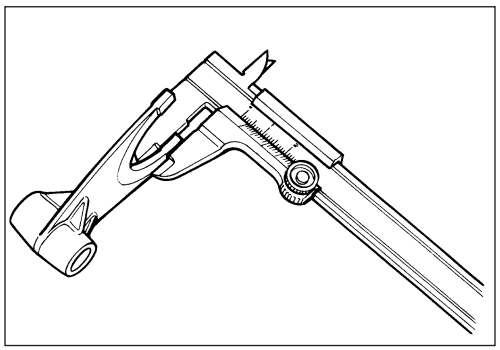
TOOL 09900-20803: Thickness gauge
09900-20102: Vernier calipers



DATA Shift fork groove width
Standard (No. 1): 5.50 – 5.60 mm (0.217 – 0.220 in)
(No. 2): 4.50 – 4.60 mm (0.177 – 0.181 in)



DATA Shift fork thickness
Standard (No. 1): 5.30 – 5.40 mm (0.209 – 0.213 in)
(No. 2): 4.30 – 4.40 mm (0.169 – 0.173 in)



OIL JET

Check the all oil jets for cogging. If it is clogged, clean its oil passage with a compressed air.

⚠ CAUTION

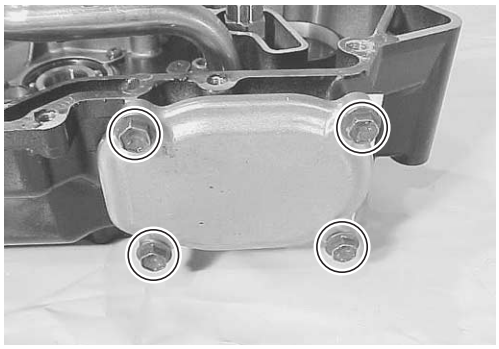
Use new O-rings to prevent the oil pressure down.

NOTE:
When installing the oil jets apply oil to the O-rings.

CRANKCASE

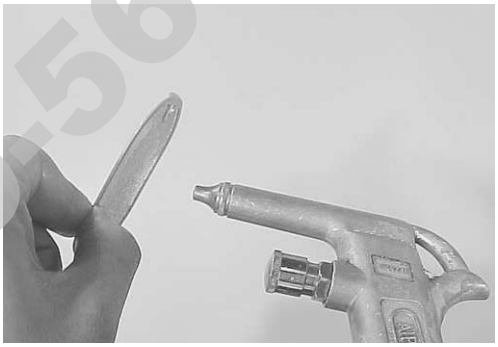
OIL SUMP FILTER

- Remove the oil sump filter cover.



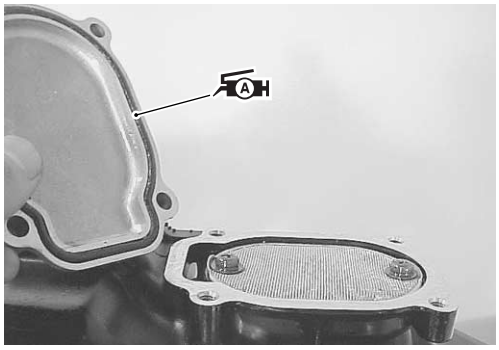
- Remove the oil sump filter.

- Clean the oil sump filter using compressed air.



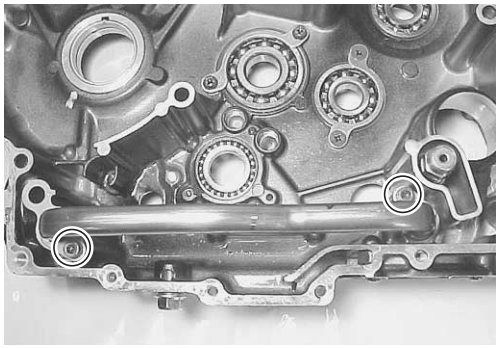
- When installing the O-ring, apply grease to it.

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A"
(For the others)



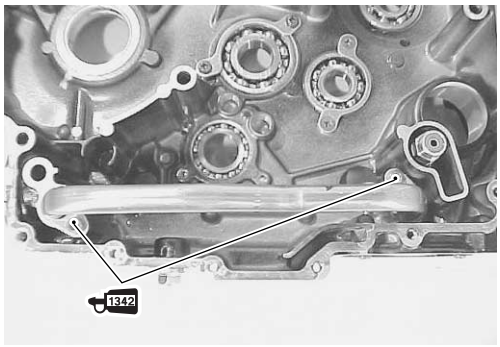
OIL PIPE

- Remove the oil pipe.



- When installing the oil pipe, use the new O-rings.
- Apply a small quantity of the THREAD LOCK “1342” to the oil pipe retainer bolts and tighten them securely.

1342 99000-32050: THREAD LOCK “1342”

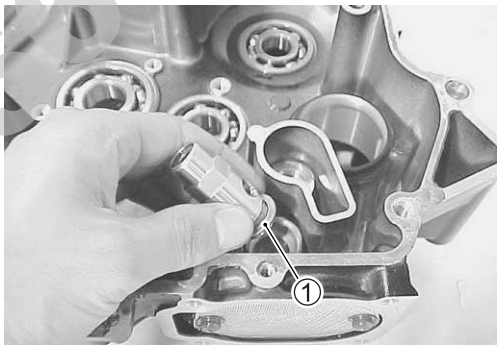


OIL PRESSURE REGULATOR

- Remove the oil pressure regulator.

Check the operation of the oil pressure regulator by pushing on the piston with an appropriately shaped tool. If the piston does not operate, replace the oil pressure regulator with a new one.

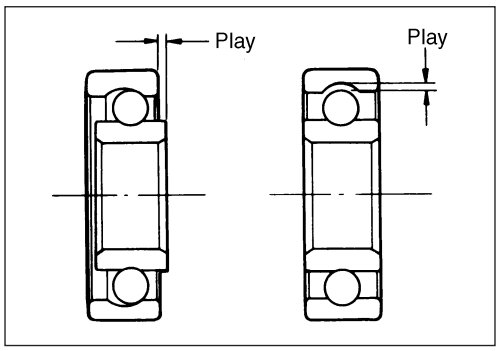
- When installing the oil pressure regulator, install the new washer ①.



BEARING INSPECTION

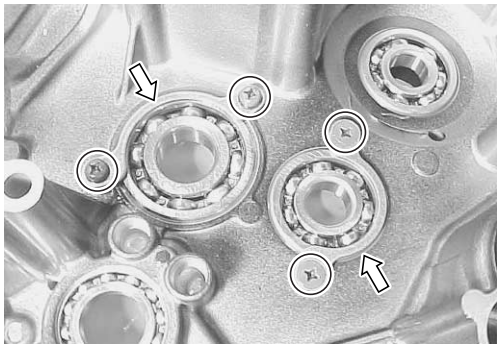
Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase.

Replace the bearing in the following procedure if there is anything unusual.



BEARING DISASSEMBLY

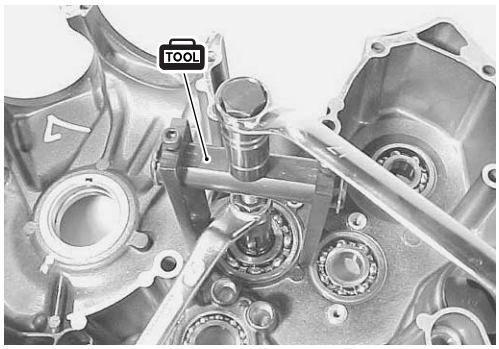
- Remove the bearing retainers.



• Remove the bearing with the special tool.

TOOL **09921-20220: Bearing remover set**

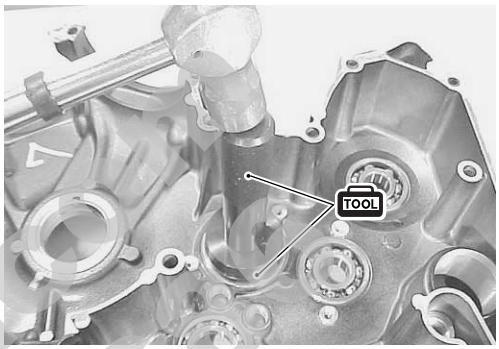
NOTE:
If abnormal noise does not occur, it is not necessary to remove the bearing.



BEARING REASSEMBLY

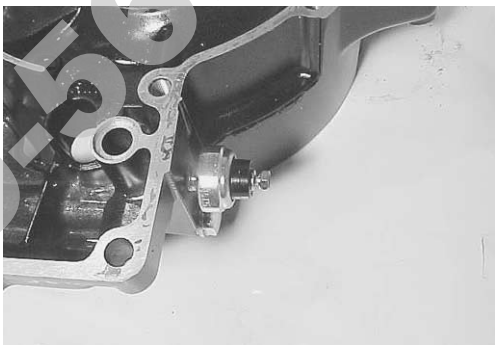
• Install the bearing into the crankcase with the special tool.

TOOL **09913-70210: Bearing installer set**



OIL PRESSURE SWITCH

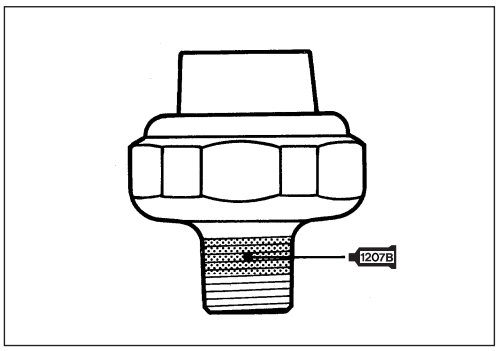
• Remove the oil pressure switch.



• When installing the switch, apply SUZUKI BOND “1207B”.

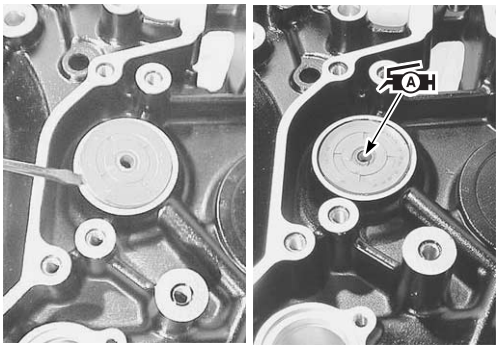
Oil pressure switch: 14 N·m (1.4 kgf·m, 10.0 lb-ft)

1207B **99104-31140: SUZUKI BOND “1207B” (For USA)**
99000-31140: SUZUKI BOND “1207B” (For the others)



OIL SEAL

• Remove the oil seal.



• Install the oil seal with the special tool.
• Apply grease to the oil seal lip.

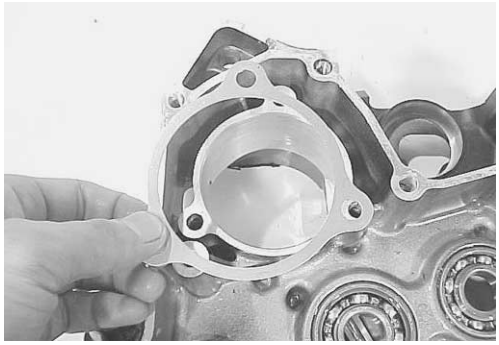
A **99000-25030: SUZUKI SUPER GREASE “A” (For USA)**
99000-25010: SUZUKI SUPER GREASE “A”
(For the others)

TOOL **09913-70210: Bearing installer set**

ENGINE REASSEMBLY

Reassemble the engine in the reverse order of disassembly. The following steps require special attention or precautionary measures should be taken.

NOTE:
Apply engine oil to each running and sliding part before reassembling.



SECONDARY DRIVE BEVEL GEAR

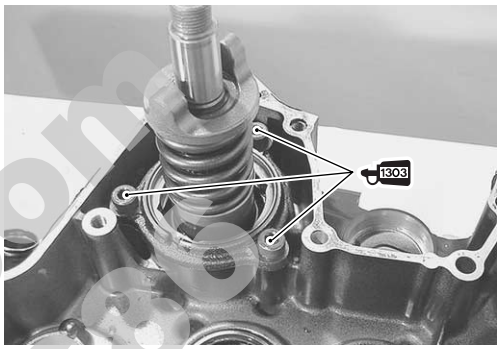
- Install the secondary drive bevel gear shim(s).

  SHIM SELECTION ☞4-6
- Install the secondary drive bevel gear assembly and tighten the retainer bolts to the specified torque.

NOTE:
Apply THREAD LOCK SUPER "1303" to the thread of the bolts.

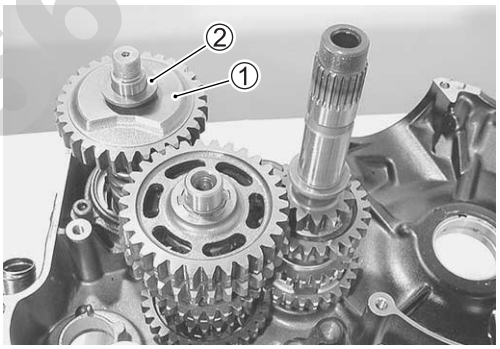
1303 99000-32030: THREAD LOCK SUPER "1303"

Secondary drive gear bearing retainer bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

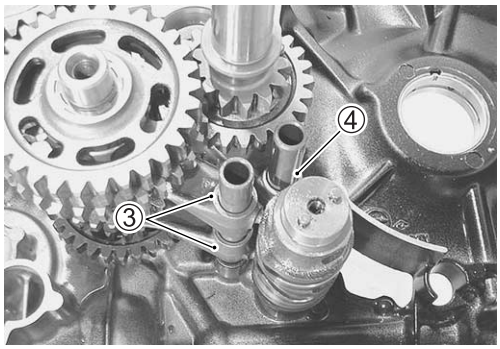


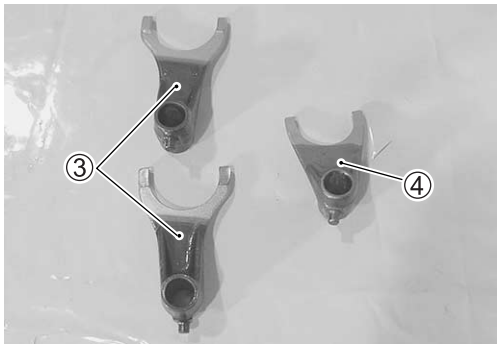
COUNTERSHAFT/DRIVESHAFT

- Install the countershaft assembly and driveshaft assembly.
- Install the over driving gear ① and bush ②.



- Install the gearshift forks ③④, gearshift fork shafts and gearshift cam.
  ③ No. 1 shift forks (For 4th and 5th driven gears)
  ④ No. 2 shift fork (For 3rd drive gear)





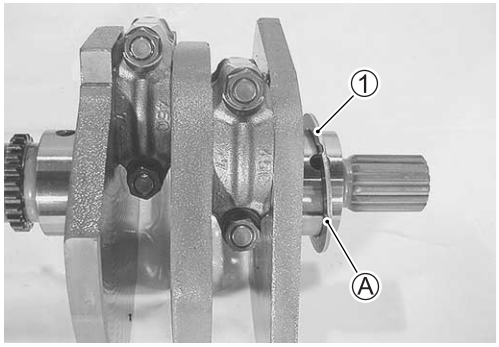
CRANKSHAFT

- Install the thrust shim ① on the crankshaft.

NOTE:

** The grooved face Ⓐ of thrust shim ① faces to crankshaft web side.*

** The thrust shim is selected by the crankshaft thrust clearance. (☞ 3-42)*



- Install the crankshaft into the left crankcase half.

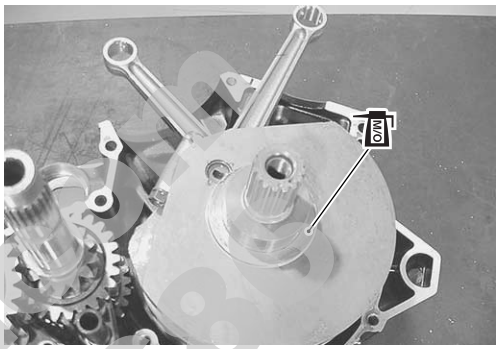
NOTE:

Coat lightly moly paste to the crankshaft journal bearings and the thrust shim.

M: 99000-25140: SUZUKI MOLY PASTE

⚠ CAUTION

Never strike the crankshaft with a plastic hammer when inserting it into the crankcase. It will be easy to install the crankshaft to left crankcase.

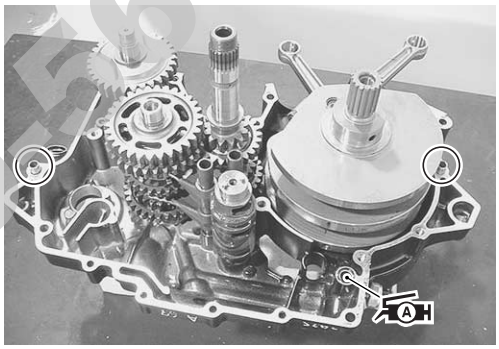


- Install the dowel pins and O-ring on the left crankcase half.

NOTE:

Apply grease to the O-ring.

A: 99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A" (For the others)

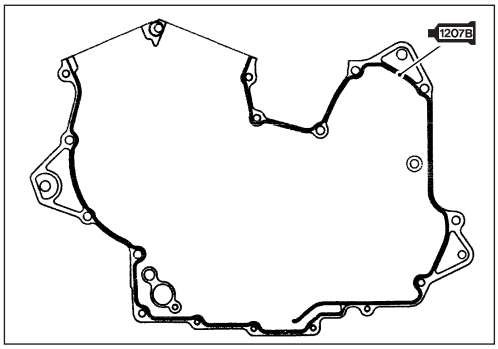


⚠ CAUTION

Use the new O-ring to prevent oil leakage.

- Clean the mating surfaces of the left and right crankcase halves.
- Apply SUZUKI BOND "1207B" to the mating surface of the right crankcase.

1207B: 99104-31140: SUZUKI BOND "1207B" (For USA)
99000-31140: SUZUKI BOND "1207B" (For the others)



NOTE:

Use of SUZUKI BOND "1207B" is as follows:

** Make surfaces free from moisture, oil, dust and other foreign materials.*

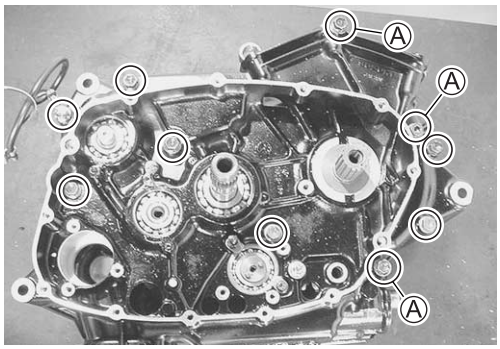
** Spread on surfaces thinly to form an even layer, and assemble the crankcases within few minutes.*

** Take extreme care not to apply any BOND "1207B" to the oil hole, oil groove and bearing.*

** Apply to distorted surfaces as it forms a comparatively thick film.*

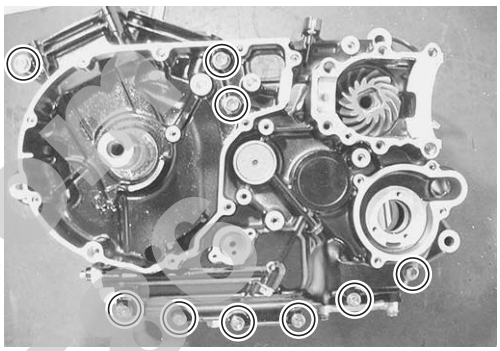
- Fit the gasket to the bolt Ⓐ.
- When securing the right and left crankcase halves, tighten each bolt a little at a time to equalize the pressure. Tighten all the securing bolts to the specified torque values.

Crankcase 8mm bolt: (Initial) 15 N·m (1.5 kgf·m, 11.0 lb-ft)
(Final) 22 N·m (2.2 kgf·m, 16.0 lb-ft)
Crankcase 6mm bolt: 11 N·m (1.1 kgf·m, 8.0 lb-ft)



⚠ CAUTION

Do not drop the O-ring into the crankcase when assembling the right and left crankcase halves.

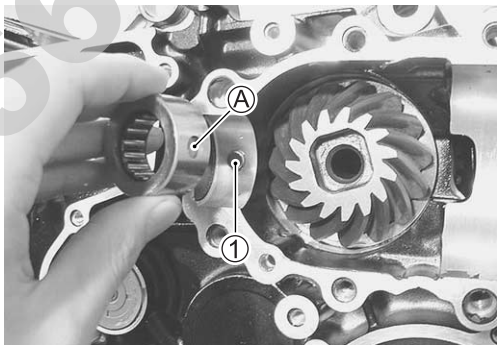


NOTE:
After the crankcase bolts have been tightened, check if the crankshaft, secondary drive bevel gear shaft, countershaft and the driveshaft rotate smoothly.

SECONDARY DRIVEN BEVEL GEAR

- Install the secondary driven bevel gear bearing and the pin ①.

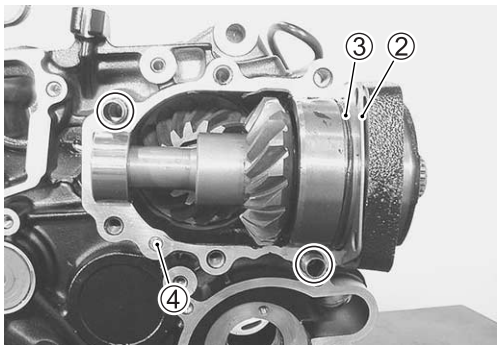
NOTE:
Align the hole Ⓐ of the secondary driven bevel gear bearing with the pin ①.



- Install the secondary driven bevel gear assembly, shim(s) ② and O-ring ③.
- Install the dowel pins and the oil jet ④.

⚠ CAUTION

Use the new O-ring to prevent oil leakage.

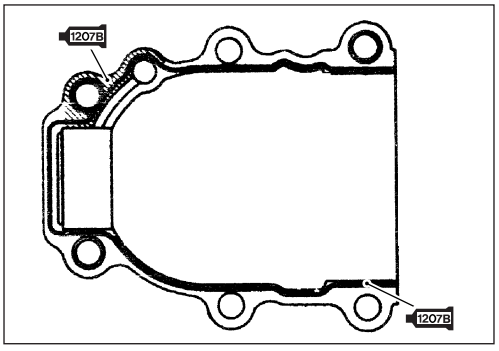


NOTE:
** Refer to the section 4 for shim selection.*
** Apply grease to the O-ring.*

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A" (For the others)

- Clean the mating surfaces of the crankcase and the secondary gear case.
- Apply SUZUKI BOND "1207B" to the mating surface of the secondary gear case.

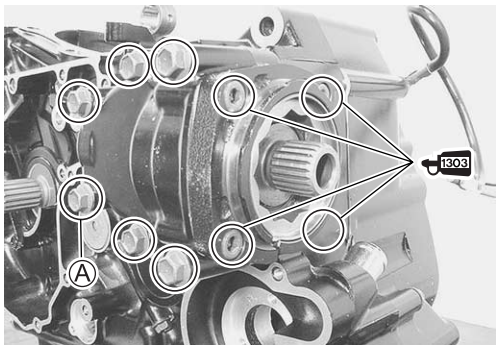
99104-31140: SUZUKI BOND "1207B" (For USA)
99000-31140: SUZUKI BOND "1207B" (For the others)



NOTE:
** Make surfaces free from moisture, oil, dust and other foreign materials.*
** Spread on surfaces thinly to form an even layer, and assemble the crankcases within few minutes.*
** Take extreme care not to apply any BOND "1207B" to the oil hole, oil groove and bearing.*
** Apply to distorted surfaces as it forms a comparatively thick film.*

• Tighten the secondary gear case bolts to the specified torque.

Secondary gear case bolt (Initial): 15 N·m (1.5 kgf·m, 11.0 lb-ft)
(Final) : 22 N·m (2.2 kgf·m, 16.0 lb-ft)



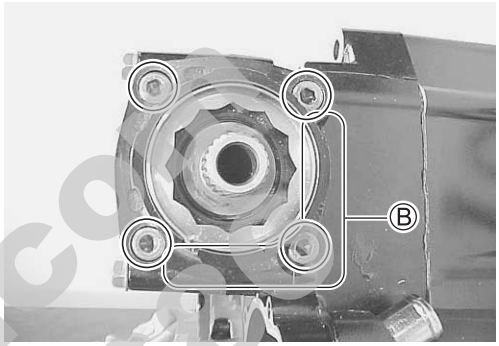
NOTE:
Fit the washer to the bolt Ⓐ.

• Tighten the secondary driven bevel gear bolt to the specified torque.

NOTE:
* *Hollow portion Ⓑ of the secondary driven gear assembly faces inside.*
* *Apply a small quantity of THREAD LOCK SUPER "1303" to the bolt.*

1303 99000-32030: THREAD LOCK SUPER "1303"

Secondary driven bevel gear bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

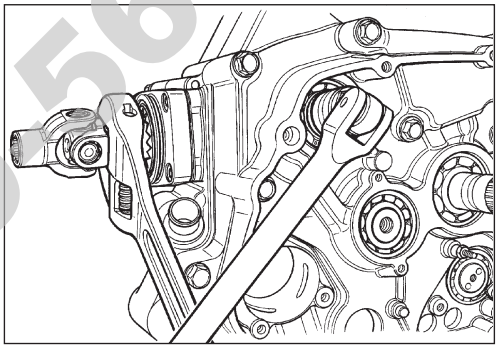


DRIVESHAFT BOLT/SECONDARY DRIVEN GEAR SHAFT NUT

• Install the universal joint on the secondary driven gear shaft.
• While holding the universal joint with a adjustable wrench, tighten the secondary drive gear shaft nut ① and driveshaft bolt ② to the specified torque.

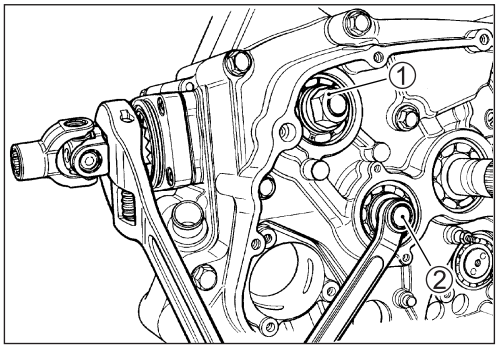
⚠ CAUTION

Driveshaft bolt ② has left-hand thread.



TOOL 09900-18710: Hexagon socket (12 mm)

Secondary drive gear shaft nut: 105 N·m (10.5 kgf·m, 76.0 lb-ft)
Driveshaft bolt: 65 N·m (6.5 kgf·m, 47.0 lb-ft)

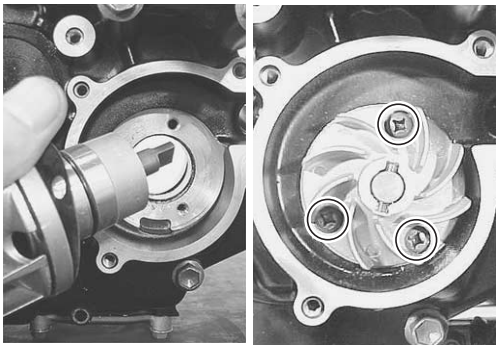


WATER PUMP

• Install the new O-ring and new gasket.
• Tighten the water pump mounting screws.

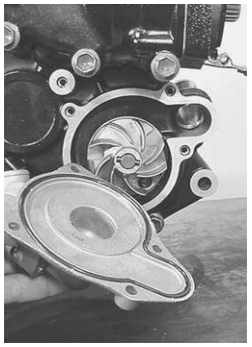
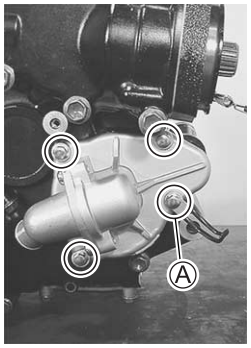
⚠ CAUTION

Use the new O-ring to prevent oil leakage.



- Install the new O-ring.
- Install the water pump cover.

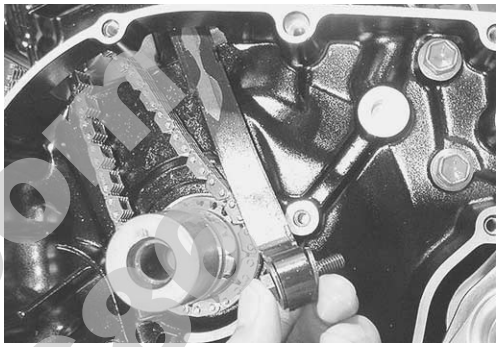
NOTE:
Fit the clamp to the bolt Ⓐ.

CAM CHAIN/CAM CHAIN TENSIONER

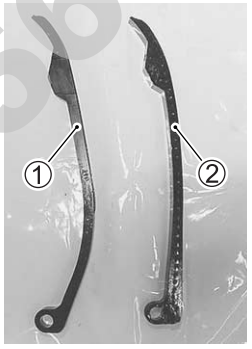
- Install the cam chain tensioner and cam chain.

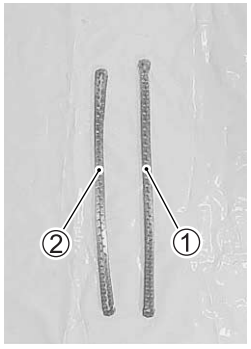
Cam chain tensioner bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)



① For front cylinder
② For rear cylinder

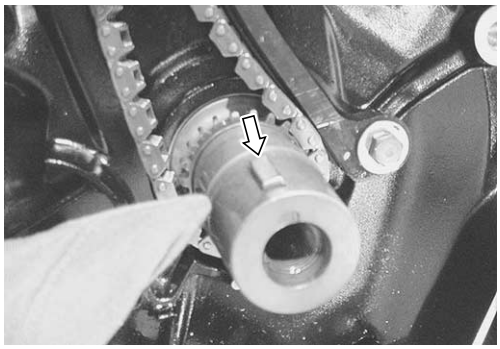
NOTE:
The No. 2 cam chain (For front cylinder) is a little longer than the No. 1 cam chain.





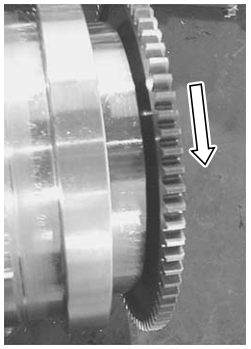
GENERATOR

- Degrease the tapered portion of the generator rotor assembly and also the crankshaft. Use nonflammable cleaning solvent to wipe off the oily or greasy matter to make these surfaces completely dry.
- Install the key.

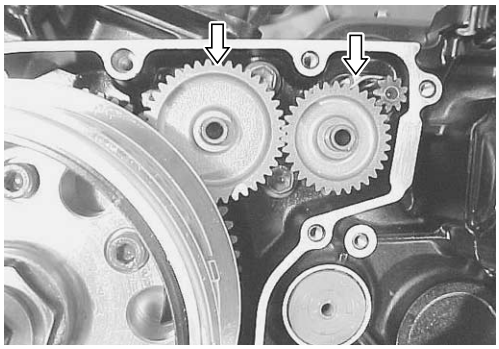


- Install the starter driven gear to the rotor.
- Install the generator rotor assembly and tighten its bolt to the specified torque.

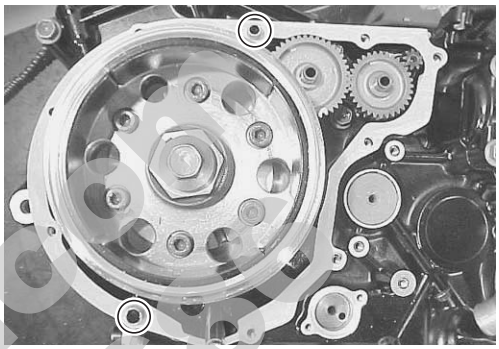
Generator rotor bolt: 160 N·m (16.0 kgf·m, 115.5 lb-ft)




• Install the starter driven gear and the idle gear.

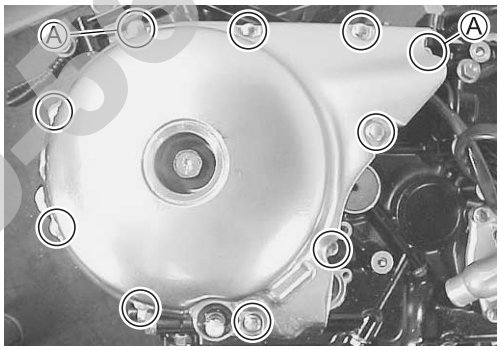


• Install the new gasket and dowel pins.



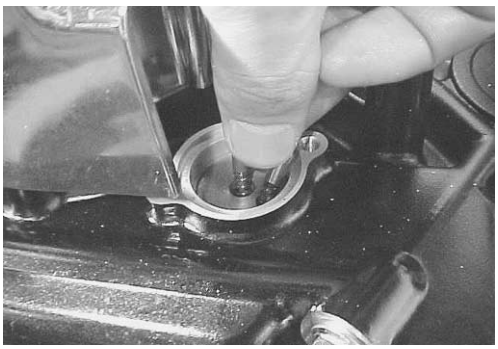
• Install the generator cover.

NOTE:
Fit the new gaskets to the bolts Ⓐ.

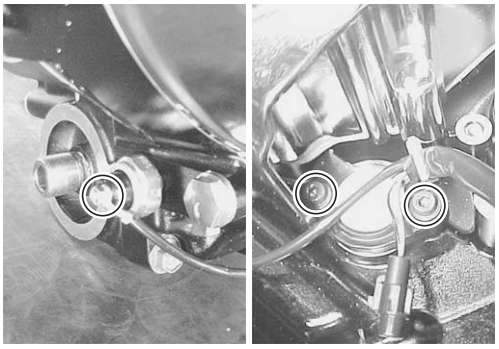


NEUTRAL SWITCH

• Install the springs and switch contacts.



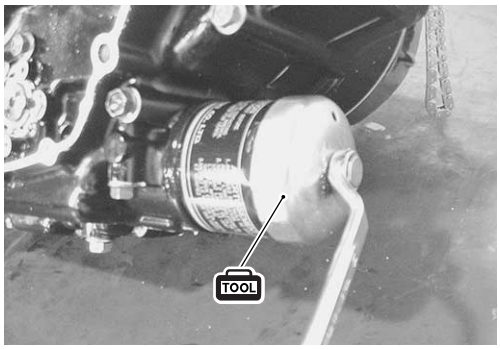
• Install the neutral switch.
• Install the oil pressure switch lead wire.



OIL FILTER

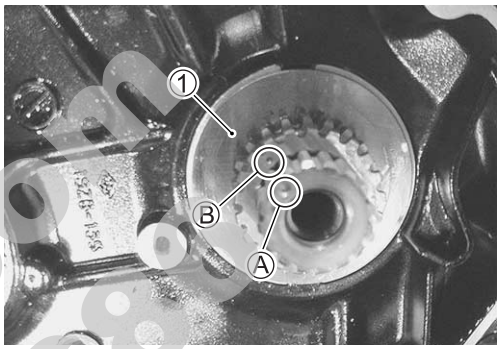
- Apply engine oil lightly to the gasket of the oil filter before installation.
- Install the oil filter turning it by hand until feeling that the filter gasket contacts the mounting surface. Then tighten it 2 turns using the oil filter wrench.

TOOL 09915-40610: Oil filter wrench



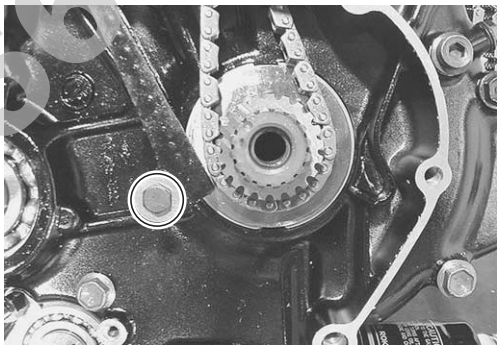
PRIMARY DRIVE GEAR

- Install the thrust washer ① onto the crankshaft.
- Align the punch mark Ⓐ on the crankshaft with the punch mark Ⓑ on the camshaft drive sprocket.



- Install the cam chain and cam chain tensioner.
- Tighten the cam chain tensioner bolt to the specified torque.

Cam chain tensioner bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)

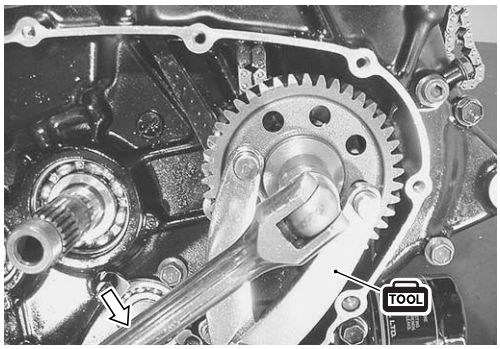


- Install the primary drive gear and tighten the primary drive gear bolt to the specified torque with the special tool.

Primary drive gear bolt: 95 N·m (9.5 kgf·m, 68.5 lb-ft)

TOOL 09930-40113: Rotor holder

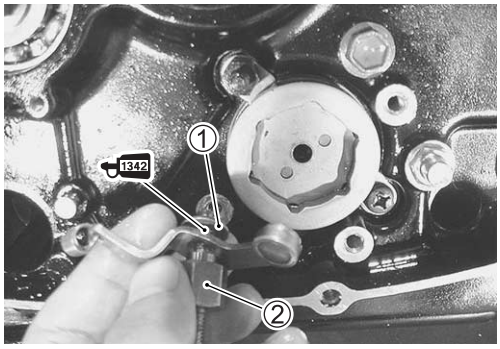
NOTE:
This bolt has left-hand thread.



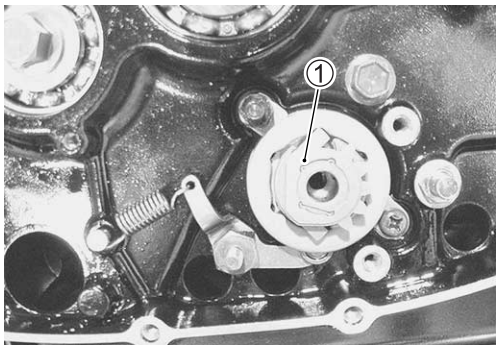
GEARSHIFT

- Install the washer ①.
- Apply a small quantity of THREAD LOCK “1342” to the gearshift cam stopper bolt ② and tighten it.

1342 99000-32050: THREAD LOCK “1342”

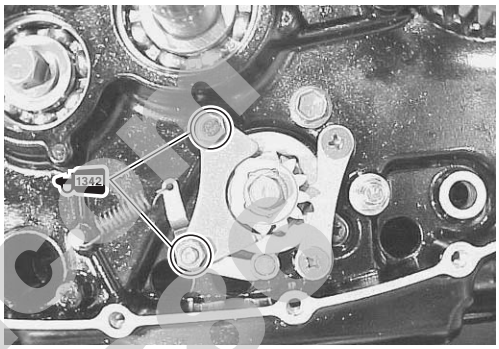


- Install the cam driven gear ① after installing the springs, pins and gearshift pawls.



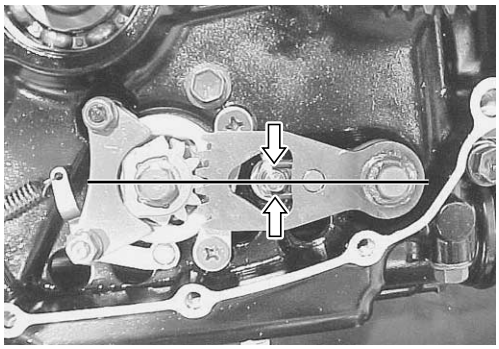
- Install the cam guide and the pawl lifter.
- Apply a small quantity of THREAD LOCK “1342” to the nuts.

1342 99000-32050: THREAD LOCK “1342”



- Install the gearshift return spring properly.

- Install the gearshift shaft with the center of shift gear on the shaft aligned the center of gearshift cam driven gear.



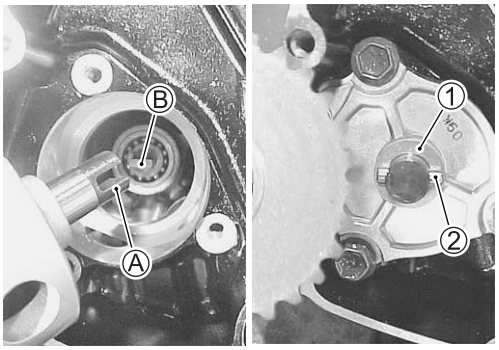
OIL PUMP

- Install the oil pump.

Oil pump mounting bolt: 11 N·m (1.1 kgf·m, 8 lb-ft)

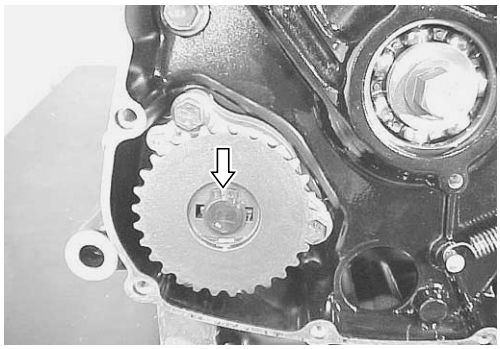
NOTE:
Set the oil pump shaft end Ⓐ to the water pump shaft Ⓑ.

- Install the washer ① and pin ②.



- Install the oil pump driven gear and the circlip.

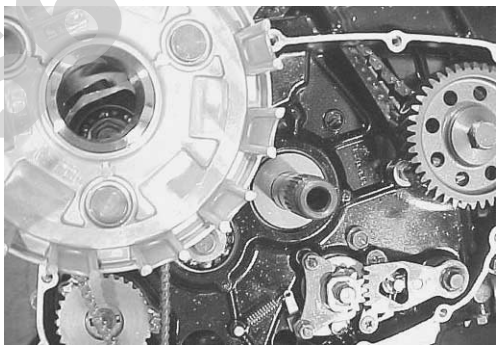
TOOL 09900-06107: Snap ring pliers



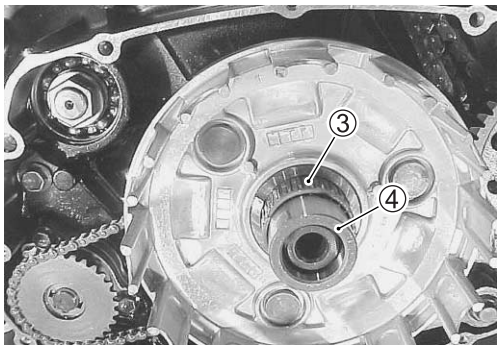
CLUTCH

- Install the spacer ① and the thrust washer ②.
- Engage the chain with the oil pump drive gear.

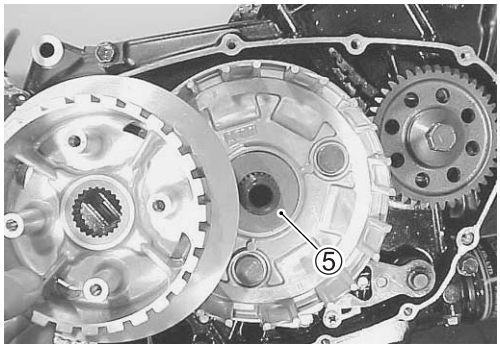
- Install the primary driven gear assembly and engage the chain with the oil pump driven gear.



- Apply engine oil to the primary driven gear bearing ③ and install it.
- Install the collar ④.

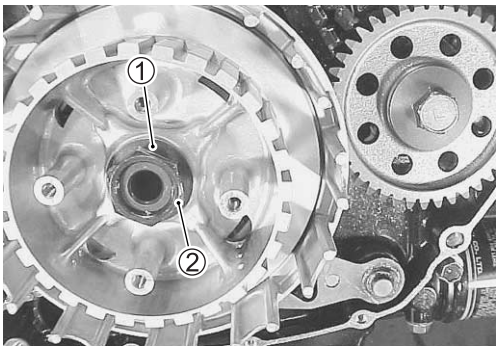


- Install the thrust washer ⑤ and the clutch sleeve hub.



• Install the washer ① and the clutch sleeve hub nut ②.

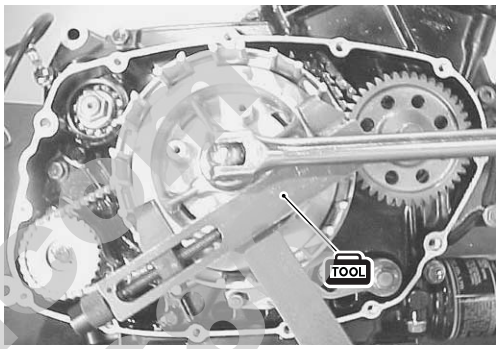
NOTE:
The convex side of the washer faces outside.

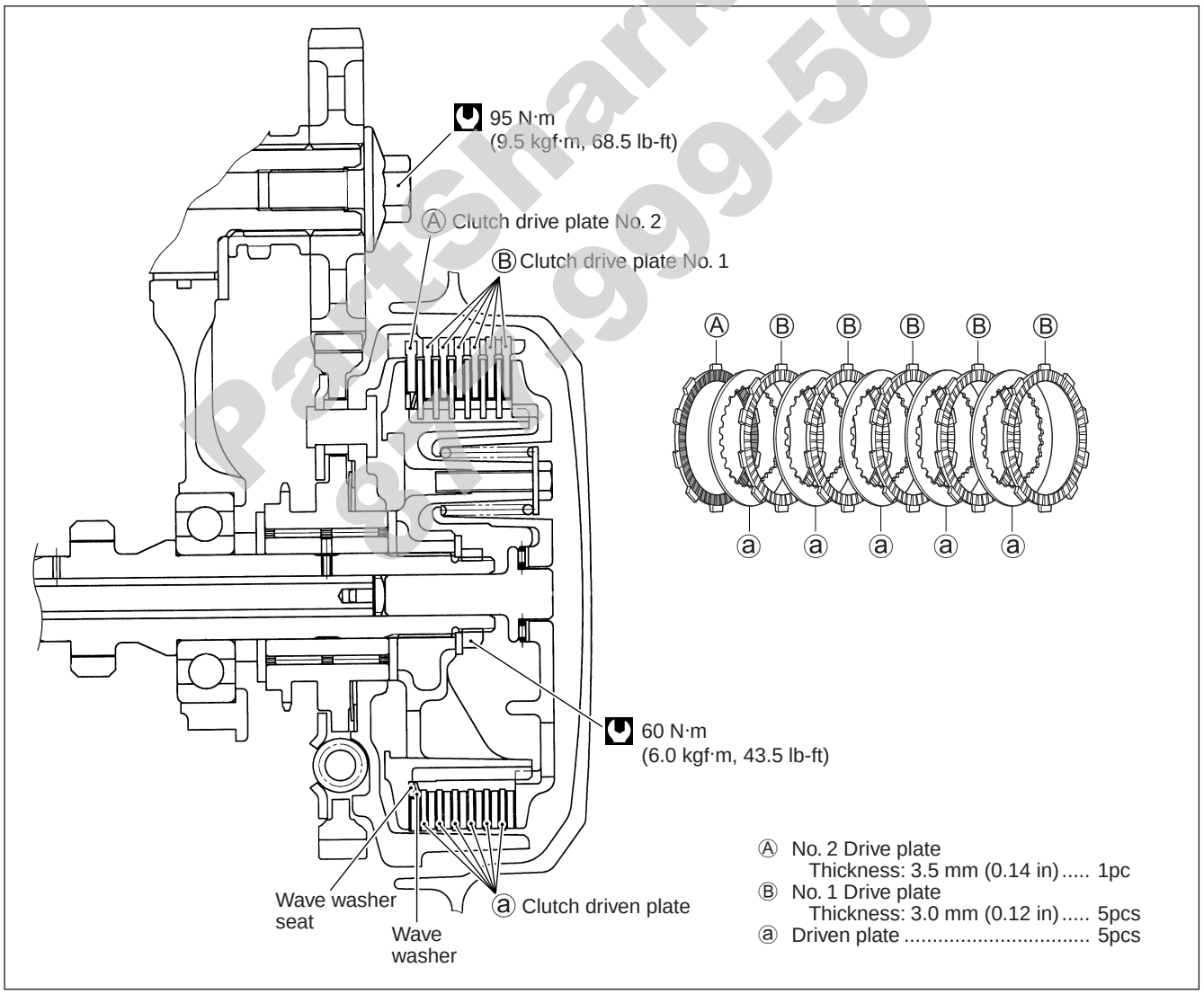


• Tighten the clutch sleeve hub nut to the specified torque with the special tool.

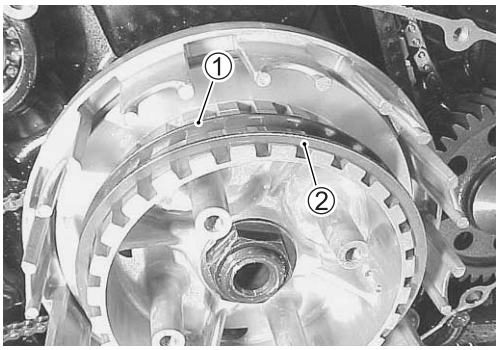
Clutch sleeve hub nut: 60 N·m (6.0 kgf·m, 43.5 lb-ft)

09920-53740: Clutch sleeve hub holder

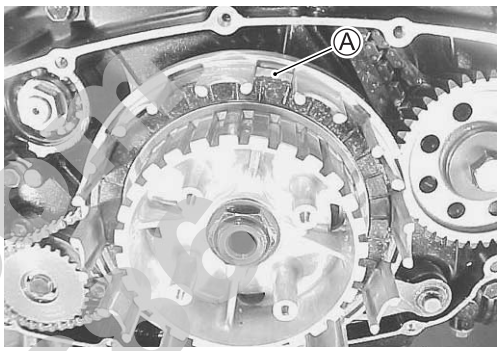




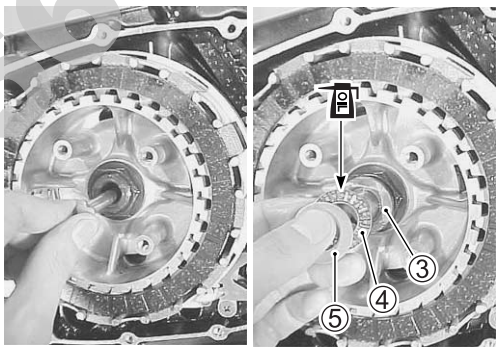
- Install the wave washer seat ① and the wave washer ②.



- Install the clutch drive plate No.2 Ⓐ first.
- Install the drive and driven plate one by one into the clutch sleeve hub.

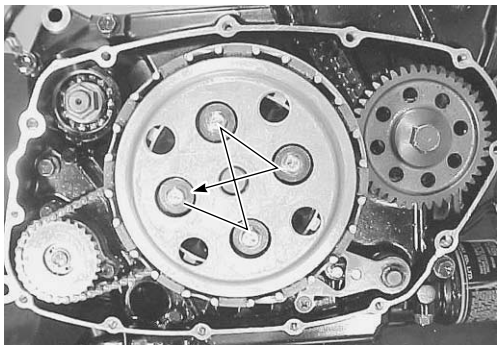


- Install the push rod.
- Install the clutch push piece ③, bearing ④ and thrust washer ⑤.
- Apply engine oil to the bearing.

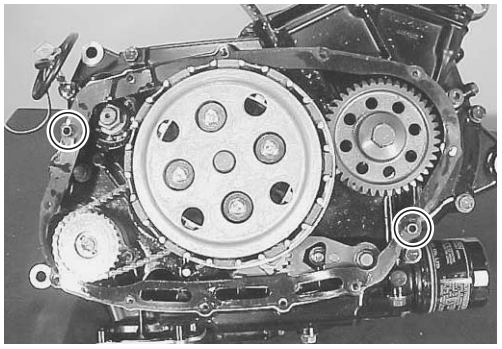


- Install the springs and tighten the clutch spring set bolts diagonally to the specified torque.

Clutch spring set bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)

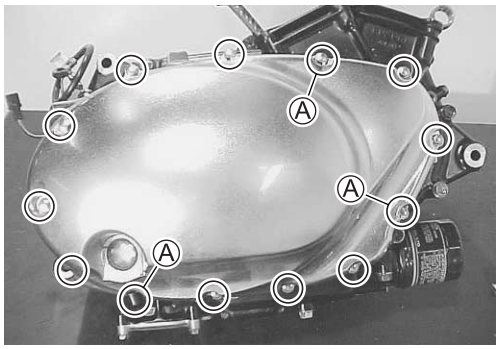


- Install the new clutch cover gasket and dowel pins.



• Install the clutch cover and tighten the bolts.

NOTE:
Fit the new gasket to the bolt Ⓐ.

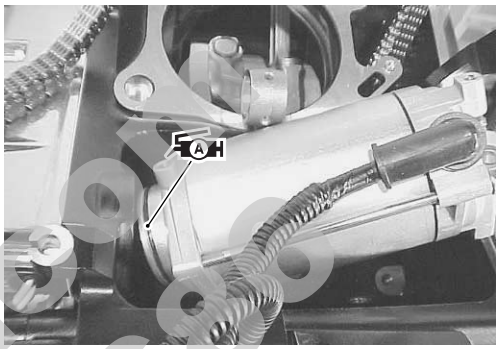


STARTER MOTOR

• Install the starter motor.

NOTE:
Apply grease to the new O-ring.

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A" (For the others)



• Install the starter motor cover.

OIL JET

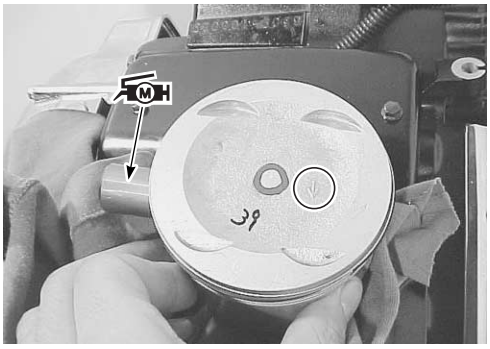
• Apply engine oil to the new O-ring and install the oil jets.

PISTON

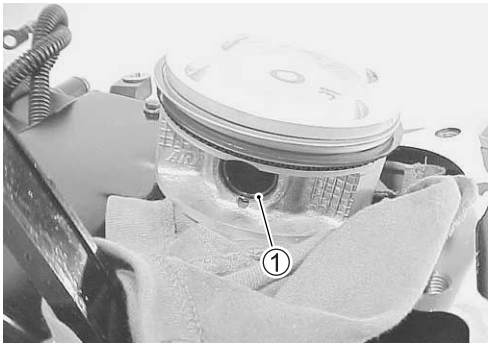
• Apply a light coat of SUZUKI MOLY PASTE to the piston pins.

99000-25140: SUZUKI MOLY PASTE

• When installing the piston, the arrow mark on the piston head is located to the exhaust side.



• Place a cloth beneath the piston, and install the circlip ①.



⚠ CAUTION

When turning the crankshaft, pull the cam chains upward, or the chains will be caught between the crankcase and the cam drive sprocket.

CYLINDER

• Install the cam chain tension adjuster to the cylinder.
• After unlocking the ratchet, push the cam chain tension adjuster rod.
• Insert the special tool between the ratchet and the adjuster body.

TOOL 09918-53810: Chain tensioner lock tool

Cam chain tension adjuster mounting bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)

• Coat SUZUKI BOND "1207B" lightly to the mating surfaces among the crankcase mating surfaces.

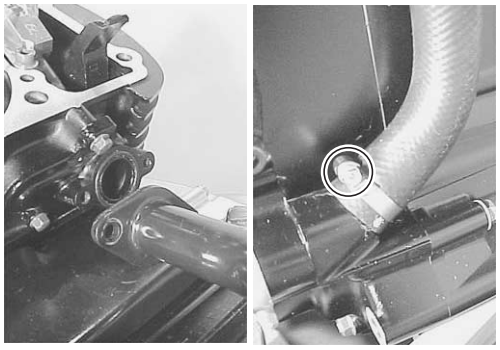
1207B 99104-31140: SUZUKI BOND "1207B" (For USA)
99000-31140: SUZUKI BOND "1207B" (For the others)

• Fit the dowel pins and the new gasket.

⚠ CAUTION

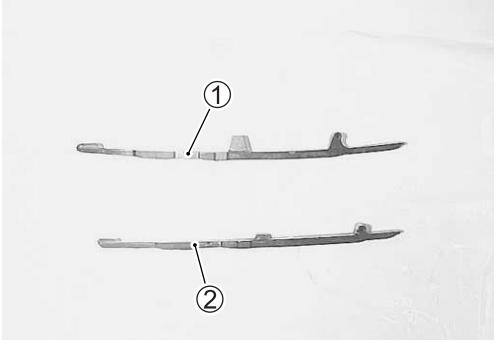
Use a new gasket to prevent gas leakage.

• Install the cylinder. (Rear cylinder)
• Install the water hose and pipe.



CYLINDER HEAD

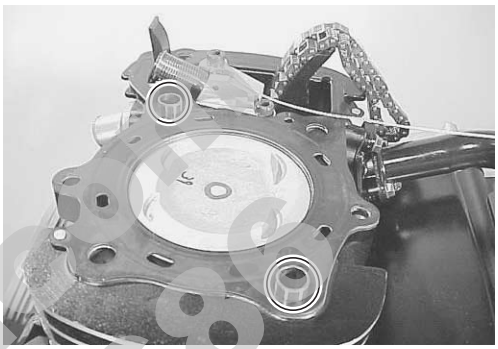
- Install the cam chain guide.
  ① For front cylinder
  ② For rear cylinder



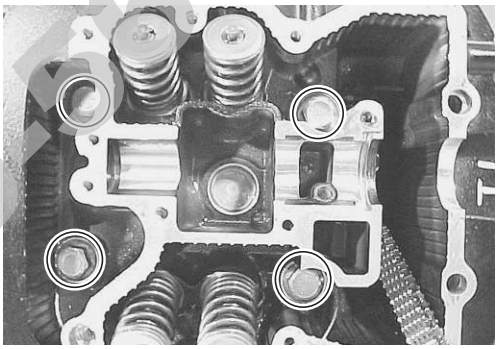
- Fit the dowel pins and the new cylinder head gasket.

⚠ CAUTION

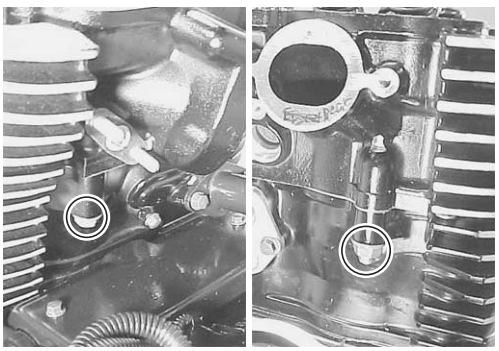
Use a new gasket to prevent gas leakage.



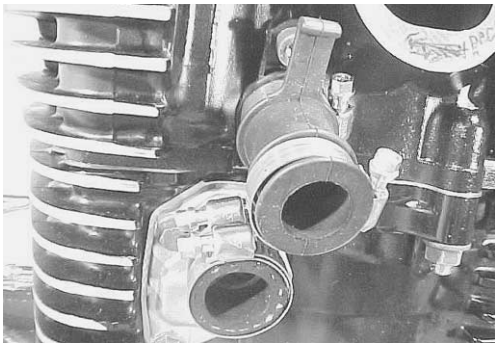
- Install the cylinder head and tighten the cylinder head bolts diagonally to the specified torque. (Rear cylinder)



- Tighten the cylinder head bolt and nut.



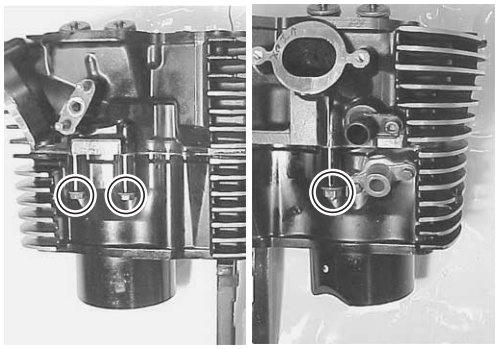
- Install the water hoses to the front cylinder.



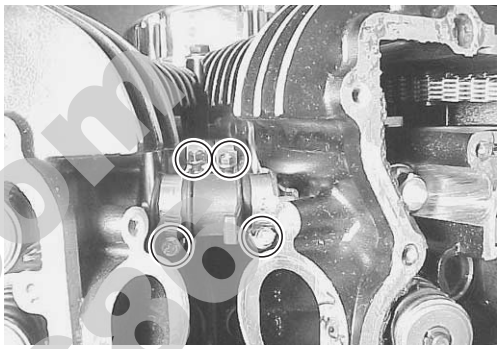
FRONT CYLINDER

- Assemble the front cylinder and the cylinder head.
- Tighten the cylinder head bolts and nut.

Cylinder head bolt and nut (M8): 25 N·m (2.5 kgf·m, 18.0 lb-ft)



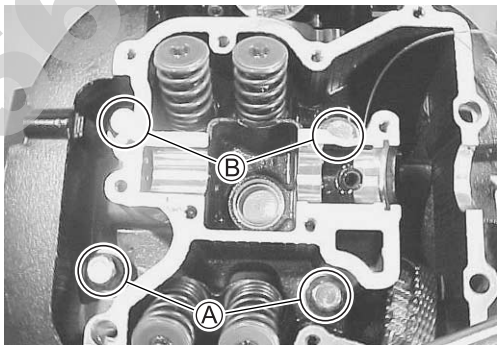
- Install the front cylinder assembly to the crankcase.
- Connect the water hoses.



- Tighten the cylinder head bolts to the specified torque.

Cylinder head bolt (M10): Initial: 25 N·m (2.5 kgf·m, 18.0 lb-ft)

Final: 38 N·m (3.8 kgf·m, 27.5 lb-ft)



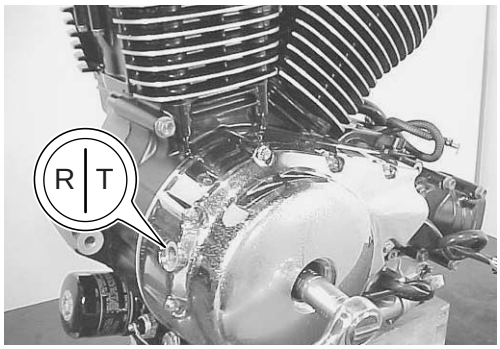
NOTE:
Bolt Ⓐ: 165 mm (6.5 in)
Bolt Ⓑ: 155 mm (6.1 in)

CAMSHAFT

- Position "RIT" mark on the generator rotor with the center of the valve timing inspection hole.

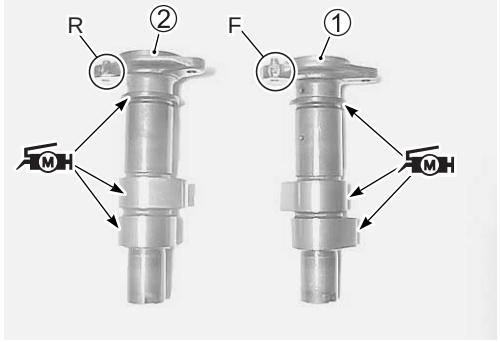
⚠ CAUTION

Pull the cam chains upward, or the chain will be caught between crankcase and cam drive sprocket.



- Before installing the camshafts onto each cylinder head, apply SUZUKI MOLY PASTE onto the camshaft journals. Also, apply engine oil onto the camshaft journal holders.

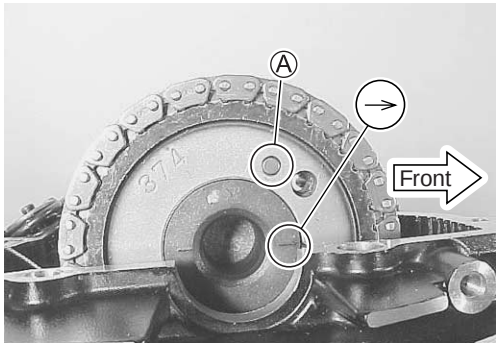
99000-25140: SUZUKI MOLY PASTE



NOTE:
The camshaft is identified by the embossed letters "F" and "R".
① Front cam shaft
② Rear cam shaft

- Align the arrow marks on the front and rear camshafts so it is parallel with the surface of the cylinder heads.

NOTE:
Arrow marks are located to forward.

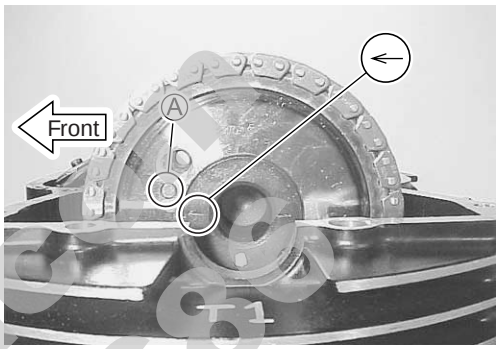


Rear (No. 1) cylinder head

- Engage the chains on the cam sprockets with the locating pin holes Ⓐ as shown in the photograph.

NOTE:
Do not rotate the generator rotor while doing this. When the sprocket is not positioned correctly, turn the sprocket.

- Recheck the position of the "RIT" mark on the generator rotor, arrow mark on the No.1 (Rear) camshaft and arrow mark on the No.2 (front) camshaft.



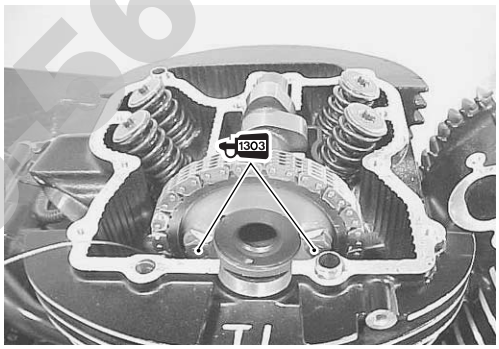
Front (No. 2) cylinder head

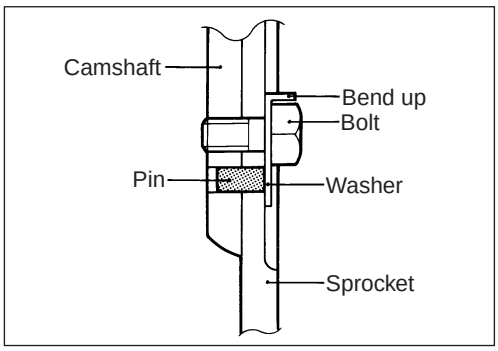
- Install the lock washer so that it is covering the locating pin.
- Apply THREAD LOCK SUPER "1303" to the bolts and tighten them to the specified torque.

Cam chain sprocket bolt: 15 N·m (1.5 kgf·m, 11.0 lb-ft)

1303 99000-32030: THREAD LOCK SUPER "1303"

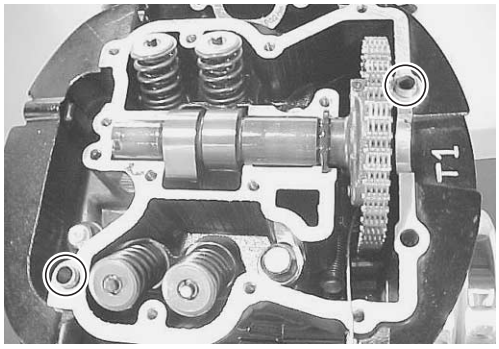
- Bend up the washer tongue positively to lock the bolts.





CYLINDER HEAD COVER

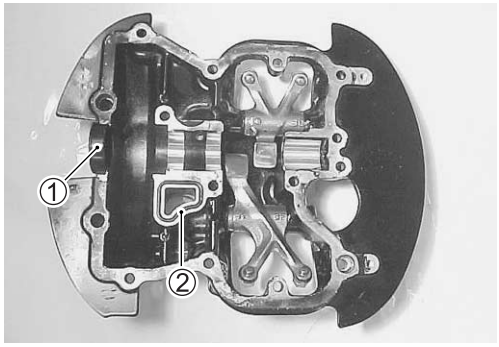
- Clean the mating surfaces of the cylinder head and head cover before matching.
- Install the dowel pins to the cylinder head.

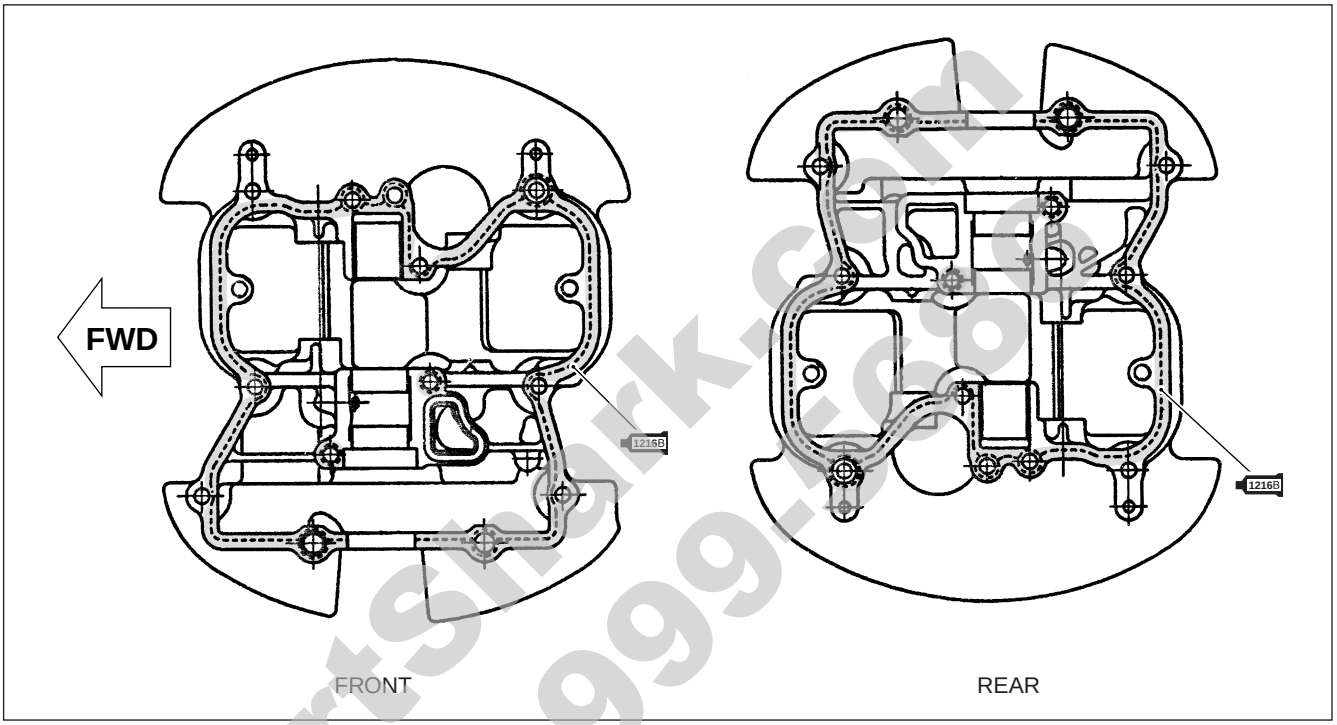


- Apply SUZUKI BOND “1216B” to the mating surface of the cylinder head cover.
- Fit the camshaft end caps ①.
- Apply grease to the O-ring ② and install it. (Front cylinder only)

99000-31230: SUZUKI BOND “1216B”

99000-25030: SUZUKI SUPER GREASE “A” (For USA)
99000-25010: SUZUKI SUPER GREASE “A”
(For the others)

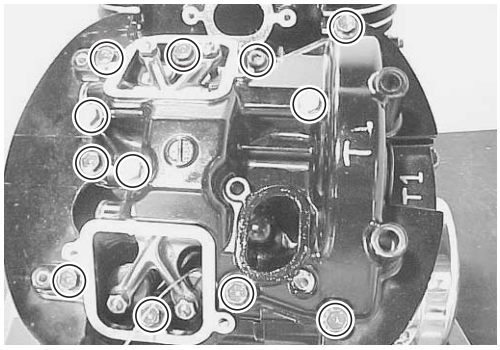


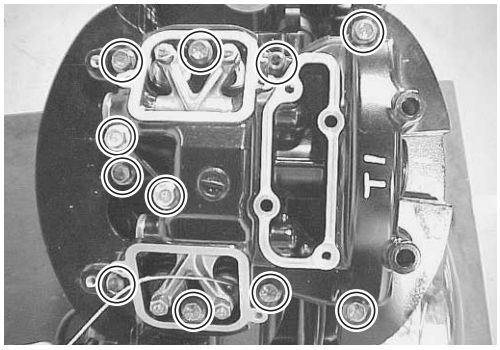


- Lightly tighten the cylinder head cover bolts diagonally, and then if everything is satisfactory, tighten securely with a torque wrench to the specified torque.

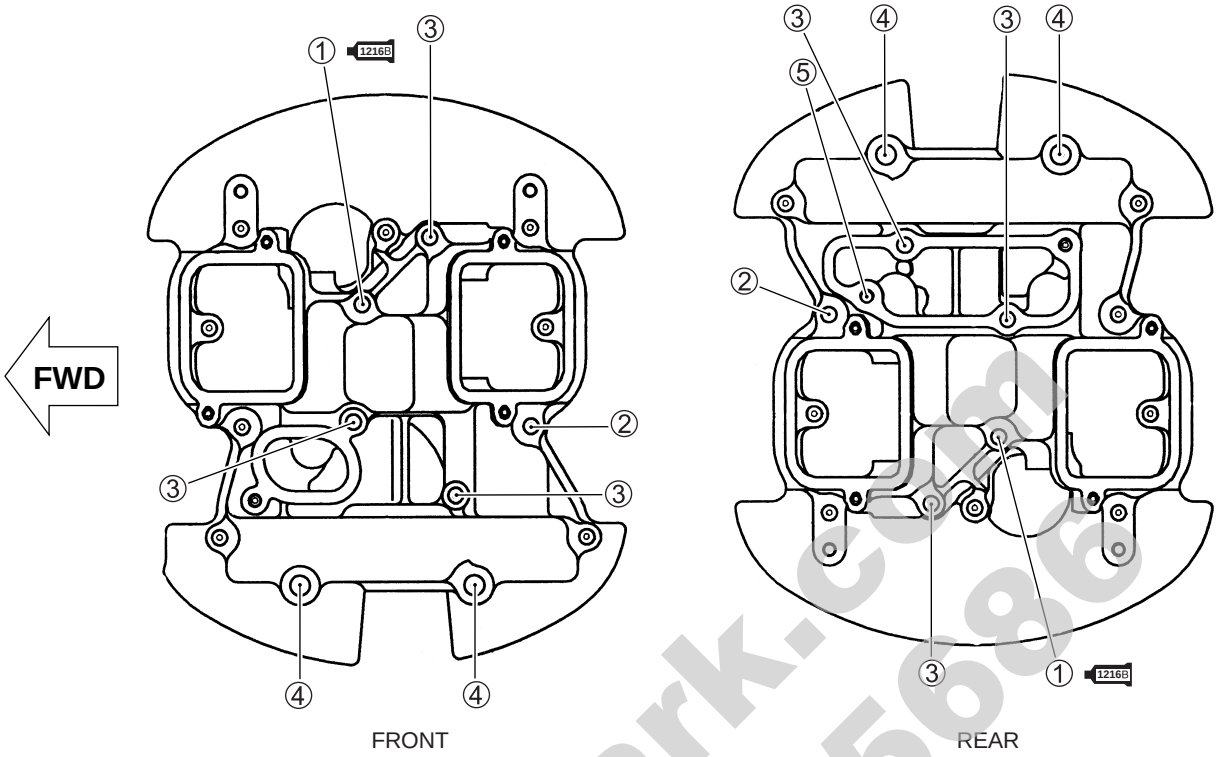
Cylinder head cover bolt (M6): 10 N·m (1.0 kgf·m, 7.0 lb-ft)
(M8): 25 N·m
(2.5 kgf·m, 18.0 lb-ft)

NOTE:
When tightening the cylinder head cover bolts, the piston must be at top dead center on the compression stroke.





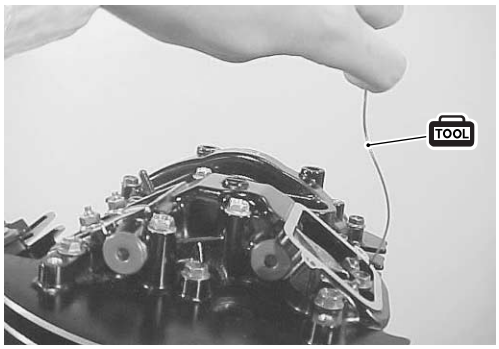
LOCATION OF CYLINDER HEAD COVER BOLT

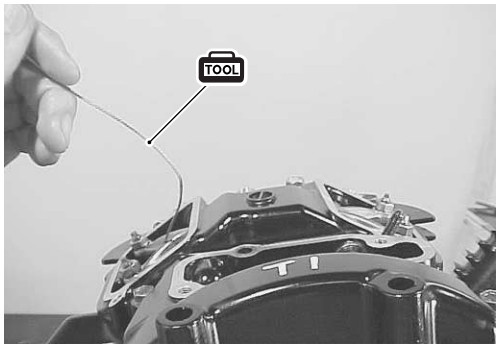


NOTE:
** Before installing the bolt ①, apply SUZUKI BOND "1207B" to the thread of the bolt.*
** Allen bolt: ②*
** Stainlessbolt: ①, ③, ④.*
** Fit the gasket to the bolt ⑤.*

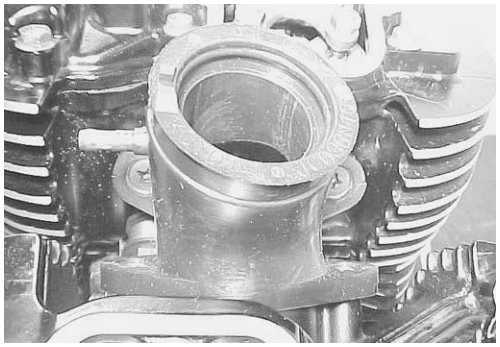
• Remove the tensioner lock tools.

NOTE:
Click sound is heard when the cam chain tension adjuster is released.



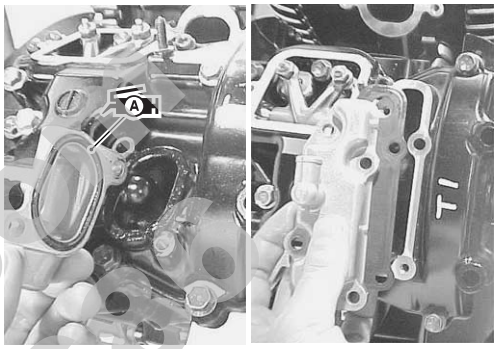


• Install the intake pipe.



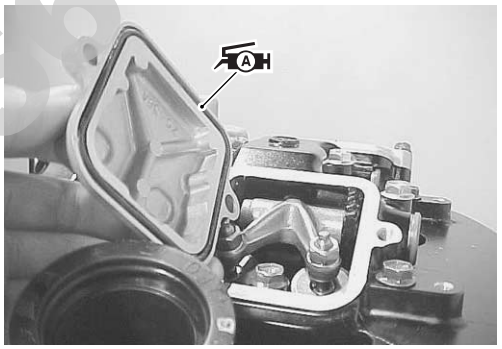
• Apply grease to the new O-ring and install the water outlet union.

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A"
(For the others)

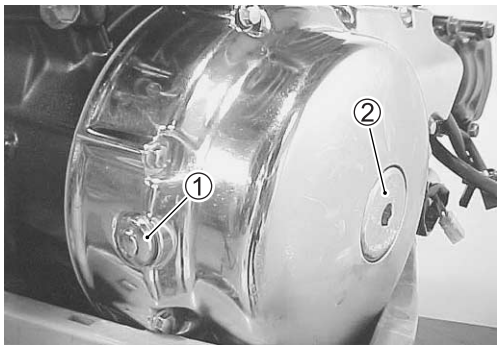


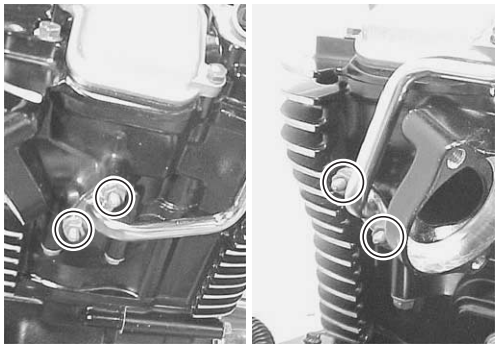
• Install the gasket and the breather cover.
• Apply grease to the new O-rings and install the valve inspection caps.

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A"
(For the others)



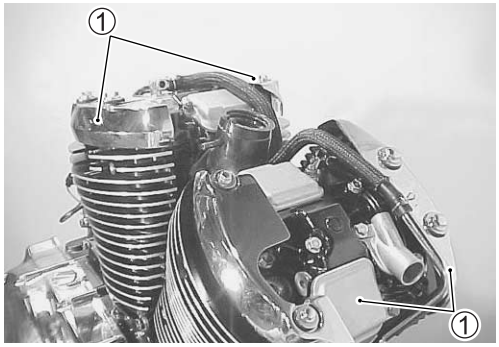
• Install the valve timing inspection plug ① and the generator cover cap ②.





- Install the PAIR pipes.
- Install the head cover caps ①.
- Install the spark plugs.

TOOL 09930-10121: Spark plug wrench set



SHAFT DRIVE

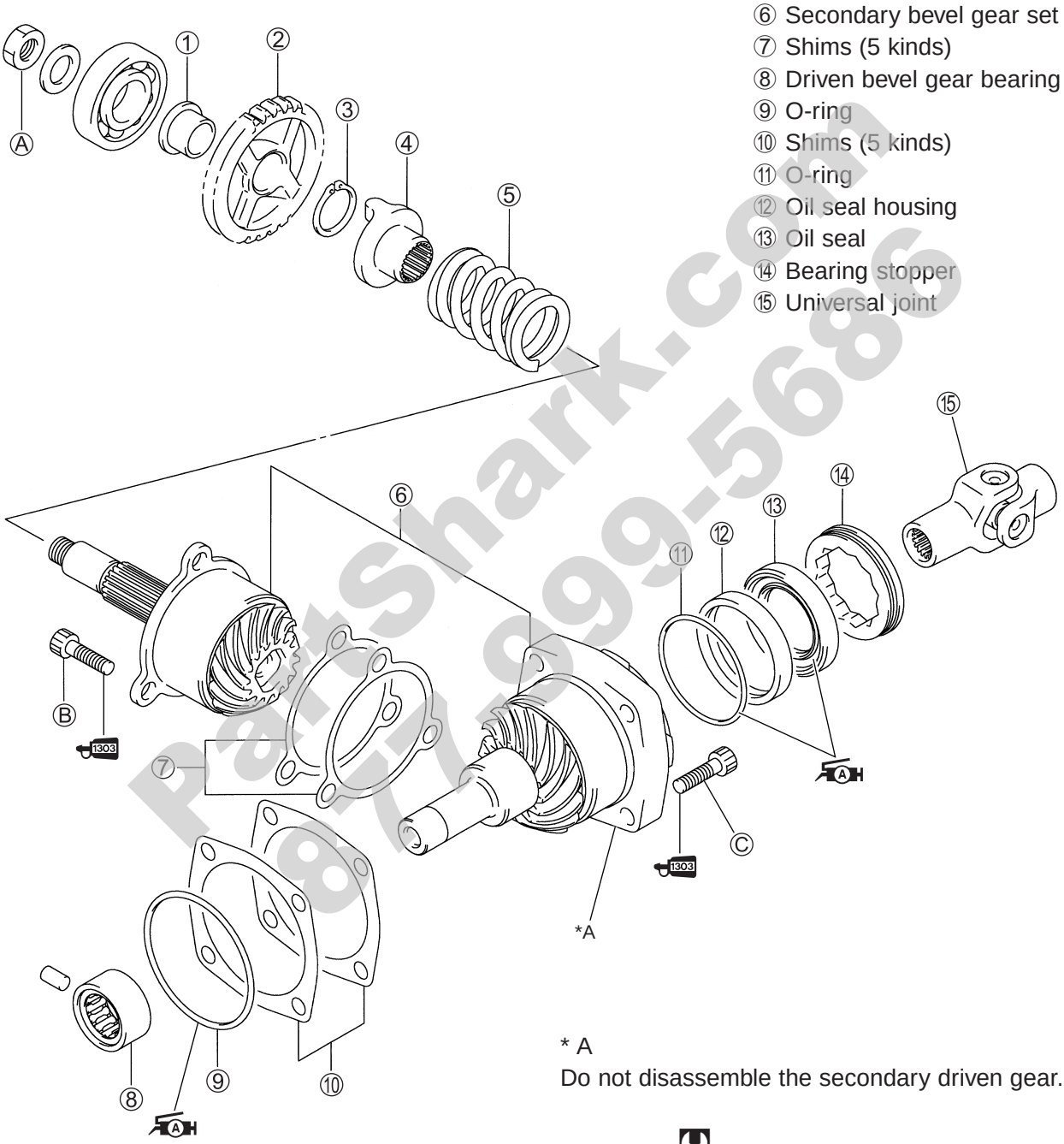
CONTENTS

SECONDARY BEVEL GEARS

CONSTRUCTION

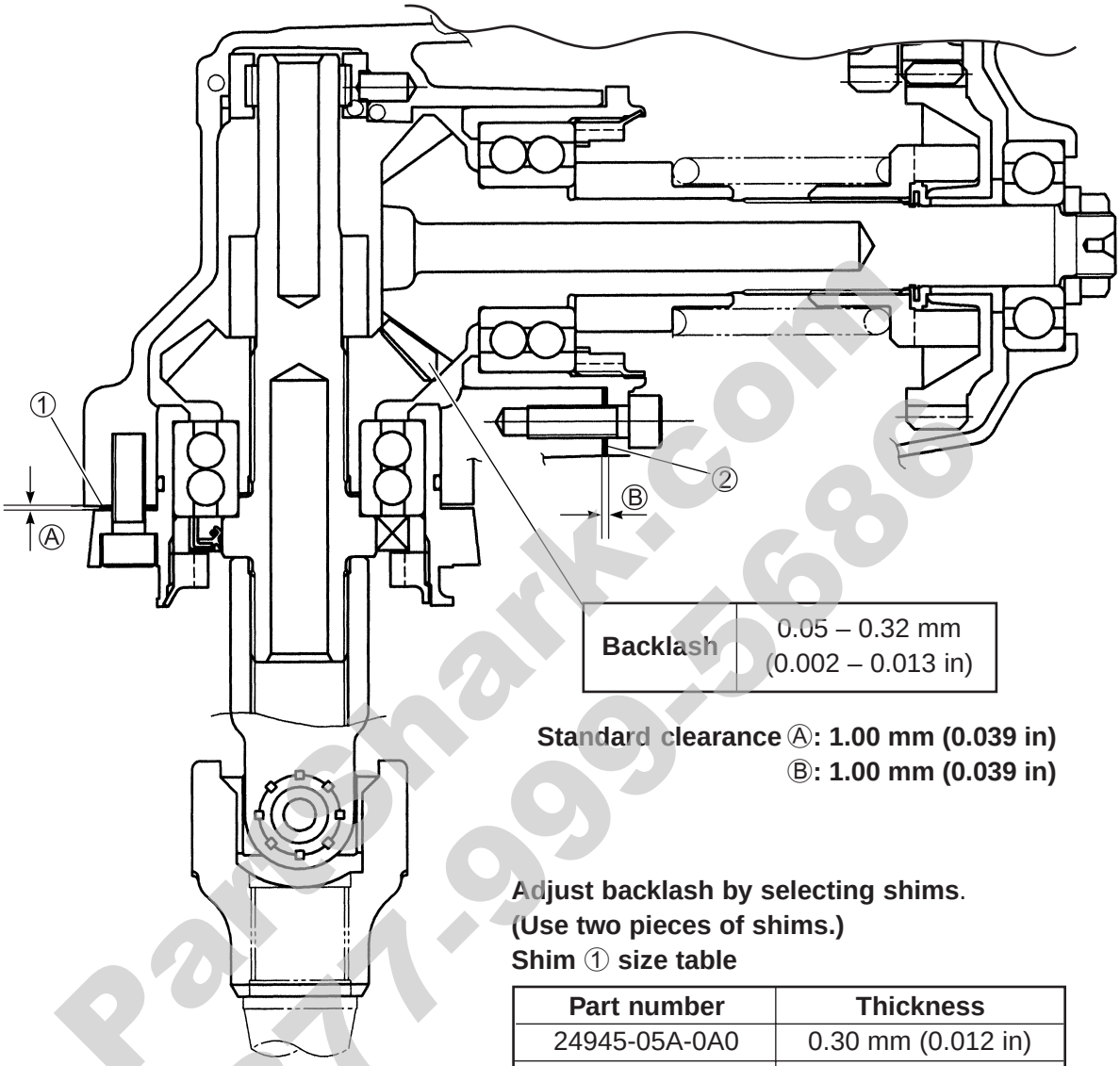
Ⓐ Secondary drive gear shaft nut
Ⓑ Secondary drive bevel gear bearing retainer bolt
Ⓒ Secondary driven bevel gear bolt

① Bush
② Overdriving driven gear
③ Circlip
④ Output cam dog
⑤ Damper spring
⑥ Secondary bevel gear set
⑦ Shims (5 kinds)
⑧ Driven bevel gear bearing
⑨ O-ring
⑩ Shims (5 kinds)
⑪ O-ring
⑫ Oil seal housing
⑬ Oil seal
⑭ Bearing stopper
⑮ Universal joint



* A
Do not disassemble the secondary driven gear.

ITEM	N·m	kgf·m	lb-ft
Ⓐ	105	10.5	76.0
Ⓑ, Ⓒ	23	2.3	16.5



Backlash	0.05 – 0.32 mm (0.002 – 0.013 in)

Standard clearance Ⓐ: 1.00 mm (0.039 in)
Ⓑ: 1.00 mm (0.039 in)

Adjust backlash by selecting shims.
(Use two pieces of shims.)
Shim ① size table

Part number	Thickness
24945-05A-0A0	0.30 mm (0.012 in)
24945-05A-0B0	0.35 mm (0.014 in)
24945-05A-0C0	0.40 mm (0.016 in)
24945-05A-0D0	0.50 mm (0.020 in)
24945-05A-0E0	0.60 mm (0.024 in)

The shims ① are available as a set (24945-05810).
Shim ② size table

Part number	Thickness
24935-38A01-030	0.30 mm (0.012 in)
24935-38A01-035	0.35 mm (0.014 in)
24935-38A01-040	0.40 mm (0.016 in)
24935-38A01-050	0.50 mm (0.020 in)
24935-38A01-060	0.60 mm (0.024 in)

The shims ② are available as a set (24935-38810).

REMOVAL

SECONDARY DRIVE BEVEL GEAR

The crankcase must be separated to service the secondary drive bevel gear. The secondary drive bevel gear service requires engine removal and disassembly. Refer to the engine removal and the engine disassembly sections for secondary drive bevel gear assembly removal.

Engine removal ☞3-3

Engine disassembly ☞3-11

SECONDARY DRIVEN BEVEL GEAR

The following components must be removed in the described order before removing the secondary driven bevel gear.

NOTE:

Refer to the following pages for the details of each step.

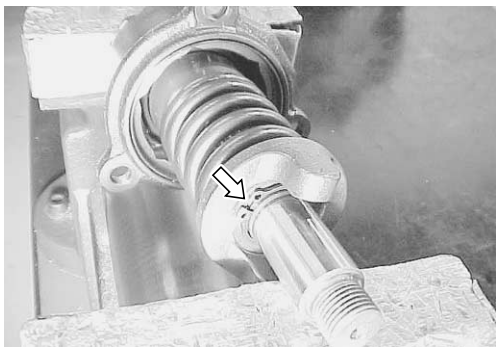
- Remove the rear wheel. (☞7-38)
- Remove the swingarm. (☞7-48)
- Remove the universal joint.
- Remove the secondary driven bevel gear.

DISASSEMBLY

SECONDARY DRIVE BEVEL GEAR

- Compress the damper spring with a vice, and remove the circlip with the special tool.

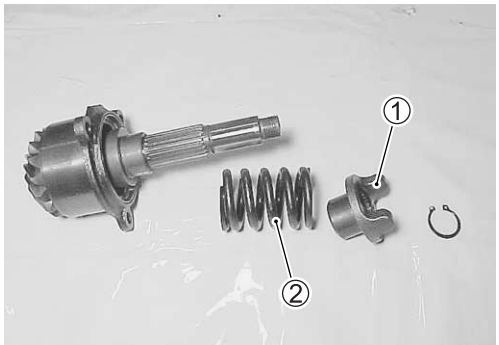
TOOL **09900-06107: Snap ring pliers**



- Remove the cam dog ① and damper spring ②.

⚠ CAUTION

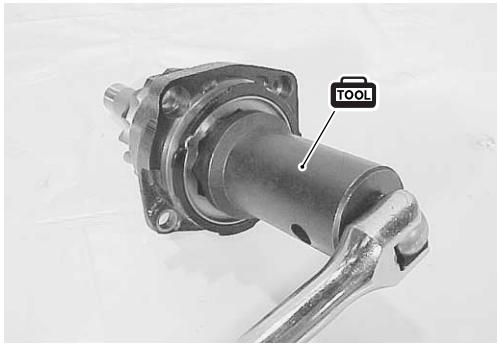
Do not attempt to remove the secondary drive bevel gear bearing. The secondary drive bevel gear and its bearing are available only as an assembly.



SECONDARY DRIVEN BEVEL GEAR

- Remove the bearing stopper with the special tool.

TOOL 09921-21820: Bearing retainer wrench



- Remove the oil seal.

INSPECTION

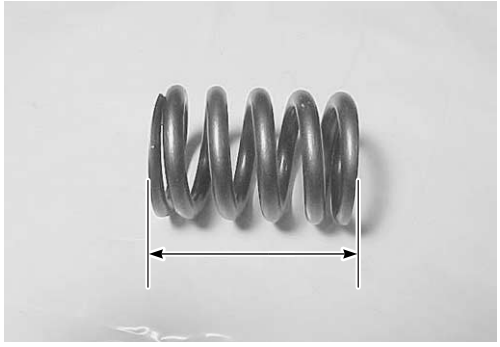
Inspect the removed parts for the following abnormalities.

* Drive and driven bevel gears damage or wear
* Improper tooth contact
* Abnormal noise of bearings
* Bearing damage or wear
* Oil seal damage or wear
* Output cam dog wear or damage
* Universal joint spline damage or wear

DAMPER SPRING

Measure the free length of the damper spring. If the length is shorter than the service limit, replace the spring with a new one.

DATA Damper spring free length
Service limit: 58.5 mm (2.30 in)



SECONDARY GEAR SHIMS ADJUSTMENT

BACKLASH

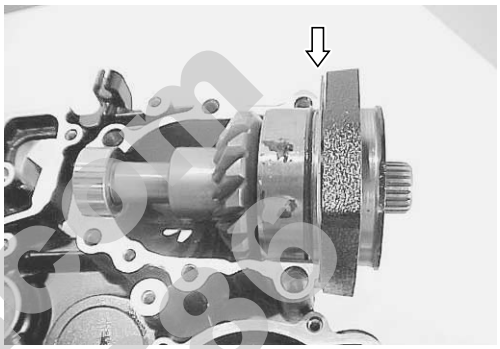
- Install the secondary drive bevel gear assembly with the removed shims and tighten the bolts to the specified torque.

Secondary drive bevel gear bearing retainer bolt:
23 N·m (2.3 kgf·m, 16.5 lb-ft)

NOTE:
When replacing the secondary drive and driven bevel gears, install the removed shims to the secondary drive bevel gear assembly and tighten the bolts to the specified torque.

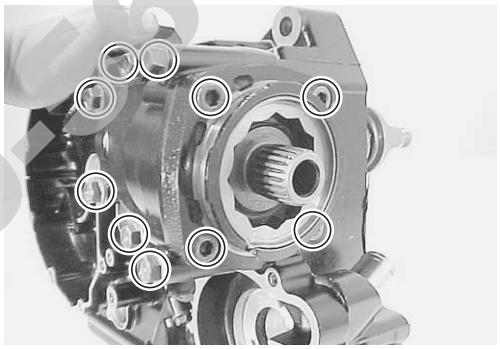
- Install the secondary driven bevel gear assembly with removed shims, the driven bevel gear bearing and secondary gear case.

NOTE:
Do not install the O-ring on the driven gear housing at this stage. O-ring is installed after backlash and tooth contact are correct.



- Tighten the secondary bevel gear case bolts and secondary driven bevel gear bolts to the specified torque.

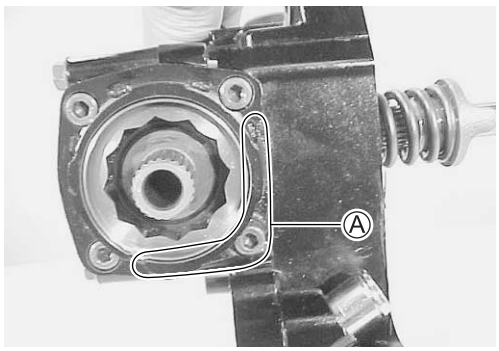
Secondary bevel gear case bolt:
22 N·m (2.2 kgf·m, 16.0 lb-ft)
Secondary driven bevel gear bolt:
23 N·m (2.3 kgf·m, 16.5 lb-ft)



NOTE:

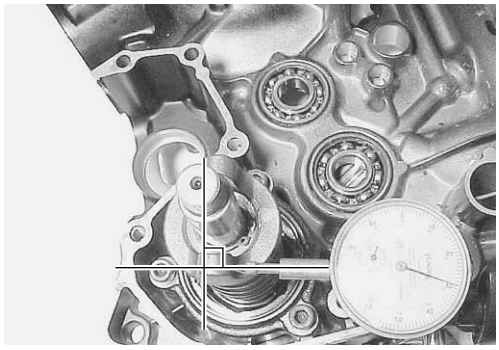
* *Hollow portion Ⓐ of the secondary driven bevel gear assembly faces inside.*

* *It is not necessary to apply SUZUKI BOND "1207B" to the matching surface at this stage.*

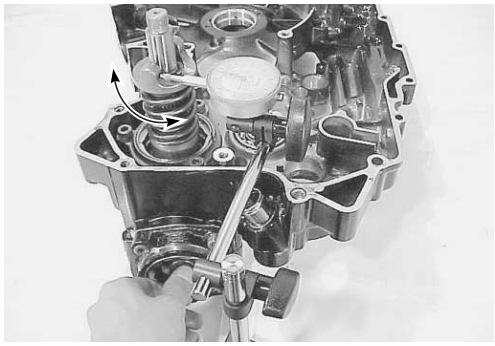


- Measure the backlash as follows.
- Set-up a dial gauge as shown in photo.

TOOL 09900-20606: Dial gauge (1/100 mm, 10 mm)
09900-20701: Magnetic stand



- Adjust the dial gauge so that it touches the secondary drive bevel gear cam dog; hold the driven bevel gear securely, and turn the drive bevel gear in each direction, reading the total backlash on the dial gauge.



DATA Secondary bevel gear backlash
Standard: 0.05 – 0.32 mm (0.002 – 0.013 in)

NOTE:
When measuring backlash, hold the left crankcase horizontally pull the secondary drive gear to take the bearing play out.

- If the backlash is not within specification, the shims (Driven bevel gear side) must be changed and the backlash should be re-checked until correct.
  Refer to the chart for appropriate changes.

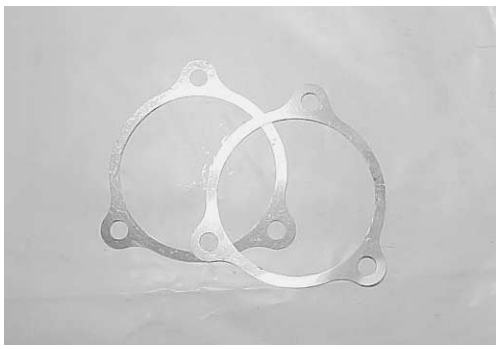
NOTE:
When changing the shims (Driven bevel gear side), measure the thickness of old shims. Using the thickness of the old shims as a guide, adjust the backlash by referring to the chart.

Backlash	Shim adjustment
Under 0.05 mm (0.002 in)	Increase shim thickness
0.05 – 0.32 mm (0.002 – 0.013 in)	Correct
Over 0.32 mm (0.013 in)	Decrease shim thickness

SHIM SPECIFICATIONS

Drive bevel gear side

Part No.	Shim thickness
24935-38A01-030	0.30 mm (0.012 in)
24935-38A01-035	0.35 mm (0.014 in)
24935-38A01-040	0.40 mm (0.016 in)
24935-38A01-050	0.50 mm (0.020 in)
24935-38A01-060	0.60 mm (0.024 in)



NOTE:
The shims (drive bevel gear side) are available as a set (24935-38810).

Driven bevel gear side

Part No.	Shim thickness
24945-05A00-0A0	0.30 mm (0.012 in)
24945-05A00-0B0	0.35 mm (0.014 in)
24945-05A00-0C0	0.40 mm (0.016 in)
24945-05A00-0D0	0.50 mm (0.020 in)
24945-05A00-0E0	0.60 mm (0.024 in)

NOTE:
The shims (driven bevel gear side) are available as a set (24945-05810).

TOOTH CONTACT

After bringing the backlash within specification by changing the secondary driven bevel gear shims, it will be necessary to check tooth contact.

- Remove the drive bevel gear assembly from the crankcase.
- Clean and degrease the secondary drive bevel gear teeth, and apply a coating of machinist's layout dye or paste to several teeth.
- Reinstall the secondary drive bevel gear assembly, with correct shim, onto the secondary gear housing.
- Rotate the secondary driven bevel gear several turns in both directions.
- Remove the secondary drive bevel gear from the crankcase, and observe the tooth contact pattern made in the dye or paste.
- Compare the tooth contact pattern to the examples as shown in ①, ② and ③.
- If tooth contact is found to be incorrect, the shims of the secondary drive bevel gear and secondary driven bevel gear must be changed, tooth contact should be re-checked until correct.

⚠ CAUTION

After the tooth contact adjustment is made, the backlash must be re-checked, as it may change. Refer to the backlash checking sub-section, and readjust until both backlash and tooth contact are correct.

Tooth contact	Shim adjustment
Contact at tooth top ①	Decrease thickness of shims ④ or ⑤
Contact at tooth root ③	Increase thickness of shims ④ or ⑤

SHIM SPECIFICATIONS

Drive bevel gear side

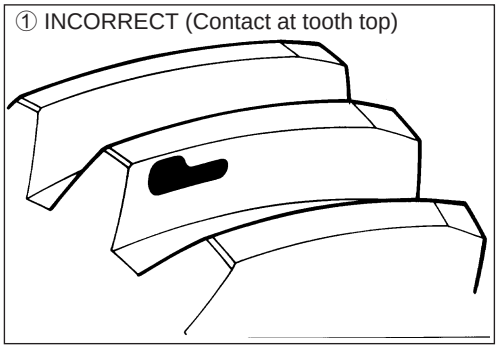
Part No.	Shim thickness
24935-38A01-030	0.30 mm (0.012 in)
24935-38A01-035	0.35 mm (0.014 in)
24935-38A01-040	0.40 mm (0.016 in)
24935-38A01-050	0.50 mm (0.020 in)
24935-38A01-060	0.60 mm (0.024 in)

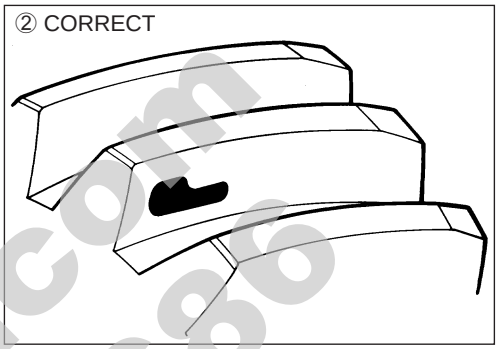
NOTE:
The shims (drive bevel gear side) are available as a set (24935-38810).

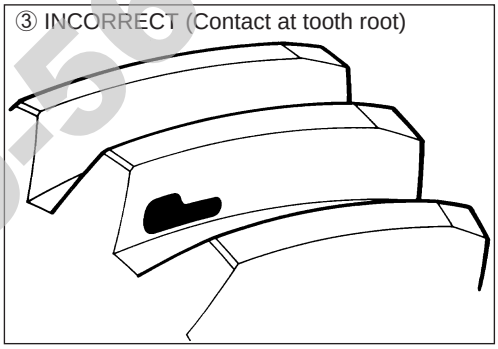
Driven bevel gear side

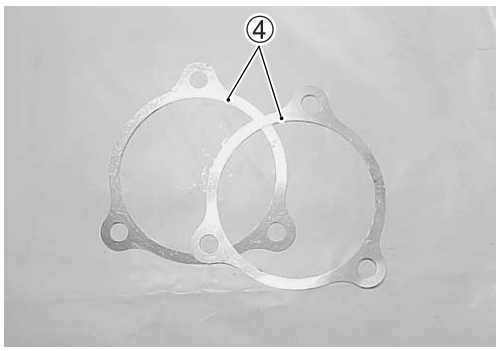
Part No.	Shim thickness
24945-05A00-0A0	0.30 mm (0.012 in)
24945-05A00-0B0	0.35 mm (0.014 in)
24945-05A00-0C0	0.40 mm (0.016 in)
24945-05A00-0D0	0.50 mm (0.020 in)
24945-05A00-0E0	0.60 mm (0.024 in)

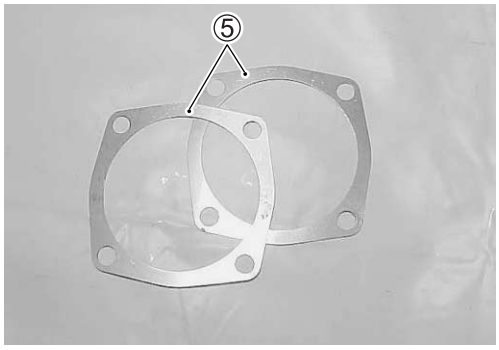
NOTE:
The shims (driven bevel gear side) are available as a set (24945-35810).











REASSEMBLY

SECONDARY DRIVEN BEVEL GEAR

- Apply grease to the lip of oil seal.

99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A" (For the others)

- Tighten the bearing stopper to the specified torque with the special tool.

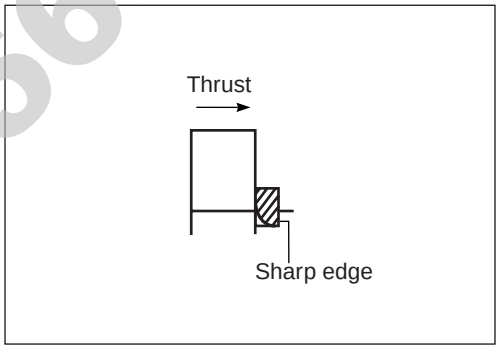
Bearing stopper: 105 N·m (10.5 kgf·m, 76.0 lb-ft)

09921-21820: Bearing retainer wrench

SECONDARY DRIVE BEVEL GEAR

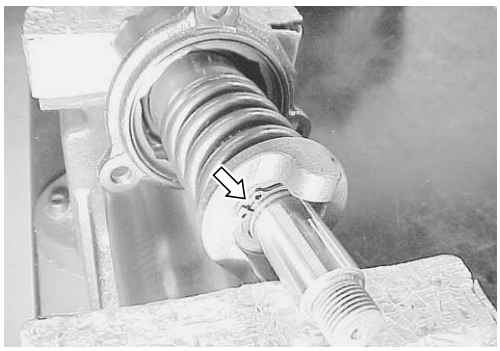
Reassemble the secondary drive bevel gear in the reverse order of disassembly. Pay attention to the following points.

- When installing a new circlip, pay attention to the direction of the circlip. Fit the circlip to the side where the thrust is, as shown in the illustration. The rounded side should be against the output cam dog surface.



⚠ CAUTION

*** Never reuse a circlip. After a circlip has been removed from a shaft, it should be discarded and a new circlip must be installed.**
*** When installing a new circlip, do not expand the end gap larger than required to slip the circlip over the shaft.**
*** After installing a circlip, make sure that it is completely seated in its groove and securely fitted.**



INSTALLATION

SECONDARY DRIVEN BEVEL GEAR/ SECONDARY DRIVE BEVEL GEAR

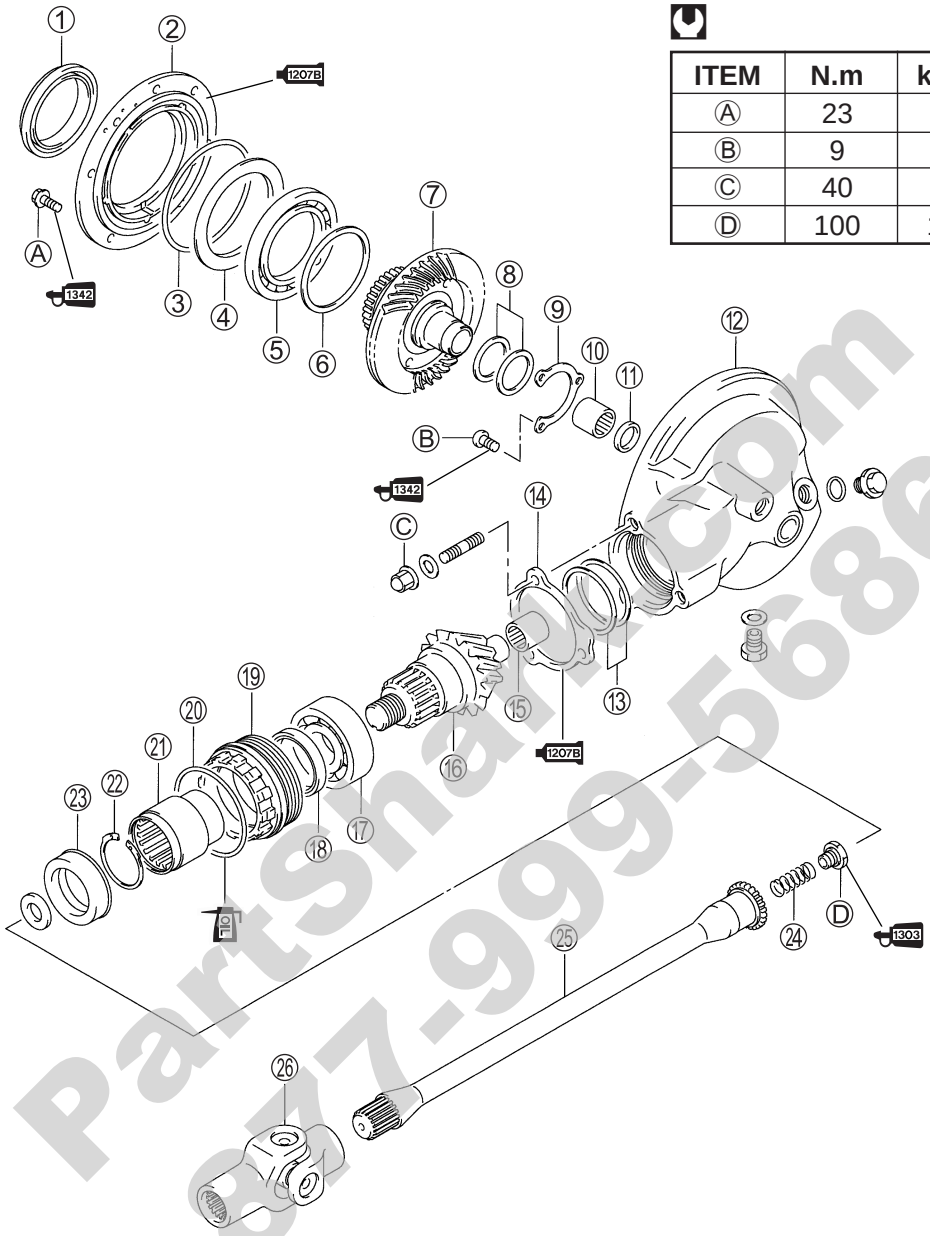
- Refer to the engine reassembly sections.

Engine reassembly ☞3-53

FINAL BEVEL GEARS

CONSTRUCTION

ITEM	N.m	kgf.m	lb-ft
Ⓐ	23	2.3	16.5
Ⓑ	9	0.9	6.5
Ⓒ	40	4.0	29.0
Ⓓ	100	10.0	72.5



Ⓐ Final gear case bolt
Ⓑ Final driven bevel gear bearing retainer screw
Ⓒ Final gear case nut
Ⓓ Final driven bevel gear coupling nut

① Oil seal
② Final gear bearing case
③ O-ring
④ Plate
⑤ Final driven gear bearing
⑥ Shims (4 kinds)
⑦ Final driven bevel gear
⑧ Shims (8 kinds)
⑨ Bearing retainer
⑩ Final driven gear bearing
⑪ Oil seal
⑫ Final gear case
⑬ Shims (5 kinds)
⑭ Stopper plate (2 kinds)
⑮ Final drive gear bearing
⑯ Final drive bevel gear
⑰ Final drive bevel gear bearing
⑱ Oil seal
⑲ Bearing stopper
⑳ O-ring
㉑ Final drive coupling
㉒ Circlip
㉓ Oil seal
㉔ Spring
㉕ Propeller shaft
㉖ Universal joint

Standard clearance Ⓒ: 1.00 mm (0.039 in)
Shim ③ size table

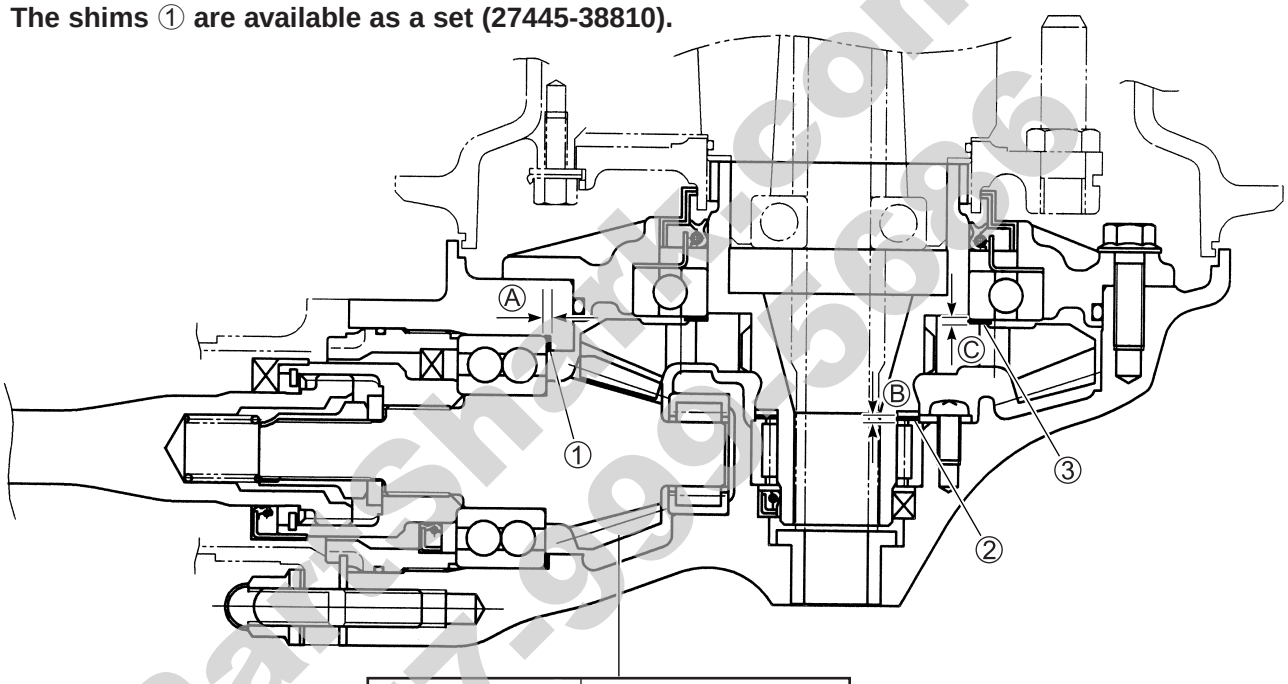
Part number	Thickness
27327-34200	0.35 mm (0.014 in)
27327-34210	0.40 mm (0.016 in)
27327-34220	0.50 mm (0.020 in)
27327-34230	0.60 mm (0.024 in)

The shims ③ are available as a set (27327-34810).

Standard clearance Ⓐ: 1.00 mm (0.039 in)
Shim ① size table

Part number	Thickness
27445-38A00-030	0.30 mm (0.012 in)
27445-38A00-035	0.35 mm (0.014 in)
27445-38A00-040	0.40 mm (0.016 in)
27445-38A00-050	0.50 mm (0.020 in)
27445-38A00-060	0.60 mm (0.024 in)

The shims ① are available as a set (27445-38810).



Backlash	0.03 – 0.064 mm (0.001 – 0.025 in)

Standard clearance Ⓑ: 2.3 mm (0.091 in)
Shim ② size table

Part number	Thickness
27326-34201	1.05 mm (0.041 in)
27326-34211	1.10 mm (0.043 in)
27326-34221	1.20 mm (0.047 in)
27326-34231	1.25 mm (0.049 in)
27326-34241	1.35 mm (0.053 in)
27326-34201-140	1.40 mm (0.055 in)
27326-34201-145	1.45 mm (0.057 in)
27326-34201-150	1.50 mm (0.059 in)

The shims ② are available as a set {27326-34810 (1.40 – 1.50), 27326-34820 (1.05 – 1.35)}.

FINAL GEAR CASE REMOVAL

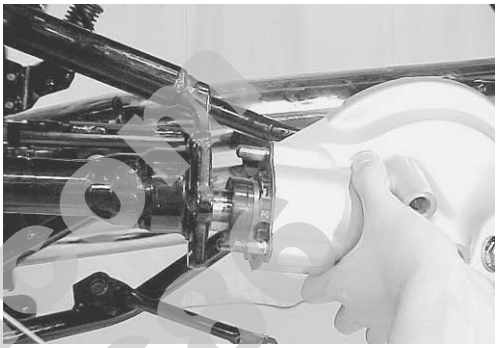
After draining final gear oil, the following components must be removed in the described order before removing the final gear case.

NOTE:

Refer to the following pages for the details of each step.

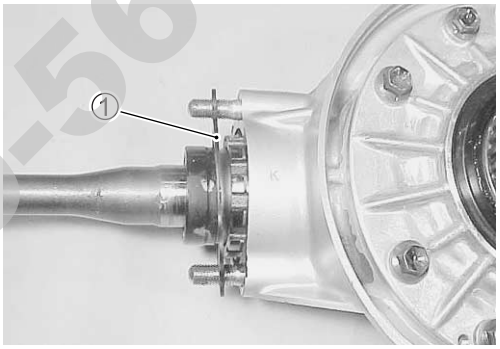
- Drain final gear oil. (☞2-15)
- Remove the rear wheel. (☞7-38)

- Remove the final gear case.



FINAL GEAR CASE DISASSEMBLY

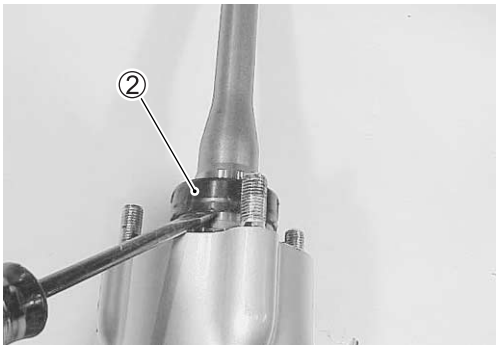
- Remove the plate ①.



- Remove the oil seal ②.

⚠ CAUTION

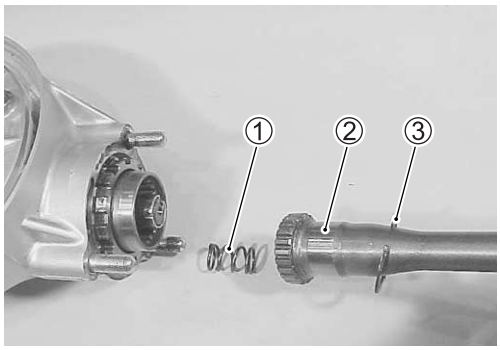
The removed oil seal must be replaced with a new one.



- Remove the circlip with the special tool and take off the propeller shaft and spring.

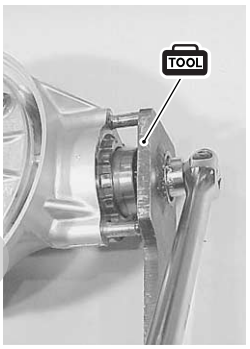
TOOL 09900-06108: Snap ring pliers

① Spring
② Propeller shaft
③ Circlip

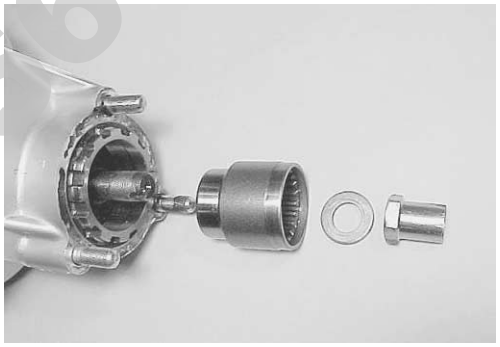


- Using a chisel, unlock the nut.
- Remove the final drive bevel gear coupling nut with the special tool.

TOOL **09924-62430: 22 mm Long socket**
09924-64510: Final drive gear coupling holder

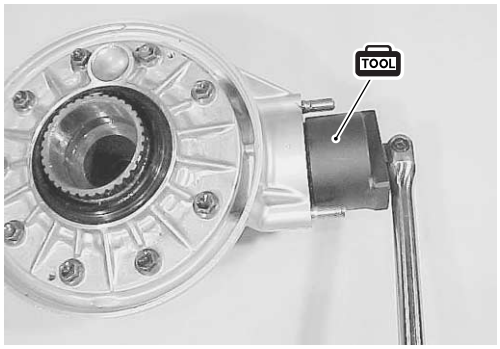


- Remove the washer and the final drive coupling.

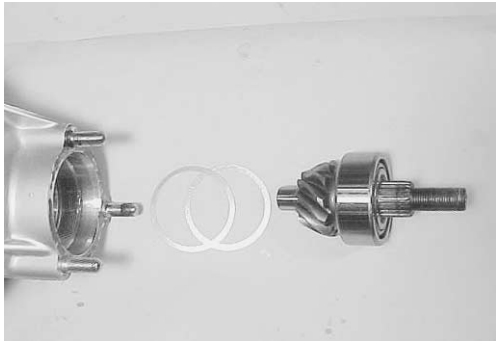


- Remove the bearing stopper by using the special tool.

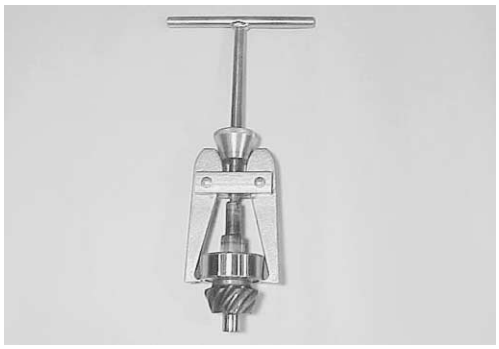
TOOL **09924-62410: Final drive gear bearing holder wrench**



- Remove the final drive bevel gear and shims.



- Remove the bearing from the final drive bevel gear with the bearing puller.



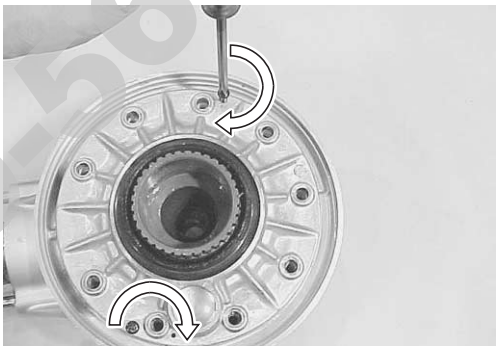
⚠ CAUTION

The removed bearing must be replaced with a new one.

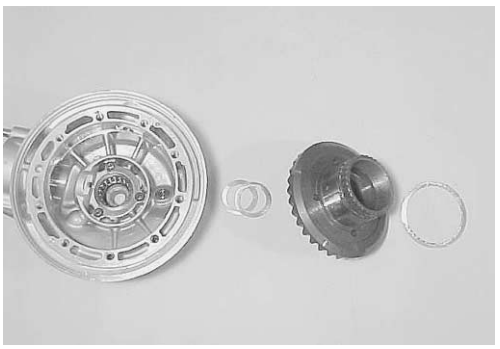
NOTE:
If no abnormal noise, the bearing removal is not necessary.

- Remove the final gear bearing case bolts.

- Remove the final gear bearing case from the final gear case, by using two 5 mm screws.



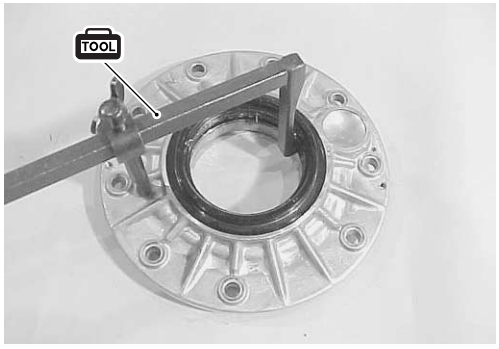
- Remove the final driven bevel gear and shims.



- Remove the oil seal with the special tool.

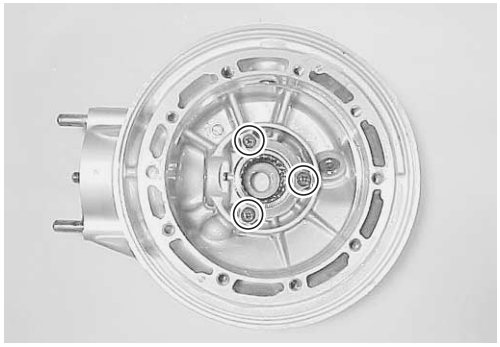
TOOL 09913-50121: Oil seal remover

NOTE:
If no oil leakage, the oil seal removal is not necessary.



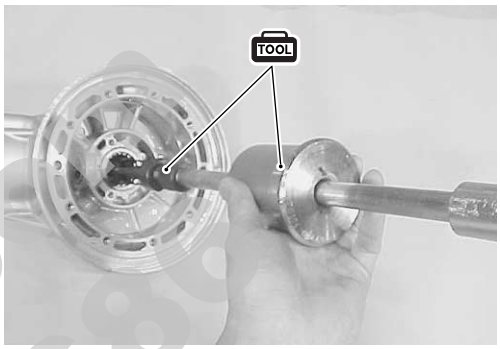
- Remove the bearing retainer screws, using an impact driver set.

TOOL 09900-09004: Impact driver set



- Remove the final driven gear bearing and oil seal with the special tools.

TOOL 09941-64511: Bearing remover
09930-30102: Sliding shaft



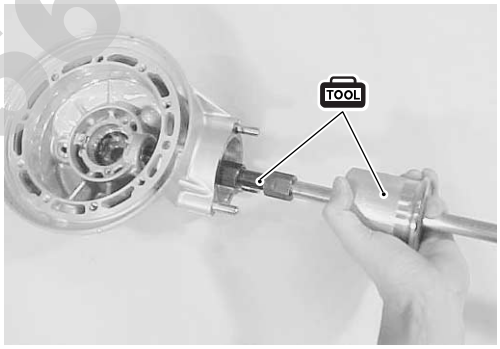
⚠ CAUTION

The removed bearing and oil seal must be replaced with new ones.

NOTE:
If no abnormal noise, the bearing removal is not necessary.

- Remove the final drive gear bearing with the special tools.

TOOL 09923-73210: Bearing remover
09930-30102: Sliding shaft

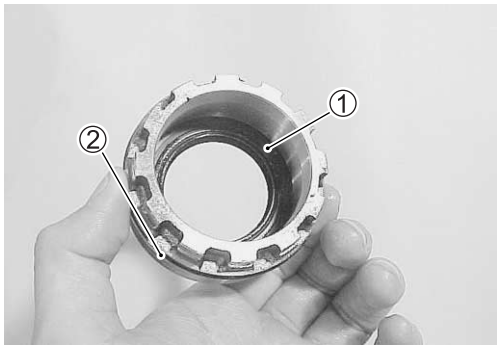


⚠ CAUTION

The removed bearing must be replaced with a new one.

NOTE:
If no abnormal noise, the bearing removal is not necessary.

- Remove the oil seal ① and O-ring ② from the bearing stopper.



⚠ CAUTION

The removed oil seal and O-ring must be replaced with new ones.

NOTE:
If no oil leakage, the oil seal removal is not necessary.

INSPECTION

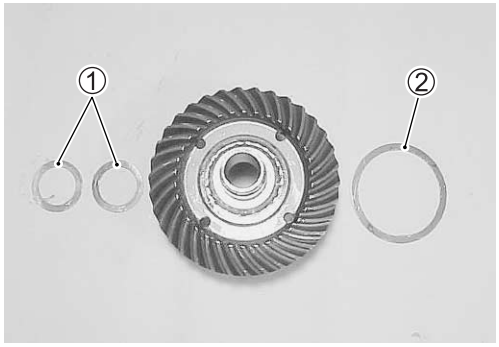
Inspect the removed parts for the following abnormalities.

* Drive and driven bevel gear damage or wear
* Improper tooth contact
* Abnormal noise of bearings
* Bearing damage or wear
* Oil seal damage or wear
* Propeller shaft spline damage or wear

FINAL GEAR SHIMS ADJUSTMENT

FINAL GEAR BEARING CASE SHIM CLEARANCE

- Install the final driven gear, shims (① and ②) and final gear bearing case to the final gear case.



- Tighten the final gear case bolts to the specified torque.

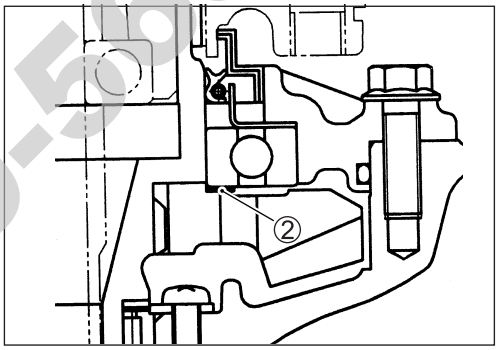
Final gear case bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

NOTE:
It is not necessary to apply SUZUKI BOND "1207B" to the matching surface at this stage.

- Measure the clearance between the shims and bearing. If it is not within the specification, the shims must be changed.

Standard

Final gear case shim clearance
Standard: 1.00 mm (0.039 in)



Shims ② specifications

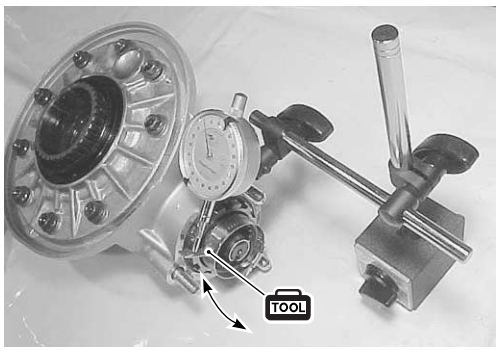
Part No.	Shim thickness
27327-34200	0.35 mm (0.014 in)
27327-34210	0.40 mm (0.016 in)
27327-34220	0.50 mm (0.020 in)
27327-34230	0.60 mm (0.024 in)

NOTE:
The shims ② are available as a set (27327-34810).

BACKLASH

After assembling the final gear case, measure the final bevel gear backlash as follows.

- Install the backlash measuring tool on the drive bevel gear coupling, and set-up a dial gauge as shown in photo.



09924-34510: Backlash measuring tool (27 – 50 mm)
09900-20606 : Dial gauge (1/100 mm, 10 mm)
09900-20701 : Magnetic stand

- Adjust the dial gauge so that it touches the backlash measuring tool arm at the mark; hold the final driven bevel gear securely, and turn the final drive bevel gear coupling slightly in each direction, reading the total backlash on the dial gauge.

Final bevel gear backlash
Standard: 0.03 – 0.64 mm (0.001 – 0.025 in)

If the backlash is not within the specification, adjust the shim thickness as follows:

- Remove shims from final gear bearing case and final gear case, and measure total thickness.
- In order not to change the clearance between final driven bevel gear and bearing, the total thickness of the shims installed after a change is made must equal the original total thickness of shims.
- If backlash is too large:
  a) Install a thinner shim pack ① between final driven bevel gear and final gear case.
  b) Increase thickness of shims ② between final driven bevel gear bearing and bearing case by an amount equal to decrease above.
- If backlash is too small:
  a) Install a thicker shim pack ① between final driven bevel gear and final gear case.
  b) Decrease thickness of shims ② between final driven gear bearing and bearing case by an amount equal to increase above.

EXAMPLE:

Final gear to case shims ①; 1.45 mm + 1.40 mm = 2.85 mm
Final gear bearing to bearing case shims ②,

0.35 mm + 0.60 mm = 0.95 mm
Original total measurement = 3.80 mm

Backlash too large:

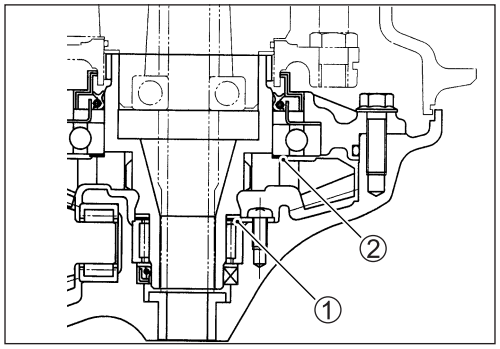
Final gear to case shims ①; 1.35 mm + 1.45 mm = 2.80 mm
Final gear bearing to bearing case shims ②,

0.60 mm + 0.40 mm = 1.00 mm
Total thickness = 3.80 mm

Backlash too small:

Final gear to case shims ①; 1.50 mm + 1.40 mm = 2.90 mm
Final gear bearing to bearing case shims ②;

0.50 mm + 0.40 mm = 0.90 mm
Total thickness = 3.80 mm



Shims ① specifications

Part No.	Shim thickness
27326-34201	1.05 mm (0.041 in)
27326-34211	1.10 mm (0.043 in)
27326-34221	1.20 mm (0.047 in)
27326-34231	1.25 mm (0.049 in)
27326-34241	1.35 mm (0.053 in)
27326-34201-140	1.40 mm (0.055 in)
27326-34201-145	1.45 mm (0.057 in)
27326-34201-150	1.50 mm (0.059 in)

The shims ① are available as a set {27326-34810 (1.40 – 1.50), 27326-34820 (1.05 – 1.35)}.

Shims ② specifications

Part No.	Shim thickness
27327-34200	0.35 mm (0.014 in)
27327-34210	0.40 mm (0.016 in)
27327-34220	0.50 mm (0.020 in)
27327-34230	0.60 mm (0.024 in)

The shims ① are available as a set (27327-34810).

TOOTH CONTACT

After backlash adjustment is carried out, the tooth contact must be checked.

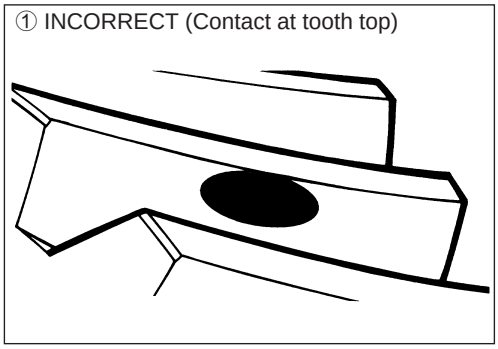
- Remove the bolts from the final gear bearing case, and remove the case with the two 5 mm screws. (☞4-14) Do not misplace the shims. Remove the final driven bevel gear.
- Clean and de-grease several teeth on the final driven bevel gear. Coat these teeth with machinist's dye or paste, preferably of a light color.
- Re-install the final driven bevel gear with shims in place, positioning the coated teeth so that they are centered on the final drive bevel gear.
- Re-install the final gear bearing case and bolts, and tighten to specification.

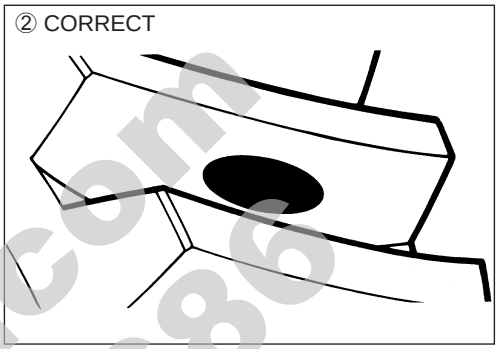
Final gear case bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

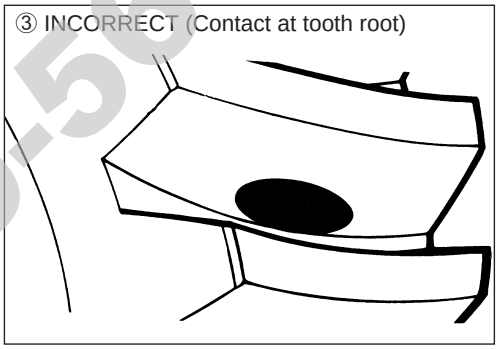
- Using a socket and handle on the final drive bevel gear coupling nut, rotate the final drive bevel gear several turns in each direction, while loading the final driven bevel gear. This will provide a contact pattern on the coated teeth of the driven bevel gear.
- Remove the final gear bearing case and final driven bevel gear, and inspect the coated teeth of the driven bevel gear. The contact patch should be as shown at right:
- If the tooth contact pattern is incorrect, as shown in ①, a thinner shim ④ is needed between the final drive bevel gear bearing and final gear case.
- If the tooth contact pattern is incorrect, as shown in ③, a thicker shim ④ is needed between the final drive bevel gear bearing and final gear case.
- If the tooth contact pattern is incorrect for either reason, the appropriate shim must be installed, and the tooth contact pattern rechecked by repeating the tooth coating procedure above.

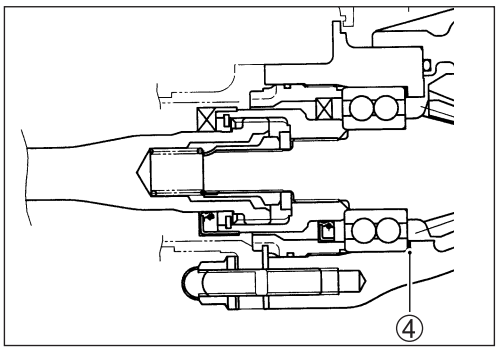
NOTE:

If it is necessary to adjust the shim ④ thickness between final drive bevel gear bearing and final gear case, the final gear backlash may change, and should be re-checked according to the procedure outlined under the Backlash Measurement sub-section. Both adjustments may be needed until both backlash and tooth contact are correct.









Shims ④ specification

Part No.	Shim thickness
27445-38A00-030	0.30 mm (0.012 in)
27445-38A00-035	0.35 mm (0.014 in)
27445-38A00-040	0.40 mm (0.016 in)
27445-38A00-050	0.50 mm (0.020 in)
27445-38A00-060	0.60 mm (0.024 in)

The shims ④ are available as a set (27445-38810).

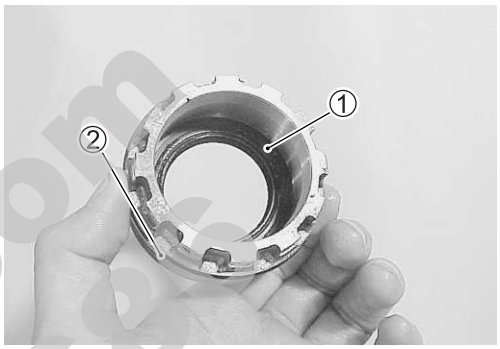
FINAL GEAR CASE REASSEMBLY

Reassemble the final gear case in the reverse order of disassembly. Pay attention to the following points.

- Install a new oil seal ① and O-ring ② to the bearing stopper.

⚠ CAUTION

Use new O-ring and oil seat to prevent oil leakage.

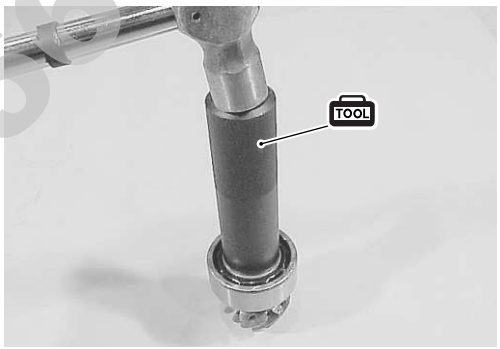


- Install the bearing to the final drive bevel gear with the special tool.

TOOL 09913-84510: Bearing installer

⚠ CAUTION

When replacing the drive bevel gear, replace the driven bevel gear also, as they must be replaced together.



- Install the needle roller bearing for the final drive bevel gear into the final gear case with the special tool.

TOOL 09913-75821 : Bearing installer

- Install the oil seal into the final gear case.

⚠ CAUTION

*** Use a new oil seal to prevent oil leakage.**
*** The lip and spring of the oil seal should face to the driven bevel gear side.**

- Install the needle roller bearing for the final driven bevel gear into the final gear case with the special tool.

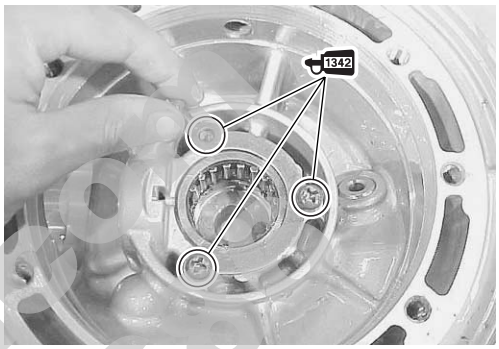
09913-76010: Bearing installer

NOTE:
The stamped ward on the bearing end should face to the driven bevel gear side.

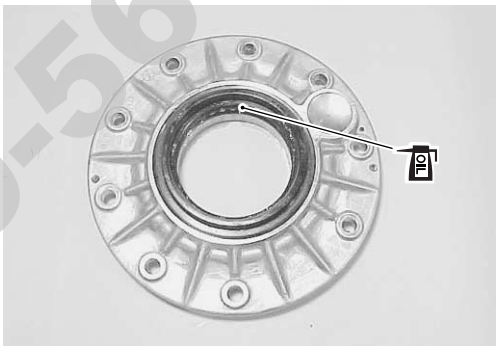
- Install the bearing retainer. Apply a small quantity of the THREAD LOCK “1342” on the screws, and tighten them to the specified torque.

99000-32050: THREAD LOCK “1342”

Bearing retainer screw: 9 N·m (0.9 kgf·m, 6.5 lb-ft)



- Install a new oil seal to the final gear bearing case.
- Apply final gear oil to the lip of the oil seal.



- Apply SUZUKI BOND “1207B” to the mating surface of the final gear case and final gear bearing case.

⚠ CAUTION

Do not block the breather passage when applying SUZUKI BOND “1207B”.

1207B 99000-31140: SUZUKI BOND “1207B”

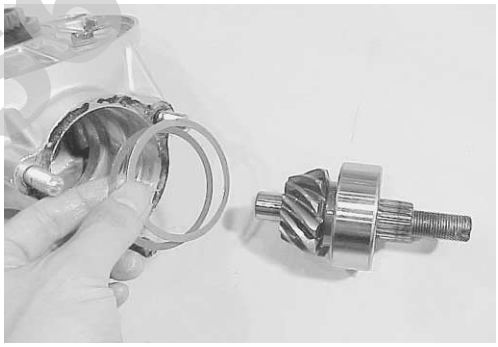
- Apply THREAD LOCK “1342” to the final gear case bolts and tighten them to the specified torque.

Final gear case bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

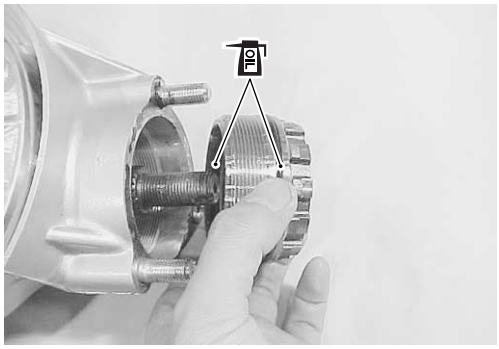
1342 99000-32050: THREAD LOCK “1342”

- Install the correct shims to the final drive bevel gear and install the bevel gear to the final gear case.

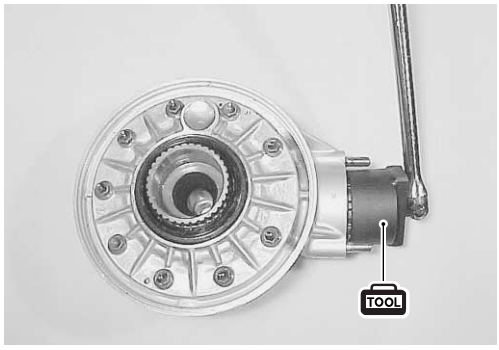
Shim adjustment (☞4-16)



- Apply oil to the O-ring and the oil seal.
- Install the bearing stopper.



- Tighten the bearing stopper to the specified torque with the special tool.

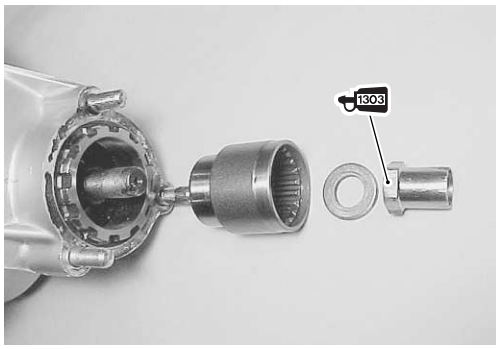


TOOL 09924-62410: Final drive gear bearing holder wrench

Final drive bevel gear bearing stopper: 110 N·m (11.0 kgf·m, 79.5 lb-ft)

- Apply a small quantity of the THREAD LOCK "1303" to the final drive bevel gear coupling nut.

1342 99000-32030: THREAD LOCK "1303"

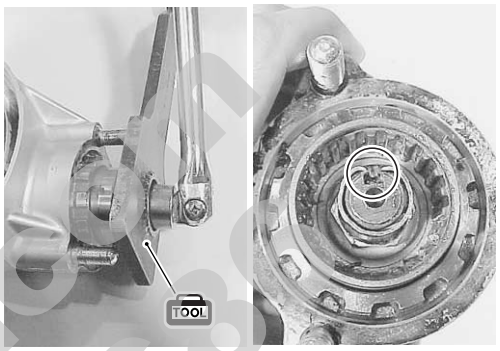


- Tighten the nut to the specified torque with the special tool.

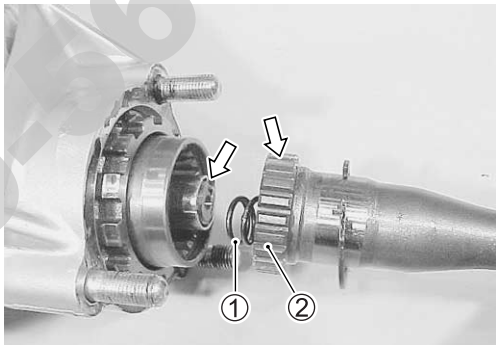
Final drive bevel gear coupling nut: 100 N·m (10.0 kgf·m, 72.5 lb-ft)

TOOL 09924-62430: 22 mm Long socket
09924-64510: Final drive gear coupling holder

- Lock the final drive bevel gear coupling nut with a center punch.

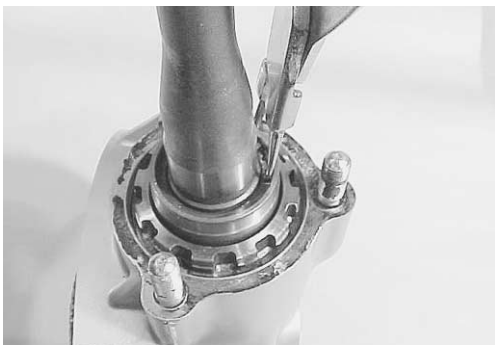


- Apply Lithium Base Molybdenum grease (NLGI #2) to the propeller shaft splines and final drive bevel gear coupling.
- Install the spring ① and propeller shaft ②.



- Install the circlip.
- After installing the propeller shaft with a new circlip, make sure that the propeller shaft turns smoothly without any hitch or bearing noise.

TOOL 09900-06108: Snap ring pliers

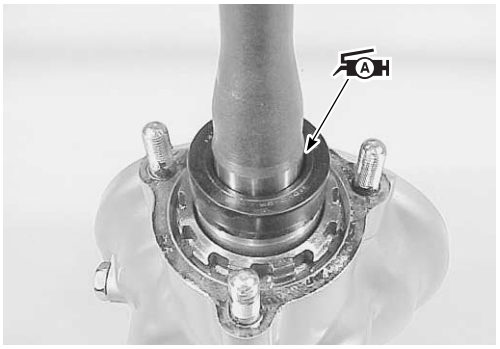


- Apply grease to the lip of the oil seal and install it to the final drive bevel gear coupling.

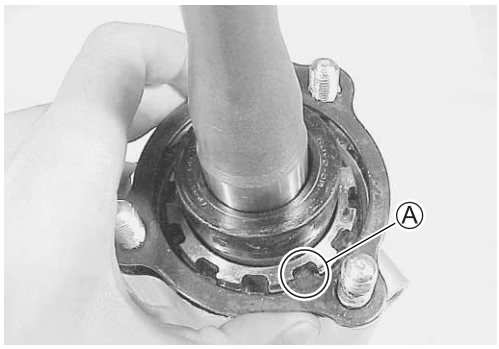
⚠ CAUTION

Use a new oil seal to prevent oil leakage.

A 99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A" (For the others)



• Install the stopper plate.



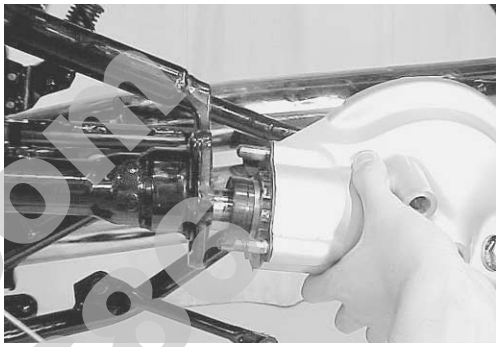
⚠ CAUTION

When installing the plate, fit the protrusion Ⓐ of plate to the one of the bearing stopper grooves.

NOTE:
Two kinds of plates are available to lock the stopper at the proper position.

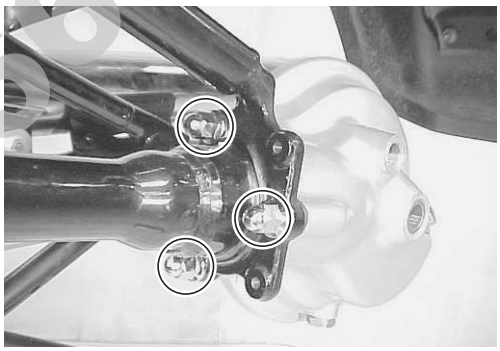
FINAL GEAR CASE INSTALLATION

Installation is in the reverse order of removal.
NOTE:
Refer to the following pages for the details of each step.
• Install the final gear case.



• Tighten the final gear case bolts to the specified torque.

Final gear case nut: 40 N·m (4.0 kgf·m, 29.0 lb-ft)



• Install the rear wheel. (☞7-41)
• Pour final gear oil. (☞2-15)

FUEL AND LUBRICATION SYSTEM

CONTENTS

5

⚠ WARNING

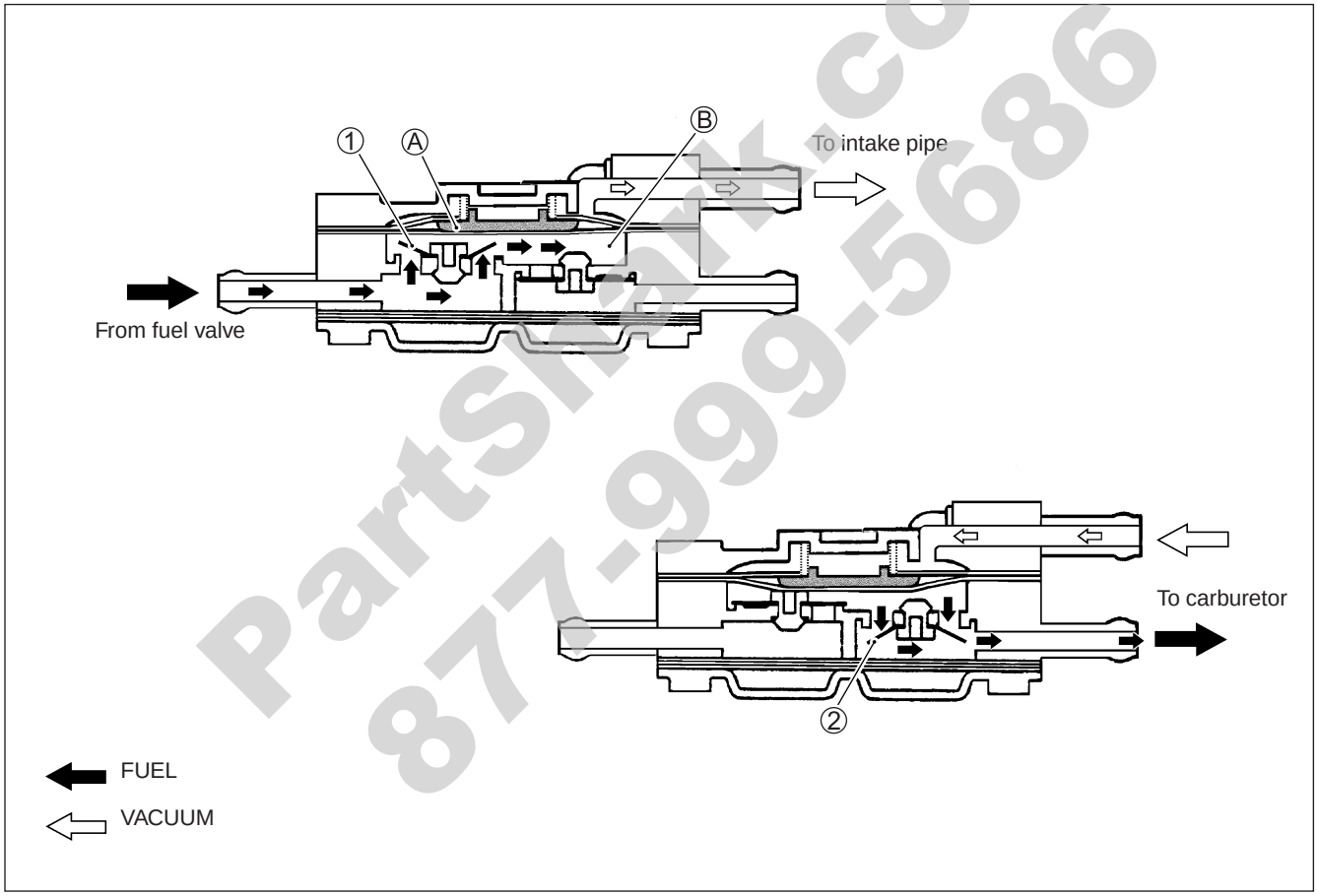
Gasoline must be handled carefully in an area well ventilated and away from fire or sparks.

FUEL SYSTEM

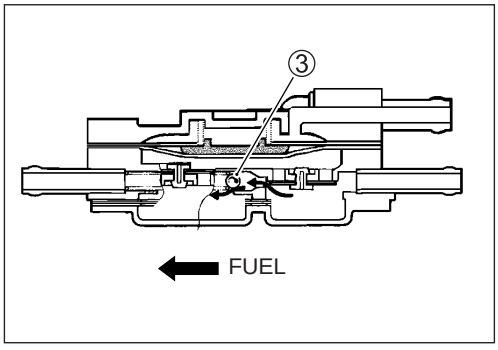
The fuel pump is operated by a vacuum force which is supplied from the carburetor intake pipe. The fuel sent under pressure by the fuel pump flows into the float chamber when the float of the carburetor has dropped and the needle valve is open. When the needle valve closes, the pressure of the fuel in the hose connecting the carburetor and the fuel pump increases, and when the set pressure is reached, the operation of the fuel pump is stopped by the fuel pressure to prevent excessive supply.

FUEL PUMP

Vacuum pulsations from the carburetor intake pipe are used to operate the pump diaphragm Ⓐ. When vacuum is applied to the diaphragm Ⓐ, fuel is drawn from the tank into the diaphragm's chamber Ⓑ. As positive pressure is applied, the diaphragm backs, pushing the fuel through the outlet to the carburetor.
A series of check valves (① and ②) is used in the fuel flow route to allow the fuel to move in only one direction, through the pump body.



If the fuel pressure in the chamber of carburetor side is too high, the return valve ③ is opened so that the fuel pressure is released to the chamber of fuel cock side.



FUEL TANK/FUEL VALVE

REMOVAL

⚠ WARNING

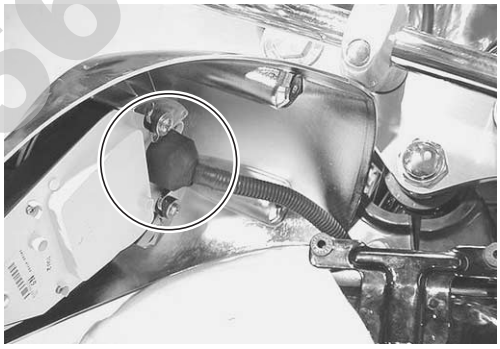
Gasoline is highly flammable and explosive. Keep heat, sparks, and flames away from gasoline.

- Remove the front seat. (☞7-2)

- Remove the speedometer.
- Disconnect the speedometer coupler.

⚠ CAUTION

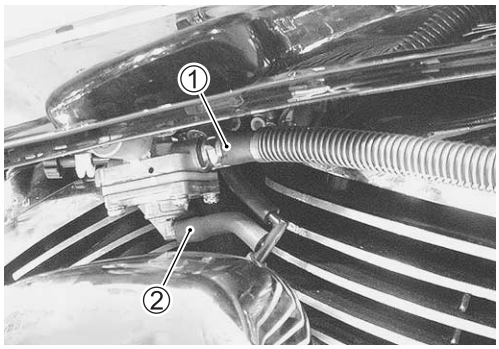
Be careful not to scratch the fuel tank.



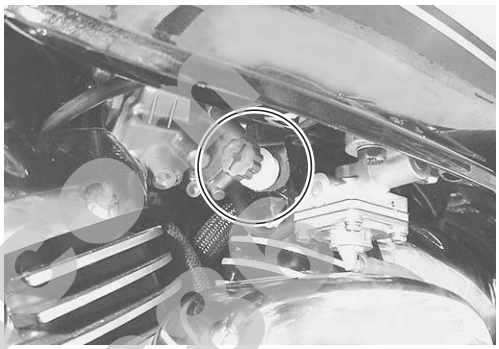
- Remove the fuel tank mounting bolt.

- Disconnect the fuel level gauge coupler.

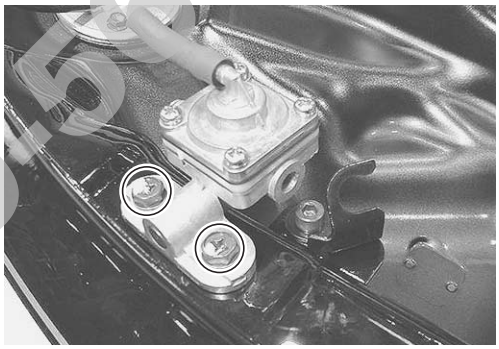
- Disconnect the fuel hose ① and vacuum hose ②.



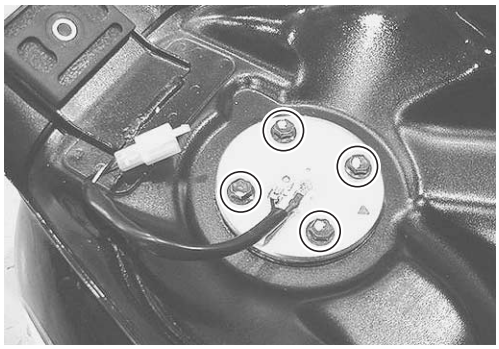
- Remove the throttle stop screw.
- Remove the fuel tank.



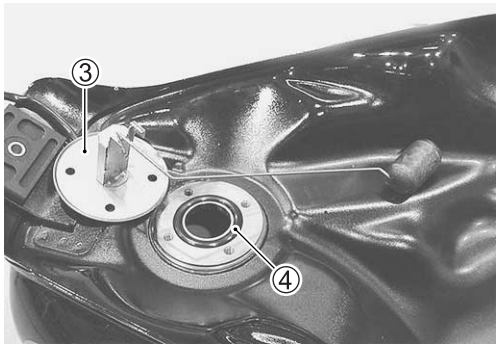
- Remove the fuel valve.



- Remove the fuel level gauge mounting bolts.



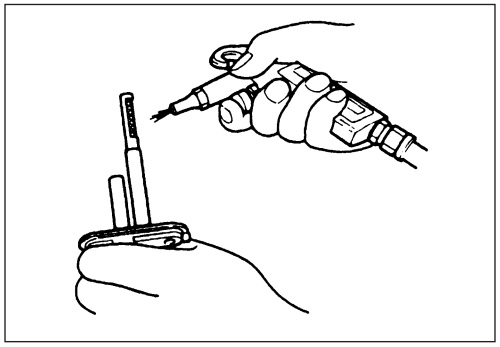
- Remove the fuel level gauge ③.
- Remove the O-ring ④.



INSPECTION

FUEL VALVE

If the fuel filter is dirty with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Clean the fuel filter with compressed air. Also check the fuel valve for cracks.

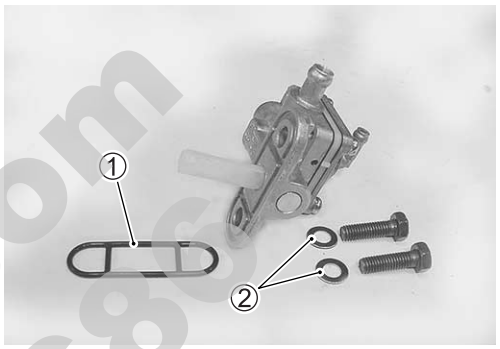


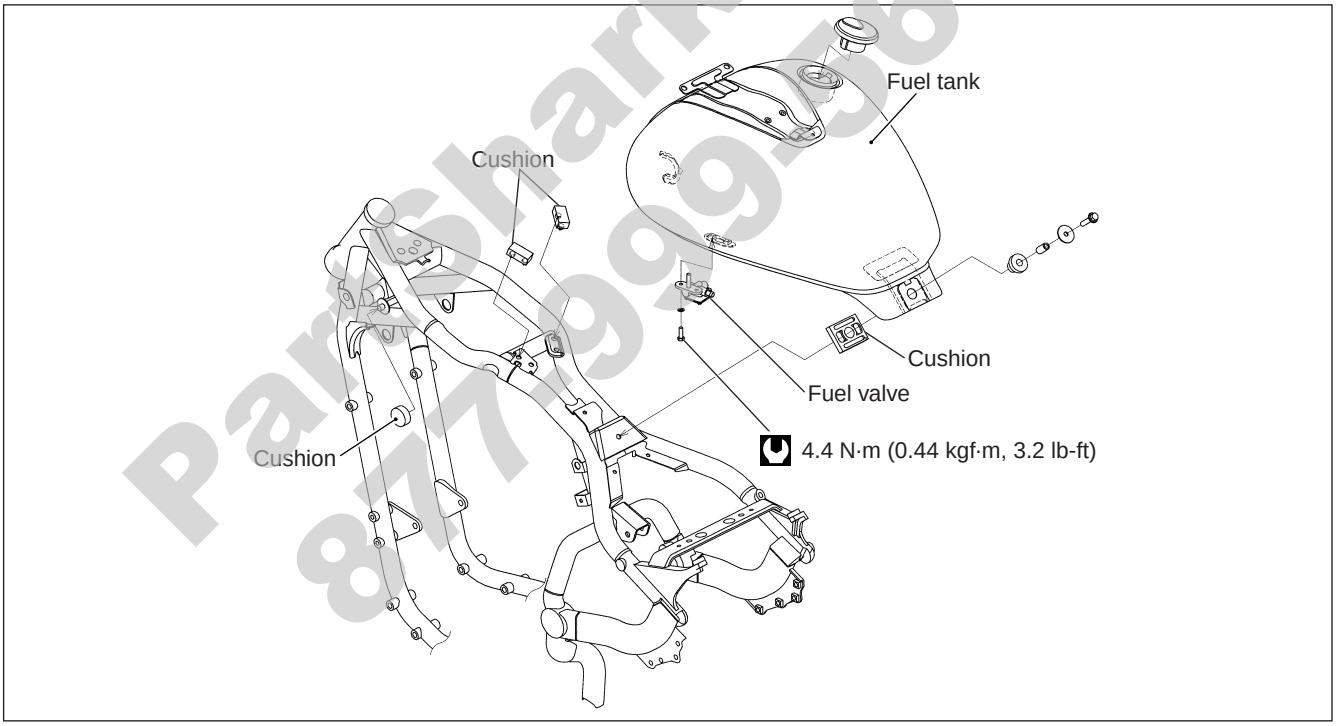
REMOUNTING

- Remount the fuel tank and fuel valve in the reverse order of removal.

⚠ WARNING

*** Gaskets ① and ② must be replaced with new ones to prevent fuel leakage.**
*** Tighten the fuel valve bolts evenly.**

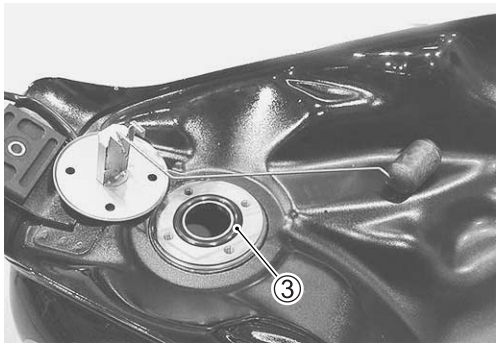


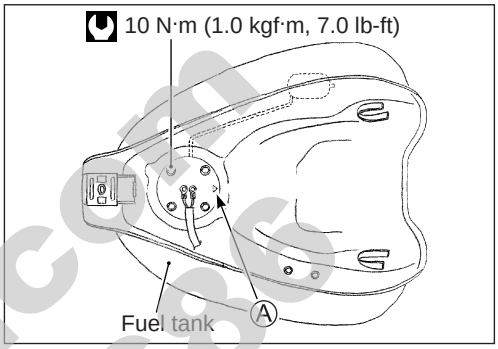


⚠ WARNING

*** Gasket ③ must be replaced with new ones to prevent fuel leakage.**
*** Tighten the fuel level gauge bolts evenly.**

NOTE:
Face △ mark Ⓐ on the fuel level gauge forward.

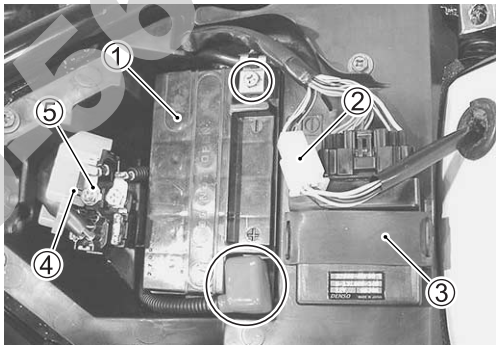




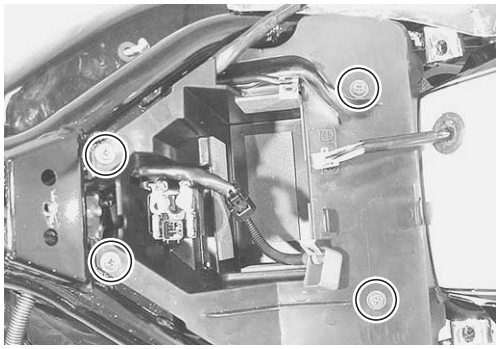
FUEL PUMP

REMOVAL

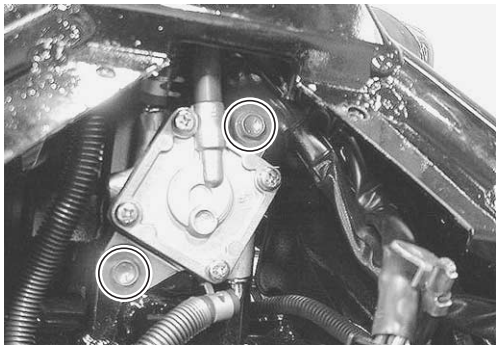
- Remove the battery ①.
- Disconnect the lead wire coupler ②.
- Remove the ignitor ③.
- Disconnect the fuse case coupler ④.
- Remove the starter lead wire ⑤.



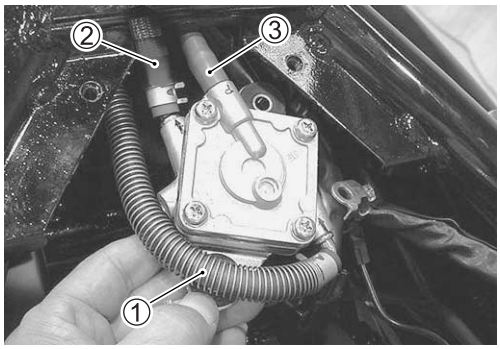
- Remove the battery case.



- Remove the fuel pump mounting bolts.



• Disconnect the fuel hoses ①, ② and vacuum hose ③.



INSPECTION

⚠ WARNING

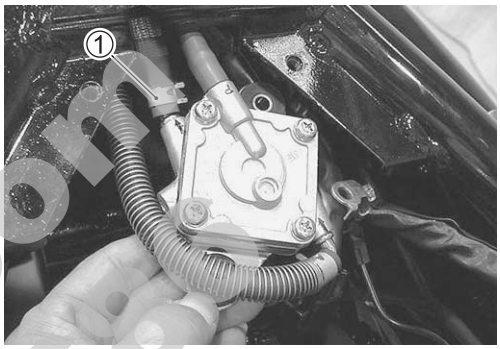
Gasoline is highly flammable and explosive. Keep heat, sparks, and flames away from gasoline.

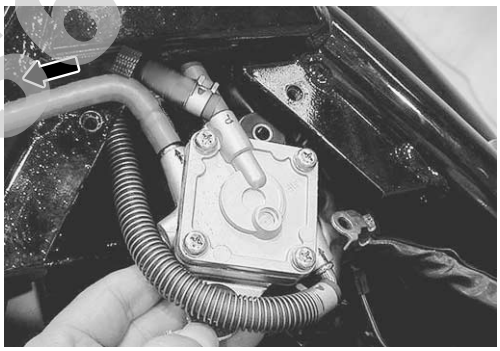
• Disconnect the fuel hose ①, connect the suitable hose and insert the free end of the hose into a receptacle.

Check the fuel flow when cranking the engine for few seconds by pressing the starter button.

If the fuel flow is not found, check the fuel valve. (☞5-5)

If the fuel valve and hoses are not fault, replace the fuel pump.





REASSEMBLY

Carry out the assembly procedure in the reverse order of disassembly.

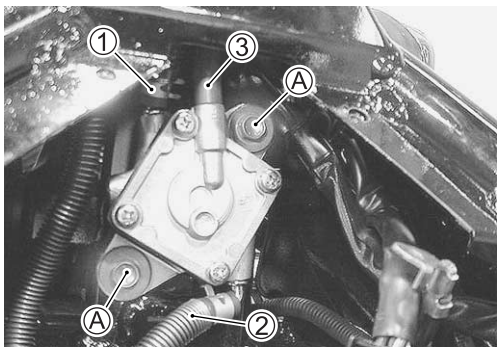
• Connect the fuel hoses ①, ② and vacuum hose ③ securely.
• Tighten the bolts Ⓐ.

FUEL HOSE ROUTING: ☞9-17

Fuel hose ① (To carburetor)

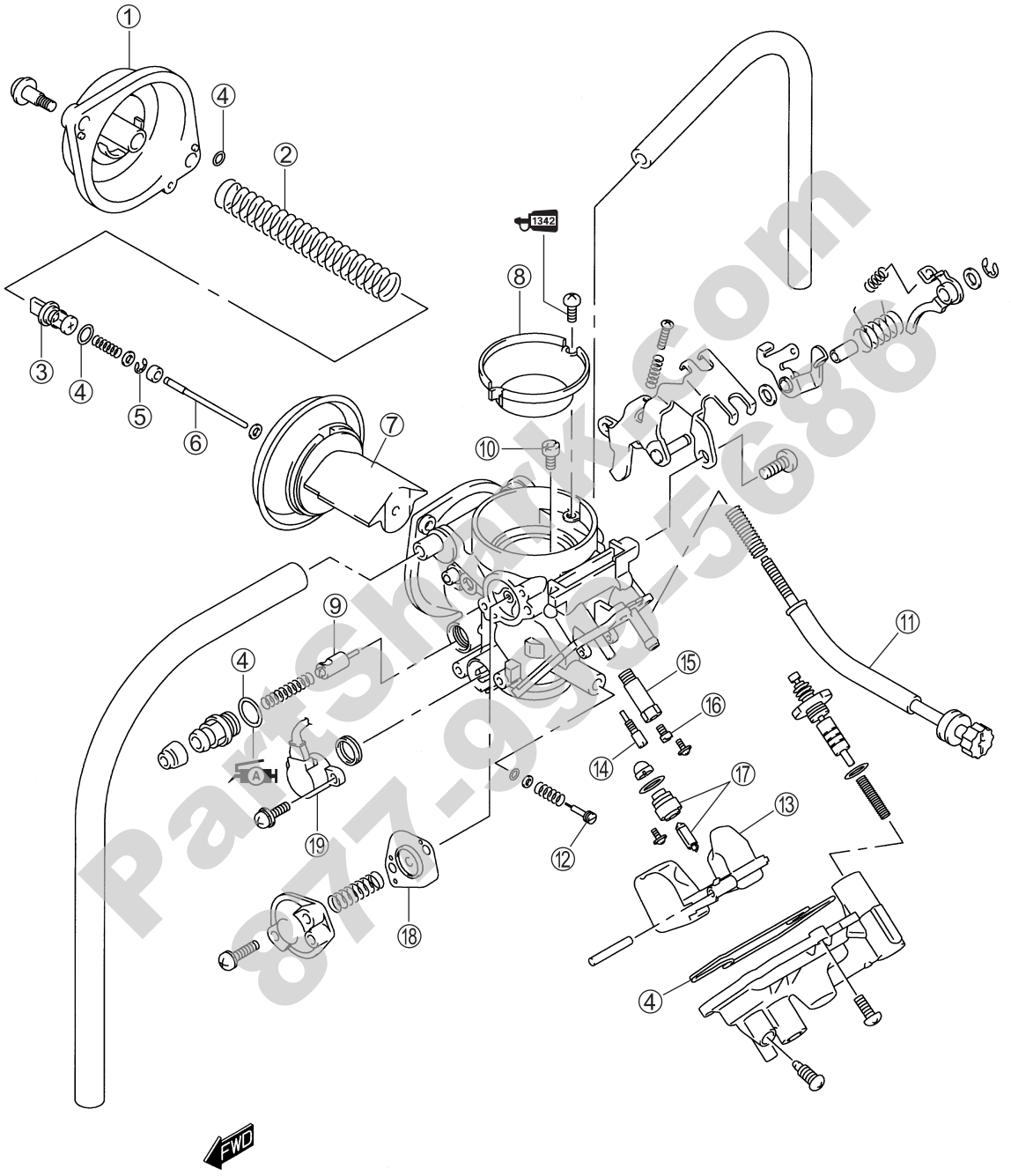
Fuel hose ② (To fuel valve)

Vacuum hose ③ (To intake pipe)



CARBURETOR

CONSTRUCTION



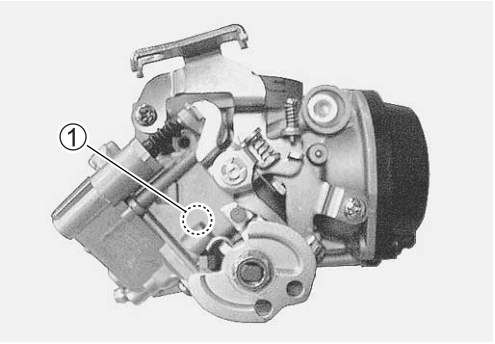
① Top cap
② Spring
③ Jet needle stopper
④ O-ring
⑤ E-ring
⑥ Jet needle
⑦ Diaphragm/Piston valve
⑧ Funnel
⑨ Starter plunger
⑩ Pilot air jet
⑪ Throttle stop screw
⑫ Pilot screw
⑬ Float
⑭ Pilot jet
⑮ Main jet holder
⑯ Main jet
⑰ Needle valve
⑱ Coasting valve
⑲ Throttle position sensor

SPECIFICATIONS

ITEM		SPECIFICATION		
		E-02, 19, 24	E-03, 28	E-33
Carburetor type		MIKUNI BDSR34	←	←
Bore size		34 mm	←	←
I.D. No.		41F1	41F2	41F3
Idle r/min.		1 100 ± 100 r/min.	←	←
Fuel level		—	—	—
Float height		7.0 ± 0.5 mm (2.76 ± 0.02 in)	←	←
Main jet	(M.J.)	#132.5	#132.5	←
Main air jet	(M.A.J.)	ϕ 1.8	←	←
Jet needle	(J.N.)	5E22-3	5E23	←
Needle jet	(N.J.)	P-0M	P-0M	←
Throttle valve	(Th.V.)	#95	←	←
Pilot jet	(P.J.)	#27.5	#27.5	←
Pilot screw	(P.S.)	PRE-SET (3.0 turns back)	PRE-SET	←
Throttle cable play		2 – 4 mm (0.08 ± 0.16 in)	←	←

LOCATION OF CARBURETOR I.D. NO.

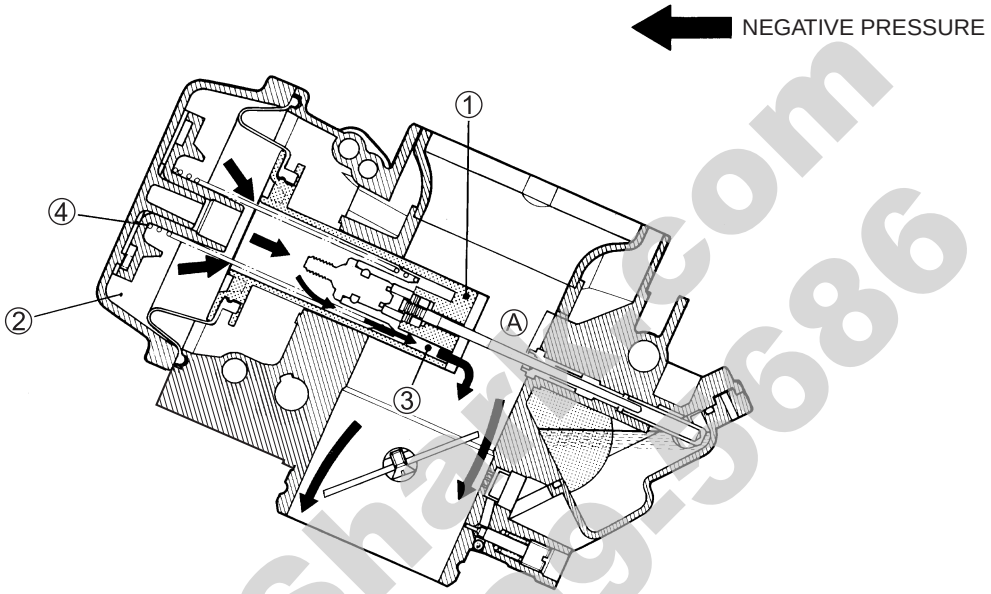
The carburetor I.D. is stamped on the location ① on the carburetor as shown in the right photo.



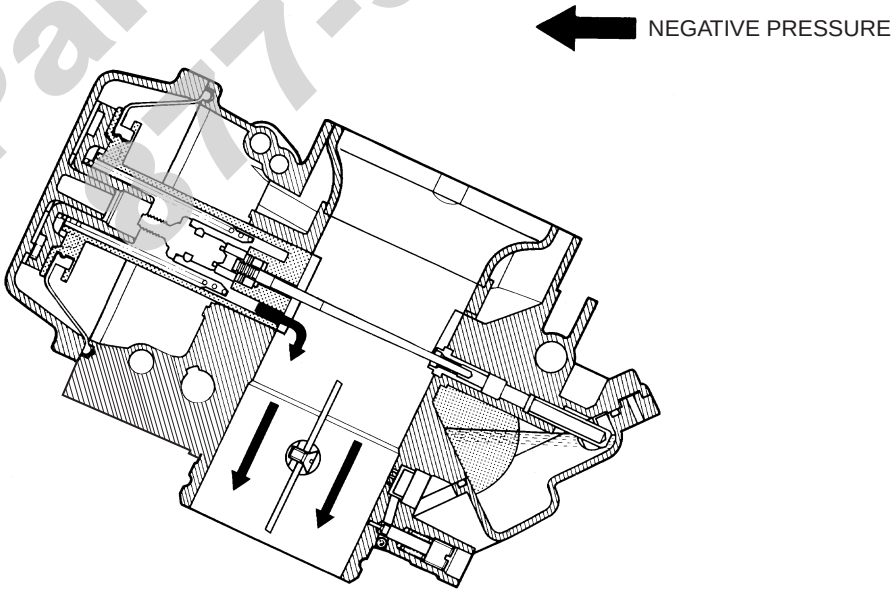
DIAPHRAGM AND PISTON OPERATION

The carburetor is a variable-venturi type, whose venturi cross sectional area is increased or decreased automatically by the piston valve ①. The piston valve moves according to the negative pressure present on the downstream side of the venturi Ⓐ. Negative pressure is admitted into the diaphragm chamber ② through an orifice ③ provided in the piston valve ①.

Rising negative pressure overcomes the spring ④ force, causing the piston valve ① to rise into the diaphragm chamber and prevent the air velocity from increasing. Thus, air velocity in the venturi passage is kept relatively constant for improved fuel atomization and the precise air/fuel mixture.



LOWER POSITION OF THE PISTON VALVE



UPPER POSITION OF THE PISTON VALVE

SLOW SYSTEM

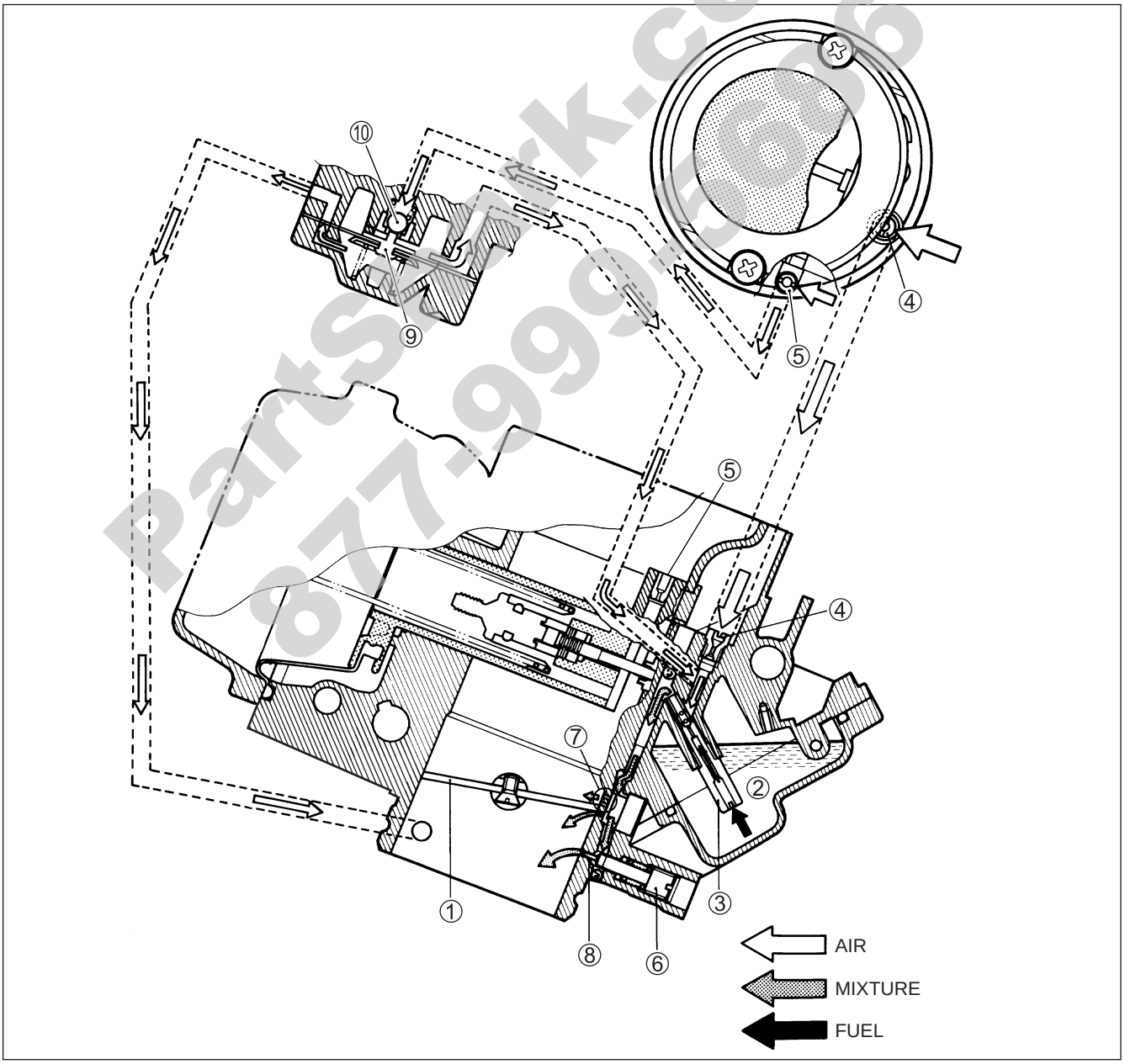
This system supplies fuel to the engine during engine operation with throttle valve ① closed or slight opened. The fuel from the float chamber ② is first passage and metered by the pilot jet ③ where it mixes with air coming in through #1 pilot air jet ④ and #2 pilot air jet ⑤.

This mixture, rich with fuel, then goes up through pilot pipe to pilot screw ⑥. A part of the mixture is discharged into the main bore out of by-pass ports ⑦. The remainder is then metered by pilot screw and sprayed out into the main bore through pilot outlet ⑧.

TRANSIENT ENRICHMENT SYSTEM

The transient enrichment system is a device which keeps fuel/air mixture ratio constant in order not to generate unstable combustion when the throttle grip is returned suddenly during high speed driving. For normal operation, sum of the air from the #1 pilot air jet ④ and #2 pilot air jet ⑤ keeps proper fuel/air mixture ratio. But when the throttle valve is closed suddenly, a large negative pressure generated on cylinder side works on to a diaphragm ⑨. The ball ⑩ held by the diaphragm ⑨ closes the air passage from #2 pilot air jet ⑤, therefore, the fuel/air mixture becomes rich with fuel.

This system is to keep the combustion condition constant by varying the fuel/air mixture ratio by controlling air flow from the pilot air jet.



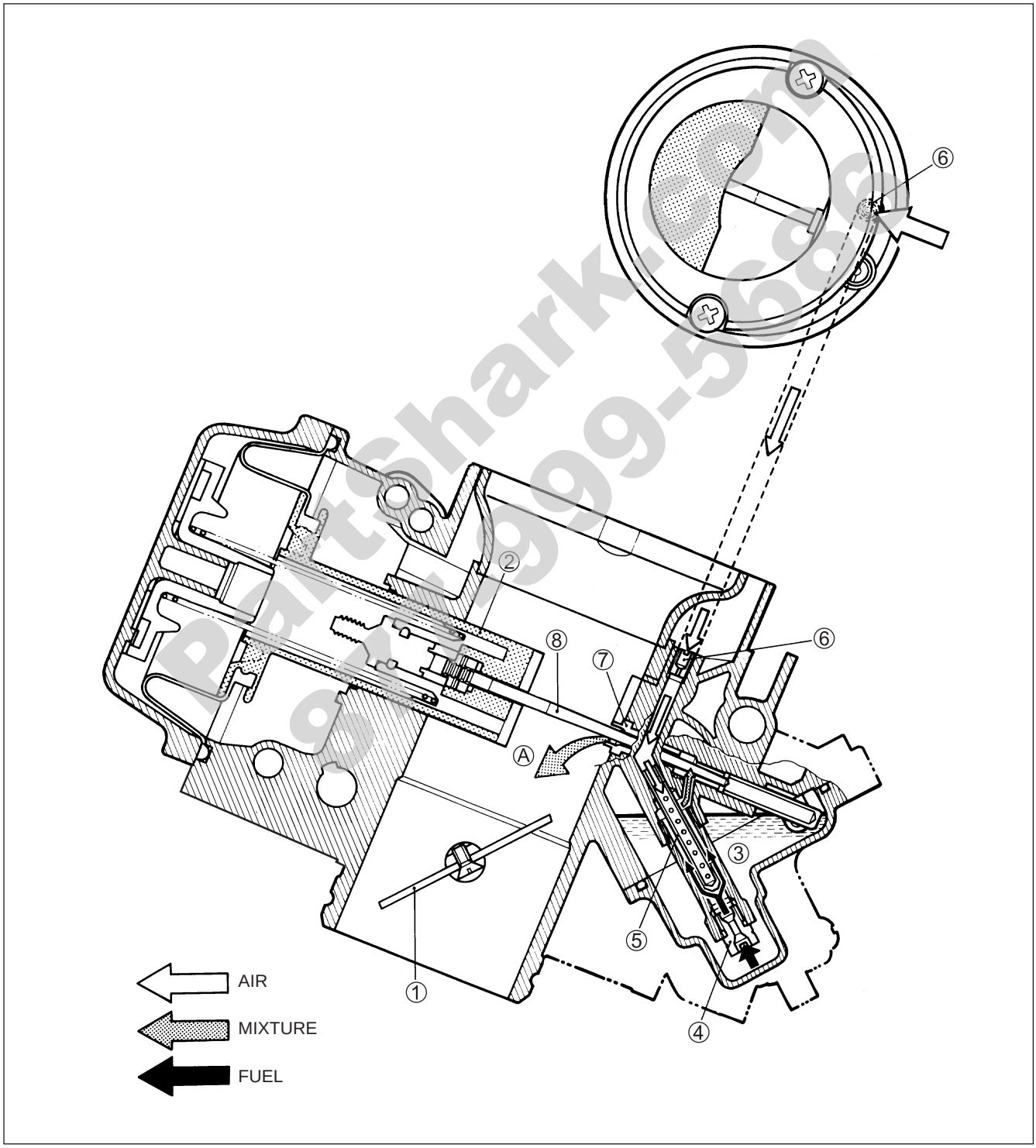
MAIN SYSTEM

As the throttle valve ① is opened, engine speed rises and negative pressure in the venturi Ⓐ increases. This causes the piston valve ② moves upward.

The fuel in the float chamber ③ is metered by the main jet ④. The metered fuel passes around main air bleed pipe ⑤, mixes with the air admitted through main air jet ⑥ to from an emulsion and emulsion fuel enters needle jet ⑦.

The emulsified fuel then passes through the clearance between the needle jet ⑦ and jet needle ⑧ and is discharged into the venturi Ⓐ, where it meets the main air stream being drawn by the engine.

Mixture proportioning is accomplished in the needle jet ⑦. The clearance through which the emulsified fuel must flow ultimately depends on throttle position.



STARTER (ENRICHER) SYSTEM

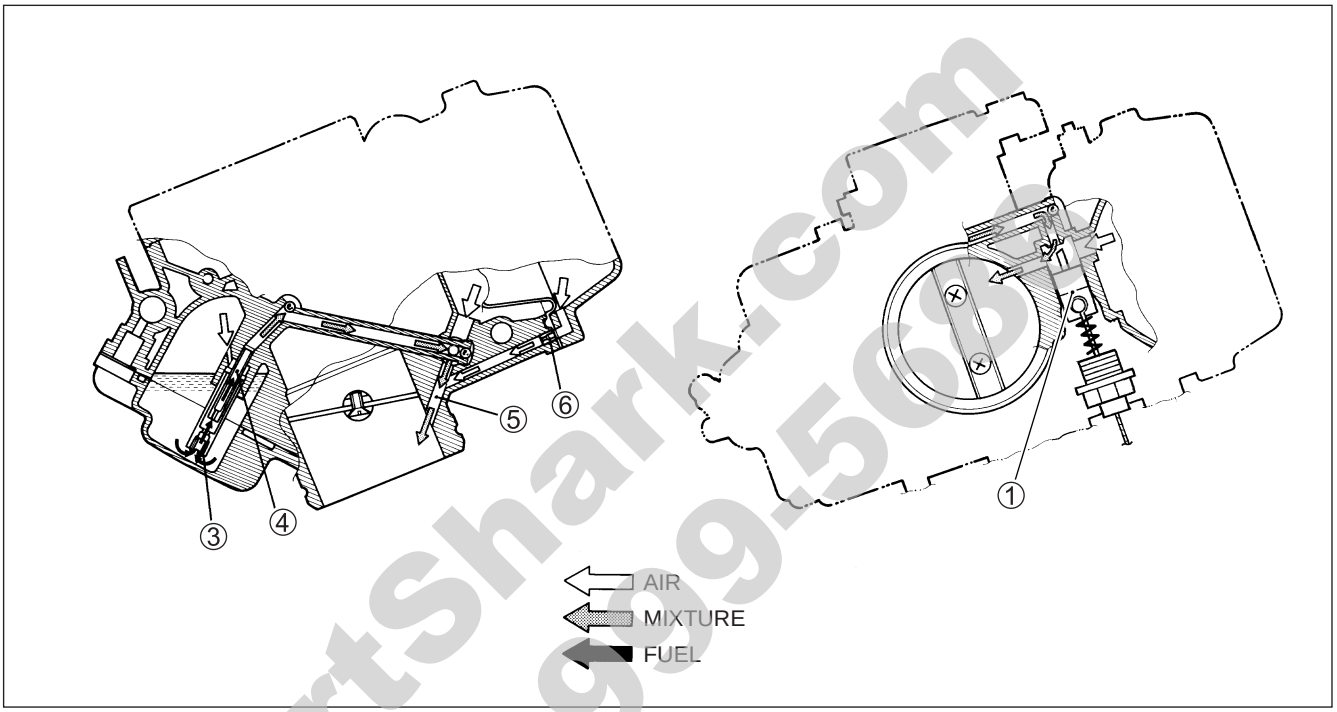
Pulling the starter (enricher) plunger ① causes fuel to be drawn into the starter circuit from the float chamber ②.

The starter jet ③ meters this fuel. The fuel then flows into the fuel pipe ④ and mixes with the air coming from the float chamber ②. The mixture, rich in fuel, reaches starter plunger ① and mixes again with the air coming through starter air jet ⑥ from the diaphragm chamber.

The three successive mixings of the fuel with the air provided the proper fuel/air mixture for starting. This occurs when the mixture is sprayed through the starter outlet port ⑤ into the main bore.

NOTE:

A starter (enricher) system is operated almost the same way as a choke.



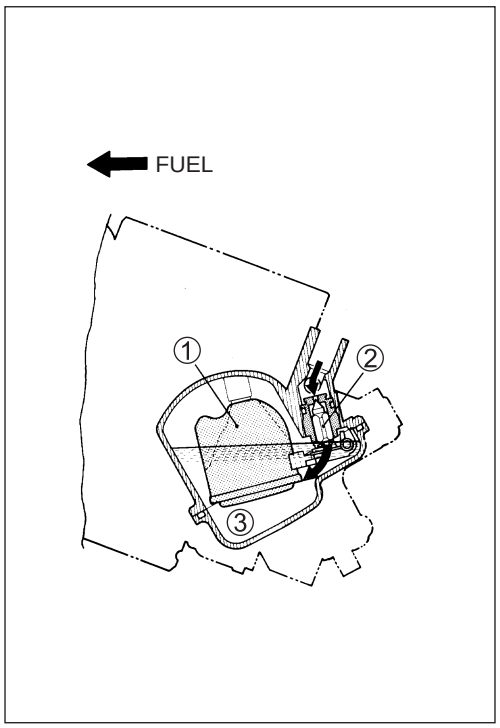
FLOAT SYSTEM

The float ① and needle valve ② work in conjunction with one another. As the float ① moves up and down, so does the needle valve ②.

When there is a high fuel level in float chamber ③, the float ① rises and the needle valve ② pushes up against the valve seat. When this occurs, no fuel enters the float chamber ③.

As the fuel level falls, the float ① lowers and the needle valve ② unseats itself; admitting fuel into the float chamber ③.

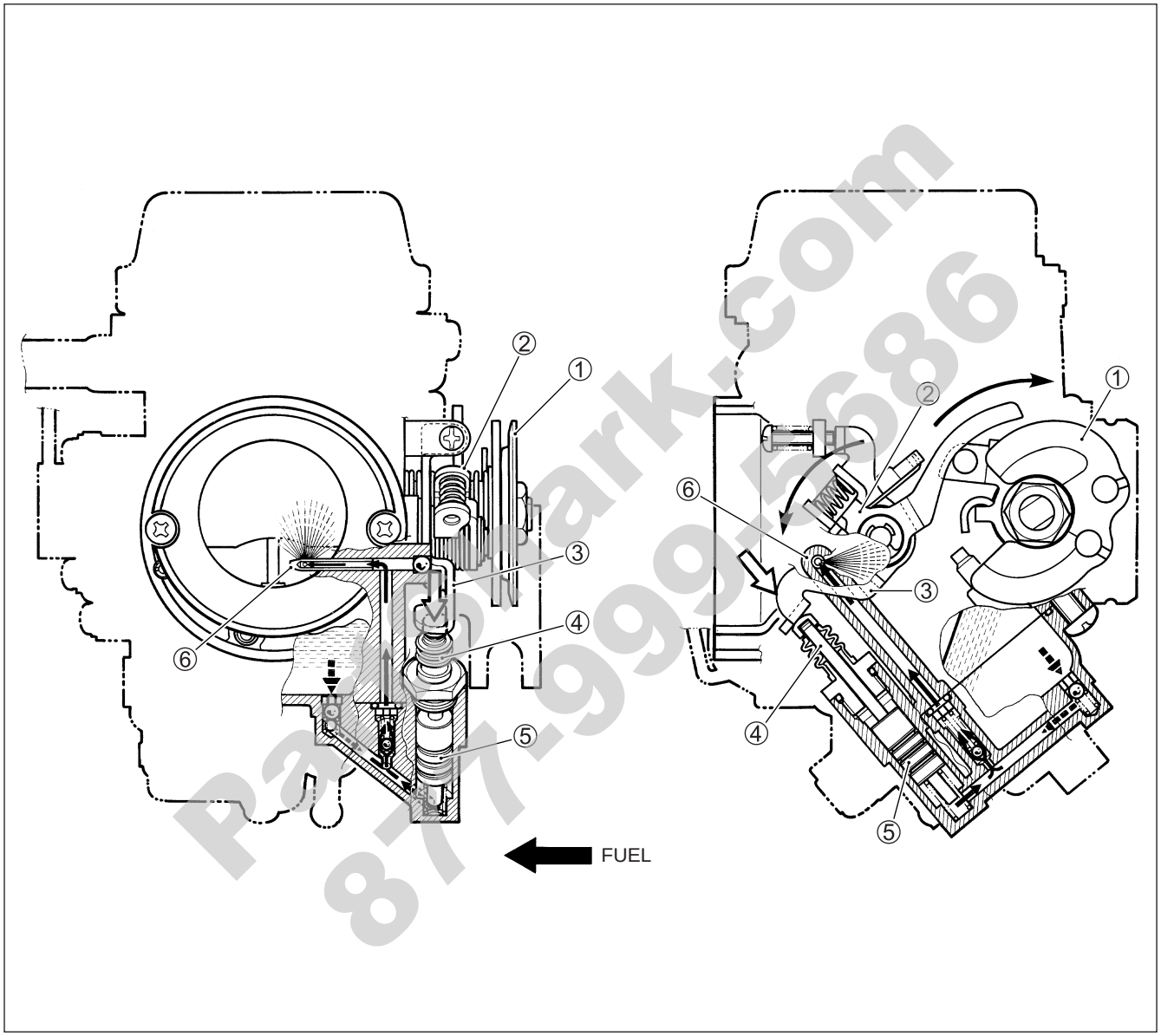
In this manner, the needle valve ② admits and shuts off fuel to maintain the appropriate fuel level inside the float chamber ③.



ACCELERATOR PUMP SYSTEM

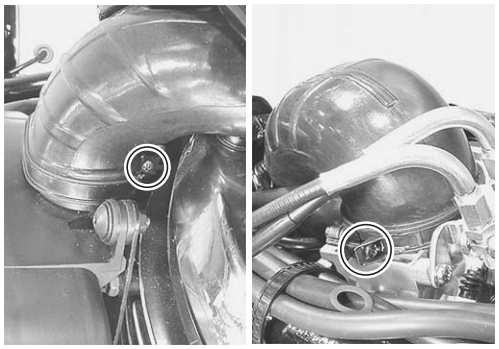
This system works only when the rider opens throttle grip quickly as pump send the necessary amount of fuel to the carburetor bore for correcting fuel/air mixture ratio. When the rider open the throttle grip quickly, the intaken air volume becomes large and air velocity at the bottom of the throttle valve (piston valve) is slow and sucking volume of fuel is less.

The throttle valve lever ① turns lever ②, and lever ③ turns and pushes rod ④. The rod ④ pushes plunger ⑤. This plunger pushes out the fuel through outlet pipe ⑥, spraying fuel into the main bore.



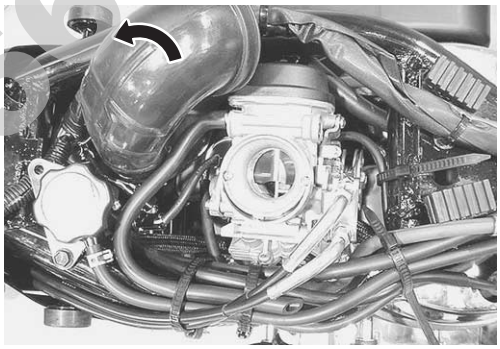
REMOVAL

- Remove the fuel tank. (☞5-3)
- Loosen the air intake pipe clamp screws.

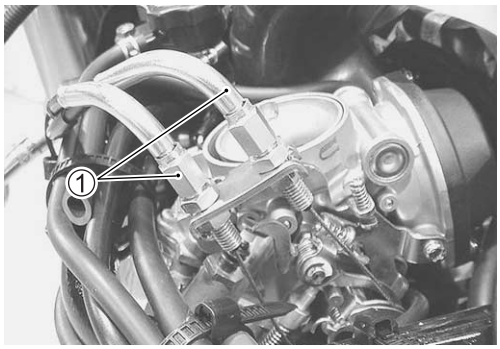


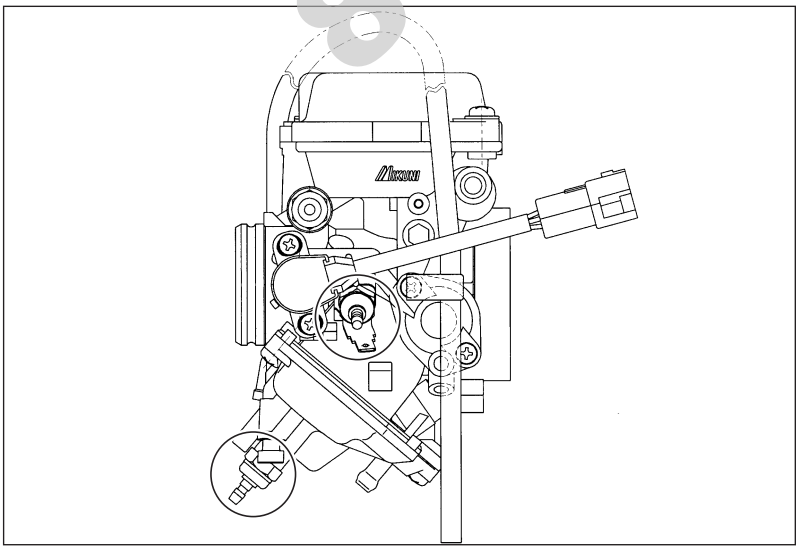
- Disconnect the breather hose.

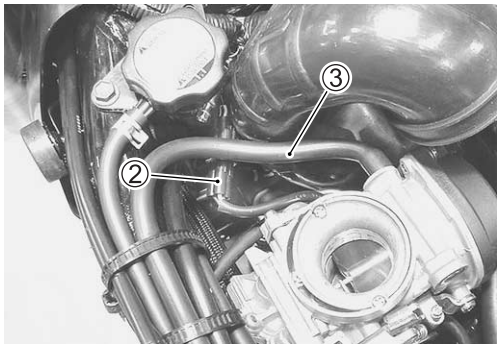
- Move the air inlet pipe to forward.



- Remove the throttle cables ①.
- Disconnect the throttle position sensor coupler ②.
- Disconnect the air vent hose ③.
- Disconnect the carburetor heater terminal lead wire.

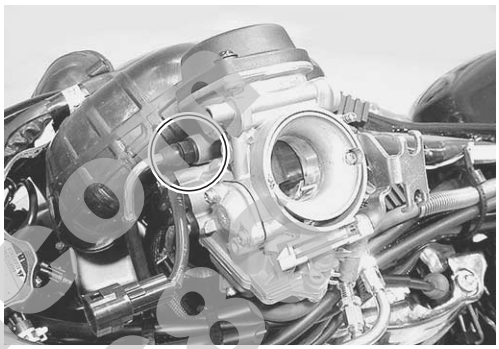






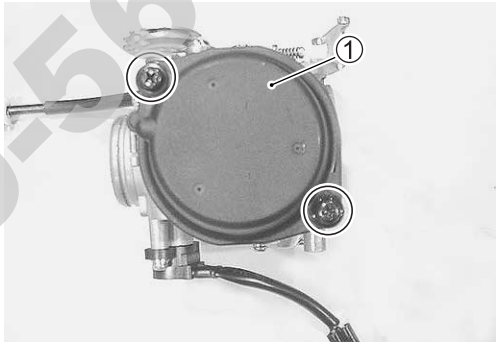
• Loosen the clamp screw and remove the carburetor.

• Remove the starter plunger.

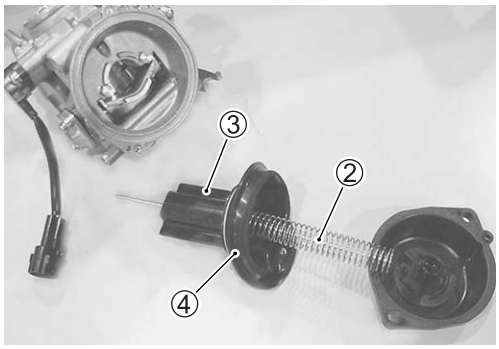


DISASSEMBLY

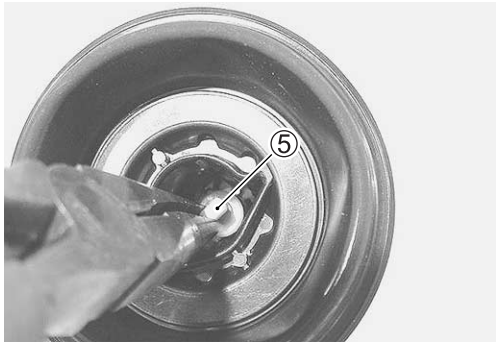
• Remove the carburetor top cap ①.



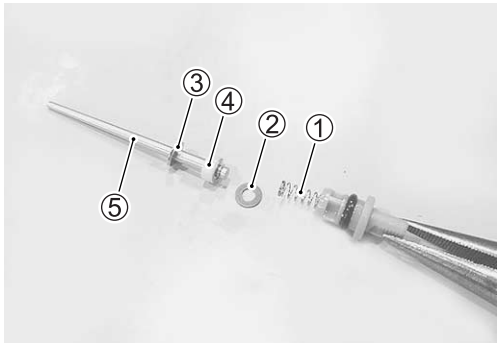
• Remove the spring ② and piston valve ③ along with diaphragm ④.



• Pull out the jet needle holder ⑤.

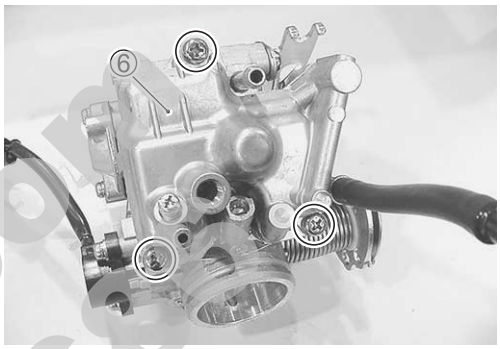


- Remove the spring ①, washers ②, ③, retainer ④ and jet needle ⑤.



- Remove the float chamber ⑥.

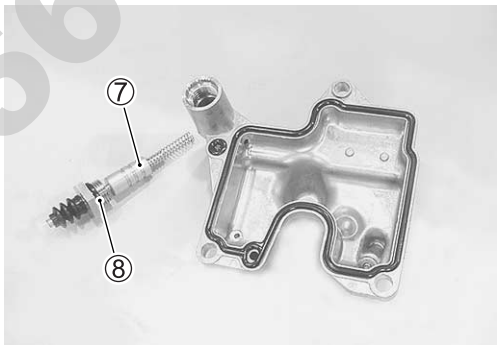
TOOL 09900-09004: Impact driver set



- Remove the accelerator pump plunger ⑦.
- Remove the O-ring ⑧.

⚠ CAUTION

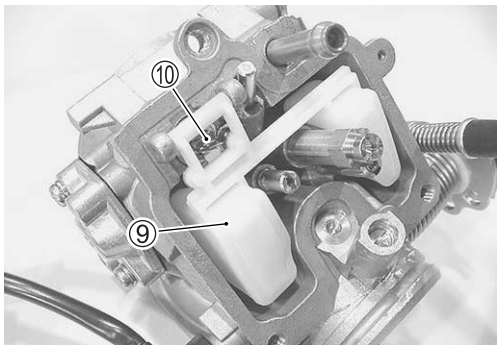
Use a new O-ring to prevent fuel leakage.



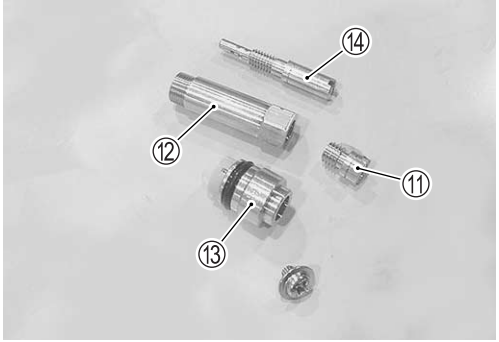
- Remove the float ⑨ and needle valve ⑩ by removing the float pin.

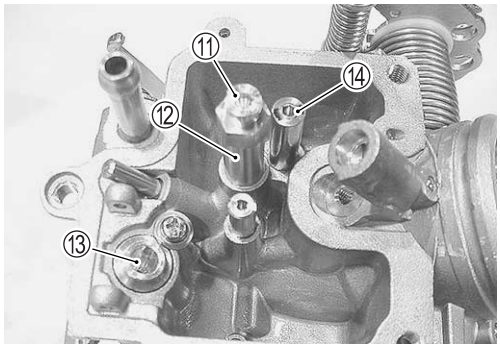
⚠ CAUTION

Do not use a wire to clean the valve seat.

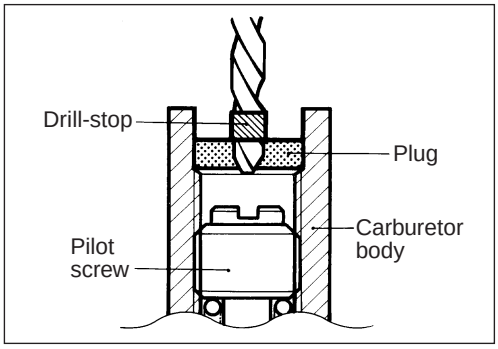


- Remove the main jet ⑪, main jet holder ⑫, valve seat ⑬ and pilot jet ⑭.





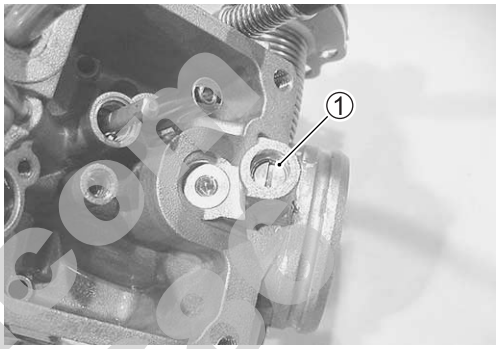
- Use a ⅛" size drill bit with a drill-stop to remove the pilot screw plug. Set the drill-stop 6 mm from the end of the bit to prevent drilling into the pilot screw. Carefully drill through the plug. Thread a self-tapping sheet metal screw into the plug. Pull on the screw head with pliers to remove the plug. Carefully clean any metal shavings from the area. (For E-03, 28, 33)



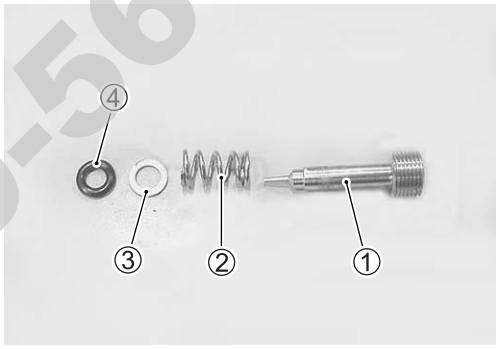
⚠ CAUTION

Replace the plug with a new one.

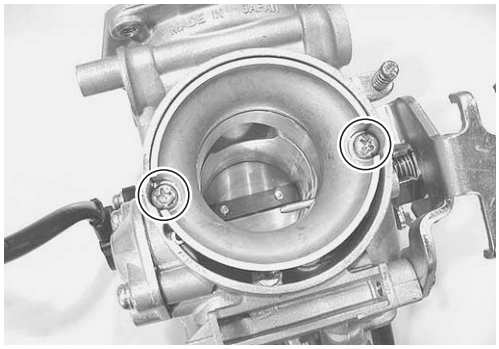
- Slowly turn the pilot screw ① in clockwise and count the number of turns until the screw is lightly seated. Make a note of how many turns were made so the screw can be reset correctly after cleaning.



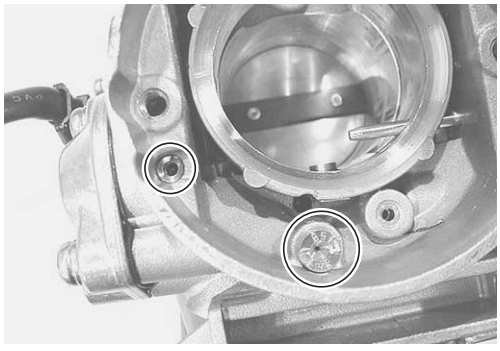
- Remove the pilot screw ① with the spring ②, washer ③, and O-ring ④.



- Remove the funnel ⑤.



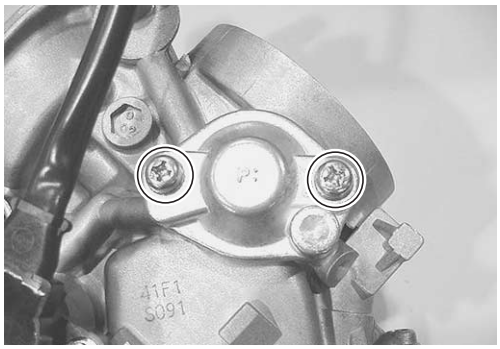
- Remove the pilot air jets ⑥.



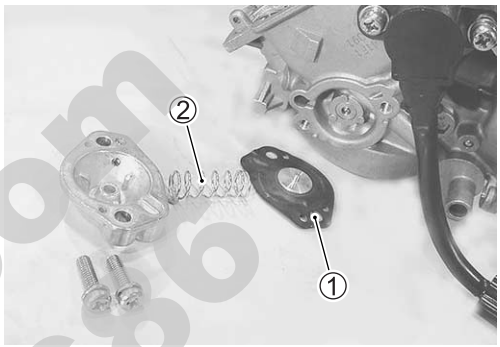
⚠ CAUTION

Do not use a wire for cleaning the passage and jets.

• Remove the casting valve cover.



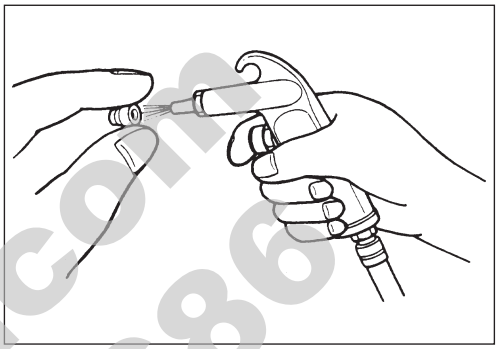
• Remove the casting valve ① and the spring ②.



CARBURETOR CLEANING

⚠ WARNING

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



- Clean all jets with a spray-type carburetor cleaner and dry them using compressed air.
- Clean all circuits of the carburetor thoroughly – not just the perceived problem area. Clean the circuits in the carburetor body with a spray-type cleaner and allow each circuit to soak if necessary to loosen dirt and varnish.
  Blow the body dry using compressed air.

⚠ CAUTION

Do not use a wire to clean the jets or passageways. A wire can damage the jets and 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 carburetor components.

- After cleaning, reassemble the carburetor with new seals and gaskets.

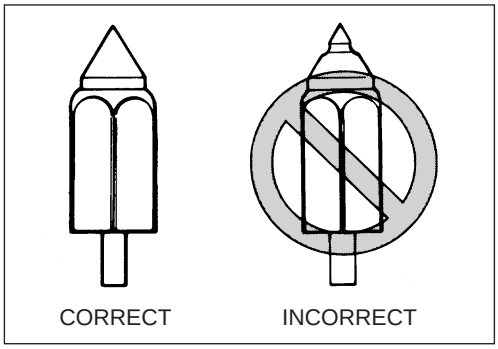
CARBURETOR INSPECTION

Check the following items for any damage or clogging.

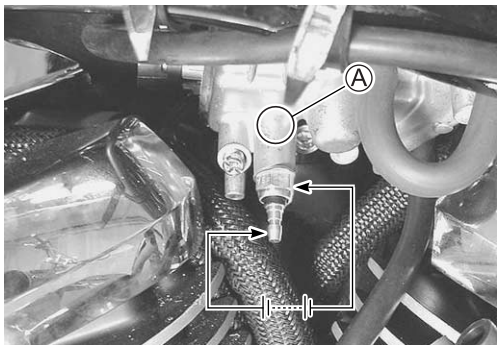
* Pilot jet
* Main jet
* Main air jet
* Pilot air jets
* Needle jet air bleeding hole
* Float
* Needle valve
* Jet needle
* Valve seat
* Piston valve
* Starter (enricher) jet
* Gasket and O-ring
* Throttle shaft oil seal
* Pilot outlet and by-pass ports
* Coasting valve

NEEDLE VALVE INSPECTION

If foreign matter is cought between the valve seat and the needle valve, the gasoline will continue flowing and overflow. If the valve seat and needle valve are worn beyond the permissible limits, similar trouble will occur. Conversely, if the needle valve sticks, the gasoline will not flow into the float chamber. Clean the float chamber and float parts with gasoline. If the needle valve is worn, as shown in the illustration, replace it along with a new valve seat. Clean the fuel passage of the mixing chamber using compressed air.



CARBURETOR HEATER INSPECTION
(for E02, E19)

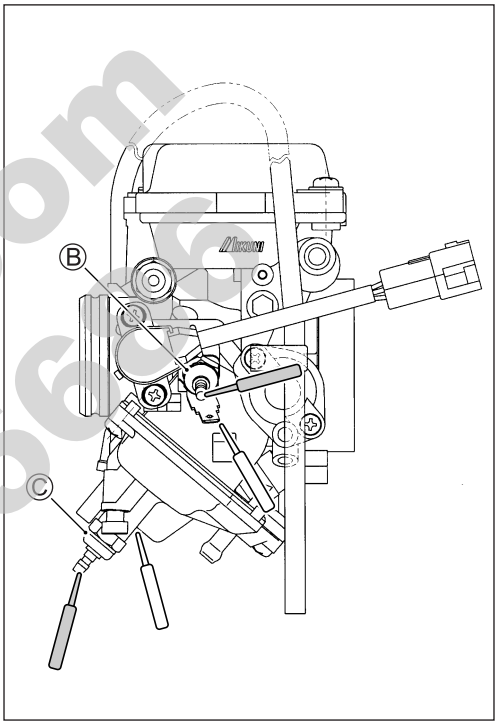


- Disconnect the carburetor heater terminal lead wires.
- Connect the positive ⊕ terminal of a 12V battery to the terminal of the carburetor heater and the battery negative ⊖ terminal to the terminal.
- Check that the heater section Ⓐ is heated in 5 minutes after the battery has been connected.

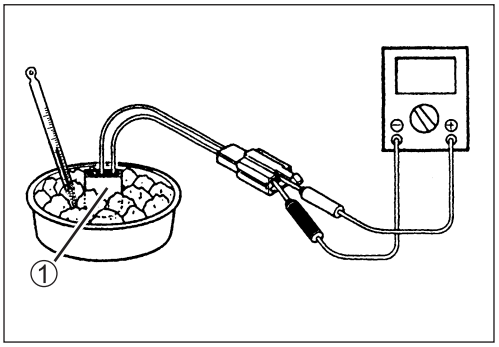
- Measure the resistance between the terminals.

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

DATA **Carbaretor heater resistance: STD:**
Ⓑ 35 W: 4 – 12 Ω
Ⓒ 25 W: 4.6 – 13.3 Ω



THERMO-SWITCH INSPECTION
(for E02, E19)



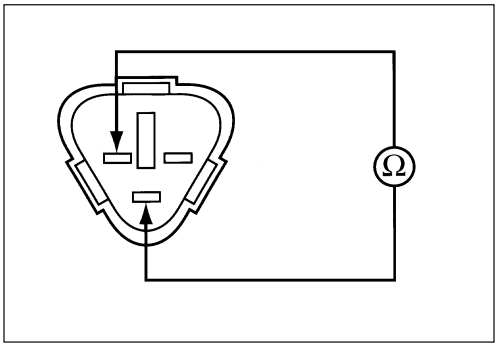
- Cool the thermo-switch ① with ice water and check for continuity.

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

DATA **Thermo-switch continuity:**

Below 8 – 14°C	**Yes**
Above 13 – 25°C	**No**

THROTTLE POSITION SENSOR INSPECTION
Measure the resistance between the terminals as shown in the illustration.



DATA **Throttle position sensor resistance: Approx. 5 kΩ**

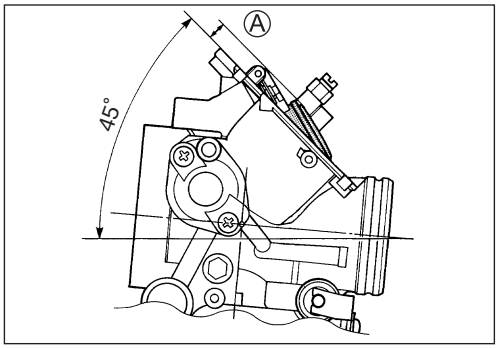
NOTE:
When performing this test, it is not necessary to remove the throttle position sensor.

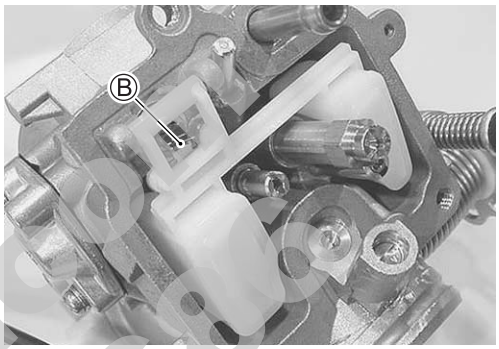
FLOAT HEIGHT ADJUSTMENT

- Measure the float height Ⓐ by using a calipers with the carburetor slanting at an angle of 45° (as shown in the right illustration) and the float arm just contacting the needle valve.
- Bend the tongue Ⓑ of the float arm as necessary to bring the height Ⓐ to the specified value.

DATA Float height Ⓐ: 7.0 ± 0.5 mm (0.28 ± 0.02 in)

TOOL 09900-20102: Vernier calipers





REASSEMBLY AND REINSTALLATION

Carburetor reassembly can be performed in the reverse order of disassembly. When reassembling, carefully observe the following instructions.

⚠ CAUTION

*** Assemble the parts taking consideration of their function.**
*** Replace O-rings and seals with new ones.**

- After cleaning, reinstall the pilot screw to the original setting by turning the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.

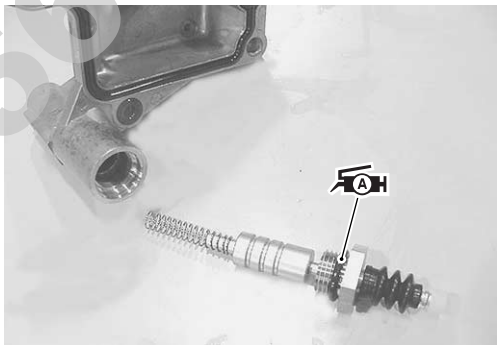
⚠ CAUTION

Replace the O-ring Ⓐ with a new one.

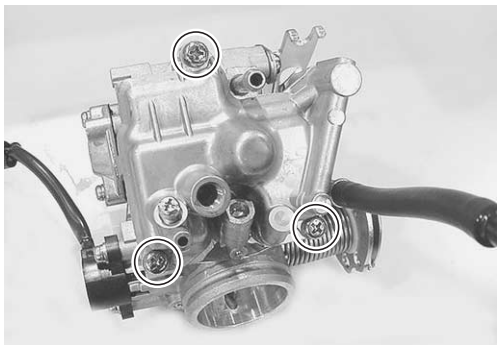
- Apply grease to the O-ring and install the accelerating plunger.

For USA
Ⓐ 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries
Ⓐ 99000-25010: SUZUKI SUPER GREASE "A"

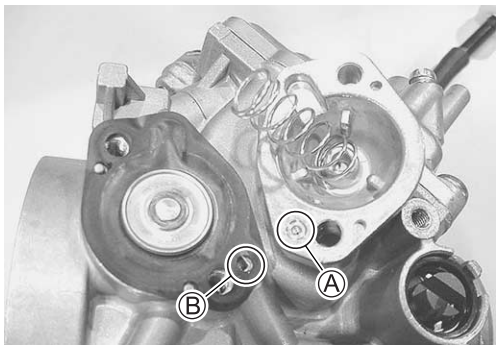


- Fit the seal rings securely to the float chamber and install the float chamber to the throttle body.



COASTING VALVE

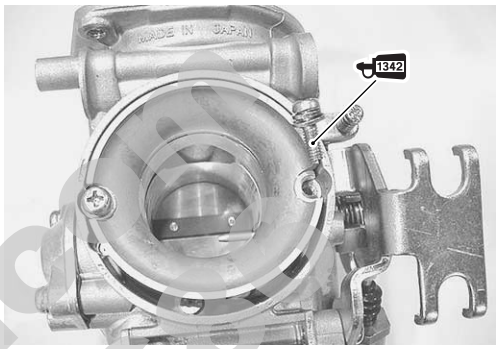
- When installing the coasting valve to the body, align the hole Ⓐ of the diagram and air hole Ⓑ of the cover.



FUNNEL

- Apply a small quantity of THREAD LOCK "1342" to the funnel stopper screws and tighten them.

1342 99000-3250: THREAD LOCK "1342"

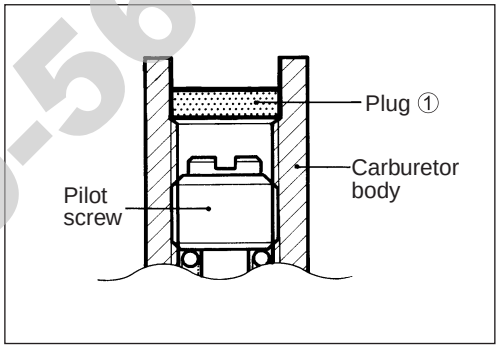


PILOT SCREW

- After cleaning, reinstall the pilot screw to the original setting by turning the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.
- Install new plug ① by tapping it into place with a punch. (For E-03, 28, 33)

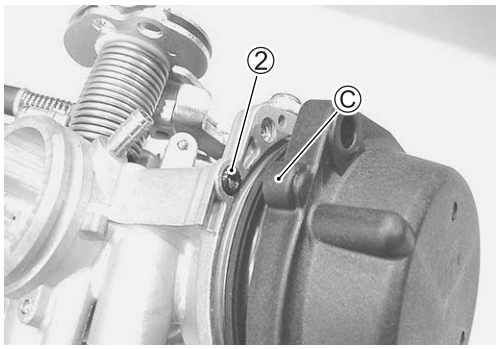
⚠ CAUTION

Replace the O-ring with a new one.



CARBURETOR TOP CAP

- Before installing the carburetor top cap, install the O-ring ②.
- Align the protrusion Ⓒ of the carburetor top cap with the O-ring ②.



STARTER PLUNGER

Apply a small quantity of grease to the starter plunger O-ring.

For USA

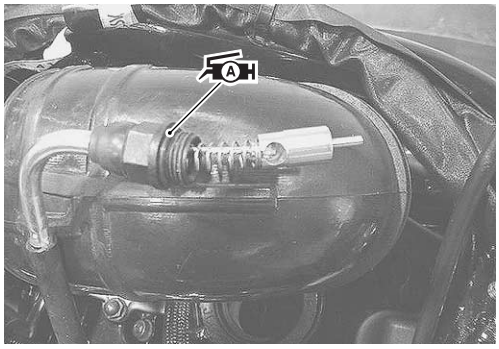
A 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

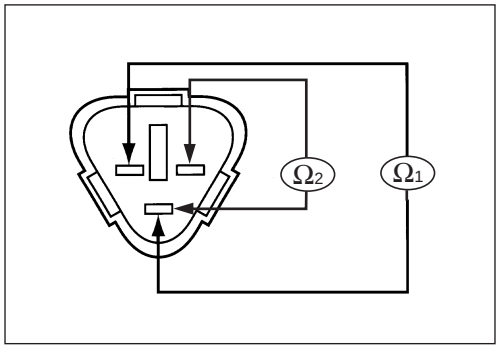
A 99000-25010: SUZUKI SUPER GREASE "A"

⚠ CAUTION

Replace the O-rings with new ones.



THROTTLE POSITION SENSOR POSITIONING

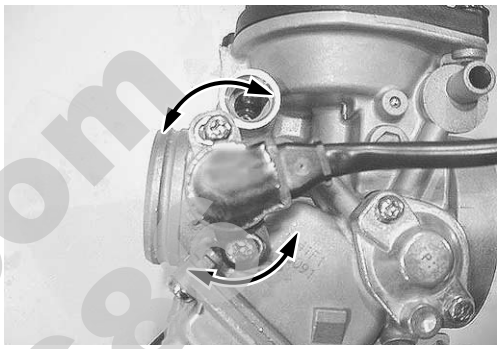


- Install the throttle position sensor with the flats on the throttle shaft end securely engaged with the slot on the throttle position sensor.
- Measure the resistance Ω1 between the throttle position sensor terminals as shown in the illustration.

DATA Throttle position sensor resistance Ω1: Approx. 5 kΩ

- Measure the resistance Ω2 between the throttle position sensor terminals as shown in the illustration.
- Fully open the throttle valve with the throttle lever.
- Position the throttle position sensor until resistance Ω2 is 3.09 – 4.63 kΩ.
- When the resistance Ω2 is within specification, tighten the throttle position sensor mounting screws.

DATA Throttle position sensor resistance Ω2:
3.09 – 4.63 kΩ



- After the assembly and installation on the engine have been completed, perform the following adjustment.
  * Throttle cable adjustment (☞ 2-11)
  * Idle speed adjustment (☞ 2-10)

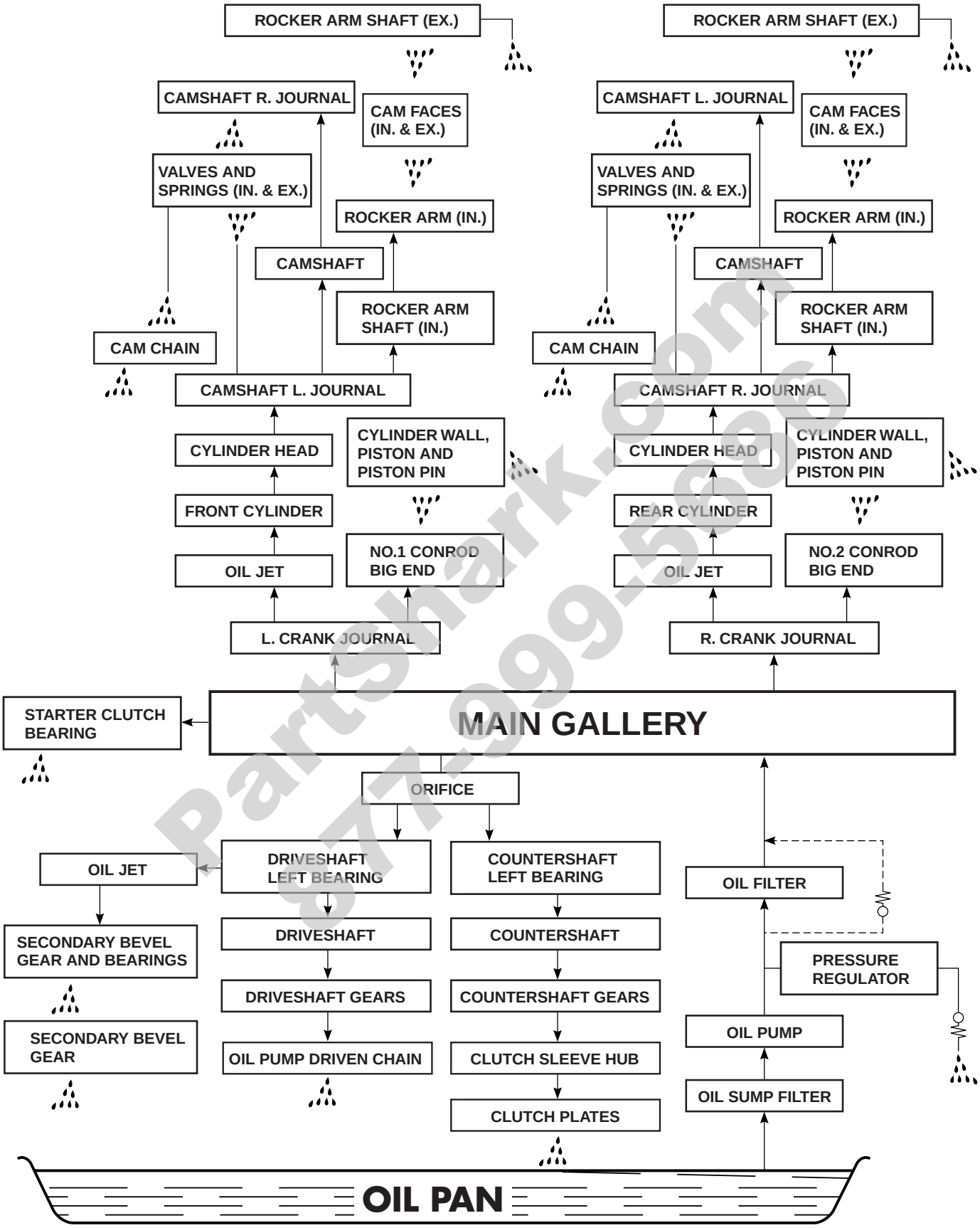
CARBURETOR HEATER

- Apply thermo-grease to the threads and tighten the carburetor heater. (for E-02, 19)

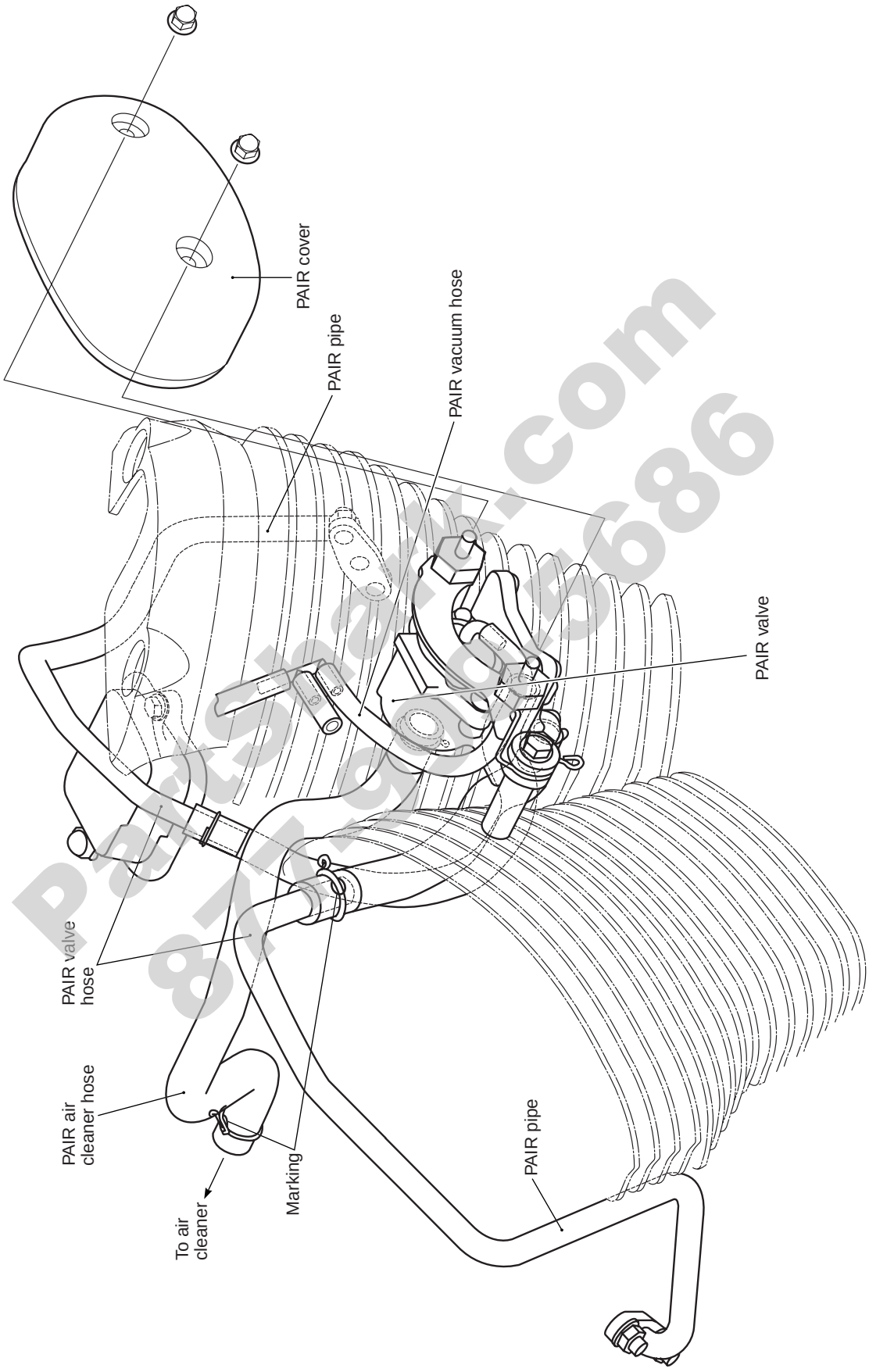
G 99000-59029: THERMO-GREASE

Carburetor heater: 3 N·m (0.3 kgf·m)

LUBRICATION SYSTEM CHART



PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



PAIR (AIR SUPPLY) SYSTEM INSPECTION

HOSES

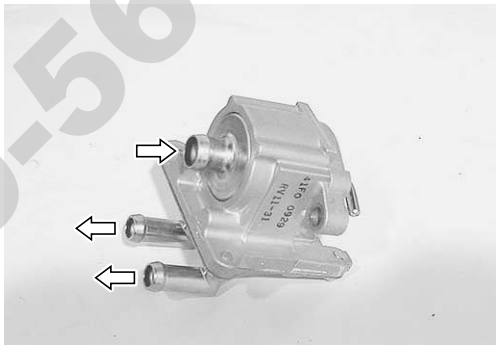
- Inspect the hoses for wear or damage.
- Inspect that the hoses and pipes are securely connected.

PAIR REED VAVLE

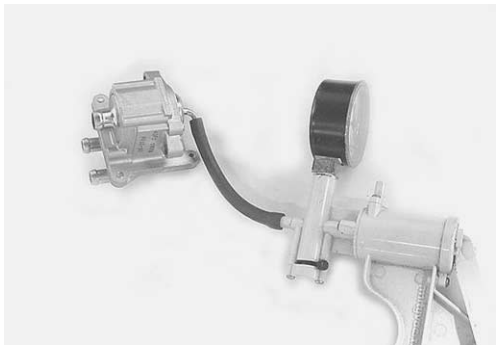
- Remove the PAIR valve cover.
- Inspect the reed valve for the carbon deposit.
- If the carbon deposit is found in the reed valve, replace the PAIR control valve with a new one.

PAIR CONTROL VALVE

- Inspect that air flows through the PAIR control valve air inlet port to the air outlet ports.
- If air does not flow out, replace the PAIR valve with a new one.



- Connect the vacuum pump gauge to the vacuum port of the control valve as shown in the photograph.
- Apply negative pressure of the specification slowly to the control valve and inspect the air flow.
- If air does not flow out, the control valve is in normal condition.
- If the control valve does not function within the specification, replace the control valve with a new one.

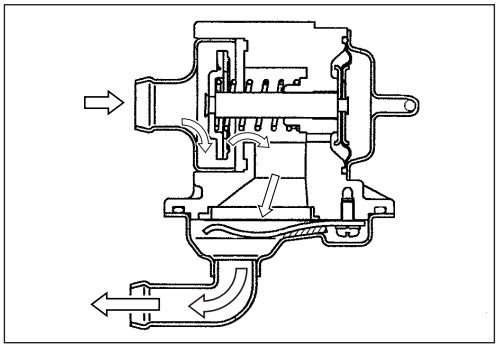


DATA Negative pressure range: More than 72 kPa (540 mmHg)

TOOL 09917-47010: Vacuum pump gauge

⚠ CAUTION

Use a hand operated vacuum pump to prevent the control valve damage.



COOLING SYSTEM

CONTENTS

ENGINE COOLANT

At the time of manufacture, the cooling system is filled with a 50:50 mixture of distilled water and ethylene glycol anti-freeze. This 50:50 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above –31°C (–24°F).
If the motorcycle is to be exposed to temperatures below –31°C (–24°F), this mixing ratio should be increased up to 55% or 60% according to the figure.

Anti-freeze density	Freezing point
50%	–30°C (–24°F)
55%	–40°C (–44°F)
60%	–55°C (–67°F)

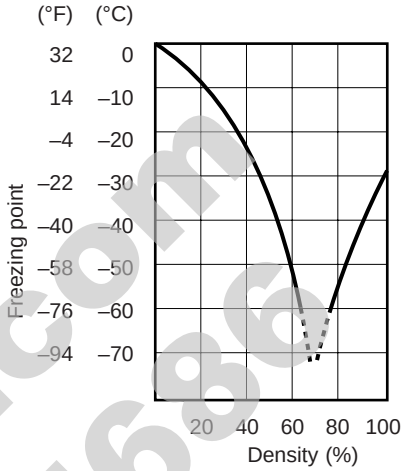


Fig.1 Engine coolant density-freezing point curve.

⚠ CAUTION

- *** Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.**
- *** Do not put in more than 60% anti-freeze or less than 50%. (Refer to Right figure.)**
- *** Do not use a radiator anti-leak additive.**

50% Engine coolant including reserve tank capacity

Anti-freeze	750 ml (1.6/1.3 US/Imp. pt)
Water	750 ml (1.6/1.3 US/Imp. pt)

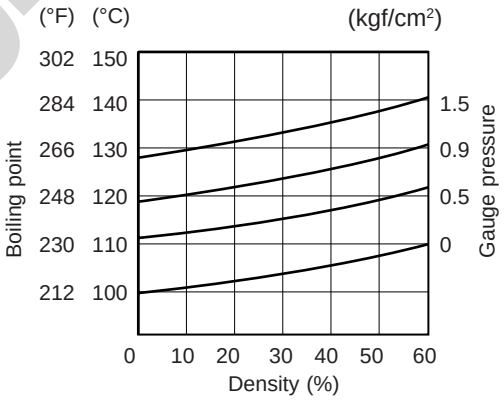


Fig.2 Engine coolant density-boiling point curve.

⚠ WARNING

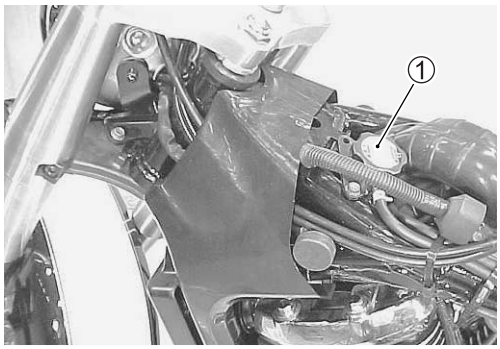
- *** You can be injured by scalding fluid or steam if you open the radiator cap when the engine is hot. After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.**
- *** The engine must be cool before servicing the cooling system.**
- *** Coolant is harmful;**
  - **If it comes in contact with skin or eyes, flush with water.**
  - **If swallowed accidentally, induce vomiting and call physician immediately.**
  - **Keep it away from children.**

RADIATOR AND WATER HOSE

COOLING CIRCUIT INSPECTION

Before removing the radiator and draining the engine coolant, inspect the cooling circuit for tightness.

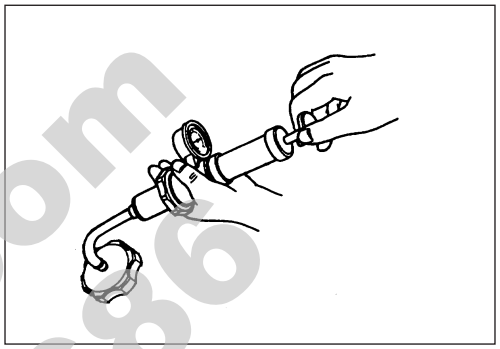
- Remove the fuel tank. (☞5-3)
- Remove the radiator cap ① and connect the tester to the filler.



⚠ WARNING

Do not remove the radiator cap when the engine is hot.

- Give a pressure of about 120 kPa (1.2 kgf/cm^2, 17 psi) and see if the system holds this pressure for 10 seconds.
- If the pressure should fall during this 10-second interval, it means that there is a leaking point in the system. In such a case, inspect the entire system and replace the leaking component or part.

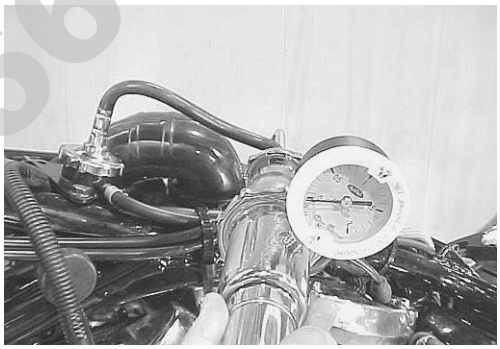


⚠ WARNING

When removing the radiator cap tester, put a rag on the filler to prevent spouting of engine coolant.

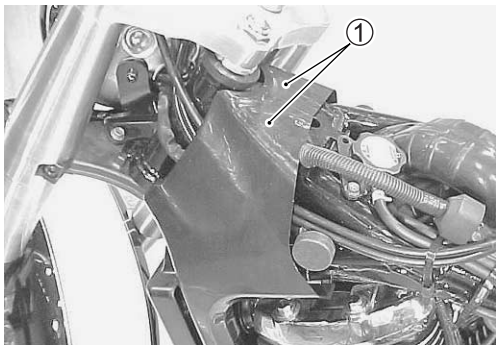
⚠ CAUTION

Do not allow the pressure to exceed the radiator cap release pressure, or the radiator can be damaged.

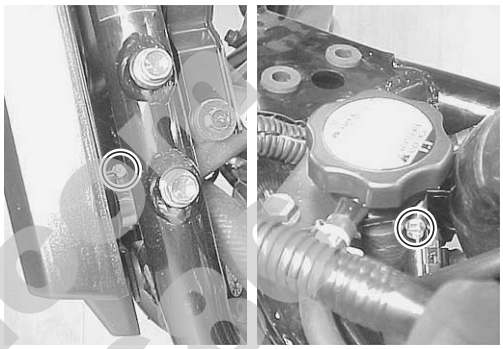


RADIATOR REMOVAL

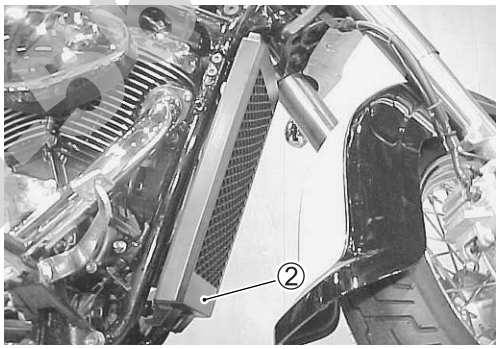
- Remove the fuel tank. (☞5-3)
- Remove the frame head covers ①.



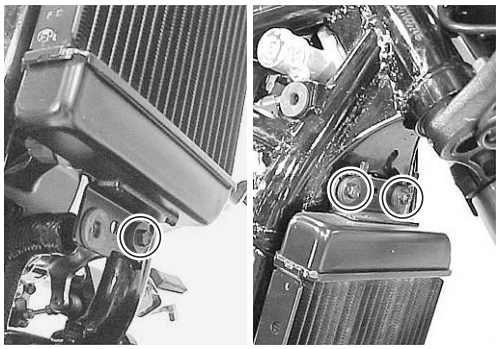
- Disconnect the water hoses.
- Drain engine coolant.



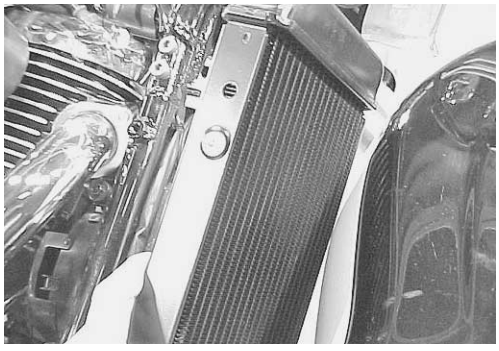
- Remove the radiator cover ②.



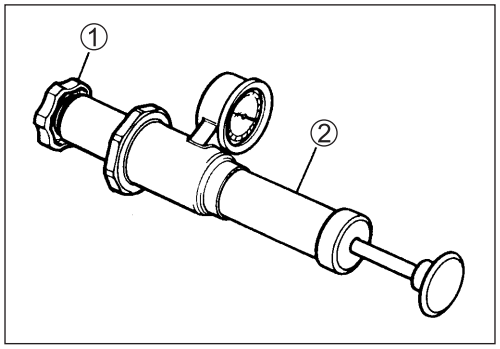
- Remove the radiator mounting bolts.



- Remove the radiator.



RADIATOR CAP INSPECTION



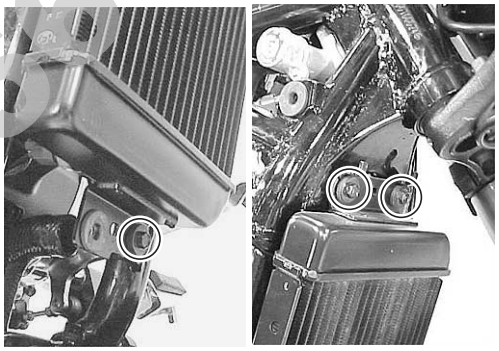
- Fit the cap ① to the radiator cap tester ②.
- Build up pressure slowly by operating the tester. Make sure that the pressure build-up stops at 95–125 kPa (0.95–12.5 kgf/cm^2, 13.5–17.8 psi) and that, with the tester held standstill, the cap is capable of holding that pressure for at least 10 seconds.
- Replace the cap if it is found not to satisfy either of these two requirements.

DATA Radiator cap valve opening pressure
Standard: 95 – 125 kPa
(0.95 – 1.25 kgf/cm^2, 13.5 – 17.8 psi)

RADIATOR INSPECTION AND CLEANING

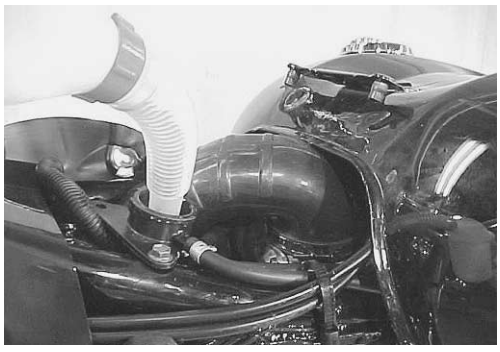
- Road dirt or trash stuck to the fins must be removed. Use of compressed air is recommended for this cleaning.
- Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.

RADIATOR REMOUNTING



The radiator is to be installed in the reverse order of the removal procedure.

- Install the radiator.
- Route the radiator hoses. (☞9-18)



- Pour engine coolant and bleed the air from the cooling circuit.
- Install the frame head covers and fuel tank. (☞5-5)

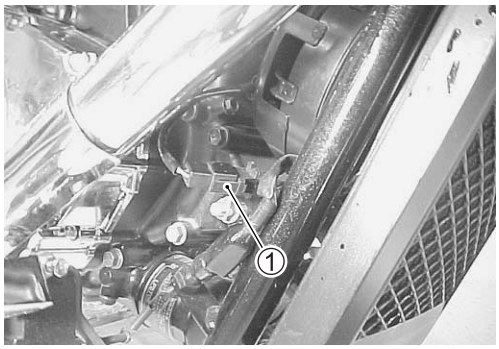
WATER HOSE INSPECTION

- Any water hose found in a cracked condition or flattened must be replaced.
- Any leakage from the connecting section should be corrected by proper tightening.

COOLING FAN

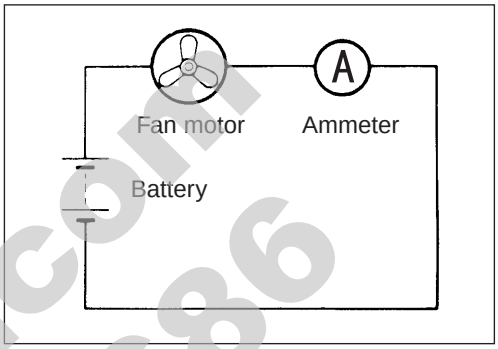
INSPECTION

- Disconnect the cooling fan lead wire coupler ①.
- Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.



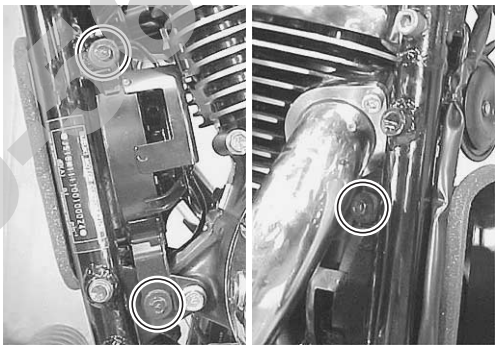
- The voltmeter is for making sure that the battery applies 12 volts to the motor. With the motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 amperes.
- If the fan motor does not turn, replace the motor assembly with a new one.

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

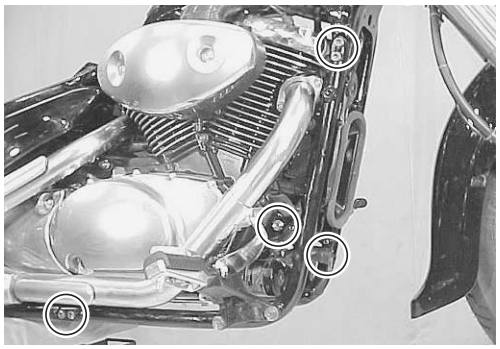


REMOVAL

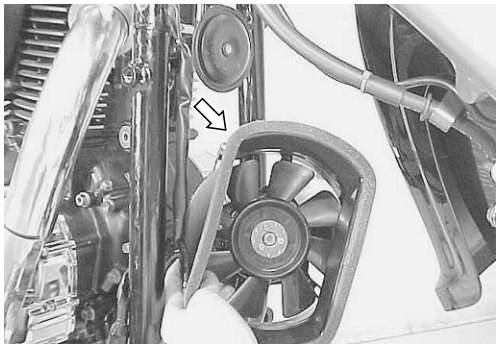
- Remove the radiator. (☞6-4)
- Remove the cooling fan mounting bolts.



- Slightly move the down tube by removing its mounting bolts.

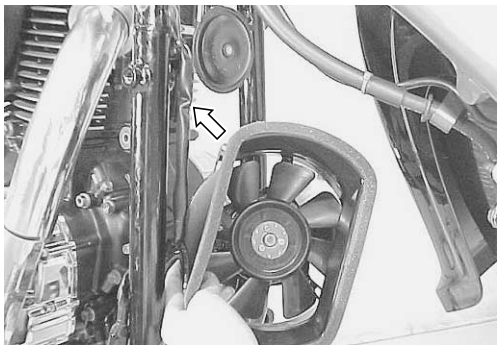


- Remove the cooling fan by disconnecting the cooling fan lead wire.

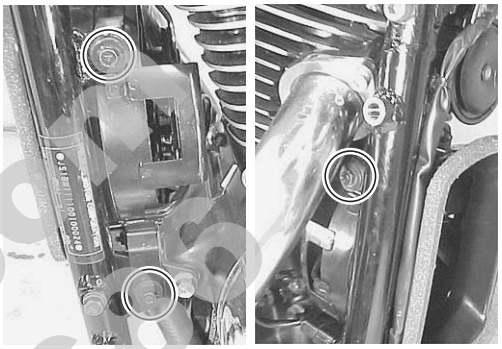


INSTALLATION

- Put the cooling fan between the down tube and the engine.
- Tighten the down tube mounting bolts. (☞3-9)



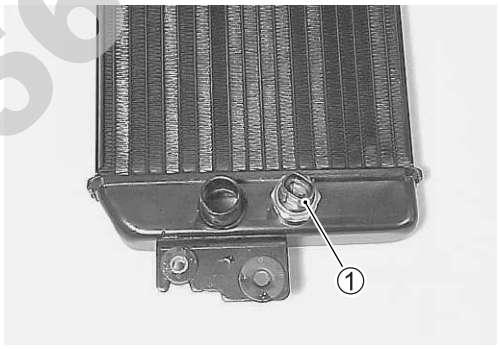
- Tighten the cooling fan mounting bolts.
- Install the radiator. (☞6-5)



COOLING FAN THERMO-SWITCH

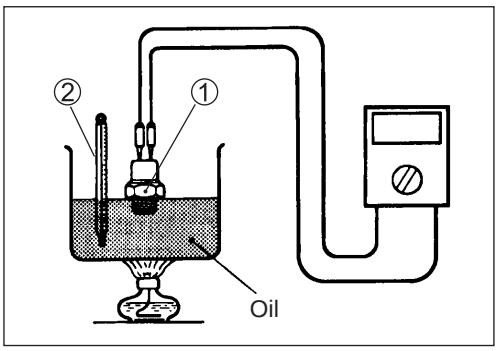
REMOVAL

- Remove the radiator. (☞6-4)
- Remove the cooling fan thermo-switch ①.



INSPECTION

- Check the thermo-switch closing or opening temperatures by testing it at the bench as shown in the figure. Connect the thermo-switch to a circuit tester and place it in the oil contained in a pan, which is placed on a stove.
- Heat the oil to raise its temperature slowly, and read the column thermometer when the switch closes or opens.



DATA Cooling fan thermo-switch operating temperature
Standard (OFF→ON): Approx. 105°C (221°F)
(ON→OFF): Approx. 100°C (212°F)

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

TOOL 09900-25008: Multi circuit tester set

⚠ CAUTION

*** Take special care when handling the thermo-switch. It may cause damage if it gets a sharp impact.**
*** Do not contact the cooling fan thermo-switch ① and the column thermometer ② with a pan.**

INSTALLATION

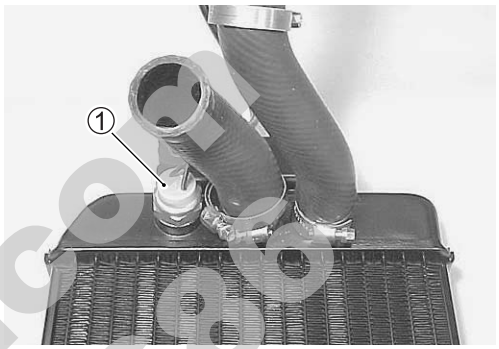
- Install the O-ring ①.
- Tighten the cooling fan thermo-switch to the specified torque.

Cooling fan thermo-switch: 17 N·m (1.7 kgf·m, 12.5 lb-ft)

- Install the radiator.

ENGINE COOLANT TEMPERATURE SWITCH

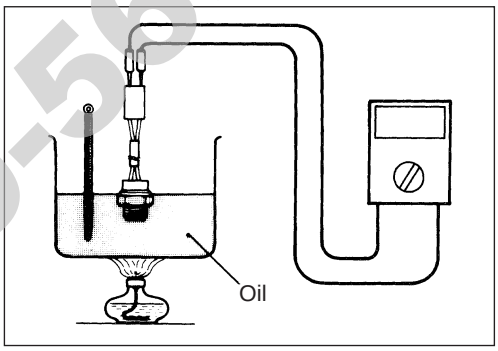
REMOVAL



- Remove the radiator. (☞6-4)
- Remove the engine coolant temperature switch ①.

INSPECTION

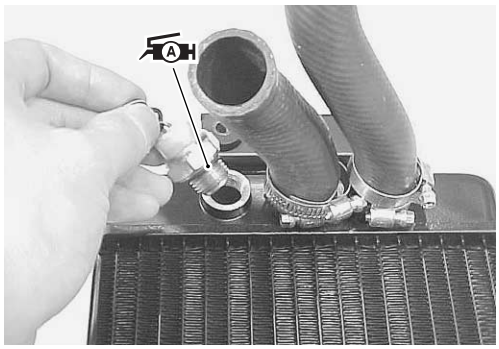
- Inspect the engine coolant temperature switch in the same manner of the cooling fan thermo-switch inspection.



DATA **Engine coolant temp. switch operating temperature**
Standard (OFF → ON): Approx. 120°C (248°F)
(ON → OFF): Approx. 113°C (235.4°F)

⚠ CAUTION

Do not allow the switch to touch the pan, or false reading will result.



- Apply grease to the O-ring.

A **99000-25030: SUZUKI SUPER GREASE "A" (For USA)**
99000-25010: SUZUKI SUPER GREASE "A" (For the others)

- Tighten the engine coolant temperature switch to the specified torque.

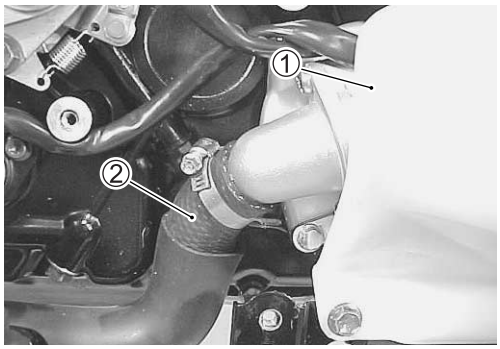
Engine coolant temperature switch: 12 N·m (1.2 kgf·m, 8.5 lb-ft)

- Install the radiator. (☞6-5)

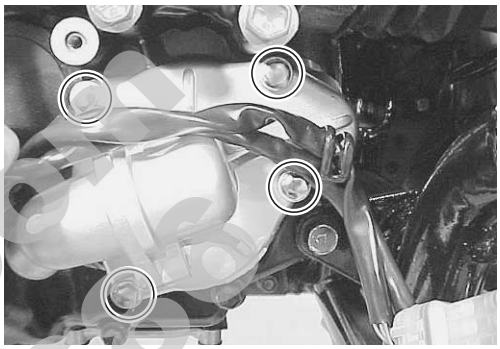
THERMOSTAT

REMOVAL

- Drain engine coolant. (☞2-13)
- Remove the secondary gear case cover.
- Remove the reserve tank ① and water hose ②.



- Remove the water pump case.



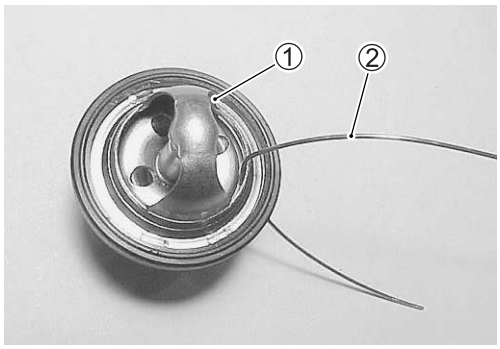
- Remove the thermostat case.
- Remove the thermostat.

INSPECTION

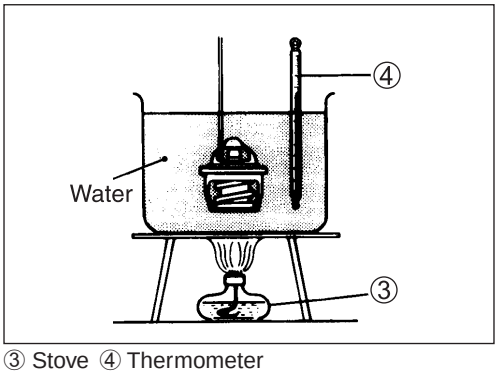
Inspect the thermostat pellet for signs of cracking.
Test the thermostat at the bench for control action, in the following manner.

- Pass a string between flange, as shown in the illustration.
- Immerse the thermostat in the water contained in a beaker, as shown in the illustration. Note that the immersed thermostat is in suspension. Heat the water by placing the beaker on a stove and observe the rising temperature on a thermometer.
- Read the thermometer just when opening the thermostat. This reading, which is the temperature level at which the thermostat valve begins to open, should be within the standard value.

DATA Thermostat valve opening temperature
Standard: Approx. 75°C (167°F)



① Thermostat ② String

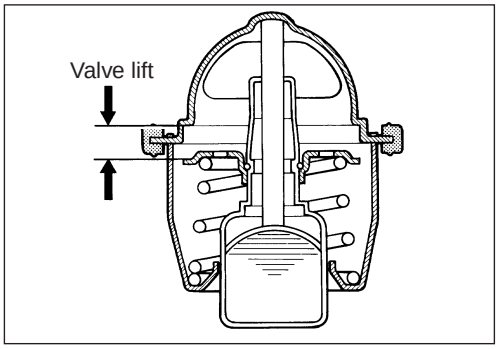


③ Stove ④ Thermometer

- Keep on heating the water to raise its temperature.
- Just when the water temperature reaches specified value, the thermostat valve should have lifted by at least 6.0 mm (0.24 in).

DATA Thermostat valve lift
Standard: Over 6.0 mm at 90°C (Over 0.24 in at 194°F)

- A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.



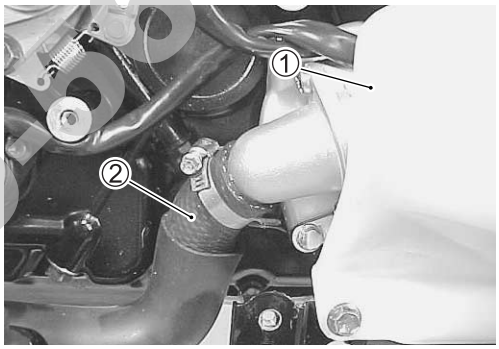
INSTALLATION

Install the thermostat in the reverse order of removal.

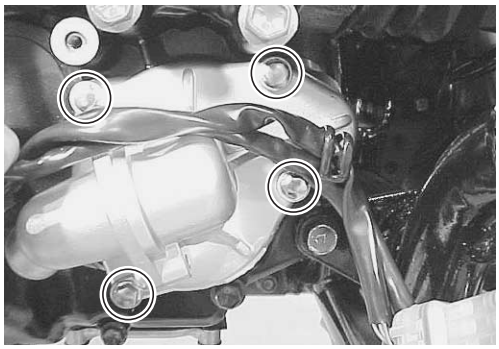
WATER PUMP

REMOVAL AND DISASSEMBLY

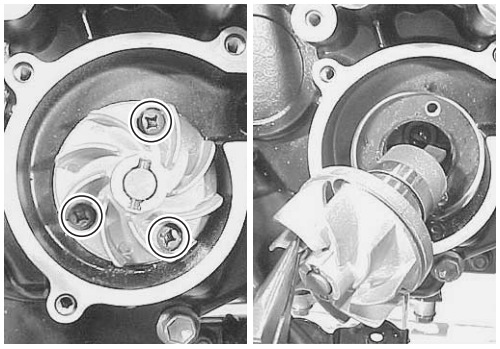
- Drain engine coolant. (☞2-13)
- Remove the secondary gear case cover.
- Remove the reserve tank ① and the water hose ②.



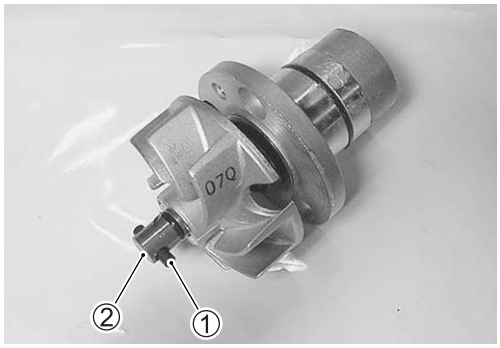
- Remove the water pump case.



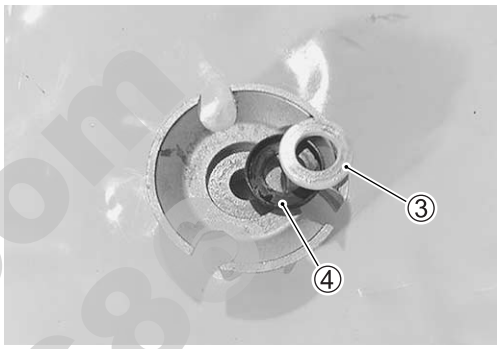
- Remove the water pump.



• Remove the pin ① and draw out the impeller shaft ②.



• Remove the mechanical seal ring ③ and rubber seal ④.



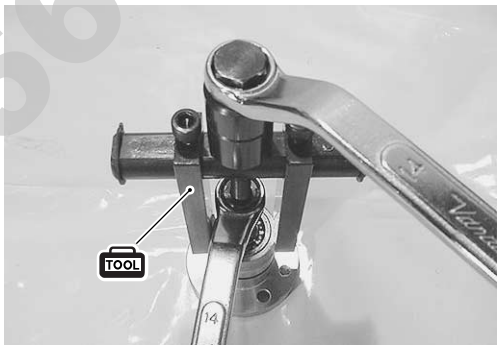
• Remove the bearing with the special tool.

TOOL 09921-20220: Bearing remover set

NOTE:
If no abnormal noise, bearing removal is not necessary.

⚠ CAUTION

The removed bearing must be replaced with a new one.



• Remove the mechanical seal with the special tool.

TOOL 09921-20220: Bearing remover set

NOTE:
If no abnormal noise, bearing removal is not necessary.

⚠ CAUTION

The removed mechanical seal must be replaced with a new one.

• Remove the oil seal with a suitable bar.

NOTE:
If no abnormal, the oil seal removal is not necessary.

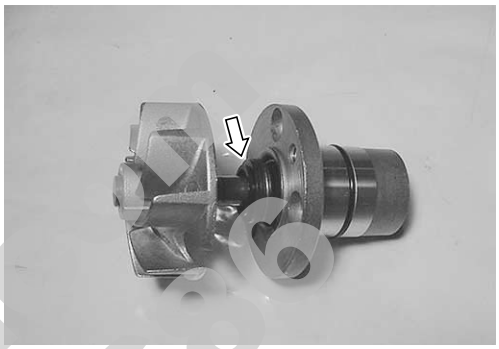
⚠ CAUTION

The removed oil seal must be replaced with a new one.

INSPECTION

BEARING

- Inspect the play of the bearing by hand while it is in the water pump case.
- Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.
- Replace the bearing if there is anything unusual.



MECHANICAL SEAL

- Visually inspect the mechanical seal for damage, with particular attention given to the sealing face.
- Replace the mechanical seal that shows indications of leakage. Also replace the seal ring if necessary.

OIL SEAL

- Visually inspect the oil seal for damage, with particular attention given to the lip.
- Replace the oil seal that shows indications of leakage.

REASSEMBLY AND INSTALLATION

- Install the oil seal.

NOTE:
The stamped mark on the oil seal faces outside.

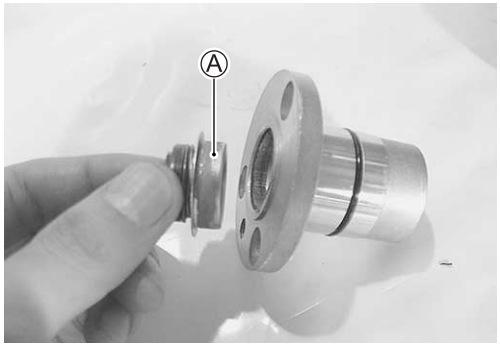
- Apply a small quantity of the SUZUKI SUPER GREASE “A” to the oil seal lip.

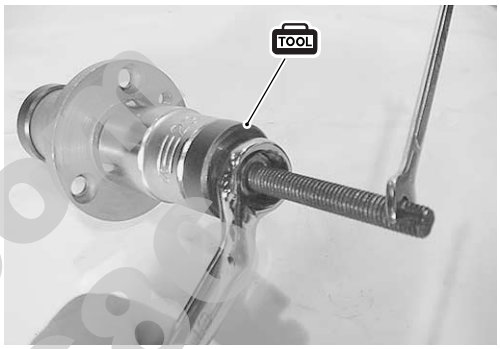
99000-25030: SUZUKI SUPER GREASE “A” (For USA)
99000-25010: SUZUKI SUPER GREASE “A”
(For the others)

- Install the new mechanical seal with a suitable size socket wrench and the special tool.

NOTE:
The new mechanical seal has been applied the sealer Ⓐ.

TOOL 09924-84521: Bearing installer





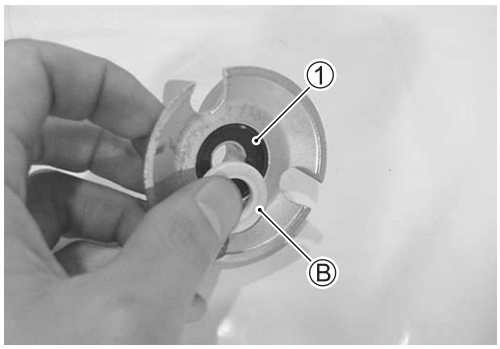
- Install the new bearing with the special tool.

TOOL 09924-84521: Bearing installer

NOTE:
The stamped mark on the bearing faces crankcase side.

- Install the rubber seal ① into the impeller.
- After wiping off the oily or greasy matter from the mechanical seal ring, install it into the impeller.

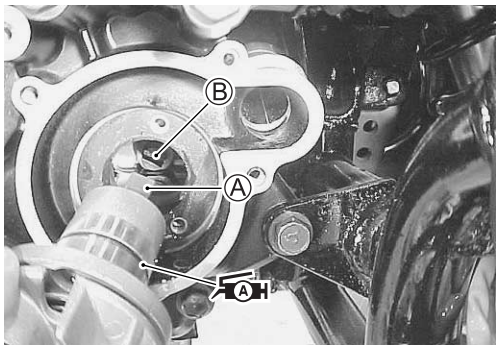
NOTE:
The marked side Ⓑ of the mechanical seal ring faces the impeller.



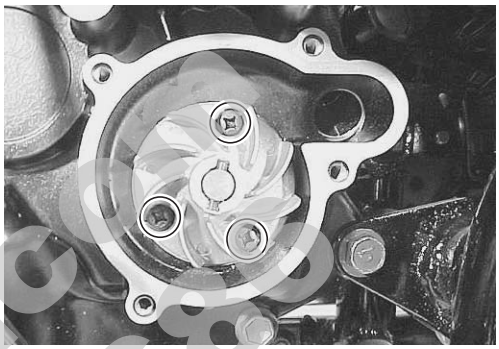
- Install the impeller and impeller shaft to the water pump body.
- Install the pin ②.

- Apply grease to the O-ring.
- Set the water pump shaft end Ⓐ to the oil pump shaft Ⓑ.

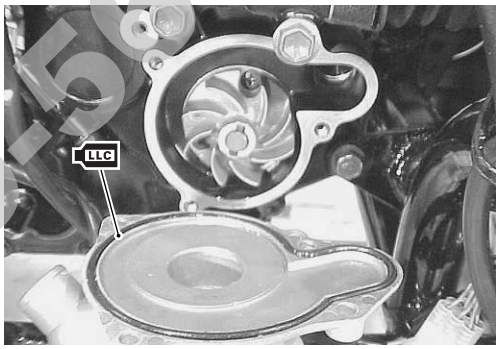
99000-25030: SUZUKI SUPER GREASE "A" (For USA)
99000-25010: SUZUKI SUPER GREASE "A"
(For the others)



- Install the water pump screws.

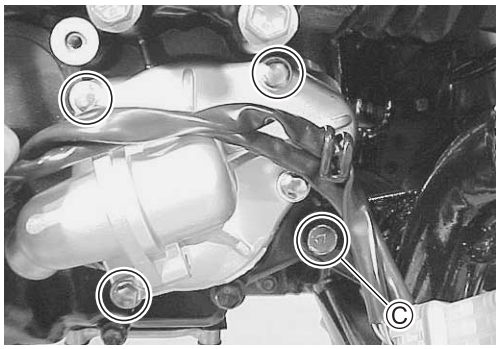


- Apply engine coolant to the O-ring and install the water pump cover.



- Tighten the water pump cover bolts.

NOTE:
Fit the clamp to the bolt Ⓒ.



- Connect the water hose.
- Install the reserve tank.
- Install the secondary gear case cover.
- Pour engine coolant. (☞2-13)

CHASSIS

CONTENTS

EXTERIOR PARTS

REMOVAL

SEAT

- Remove the rear seat by removing the bolts.

⚠ CAUTION

Be careful not to scratch the rear fender.

- Remove the rear seat grip band by removing the bolts.

- Remove the seat.

⚠ CAUTION

Be careful not to scratch the rear fender.

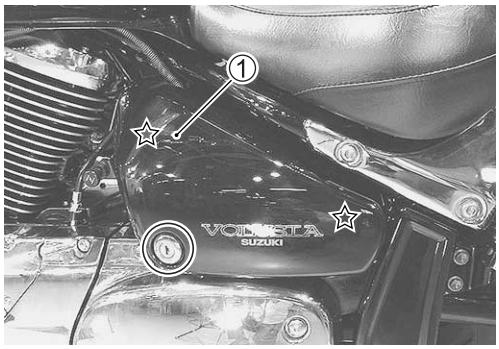
FRAME COVER

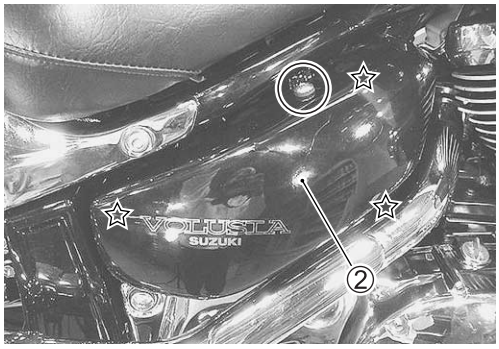
- Remove the left frame cover ① with the ignition key.
- Remove the right frame covers ② by removing the bolts.

⚠ CAUTION

- *** Wait untill the engine and exhaust pipe are cool enough to touch with bare hands before draining oil.**
- *** Be careful not to scratch the frame covers.**

☆ : hooked part

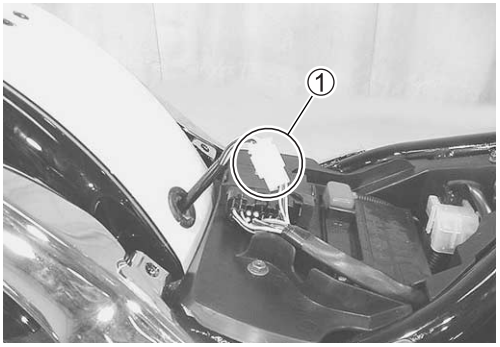




☆ : hooked part

REAR FENDER

- Remove the seat. (☞7-2)
- Disconnect the coupler ①.



- Remove the left or right side frame handle grip.
- Remove the rear fender ②.

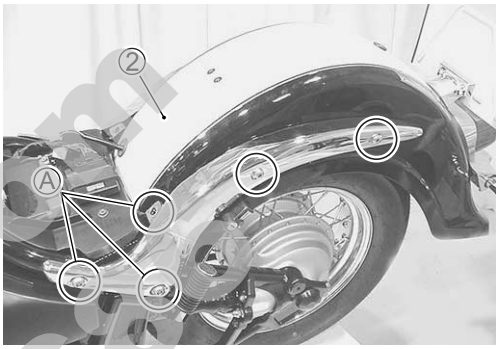
⚠ CAUTION

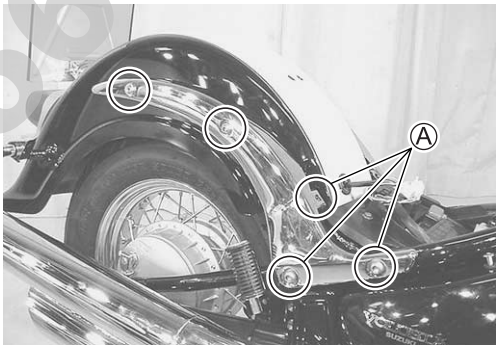
Be careful not to scratch the rear fenders.

NOTE:
When installing the frame handle grip bolts, apply a small quantity of THREAD LOCK "1303" to its mounting bolts and tighten them to the specified torque.

1303 99000-32030: THREAD LOCK SUPER "1303"

Frame handle grip mounting bolt Ⓐ (M10): 50 N·m (5.0 kgf·m, 36.0 lb-ft)



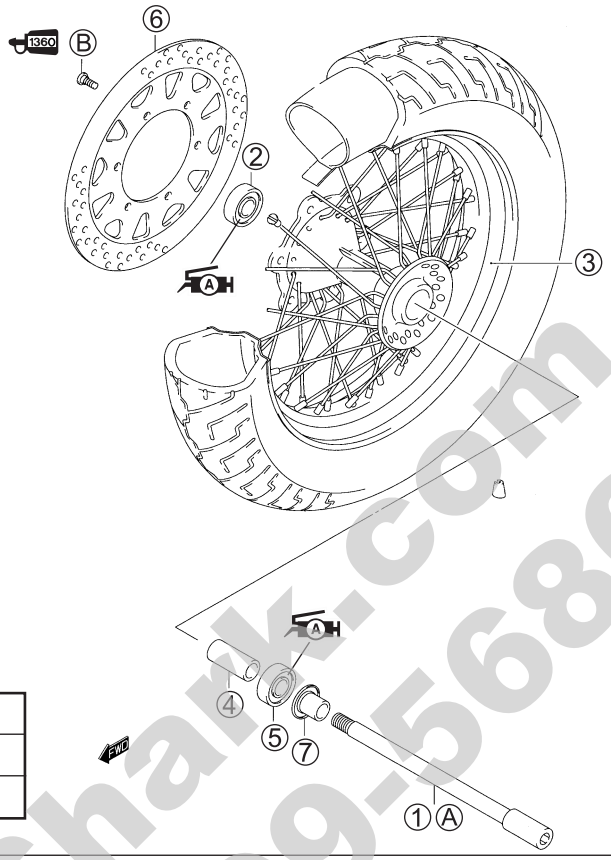


REMOUNTING

Remount the seats, covers and rear fender in the reverse order of removal.

FRONT WHEEL

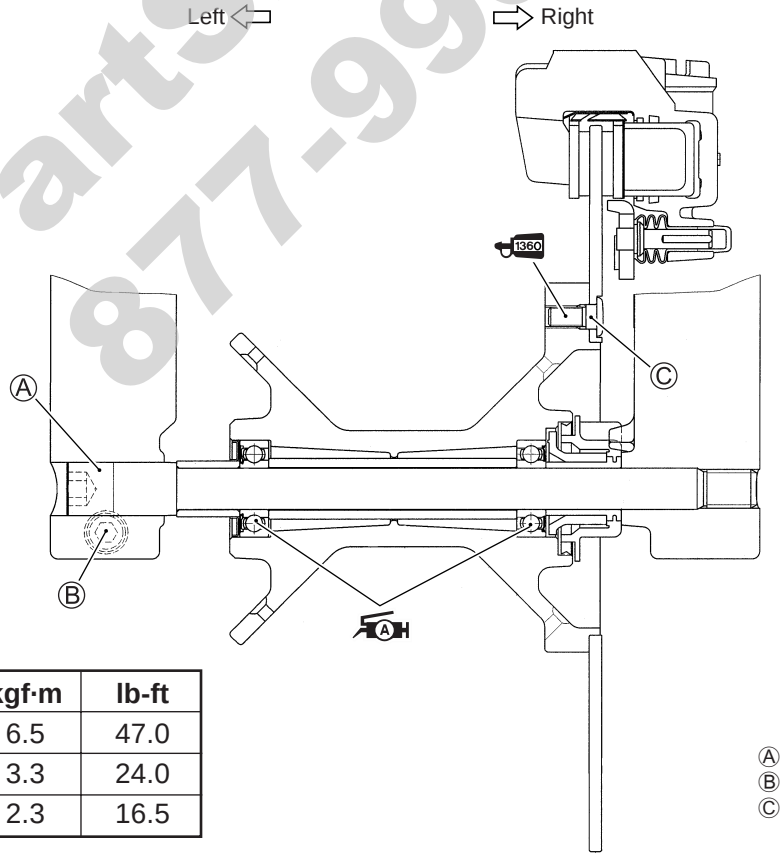
CONSTRUCTION



① Front axle
② Bearing (R)
③ Front wheel
④ Spacer
⑤ Bearing (L)
⑥ Brake disc
⑦ Spacer

Ⓐ Front axle
Ⓑ Brake disc mounting bolt

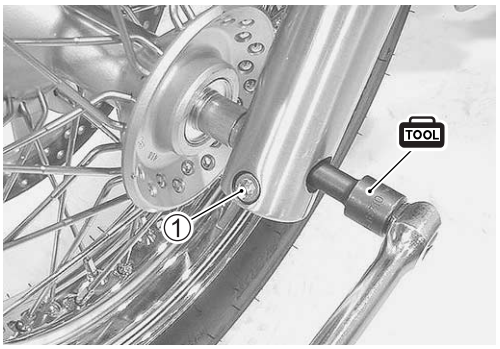
ITEM	N·m	kgf·m	lb-ft
Ⓐ	65	6.5	47.0
Ⓑ	23	2.3	16.5



ITEM	N·m	kgf·m	lb-ft
Ⓐ	65	6.5	47.0
Ⓑ	33	3.3	24.0
Ⓒ	23	2.3	16.5

Ⓐ Front axle
Ⓑ Axle pinch bolt
Ⓒ Brake disc bolt

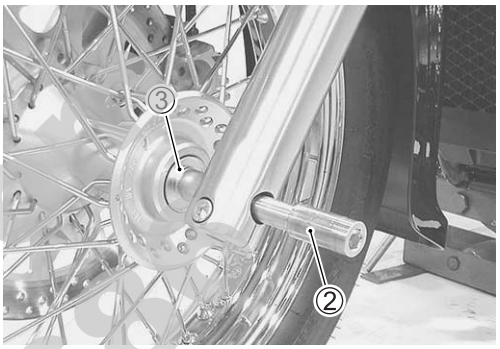
REMOVAL AND DISASSEMBLY



- Loosen the front axle pinch bolt ①.
- Loosen the front axle ② by using the special tool.

TOOL 09900-18710: Hexagon socket (12 mm)

- Raise the front wheel off the ground with a jack or a wooden block.



- Remove the front axle ②, spacers ③ and front wheel.

⚠ CAUTION

Do not operate the brake lever during or after front wheel removal.

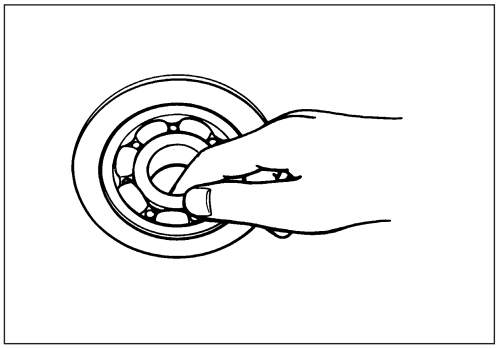
- Remove the brake disc by removing its bolts.

INSPECTION

WHEEL BEARINGS

Inspect the play of the wheel bearings by finger while they are in the wheel. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation.

Replace the bearing in the following procedure if there is anything unusual.



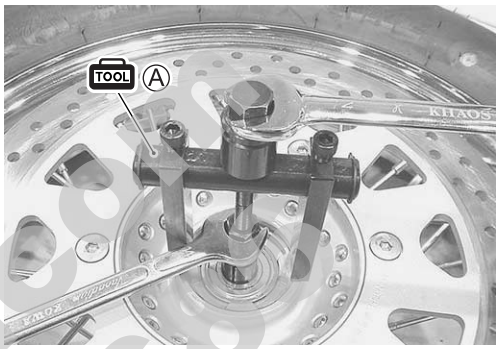
WHEEL BEARINGS REMOVAL

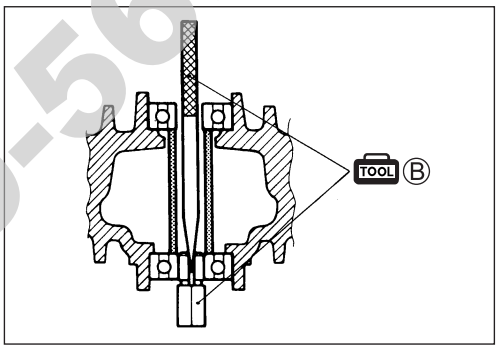
- Remove the wheel bearings by using the special tool Ⓐ or Ⓑ.

TOOL **09921-20220: Ⓐ Bearing remover set (17 mm)**
or 09941-50111: Ⓑ Wheel bearing remover

⚠ CAUTION

The removed bearings should be replaced with new ones.

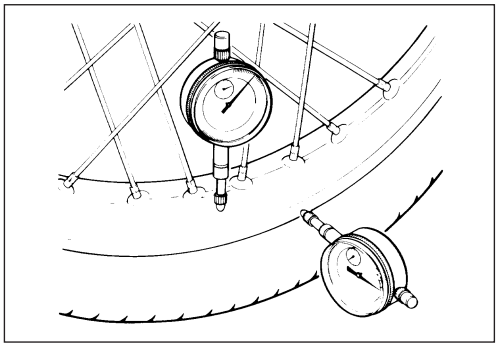




FRONT WHEEL

Make sure that the wheel runout (axial and radial) does not exceed the service limit when checked as shown. An excessive amount of runout is usually due to worn or loose wheel bearings and can be corrected by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel with a new one.

DATA **Wheel rim runout (axial and radial)**
Service Limit: 2.0 mm (0.08 in)

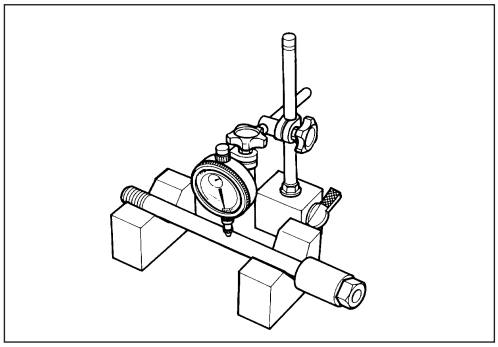


FRONT AXLE

Measure the front axle runout using the dial gauge. If the runout exceeds the service limit, replace the front axle with a new one.

TOOL **09900-20606: Dial gauge (1/100 mm)**
09900-20701: Magnetic stand
09900-21304: V-block set (100 mm)

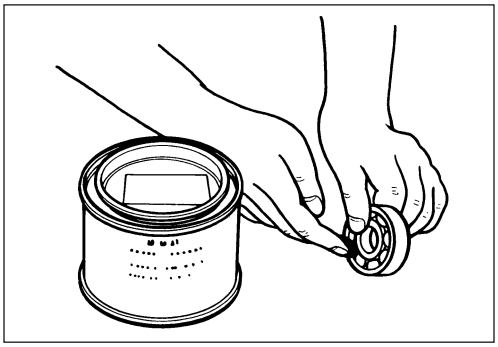
DATA **Wheel axle runout**
Service Limit: 0.25 mm (0.010 in)



TIRE ..... ☞2-18

REASSEMBLY AND REMOUNTING

Reassemble and remount the front wheel in the reverse order of removal and disassembly. Pay special attention to the following points:



WHEEL BEARING

- Apply SUZUKI SUPER GREASE "A" to the bearings before installing.

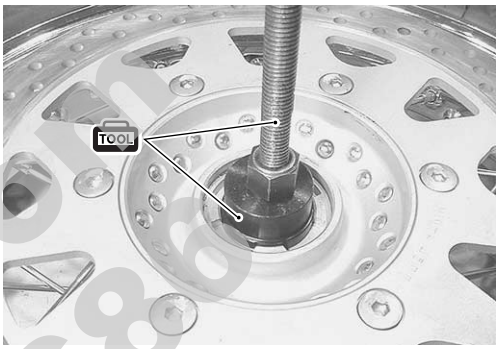
For USA

99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

99000-25010: SUZUKI SUPER GREASE "A"

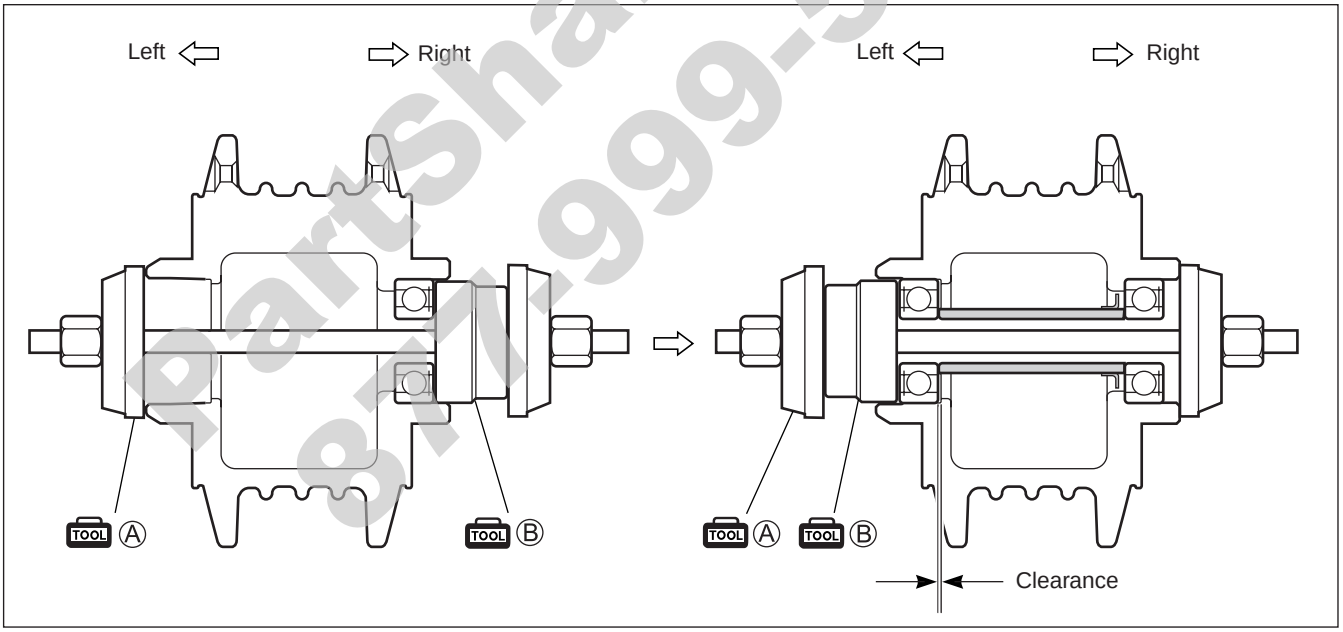
- Install the wheel bearings using the used bearings and special tool as described below.



TOOL Ⓐ 09941-34513: Bearing installer set
Ⓑ 09913-70210: Bearing installer set (40 mm)

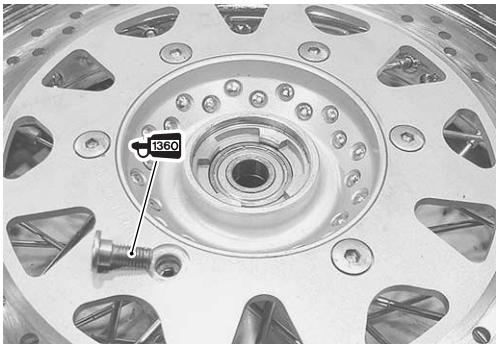
⚠ CAUTION

*** First install the right wheel bearing, then install the left wheel bearing.**
*** The sealed covers on the bearings must face to the outside.**



BRAKE DISC

- Make sure that the brake disc is clean and free of any grease. Apply THREAD LOCK SUPER "1360" to the brake disc bolts and tighten them to the specified torque.



1360 99000-32130: THREAD LOCK SUPER "1360"

Brake disc bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

SPEED SENSOR

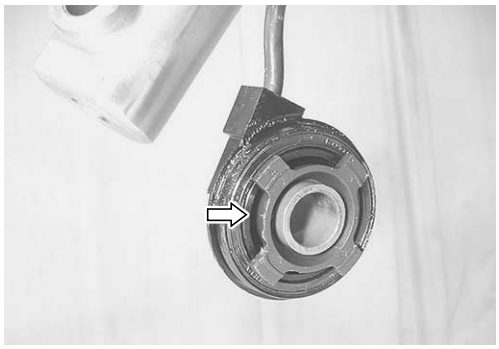
- Apply SUZUKI SUPER GREASE "A" to the speed sensor dust seal.

For USA

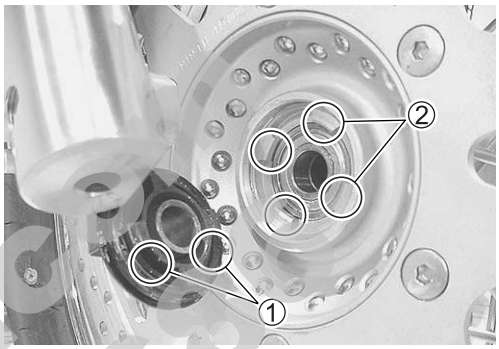
99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

99000-25010: SUZUKI SUPER GREASE "A"

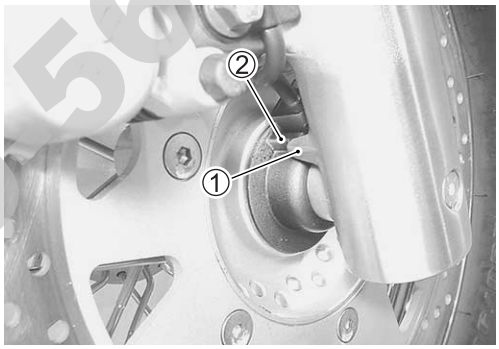


- Align the grooves ① on the speed sensor with the lugs ② on the wheel hub.



FRONT WHEEL

- Make sure that the front fork stopper ① and the speed sensor stopper ② are installed as shown.



⚠ CAUTION

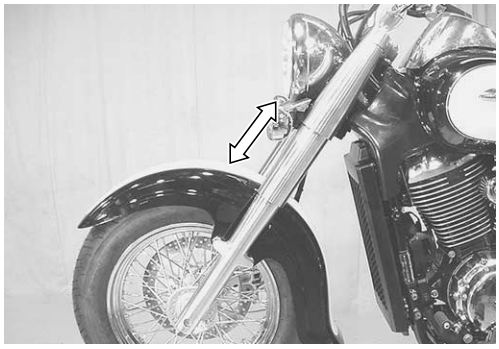
When installing the front wheel, position the brake disc between the brake pads. Be careful not to damage the brake pads.

- Tighten the front axle to the specified torque.
- Tighten the front axle pinch bolt ③ on the specified torque.

Front axle: 65 N·m (6.5 kgf·m, 47.0 lb-ft)
Front axle pinch bolt: 33 N·m (3.3 kgf·m, 24 lb-ft)

TOOL 09900-18710: Hexagon socket (12 mm)

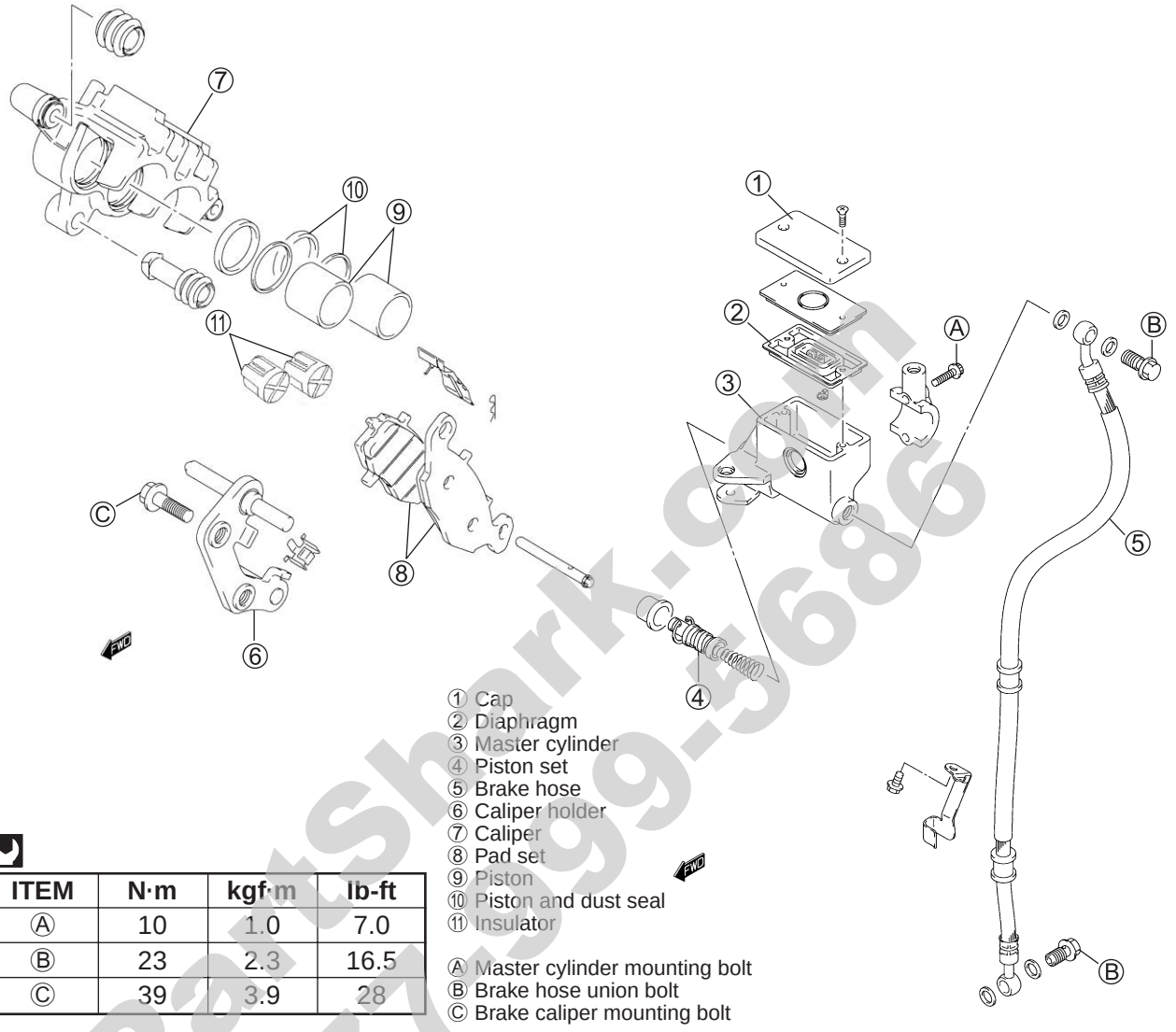
NOTE:
Before tightening the front axle pinch bolts ③, move the front fork up and down four or five times.



NOTE:
After remounting the front wheel, pump the brake lever a few times to check for proper brake operation.

FRONT BRAKE

CONSTRUCTION



① Cap
② Diaphragm
③ Master cylinder
④ Piston set
⑤ Brake hose
⑥ Caliper holder
⑦ Caliper
⑧ Pad set
⑨ Piston
⑩ Piston and dust seal
⑪ Insulator

Ⓐ Master cylinder mounting bolt
Ⓑ Brake hose union bolt
Ⓒ Brake caliper mounting bolt

ITEM	N·m	kgf·m	lb-ft
Ⓐ	10	1.0	7.0
Ⓑ	23	2.3	16.5
Ⓒ	39	3.9	28

⚠ WARNING

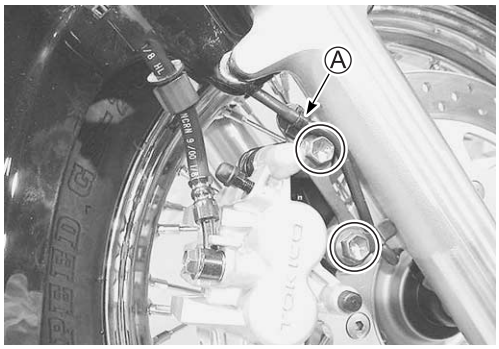
- *** The brake system is filled with an glycol-based brake fluid, which is classified DOT 4. Do not use or mix other types of brake fluid, such as silicone-based and petroleum-based brake fluids when refilling the brake system, otherwise serious damage to the brake system will result.**
- *** Do not use any brake fluid taken from old, used, or unsealed containers.**
- *** Do not reuse brake fluid left over from the last servicing or which has been stored for a long period of time.**
- *** When storing brake fluid, be sure to seal the container completely and keep it out of the reach of children.**
- *** When replenishing brake fluid, be sure not to get any dust or other foreign materials in the fluid.**
- *** When washing brake components, always use new brake fluid. Do not use cleaning solvent.**
- *** A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the brake disc with high-quality brake cleaner or a neutral detergent.**

⚠ CAUTION

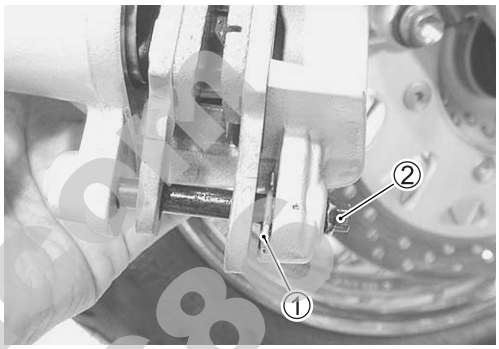
Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber material, etc.

BRAKE PAD REPLACEMENT

- Remove the guide hook Ⓐ.
- Remove the brake caliper by removing the brake caliper mounting bolts.



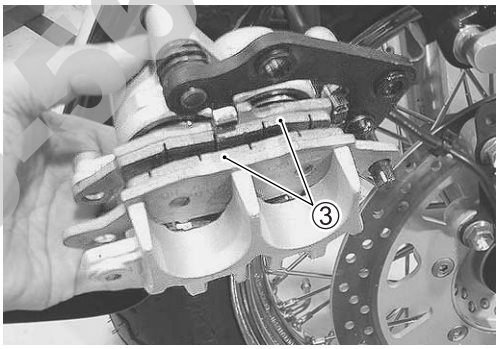
- Remove the pin ①.
- Remove the pad pin ②.



- Remove the brake pads ③.

⚠ CAUTION

*** Do not operate the brake lever during or after brake pad removal.**
*** Replace the brake pads as a set, otherwise braking performance will be adversely affected.**



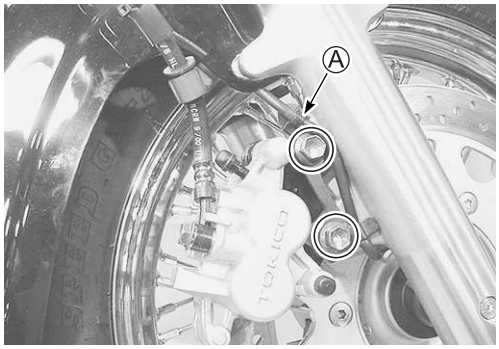
- Install the new brake pads.

- Tighten the brake caliper mounting bolts to the specified torque.

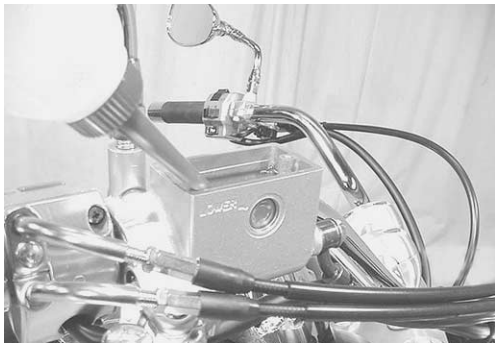
Brake caliper mounting bolts: 39 N·m (3.9 kgf·m, 28 lb-ft)

- Install the guide hook Ⓐ.

NOTE:
After replacing the brake pads, pump the brake lever a few times to check for proper brake operation and then check the brake fluid level.



BRAKE FLUID REPLACEMENT



- Place the motorcycle on a level surface and keep the handlebar straight.
- Remove the master cylinder reservoir cap and diaphragm.
- Remove as much old brake fluid as possible.
- Fill the reservoir with new brake fluid.

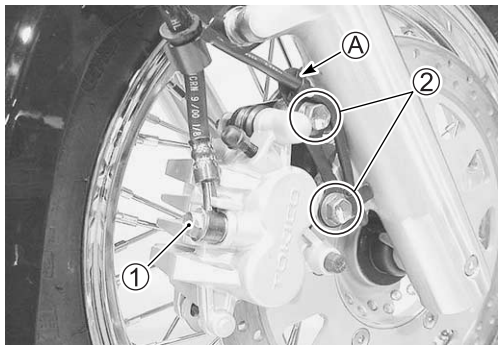
Specification and classification: DOT 4

- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake lever until the old brake fluid is completely out of the brake system.
- Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper end of the inspection window.

⚠ CAUTION

Bleed air from the brake system.
(☞2-17)

BRAKE CALIPER REMOVAL AND DISASSEMBLY

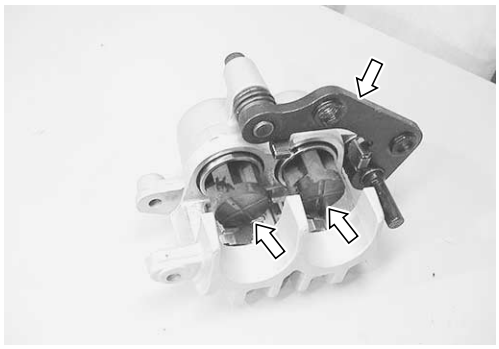


- Remove the guide hook Ⓐ.
- Disconnect the brake hose from the brake caliper by removing the brake hose union bolt ① and allow the brake fluid to drain into a suitable receptacle.
- Remove the brake caliper by removing the brake caliper mounting bolts ②.

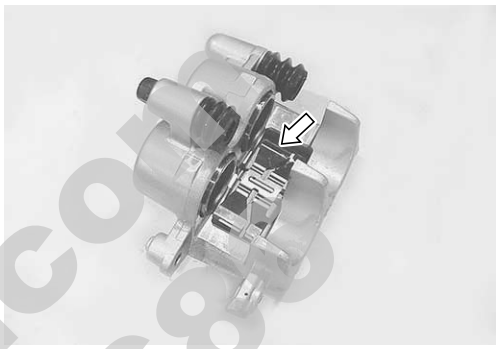
⚠ WARNING

- *** Do not reuse the brake fluid left over from the last servicing or which has been stored for a long period of time, otherwise serious damage to the brake system will result.**
- *** Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and oil leakage.**

- Remove the brake pads. (☞7-10)
- Remove the insulator.
- Remove the brake caliper holder.



- Remove the spring.



- Place a rag over the brake caliper pistons to prevent them from popping out, and then force out the pistons using compressed air.

⚠ CAUTION

Do not use extremely high pressure to remove the brake caliper pistons, otherwise damage to the pistons will result.

- Remove the dust seals and piston seals.

⚠ CAUTION

Do not reuse the dust seals and piston seals to prevent fluid leakage.

BRAKE CALIPER INSPECTION

BRAKE CALIPER

Inspect each brake caliper cylinder wall for nicks, scratches or other damage. If any damages are found, replace the brake caliper with a new one.

BRAKE CALIPER PISTONS

Inspect the brake caliper pistons for any scratches or other damage. If any damages are found, replace the piston with a new one.

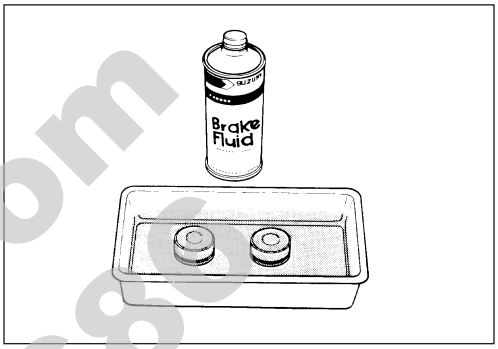
RUBBER PARTS

Replace the removed rubber parts with new ones.

BRAKE CALIPER REASSEMBLY AND REMOUNTING

Reassemble and remount the brake caliper in the reverse order of removal and disassembly. Pay special attention to the following points:

- Wash the caliper bores and pistons with the specified brake fluid. Thoroughly wash the dust seal grooves and piston seal grooves.



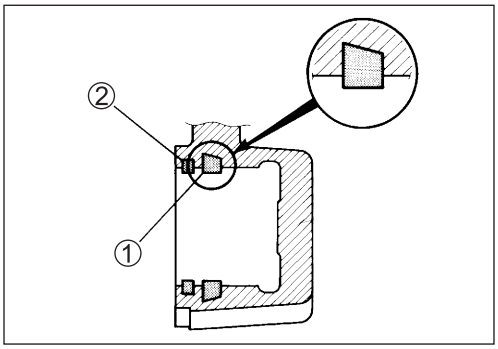
BF Specification and classification: DOT 4

⚠ CAUTION

*** Wash the brake caliper components with new brake fluid before reassembly.**
*** Do not wipe the brake fluid off after washing the components.**
*** When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
*** Replace the removed piston seals and dust seals with new ones.**
*** Apply brake fluid to all of the seals, brake caliper bores and pistons before reassembly.**

PISTON SEALS

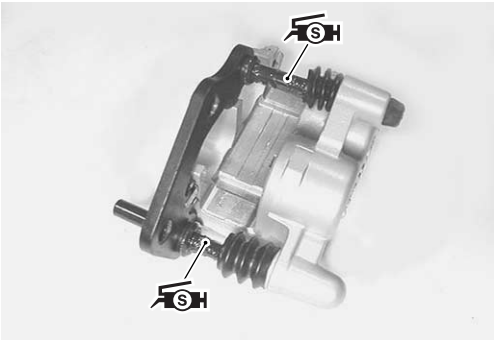
- Install the piston seals ① and dust seals ② as shown.



BRAKE CALIPER HOLDER

- Apply SUZUKI SILICON GREASE to the brake caliper holder.

S H 99000-25100: SUZUKI SILICONE GREASE

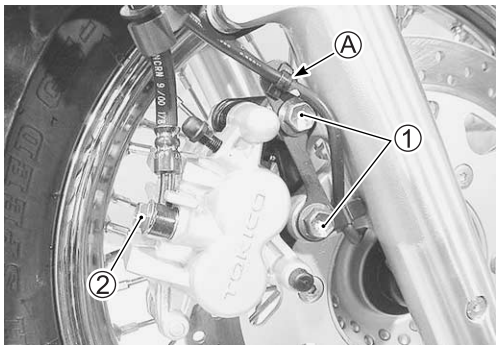


- Tighten the brake caliper mounting bolts ①, and brake hose union bolt ② to the specified torque.

Brake caliper mounting bolt: 39 N·m (3.9 kgf·m, 28 lb-ft)
Brake hose union bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

- For assembly procedure of brake hose: ☞9-18
- Install the guide hook Ⓐ.

NOTE:
Before remounting the brake caliper, push the brake caliper pistons all the way into the caliper.



⚠ CAUTION

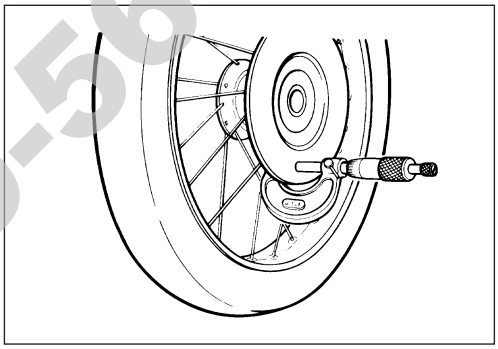
Bleed air from the system after reassembling the brake caliper. (☞2-17)

BRAKE DISC INSPECTION

Check the brake disc for cracks or damage and measure the thickness using the micrometer. If any damages are found or if the thickness is less than the service limit, replace the brake disc with a new one.

TOOL 09900-20205: Micrometer (0 – 25 mm)

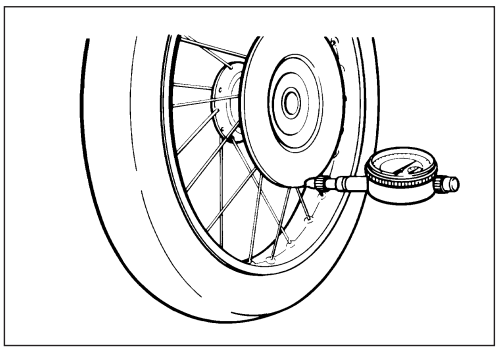
DATA Brake disc thickness
Service Limit: 4.5 mm (0.098 in)



Measure the runout using the dial gauge. If the runout exceeds the service limit, replace the brake disc with a new one.

TOOL 09900-20606: Dial gauge (1/100 mm)
09900-20701: Magnetic stand

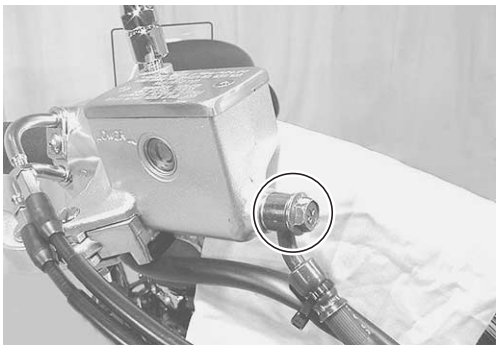
DATA Brake disc runout
Service Limit: 0.3 mm (0.012 in)



- If either measurement exceeds the service limit, replace the brake disc with a new one. (☞7-5)

MASTER CYLINDER REMOVAL AND DISASSEMBLY

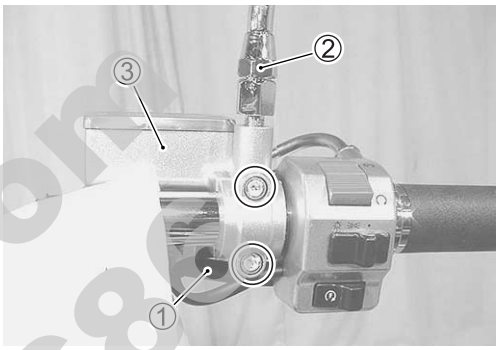
- Place a rag underneath the brake hose union bolt on the master cylinder to catch any spilt brake fluid. Remove the brake hose union bolt and disconnect the brake hose.



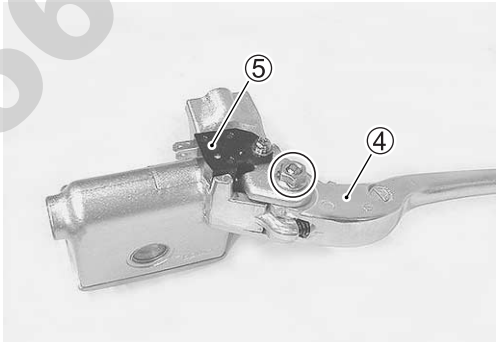
⚠ CAUTION

Immediately wipe off any brake fluid contacting any part of the motorcycle. The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.

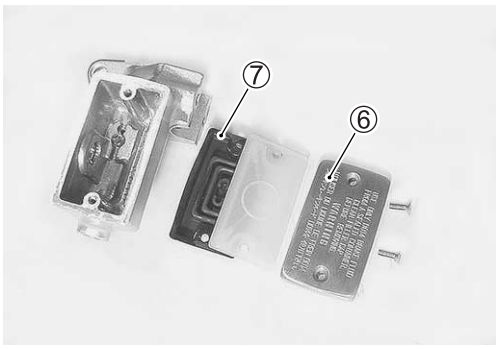
- Disconnect the front brake light switch lead wire ①.
- Remove the right rear view mirror ② and master cylinder assembly ③.



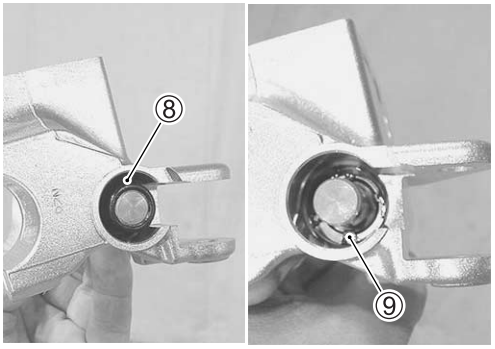
- Remove the brake lever ④ and front brake light switch ⑤.



- Remove the reservoir cap ⑥ and diaphragm ⑦.
- Drain the brake fluid.



- Pull the dust boot ⑧ out and remove the circlip ⑨.

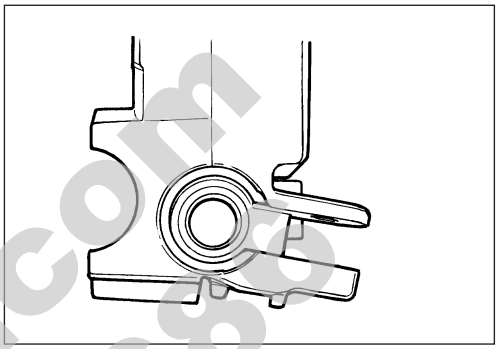


• Remove the piston assembly.

MASTER CYLINDER INSPECTION

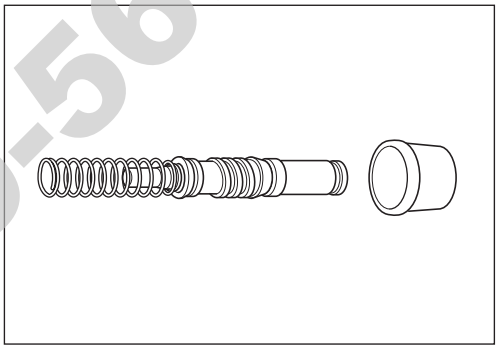
MASTER CYLINDER

Inspect the master cylinder bore for any scratches or damage. If any damages are found, replace the master cylinder with a new one.



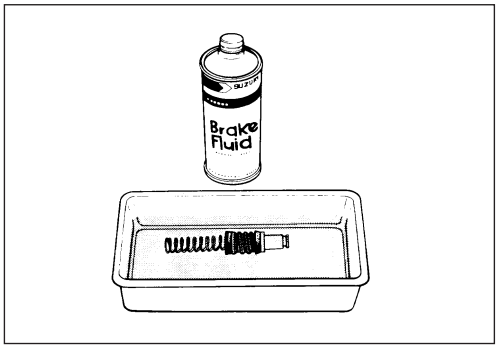
PISTON AND RUBBER PARTS

Inspect the piston surface, primary/secondary cup, and dust boot for any scratches, wear or damage. If any damages are found, replace the piston set with a new one.



MASTER CYLINDER REASSEMBLY AND REMOUNTING

Reassemble and remount the master cylinder in the reverse order of removal and disassembly. Pay special attention to the following points:

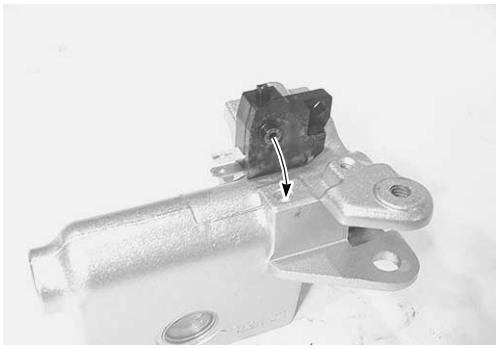


⚠ CAUTION

- *** Wash the master cylinder components with new brake fluid before reassembly.**
- *** Do not wipe the brake fluid off after washing the components.**
- *** When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
- *** Apply brake fluid to the master cylinder bore and all of the master cylinder components before reassembly.**

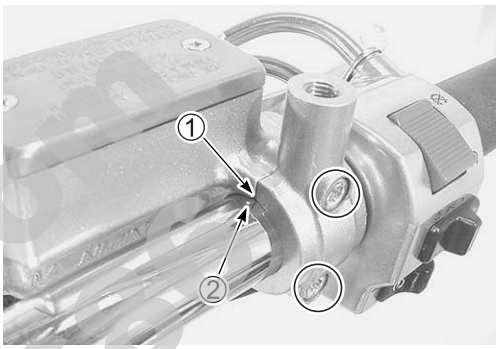
BF Specification and classification: DOT 4

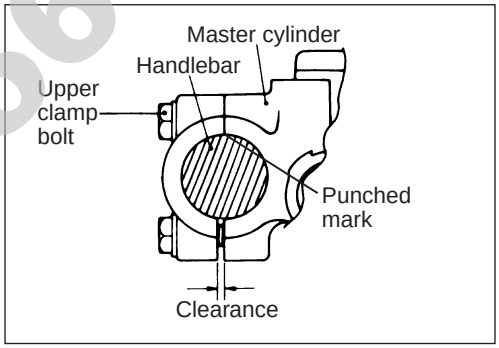
- When installing the brake light switch, align the projection on the switch with the hole in the master cylinder.



- When remounting the master cylinder onto the handlebars, align the master cylinder holder's mating surface ① with the punch mark ② on the handlebars and tighten the upper clamp bolt first.

Master cylinder mount bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)



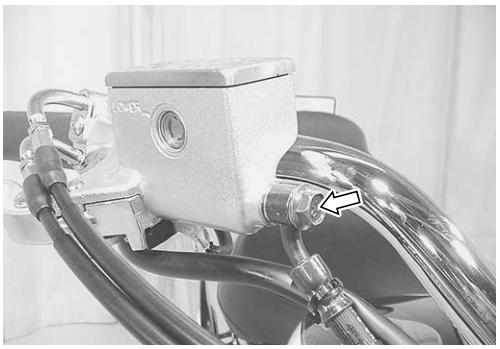


- Tighten the brake hose union bolt to the specified torque.
- For assembly procedure of brake hose. (☞9-18)

Brake hose union bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

⚠ CAUTION

Bleed air from the brake system after installing the master cylinder. (☞2-17)

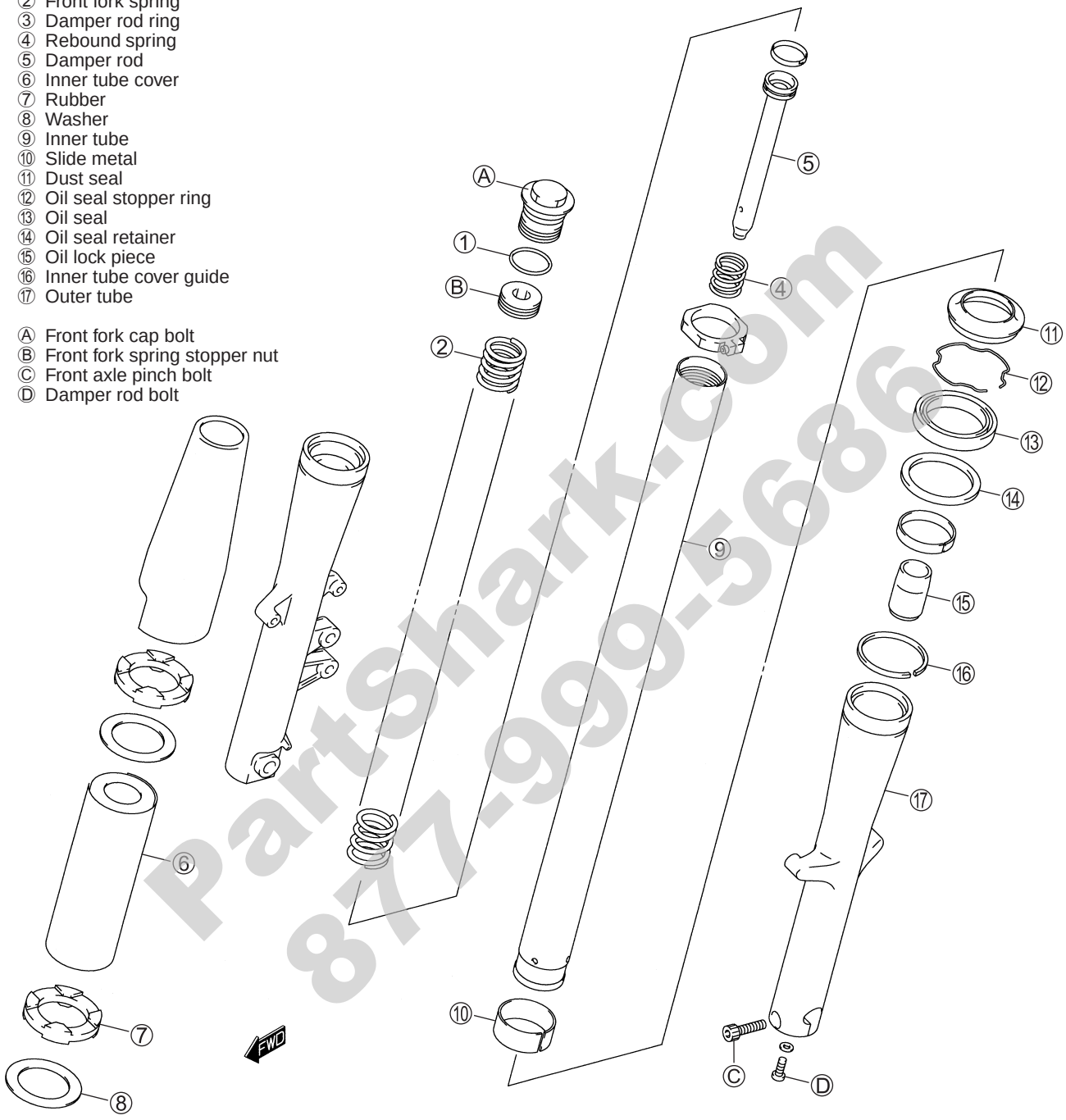


FRONT FORK

CONSTRUCTION

① O-ring
② Front fork spring
③ Damper rod ring
④ Rebound spring
⑤ Damper rod
⑥ Inner tube cover
⑦ Rubber
⑧ Washer
⑨ Inner tube
⑩ Slide metal
⑪ Dust seal
⑫ Oil seal stopper ring
⑬ Oil seal
⑭ Oil seal retainer
⑮ Oil lock piece
⑯ Inner tube cover guide
⑰ Outer tube

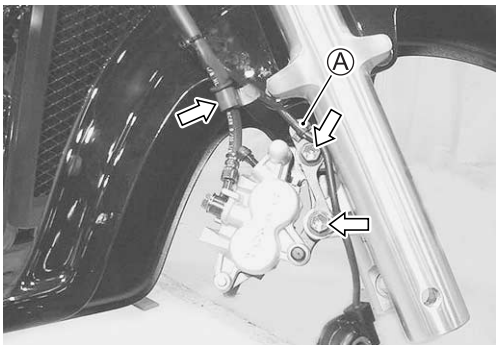
Ⓐ Front fork cap bolt
Ⓑ Front fork spring stopper nut
Ⓒ Front axle pinch bolt
Ⓓ Damper rod bolt



ITEM	N·m	kgf·m	lb-ft
Ⓐ	45	4.5	32.5
Ⓑ	35	3.5	25.5
Ⓒ	33	3.3	24
Ⓓ	20	2.0	14.5

REMOVAL AND DISASSEMBLY

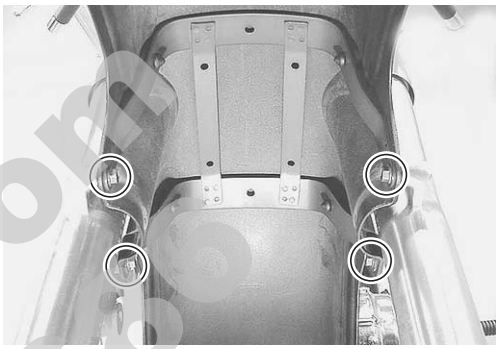
- Remove the front wheel. (☞7-5)
- Remove the brake hose from the hose guide.
- Remove the guide hook Ⓐ.
- Remove the front brake caliper by removing the bolts.



- Remove the front fender by removing its mounting bolts.

⚠ CAUTION

Be careful not to scratch the front fender.

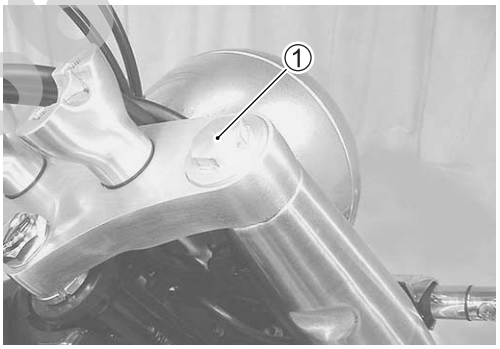


- Remove the handlebars. (☞7-27)
- Remove the front fork cap bolts ①.

NOTE:

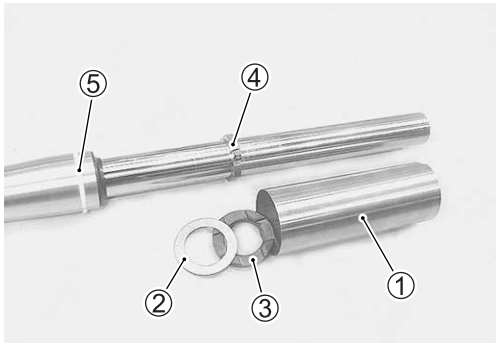
Slightly loosen the front fork spring stopper nut to facilitate later disassembly.

TOOL 09900-18720: Hexagon socket (14 mm)



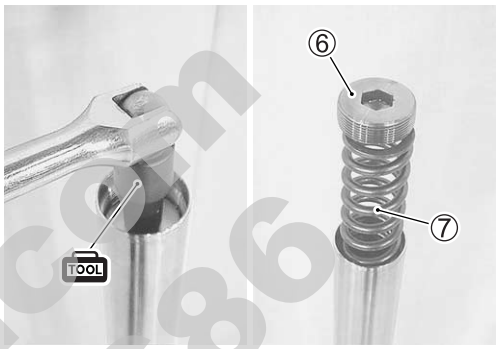
- Remove the front forks after loosening the front fork lower clamp bolts.

- Remove the front fork inner tube cover ①, washer ② and rubber ③.
- Remove the inner tube cover stopper ④ by loosening the bolt.
- Remove the inner tube cover guide ⑤.

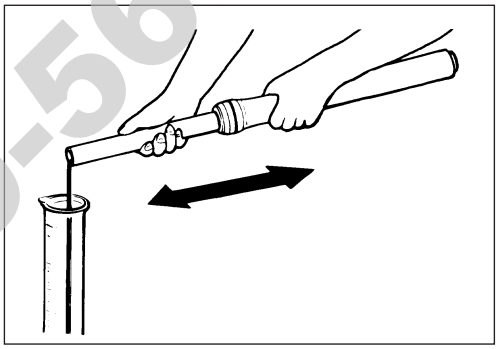


- Remove the front fork spring stopper nut ⑥ and fork spring ⑦.

09900-18720: Hexagon socket (14 mm)

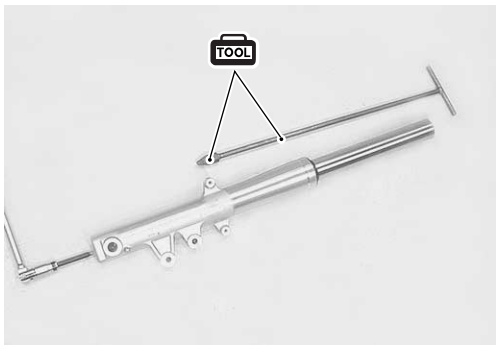


- Invert the front fork and stroke it several times to drain out fork oil.
- Hold the front fork in the inverted position for a few minutes to allow fork oil to fully drain.

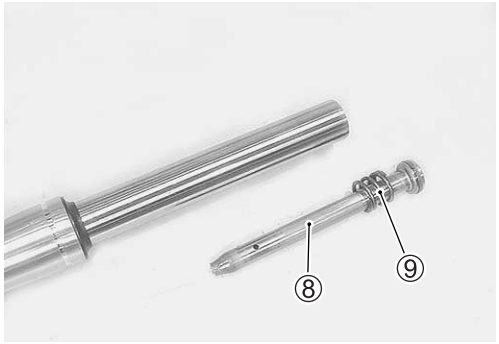


- Remove the damper rod bolt using a 6-mm hexagon wrench and the special tools.

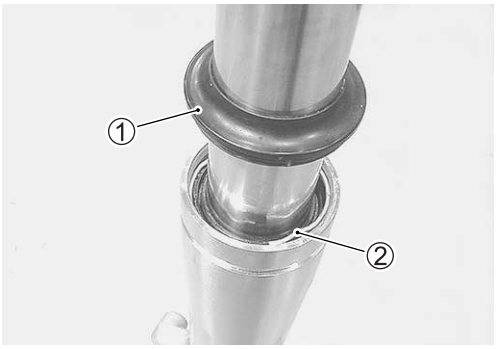
09940-34520: "T" handle
09940-34531: Attachment "A"



- Remove the damper rod ⑧ and Rebound spring ⑨.

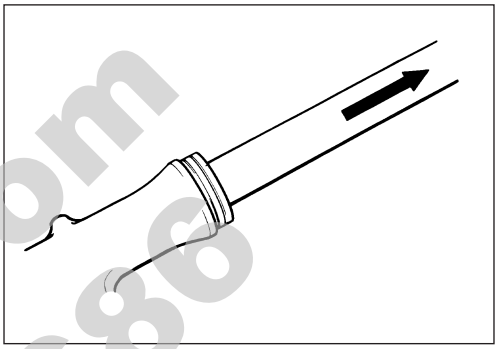


• Remove the dust seal ① and the oil seal stopper ring ②.



• Remove the oil seal by slowly pulling out the inner tube.

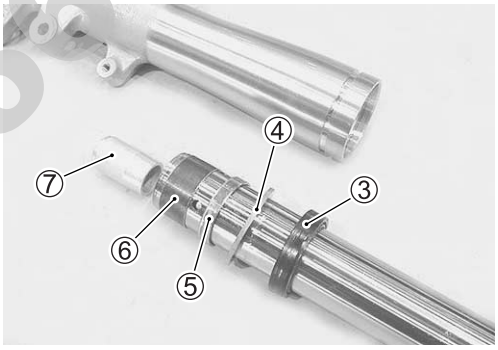
NOTE:
Be careful not to damage the inner tube.



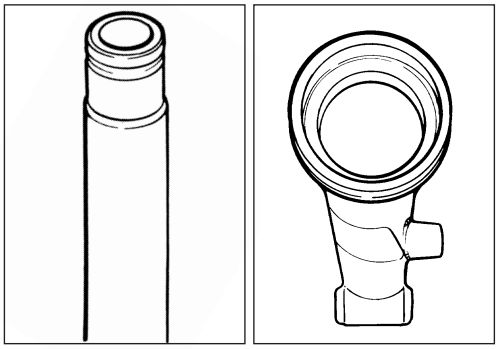
⚠ CAUTION

The outer and inner tube's slide metals must be replaced along with the oil seal and dust seal when assembling the front fork.

• Remove the following parts.
③ Oil seal
④ Oil seal retainer
⑤ Outer tube slide metal
⑥ Inner tube slide metal
⑦ Oil lock piece



INSPECTION

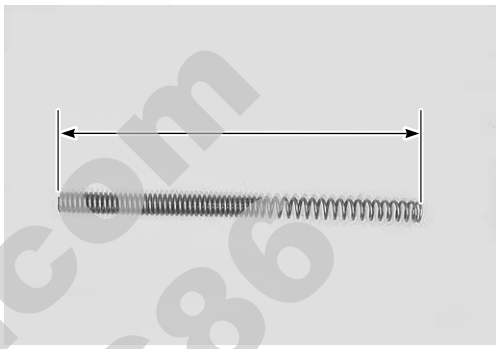


INNER AND OUTER TUBES

Inspect the inner tube sliding surface and outer tube sliding surface for scuffing.

FORK SPRING

Measure the fork spring free length. If it is shorter than the service limit, replace it with a new one.



DATA **Front fork spring free length**
Service Limit: 540 mm (21.26 in)

DAMPER ROD RING

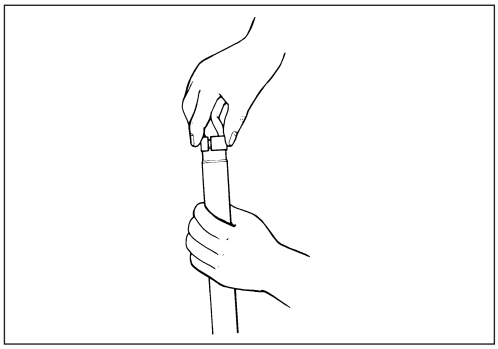
Inspect the damper rod ring for wear or damage. If it is worn or damaged, replace it with a new one.

REASSEMBLY AND REMOUNTING

Reassemble and remount the front fork in the reverse order of removal and disassembly. Pay attention to the following points:

SLIDE METALS AND OIL AND DUST SEALS

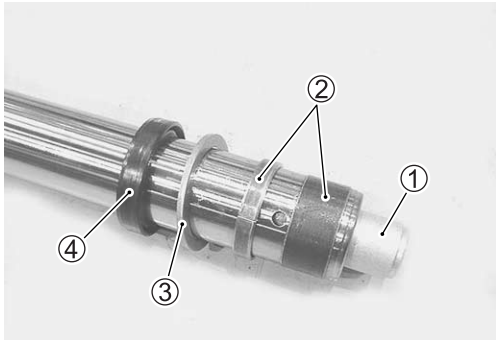
- Hold the inner tube vertically, clean the metal groove and install the slide metal by hand.



⚠ CAUTION

Do not damage the Teflon coated surface of the inner tube's slide metal when mounting it.

- Install the oil lock piece ①, slide metals ②, oil seal retainer ③ and oil seal ④ onto the inner tube.

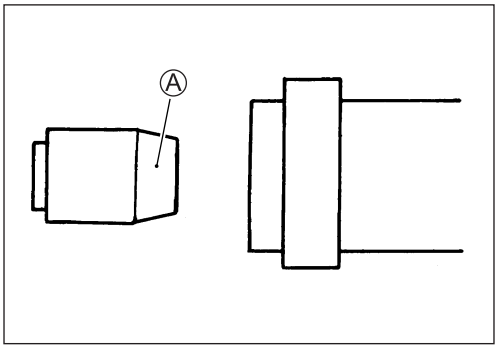


NOTE:
Apply grease to the oil seal ④ lip lightly before installing it.

For USA
99000-25030: SUZUKI SUPER GREASE "A"

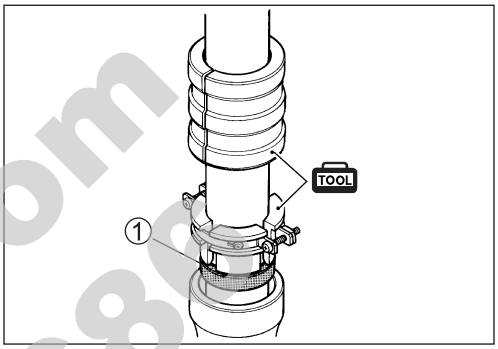
For the other countries
99000-25010: SUZUKI SUPER GREASE "A"

NOTE:
When installing the oil lock piece, insert the tapered end Ⓐ of oil lock piece into the inner tube.



- Insert the inner tube into the outer tube and install the oil seal ① using the special tool.

TOOL 09940-52861: Front fork oil seal installer

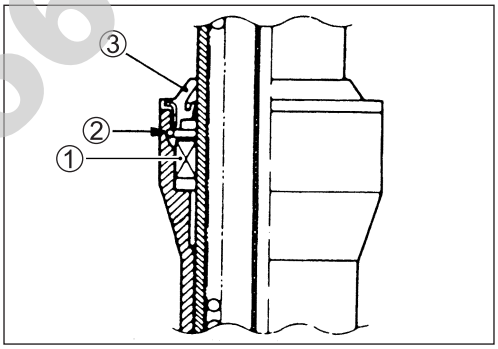


- Install the oil seal stopper ring ②.

⚠ CAUTION

Make sure that the oil seal stopper ring is fitted securely.

- Install the dust seal ③.



DAMPER ROD

- Install the damper rod ④ and rebound spring ⑤ as shown.

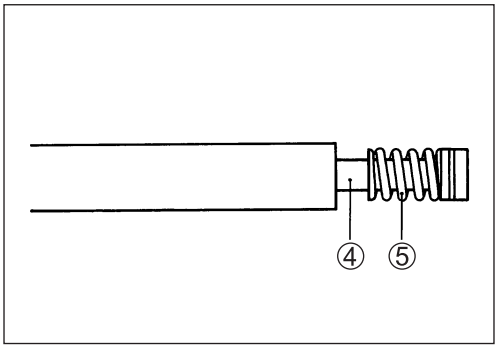
Tighten the damper rod bolt to the specified torque using a 6-mm hexagon wrench and the special tools.

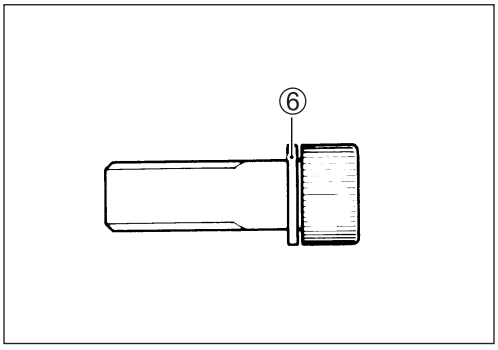
TOOL 09940-34520: "T" handle
09940-34531: Attachment "A"

Damper rod bolt: 20 N·m (2.0 kgf·m, 14.5 lb-ft)

⚠ CAUTION

Use a new damper rod bolt gasket ⑥ to prevent oil leakage.





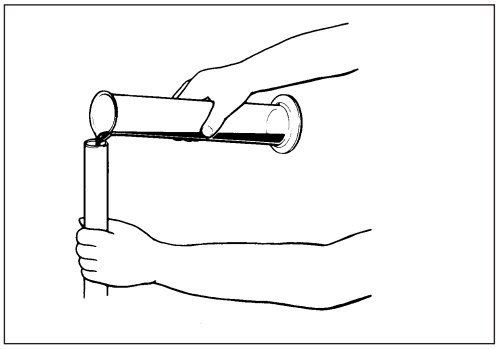
FORK OIL

- Pour the specified fork oil into the inner tube.

Fork oil type: SUZUKI FORK OIL SS-08 (#10) or equivalent fork oil

99000-99001-SS8: SUZUKI FORK OIL SS-08

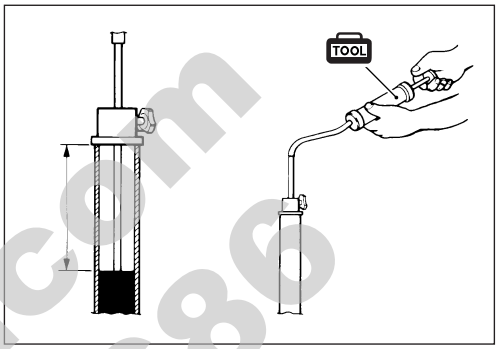
Front fork oil capacity (each leg): 412 ml (13.9/14.5 US/Imp oz)



- Hold the front fork in a vertical position and adjust the fork oil level using the special tool.

09943-74111: Front fork oil level gauge

Front fork oil level
Service Limit: 177 mm (6.96 in)

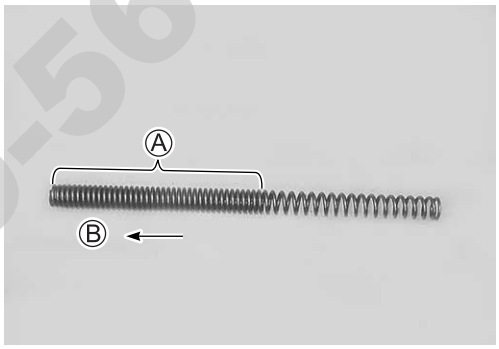


NOTE:
When adjusting the oil level, remove the fork spring and compress the inner tube fully.

FORK SPRING

- Install the fork spring as shown.

NOTE:
The end of the fork spring with the widely close pitch Ⓐ side should be at the bottom Ⓑ of the front fork.



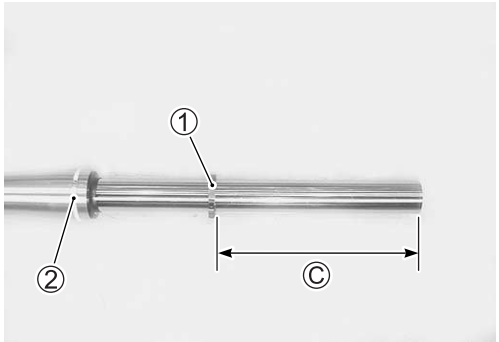
- Install the front fork spring stopper nut temporarily.

09900-18720: Hexagon socket (14 mm)

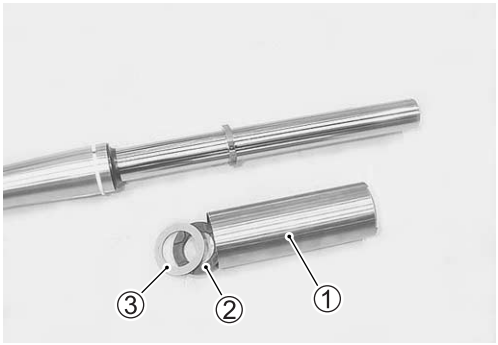
REMOUNTING

Remount the front forks in the reverse order of removal. Pay attention to the following points.

- Install the inner tube cover stopper ① at 246.6 mm (9.70 in) Ⓒ from the upper surface of the inner tube.
- Install the inner tube cover guide ②.



- Install the inner tube cover ①, rubber ② and washer ③.



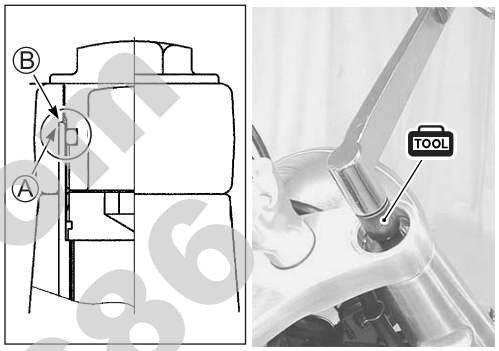
- Remount the front fork and tighten the front fork lower clamp bolts temporarily.

NOTE:
Install the inner tube Ⓐ until it seets to the flange part Ⓑ of the steering stem upper bracket.

- Tighten the front fork spring stopper nut to the specified torque.

Front fork spring stopper nut: 35 N·m (3.5 kgf·m, 25.5 lb-ft)

09900-18720: Hexagon socket (14 mm)



- After loosening the front fork lower clamp bolts slightly, tighten the front fork cap bolt to the specified torque.

Front fork cap bolt: 45 N·m (4.5 kgf·m, 32.5 lb-ft)

⚠ CAUTION

Replace the front fork cap bolt's O-ring to prevent oil leakage.

- Tighten the front fork lower clamp bolts to the specified torque.

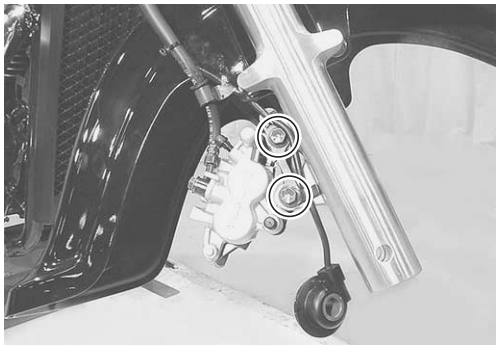
Front fork lower clamp bolt: 33 N·m (3.3 kgf·m, 24 lb-ft)

- Tighten the front brake caliper mounting bolts to the specified torque.

Front brake caliper mounting bolt: 39 N·m (3.9 kgf·m, 28 lb-ft)

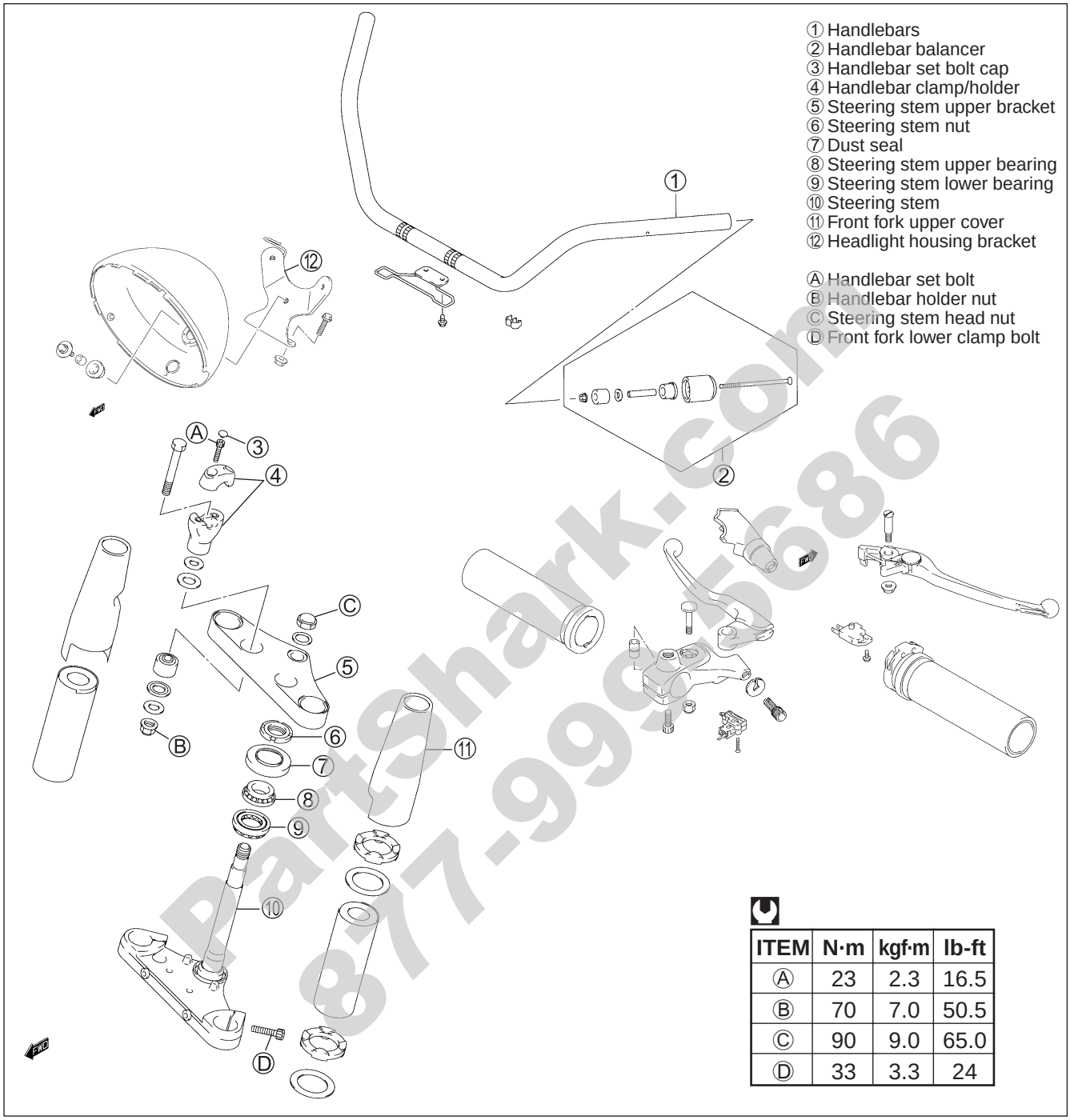
- Install the front wheel. (☞7-7)

NOTE:
Before tightening the front axle and front axle pinch bolts, move the front fork up and down four or five times.



STEERING

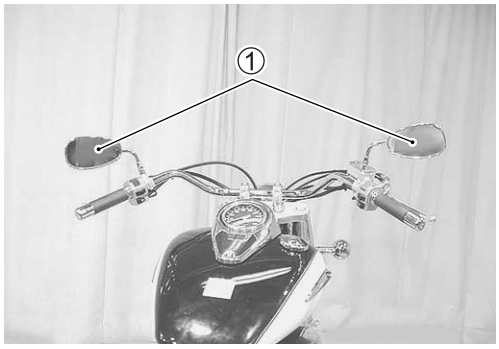
CONSTRUCTION



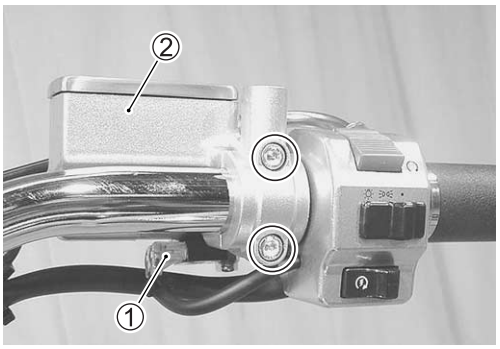
ITEM	N·m	kgf·m	lb-ft
Ⓐ	23	2.3	16.5
Ⓑ	70	7.0	50.5
Ⓒ	90	9.0	65.0
Ⓓ	33	3.3	24

REMOVAL AND DISASSEMBLY

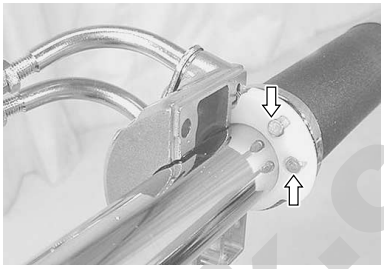
- Remove the front wheel. (☞7-5)
- Remove the front fork. (☞7-19)
- Remove the rear view mirrors ①.

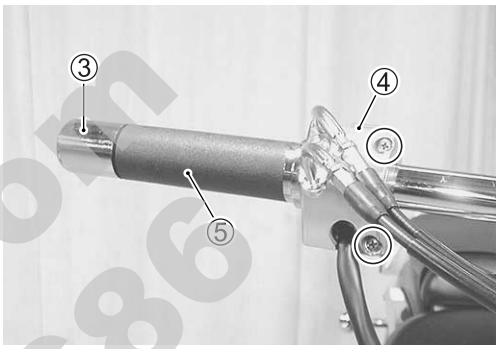


- Disconnect the front brake light switch lead wires ①.
- Remove the front brake master cylinder ②.

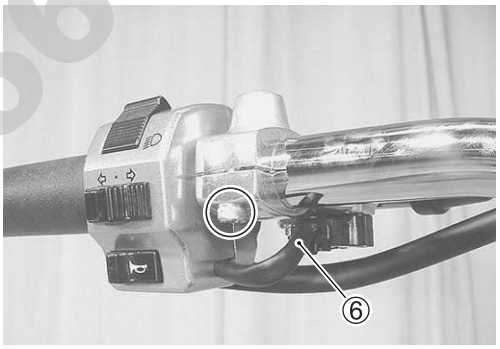


- Remove the right handlebar balancer ③, the right handlebar switch ④ and the throttle grip ⑤.

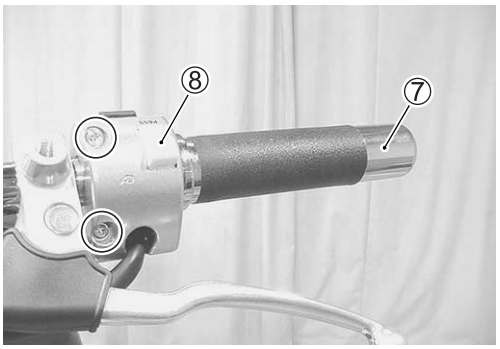




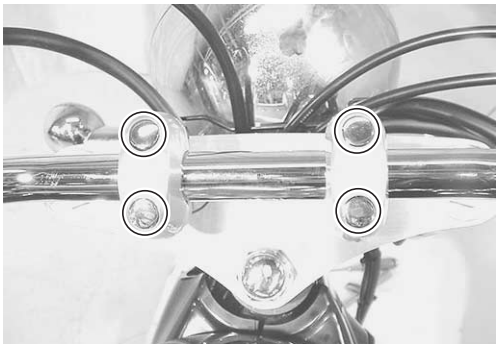
- Disconnect the clutch lever position switch lead wires ⑥.
- Loosen the clutch lever holder bolt.



- Remove the left handlebar balancer ⑦ and the left handlebar switch ⑧.

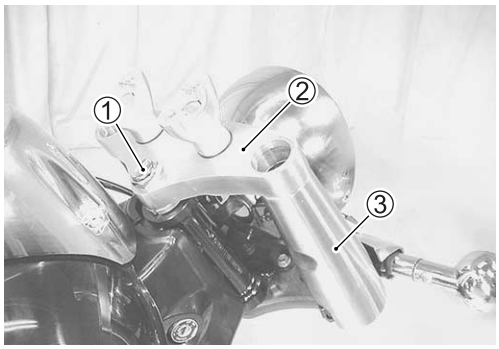


- Remove the handlebars by removing the handlebar clamp bolt caps, handlebar clamp bolts and handlebar clamps.



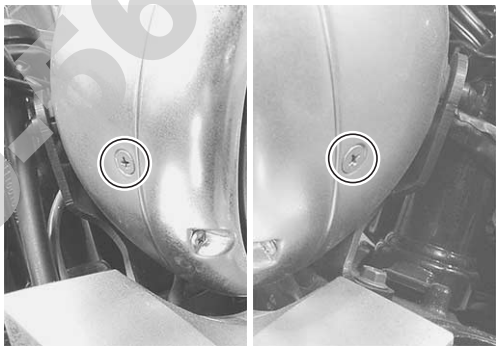
- Remove the steering stem head nut ① and washer.
- Remove the steering stem upper bracket ② and the front fork upper cover ③.

NOTE:
Hold the front fork upper cover to prevent it from falling.

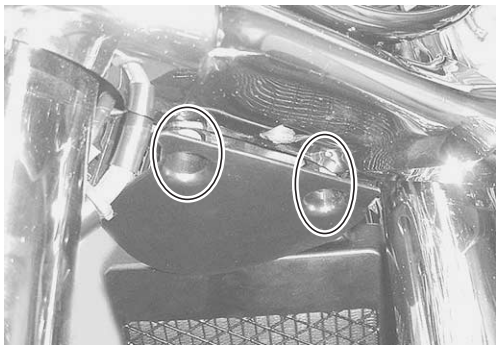


- Remove the cable guide ④.

- Remove the headlight.

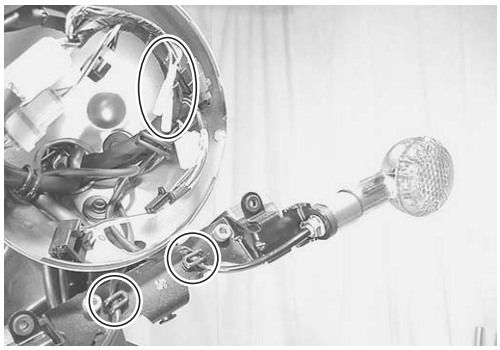


- Remove the cooling air guide.



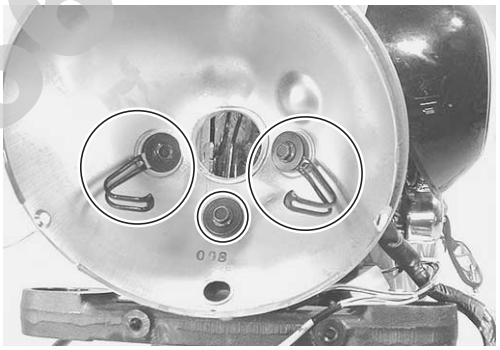
- Remove the steering stem cover.

- Remove the front turn signal light bracket.
- Disconnect the front turn signal light lead-wire connector.

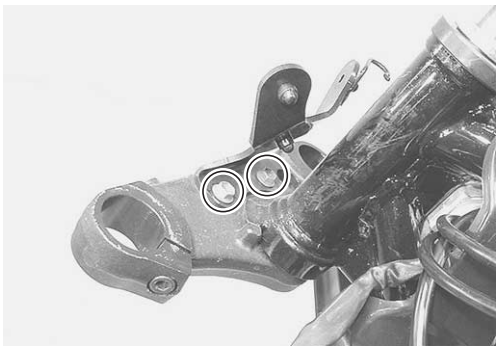


- Remove the brake hose guide.
- Remove the brake hose and speedo sensor lead-wire. (☞9-21)

- Remove the head light housing.



- Remove the head light housing bracket.

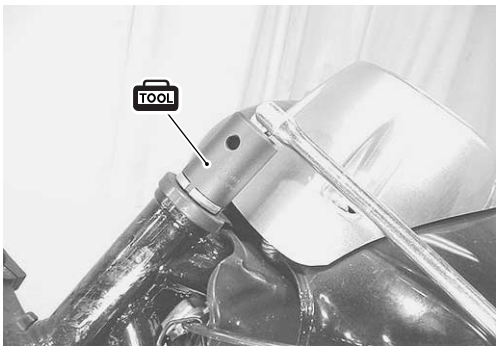


- Remove the steering stem nut using the special tool.

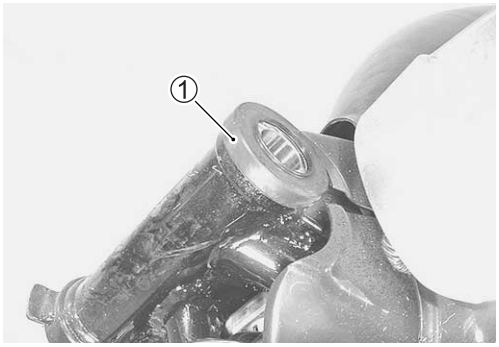
TOOL 09940-14911: Steering stem nut wrench

- Remove the steering stem lower bracket.

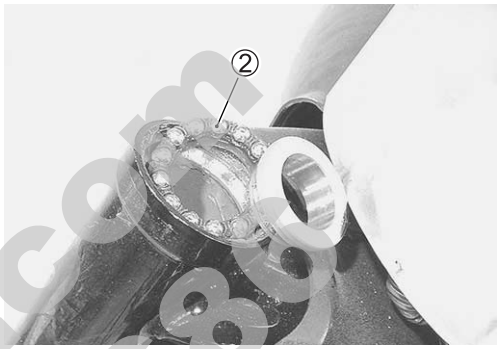
NOTE:
Hold the steering stem lower bracket to prevent it from falling.



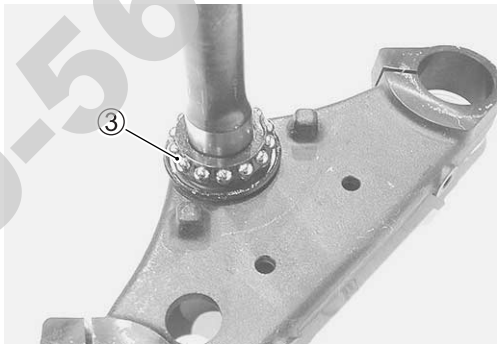
- Remove the dust seal ①.



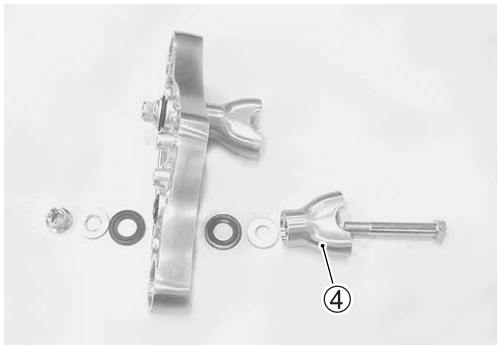
- Remove the steering stem upper bearing ②.



- Remove the steering stem lower bearing ③.



- Remove the handlebar holders ④ from the steering stem upper bracket.



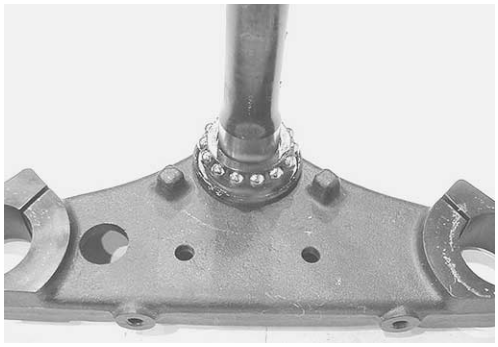
- Remove the handlebar bushes by using the proper tool and special tools.

TOOL 09941-34513: Steering outer race installer

INSPECTION AND DISASSEMBLY

Inspect the removed parts for the following abnormalities.

* Handlebars distortion
* Race wear and brinelling
* Bearing wear or damage
* Abnormal bearing noise
* Distortion of the steering stem



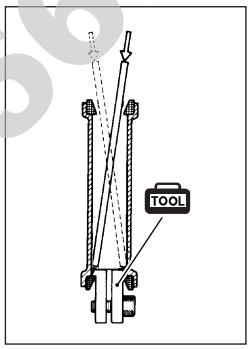
- Remove the steering stem lower bearing inner race by using a chisel.

⚠ CAUTION

The removed bearing and inner race must be replaced with a new one.

- Drive out the steering stem upper and lower bearing races by using the special tools and suitable bar.

TOOL 09941-54911: Bearing outer race remover



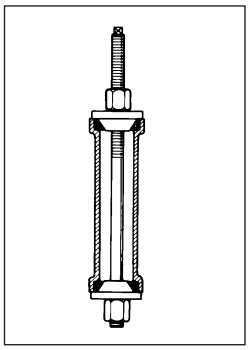
REASSEMBLY AND REMOUNTING

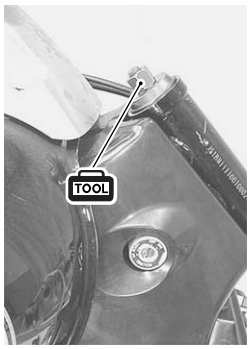
Reassemble and remount the steering stem in the reverse order of removal and disassembly. Pay attention to the following points.

OUTER RACES

- Press in the upper and lower outer races using the special tool.

TOOL 09941-34513: Steering outer race installer

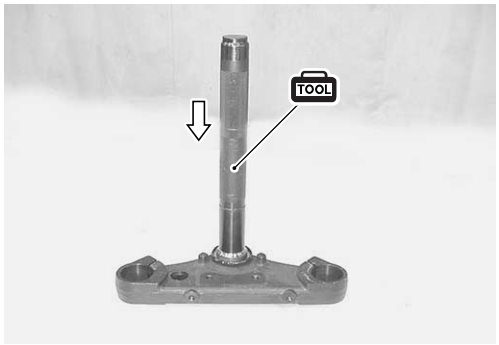




BEARINGS

- Press in the lower bearing using the special tool.

TOOL 09941-74911: Steering bearing installer



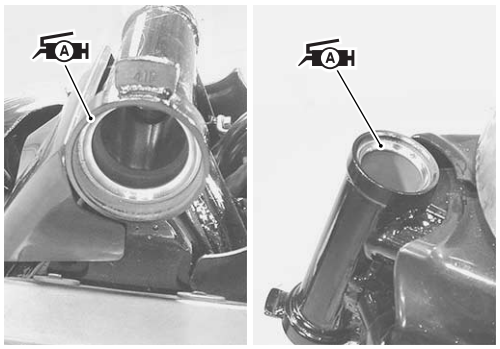
- Apply grease to the upper and lower bearings before remounting the steering stem.

For USA

99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

99000-25010: SUZUKI SUPER GREASE "A"



- Install the bearings inner race and the dust seal.

STEERING STEM NUT

- Install the steering stem.
- Install the steering stem nut as shown.

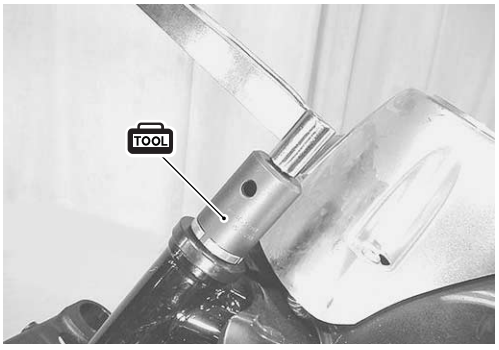
NOTE:

The flange side Ⓐ of the steering stem must face down.

- Tighten the steering stem nut to the specified torque using the special tools.

09940-14911: Steering stem nut wrench

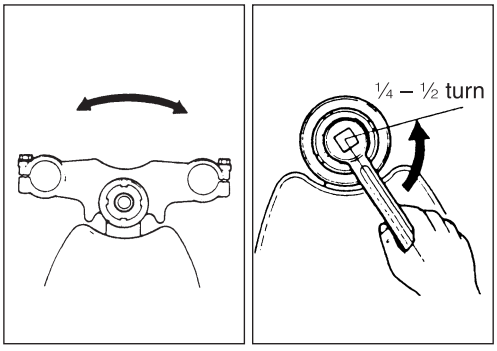
Stem nut: 45 N·m (4.5 kgf·m, 32.5 lb-ft)



- Turn the steering stem lower bracket about five or six times to the left and right so that the bearings seat properly.
- Loosen the steering stem nut by ¼ – ½ of a turn.

NOTE:

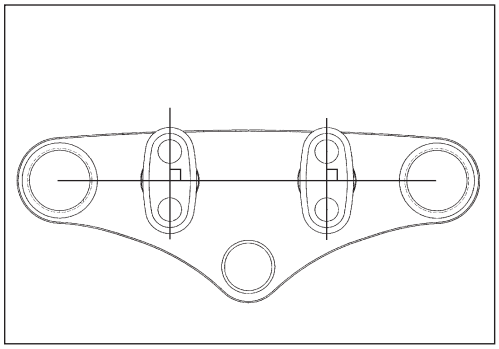
This adjustment will vary from motorcycle to motorcycle.

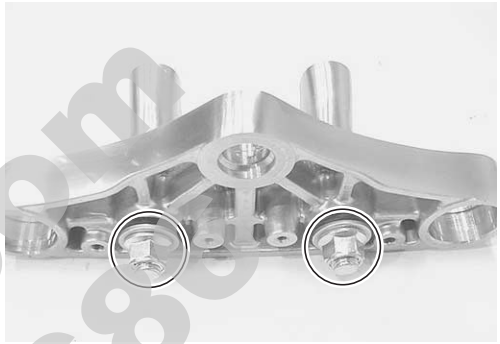


HANDLEBAR HOLDER

- Install the handlebar holders and related parts to the steering stem head.
- Tighten the handlebar holder nuts to the specified torque.

Handlebar holder nut: 70 N·m (7.0 kgf·m, 50.5 lb-ft)





STEERING STEM UPPER BRACKET

- Install the front fork upper cover, steering stem upper bracket, washer and steering stem head nut.

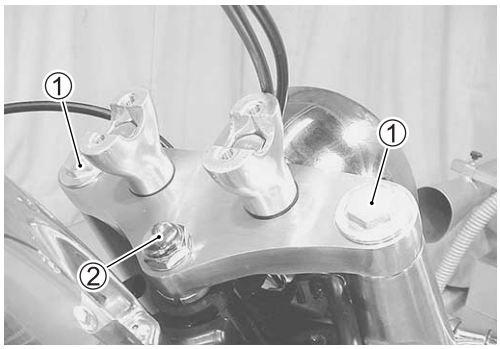
NOTE:

When installing the right side of the cover, face the dent part Ⓐ to back ward.

FRONT FORK AND STEERING STEM HEAD NUT

- Tighten the front fork cap bolts ①, steering stem head nut ② and front fork lower clamp bolts ③ to the specified torque.

Front fork cap bolt ①: 45 N·m (4.5 kgf·m, 32.5 lb-ft)
Steering stem head nut ②: 90 N·m (9.0 kgf·m, 65.0 lb-ft)
Front fork lower clamp bolt ③: 33 N·m (3.3 kgf·m, 24 lb-ft)

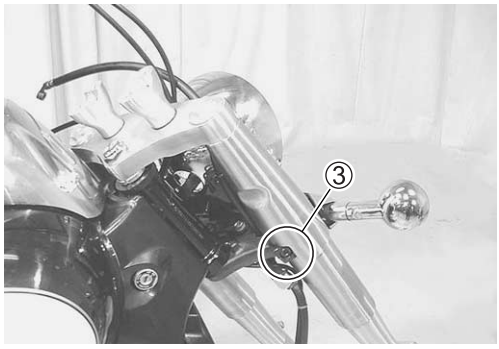


NOTE:

** Tighten the front fork cap bolts and steering stem head nut first, and the lower clamp bolts finally.*

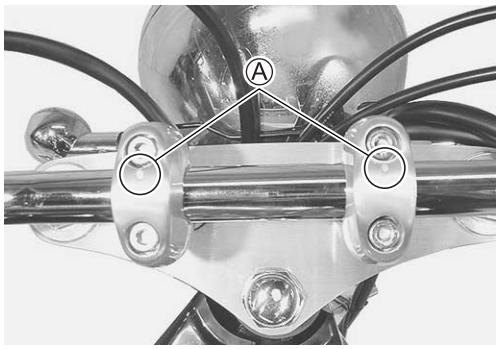
** Rout the brake hose, throttle cables and handlebar switch lead wires, before installing the front forks. (☞7-25)*

- Speed sensor lead-wire routing. (☞9-20)

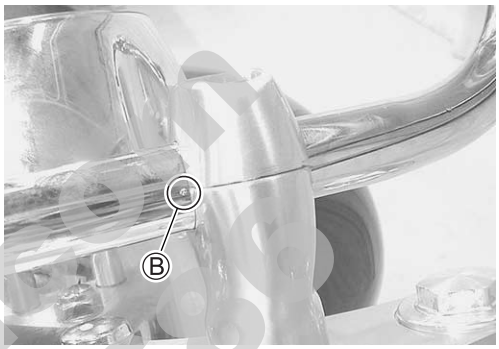


HANDLEBARS

- When setting the handlebar clamp to the handlebar holder of the steering upper bracket, face the punched mark Ⓐ on its clamp forward.



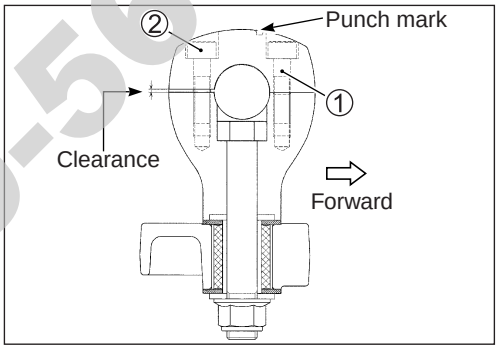
- Install the handlebars with the punch mark Ⓑ aligned with the handlebar clamp as shown.



- First, tighten the handlebar clamp bolts ① to the half of specified torque, and then tighten the handlebar clamp bolts ① and ② to the specified torque.

Handlebar set bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)

- Install the handlebar set bolt cap.



- Apply grease to the throttle cable end.

For USA

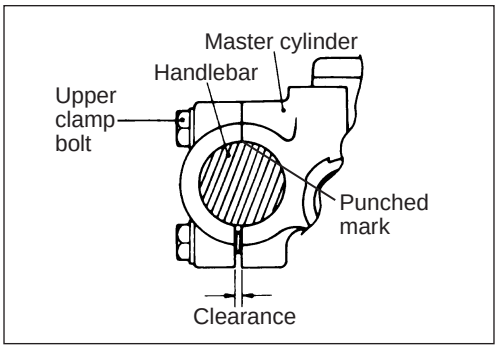
99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

99000-25010: SUZUKI SUPER GREASE "A"

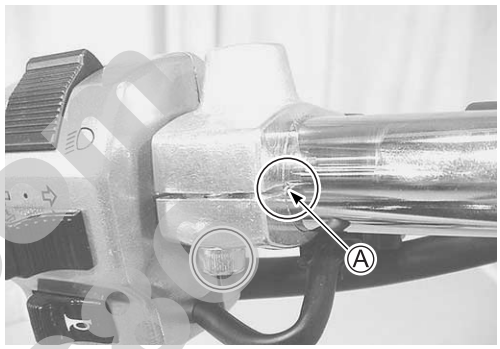
- Install the front brake master cylinder. (☞7-17)

Front master cylinder mounting bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)



- Install the clutch lever holder with the punch mark Ⓐ aligned with the clutch lever holder clamp as shown.

Clutch lever holder clamp bolt: 10 N·m (1.0 kgf·m, 7.3 lb-ft)

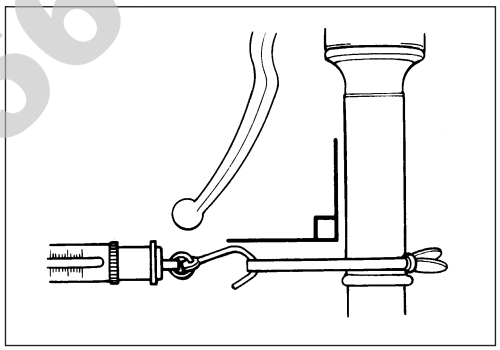


- Install the front wheel. (☞7-5)
- Adjust the throttle cable play. (☞2-10)

STEERING TENSION ADJUSTMENT

Check the steering movement in the following procedure.

- By supporting the motorcycle with a jack, lift the front wheel until it is off the floor by 20 – 30 mm (0.8 – 1.2 in).
- Check to make sure that the cables and wire harnesses are properly routed.
- With the front wheel in the straight ahead state, hitch the spring scale (special tool) on one handlebar grip end as shown in the figure and read the graduation when the handlebar starts moving. Do the same on the other grip end.



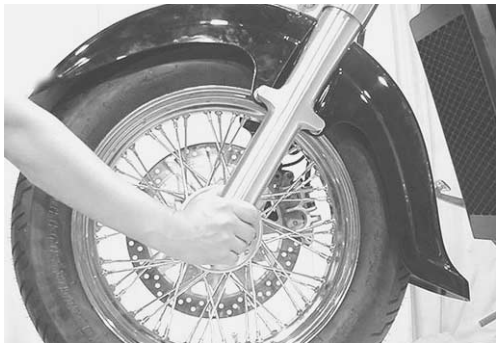
DATA Initial force: 200 – 500 grams

TOOL 09940-92720: Spring scale

- If the initial force read on the scale when the handlebar starts turning is either too heavy or too light, adjust it till it satisfies the specification.

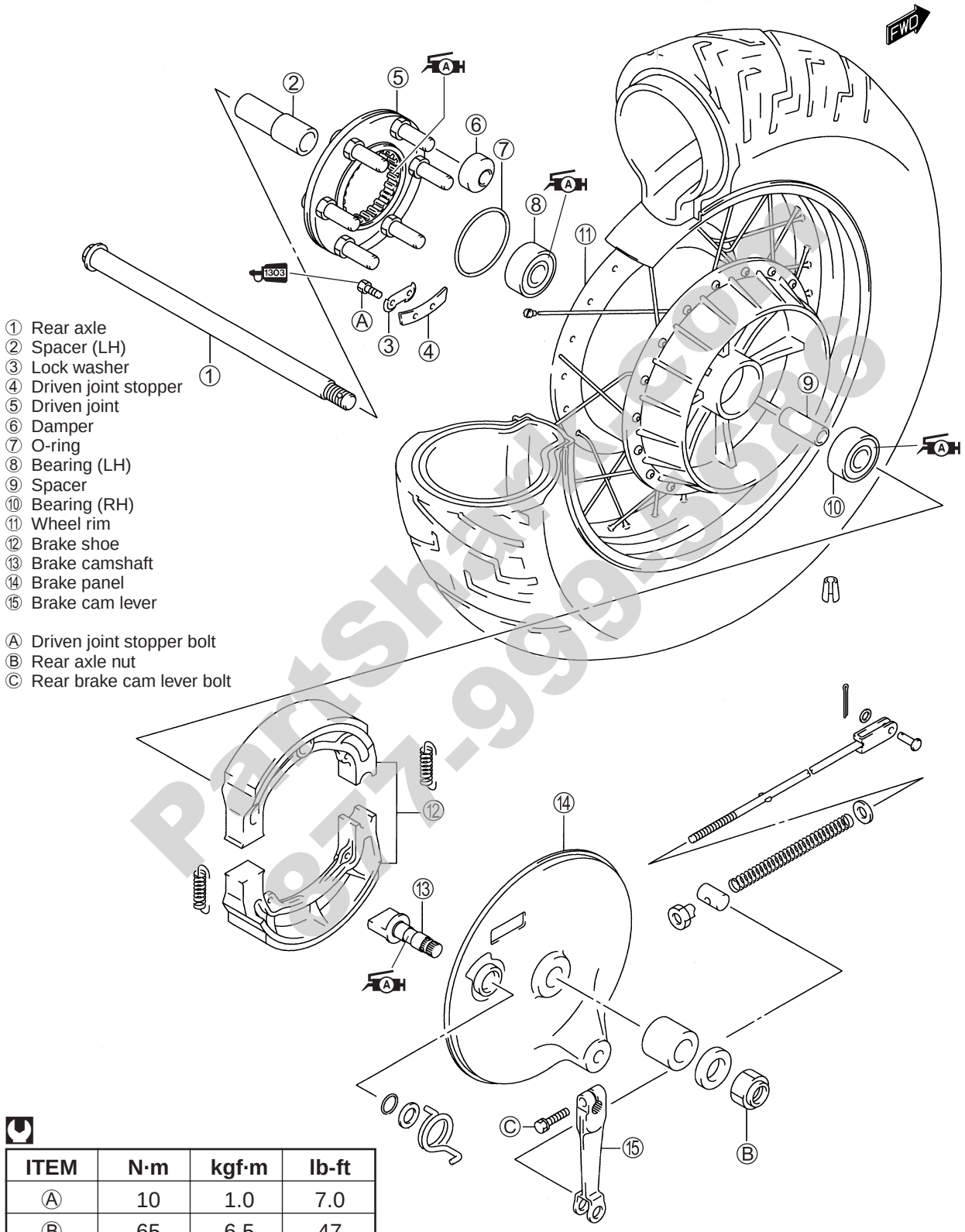
1) First, loosen the front fork upper and lower clamp bolts, steering stem head nut and steering stem lock nut, and then adjust the steering stem nut by loosening or tightening it.
2) Tighten the steering stem lock nut, stem head nut and front fork upper and lower clamp bolts to the specified torque and recheck the initial force with the spring scale according to the previously described procedure.
3) If the initial force is found within the specified range, adjustment has been completed.

NOTE:
Hold the front fork legs, move them back and forth and make sure that the steering is not loose.



REAR WHEEL

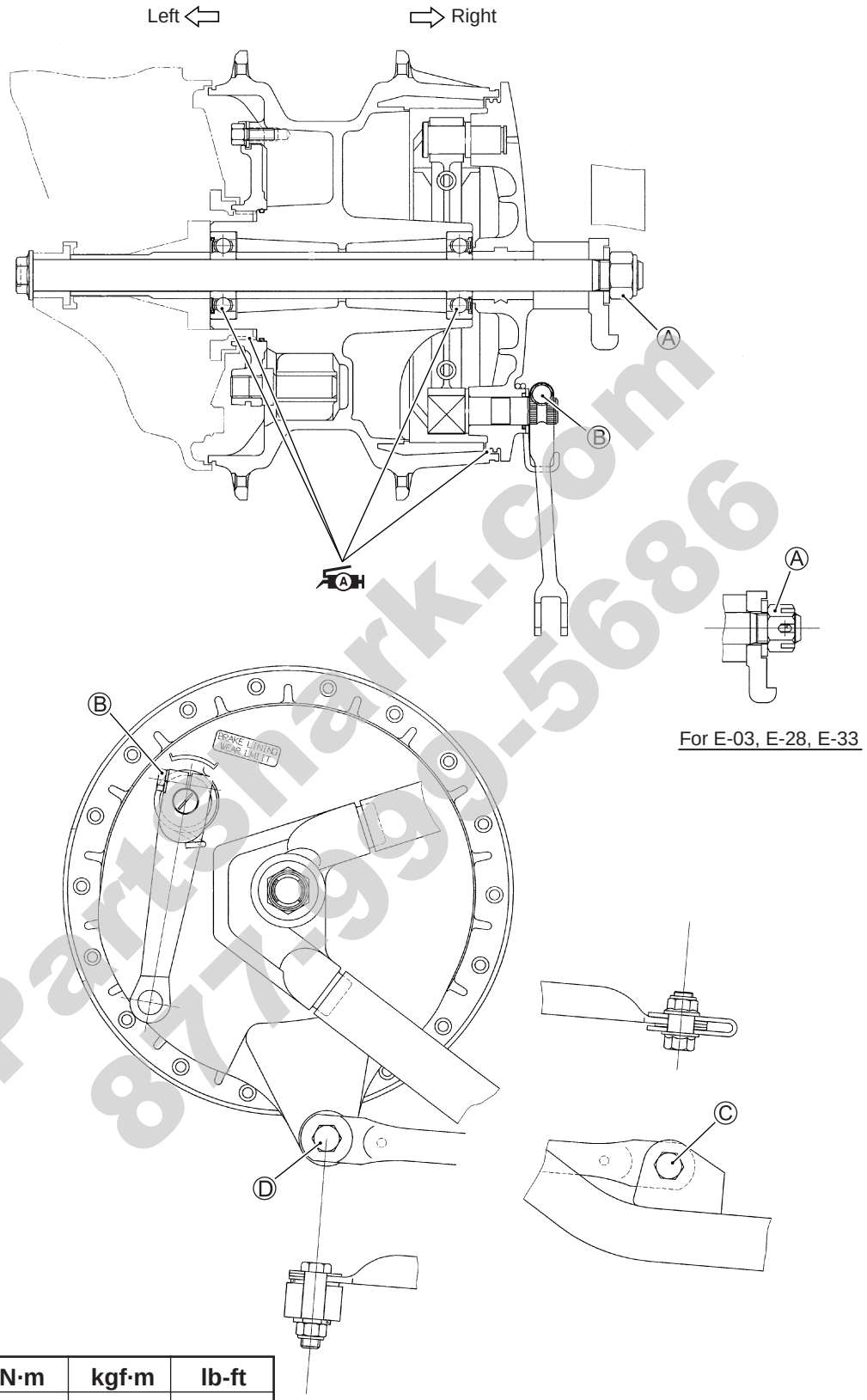
CONSTRUCTION



① Rear axle
② Spacer (LH)
③ Lock washer
④ Driven joint stopper
⑤ Driven joint
⑥ Damper
⑦ O-ring
⑧ Bearing (LH)
⑨ Spacer
⑩ Bearing (RH)
⑪ Wheel rim
⑫ Brake shoe
⑬ Brake camshaft
⑭ Brake panel
⑮ Brake cam lever

Ⓐ Driven joint stopper bolt
Ⓑ Rear axle nut
Ⓒ Rear brake cam lever bolt

ITEM	N·m	kgf·m	lb-ft
Ⓐ	10	1.0	7.0
Ⓑ	65	6.5	47
Ⓒ	10	1.0	7.0



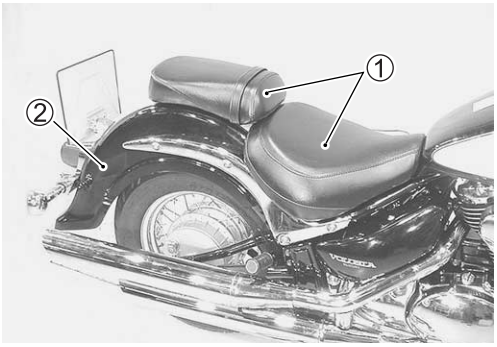
ITEM	N·m	kgf·m	lb-ft
Ⓐ	65	6.5	47
Ⓑ	10	1.0	0.73
Ⓒ	35	3.5	25.5
Ⓓ	25	2.5	18.0

Ⓐ Rear axle nut
Ⓑ Brake cam lever nut
Ⓒ Rear torque link nut (F)
Ⓓ Rear torque link nut (R)

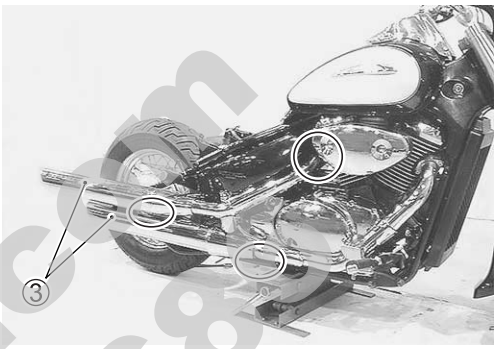
REMOVAL

- Remove the seat ①. (☞7-2)
- Remove the rear fender ②. (☞7-3)

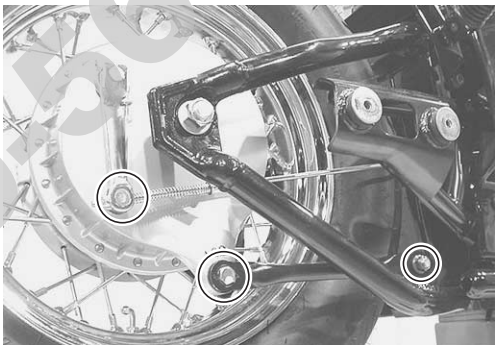
NOTE:
The rear fender removal is not necessary when the rear part of motorcycle can be lifted high enough to take the rear wheel out smoothly.



- Remove the exhaust pipes and mufflers assembly ③. (☞3-5)

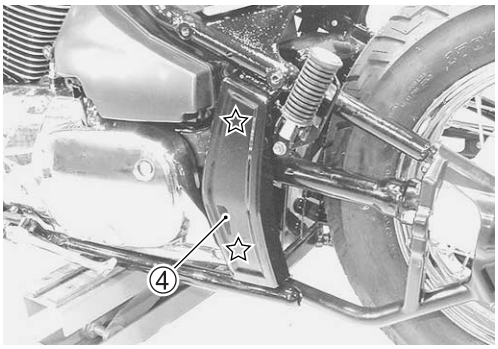


- Remove the rear brake rod.
- Remove the torque link rod.

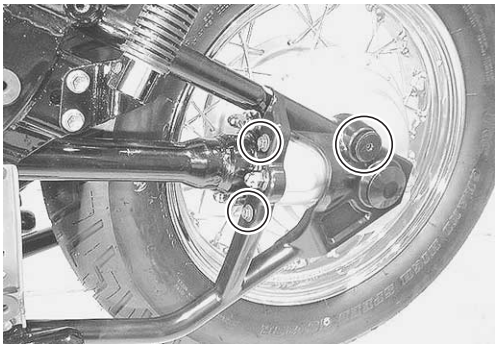


- Remove the left frame cover. (☞7-2)
- Remove the left frame lower cover ④.

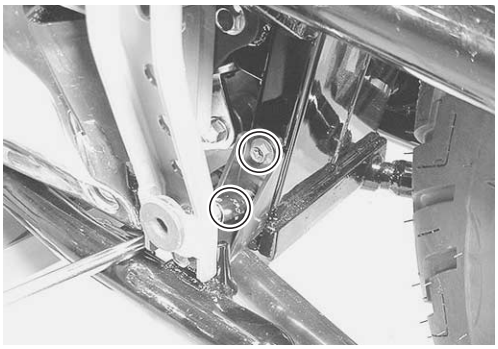
☆ : hooked part



- Remove the rear swingarm left cover mounting bolts.



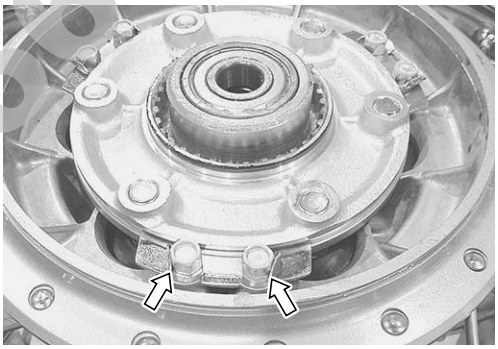
• Remove the rear swingarm left cover.



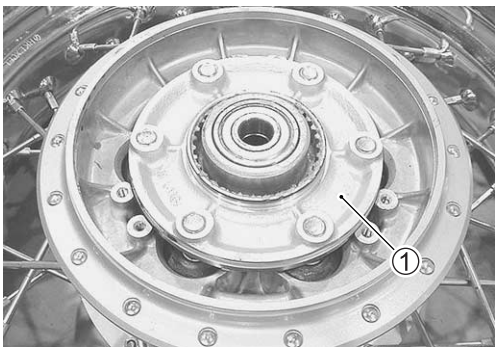
• Remove the rear axle shaft.

DISASSEMBLY

• Flatten the lock washers.
• Remove the fitting bolts, washers and plates.



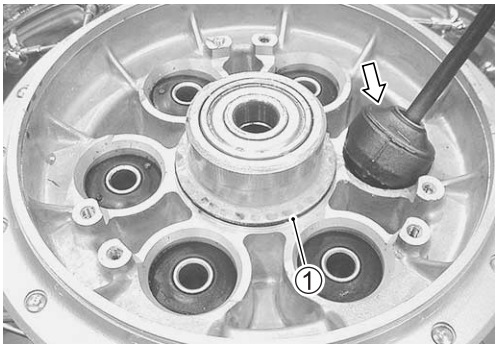
• Pull off the driven joint ①.



• Remove the O-ring ①.
• Remove the dampers with a screw driver.

⚠ CAUTION

The removed O-ring must be replaced with a new one.

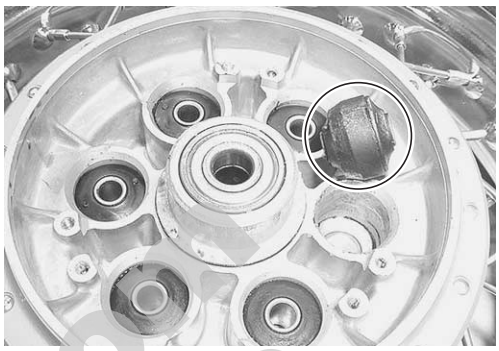


INSPECTION AND DISASSEMBLY

WHEEL BEARING ..... ☞7-6
WHEEL AXLE ..... ☞7-6
WHEEL RIM ..... ☞7-6
TIRE ..... ☞2-18

WHEEL DAMPER

Inspect the wheel dampers for damage or wear.



REASSEMBLY AND REMOUNTING

Reassemble and remount the rear wheel in the reverse order of removal and disassembly. Pay attention to the following points:

WHEEL BEARING

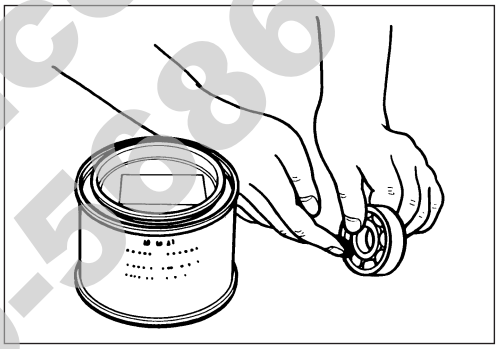
- Apply grease to the bearings before installation.

For USA

99000-25030: SUZUKI SUPER GREASE "A"

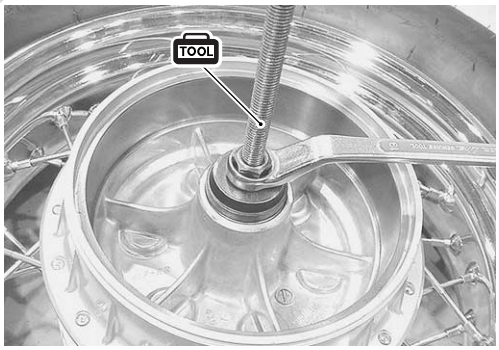
For the other countries

99000-25010: SUZUKI SUPER GREASE "A"



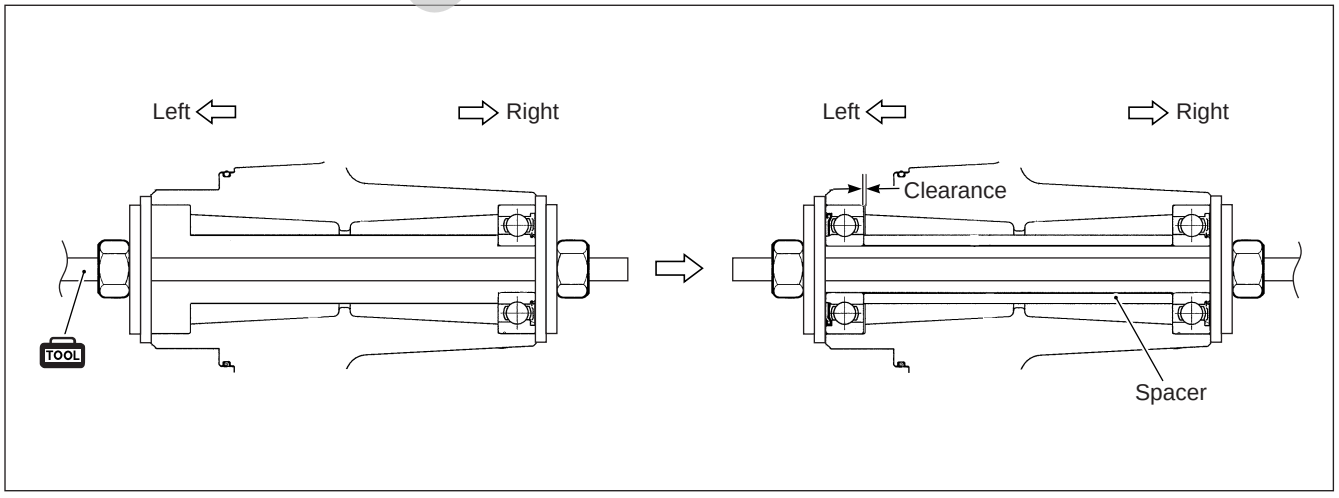
- Install the wheel bearings using the special tool.

09941-34513: Bearing installer set



⚠ CAUTION

*** First, install the right wheel bearing, then install the left wheel bearing.**
*** The sealed cover on the bearing must face out.**

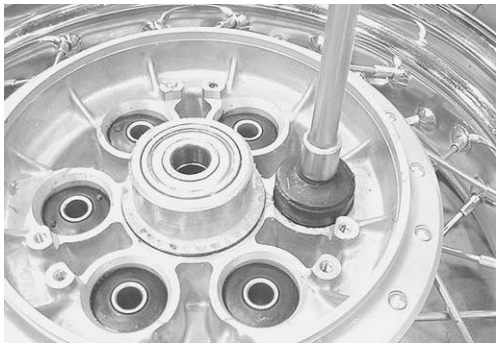


WHEEL DAMPER

- Install the dampers.

NOTE:

If soap water is applied around the damper, it makes the job easier.



DRIVEN JOINT

- Install the driven joint.

NOTE:

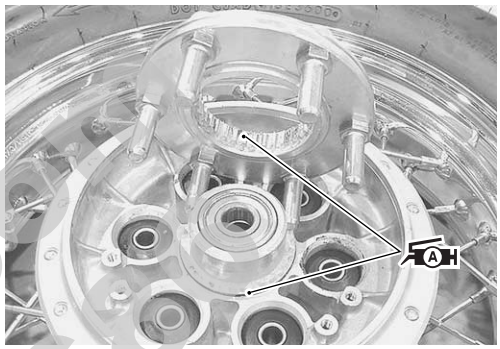
Apply grease to the O-ring and the final gear spline before installing the driven joint.

For USA

99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

99000-25010: SUZUKI SUPER GREASE "A"



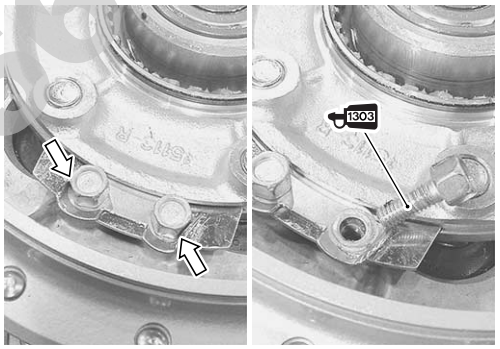
- Apply THREAD LOCK SUPER "1303" to the thread of driven joint stopper bolts.

99000-32030: THREAD LOCK SUPER "1303"

- Tighten the driven joint stopper bolts to the specified torque.

Driven joint stopper bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)

- Bend up the washer to lock the bolts.



REAR WHEEL

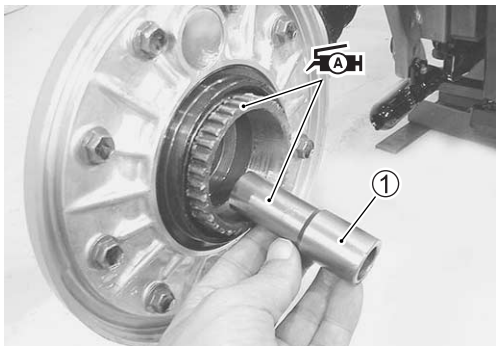
- Install the spacer ①.
- Apply grease to the final gear spline before installing the rear wheel.

For USA

99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

99000-25010: SUZUKI SUPER GREASE "A"



- Remount the rear wheel spacer and rear axle.

NOTE:

Refer to the page 7-37 for the spacer positioning.

- Tighten the rear axle nut to the specified torque.

Rear axle nut: 65 N·m (6.5 kgf·m, 47 lb-ft)

NOTE:

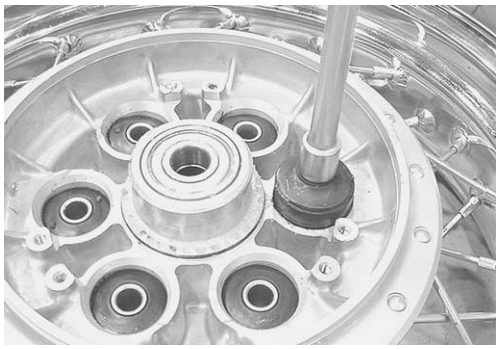
After remounting the rear wheel, check for proper brake operation.

- Install the exhaust pipe and muffler. (☞3-5)
- Install the rear fender (☞7-3)

REAR BRAKE

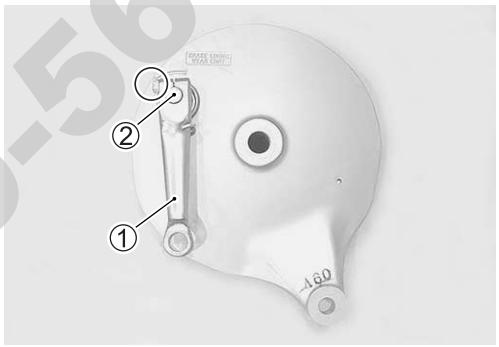
REMOVAL AND DISASSEMBLY

- Remove the rear wheel. (☞7-38)
- Remove the rear brake panel.

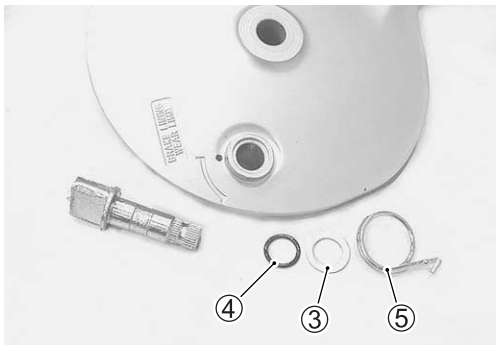


- Remove the brake shoes.

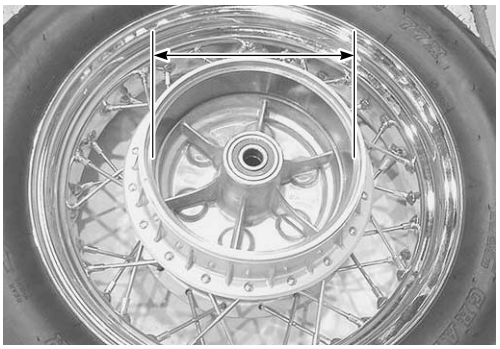
- Remove the rear brake cam lever ① and rear brake cam ② by removing bolt.



- Remove the washer ③, O-ring ④ and spring ⑤.



INSPECTION



BRAKE DRUM

Inspect the brake drum and measure the brake drum I.D. to determine the extent of wear. Replace the brake drum if the measurement exceeds the service limit. The value of this limit is indicated inside the brake drum.

TOOL 09900-20102: Vernier calipers

DATA Brake drum I.D.: Service Limit: 180.7 mm

BRAKE SHOES

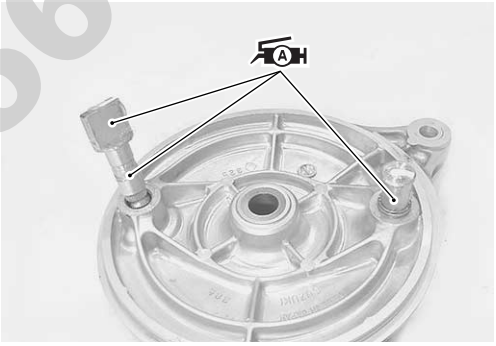
Check the brake shoe wear (☞2-16) and decide whether it should be replaced or not.

⚠ CAUTION

Replace the brake shoes as a set, otherwise braking performance will be adversely affected.

REASSEMBLY AND REMOUNTING

BRAKE CAMSHAFT



- When installing the brake camshaft, apply SUZUKI SUPER GREASE "A" to the camshaft and cam face.

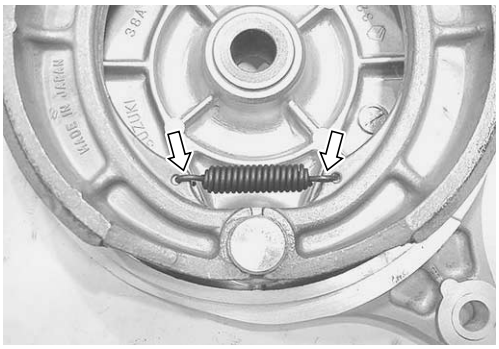
For USA

A 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

A 99000-25010: SUZUKI SUPER GREASE "A"

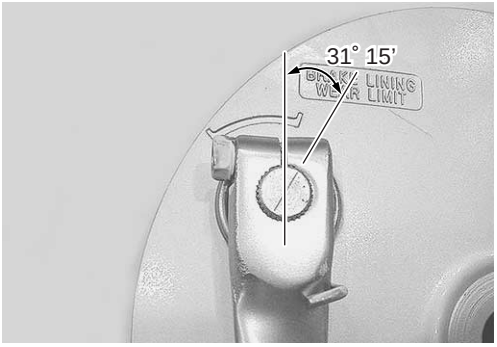
- Install the brake shoes with spring hooks faced inside.



⚠ CAUTION

Be careful not to apply too much grease to the cam and pin. If grease gets on the lining, brake slippage will result.

BRAKE CAM LEVER



- Install the new O-ring and washer.
- Install the brake cam lever to the brake camshaft as shown.

- Tighten the brake cam lever bolt to the specified torque.

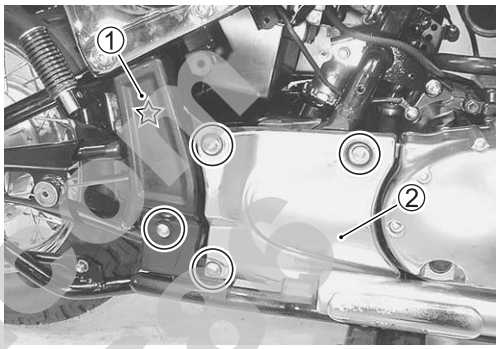
Brake cam lever nut: 10 N·m (1.0 kgf·m, 7.0 lb-ft)

- Install the rear wheel. (☞7-41)
- Adjust the rear brake pedal free travel. (☞2-16)

REAR BRAKE ROD

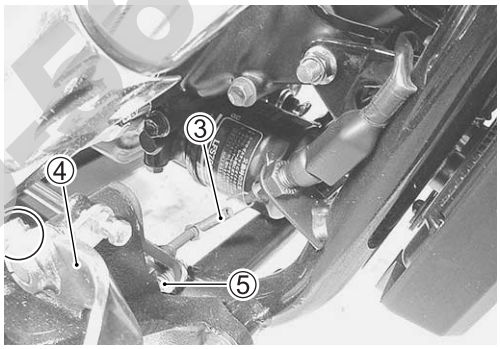
REMOVAL AND DISASSEMBLY

- Remove the exhaust pipes and mufflers assembly. (☞3-5)
- Remove the right frame LOWER cover ①, clutch rear cover ②.

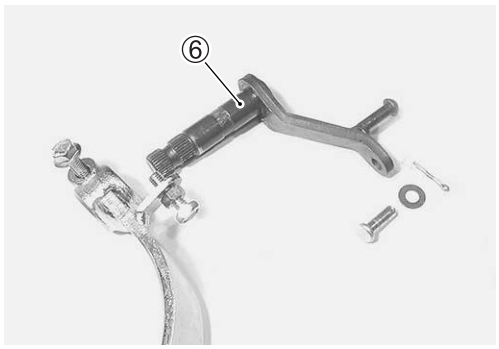


☆ : hooked part

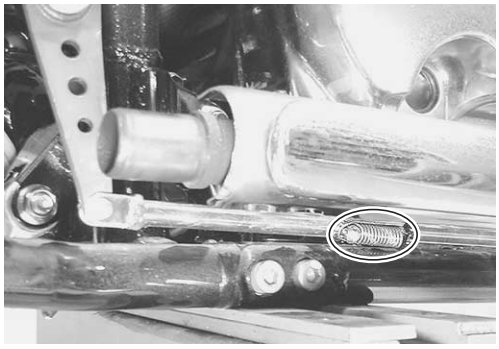
- Remove the rear brake switch spring ③.
- Remove the rear brake pedal ④.
- Remove the cotter pin ⑤.



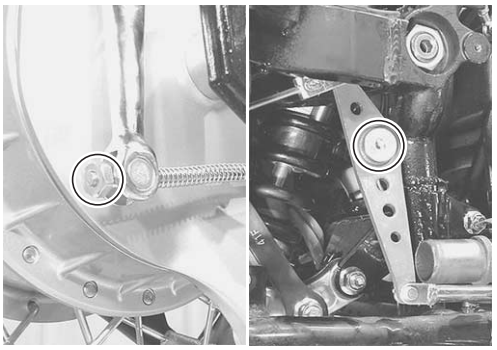
- Remove the rear brake pedal shaft ⑥.



- Remove the return spring.



- Remove the rear brake adjust nut, spring and washer.
- Remove the rear brake link.



- Remove the cotter pins.

REASSEMBLY REMOUNTING

Reassemble and remount the rear brake rod in the reverse order of removal and disassembly. Pay attention to the following points.

- Apply grease to the rear brake link pivot bolt and tighten it to the specified torque.

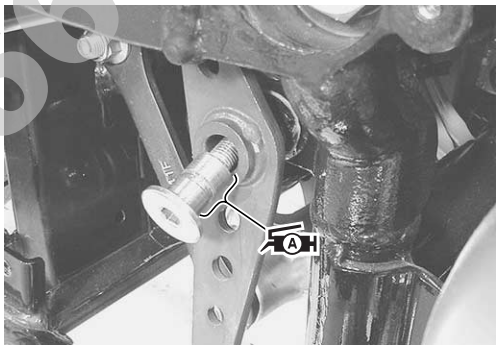
For USA

99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

99000-25010: SUZUKI SUPER GREASE "A"

Rear brake link pivot bolt: 29 N·m (2.9 kgf·m, 21 lb-ft)



- Apply grease to the rear brake pedal shaft.

For USA

99000-25030: SUZUKI SUPER GREASE "A"

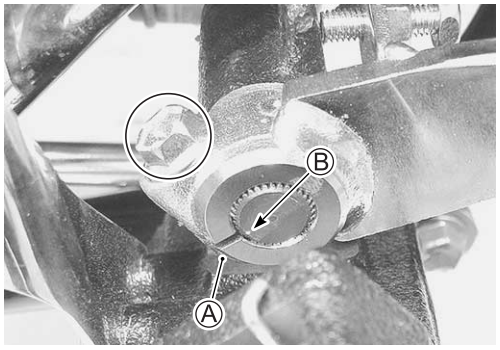
For the other countries

99000-25010: SUZUKI SUPER GREASE "A"

- Tighten the rear brake pedal mount bolt to the specified torque.

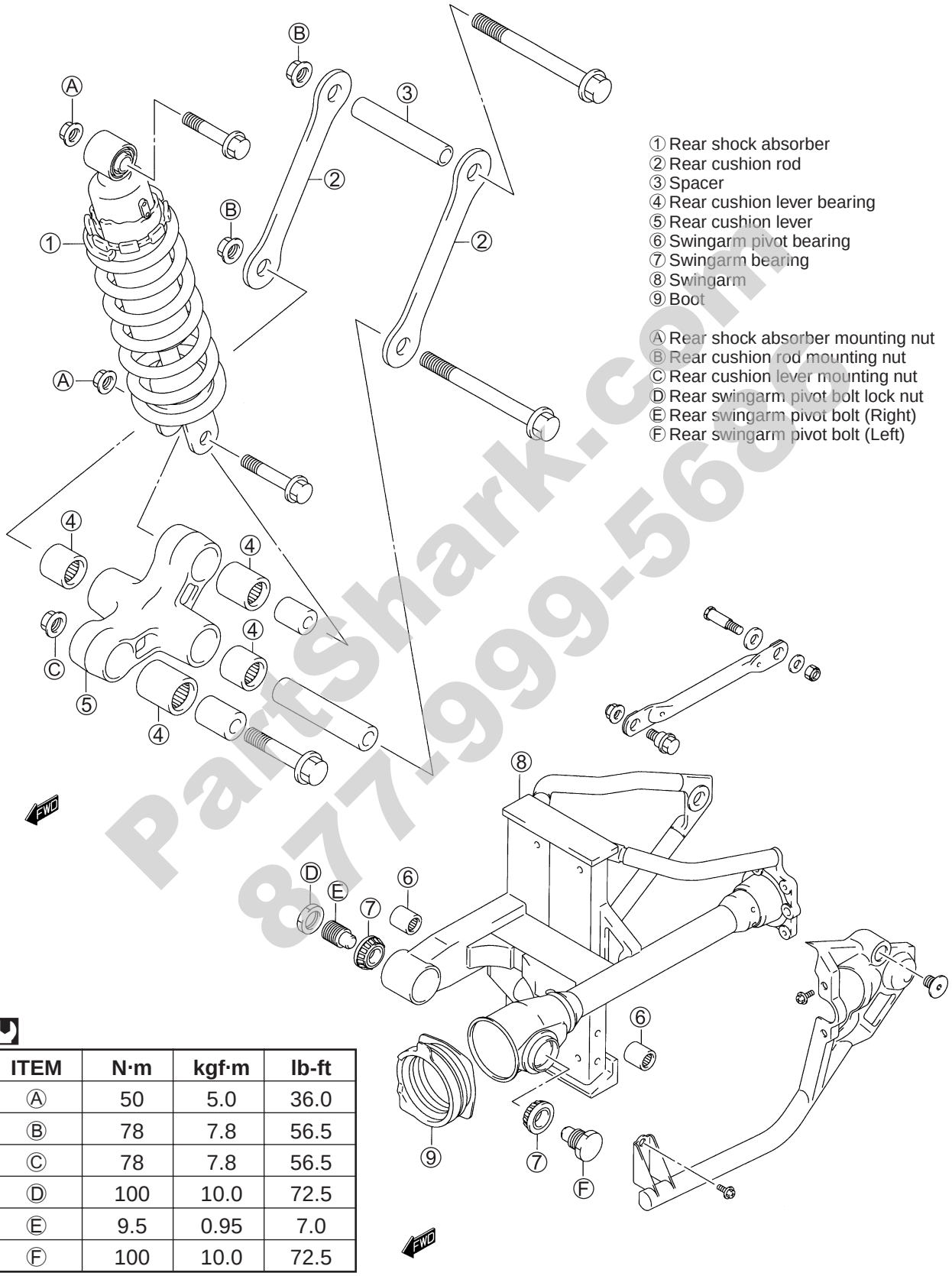
Rear brake pedal mount bolt: 11 N·m (1.1 kgf·m, 8.0 lb-ft)

NOTE:
When remounting the rear brake pedal onto the rear brake pedal shaft, align the rear brake pedal mounting surface Ⓐ with the punch mark Ⓑ.

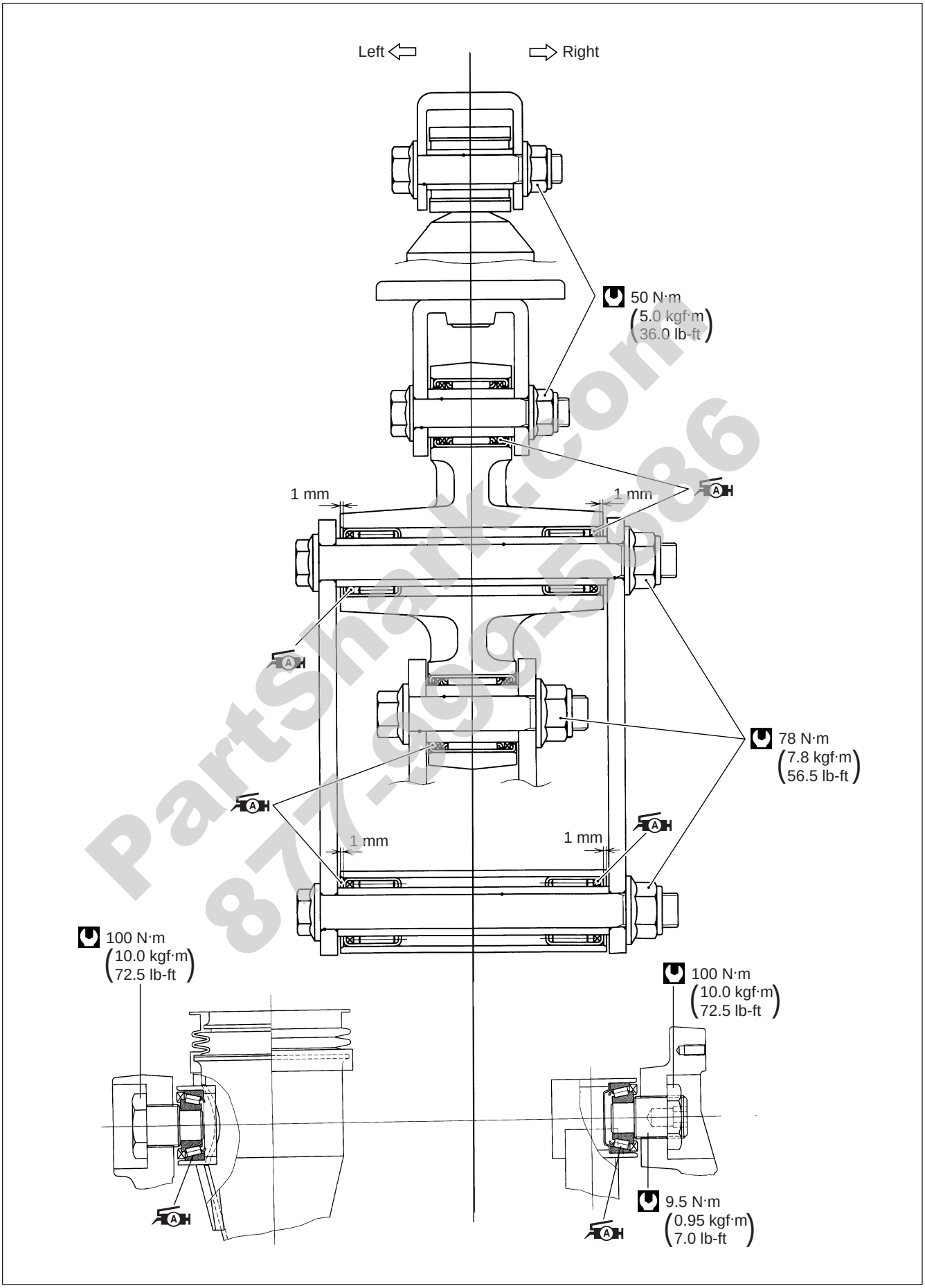


REAR SUSPENSION

CONSTRUCTION



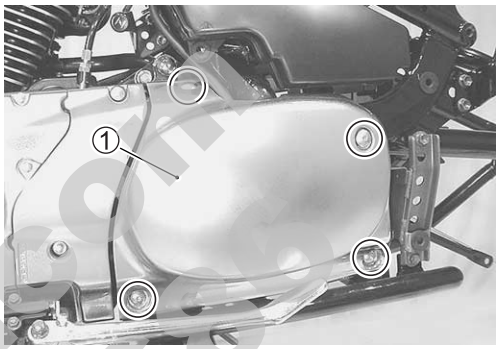
ITEM	N·m	kgf·m	lb-ft
Ⓐ	50	5.0	36.0
Ⓑ	78	7.8	56.5
Ⓒ	78	7.8	56.5
Ⓓ	100	10.0	72.5
Ⓔ	9.5	0.95	7.0
Ⓕ	100	10.0	72.5



REMOVAL

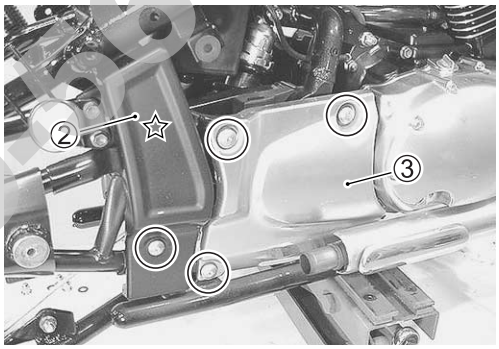
- Remove the rear wheel. (☞7-41)
- Remove the final gear case with propeller shaft.

- Remove the secondary gear case cover ①.

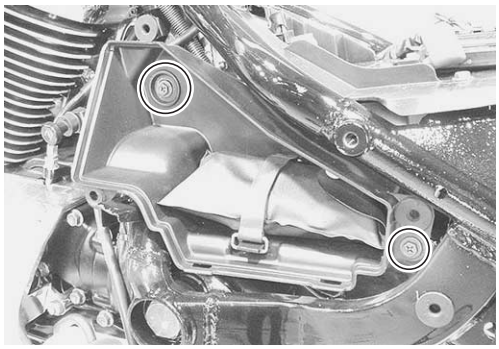


- Remove the right frame lower cover ②, clutch rear cover ③.

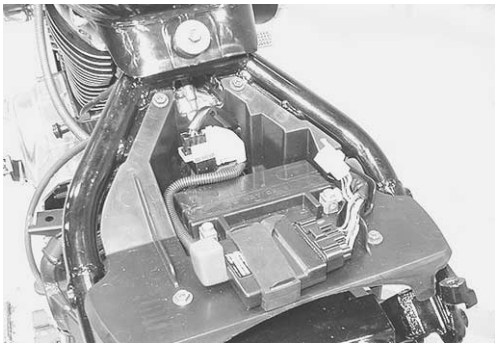
☆ : hooked part



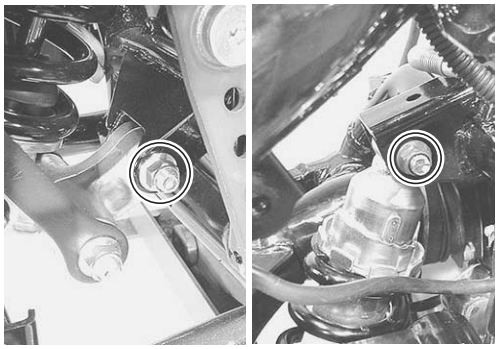
- Remove the tool box.



- Remove the battery case. (☞5-6)



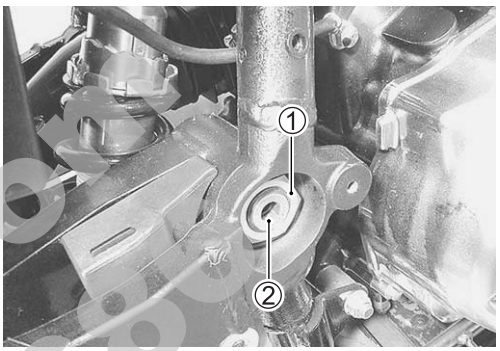
- Remove the cushion lever mounting bolt and nut.
- Remove the shock absorber upper mounting bolt and nut.

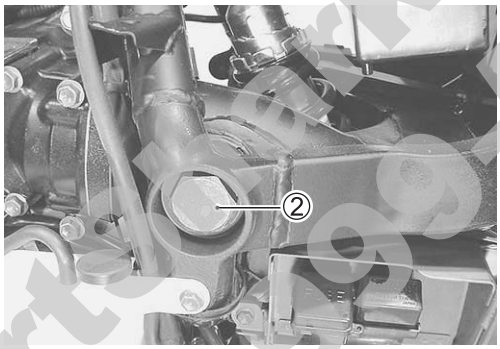


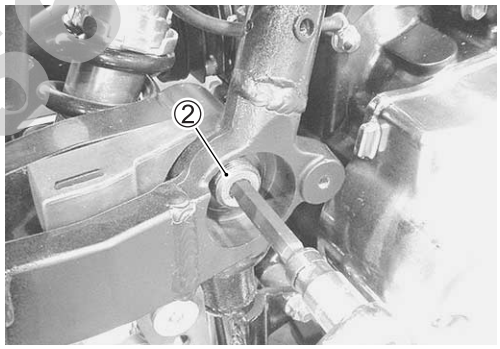
- Remove the right side swingarm pivot bolt lock nut ①.
- Remove the left and right side swingarm pivot bolts ②.

NOTE:
Slightly loosen the cushion rod mounting nuts and the shock absorber lower mounting nut before removing the swingarm to facilitate later disassembly.

- Remove the rear suspension assembly.

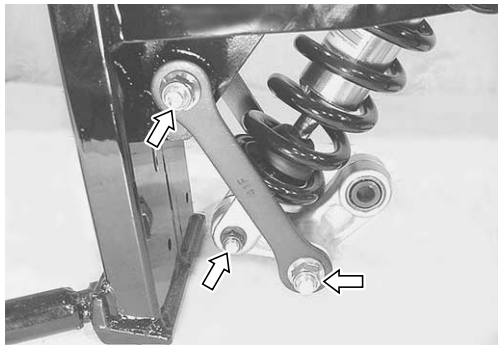






- Remove the tapered roller bearings.

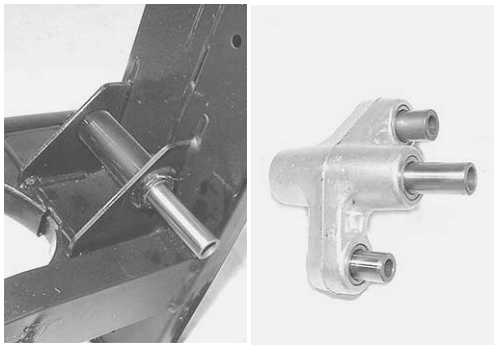
- Remove the shock absorber, cushion lever and cushion rod.



INSPECTION AND DISASSEMBLY

SPACER

- Remove spacer from swingarm.
- Remove the spacers from the cushion lever.
- Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with new ones.

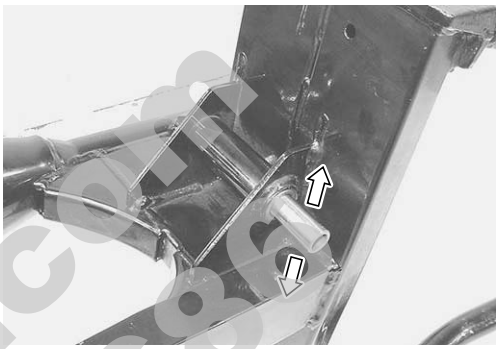


SWINGARM BEARING

Insert the spacer into swingarm cushion rod upper side bearing and check the play to move the spacer up and down.
If excessive play is noted, replace the bearing with a new one.
Inspect the swingarm pivot bearing, its race and dust seal for wear or damage. If any defects are found, replace the bearing with a new one.

- Remove the swingarm pivot right side bearing plate ① and bearing races ② by using a suitable bar and so on.

NOTE:
The swingarm pivot right side bearing and its plate are available as one component.

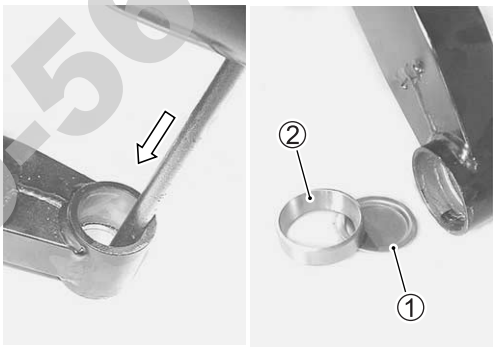


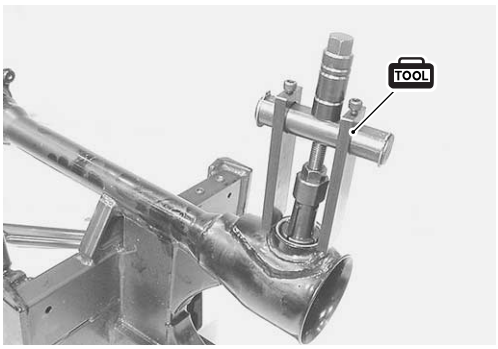
- Remove the swingarm pivot bearing races by using the special tools.

TOOL 09921-20220: Bearing remover set (30 mm)

⚠ CAUTION

The removed bearings must be replaced with new ones.



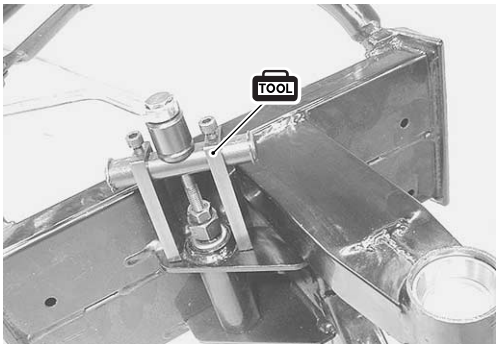


- Remove the swingarm cushion rod upper side bearing by using the special tools.

TOOL 09921-20220: Bearing remover set (17 mm)

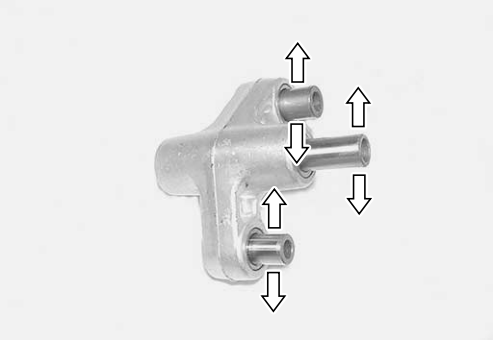
⚠ CAUTION

The removed bearings must be replaced with new ones.



CUSHION LEVER BEARING

Insert the spacer into bearing and check the play to move the spacer up and down. If an excessive play is noted, replace the bearing with a new one.



- Remove the cushion rod lower side bearing ① by using the special tools.

TOOL 09921-20220: Bearing remover set (17 mm)

⚠ CAUTION

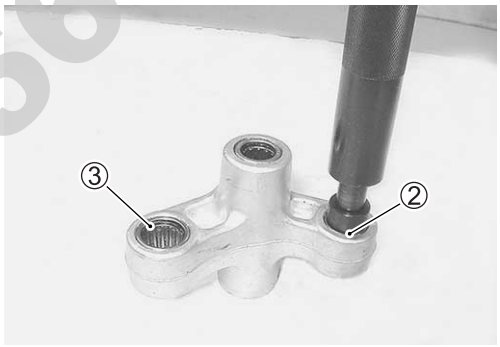
The removed bearings must be replaced with new ones.

- Remove the cushion lever mounting bearing ② and shock absorber lower side bearing ③ by using the special tools.

TOOL 09913-70210: Bearing installer set

⚠ CAUTION

The removed bearings must be replaced with new ones.

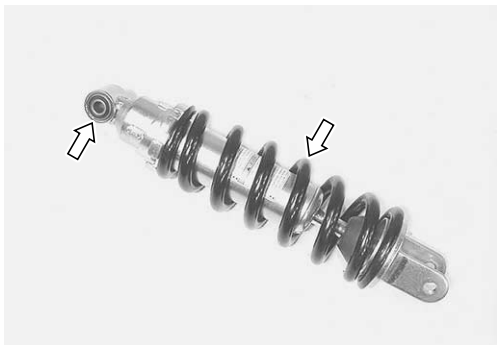


SHOCK ABSORBER

Inspect the shock absorber body and bush for damage and oil leakage. If any defects are found, replace the shock absorber with a new one.

⚠ CAUTION

Do not attempt to disassemble the rear shock absorber unit. It is unserviceable.



REASSEMBLY

Reassemble the swingarm and shock absorber in the reverse order of disassembly and removal, and pay attention to the following points:

SWINGARM BEARING

- Install the swingarm pivot bearing races by using the special tool.

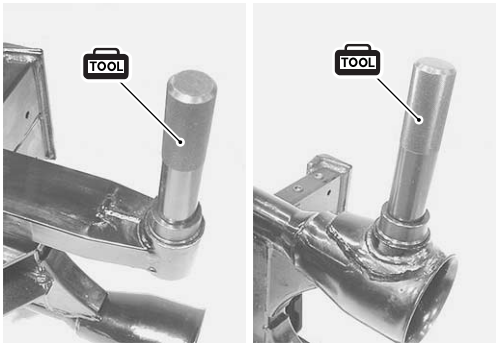
TOOL 09913-70210: Bearing installer set (40 mm)

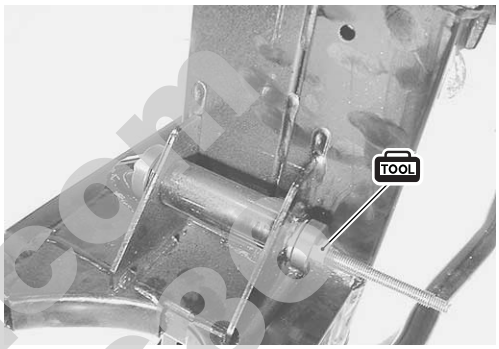
NOTE:
The swingarm pivot bearing race with plate is positioned right side.

- Install the swingarm cushion rod upper side bearing with the special tool.

TOOL 09924-84521: Bearing installer set

NOTE:
When reinstalling the bearing, stamped mark of bearing must face outside.





CUSHION LEVER BEARING

- Install the bearings into the cushion lever by using the special tool.

TOOL 09924-84521: Bearing installer

NOTE:
When installing the bearings, stamped mark of bearing must face outside.

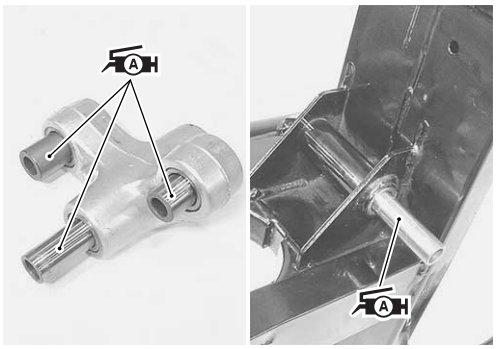
- Apply grease to the spacers and bearings.

For USA
A 99000-25030: SUZUKI SUPER GREASE "A"

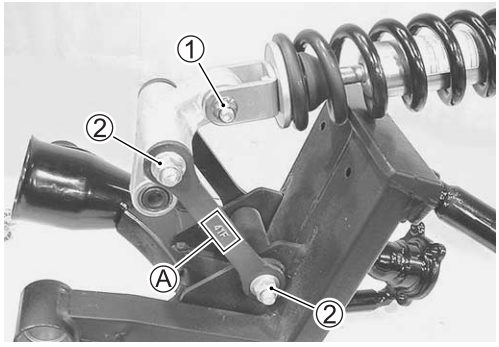
For the other countries
A 99000-25010: SUZUKI SUPER GREASE "A"

- Assemble the shock absorber, cushion lever and cushion rods onto the swingarm. (☞7-47)

Shock absorber mounting nut ①: 50 N·m (5.0 kgf·m, 36.0 lb-ft)
Cushion rod mounting nut ②: 78 N·m (7.8 kgf·m, 56.5 lb-ft)

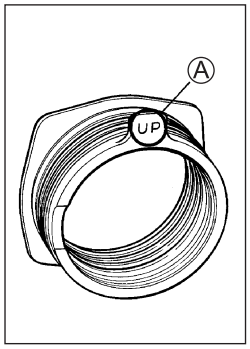


NOTE:
The stamped marks Ⓐ on the cushion rod should be face outside.



REMOUNTING

Remount the swingarm and shock absorber in the reverse order of disassembly and removal, and pay attention to the following points.



SWINGARM

- Before installing the swingarm, install the boot and the universal joint.

NOTE:
Make sure that the "UP" mark Ⓐ on the boot faces up.

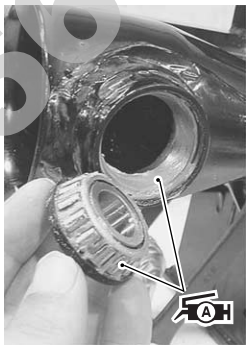
- Install the swingarm assembly, its pivot bearings and bolts (①, ②).

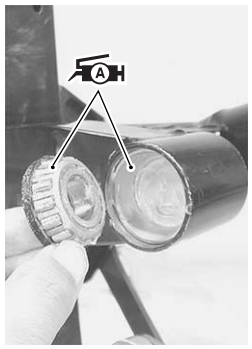
NOTE:
Apply grease to the swingarm pivot bearings.

For USA
99000-25030: SUZUKI SUPER GREASE "A"

For the other countries
99000-25010: SUZUKI SUPER GREASE "A"

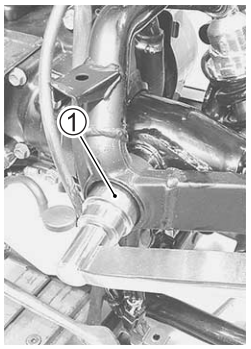
①: For left side swingarm pivot bolt
②: For right side swingarm pivot bolt

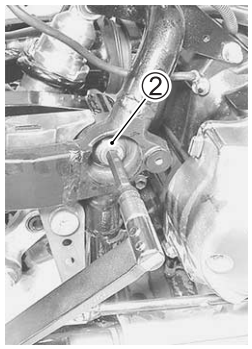




- Tighten the left side swingarm pivot bolt ① to the specified torque.

Swingarm pivot bolt (left side): 100 N·m (10.0 kgf·m, 72.5 lb-ft)





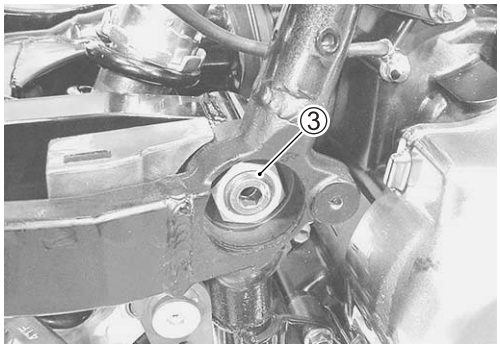
NOTE:
Before tightening the left side swingarm pivot bolt ①, loosen the right side one ②.

- Tighten the right side swingarm pivot bolt ② to the specified torque.

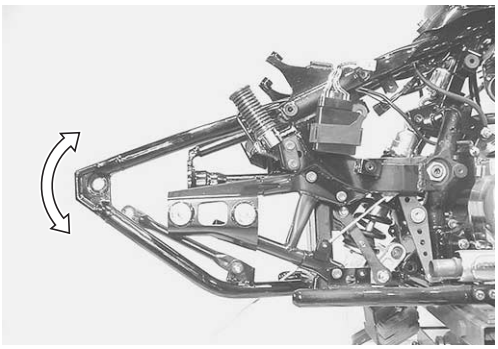
Swingarm pivot bolt (right side): 9.5 N·m (0.95 kgf·m, 7.0 lb-ft)

- Tighten the swingarm pivot lock nut ③ to the specified torque.

Swingarm pivot lock nut: 100 N·m (10.0 kgf·m, 72.5 lb-ft)



NOTE:
After tightening the swingarm pivot lock nut, be sure to check the swingarm operation.



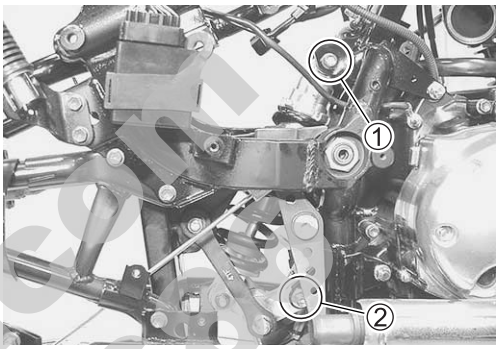
SHOCK ABSORBER AND CUSHION LEVER MOUNTING NUT

- Tighten the shock absorber upper mounting nut ① to the specified torque.

Shock absorber mounting nut: 50 N·m (5.0 kgf·m, 36.0 lb-ft)

- Tighten the cushion lever mounting nut ② to the specified torque.

Cushion lever mounting nut: 78 N·m (7.8 kgf·m, 56.5 lb-ft)

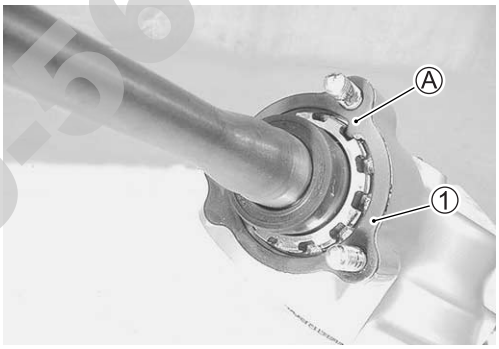


FINAL GEAR CASE

- Install the plate to the final gear case ①. Apply SUZUKI BOND "1207B" to the mating surface of swingarm and final gear case.

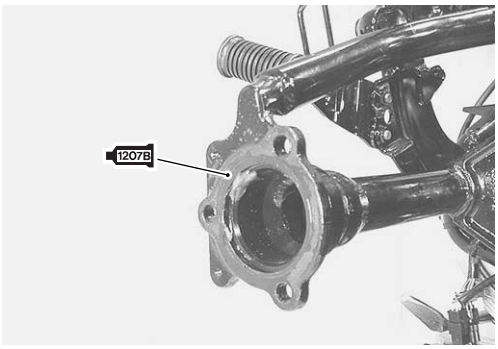
For USA
1207B 99104-31140: SUZUKI BOND "1207B"

For the other countries
1207B 99000-31140: SUZUKI BOND "1207B"

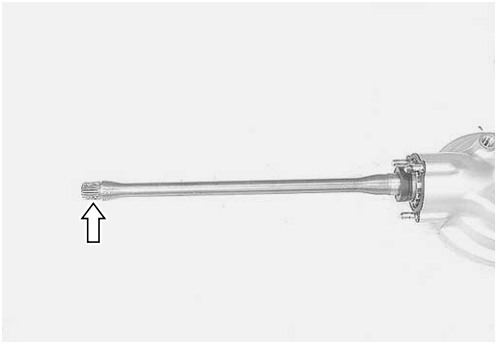


⚠ CAUTION

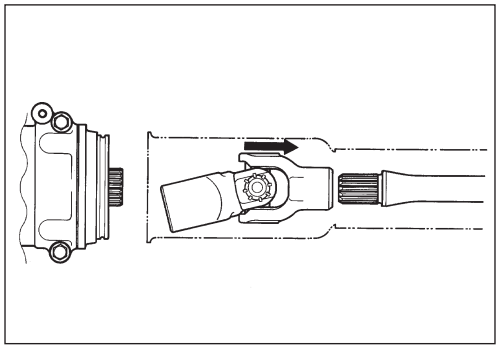
When installing the plate ①, align the lug Ⓐ of the plate ① to the bearing retainer groove.

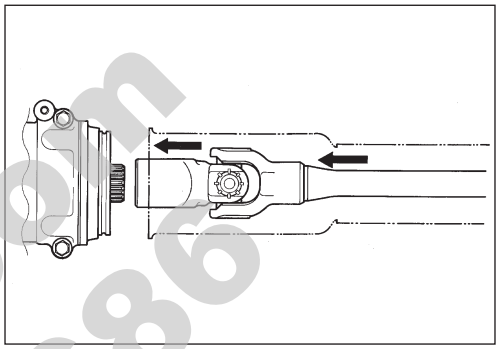


- Apply Lithium Base Molybdenum grease (NLGI #2) to the propeller shaft spline.



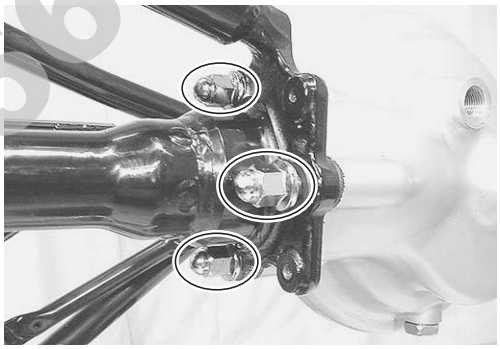
NOTE:
To install the final gear case easily, move the dust boot front and the universal joint back. Engage the universal joint to the propeller shaft first and then engage it to the secondary driven bevel gear shaft.



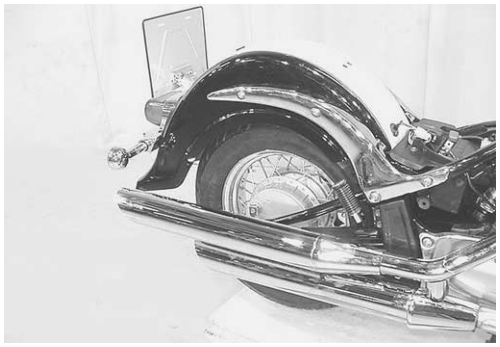


- Tighten the final gear case mounting nuts to the specified torque.

Final gear case mounting nut: 40 N·m
(4.0 kgf·m, 29.0 lb-ft)



- Install the rear wheel. (☞7-41)
- Install the exhaust pipes and mufflers. (☞3-5)



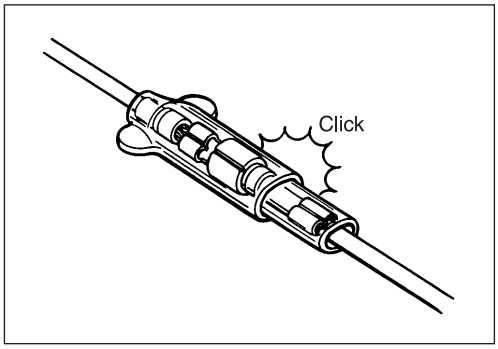
ELECTRICAL SYSTEM

CONTENTS

CAUTIONS IN SERVICING

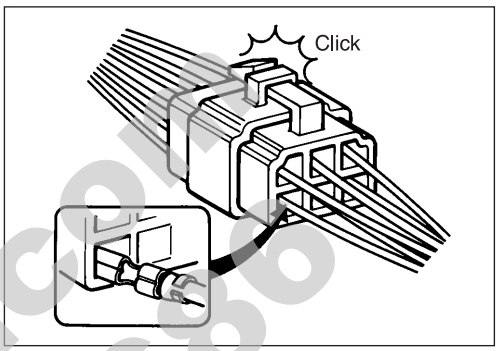
CONNECTORS

- When disconnecting a connector, be sure to hold the terminals; do not pull the lead wires.
- When connecting a connector, push it in so it is firmly attached.
- Inspect the connector for corrosion, contamination and any breakage in the cover.



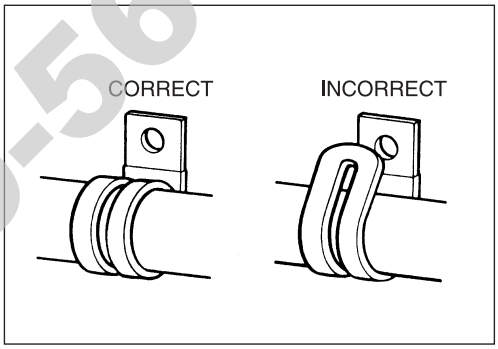
COUPLERS

- With a lock-type coupler, be sure to release the lock before disconnecting it. When connecting a coupler, push it in until the lock clicks shut.
- When disconnecting a coupler, be sure to hold the coupler; do not pull the lead wires.
- Inspect each terminal on the coupler for looseness or bends.
- Inspect each terminal for corrosion and contamination.



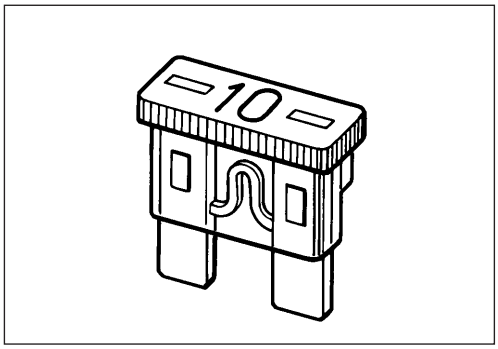
CLAMPS

- Refer to the “WIRE HARNESS ROUTING” section for proper clamping procedures. (☞9-13 and 9-14)
- Bend the clamp properly, as shown in the illustration.
- When clamping the wire harness, do not allow it to hang down.
- Do not use wire or any substitutes for the band-type clamp.



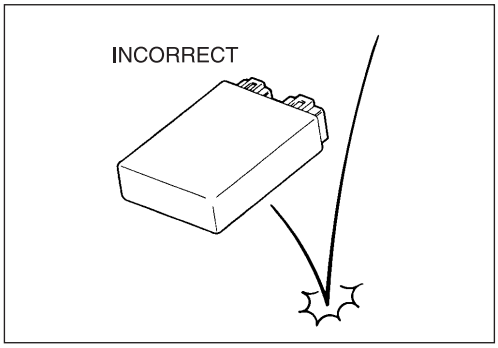
FUSES

- When a fuse blows, always investigate the cause, correct the problem, and then replace the fuse.
- Do not use a fuse of a different capacity.
- Do not use any substitutes for the fuse (e.g., wire).



SEMICONDUCTOR EQUIPPED PARTS

- Do not drop any part that contains a semiconductor (e.g., ignitor unit, regulator/rectifier).
- When inspecting the part, follow the inspection instructions carefully. Neglecting proper procedures may cause this part to be damaged.

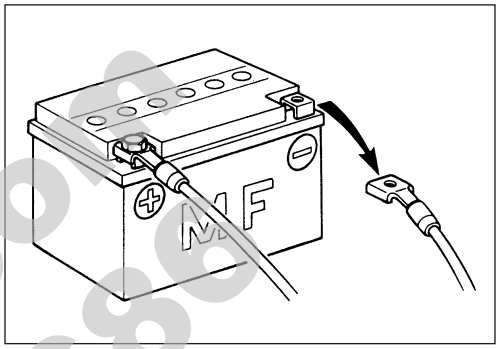


BATTERY

- The MF battery used in this motorcycle does not require maintenance (e.g., electrolyte level inspection, distilled water replenishment).
- During normal charging, no hydrogen gas is produced. However, if the battery is overcharged, hydrogen gas may be produced. Therefore, be sure there are no fire or spark sources (e.g., short circuit) nearby when charging the battery.
- Be sure to recharge the battery in a well-ventilated and open area.
- Note that the charging system for the MF battery is different from that of a conventional battery. Do not replace the MF battery with a conventional battery.

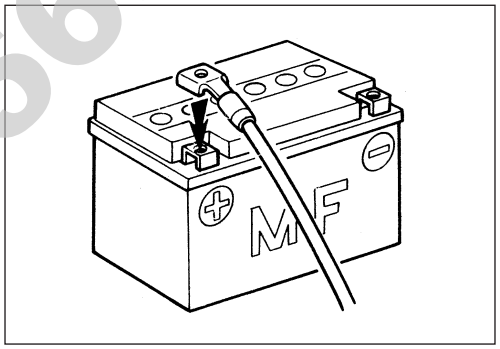
CONNECTING THE BATTERY

- When disconnecting terminals from the battery for disassembly or servicing, be sure to disconnect the ⊖ battery lead wire, first.
- When connecting the battery lead wires, be sure to connect the ⊕ battery lead wire, first.
- If the terminal is corroded, remove the battery, pour warm water over it and clean it with a wire brush.
- After connecting the battery, apply a light coat of grease to the battery terminals.
- Install the cover over the ⊕ battery terminal.



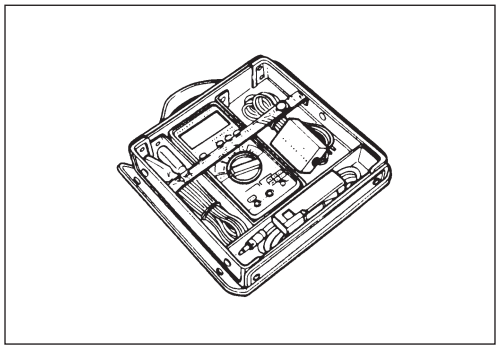
WIRING PROCEDURE

- Properly route the wire harness according to the “WIRE ROUTING” section. (☞9-13 to 9-14)



USING THE MULTI CIRCUIT TESTER

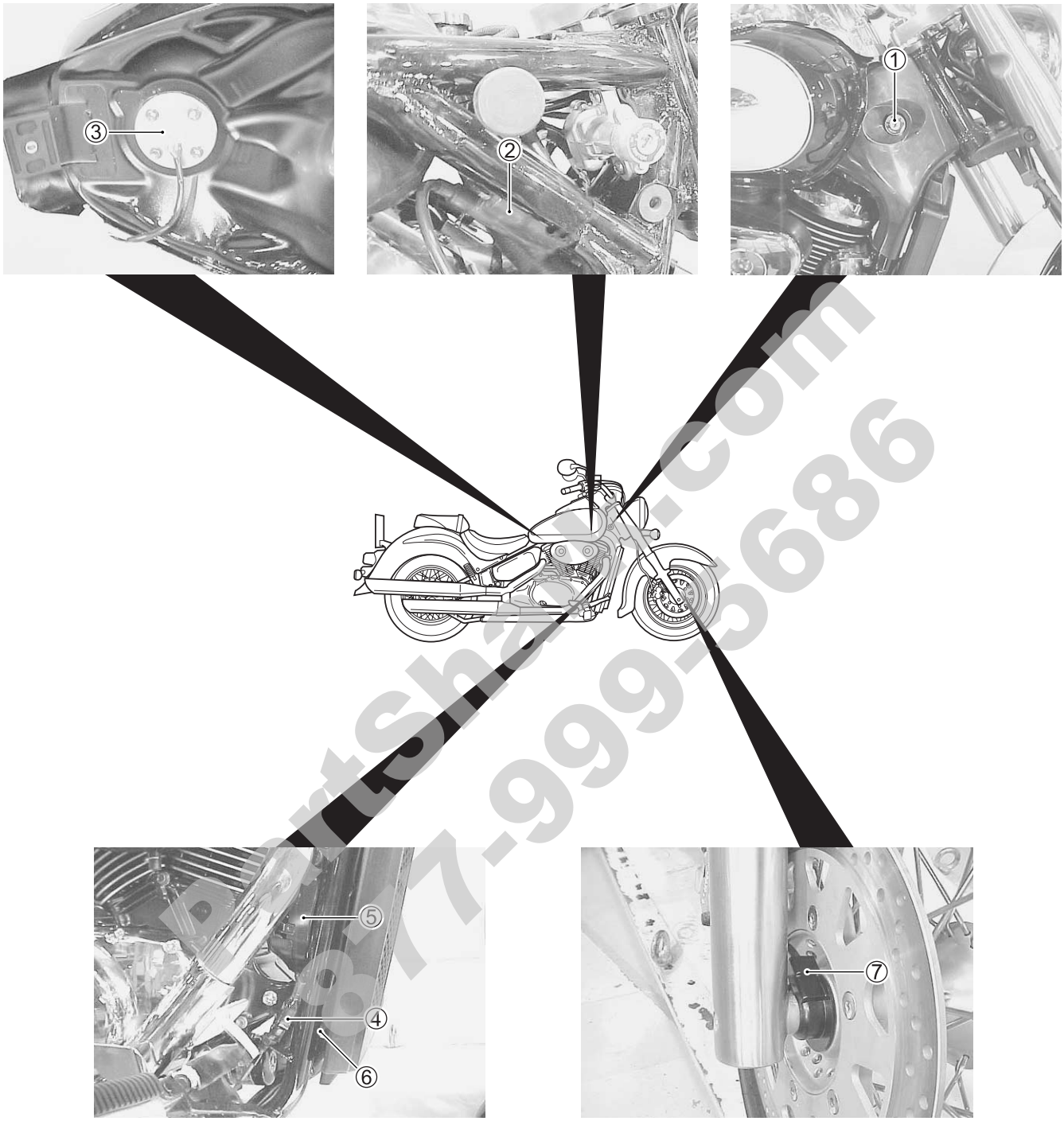
- Properly use the multi circuit tester ⊕ and ⊖ probes. Improper use can cause damage to the motorcycle and tester.
- If the voltage and current values are not known, begin measuring in the highest range.
- When measuring the resistance, make sure that no voltage is applied. If voltage is applied, the tester will be damaged.
- After using the tester, be sure to turn the switch to the OFF position.



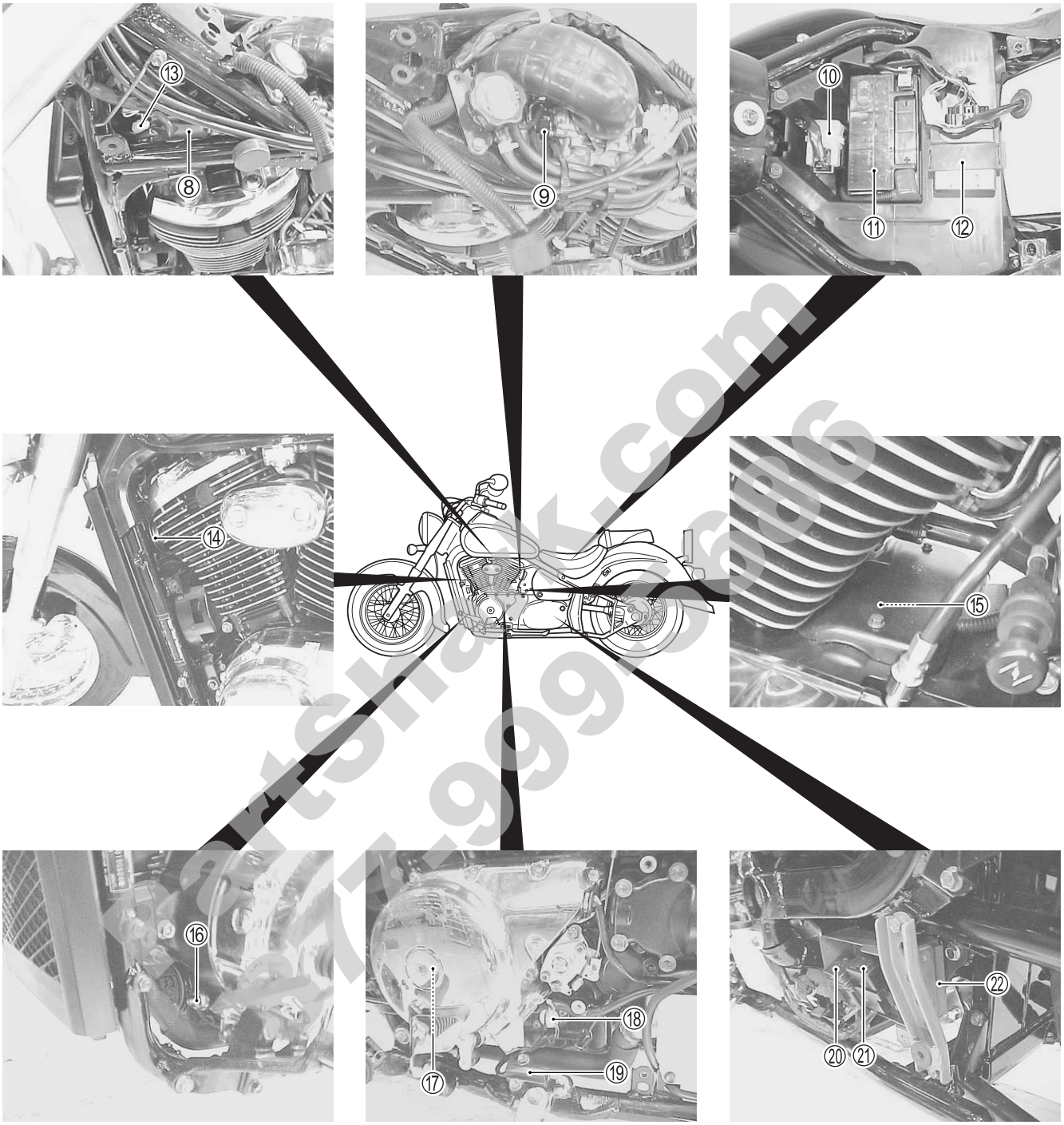
⚠ CAUTION

Before using the multi circuit tester, read its instruction manual.

LOCATION OF ELECTRICAL COMPONENTS

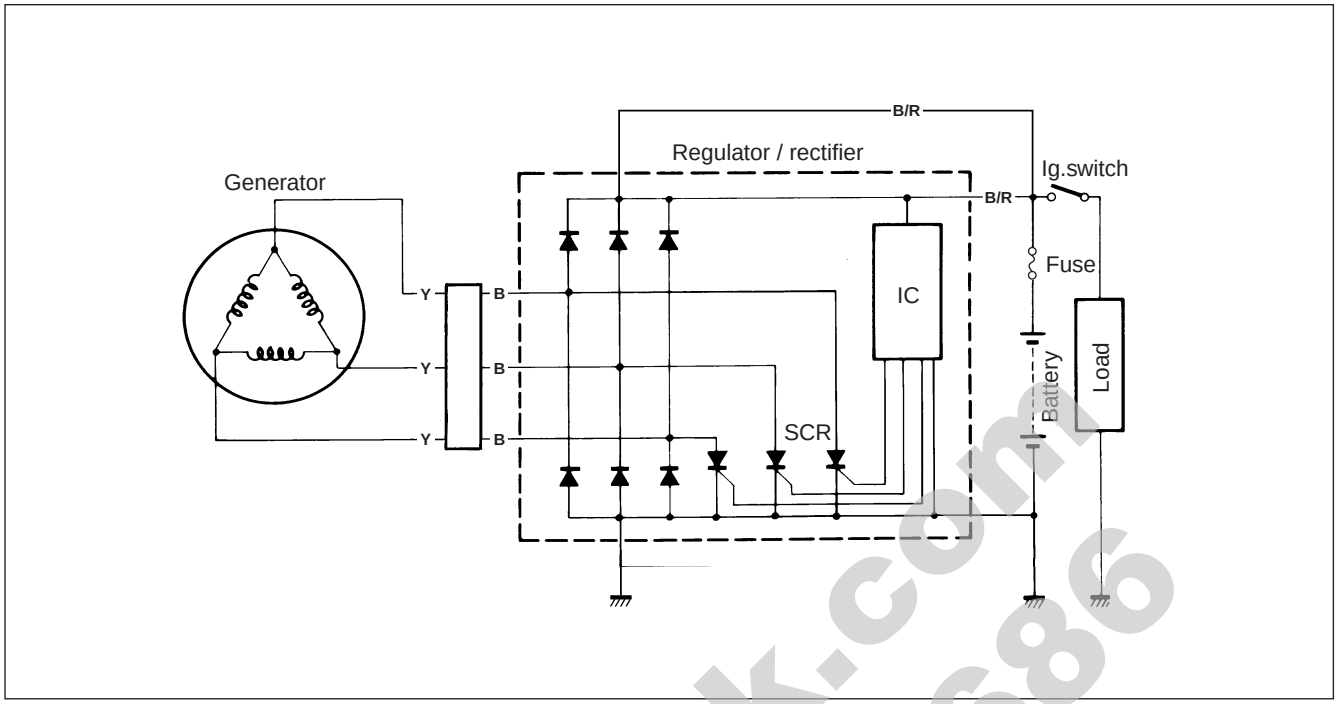


① Ignition switch
② Ignition coil #2
③ Fuel level gauge
④ Rear brake switch
⑤ Cooling fan
⑥ Cooling fan thermo-switch
⑦ Speedometer sensor



⑧ Ignition coil #1
⑨ Throttle position sensor
⑩ Starter relay/main fuse
⑪ Battery
⑫ Ignitor
⑬ Engine coolant temperature sensor
⑭ Horn
⑮ Starter motor
⑯ Oil pressure switch
⑰ Generator
⑱ Gear position switch
⑲ Side-stand switch
⑳ Fuse box
㉑ Turn signal side-stand relay
㉒ Regulator/rectifier

CHARGING SYSTEM



TROUBLESHOOTING

Battery runs down quickly.

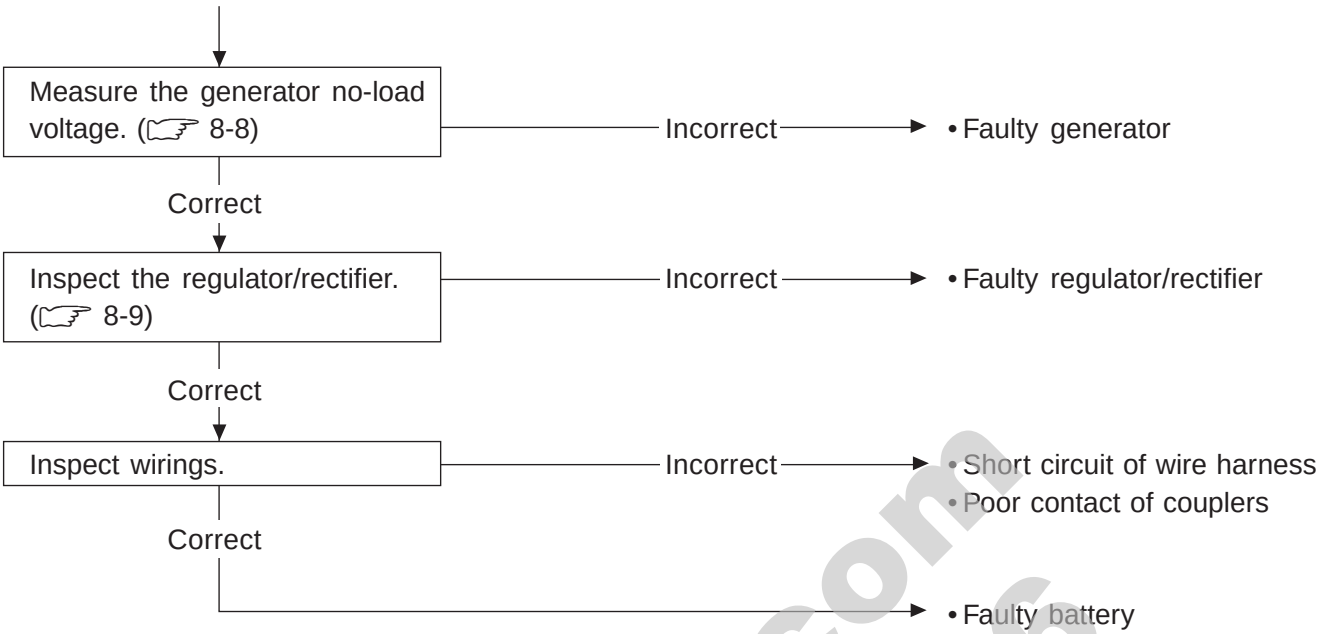
Check accessories which use excessive amounts of electricity.
- Accessories are installed → • Remove accessories.
- No accessories ↓

Check the battery for current leaks. (☞ 8-7)
- Current leaks → • Short circuit of wire harness • Faulty electrical equipment
- No current leaks ↓

Measure the charging voltage between the battery terminals. (☞ 8-8)
- Correct → • Faulty battery • Abnormal driving condition
- Incorrect ↓

Measure the continuity of the generator coil. (☞ 8-8)
- No continuity → • Faulty generator coil or disconnected lead wires
- Continuity ↓

Continued on next page



Others

Battery overcharge	• Faulty regulator/rectifier • Faulty battery • Poor contact of generator lead wire coupler

INSPECTION

BATTERY CURRENT LEAKAGE

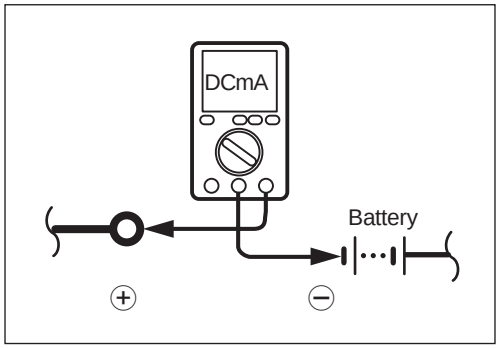
- Remove the two seats. (☞7-2)
- Turn the ignition switch to the OFF position.
- Disconnect the battery ⊖ lead wire.

Measure the current between ⊖ battery terminal and the ⊖ battery lead wire using the multi circuit tester. If the reading exceeds the specified value, leakage is evident.

TOOL 09900-25008: Multi circuit tester set

DATA Battery current (leak): Under 3 mA

Tester knob indication: Current (⎓, 20 mA)



⚠ CAUTION

*** Because the current leak might be large, turn the tester to high range first to avoid tester damage.**
*** Do not turn the ignition switch to the "ON" position when measuring current.**

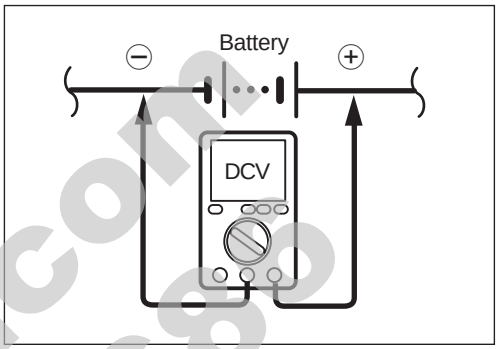
When checking to find the excessive current leakage, remove the couplers and connectors, one by one, checking each part.

REGULATED VOLTAGE

- Remove the two seats. (☞7-2)
- Start the engine and keep it running at 5 000 r/min. with lighting switch turned ON (except for E-03, 28, 24, 33 models) and dimmer switch turned HI position.

Measure the DC voltage between the ⊕ and ⊖ battery terminals using the multi circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier. (☞8-8 and 8-9)

NOTE:
When making this test, be sure that the battery is in fully-charged condition.



TOOL 09900-25008: Multi circuit tester set

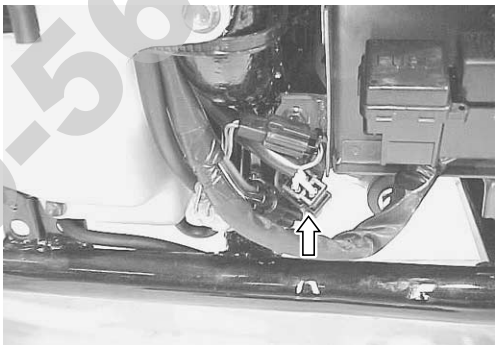
Tester knob indication: Voltage (⎓)

DATA Charging output (Regulated voltage): 14.0 – 15.5 V at 5 000 r/min.

GENERATOR COIL RESISTANCE

- Remove the secondary gear case cover.
- Disconnect the generator coupler.

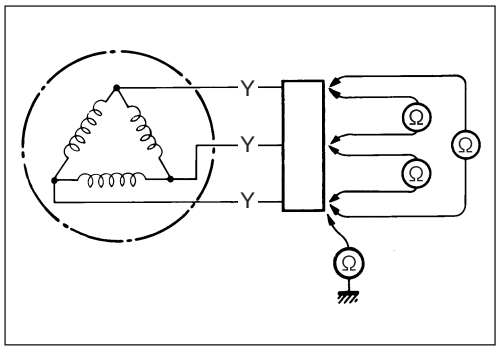
Measure the resistance between the three lead wires.
If the resistance is not specified value, replace the stator with a new one. Also, check that the generator core is insulated.



TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

DATA Generator coil resistance: 0.2 – 1.5 Ω (Yellow – Yellow)
∞ Ω (Yellow – Ground)

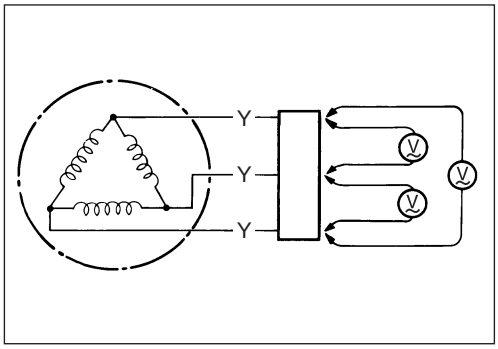


NOTE:
When making above test, it is not necessary to remove the generator.

GENERATOR NO-LOAD PERFORMANCE

- Start the engine and keep it running at 5 000 r/min.

Using the multi circuit tester, measure the voltage between three lead wires.
If the tester reads under the specified value, replace the generator with a new one.

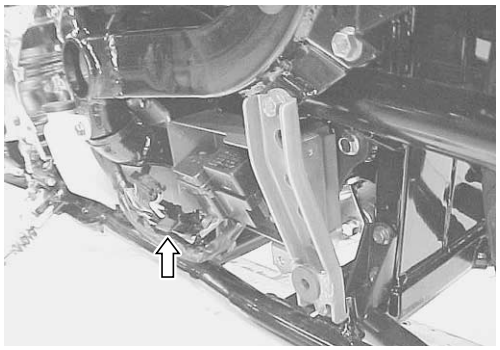


TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Voltage (~)

DATA Generator no-load performance (When engine is cold): More than 70 V at 5 000 r/min

REGULATOR/RECTIFIER



- Remove the secondary gear case cover.
- Disconnect the regulator/rectifier couplers.

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

TOOL 09900-25008: Multi circuit tester set

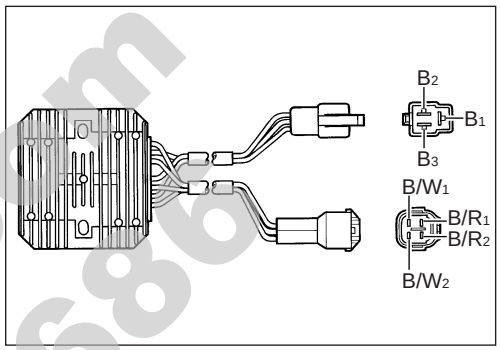
Tester knob indication: Diode test (⊣◀)

Unit: V

⊖ Tester probe / ⊕ Tester probe	B/R_1	B/R_2	B_1	B_2	B_3	B/W_1	B/W_2
B/R_1		0	0.4 – 0.7	0.4 – 0.7	0.4 – 0.7	0.5 – 1.2	0.5 – 1.2
B/R_2	0		0.4 – 0.7	0.4 – 0.7	0.4 – 0.7	0.5 – 1.2	0.5 – 1.2
B_1	∗	∗		∗	∗	0.4 – 0.7	0.4 – 0.7
B_2	∗	∗	∗		∗	0.4 – 0.7	0.4 – 0.7
B_3	∗	∗	∗	∗		0.4 – 0.7	0.4 – 0.7
B/W_1	∗	∗	∗	∗	∗		0
B/W_2	∗	∗	∗	∗	∗	0	

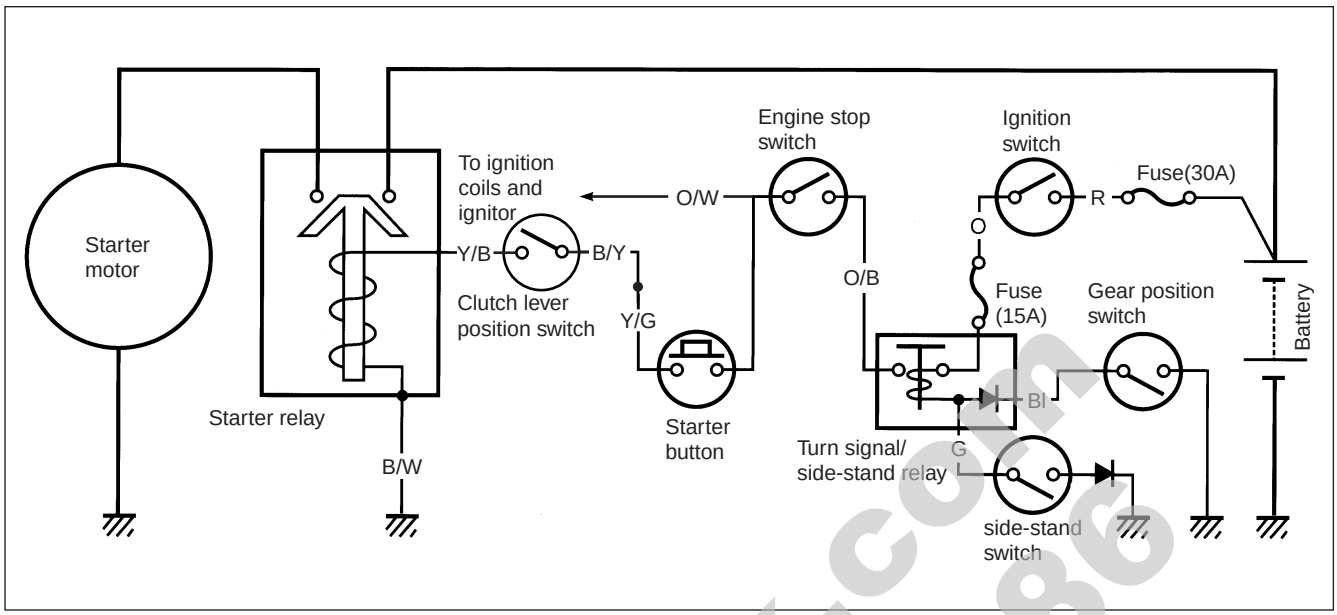
∗ More than 1.4 V (tester's battery voltage)

NOTE:
If the tester reads under 1.4 V when the tester probes are not connected, replace the battery of multi circuit tester.



WIRE COLOR
B: Black, B/R: Black with Red tracer,
B/W: Black with White tracer

STARTER SYSTEM AND SIDE-STAND/IGNITION INTERLOCK SYSTEM



TROUBLESHOOTING

Starter motor will not run.

The transmission is in neutral. Grasp the clutch lever, turn on the ignition switch with the engine stop switch in the "RUN" position and listen for a click from the starter relay when the starter button is pushed.

- Clicks → Check if the starter motor runs when its terminal is connected to the battery ⊕ terminal (Do not use thin "wire" because a large amount of current flows)
  - Runs
    - • Faulty starter relay
    - • Loose or disconnected starter motor lead wire
  - Does not run
    - • Faulty starter motor
- No click → Measure the starter relay voltage at the starter relay connectors (between Y/B ⊕ and B/W ⊖) when the starter button is pushed.
  - No voltage
    - • Faulty ignition switch
    - • Faulty engine stop switch
    - • Faulty clutch lever position switch
    - • Faulty gear position switch
    - • Faulty turn signal/side-stand relay
    - • Faulty starter button
    - • Poor contact of connector
    - • Open circuit in wire harness
  - Voltage

Continued on next page

Check the starter relay.
(☞ 8-13)
→ Incorrect → • Faulty starter relay
Correct
→ • Poor contact of the starter relay

The starter motor runs when the transmission is in neutral, but does not run when the transmission is in any position other than neutral, with the side-stand up.

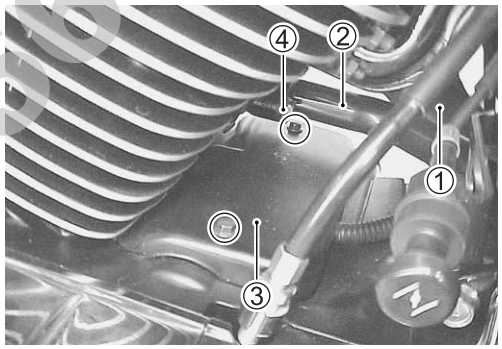
Check the side-stand switch.
(☞ 8-14)
→ Incorrect → • Faulty side-stand switch
Correct
→ • Open circuit in wire harness
• Poor contact of connector

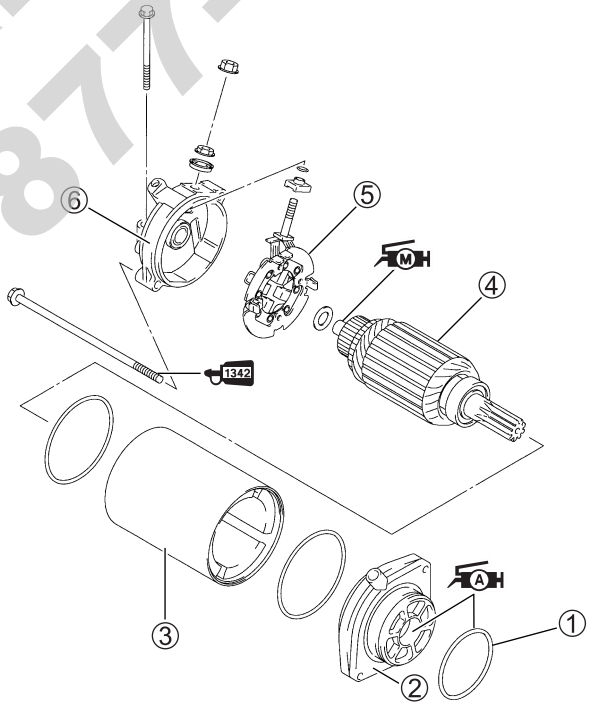
Others

Engine does not turn though the starter motor runs.	• Faulty starter clutch

STARTER MOTOR REMOVAL AND DISASSEMBLY

- Drain engine coolant. (☞2-13)
- Remove the muffler (No.1) ①. (☞3-5)
- Remove the engine coolant pipe ②. (☞3-13)
- Remove the starter motor cover ③.
- Remove the engine coolant inlet ④.
- Remove the starter motor. (☞3-14)
- Disassemble the starter motor as shown in the illustration.



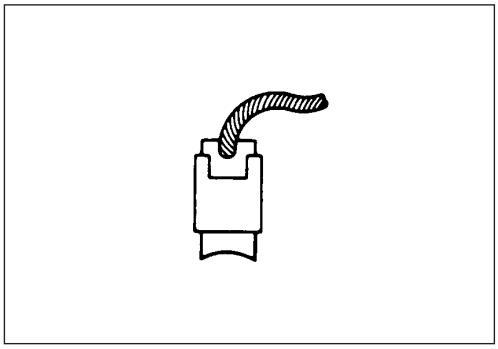


① O-ring
② Housing end (inside)
③ Starter motor case
④ Armature
⑤ Brush holder
⑥ Housing end (outside)

STARTER MOTOR INSPECTION

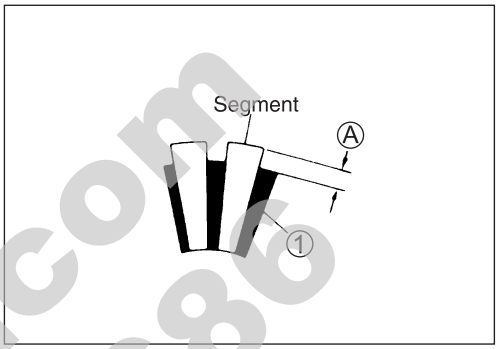
CARBON BRUSH

Inspect the brushes for abnormal wear, cracks, or smoothness in the brush holder.
If any damages are found, replace the brush assembly with a new one.



COMMUTATOR

Inspect the commutator for discoloration, abnormal wear or undercut Ⓐ.
If abnormal wear is found, replace the armature with a new one.
If the commutator surface is discolored, polish it with #400 sand paper and wipe it using a clean dry cloth.
If there is no undercut, scrape out the insulator ① with a saw blade.

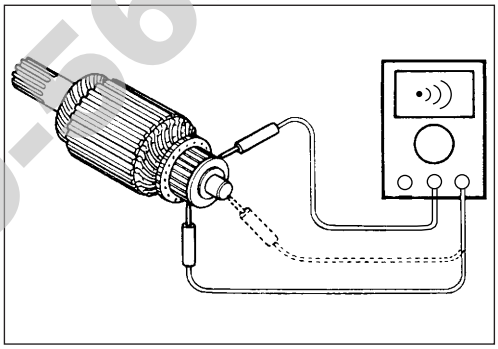


ARMATURE COIL INSPECTION

Check for continuity between each segment and between each segment and the armature shaft using the multi circuit tester.
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

09900-25008: Multi circuit tester set

Tester knob indication: Continuity test ( ))))



OIL SEAL INSPECTION

Check the oil seal lip for damage or leakage.
If any damage is found, replace the housing end.

STARTER MOTOR REASSEMBLY

Reassemble the starter motor in the reverse order of disassembly. Pay attention to the following points:

- Apply grease to the lip of the oil seal.

For U.S.A.

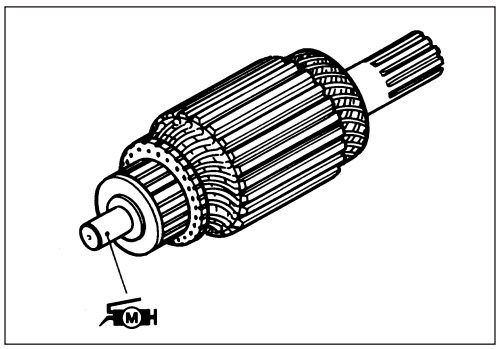
99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

99000-25010: SUZUKI SUPER GREASE "A"

- Apply a small quantity of SUZUKI MOLY PASTE to the armature shaft.

99000-25140: SUZUKI MOLY PASTE



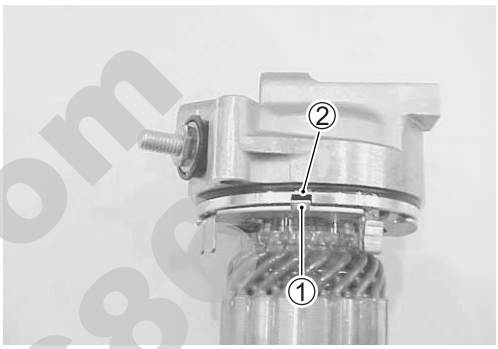
- Align the tonque ① on the brush holder with the groove ② on the housing end.
- Align the threaded parts ③ on the housing end.
- Apply a small quantity of THREAD LOCK "1342" to the starter motor housing bolts.

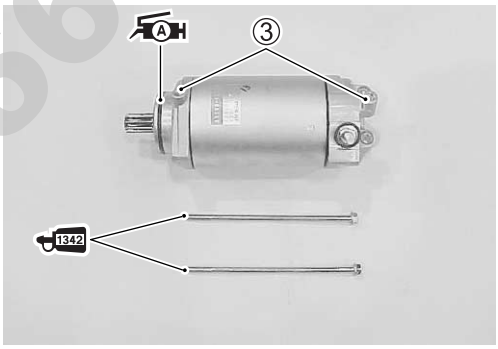
99000-32050: THREAD LOCK "1342"

- Apply SUZUKI SUPER GREASE "A" to the O-ring.

For U.S.A.
99000-25030: SUZUKI SUPER GREASE "A"

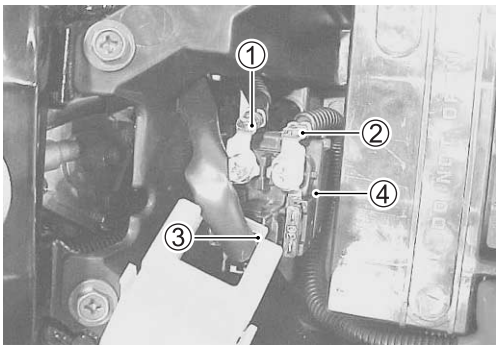
For the others
99000-25010: SUZUKI SUPER GREASE "A"





STARTER RELAY INSPECTION

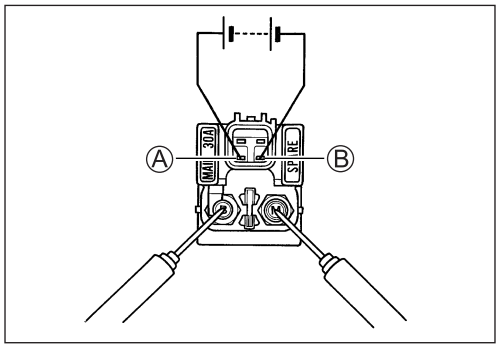
- Remove the two seats. (☞7-2)
- Disconnect the battery ⊖ lead wire from the battery.
- Remove the starter relay cover.
- Disconnect the starter motor lead wire ①, battery lead wire ② and starter relay coupler ③.
- Remove the starter relay ④.



Apply 12 V to Ⓐ and Ⓑ terminals and check for continuity between the positive and negative terminals using the multi circuit tester. If the starter relay clicks and continuity is found, the relay is ok.

09900-25008: Multi circuit tester set

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



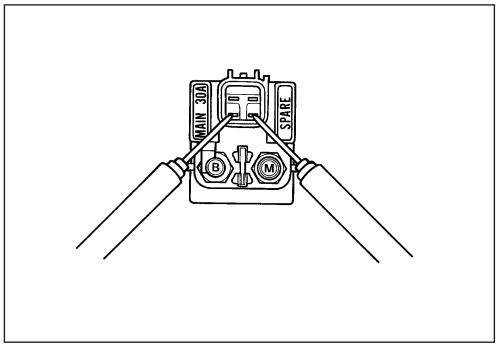
⚠ CAUTION

Do not apply a battery voltage to the starter relay for more than five seconds, since the relay coil may overheat and damaged.

Measure the relay coil resistance between the terminals using the multi circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

09900-25008: Multi circuit tester set

Starter relay resistance: 3 – 7 Ω



SIDE STAND/IGNITION INTERLOCK SYSTEM PARTS INSPECTION

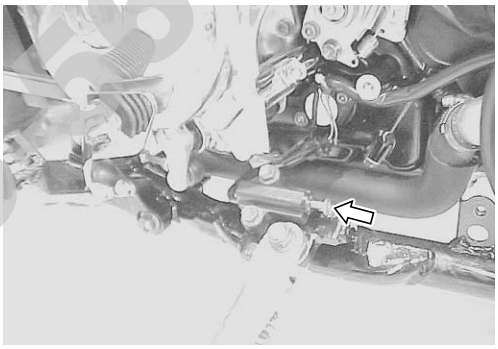
Check the interlock system for proper operation. If the interlock system does not operate properly, check each component for damage or abnormalities. If any abnormality is found, replace the component with a new one.

SIDE-STAND SWITCH

- Remove the secondary gear case cover.
- Disconnect the side-stand switch coupler and measure the voltage between Green and Black/White lead wires.

09900-25008: Multi circuit tester set

Tester knob indication: Diode test (⊣◀)

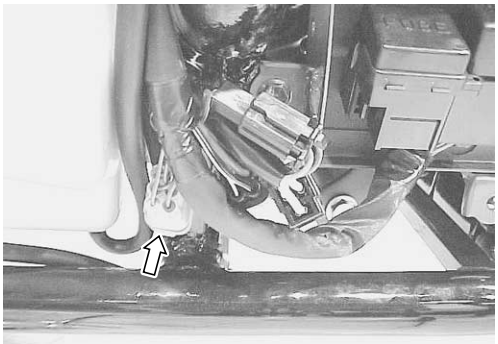


	Green (⊕ Probe)	Black/White (⊖ Probe)
ON (Side-stand up)	0.4–0.6 V	
OFF (Side-stand down)	More than 1.4 V (Tester's battery voltage)	

NOTE:
If the tester reads under 1.4V when the tester probes are not connected, replace its battery.

GEAR POSITION SWITCH

- Remove the secondary gear case cover.
- Disconnect the gear position switch coupler and check the continuity between Blue and Black/White with the transmission in "NEUTRAL".



	Blue	Black / White
ON (Neutral)	○———	———○
OFF (Except neutral)		

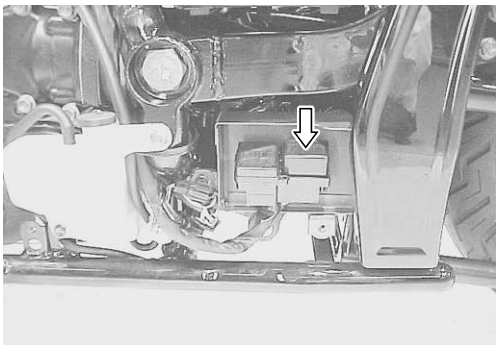
⚠ CAUTION

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

TURN SIGNAL/SIDE-STAND RELAY

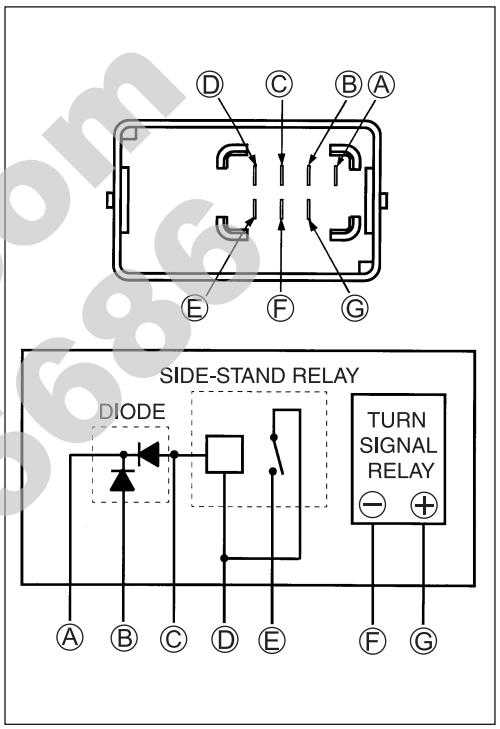
The turn signal/side-stand relay is composed of the turn signal relay, and the side-stand relay and diode.

- Remove the secondary gear case cover.
- Remove the turn signal/side-stand relay.



SIDE-STAND RELAY INSPECTION

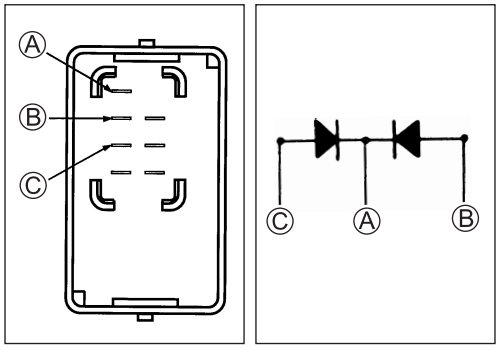
First check the insulation between Ⓓ and Ⓔ terminals with the tester. Then apply 12V to terminals Ⓓ and Ⓒ (⊕ to Ⓓ and ⊖ to Ⓒ) and check the continuity between Ⓓ and Ⓔ. If there is no continuity, replace the turn signal/side-stand relay with a new one.



DIODE INSPECTION

Measure the voltage between the terminals using the multi circuit tester. Refer to the following table.

⊖ Probe of tester to:	⊕ Probe of tester to: Ⓒ,Ⓑ	⊕ Probe of tester to: Ⓐ
Ⓒ,Ⓑ		More than 1.4 V (Tester's battery voltage)
Ⓐ	0.4–0.6 V	



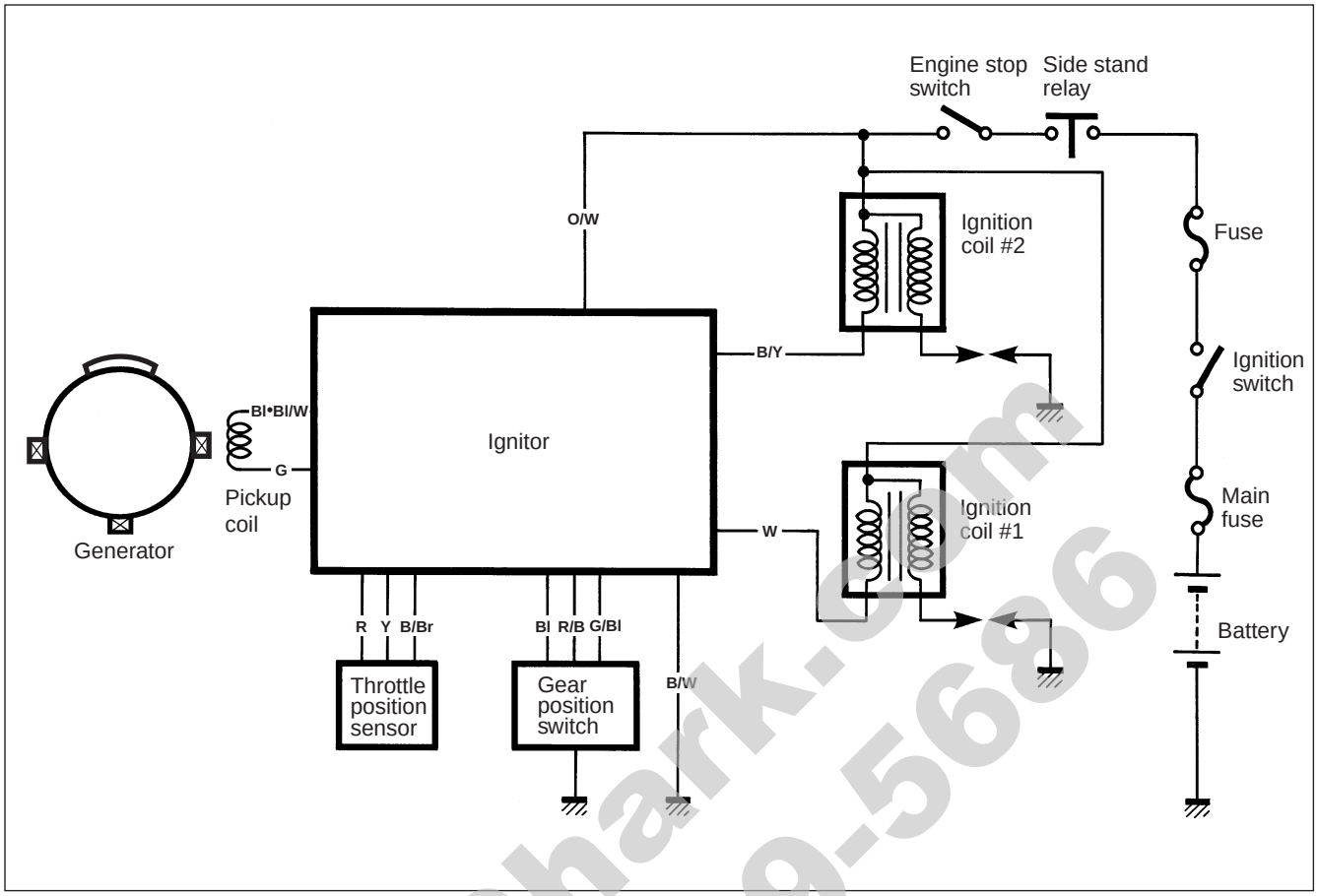
09900-25008: Multi circuit tester set

Tester knob indication: Diode test (⊣◀)

NOTE:

If the multi circuit tester reads under 1.4V when the tester probes are not connected, replace its battery.

IGNITION SYSTEM



NOTE:

The ignition cut-off circuit is incorporated in this ignitor to prevent over-running of engine. If engine rpm reaches 8 000 r/min., this circuit cuts off the ignition primary current for all spark plugs.

⚠ CAUTION

Under no load, the engine can run over 8 000 r/min, even if the ignition cut-off circuit is effective, and it may cause engine damage. Do not run the engine without load over 8 000 r/min at anytime.

TROUBLESHOOTING

No spark or poor spark

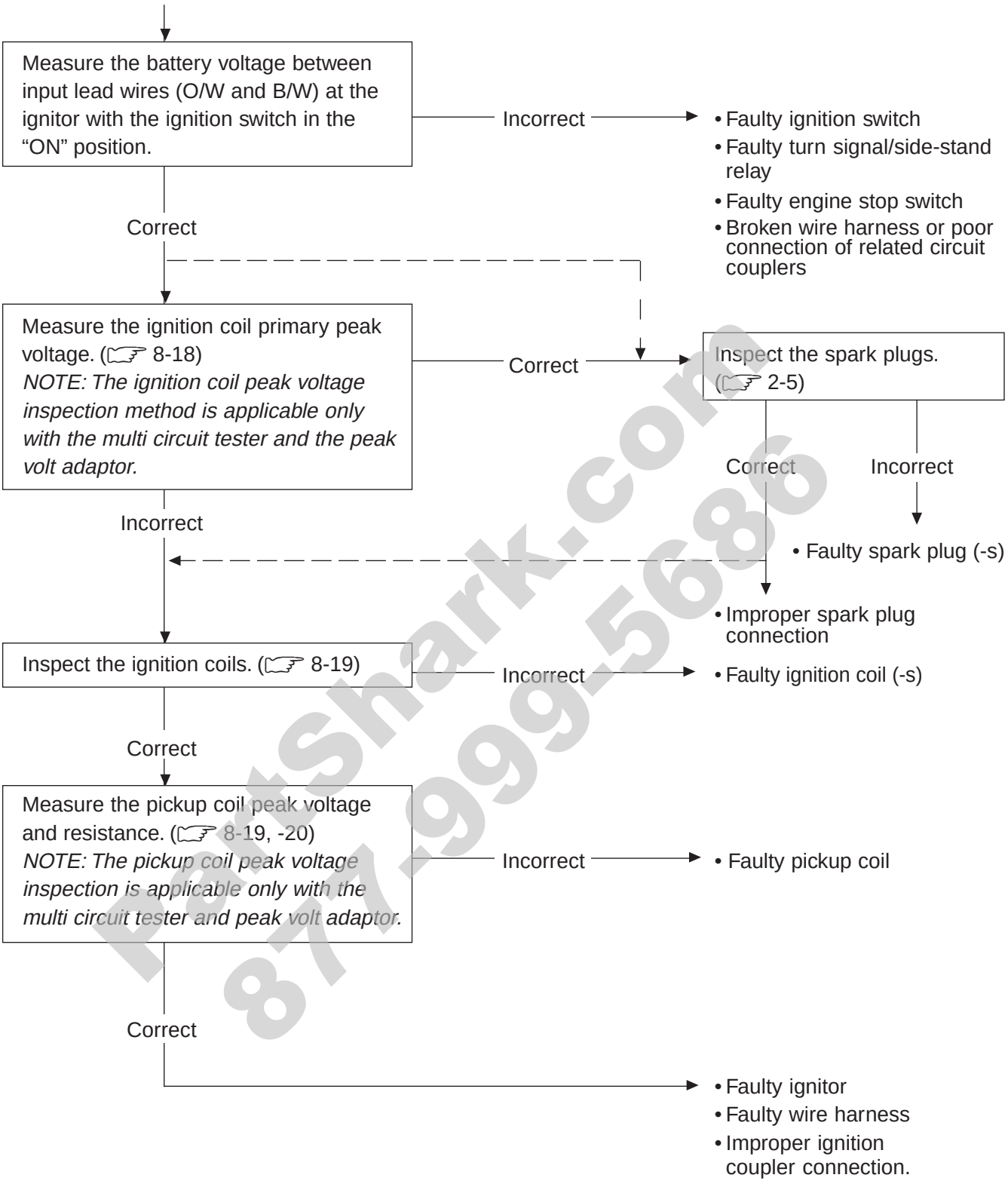
* Make sure the transmission is in neutral and the engine stop switch is in the "RUN" position. Grasp the clutch lever. Make sure the fuse is not blown and the battery is fully-charged before diagnosing.

Check the ignition system couplers for poor connections.

Loose → • Improper coupler connection

Correct

Continued on next page



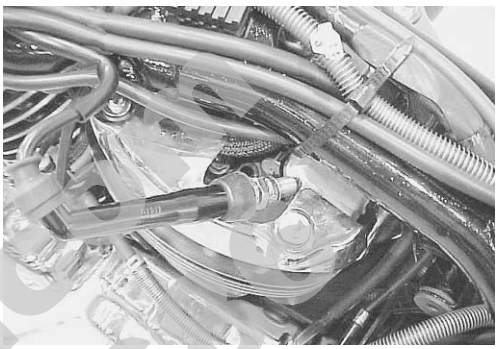
INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

- Remove the fuel tank. (☞5-3)
- Disconnect the two spark plug caps.
- Connect the new spark plugs to the each spark plug cap and ground them on the cylinder head.

NOTE:
Make sure that the each spark plug cap and spark plug are connected properly.

Measure the ignition coil primary peak voltage using the multi circuit tester in the following procedure.



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

No.1 ignition coil ⊕ Probe: White lead wire connector
⊖ Probe: Ground
No.2 ignition coil ⊕ Probe: Black/Yellow lead wire connector
⊖ Probe: Ground

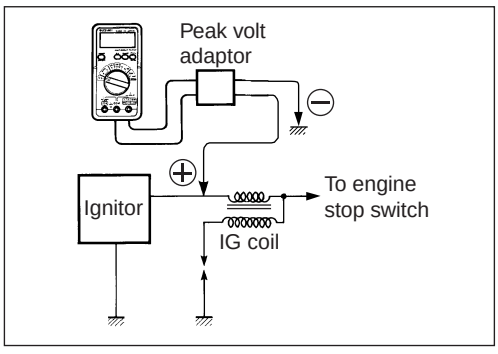
NOTE:
Do not disconnect the ignition coil primary lead wires.

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 then turn the ignition switch to the "ON" position.
- Pull the clutch lever.
- Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage.



Tester knob indication: voltage (⎓)

DATA Ignition coil primary peak voltage: More than 200 V

⚠ WARNING

While testing, do not touch the tester probes and spark plugs to prevent receiving an electric shock.

If the peak voltage is lower than the specified values, inspect the ignition coil. (☞8-19)

IGNITION COIL RESISTANCE

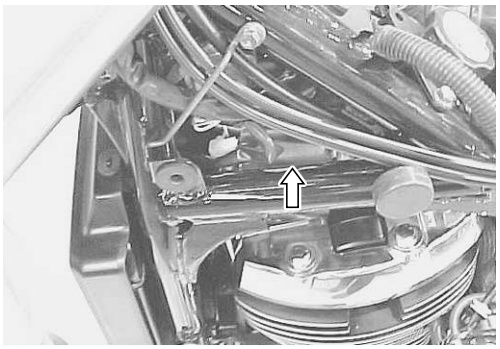
- Remove the fuel tank. (☞5-3)
- Disconnect the ignition coil lead wires and plug caps.

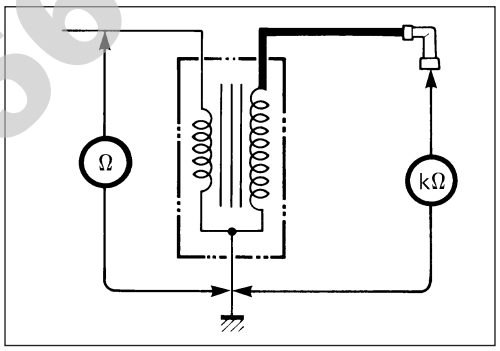
Measure the ignition coil resistance in both the primary and secondary windings. If the resistance is not within the standard range, replace the ignition coil with a new one.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

DATA Ignition coil resistance
Primary : 2 – 6 Ω (Terminal – Terminal)
Secondary : 15 – 30 kΩ (Plug cap – Terminal)





PICKUP COIL PEAK VOLTAGE

- Remove the two seats. (☞7-2)
- Disconnect the wire harness coupler ① at the ignitor.

NOTE:
Make sure that all of the couplers are connected properly.

Measure the pickup coil peak voltage in the following procedure.

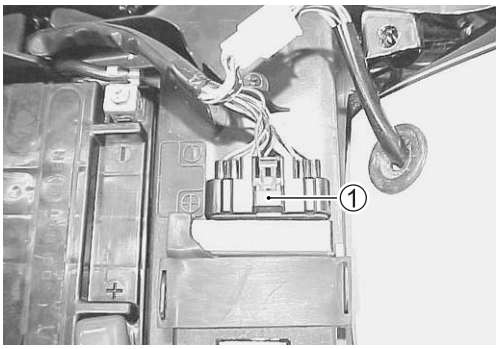
- Connect the multi circuit tester with the peak volt adaptor as follows.

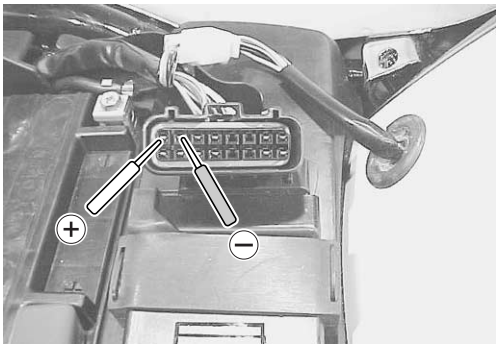
⊕ Probe: Blue/White lead wire
⊖ Probe: Green lead wire

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.

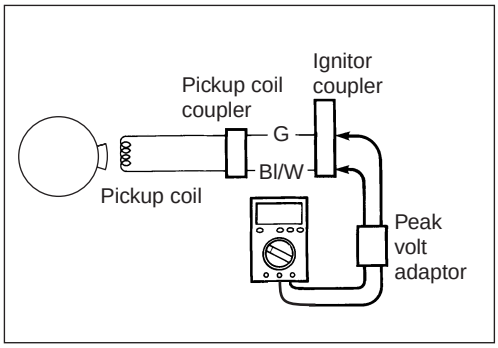




- Shift the transmission into the neutral, and then turn the ignition switch to the “ON” position.
- Pull the clutch lever.
- Press the starter button and allow the engine to crank for a few seconds, and then measure the pickup coil peak voltage.
- Repeat the above procedure a few times and measure the highest peak voltage.

Tester knob indication: Voltage (⎓)

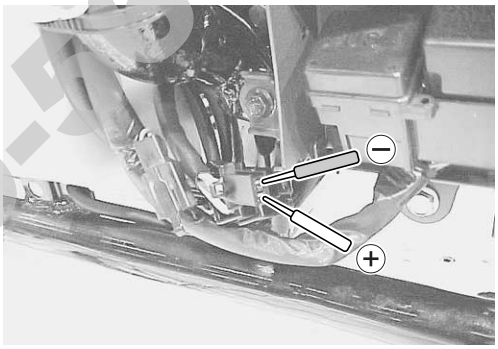
DATA Pickup coil peak voltage: More than 1.5 V



If the peak voltage is lower than the specified values, check the peak voltage at the pickup coil lead wire coupler.

- Remove the secondary gear case cover.
- Disconnect the pickup coil lead wire coupler and connect the multi circuit tester with the peak volt adaptor.

⊕ Probe: Blue lead wire
⊖ Probe: Green lead wire

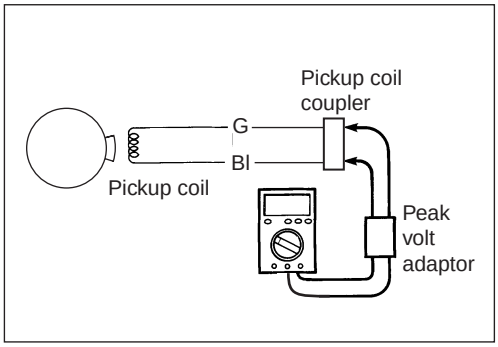


Measure the pickup coil peak voltage at the pickup coil lead wire coupler, in the same manner as on the ignitor coupler.

Tester knob indication: Voltage (⎓)

DATA Pickup coil peak voltage: More than 1.5 V

If the peak voltage on the pickup coil lead wire coupler is ok but on the ignitor coupler is out of specification, the wire harness must be replaced. If both peak voltages are out of specification, the generator must be replaced and re-checked.



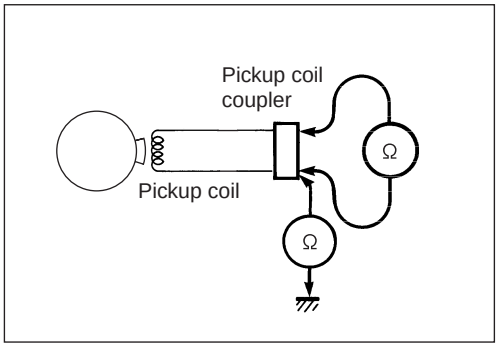
PICKUP COIL RESISTANCE

Measure the resistance between the lead wires and ground. If the resistance is not specified value, the pickup coil must be replaced.

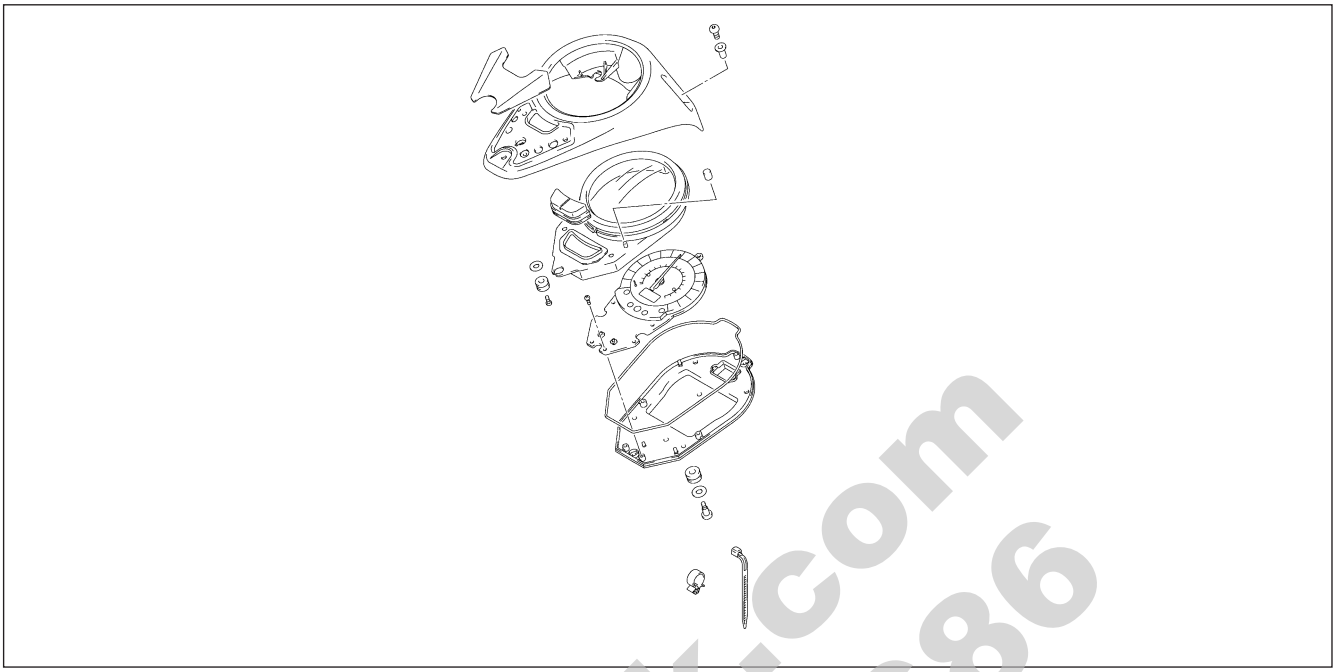
TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

DATA Pickup coil resistance : 160 – 300 Ω (Green – Blue)
: ∞ Ω (Green – Ground)



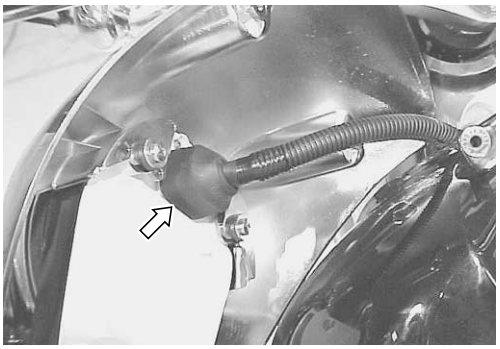
SPEEDOMETER



REMOVAL

- Remove the screws.

- Disconnect the cover and coupler.

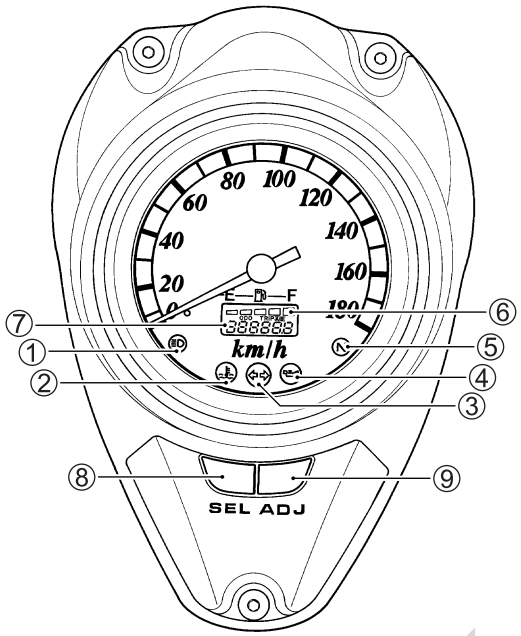


⚠ CAUTION

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

- Remove the speedometer.

PARTS NAMES



① High beam indicator light
② Engine coolant temperature indicator light
③ Turn signal indicator light
④ Oil pressure indicator light
⑤ Neutral indicator light
⑥ Fuel level meter
⑦ Speedometer/tripmeter/clock
⑧ SELECT button
⑨ ADJUST button

OPERATING PROCEDURE

INITIAL DISPLAY

When the ignition switch is set to ON, all LCD light up for three seconds.

NOTE:

If the power supply is cut (e, g, when the battery is replaced):

* *The odometer, tripmeter and clock are displayed after the initial display appears.*
* *Since the clock resets to "1:00", it will need to be readjusted.*

CHANGE THE DISPLAY MODE

With each press of the SELECT button, the display changes between odometer, tripmeter A, tripmeter B and clock as shown.

⚠ WARNING

To avoid riding with only one hand, do not operate the buttons while riding.

ODOMETER

- Displays the total distance travelled.

TRIPMETER

- Displays the distance travelled since the tripmeter was last reset.

NOTE:

The tripmeters A and B can be used independently.

- Hold down the ADJUST button for two seconds to reset the tripmeter.

CLOCK

- Displays the time (hours and minutes) on a 12-hour clock.
- Setting the time.

Hold down the ADJUST button for two seconds while pressing the SELECT button and then flashing the hour display. ⇨ The setting that is flashing can be changed.

hour → min. → No Flashing ⇨ Select the correct time.

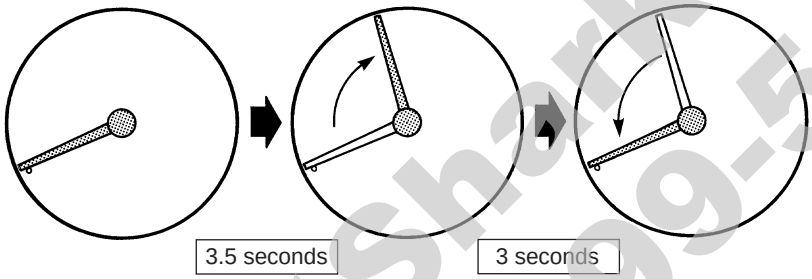
FUEL LEVEL INDICATOR

- Displays the amount of fuel remaining in the fuel tank.

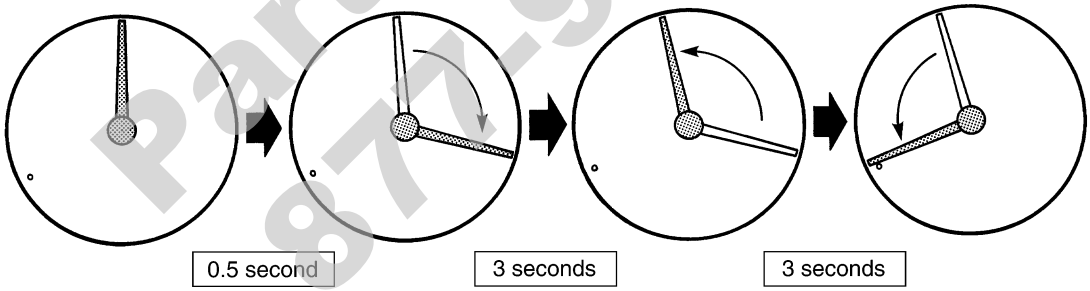
SPEEDOMETER

- The speedometer pointer operates onetime as shown below to reset speedometer pointer, when connecting the battery or speedometer coupler.

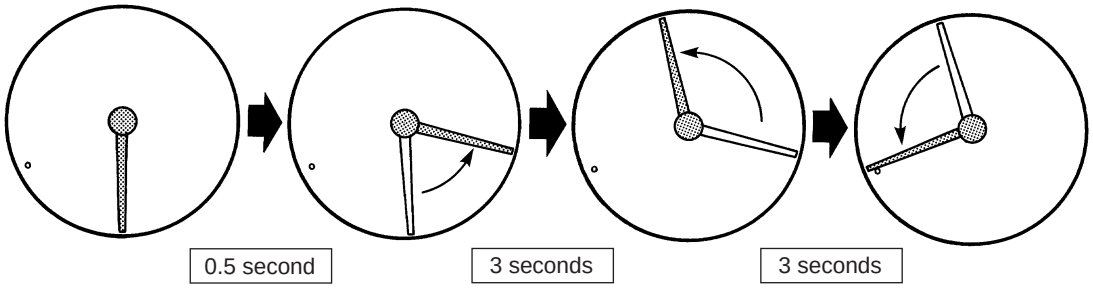
1. When the speedometer pointer is normal position.



2. When the speedometer pointer is top position.



3. When the speedometer pointer is bottom position.



NOTE:

The speedometer pointer can indicates case 2 or case 3 if the battery terminal or speedometer lead wire coupler is disconnected while riding.

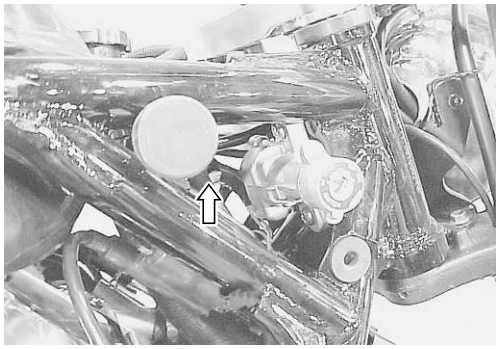
INSPECTION

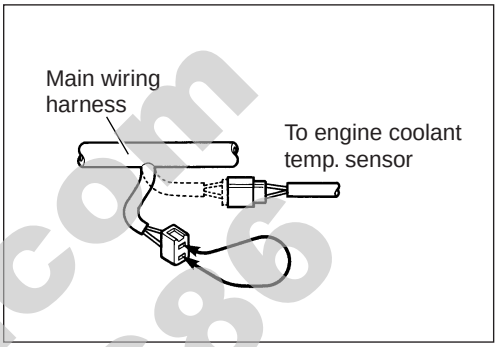
ENGINE COOLANT TEMPERATURE INDICATOR LIGHT

Engine coolant temperature sensor inspection: ☞6-8

- Remove the fuel tank. (☞5-3)
- Disconnect the engine coolant temperature sensor coupler.
- Connect the jumper wire to the wire harness coupler.

Check that the LED light immediately after turning the ignition switch on. If the LED fail in operation, replace the speedometer unit with a new one.





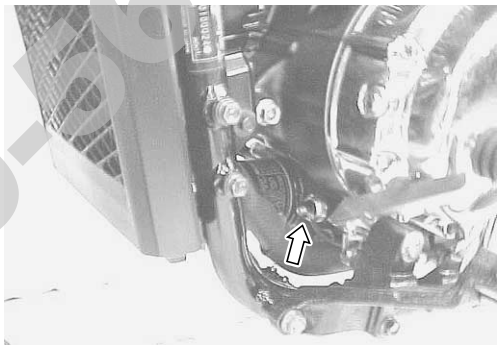
OIL PRESSURE INDICATOR LIGHT

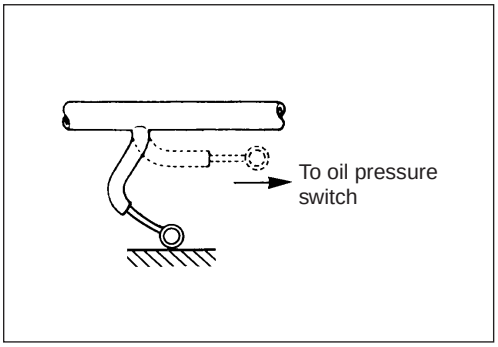
NOTE:

Before inspecting the oil pressure switch, check if the engine oil level is enough. (☞2-8)

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

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

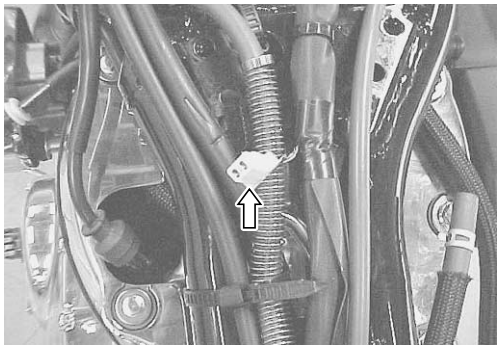


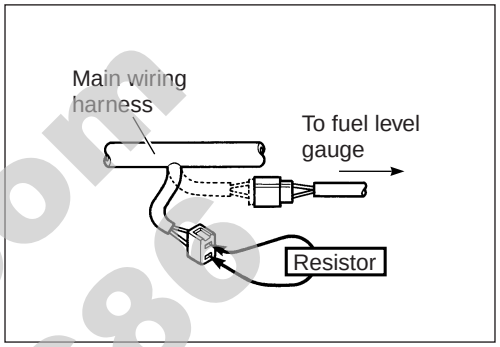


FUEL LEVEL METER

- Remove the fuel tank. (☞5-3)
- Connect the speedometer.
- Connect each resistor between the Yellow/Black and Black/White lead wire at the wire harness.
- Turn the ignition switch “ON” position and wait for approx, 13 seconds.

Check the display of fuel meter as shown below. If any abnormality is found, replace the speedometer with a new one.

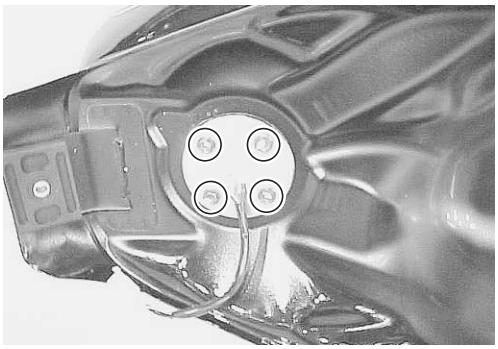




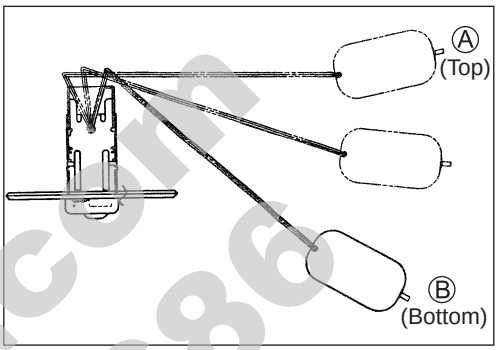
Resistance	Less than 17 Ω	22 – 28 Ω	33 – 49 Ω	54 – 69 Ω	74 – 83 Ω	More than 94 Ω
Fuel level meter						Flicker

FUEL LEVEL GAUGE INSPECTION

- Remove the fuel tank. (☞5-3)
- Remove the fuel level gauge.



Measure the resistance at each fuel level gauge float position. If the resistance is incorrect, replace the fuel level gauge with a new one.

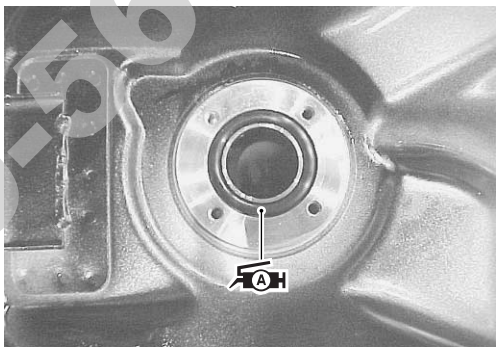


Float position	Resistance
Ⓐ "F" (Full)	4 – 10 Ω
Ⓑ "E" (Empty)	90 – 100 Ω

Remount the fuel level gauge in the reverse order of removal. Pay attention to the following points.

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

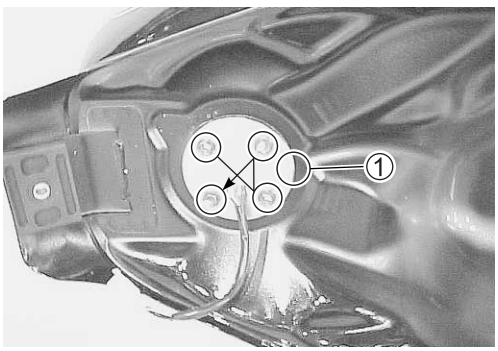
For U.S.A.
99000-25030: SUZUKI SUPER GREASE "A"
For the other countries
99000-25010: SUZUKI SUPER GREASE "A"



⚠ CAUTION

Use a new O-ring to prevent fuel leakage.

- Face the "△" mark ① on the fuel level gauge forward.
- Lightly tighten the bolts in a crisscross pattern, and then tighten them to the specified torque in the above manner.

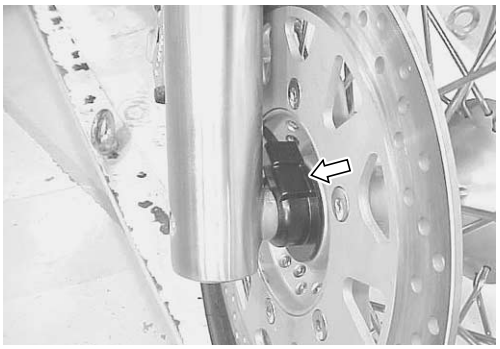


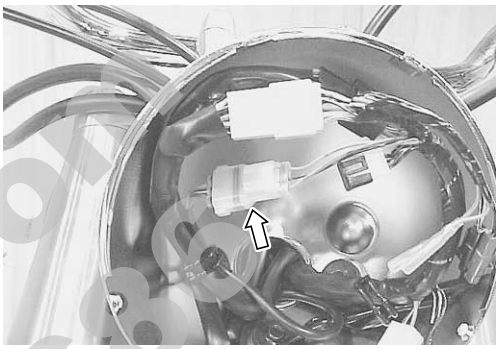
Fuel level gauge bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)

SPEED SENSOR INSPECTION

If the speedometer, odometer or tripmeter does not function properly. Inspect the speed sensor and connection of couplers. If the speed sensor and connection is all right, replace the unit with a new one.

- Remove the front wheel. (☞7-4)
- Remove the head light.
- Disconnect the speed sensor lead wire coupler.
- Remove the speed sensor.
- Connect 12V battery (between O/R and B/W), 10 kΩ resistor (between O/R and P) and the multi circuit tester (⊕ probe of tester to O/R and ⊖ to P) as shown right illustration.





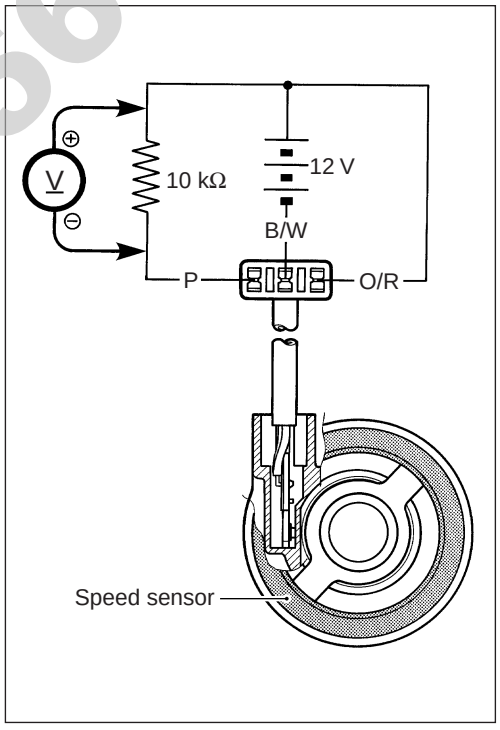
O/R : Orange with Red tracer
B/W: Black with White tracer
P : Pink

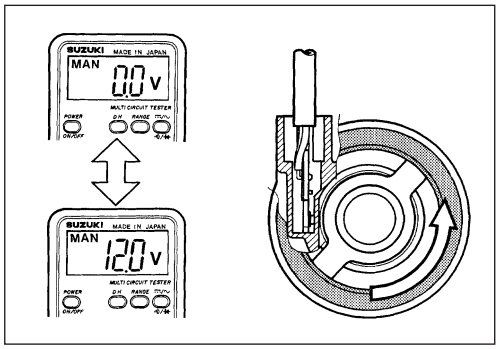
09900-25008: Multi circuit tester set

Tester knob indication: Voltage (⎓)

Under above condition, by rotating the drive lugs of speed sensor slowly, the tester reading voltage relatively changes (0V → 12V or 12V → 0V). If the tester reading voltage does not change, replace the speed sensor with a new one.

NOTE:
The highest tester reading voltage (12V) while testing is same as battery voltage.



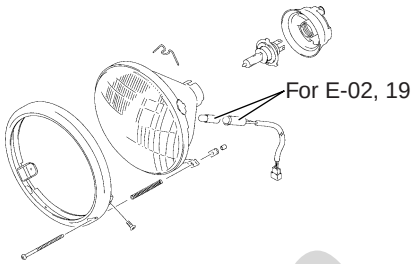


LAMPS

HEADLIGHT, BRAKE LIGHT/TAILLIGHT AND TURN SIGNAL LIGHT

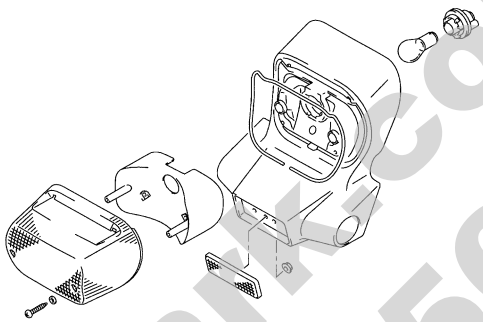
HEADLIGHT

12 V 60/55 W ..... For E-03, 24, 28, 33
12 V 60/55 W + 4 W ..... For E-02,19



BRAKE LIGHT/TAILLIGHT

12 V 21/5 W



TURN SIGNAL LIGHT

Front
12 V 21/5 W ..... For E-03, 28, 33
12 V 21 W..... For E-02, 19, 24
Rear
12 V 21 W

⚠ CAUTION

If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

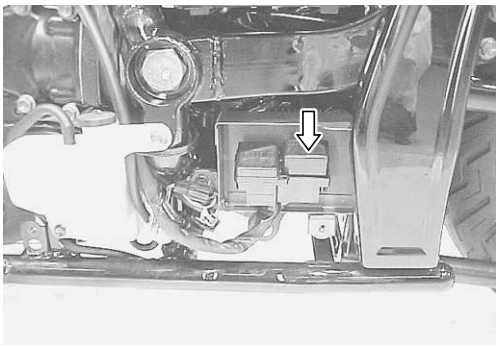
HEADLIGHT BEAM ADJUSTMENT

- Adjust the headlight beam, both vertical and horizontal.

RELAYS

TURN SIGNAL/SIDE-STAND RELAY

The turn signal/side-stand relay is composed of the turn signal relay, side-stand relay and diode.

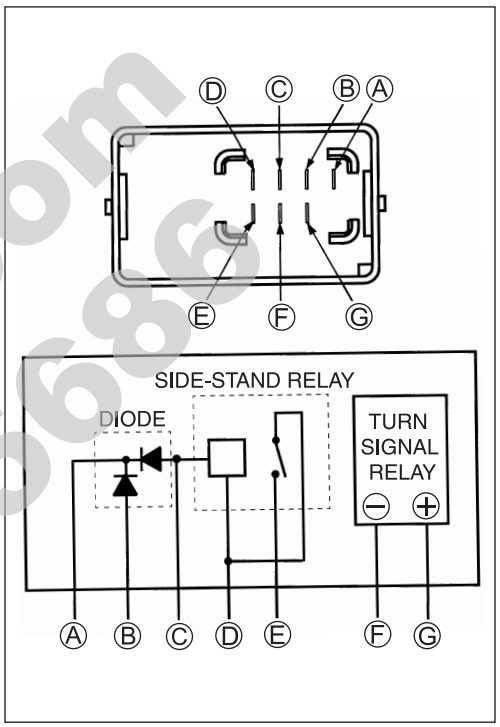


INSPECTION

Before removing the turn signal/side-stand relay, check the operation of the turn signal light.
If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection.
If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal/side-stand relay with a new one.

NOTE:

* *Make sure that the battery is fully charged.*
* *Refer to the page 8-15 for the side-stand relay and diode inspection.*



STARTER RELAY

☞8-13

SWITCHES

IGNITION SWITCH REMOVAL

- Remove the fuel tank. (☞5-3)
- Remove the frame head covers. (☞6-4)
- Disconnect the coupler.
- Remove the ignition switch mounting bolts using the special tool.

TOOL 09930-11920: Torx bit JT40H
09930-11940: Bit holder

⚠ CAUTION

When reusing the ignition switch bolt, clean thread and apply the THREAD LOCK SUPER "1303"

1303 99000-32030: THREAD LOCK SUPER "1303"

Inspect each switch for continuity with a tester. If any abnormality is found, replace the respective switch assemblies with new ones.

IGNITION SWITCH
(For E-24)

Color / Position	R	O	O/Y	B/W
ON	○——	——○	○——	——○
OFF				
LOCK				

(For Others)

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

LIGHTING SWITCH
(Except for E-03, 24, 28 and 33)

Color / Position	O/Bl	Gr	O/R	Y/W
OFF (•)				
S (≥00≤)	○——	——○		
ON (☼)	○——	——○	○——	——○

DIMMER SWITCH

Color / Position	W	Y	Y/W
HI (≡D)		○——	——○
LO (≡D)	○——	——	——○

TURN SIGNAL SWITCH

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

PASSING LIGHT SWITCH
(Except for E-03, 28 and 33)

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
•		
PUSH	○——	——○

HORN BUTTON

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

FRONT BRAKE SWITCH

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

REAR BRAKE SWITCH

Color / Position	Terminal	Terminal
OFF		
ON	○——	——○

CLUTCH LEVER POSITION SWITCH

Color / Position	B/Y	B/Y
OFF		
ON	○——	——○

OIL PRESSURE SWITCH

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

NOTE:
Before inspecting the oil pressure switch, check if the engine oil level is enough. (☞2-8)

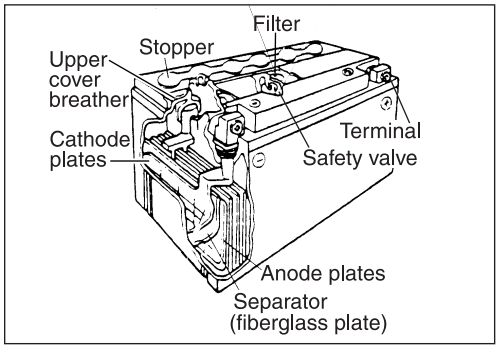
WIRE COLOR

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

BATTERY

SPECIFICATIONS

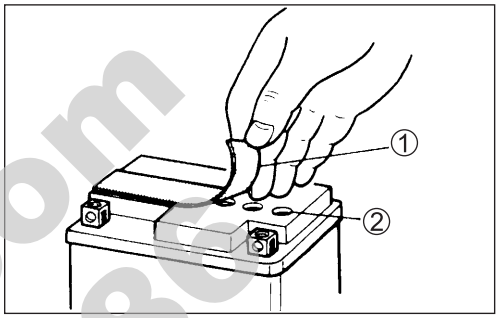
Type designation	FTX12-BS
Capacity	12V, 36 kC (10 Ah)/10HR



INITIAL CHARGING

FILLING ELECTROLYTE

- Remove the aluminum tape ① which seals the battery filler holes ②.

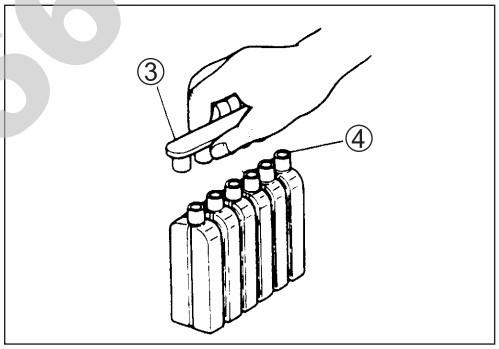


- Remove the caps ③ from the electrolyte container.

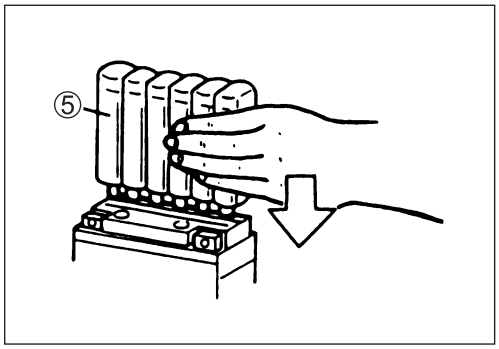
NOTE:

** Do not remove or pierce the sealed areas ④ of the electrolyte container.*

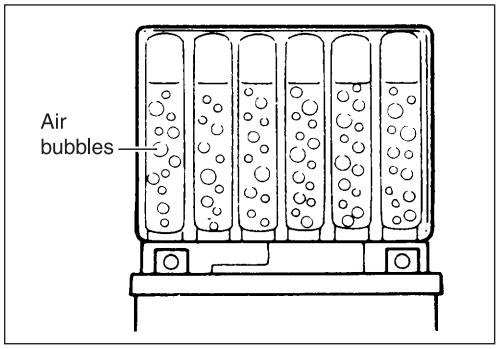
** After completely filling the battery with electrolyte, use the caps ③ from the electrolyte container to seal the battery filler holes.*



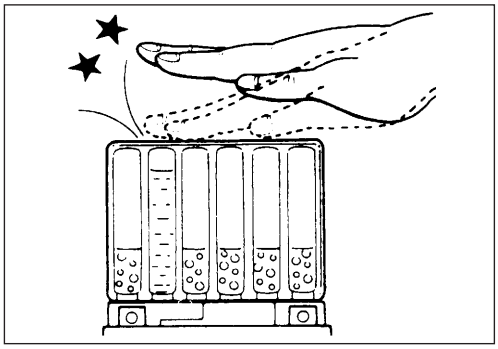
- Insert the nozzles of the electrolyte container ⑤ into the electrolyte filler holes of the battery. Hold the electrolyte container firmly so that it does not fall. Do not allow any of the electrolyte to spill.



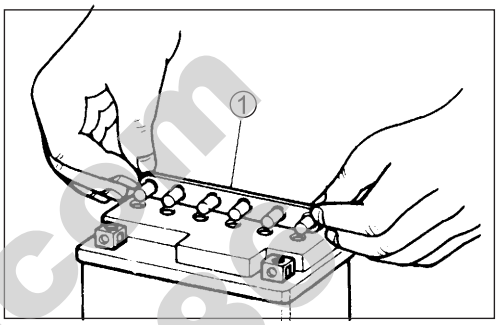
- Make sure the air bubbles rise to the top of each electrolyte container and leave the electrolyte container in this position for more than 20 minutes.



NOTE:
If air bubbles do not rise from any one of the filler ports, tap the bottom of the electrolyte container two or three times.
Never remove the electrolyte container from the battery while there is still electrolyte in the container.

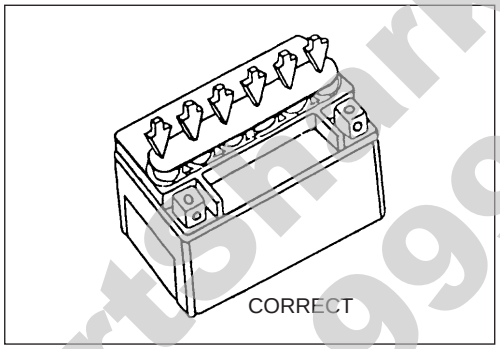


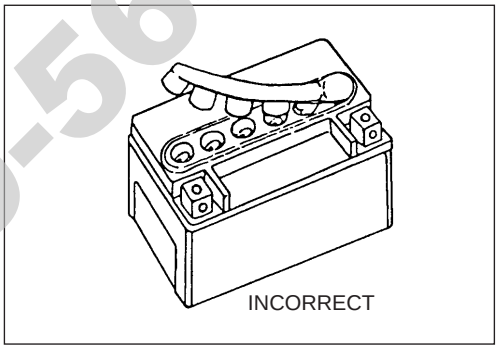
- After the electrolyte container is completely empty, remove it from the battery and wait about 20 minutes.
- Insert the caps ① firmly into the filler holes, so that the top of the caps do not protrude above the upper surface of the top cover of the battery.



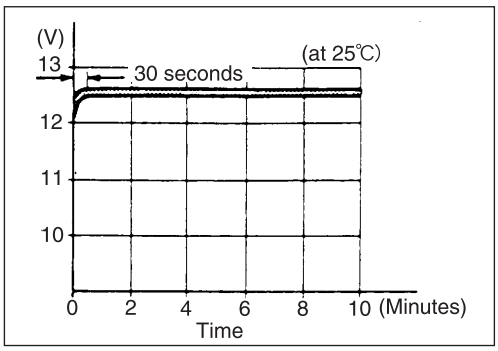
⚠ CAUTION

*** Never use anything except the specified battery.**
*** Do not remove the caps once they are installed in the battery.**
*** Do not tap the caps with a hammer when installing them.**





- Measure the battery voltage using multi circuit tester. The tester should indicate more than 12.5 – 12.6V (DC) as shown in the Fig. If the battery voltage is lower than the specification, charge the battery with a battery charger. (Refer to the recharging operation)



⚠ CAUTION

Do not remove the caps on the battery top while charging.

NOTE:
Initial charging for a new battery is recommended if two years have elapsed since the date of manufacture.

SERVICING

Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one. If the battery terminals are found to be coated with rust or an acidic white powdery substance, clean the battery terminals with sandpaper.

RECHARGING OPERATION

- Measure the battery voltage using the multi circuit tester. If the voltage reading is less than the 12.0V (DC), recharge the battery with a battery charger.

⚠ CAUTION

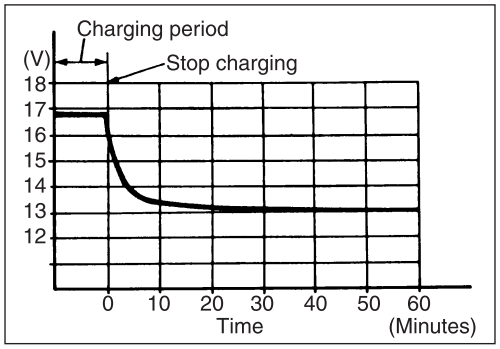
*** When recharging the battery, remove the battery from the motorcycle.**
*** Do not remove the caps on the battery top while recharging.**

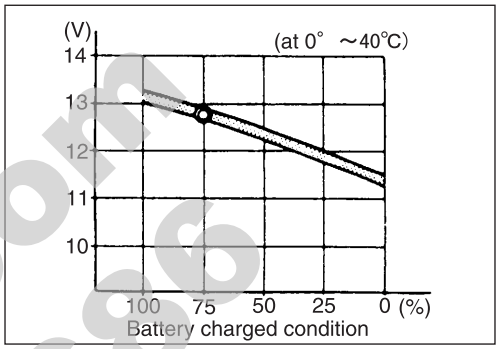
Recharging time: 1.2A for 5 to 10 hours or 5A for one hour

⚠ CAUTION

Be careful not to permit the charging current to exceed 5A at any time.

- After recharging, wait at least 30 minutes and then measure the battery voltage using the multi circuit tester. If the battery voltage is less than 12.5V, recharge the battery again. If battery voltage is still less than 12.5V after recharging, replace the battery with a new one. When a battery is left unused for a long time, its voltage needs to be regularly measured. When the motorcycle is not used for more than one month (especially during the winter season), measure the battery voltage at least once a month.





SERVICING INFORMATION

CONTENTS

TROUBLESHOOTING

ENGINE

Complaint	Symptom and possible causes	Remedy
Engine will not start or is hard to start.	**Compression too low**	
	1. Worn cylinder.	Replace.
	2. Worn piston ring.	Replace.
	3. Worn valve guide or improper valve seating.	Repair or replace.
	4. Loose spark plug.	Tighten.
	5. Broken, cracked, or damaged piston.	Replace.
	6. Slow cranking starter motor.	See electrical section.
	7. Mistimed valves.	Adjust.
	8. Valve clearance out of adjustment.	Adjust.
	Spark plug not sparking	
	1. Damaged spark plug.	Replace.
	2. Damaged spark plug cap.	Replace.
	3. Fouled spark plug.	Clean or replace.
	4. Wet spark plug.	Clean and dry or replace.
	5. Defective ignition coil.	Replace.
	6. Open or short in high-tension cord.	Replace.
	7. Defective pick-up coil or ignitor unit.	Replace.
	No fuel reaching the carburetor	
	1. Clogged hole in the fuel tank cap.	Clean or replace.
	2. Defective fuel pump.	Replace.
	3. Clogged or defective fuel valve.	Clean or replace.
	4. Defective carburetor needle valve.	Replace.
	5. Clogged fuel hose.	Clean or replace.
	6. Clogged fuel filter.	Clean or replace.
Engine stalls easily.	1. Fouled spark plug.	Clean or replace.
	2. Defective signal coil or ignitor unit.	Replace.
	3. Defective fuel pump.	Replace.
	4. Clogged or defective fuel valve.	Clean or replace.
	5. Clogged carburetor jet.	Clean.
	6. Valve clearance out of adjustment.	Adjust.

Complaint	Symptom and possible causes	Remedy
Engine is noisy.	**Excessive valve chatter**	
	1. Excessive valve clearance.	Adjust.
	2. Weak or broken valve spring.	Replace.
	3. Worn camshaft.	Replace.
	4. Worn or burnt camshaft journal.	Replace.
	Noise seems to come from the piston	
	1. Worn piston.	Replace.
	2. Worn cylinder.	Replace.
	3. Carbon buildup in combustion chamber.	Clean.
	4. Worn piston pin or piston pin bore.	Replace.
	5. Worn piston ring or ring groove.	Replace.
	Noise seems to come from the cam chain	
	1. Stretched cam chain.	Replace cam chain and sprockets.
	2. Worn cam chain sprocket.	Replace cam chain and sprockets.
	3. Improperly working cam chain tensioner.	Repair or replace.
	Noise seems to come from the clutch	
	1. Worn countershaft spline.	Replace countershaft.
	2. Worn clutch hub spline.	Replace clutch hub.
	3. Worn clutch plate teeth.	Replace clutch plate.
	4. Distorted clutch plate.	Replace.
	5. Weak clutch damper.	Replace primary driven gear.
	6. Weak clutch spring.	Replace.
	Noise seems to come from the crankshaft	
	1. Rattling bearing.	Replace.
	2. Worn or burnt crank pin bearing.	Replace.
	3. Worn or burnt journal bearing.	Replace.
	4. Excessive thrust clearance.	Replace thrust bearing.
	Noise seems to come from the transmission	
	1. Worn or rubbing gear.	Replace.
	2. Worn countershaft spline.	Replace countershaft.
	3. Worn driveshaft spline.	Replace driveshaft.
	4. Worn or rubbing primary gear.	Replace.
	5. Worn bearing.	Replace.
Clutch drags.	1. Clutch out of adjustment.	Adjust.
	2. Clutch release screw out of adjustment.	Adjust.
	3. Some clutch springs are weak, while others are not.	Replace.
	4. Worn or distorted clutch pressure plate.	Replace.
	5. Distorted clutch plate.	Replace.
Transmission will not shift.	1. Broken gearshift cam.	Replace.
	2. Distorted gearshift fork.	Replace.
	3. Worn gearshift pawl.	Replace.
Transmission will not shift back.	1. Broken gearshift shaft return spring.	Replace.
	2. Rubbing or stuck gearshift shaft.	Repair or replace.
	3. Worn or distorted gearshift fork.	Replace.

Complaint	Symptom and possible causes	Remedy
Transmission jumps out of gear.	1. Worn gear. 2. Worn or distorted gearshift fork. 3. Weakened gearshift stopper spring. 4. Worn gearshift pawl.	Replace. Replace. Replace. Replace.
Engine idles poorly.	1. Valve clearance out of adjustment. 2. Improper valve seating. 3. Worn valve guide. 4. Worn camshaft. 5. Excessive spark plug gap. 6. Defective ignition coil. 7. Defective generator. 8. Defective ignitor unit. 9. Incorrect float chamber fuel level. 10. Clogged carburetor jet.	Adjust. Repair or replace. Replace. Replace. Adjust or replace. Replace. Replace. Replace. Adjust float height. Clean.
Engine runs poorly in high-speed range.	1. Weak valve spring. 2. Worn camshaft. 3. Insufficient spark plug gap. 4. Mistimed valves. 5. Ignition not advanced sufficiently due to poorly working timing advance circuit. 6. Defective ignition coil. 7. Defective generator. 8. Defective ignitor unit. 9. Low float chamber fuel level. 10. Dirty air cleaner element. 11. Clogged fuel hose, resulting in inadequate fuel supply to carburetor.	Replace. Replace. Regap or replace. Adjust. Replace ignitor unit. Replace. Replace. Replace. Adjust float height. Clean or replace. Clean and prime.
Exhaust smoke is dirty or thick.	1. Excessive amount of engine oil. 2. Worn cylinder. 3. Worn piston ring. 4. Worn valve guide. 5. Scored or scuffed cylinder wall. 6. Worn valve stem. 7. Defective valve stem oil seal. 8. Worn oil ring side rail.	Check level and drain. Rebore or replace. Replace. Replace. Replace. Replace valve. Replace. Replace oil ring.
Engine lacks power.	1. Insufficient valve clearance. 2. Weak valve spring. 3. Mistimed valves. 4. Worn cylinder. 5. Worn piston ring. 6. Improper valve seating. 7. Fouled spark plug. 8. Incorrect spark plug. 9. Clogged carburetor jet. 10. Incorrect float chamber fuel level. 11. Dirty air cleaner element. 12. Air leakage from intake pipe. 13. Excessive amount of engine oil.	Adjust. Replace. Adjust. Replace. Replace. Repair or replace. Clean or replace. Replace. Clean. Adjust float height. Clean or replace. Tighten or replace. Check level and drain.

Complaint	Symptom and possible causes	Remedy
Engine overheats.	1. Carbon buildup on piston crown. 2. Insufficient amount of engine oil. 3. Defective oil pump. 4. Clogged oil circuit. 5. Float chamber fuel level too low. 6. Air leakage from intake pipe. 7. Incorrect engine oil.	Clean. Check level and add. Replace. Clean. Adjust float height. Tighten or replace. Change.

CARBURETOR

Complaint	Symptom and possible causes	Remedy
Starting difficulty.	1. Clogged starter jet. 2. Clogged starter jet passage. 3. Air leaking from carburetor joint or vacuum hose joint. 4. Improperly working starter (enricher) plunger.	Clean. Clean. Tighten or replace defective part. Adjust.
Idling or low-speed trouble.	1. Clogged or loose pilot jet. 2. Clogged or loose pilot air jet. 3. Air leaking from carburetor joint, vacuum pipe joint, or starter. 4. Clogged pilot outlet port. 5. Clogged bypass port. 6. Starter (enricher) plunger not fully closed.	Clean or tighten. Clean or tighten. Tighten or replace defective part. Clean. Clean. Adjust.
Medium or high-speed trouble.	1. Clogged main jet. 2. Clogged main air jet. 3. Clogged needle jet. 4. Improperly working throttle valve. 5. Clogged fuel filter.	Clean. Clean. Clean. Adjust. Clean or replace.
Overflow and fuel level fluctuations.	1. Worn or damaged needle valve. 2. Broken needle valve spring. 3. Improperly working float. 4. Foreign matter on the needle valve. 5. Incorrect float chamber fuel level.	Replace. Replace. Adjust or replace. Clean or replace with needle valve seat. Adjust float height.

SHAFT DRIVE

Complaint	Symptom and possible causes	Remedy
Noisy shaft drive.	**Noise seems to come from secondary bevel gear and final bevel gear assemblies.** 1. Oil level too low. 2. Drive and driven bevel gears damaged or worn. 3. Excessive backlash. 4. Improper tooth contact. 5. Damage to bearings.	 Refill. (Check oil jet/replace oil seal) Replace. Adjust. Adjust. Replace.
	Noise seems to come from propeller shaft area. 1. Propeller shaft universal joint damaged. 2. Propeller shaft splines damaged or worn. 3. Insufficient lubricant. 4. Cam dog contacting surface damaged or worn.	 Replace. Replace. Refill. (Replace oil seal) Replace.

CHASSIS

Complaint	Symptom and possible causes	Remedy
Steering is heavy.	1. Overtightened steering stem nut. 2. Broken bearing in steering stem. 3. Distorted steering stem. 4. Low tire pressure.	Adjust. Replace. Replace. Regulate.
Handlebar wobbles.	1. Loss of balance between right and left front forks. 2. Distorted front fork. 3. Distorted front axle. 4. Twisted tire.	Adjust or replace. Repair or replace. Replace. Replace.
Front wheel wobbles.	1. Distorted wheel rim. 2. Worn front wheel bearing. 3. Defective or incorrect tire. 4. Loose front axle nut. 5. Incorrect fork oil level.	Replace. Replace. Replace. Tighten. Adjust.
Front suspension too soft.	1. Weak spring. 2. Insufficient fork oil.	Replace. Check level and add.
Front suspension too stiff.	1. Excessively viscous fork oil. 2. Excessive fork oil.	Replace. Check level and drain.
Front suspension too noisy.	1. Insufficient fork oil. 2. Loose front suspension fastener.	Check level and add. Tighten.
Rear wheel wobbles.	1. Distorted wheel rim. 2. Worn rear wheel bearing. 3. Defective or incorrect tire. 4. Worn swingarm bearing. 5. Loose rear axle nut. 6. Loose rear suspension fastener.	Replace. Replace. Replace. Replace. Tighten. Tighten.
Rear suspension too soft.	1. Weak rear shock absorber spring. 2. Rear shock absorber leaks oil. 3. Improper suspension setting.	Replace. Replace. Adjust.
Rear suspension too stiff.	1. Improper suspension setting. 2. Bent rear shock absorber shaft. 3. Worn swingarm bearing and rear suspension related bearing.	Adjust. Replace. Replace.
Rear suspension too noisy.	1. Loose rear suspension fastener. 2. Worn swingarm bearing and rear suspension related bearing.	Tighten. Replace.

BRAKES

Complaint	Symptom and possible causes	Remedy
Brake power insufficient.	1. Leakage of brake fluid. 2. Worn brake pad/shoe. 3. Oil on brake pad surface. 4. Worn brake disc. 5. Air in hydraulic system.	Repair or replace. Replace. Clean brake disc and brake pads. Replace. Bleed.
Brake squeaks.	1. Carbon adhesion on brake pad/shoe surface. 2. Tilted brake pad. 3. Damaged wheel bearing. 4. Worn brake pad/shoe. 5. Foreign material in brake fluid. 6. Clogged return port of master cylinder. 7. Loose front or rear axle nut.	Clean surface with sandpaper. Readjust brake pad position or replace. Replace. Replace. Change brake fluid. Disassemble and clean master cylinder. Tighten.
Brake lever or pedal stroke excessive.	1. Air in hydraulic system. 2. Insufficient brake fluid. 3. Incorrect brake fluid.	Bleed. Check level and add. Bleed any air. Change.
Brake fluid leaks.	1. Loose connection joint. 2. Cracked hose. 3. Worn piston seal. 4. Worn secondary cup.	Tighten. Replace. Replace. Replace.
Brake drags.	1. Rusty part. 2. Insufficient brake lever or brake pedal pivot lubrication.	Clean and lubricate. Lubricate.

ELECTRICAL

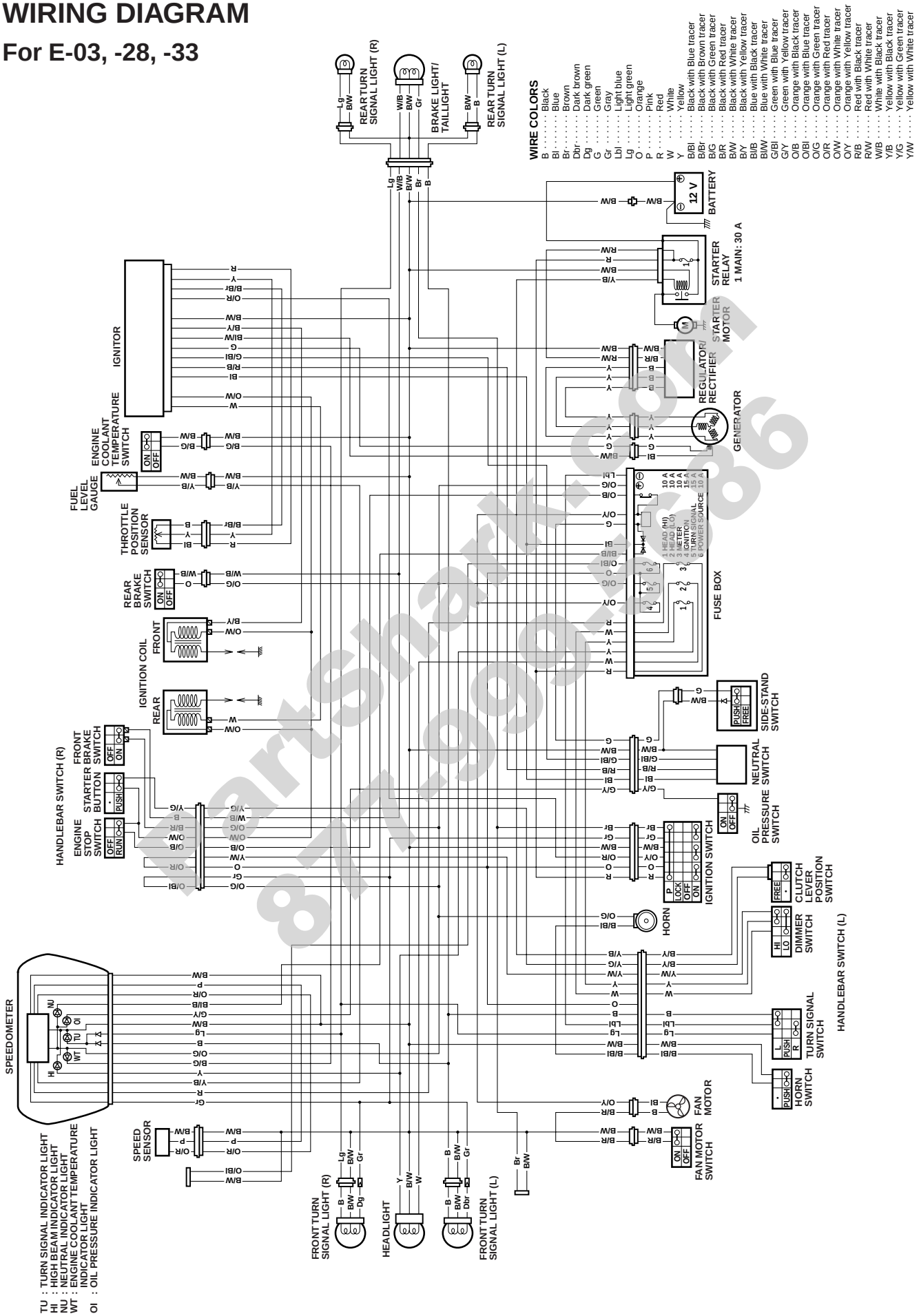
Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking.	1. Defective ignition coil. 2. Defective spark plug. 3. Defective pick-up coil. 4. Defective ignitor unit.	Replace. Replace. Replace. Replace.
Spark plug is wet or quickly becomes fouled with carbon.	1. Excessively rich air/fuel mixture. 2. Excessively high idling speed. 3. Incorrect gasoline. 4. Dirty air cleaner element. 5. Incorrect spark plug (cold type).	Adjust carburetor. Adjust carburetor. Change. Clean or replace. Change to hot type spark plug.
Spark plug quickly becomes fouled with oil or carbon.	1. Worn piston ring. 2. Worn piston. 3. Worn cylinder. 4. Excessive valve-stem-to-valve-guide clearance. 5. Worn valve stem oil seal.	Replace. Replace. Replace. Replace. Replace.
Spark plug electrodes overheat or burn.	1. Incorrect spark plug (hot type). 2. Overheated engine. 3. Loose spark plug. 4. Excessively lean air/fuel mixture.	Change to cold type spark plug. Tune-up. Tighten. Adjust carburetor.
Generator does not charge.	1. Open or short in lead wires, or loose lead connections. 2. Shorted, grounded, or open generator coil. 3. Shorted or punctured regulator/rectifier.	Repair, replace, or connect properly. Replace. Replace.
Generator charges but charging rate is below the specifications.	1. Lead wires tend to get shorted or open-circuited or loosely connected at terminal. 2. Grounded or open-circuited stator coils or generator. 3. Defective regulator/rectifier. 4. Defective battery cell plates.	Repair or tighten. Replace. Replace. Replace battery.
Generator overcharges.	1. Internal short-circuit in the battery. 2. Damaged or defective regulator/rectifier. 3. Poorly grounded regulator/rectifier.	Replace battery. Replace. Repair, replace, or connect properly.
Unstable charging.	1. Lead wire insulation frayed due to vibration, resulting in intermittent shorting. 2. Internally shorted generator. 3. Defective regulator/rectifier.	Repair or replace. Replace. Replace.
Starter button does not work.	1. Run down battery. 2. Defective switch contact. 3. Brushes do not seat properly on the commutator in the starter motor. 4. Defective starter relay. 5. Defective turn signal/side stand relay. 6. Wiring connections loose or disconnected.	Recharge or replace. Replace. Repair or replace. Replace. Replace. Tighten or repair.

BATTERY

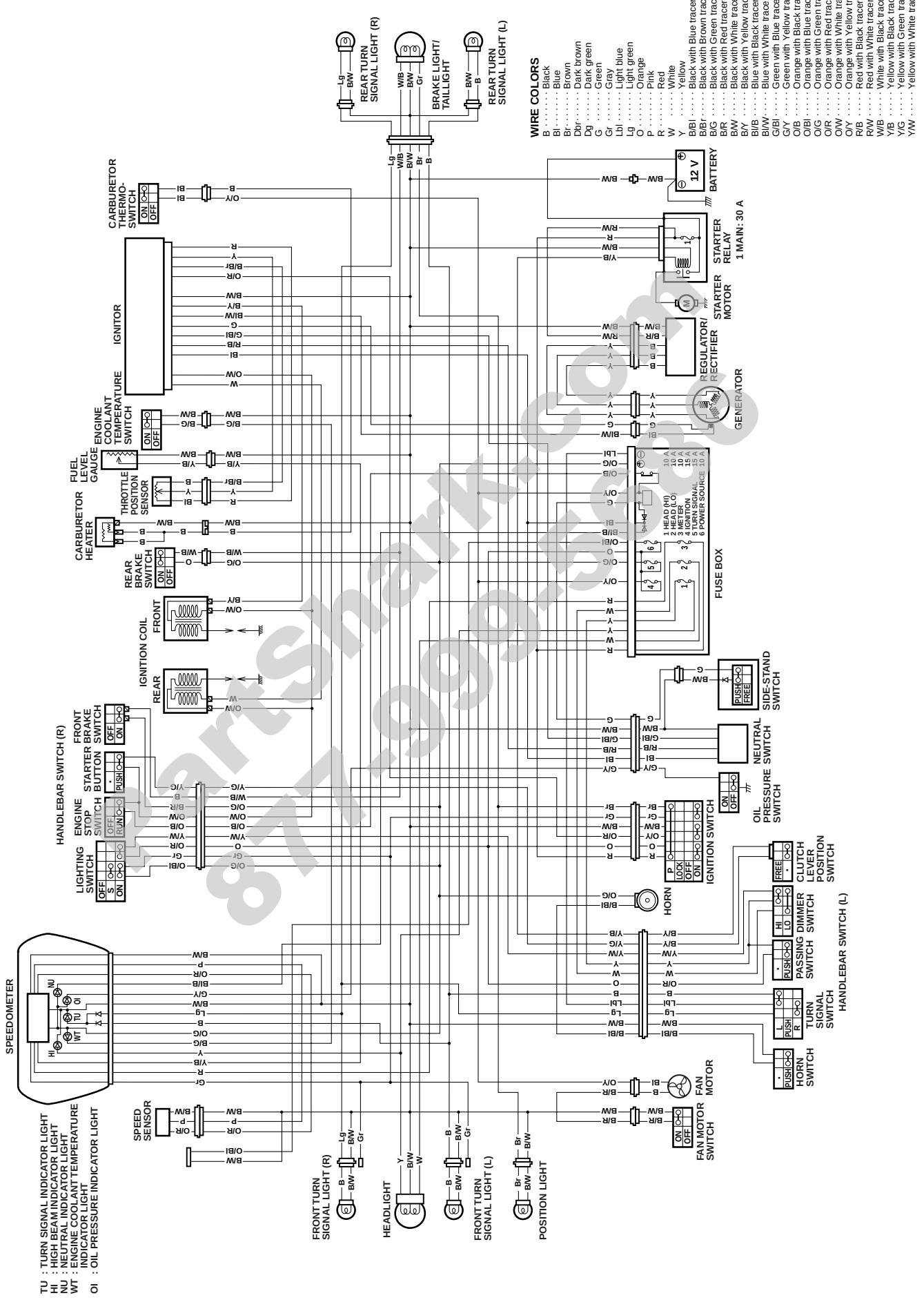
Complaint	Symptom and possible causes	Remedy
Sulfation or spots on surfaces of cell plates.	1. Cracked battery case. 2. Battery has been left in a run-down condition for a long time.	Replace. Replace.
Battery runs down quickly.	1. Incorrect charging method. 2. Battery cell plates have lost much of their active material as a result of overcharging. 3. Internally shorted battery. 4. Excessively low battery voltage. 5. Battery is too old. 6. Dirty container top and sides.	Check generator, regulator/rectifier circuit connections, and make necessary adjustment to obtain specified charging operation. Replace battery and correct charging system. Replace. Charge. Replace. Clean.
Battery sulfation.	1. Incorrect charging rate. (When not in use, the battery should be checked at least once a month and properly charged if necessary, to avoid sulfation.) 2. The battery was left unused in a cold climate for too long.	Replace. Replace the battery if badly sulfated.

WIRING DIAGRAM

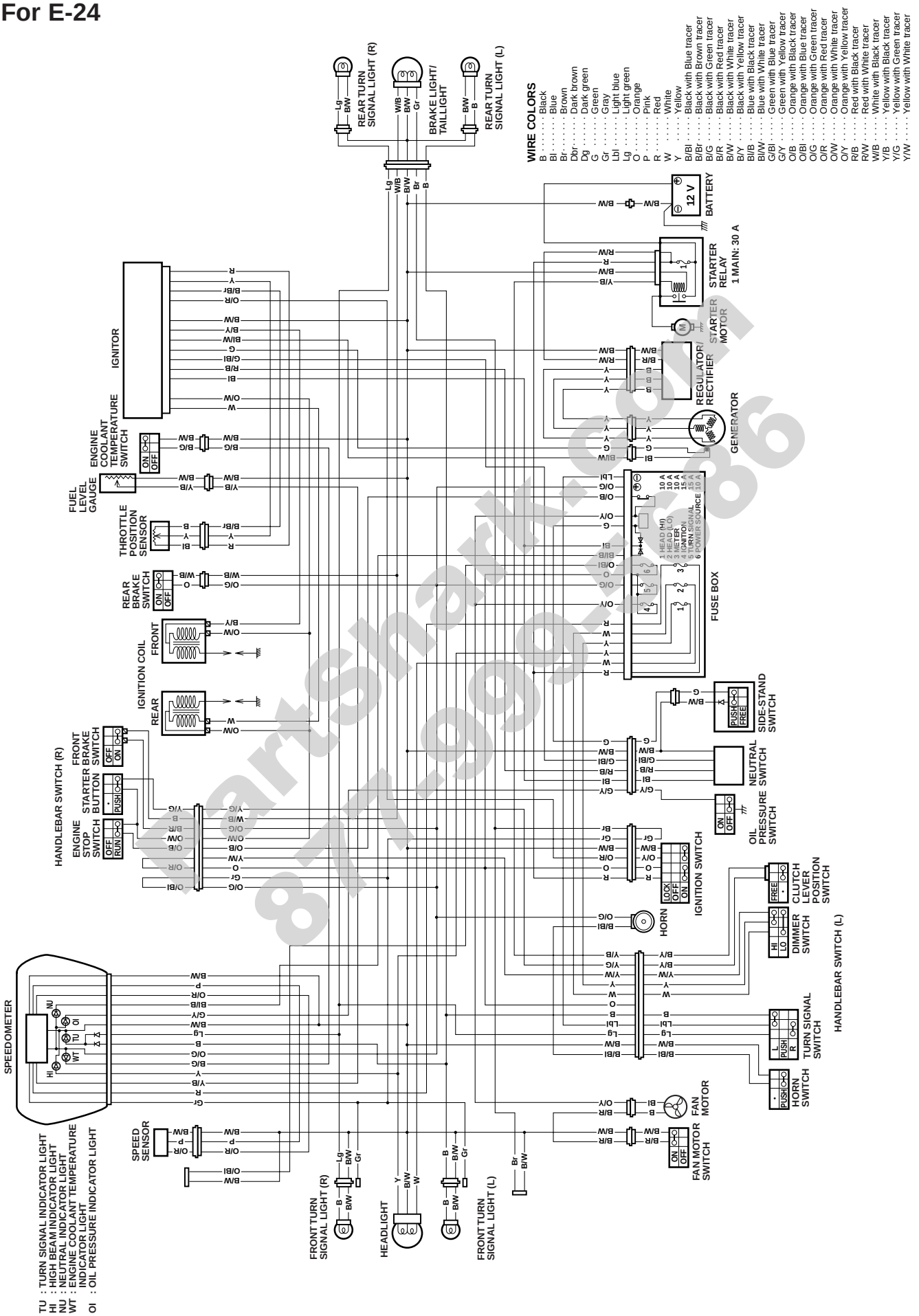
For E-03, -28, -33



For E-02, -19

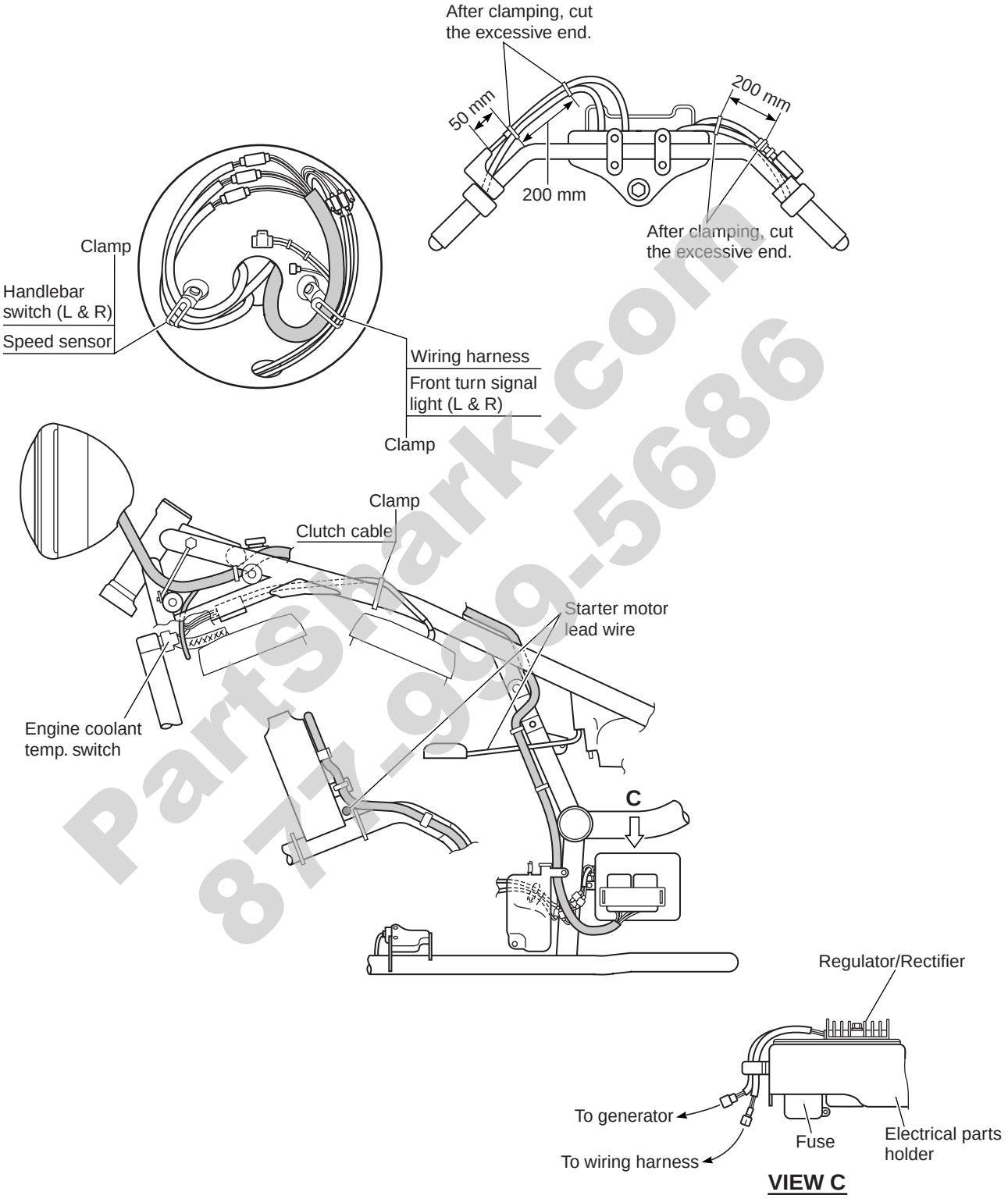


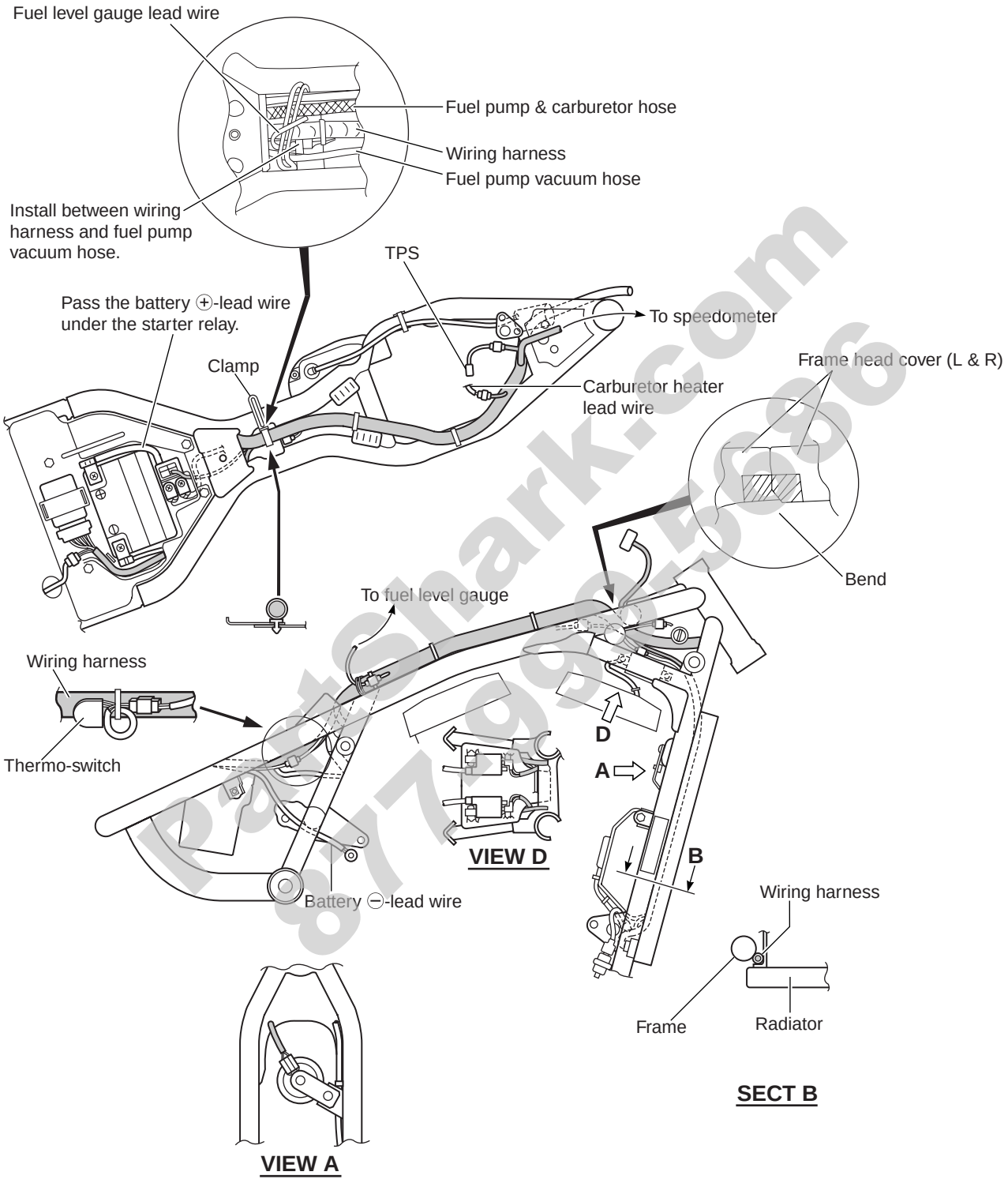
For E-24

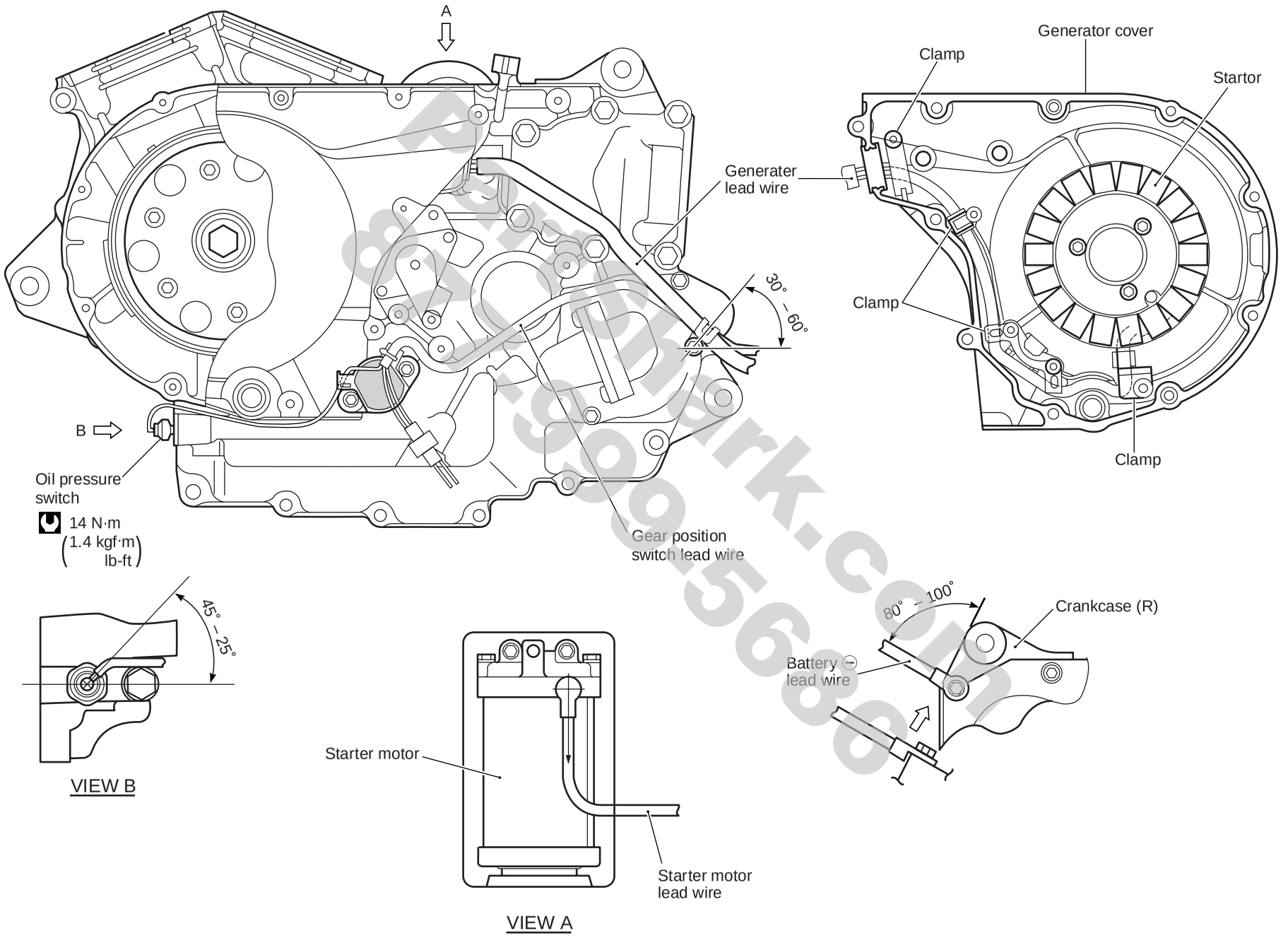


WIRE HARNESS, CABLE AND HOSE ROUTING

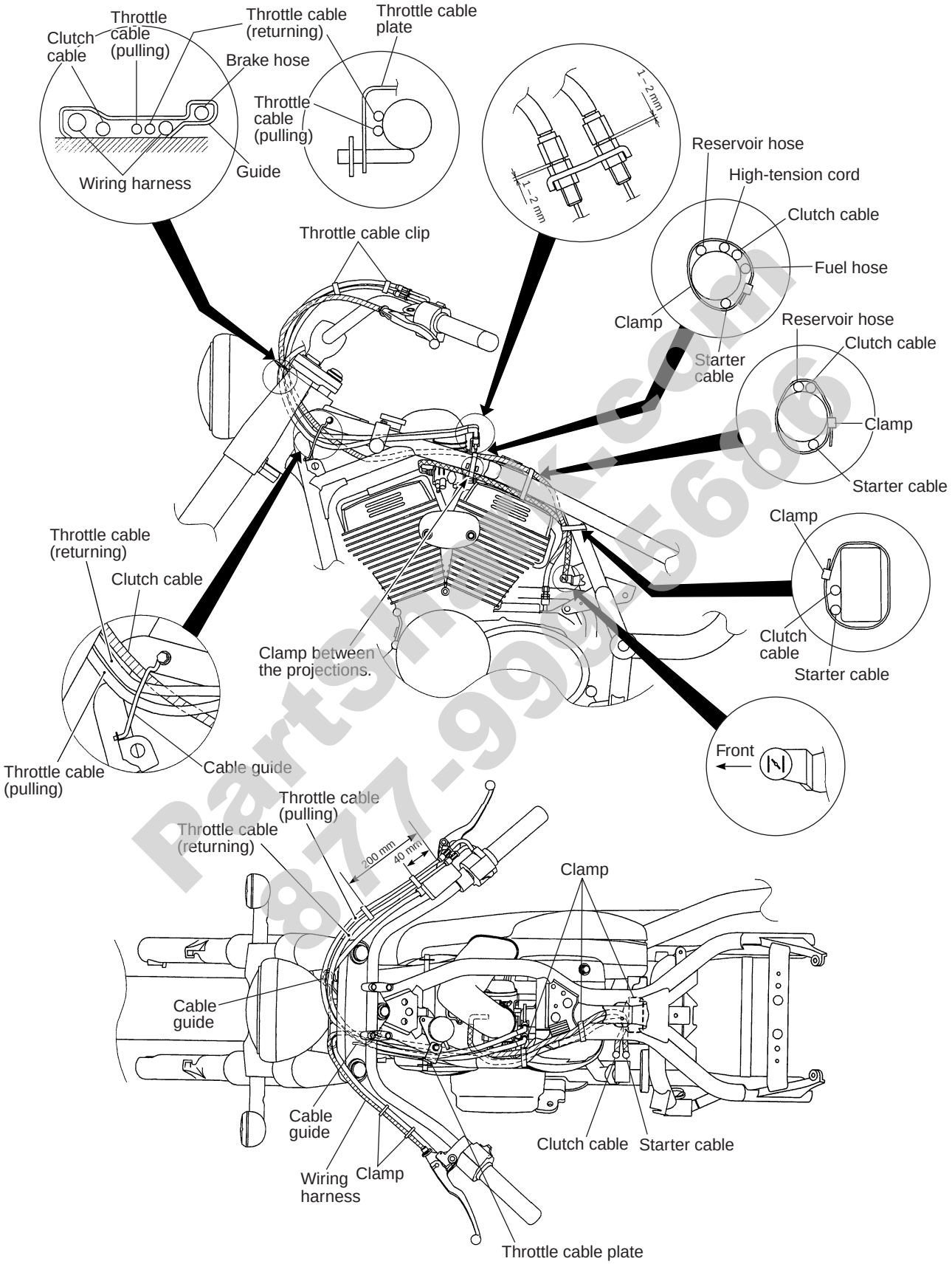
WIRE HARNESS ROUTING



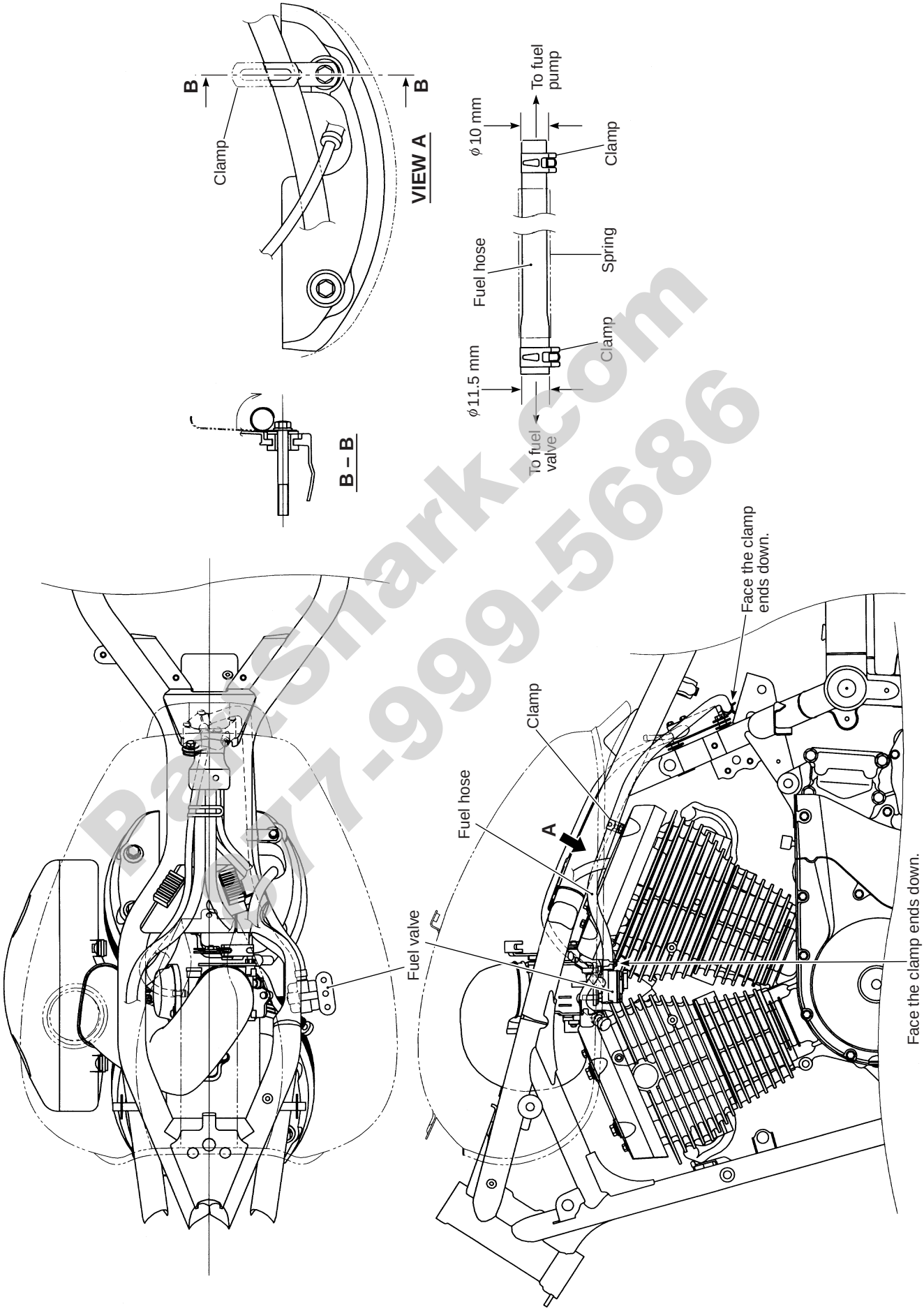




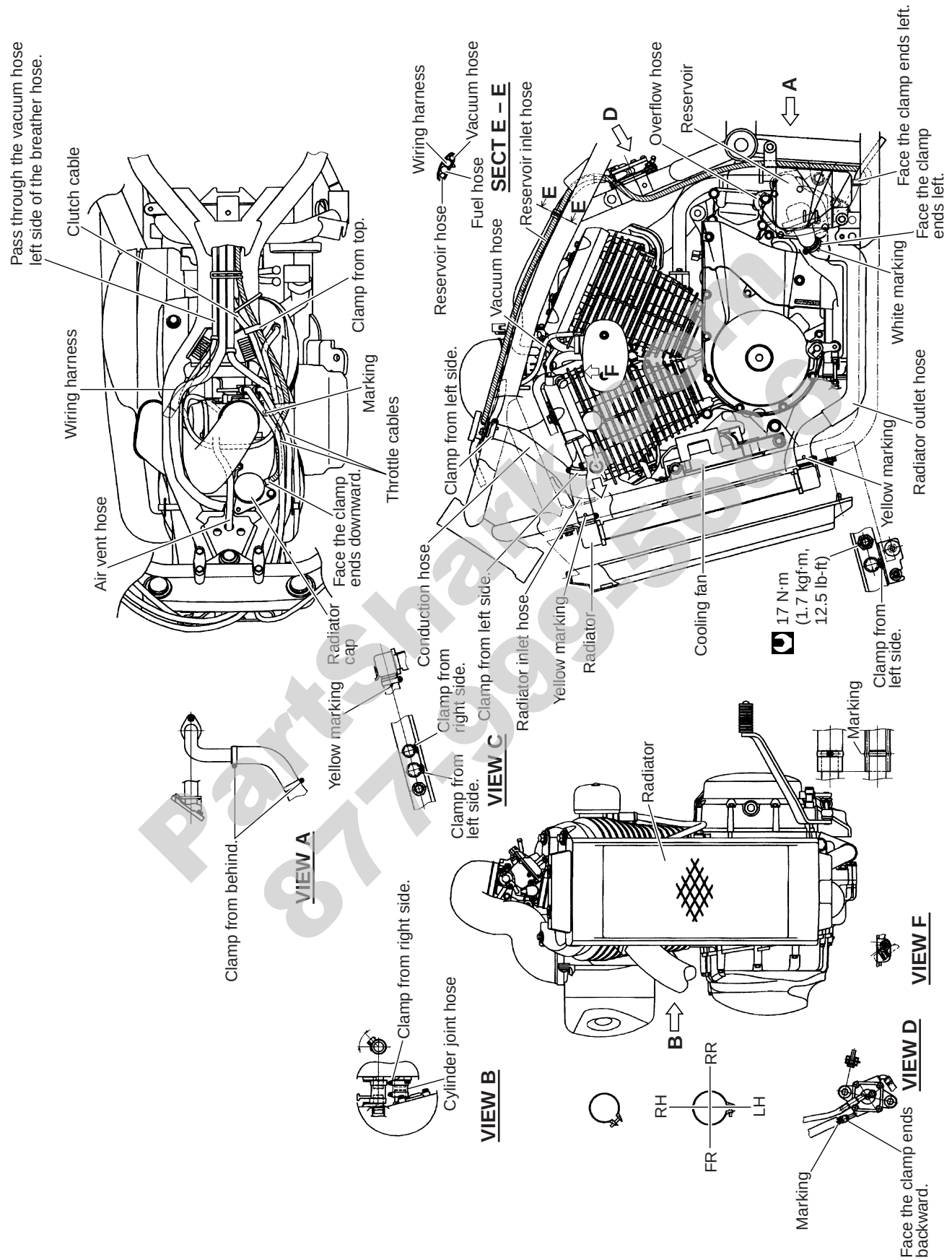
CABLE ROUTING



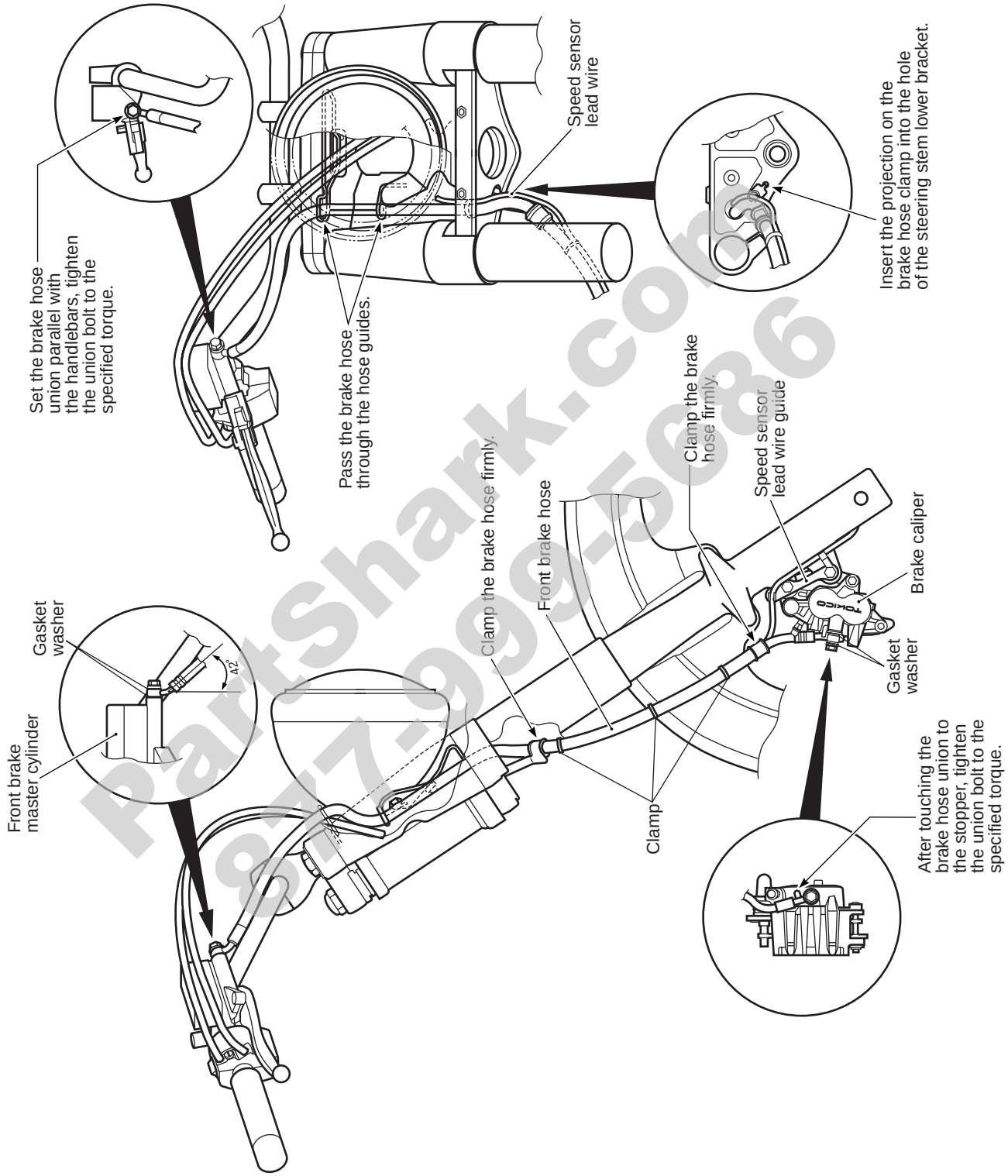
FUEL HOSE ROUTING



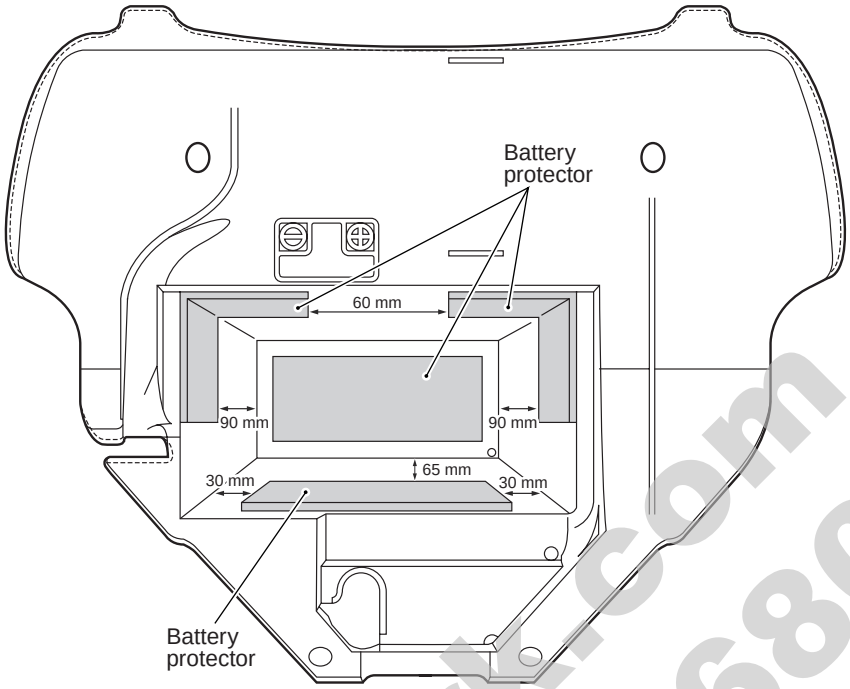
COOLING HOSE ROUTING



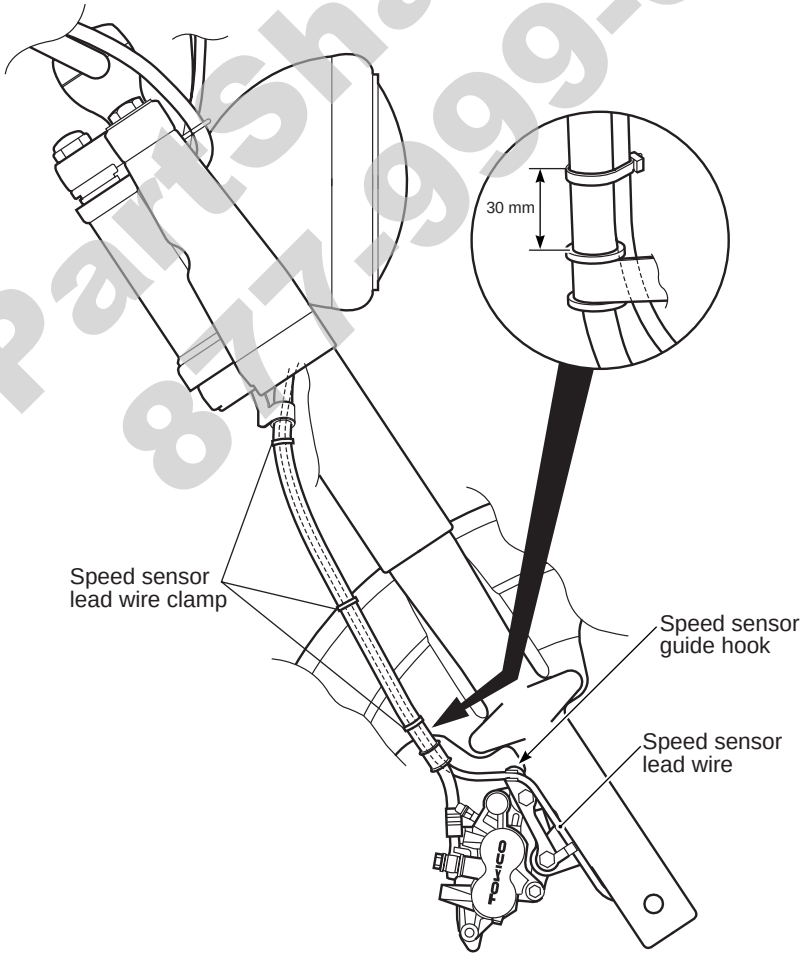
FRONT BRAKE HOSE ROUTING



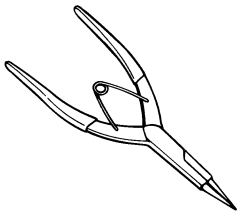
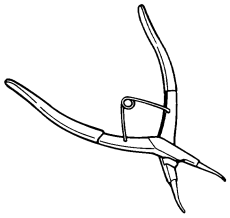
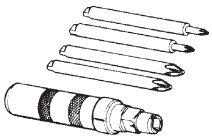
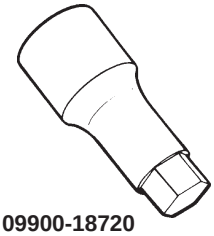
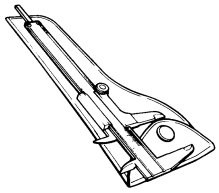
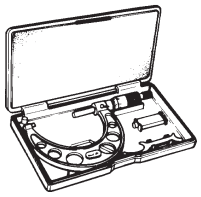
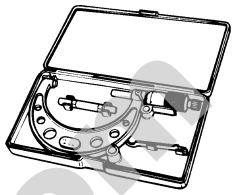
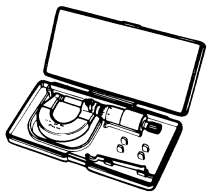
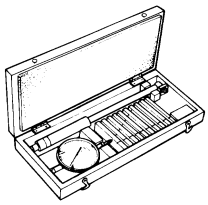
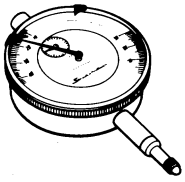
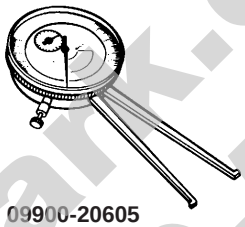
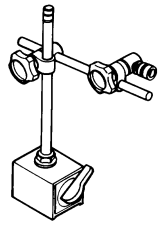
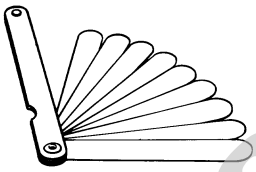
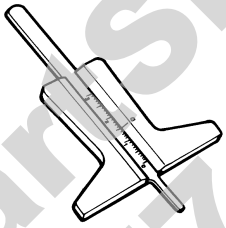
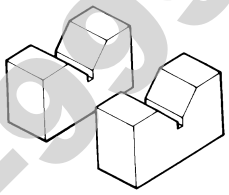
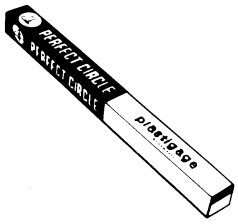
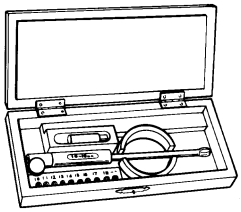
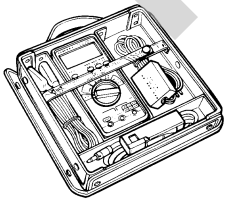
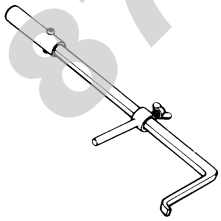
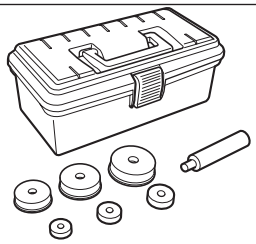
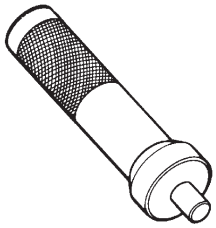
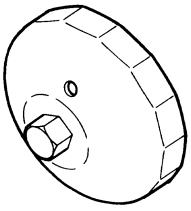
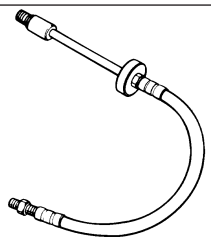
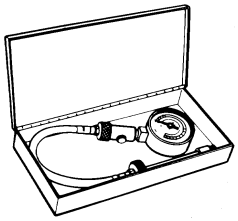
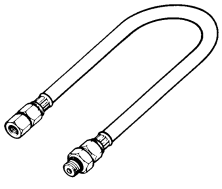
BATTERY PROTECTOR

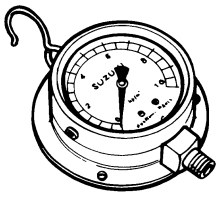
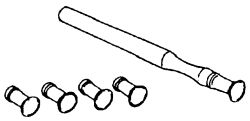
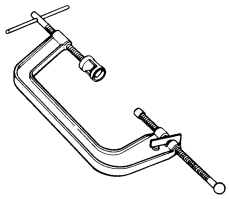
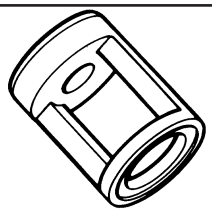
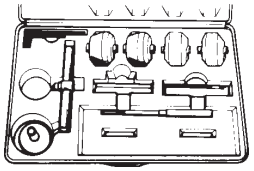
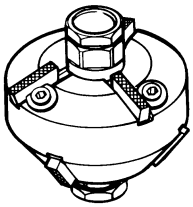
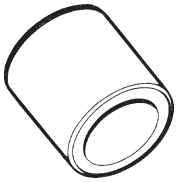
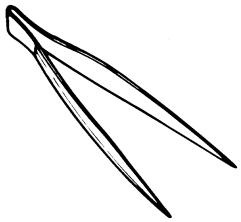
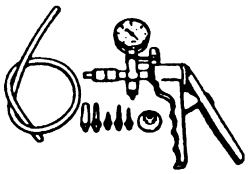
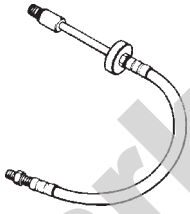
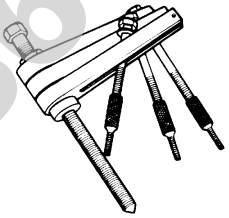
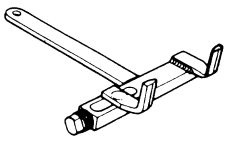
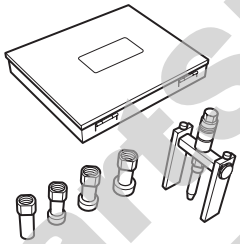
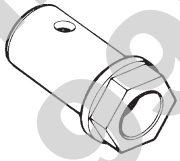
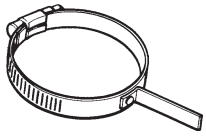
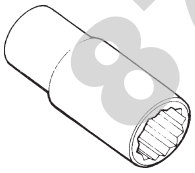
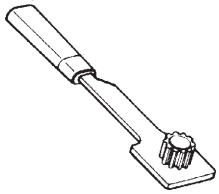
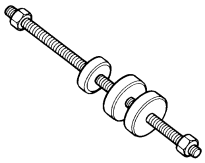
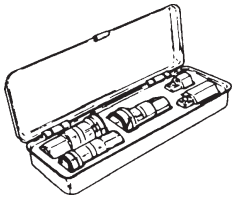
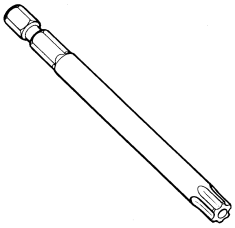
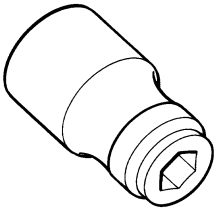
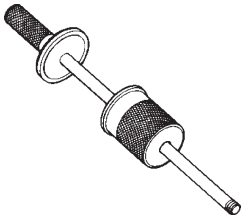
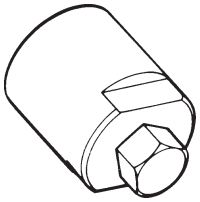
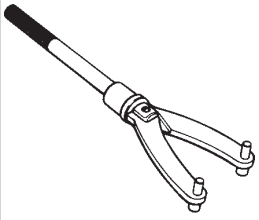


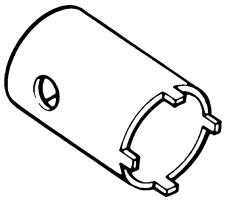
SPEED SENSOR LEAD WIRE ROUTING



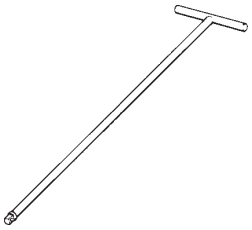
SPECIAL TOOLS

 09900-06107 Snap ring pliers	 09900-06108 Snap ring pliers	 09900-09004 Impact driver set	 09900-18710 Hexagon socket (12 mm)	 09900-18720 Hexagon socket (14 mm)
 09900-20102 Vernier calipers (200 mm)	 09900-20202 Micrometer (25 – 50 mm)	 09900-20203 Micrometer (50 – 75 mm)	 09900-20204 Micrometer (75 – 100 mm)	 09900-20205 Micrometer (0 – 25 mm)
 09900-20508 Cylinder gauge set	 09900-20602 Dial gauge (1/1000 mm, 1 mm)	 09900-20605 Dial calipers (10 – 34 mm)	 09900-20606 Dial gauge (1/100, mm, 10 mm)	 09900-20701 Magnetic stand
 09900-20803 Thickness gauge	 09900-20805 Tire depth gauge	 09900-21304 V-block (100 mm)	 09900-22302 Plastigauge	 09900-22403 Small bore gauge (18 – 35 mm)
 09900-25008 Multi circuit tester set	 09913-50121 Oil seal remover	 09913-70210 Bearing installer set	 09913-75821 Bearing installer	 09913-84510 Bearing installer
 09915-40610 Oil filter wrench	 09915-63210 Adaptor	 09915-77330 Compression gauge	 09915-74510 Oil pressure gauge hose	 09915-74532 Oil pressure gauge adaptor

 09915-77330 Meter (For high pressure)	 09916-10911 Valve lapper set	 09916-14510 Valve lifter	 09916-14910 Valve lifter attachment	 09916-21111 Valve seat cutter set
 09916-22430 Valve seat cutter (N-128)	 09916-34550 Valve guide reamer (5.5 mm)	 09916-34580 Valve guide reamer (10.8 mm)	 09916-44910 Valve guide remover/installer	 09916-44920 Valve guide installer attachment
 09916-84511 Tweezers	 09917-47010 Vacuum pump gauge	 09918-03810 Compression gauge adaptor	 09918-53810 Chain tensioner lock tool	 09920-13120 Crankcase & Shaft remover
 09920-53740 Clutch sleeve hub holder	 09921-20240 Bearing remover set	 09921-21820 Bearing retainer wrench	 09923-73210 Bearing remover	 09924-34510 Backlash measuring tool (27 – 50)
 09924-62410 Final drive gear bearing holder wrench	 09924-62430 22 mm Long socket	 09924-64510 Final drive gear coupring holder	 09924-84521 Bearing installer	 09930-10121 Spark plug wrench set
 09930-11920 Torx bit JT40H	 09930-11940 Bit holder	 09930-30102 Sliding shaft	 09930-33730 Rotor remover	 09930-40113 Rotor holder



09940-14911
Steering stem nut wrench



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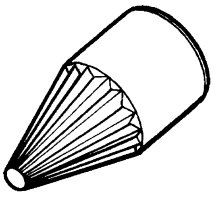

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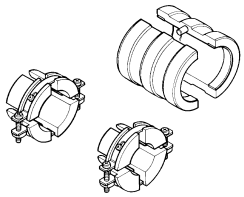
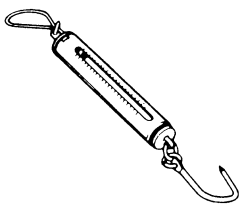
Attachment "A"



09940-52861
Front fork oil seal installer



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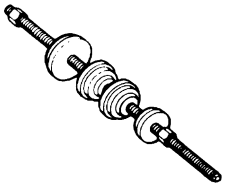
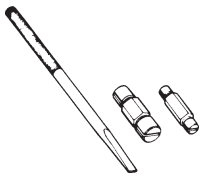
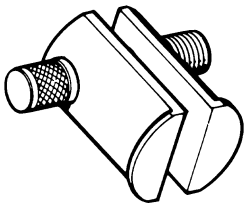


09941-34513
Steering outer race installer



09941-50111
Bearing remover set



09941-54911
Bearing outer race remover

09941-64511
Bearing remover

09941-74911
Steering bearing installer

09943-74111
Front fork oil level gauge

TIGHTENING TORQUE

ENGINE

ITEM			N·m	kgf·m	lb-ft
Rocker arm shaft			27	2.7	19.5
Cylinder head cover bolt		6 mm	10	1.0	7.0
		8 mm	25	2.5	18.0
Cylinder head bolt and nut	8 mm	Initial	10	1.0	7.0
		Final	25	2.5	18.0
	10 mm	Initial	25	2.5	18.0
		Final	38	3.8	27.5
Cam sprocket bolt			15	1.5	11.0
Cam chain tension adjuster mounting bolt			10	1.0	7.0
Cam chain tensioner bolt			10	1.0	7.0
Primary drive gear bolt			95	9.5	68.5
Clutch spring set bolt			10	1.0	7.0
Clutch sleeve hub nut			60	6.0	47.0
Driveshaft bolt			65	6.5	44.2
Secondary drive gear shaft nut			105	10.5	76.0
Secondary gear case bolt		Initial	15	1.5	11.0
		Final	22	2.2	16.0
Generator rotor bolt			160	16.0	115.5
Starter clutch allen bolt			26	2.6	19.0
Crankcase bolt	6 mm		11	1.1	8.0
	8 mm	Initial	15	1.5	11.0
		Final	22	2.2	16.0
Conrod cap nut		Initial	25	2.5	18.0
		Final	51	5.1	37.0
Oil pressure regulator			28	2.8	20.0
Oil pump mounting bolt			11	1.1	8.0
Oil pressure switch			14	1.4	10.0
Oil drain plug			21	2.1	15.0

ITEM		N·m	kgf·m	lb-ft
Oil plug	6 mm	6	0.6	4.3
	8 mm	18	1.8	13.0
	10 mm	15	1.5	11.0
	14 mm	23	2.3	16.5
	16 mm	35	3.5	25.5
Engine mounting bolt		79	7.9	57.0
Engine mounting bracket bolt		23	2.3	16.5
Frame mounting bolt/nut	8 mm	23	2.3	16.5
	10 mm	50	5.0	36.0
Exhaust pipe clamp bolt		23	2.3	16.5
Muffler mounting bolt		23	2.3	16.5
Speed sensor rotor bolt		100	10.0	72.5
Spark plug		18	1.8	13.0

SECONDARY AND FINAL

ITEM		N·m	kgf·m	lb-ft
Secondary drive bevel gear bearing retainer bolt		23	2.3	16.5
Secondary driven bevel gear bolt		23	2.3	16.5
Secondary driven bevel gear bearing stopper		105	10.5	76.0
Final gear case mounting nut		40	4.0	29.0
Final drive bevel gear coupling nut		100	10.0	72.5
Final drive bevel gear bearing stopper		110	11.0	79.5
Final gear case oil drain plug		23	2.3	16.5
Final gear case bolt	8 mm	23	2.3	16.5
	10 mm	50	5.0	36.0
Final driven bevel gear bearing retainer screw		9	0.9	6.5

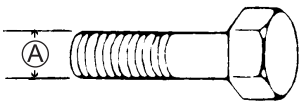
CHASSIS

ITEM	N·m	kgf·m	lb-ft
Front axle	65	6.5	47.0
Front axle pinch bolt	33	3.3	24.0
Brake disc bolt	23	2.3	16.5
Front fork cap bolt	45	4.5	33.1
Front fork spring stopper nut	35	3.5	25.5
Front fork damper rod bolt	20	2.0	14.5
Front fork lower clamp bolt	33	3.3	24.0
Steering stem head nut	90	9.0	65.0
Front master cylinder mounting bolt	10	1.0	7.0
Front brake caliper mounting bolt	39	3.9	28.0
Brake hose union bolt	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	55	5.5	40.0
Frame down tube mounting bolt (M8)	23	2.3	16.5
Frame down tube mounting bolt (M10)	50	5.0	36.0
Rear brake pedal bolt	11	1.1	8.0
Rear swingarm pivot bolt (Left)	100	10.0	72.5
Rear swingarm pivot bolt (Right)	9.5	0.95	7.0
Rear swingarm pivot bolt 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	78	7.8	57.5
Rear axle nut	65	6.5	47.0
Rear torque link nut (front)	35	3.5	25.5
Rear torque link nut (rear)	25	2.5	18.0
Rear brake cam lever bolt	10	1.0	7.3
Driven joint stopper bolt	10	1.0	7.0
Frame handle grip mounting bolt (M10)	50	5.0	36.0
Fuel level gauge mounting bolt	10	1.0	7.0

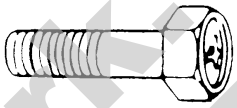
TIGHTENING TORQUE CHART

For other bolts and nuts listed previously, refer to this chart:

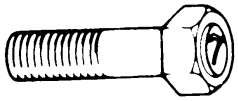
Bolt Diameter Ⓐ (mm)	Conventional or “4” marked bolt			“7” marked bolt		
	N·m	kgf·m	lb-ft	N·m	kgf·m	lb-ft
4	1.5	0.15	1.0	2.3	0.23	1.5
5	3	0.3	2.0	4.5	0.45	3.0
6	5.5	0.55	4.0	10	1.0	7.0
8	13	1.3	9.5	23	2.3	16.5
10	29	2.9	21.0	50	5.0	36.0
12	45	4.5	32.5	85	8.5	61.5
14	65	6.5	47.0	135	13.5	97.5
16	105	10.5	76.0	210	21.0	152.0
18	160	16.0	115.5	240	24.0	173.5



Conventional bolt



“4” marked bolt



“7” marked bolt

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	———
	EX.	26 (1.02)	———
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	———
	EX.	0.17 – 0.22 (0.007 – 0.009)	———
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	———
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	———
Valve stem deflection	IN. & EX.	———	0.35 (0.014)
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	———
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	———
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length	INNER	———	38.3 (1.51)
	OUTER	———	40.1 (1.58)
Valve spring tension	INNER	6.51 – 7.49 kgf (14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	———
	OUTER	12.09 – 13.91 kgf (26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	Front	IN.	35.95 – 35.99 (1.415 – 1.417)	35.65 (1.404)
		EX.	36.92 – 36.96 (1.454 – 1.455)	36.62 (1.442)
	Rear	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
		EX.	36.58 – 36.62 (1.440 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)			0.150 (0.0059)
Camshaft journal holder I.D.	No.1 Left side No.2 Right side		20.012 – 20.025 (0.7879 – 0.7884)	———
	No.1 Right side No.2 Left side		25.012 – 25.025 (0.9847 – 0.9852)	———
Camshaft journal O.D.	No.1 Left side No.2 Right side		19.959 – 19.980 (0.7858 – 0.7866)	———
	No.1 Right side No.2 Left side		24.959 – 24.980 (0.9826 – 0.9835)	———
Camshaft runout	———			0.10 (0.004)
Rocker arm I.D.	IN. & EX.		12.000 – 12.018 (0.4724 – 0.4731)	———
Rocker arm shaft O.D.	IN. & EX.		11.966 – 11.984 (0.4711 – 0.4718)	———
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	1 300 – 1 700 kPa (13 – 17 kgf/cm^2 185 – 242 psi)	1 100 kPa (11 kgf/cm^2 156 psi)
Compression pressure difference	———	200 kPa (2 kgf/cm^2 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)	0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)	83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.	82.880 (3.2630)
Cylinder distortion	———	0.05 (0.002)

ITEM	STANDARD		LIMIT
Piston ring free end gap	1st	Approx. 9.6 (0.38)	7.7 (0.30)
	2nd R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring groove clearance	1st	———	0.180 (0.007)
	2nd	———	0.150 (0.006)
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	———
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	———
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	———
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	———
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	———
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	———
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	———
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 pressure (at 60°C,140°F)	Above 350 kPa (3.5 kgf/cm^2, 50 psi) Below 650 kPa (6.5 kgf/cm^2, 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch cable play	10 – 15 (0.4 – 0.6)		———
Clutch release screw	1/4 turn back		
Drive plate thickness	No.1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No.2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.690 (71/42)		———
Secondary reduction ratio		1.133 (17/15)		———
Final reduction ratio		3.090 (34/11)		———
Gear ratios	Low	2.461 (32/13)		———
	2nd	1.631 (31/19)		———
	3rd	1.227 (27/22)		———
	4th	1.000 (25/25)		———
	Top	0.814 (22/27)		———
Shift fork to groove clearance		No.1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No.2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width		No.1	5.50 – 5.60 (0.217 – 0.220)	———
		No.2	4.50 – 4.60 (0.177 – 0.181)	———
Shift fork thickness		No.1	5.30 – 5.40 (0.209 – 0.213)	———
		No.2	4.30 – 4.40 (0.169 – 0.173)	———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		———
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	———
Damper spring free length	———		58.5 (2.30)

CARBURETOR

ITEM	SPECIFICATION		
	E-02, 19, 24	E-03, 28	E-33
Carburetor type	MIKUNI BDSR34	←	←
Bore size	34 mm	←	←
I.D. No.	41F1	41F2	41F3
Idle r/min.	1 100 ± 100 r/min.	←	←
Fuel level	—	—	—
Float height	7.0 ± 0.5 mm (2.76 ± 0.02 in)	←	←
Main jet (M.J.)	#132.5	#132.5	←
Main air jet (M.A.J.)	ϕ 1.8	←	←
Jet needle (J.N.)	5E22-3	5E23	←
Needle jet (N.J.)	P-0M	P-0M	←
Throttle valve (Th.V.)	#95	←	←
Pilot jet (P.J.)	#27.5	#27.5	←
Pilot screw (P.S.)	PRE-SET (3.0 turns back)	PRE-SET	←
Throttle cable play	2 – 4 mm (0.08 ± 0.16 in)	←	←

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		LIMIT
Thermostat valve opening temperature	Approximately 75 °C (167 °F)		———
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		———
Engine coolant temp. switch operating temperature	OFF → ON	Approximately 120°C (248°F)	———
	ON → OFF	Approximately 113°C (235.4°F)	———
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		———
Cooling fan thermoswitch operating temperature	OFF → ON	Approximately 105°C (221°F)	———
	ON → OFF	Approximately 100°C (212°F)	———
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiators, mixed with distilled water only, at the ratio of 50:50		———
Engine coolant capacity	1 500 ml (1.6 US qt, 1.3 lmp qt)		———

ELECTRICAL

Unit: mm (in)

ITEM	SPECIFICATION		NOTE
Firing order	1·2		
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.		
Ignition coil resistance	Primary	2 – 6 Ω	Terminal – Terminal
	Secondary	15 – 30 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage	More than 200 V		#1⊕:W, ⊖:Ground #2⊕:B/Y, ⊖:Ground
Generator coil resistance	Pickup coil	160 – 300 Ω	G – Bl
	Charging coil	0.2 – 1.5 Ω	Y – Y
Pickup coil peak voltage	More than 1.5 V		⊕: Bl, ⊖: G
Generator no-load voltage (When engine cold)	More than 70 V (AC) at 5 000 r/min.		Y – Y
Regulated voltage	14.0 – 15.5 V at 5 000 r/min.		
Generator maximum output	375 W at 5 000 r/min.		
Starter relay resistance	3 – 7 Ω		
Battery	Type designation	FTX12-BS	
	Capacity	12 V 36 kC (10Ah)/10HR	
Fuse size	Headlight HI	10 A	
	Headlight LO	10 A	
	Signal	15 A	
	Ignition	15 A	
	Meter	10 A	
	Main	30 A	
	Power source	10 A	

WATTAGE

Unit: W

ITEM	SPECIFICATION		
	E-03, 28, 33	E-24	The others
Headlight HI	60	←	←
Headlight LO	55	←	←
Position/Parking light			4
Brake light/Taillight	21/5	←	←
Turn signal light	21/5 (Front), 21 (Rear)	21	←
Speedometer light	LED	←	←
Water temp. meter light	LED	←	←
Turn signal indicator light	LED	←	←
High beam indicator light	LED	←	←
Neutral indicator light	LED	←	←
Oil pressure indicator light	LED	←	←

SUSPENSION

Unit: mm (in)

ITEM	STANDARD/SPECIFICATION	LIMIT
Front fork stroke	140 (5.51)	———
Front fork spring free length	551.7 (21.73)	540.6 (21.29)
Front fork oil level (without spring)	177 (6.96)	———
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	———
Front fork oil capacity (each leg)	412 ml (24.0 US oz, 25.0 lmp oz)	
Front fork spring adjuster	———	———
Rear shock absorber spring adjuster	4	———
Rear wheel travel	105 (4.13)	———
Swingarm pivot shaft runout	———	0.3 (0.01)

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal free travel		20 – 30 (0.8 – 1.2)	———
Rear brake pedal height		75 – 85 (3.0 – 3.3)	———
Brake drum I.D.	Rear	———	180.7 (7.11)
Brake disc thickness	Front	5.0 ± 0.2 (0.20 ± 0.01)	4.5 (0.18)
Brake disc runout		———	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	———
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	———
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	———
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	———
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)
Wheel rim size	Front	J16 × MT3.00 or J16M/C × MT3.00	———
	Rear	J15 M/C × MT4.00	———

TIRE

Unit: mm (in)

ITEM	STANDARD/SPECIFICATION		LIMIT
Cold inflation tire pressure (Solo riding)	Front	200 kPa (2.00 kgf/cm^2, 29 psi)	———
	Rear	250 kPa (2.50 kgf/cm^2, 36 psi)	———
Cold inflation tire pressure (Dual riding)	Front	200 kPa (2.00 kgf/cm^2, 29 psi)	———
	Rear	250 kPa (2.50 kgf/cm^2, 36 psi)	———
Tire size	Front	130/90-16 67H	———
	Rear	170/80-15 M/C 77H	———
Tire type	Front	IRC GS-23F	———
	Rear	IRC GS-23R	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

FUEL + OIL + COOLANT

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane ($\frac{R+M}{2}$) 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.		Other models
Fuel tank including reserve	17.0 L (4.5/3.7 US/lmp gal)		
reserve (flicker)	1.5 L (0.4/0.3 US/lmp gal)		
Engine oil type	SAE 10W/40, API SF or SG		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/lmp qt)	
	Filter change	3 400 ml (3.6/3.0 US/lmp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/lmp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/lmp oz)		
Brake fluid type	DOT 4		
Coolant capacity	1 500 ml (1.6/1.3 US/lmp qt)		

EMISSION CONTROL INFORMATION

CONTENTS

EMISSION CONTROL CARBURETOR COMPONENTS

VL800 motorcycles are equipped with precision, manufactured carburetors for emission level control. These caburetors require special mixture control components and other precision adjustments to function properly.

There are several carburetor mixture control components in each carburetor assembly. Three (3) of these components are machined to much closer tolerances than standard machined carburetor jets. These three (3) particular jets–MAIN JET, NEEDLE JET, PILOT JET–must not be replaced by standard jets. To aid in identifying these three (3) jets a different design of letter and number are used. If replacement of these close tolerance jets becomes necessary, be sure to replace them with the same type close tolerance jets marked as in the examples shown below.

The jet needle is also of special manufacture. Only one clip position is provided on the jet needle. If replacement becomes necessary the jet needle may only be replaced with an equivalent performing replacement component. Suzuki recommends that Genuine Suzuki Parts be utilized whenever possible for the best possible performance and durability.

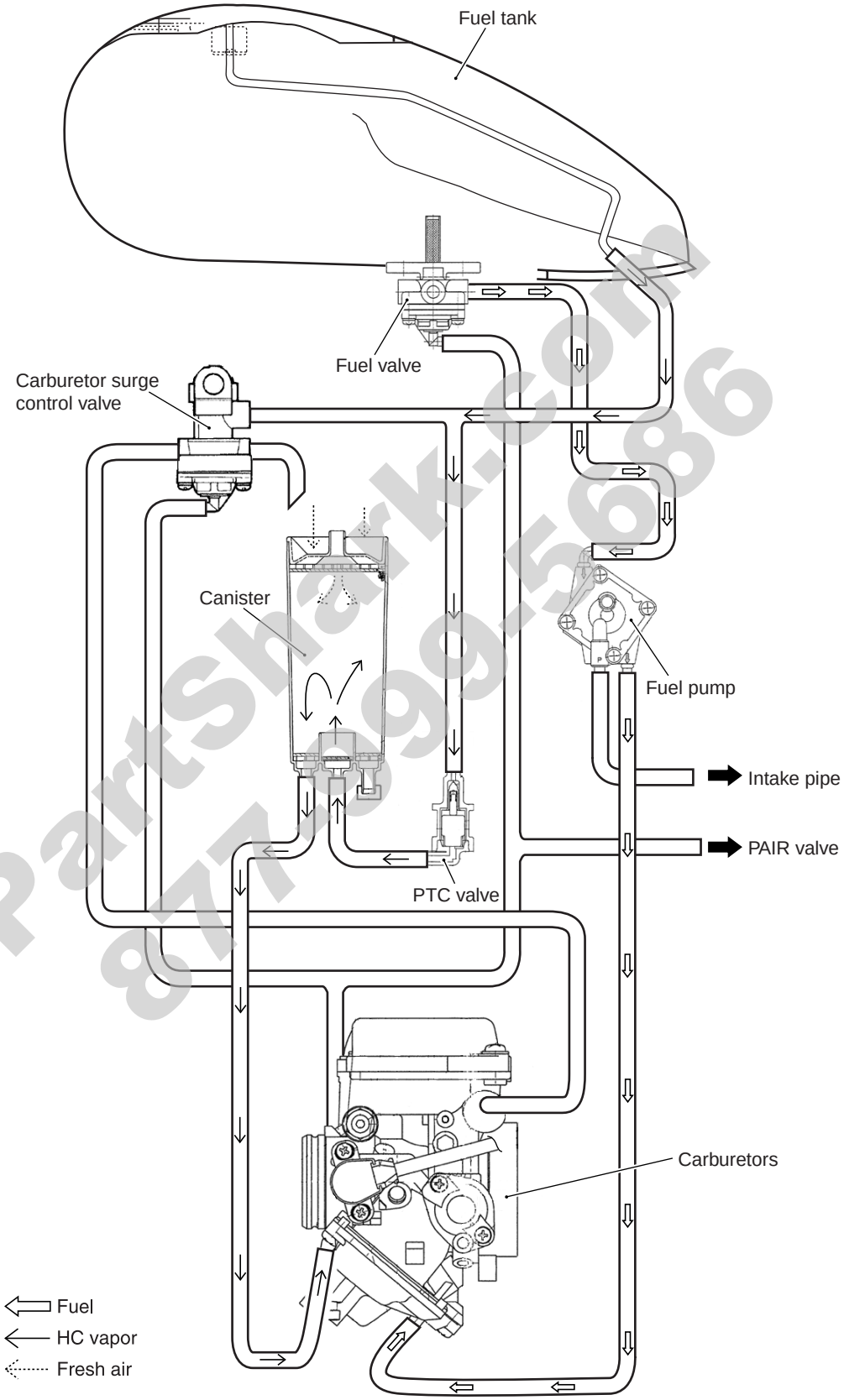
Conventional Figures Used on Standard Tolerance Jet Components

Emission Type Figures Used on Close Tolerance Jet Components	1 2 3 4 5 6 7 8 9 0
The carburetor specifications for the emission-controlled VL800 are as follows.	1 2 3 4 5 6 7 8 9 0

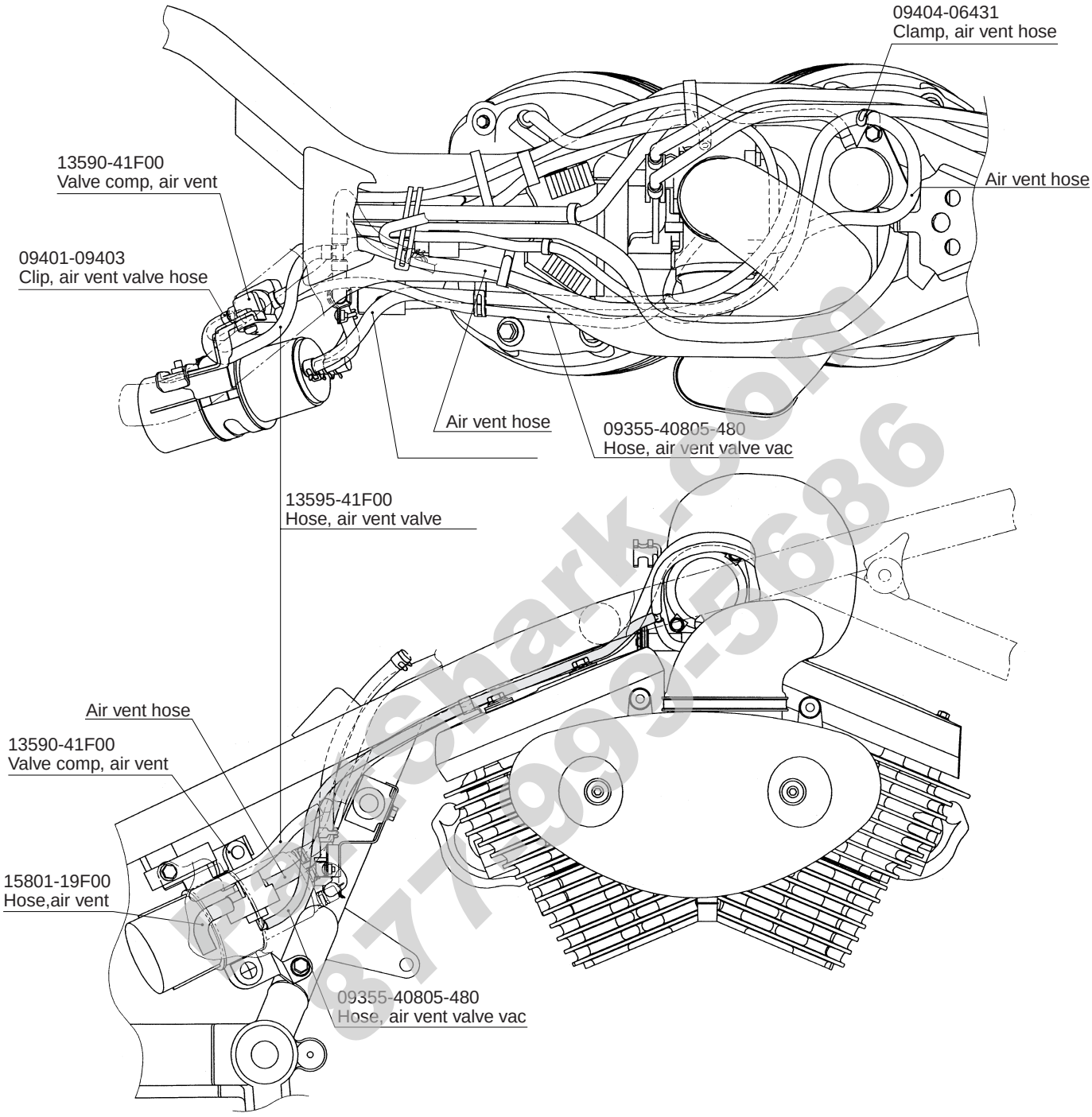
Carburetor I. D. No.	Main Jet	Needle Jet	Jet Needle	Pilot Jet	Pilot Screw
41F3 (California model only)	#132.5	P-0M	5E23	#27.5	PRE-SET DO NOT ADJUST
41F2					

Adjusting, interferring with, improper replacement, or resetting of any of the carburetor components may adversely affect carburetor performance and cause the motorcycle to exceed the exhaust emission level limits. If unable to effect repairs, contact the distributors representative for further technical information and assistance.

EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA MODEL ONLY)



CANISTER HOSE ROUTING



EVAPORATIVE EMISSION CONTROL SYSTEM INSPECTION

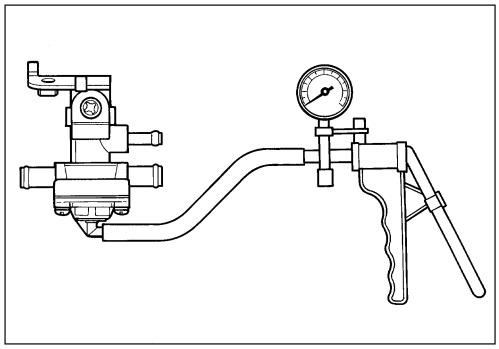
HOSES

Inspect the hoses and pipes for wear or damage.
Inspect the hoses and pipes for connection.

CANISTER

Inspect the canister for damage of the body.

CARBURETOR SURGE CONTROL VALVE



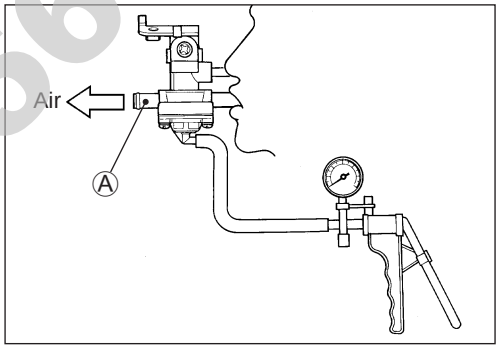
- Remove the carbretor surge control valve.
- Connect the vacuum pump to the vacuum port as shown.
- Apply the specified negative pressure to the carburetor surge control valve.
- The specified negative pressure must be maintained.
- Replace the carburetor surge control valve if negative pressure is not maintained.

DATA Negative pressure: 2.7 kPa (20 mm Hg)

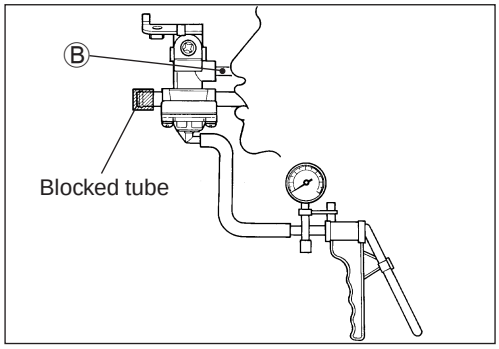
TOOL 09917-47010: Vacuum pump gauge

⚠ CAUTION

Use a hand operated vacuum pump to prevent the control valve damage.

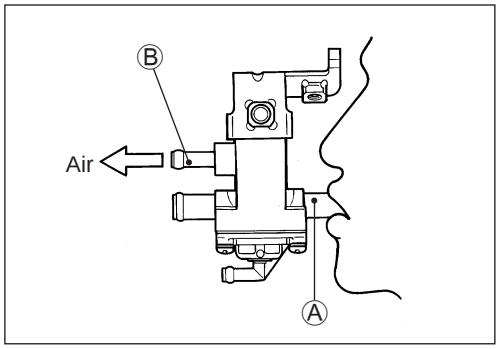


- While applying the specified negative pressure to the carburetor surge control valve vacuum port, blow air through the open air port.
- Air should flow through the carburetor surge control valve and out the air vent port Ⓐ.
- Replace the carburetor surge control valve if air does not flow out air vent port Ⓐ.

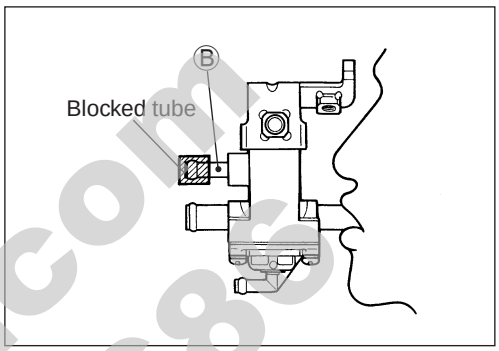


- Plug the air vent port Ⓐ.
- While applying the specified negative pressure to the carburetor surge control valve vacuum port, blow air through the open air port.
- Air should not flow through the carburetor surge control valve and out the canister port Ⓑ.
- Replace the carburetor surge control valve if air leaks out the canister port Ⓑ.

- Remove the vacuum pump and blow air through the air vent port Ⓐ.
- Air should flow through the carburetor surge control valve and out the canister port Ⓑ.
- Replace the carbretor surge control valve if air does not flow out the canister port Ⓑ.



- Plug the canister port Ⓑ.
- Air should not flow through the carburetor surge control valve and out the open air port.
- Replace the carburetor surge control valve if air leaks out the open air port.



VL800K2 ('02-MODEL)

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CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 510 mm (98.818 in)
Overall width	985 mm (38.779 in)
Overall height	1 110 mm (43.700 in)
Wheelbase	1 650 mm (64.960 in)
Ground clearnce	140 mm (5.511 in)
Seat height	700 mm (27.559 in)
Dry mass	239 kg (53.727 lbs)

ENGINE

Type	Four-stroke, Liquid-cooled, OHC
Number of cylinders	2
Bore	83 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Carburetor	BDSR34
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

TRANSMISSION

Clutch		Wet multi-plate type
Transmission		5-speed, constant mesh
Gearshift pattern		1-down, 4-up
Primary reduction ratio		1.690 (71/42)
Secondary reduction ratio		1.133 (17/15)
Final reduction ratio		3.090 (34/11)
Gear ratios,	Low	2.461 (32/13)
	2nd	1.631 (31/19)
	3rd	1.227 (27/22)
	4th	1.000 (25/25)
	Top	0.814 (22/27)
Drive system		Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Link type, coil spring, oil damped, spring pre-load 7-way adjustable
Steering angle	38° (right & left)
Caster	33° 20'
Trail	141 mm (3.55 in)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake
Rear brake	Drum brake
Front tire size	130/90-16 67H, tube or 130/90-16M/C 67H, tube
Rear tire size	170/80-15M/C 77H, tube
Front fork stroke	140 mm (5.5 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	5° B.T.D.C. at 1 110 r/min
Spark plug	NGK: DPR8EA-9 or DENSO: X24EPR-U9
Battery	12 V 36 kC (10 Ah)/10HR
Generator	Three-phase A.C. Generator
Main fuse	30 A
Fuse	15/15/10/10/10/10 A
Headlight	12 V 60/55 W
Position/parking light	12 V 4 W ..... Except for E-03, 24, 28, 33
Front turn signal light	12 V 21 W E-02, 19, 24
	12 V 21/5 W E-03, 28, 33
Rear turn signal light	12 V 21 W
Brake light/Taillight	12 V 21/5 W
Speedometer light	LED
Neutral indicator light	LED
High beam indicator light	LED
Turn signal indicator light	LED
Oil pressure light	LED

CAPACITIES

Fuel tank	17.0 L (4.5/3.7 US/lmp gal)
Engine oil, oil change	3 000 ml (3.2/2.6 US/lmp qt)
with filter change	3 400 ml (3.6/3.0 US/lmp qt)
overhaul	3 700 ml (3.9/3.3 US/lmp qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/lmp qt)
Engine coolant	1 500 ml (1.5/1.3 US/lmp qt)
Front fork oil (each leg)	412 ml (13.9/14.5 US/lmp oz)

These specifications are subject to change without notice.

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	———
	EX.	26 (1.02)	———
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	———
	EX.	0.17 – 0.22 (0.007 – 0.009)	———
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	———
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	———
Valve stem deflection	IN. & EX.	———	0.35 (0.014)
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	———
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	———
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	———
Valve stem runout	IN. & EX.	———	0.05 (0.002)
Valve head thickness	IN. & EX.	———	0.5 (0.02)
Valve stem end length	IN. & EX.	———	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	———
Valve head radial runout	IN. & EX.	———	0.03 (0.001)
Valve spring free length	INNER	———	38.3 (1.51)
	OUTER	———	40.1 (1.58)
Valve spring tension	INNER	6.51 – 7.49 kgf (14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	———
	OUTER	12.09 – 13.91 kgf (26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	Front	IN.	35.95 – 35.99 (1.415 – 1.417)	35.65 (1.404)
		EX.	36.92 – 36.96 (1.454 – 1.455)	36.62 (1.442)
	Rear	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
		EX.	36.58 – 36.62 (1.440 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)			0.150 (0.0059)
Camshaft journal holder I.D.	No.1 Left side No.2 Right side		20.012 – 20.025 (0.7879 – 0.7884)	———
	No.1 Right side No.2 Left side		25.012 – 25.025 (0.9847 – 0.9852)	———
Camshaft journal O.D.	No.1 Left side No.2 Right side		19.959 – 19.980 (0.7858 – 0.7866)	———
	No.1 Right side No.2 Left side		24.959 – 24.980 (0.9826 – 0.9835)	———
Camshaft runout	———			0.10 (0.004)
Rocker arm I.D.	IN. & EX.		12.000 – 12.018 (0.4724 – 0.4731)	———
Rocker arm shaft O.D.	IN. & EX.		11.966 – 11.984 (0.4711 – 0.4718)	———
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	1 300 – 1 700 kPa (13 – 17 kgf/cm^2 185 – 242 psi)	1 100 kPa (11 kgf/cm^2 156 psi)
Compression pressure difference	———	200 kPa (2 kgf/cm^2 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)	0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)	83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.	82.880 (3.2630)
Cylinder distortion	———	0.05 (0.002)

ITEM	STANDARD		LIMIT
Piston ring free end gap	1st	Approx. 9.6 (0.38)	7.7 (0.30)
	2nd R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring groove clearance	1st	———	0.180 (0.007)
	2nd	———	0.150 (0.006)
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	———
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	———
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	———
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	———
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	———
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	———
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	———
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 pressure (at 60°C,140°F)	Above 350 kPa (3.5 kgf/cm^2, 50 psi) Below 650 kPa (6.5 kgf/cm^2, 92 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch cable play	10 – 15 (0.4 – 0.6)		———
Clutch release screw	1/4 turn back		
Drive plate thickness	No.1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No.2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	———		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.690 (71/42)		———
Secondary reduction ratio		1.133 (17/15)		———
Final reduction ratio		3.090 (34/11)		———
Gear ratios	Low	2.461 (32/13)		———
	2nd	1.631 (31/19)		———
	3rd	1.227 (27/22)		———
	4th	1.000 (25/25)		———
	Top	0.814 (22/27)		———
Shift fork to groove clearance		No.1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No.2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width		No.1	5.50 – 5.60 (0.217 – 0.220)	———
		No.2	4.50 – 4.60 (0.177 – 0.181)	———
Shift fork thickness		No.1	5.30 – 5.40 (0.209 – 0.213)	———
		No.2	4.30 – 4.40 (0.169 – 0.173)	———

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		———
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	———
Damper spring free length	———		58.5 (2.30)

CARBURETOR

ITEM	SPECIFICATION		
	E-02, 19, 24	E-03, 28	E-33
Carburetor type	MIKUNI BDSR34	←	←
Bore size	34 mm	←	←
I.D. No.	41F1	41F2	41F3
Idle r/min.	1 100 ± 100 r/min.	←	←
Fuel level	9 ± 1.0 mm (0.35 ± 0.04 in)	←	←
Float height	7.0 ± 0.5 mm (2.76 ± 0.02 in)	←	←
Main jet (M.J.)	#132.5	#132.5	←
Jet needle (J.N.)	5E22-3rd	5E23	←
Needle jet (N.J.)	P-0M	P-0M	←
Throttle valve (Th.V.)	#95	←	←
Pilot jet (P.J.)	#27.5	#27.5	←
Pilot air jet (P.A.J.)	#55	←	←
Pilot screw (P.S.)	PRE-SET (3.0 turns back)	PRE-SET	←
Throttle cable play	2 – 4 mm (0.08 ± 0.16 in)	←	←

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		LIMIT
Thermostat valve opening temperature	Approximately 75 °C (167 °F)		———
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		———
Engine coolant temp. switch operating temperature	OFF → ON	Approximately 120°C (248°F)	———
	ON → OFF	Approximately 113°C (235.4°F)	———
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm^2, 13.5 – 17.8 psi)		———
Cooling fan thermoswitch operating temperature	OFF → ON	Approximately 105°C (221°F)	———
	ON → OFF	Approximately 100°C (212°F)	———
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiators, mixed with distilled water only, at the ratio of 50:50		———
Engine coolant capacity	1 500 ml (1.6 US qt, 1.3 lmp qt)		———

ELECTRICAL

Unit: mm (in)

ITEM	SPECIFICATION		NOTE
Firing order	1·2		
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.		
Ignition coil resistance	Primary	2 – 6 Ω	Terminal – Terminal
	Secondary	15 – 30 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage	More than 200 V		#1⊕:W, ⊖:Ground #1⊕:B/Y, ⊖:Ground
Generator coil resistance	Pickup coil	160 – 300 Ω	G – Bl
	Charging coil	0.2 – 1.5 Ω	Y – Y
Pickup coil peak voltage	More than 1.5 V		⊕: Bl, ⊖: G
Signal coil peak voltage			⊕: B, ⊖: W
Generator no-load voltage (When engine cold)	More than 70 V (AC) at 5 000 r/min.		Y – Y
Regulated voltage	14.0 – 15.5 V at 5 000 r/min.		
Generator maximum output	375 W at 5 000 r/min.		
Starter relay resistance	3 – 7 Ω		
Battery	Type designation	FTX12-BS	
	Capacity	12 V 36 kC (10Ah)/10HR	
Fuse size	Headlight HI	10 A	
	Headlight LO	10 A	
	Signal	15 A	
	Ignition	15 A	
	Meter	10 A	
	Main	30 A	
	Power source	10 A	

WATTAGE

Unit: W

ITEM	SPECIFICATION		
	E-03, 28, 33	E-24	The others
Headlight HI	60	←	←
Headlight LO	55	←	←
Position/Parking light			4
Brake light/Taillight	21/5	←	←
Turn signal light	21/5 (Front), 21 (Rear)	21	←
Speedometer light	LED	←	←
Water temp. meter light	LED	←	←
Turn signal indicator light	LED	←	←
High beam indicator light	LED	←	←
Neutral indicator light	LED	←	←
Oil pressure indicator light	LED	←	←

SUSPENSION

Unit: mm (in)

ITEM	STANDARD/SPECIFICATION	LIMIT
Front fork stroke	140 (5.51)	———
Front fork spring free length	551.7 (21.73)	540.6 (21.29)
Front fork oil level (without spring)	177 (6.96)	———
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	———
Front fork oil capacity (each leg)	412 ml (24.0 US oz, 25.0 lmp oz)	
Front fork spring adjuster	———	———
Rear shock absorber spring adjuster	4	———
Rear wheel travel	105 (4.13)	———
Swingarm pivot shaft runout	———	0.3 (0.01)

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20 – 30 (0.8 – 1.2)		———
Rear brake pedal height	75 – 85 (3.0 – 3.3)		———
Brake drum I.D.	Rear	———	180.7 (7.11)
Brake disc thickness	Front	5.0 ± 0.2 (0.20 ± 0.01)	4.5 (0.18)
Brake disc runout	———		0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	———
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	———
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	———
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	———
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)
Wheel rim size	Front	J16 × MT3.00 or J16M/C × MT3.00	———
	Rear	J15 M/C × MT4.00	———

TIRE

Unit: mm (in)

ITEM	STANDARD/SPECIFICATION		LIMIT
Cold inflation tire pressure (Solo riding)	Front	200 kPa (2.00 kgf/cm^2, 29 psi)	———
	Rear	250 kPa (2.50 kgf/cm^2, 36 psi)	———
Cold inflation tire pressure (Dual riding)	Front	200 kPa (2.00 kgf/cm^2, 29 psi)	———
	Rear	250 kPa (2.50 kgf/cm^2, 36 psi)	———
Tire size	Front	130/90-16 67H or 130/90-16M/C 67H	———
	Rear	170/80-15 M/C 77H	———
Tire type	Front	IRC GS-23F	———
	Rear	IRC GS-23R	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

FUEL + OIL + COOLANT

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane ($\frac{R+M}{2}$) 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.		Other models
Fuel tank including reserve	17.0 L (4.5/3.7 US/Imp gal)		
reserve (flicker)	1.5 L (0.4/0.3 US/Imp gal)		
Engine oil type	SAE 10W/40, API SF or SG		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 400 ml (3.6/3.0 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)		
Brake fluid type	DOT 4		
Coolant capacity	1 500 ml (1.6/1.3 US/Imp qt)		

VL800K3 ('03-MODEL)

12

This chapter describes service data, service specifications and servicing procedures which differ from those of the VL800K2 ('02-MODEL).

NOTE:
** Please refer to the chapter 1 through 11 for details which are not given in this chapter.*

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 510 mm (98.8 in)
Overall width	985 mm (38.7 in)
Overall height	1 100 mm (43.3 in)
Wheelbase	1 655 mm (65.2 in)
Ground clearnce	140 mm (5.5 in)
Seat height	700 mm (27.6 in)
Dry mass	241 kg (53.1 lbs)

ENGINE

Type	Four-stroke, Liquid-cooled, OHC
Number of cylinders	2
Bore	83 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Carburetor	BDSR34
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	5-speed, constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.690 (71/42)
Secondary reduction ratio	1.133 (17/15)
Final reduction ratio	3.090 (34/11)
Gear ratios, Low	2.461 (32/13)
2nd	1.631 (31/19)
3rd	1.227 (27/22)
4th	1.000 (25/25)
Top	0.814 (22/27)
Drive system	Shaft drive

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Link type, coil spring, oil damped, spring pre-load 7-way adjustable
Steering angle	38° (right & left)
Caster	33° 20'
Trail	141 mm (3.55 in)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake
Rear brake	Drum brake
Front tire size	130/90-16M/C 67H, tube
Rear tire size	170/80-15M/C 77H, tube
Front fork stroke	140 mm (5.5 in)
Rear wheel travel	105 mm (4.1 in)

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	5° B.T.D.C. at 1 100 r/min
Spark plug	NGK: DPR7EA-9 or DENSO: X22EPR-U9
Battery	12 V 36 kC (10 Ah)/10HR
Generator	Three-phase A.C. Generator
Main fuse	30 A
Fuse	15/15/10/10/10/10 A
Headlight	12 V 60/55 W
Position/parking light	12 V 4 W .....Except E-03, 24, 28, 33
Front turn signal light	12 V 21 W E-02, 19, 24
	12 V 21/5 W E-03, 28, 33
Rear turn signal light	12 V 21 W
Brake light/Taillight	12 V 21/5 W
Speedometer light	LED
Neutral indicator light	LED
High beam indicator light	LED
Turn signal indicator light	LED
Oil pressure warning light	LED

CAPACITIES

Fuel tank	17.0 L (4.5/3.7 US/Imp gal)
Engine oil, oil change	3 000 ml (3.2/2.6 US/Imp qt)
with filter change	3 400 ml (3.6/3.0 US/Imp qt)
overhaul	3 700 ml (3.9/3.3 US/Imp qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp qt)
Engine coolant	1 500 ml (1.5/1.3 US/Imp qt)
Front fork oil (each leg)	412 ml (13.9/14.5 US/Imp oz)

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	—
	EX.	26 (1.02)	—
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	—
	EX.	0.17 – 0.22 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	INNER	—	38.3 (1.51)
	OUTER	—	40.1 (1.58)
Valve spring tension	INNER	6.51 – 7.49 kgf (14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	—
	OUTER	12.09 – 13.91 kgf (26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	Front	IN.	35.95 – 35.99 (1.415 – 1.417)	35.65 (1.404)
		EX.	36.92 – 36.96 (1.454 – 1.455)	36.62 (1.442)
	Rear	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
		EX.	36.58 – 36.62 (1.440 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)			0.150 (0.0059)
Camshaft journal holder I.D.	No.1 Left side No.2 Right side		20.012 – 20.025 (0.7879 – 0.7884)	—
	No.1 Right side No.2 Left side		25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	No.1 Left side No.2 Right side		19.959 – 19.980 (0.7858 – 0.7866)	—
	No.1 Right side No.2 Left side		24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	—			0.10 (0.004)
Rocker arm I.D.	IN. & EX.		12.000 – 12.018 (0.4724 – 0.4731)	—
Rocker arm shaft O.D.	IN. & EX.		11.966 – 11.984 (0.4711 – 0.4718)	—
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	1 300 – 1 700 kPa (13 – 17 kgf/cm^2, 185 – 242 psi)	1 100 kPa (11 kgf/cm^2, 156 psi)
Compression pressure difference	—	200 kPa (2 kgf/cm^2, 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)	0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)	83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.	82.880 (3.2630)
Cylinder distortion	—	0.05 (0.002)

ITEM	STANDARD			LIMIT
Piston ring free end gap	1st		Approx. 9.6 (0.38)	7.7 (0.30)
	2nd	R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring groove clearance	1st		—	0.180 (0.007)
	2nd		—	0.150 (0.006)
Piston ring groove width	1st		1.01 – 1.03 (0.0398 – 0.0406)	—
	2nd		1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil		2.51 – 2.53 (0.0988 – 0.0996)	—
Piston ring thickness	1st		0.970 – 0.990 (0.0382 – 0.0390)	—
	2nd		1.170 – 1.190 (0.0461 – 0.0469)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)			20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)			19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	—
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	—
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 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
Clutch cable play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		
Drive plate thickness	No.1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No.2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.690 (71/42)		—
Secondary reduction ratio		1.133 (17/15)		—
Final reduction ratio		3.090 (34/11)		—
Gear ratios	Low	2.461 (32/13)		—
	2nd	1.631 (31/19)		—
	3rd	1.227 (27/22)		—
	4th	1.000 (25/25)		—
	Top	0.814 (22/27)		—
Shift fork to groove clearance		No.1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No.2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width		No.1	5.50 – 5.60 (0.217 – 0.220)	—
		No.2	4.50 – 4.60 (0.177 – 0.181)	—
Shift fork thickness		No.1	5.30 – 5.40 (0.209 – 0.213)	—
		No.2	4.30 – 4.40 (0.169 – 0.173)	—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		—
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	—
Damper spring free length	—		58.5 (2.30)

CARBURETOR

ITEM	SPECIFICATION		
	E-02, 19, 24	E-03, 28	E-33
Carburetor type	MIKUNI BDSR34	←	←
Bore size	34 mm	←	←
I.D. No.	41F1	41F2	41F3
Idle r/min.	1 100 ± 100 r/min.	←	←
Fuel level	9 ± 1.0 mm (0.35 ± 0.04 in)	←	←
Float height	7.0 ± 0.5 mm (2.76 ± 0.02 in)	←	←
Main jet (M.J.)	#132.5	# 132.5	←
Jet needle (J.N.)	5E22-3rd	5E23	←
Needle jet (N.J.)	P-0M	P-0M	←
Throttle valve (Th.V.)	#95	←	←
Pilot jet (P.J.)	#27.5	# 27.5	←
Pilot air jet (P.A.J.)	#55	←	←
Pilot screw (P.S.)	PRE-SET (3.0 turns back)	PRE-SET	←
Throttle cable play	2 – 4 mm (0.08 ± 0.16 in)	←	←

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		LIMIT
Thermostat valve opening temperature	Approximately 75 °C (167 °F)		—
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		—
Engine coolant temp. switch operating temperature	OFF → ON	Approximately 120°C (248°F)	—
	ON → OFF	Approximately 113°C (235.4°F)	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermoswitch operating temperature	OFF → ON	Approximately 105°C (221°F)	—
	ON → OFF	Approximately 100°C (212°F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiators, mixed with distilled water only, at the ratio of 50:50		—
Engine coolant capacity	1 500 ml (1.6 US qt, 1.3 lmp qt)		—

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION		NOTE
Firing order			1·2		
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.		
Ignition coil resistance			Primary	2 – 6 Ω	Terminal – Terminal
			Secondary	15 – 30 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage			More than 200 V		#1⊕: W, ⊖: Ground #1⊕: B/Y, ⊖: Ground
Generator coil resistance			Pickup coil	160 – 300 Ω	G – Bl
			Charging coil	0.2 – 1.5 Ω	Y – Y
Pickup coil peak voltage			More than 1.5 V		⊕: Bl, ⊖: G
Signal coil peak voltage					⊕: B, ⊖: W
Generator no-load voltage (When engine cold)			More than 70 V (AC) at 5 000 r/min.		Y – Y
Regulated voltage			14.0 – 15.5 V at 5 000 r/min.		
Generator maximum output			375 W at 5 000 r/min.		
Starter relay resistance			3 – 7 Ω		
Battery			Type designation	FTX12-BS	
			Capacity	12 V 36 kC (10Ah)/10HR	
Fuse size	Headlight	HI	10 A		
		LO	10 A		
	Signal		15 A		
	Ignition		15 A		
	Meter		10 A		
	Main		30 A		
	Power source		10 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	The others
Headlight	HI	60	←	←
	LO	55	←	←
Position/Parking light				4
Brake light/Taillight		21/5	←	←
Turn signal light		21/5 (Front), 21 (Rear)	21	←
Speedometer light		LED	←	←
Water temp. meter light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure indicator light		LED	←	←

SUSPENSION

Unit: mm (in)

ITEM	STANDARD/SPECIFICATION	LIMIT
Front fork stroke	140 (5.51)	—
Front fork spring free length	551.7 (21.73)	540.6 (21.29)
Front fork oil level (without spring)	177 (6.96)	—
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	—
Front fork oil capacity (each leg)	412 ml (24.0 US oz, 25.0 Imp oz)	
Front fork spring adjuster	—	—
Rear shock absorber spring adjuster	(4)	—
Rear wheel travel	105 (4.13)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20 – 30 (0.8 – 1.2)		—
Rear brake pedal height	75 – 85 (3.0 – 3.3)		—
Brake drum I.D.	Rear	—	180.7 (7.11)
Brake disc thickness	Front	5.0 ± 0.2 (0.20 ± 0.01)	4.5 (0.18)
Brake disc runout	—		0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	—
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)
Wheel rim size	Front	J16 × MT3.00 or J16M/C × MT3.00	—
	Rear	J15 M/C × MT4.00	—

TIRE

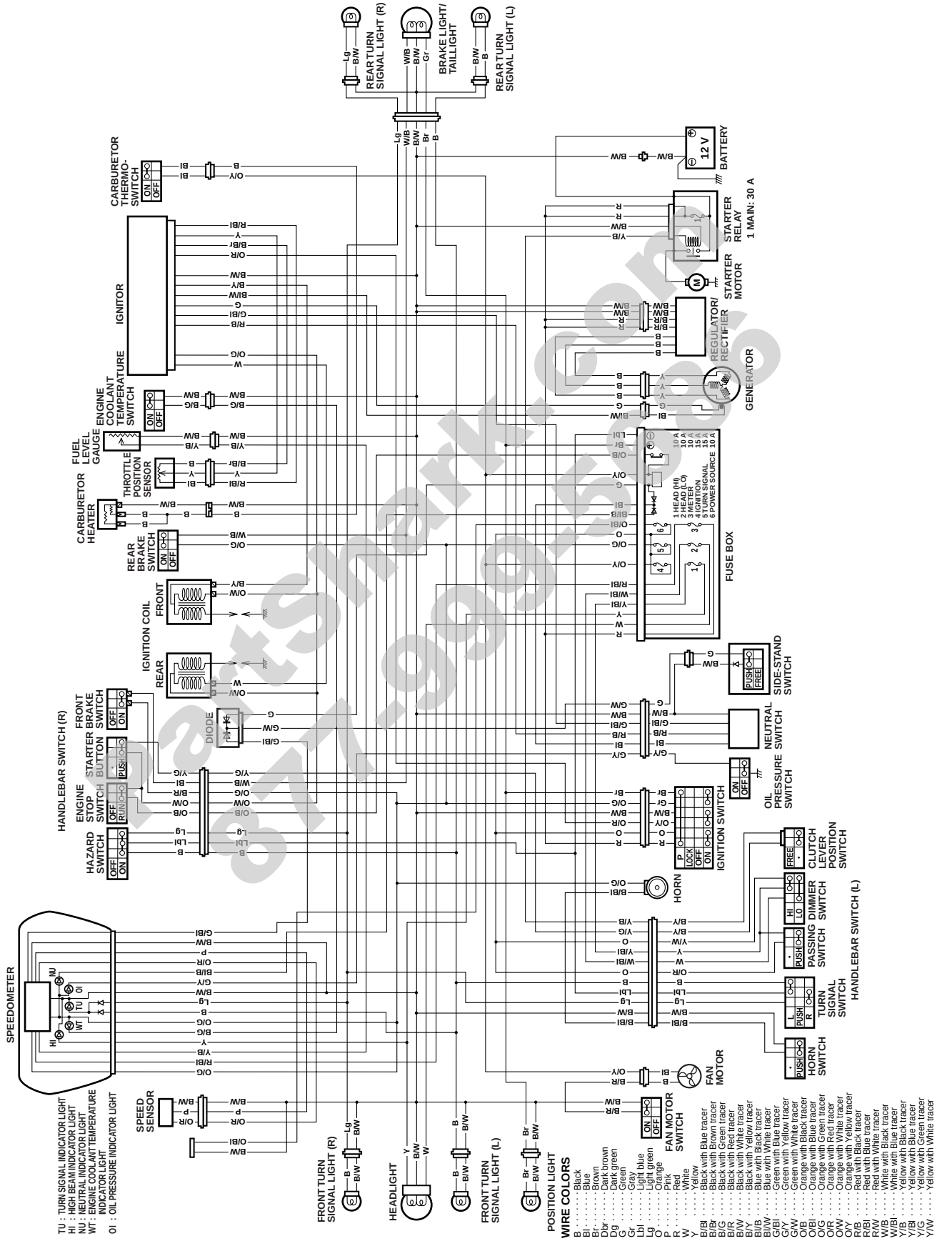
Unit: mm (in)

ITEM	STANDARD/SPECIFICATION		LIMIT
Cold inflation tire pressure (Solo riding)	Front	200 kPa (2.00 kgf/cm², 29 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Cold inflation tire pressure (Dual riding)	Front	200 kPa (2.00 kgf/cm², 29 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Tire size	Front	130/90-16M/C 67H	—
	Rear	170/80-15 M/C 77H	—
Tire type	Front	IRC GS-23F	—
	Rear	IRC GS-23R	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

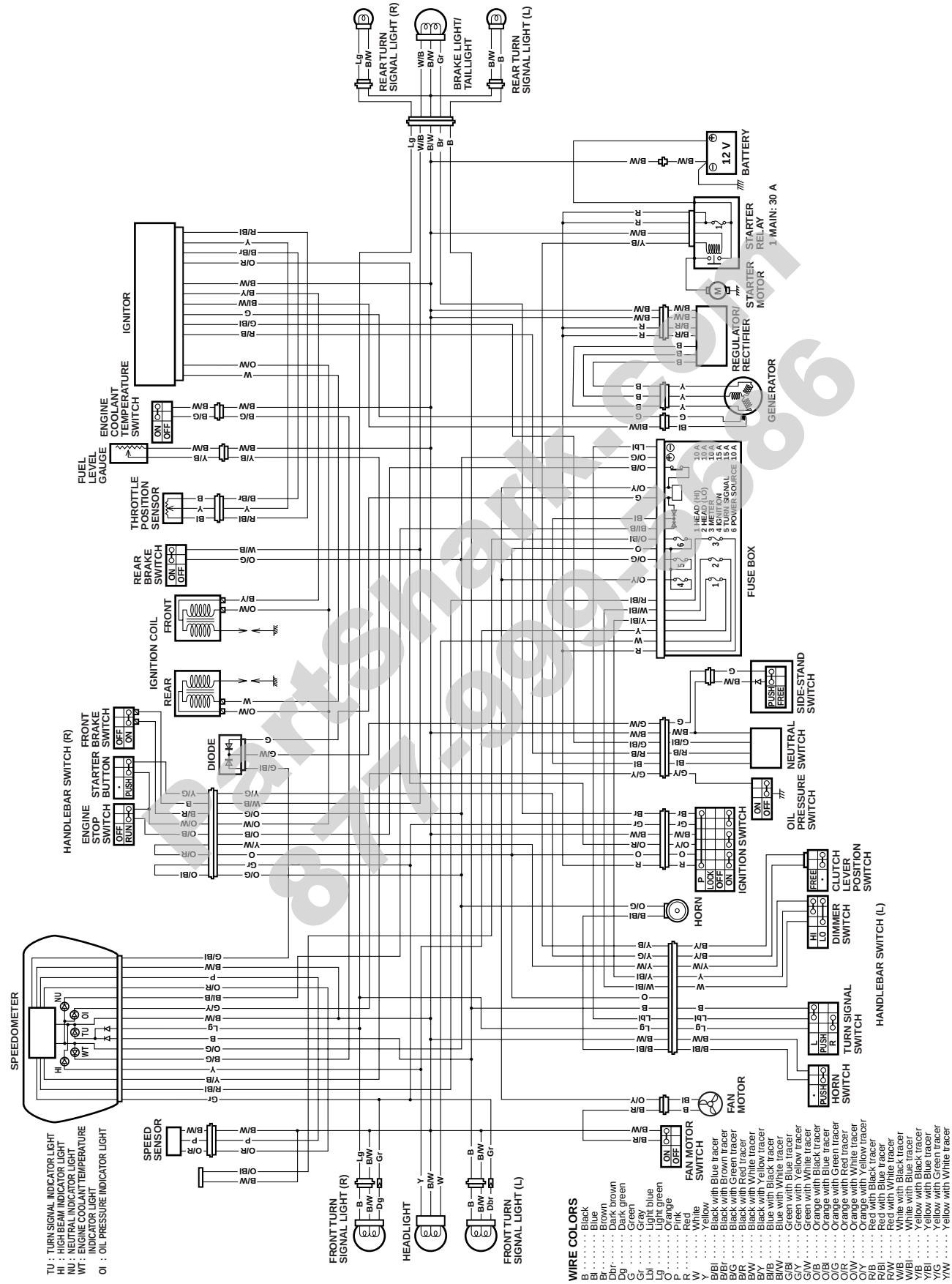
FUEL + OIL + COOLANT

ITEM		SPECIFICATION		NOTE
Fuel type		Use only unleaded gasoline of at least 87 pump octane or 91 octane ($\frac{R+M}{2}$) 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.		Other models
Fuel tank including	reserve	17.0 L (4.5/3.7 US/Imp gal)		
	reserve (flicker)	1.5 L (0.4/0.3 US/Imp gal)		
Engine oil type		SAE 10W-40, API SF or SG		
Engine oil capacity		Change	3 000 ml (3.2/2.6 US/Imp qt)	
		Filter change	3 400 ml (3.6/3.0 US/Imp qt)	
		Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Final bevel gear oil type		SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity		200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)		
Brake fluid type		DOT 4		
Coolant capacity		1 500 ml (1.6/1.3 US/Imp qt)		

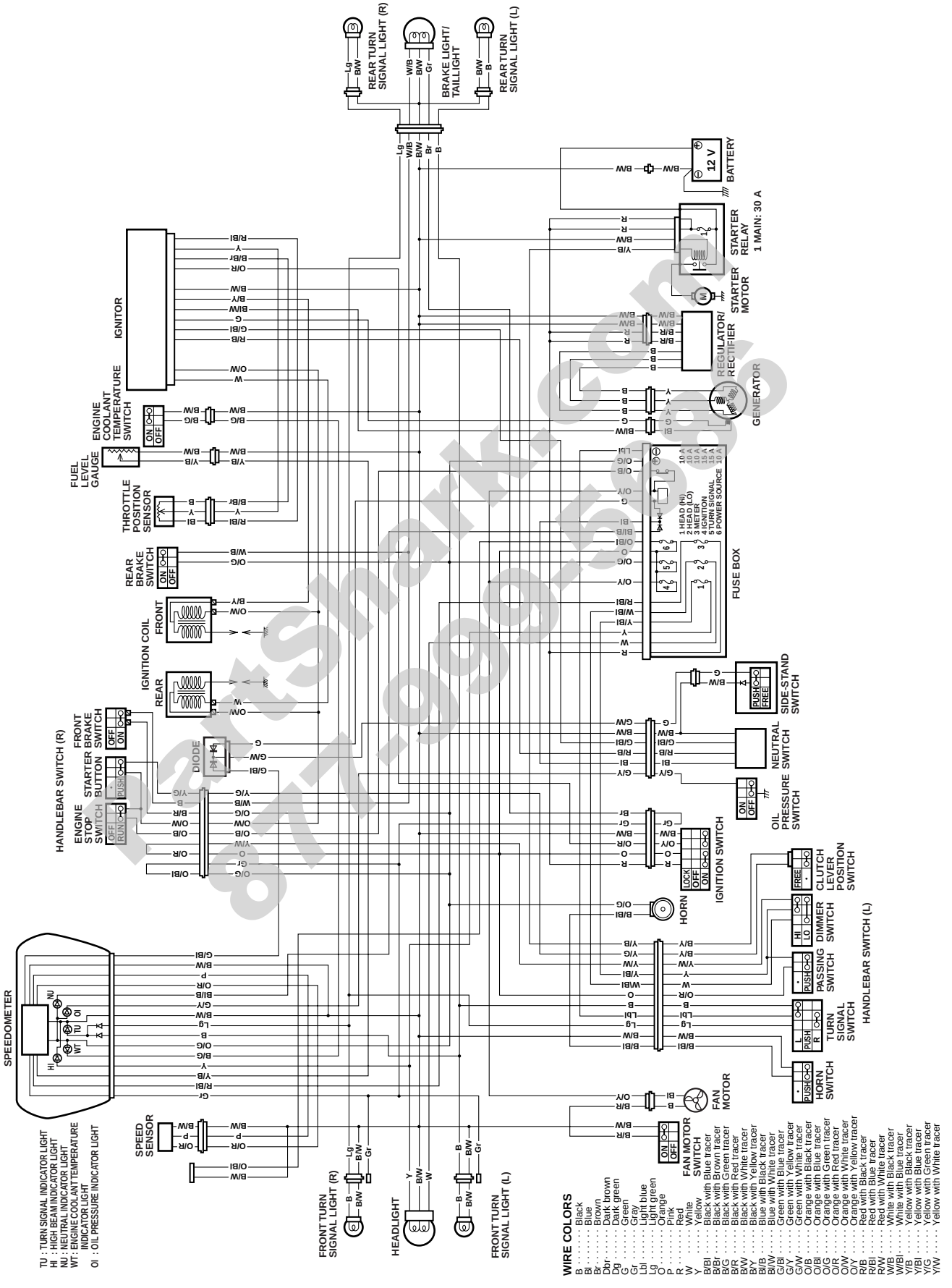
WIRING DIAGRAM
For E-02, 19



For E-03, 28, 33



For E-24



VL800K4 ('04-MODEL)

This chapter describes servicing procedures which differ from those of the VL800K3 ('03-MODEL).

NOTE:
** Please refer to the chapters 1 through 12 for details which are not given in this chapter.*

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 510 mm (98.8 in)
Overall width	985 mm (38.8 in)
Overall height	1 100 mm (43.3 in)
Wheelbase	1 655 mm (65.2 in)
Ground clearance	140 mm (5.5 in)
Seat height	700 mm (27.6 in)
Dry mass	241 kg (531 lbs)

ENGINE

Type	4-stroke, Liquid-cooled, OHC
Number of cylinders	2
Bore	83 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Carburetor	MIKUNI BDSR34
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

DRIVE TRAIN

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.690 (71/42)
Gear ratios, Low	2.461 (32/13)
2nd	1.631 (31/19)
3rd	1.227 (27/22)
4th	1.000 (25/25)
Top	0.814 (22/27)
Final reduction ratio	3.503 (17/15 × 34/11)
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	105 mm (4.1 in)
Caster	33° 20'
Trail	141 mm (3.55 in)
Steering angle	38° (right & left)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake
Rear brake	Drum brake
Front tire size	130/90-16 M/C 67H, tube type
Rear tire size	170/80-15 M/C 77H, tube type

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	5° B.T.D.C. at 1 100 r/min
Spark plug	NGK DPR7EA-9 or DENSO X22EPR-U9
Battery	12V 36 kC (10Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	30A
Fuse	15/15/10/10/10/10A
Headlight	12V 60/55W (H4)
Position/Parking light	12V 4W ..... Except E-03, 24, 28, 33
Brake light/Taillight	12V 21/5W
Front turn signal light	12V 21W E-02, 19, 24
	12V 21/5W E-03, 28, 33
Rear turn signal light	12V 21W
Speedometer light	LED
Turn signal indicator light	LED
Neutral indicator light	LED
High beam indicator light	LED
Oil pressure indicator light	LED
Engine coolant temp. warning light	LED

CAPACITIES

Fuel tank	17.0 L (4.5/3.7 US/Imp gal)
Engine oil, oil change	3 000 ml (3.2/2.6 US/Imp qt)
with filter change	3 400 ml (3.6/3.0 US/Imp qt)
overhaul	3 700 ml (3.9/3.3 US/Imp qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	—
	EX.	26 (1.02)	—
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	—
	EX.	0.17 – 0.22 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	INNER	—	38.3 (1.51)
	OUTER	—	40.1 (1.58)
Valve spring tension	INNER	6.51 – 7.49 kgf (14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	—
	OUTER	12.09 – 13.91 kgf (26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	Front	IN.	35.95 – 35.99 (1.415 – 1.417)	35.65 (1.404)
		EX.	36.92 – 36.96 (1.454 – 1.455)	36.62 (1.442)
	Rear	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
		EX.	36.58 – 36.62 (1.440 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)			0.150 (0.0059)
Camshaft journal holder I.D.	No.1 Left side No.2 Right side		20.012 – 20.025 (0.7879 – 0.7884)	—
	No.1 Right side No.2 Left side		25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	No.1 Left side No.2 Right side		19.959 – 19.980 (0.7858 – 0.7866)	—
	No.1 Right side No.2 Left side		24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	—			0.10 (0.004)
Rocker arm I.D.	IN. & EX.		12.000 – 12.018 (0.4724 – 0.4731)	—
Rocker arm shaft O.D.	IN. & EX.		11.966 – 11.984 (0.4711 – 0.4718)	—
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	1 300 – 1 700 kPa (13 – 17 kgf/cm², 185 – 242 psi)	1 100 kPa (11 kgf/cm², 156 psi)
Compression pressure difference	—	200 kPa (2 kgf/cm², 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)	0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)	83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.	82.880 (3.2630)
Cylinder distortion	—	0.05 (0.002)

ITEM	STANDARD		LIMIT
Piston ring free end gap	1st	Approx. 9.6 (0.38)	7.7 (0.30)
	2nd R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring groove clearance	1st	—	0.180 (0.007)
	2nd	—	0.150 (0.006)
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	—
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	—
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	—
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	—
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 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
Clutch cable play		10 – 15 (0.4 – 0.6)	—
Clutch release screw		1/4 turn back	
Drive plate thickness	No.1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No.2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width		15.9 – 16.0 (0.626 – 0.630)	15.1 (0.594)
Driven plate distortion		—	0.10 (0.004)
Clutch spring free length		49.2 (1.94)	46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM			STANDARD	LIMIT
Primary reduction ratio			1.690 (71/42)	—
Secondary reduction ratio			1.133 (17/15)	—
Final reduction ratio			3.090 (34/11)	—
Gear ratios	Low		2.461 (32/13)	—
	2nd		1.631 (31/19)	—
	3rd		1.227 (27/22)	—
	4th		1.000 (25/25)	—
	Top		0.814 (22/27)	—
Shift fork to groove clearance		No.1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No.2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width		No.1	5.50 – 5.60 (0.217 – 0.220)	—
		No.2	4.50 – 4.60 (0.177 – 0.181)	—
Shift fork thickness		No.1	5.30 – 5.40 (0.209 – 0.213)	—
		No.2	4.30 – 4.40 (0.169 – 0.173)	—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		—
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	—
Damper spring free length	—		58.5 (2.30)

CARBURETOR

ITEM	SPECIFICATION		
	E-02, 19, 24	E-03, 28	E-33
Carburetor type	MIKUNI BDSR34	←	←
Bore size	34 mm	←	←
I.D. No.	41F1	41F2	41F3
Idle r/min	1 100 ± 100 r/min	←	←
Fuel level	9 ± 1.0 mm (0.35 ± 0.04 in)	←	←
Float height	7.0 ± 0.5 mm (2.76 ± 0.02 in)	←	←
Main jet (M.J.)	#132.5	# 132.5	←
Jet needle (J.N.)	5E22-3rd	5E23	←
Needle jet (N.J.)	P-0M	P-0M	←
Throttle valve (Th.V.)	#95	←	←
Pilot jet (P.J.)	#27.5	# 27.5	←
Pilot air jet (P.A.J.)	#55	←	←
Pilot screw (P.S.)	PRE-SET (3 turns back)	PRE-SET	←
Throttle cable play	2 – 4 mm (0.08 ± 0.16 in)	←	←

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		LIMIT
Thermostat valve opening temperature	Approximately 75 °C (167 °F)		—
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		—
Engine coolant temp. switch operating temperature	OFF → ON	Approximately 120°C (248°F)	—
	ON → OFF	Approximately 113°C (235.4°F)	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermoswitch operating temperature	OFF → ON	Approximately 105°C (221°F)	—
	ON → OFF	Approximately 100°C (212°F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiators, mixed with distilled water only, at the ratio of 50:50		—
Engine coolant capacity	1 500 ml (1.6 US qt, 1.3 lmp qt)		—

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION		NOTE
Firing order			1·2		
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.		
Ignition coil resistance			Primary	2 – 6 Ω	Terminal – Terminal
			Secondary	15 – 30 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage			More than 200 V		#1⊕: W, ⊖: Ground #1⊕: B/Y, ⊖: Ground
Generator coil resistance			Pickup coil	160 – 300 Ω	G – Bl
			Charging coil	0.2 – 1.5 Ω	Y – Y
Pickup coil peak voltage			More than 1.5 V		⊕: Bl, ⊖: G
Generator no-load voltage (When engine cold)			More than 70 V (AC) at 5 000 r/min		Y – Y
Regulated voltage			14.0 – 15.5 V at 5 000 r/min		
Generator maximum output			375 W at 5 000 r/min		
Starter relay resistance			3 – 7 Ω		
Battery			Type designation	FTX12-BS	
			Capacity	12 V 36 kC (10Ah)/10HR	
Fuse size	Headlight	HI	10 A		
		LO	10 A		
	Signal		15 A		
	Ignition		15 A		
	Meter		10 A		
	Main		30 A		
	Power source		10 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	The others
Headlight	HI	60	←	←
	LO	55	←	←
Position/Parking light				4
Brake light/Taillight		21/5	←	←
Turn signal light		21/5 (Front), 21 (Rear)	21	←
Speedometer light		LED	←	←
Engine coolant temp. warning light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure indicator light		LED	←	←

SUSPENSION

Unit: mm (in)

ITEM	STANDARD/SPECIFICATION	LIMIT
Front fork stroke	140 (5.51)	—
Front fork spring free length	551.7 (21.73)	540.6 (21.29)
Front fork oil level (without spring)	177 (6.96)	—
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	—
Front fork oil capacity (each leg)	412 ml (24.0 US oz, 25.0 lmp oz)	
Front fork spring adjuster	—	—
Rear shock absorber spring adjuster	(4)	—
Rear wheel travel	105 (4.13)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal free travel		20 – 30 (0.8 – 1.2)	—
Rear brake pedal height		75 – 85 (3.0 – 3.3)	—
Brake drum I.D.	Rear	—	180.7 (7.11)
Brake disc thickness	Front	5.0 ± 0.2 (0.20 ± 0.01)	4.5 (0.18)
Brake disc runout		—	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	—
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)
Wheel rim size	Front	J16M/C × MT3.00	—
	Rear	J15 M/C × MT4.00	—

TIRE

Unit: mm (in)

ITEM	STANDARD/SPECIFICATION		LIMIT
Cold inflation tire pressure (Solo riding)	Front	200 kPa (2.00 kgf/cm², 29 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Cold inflation tire pressure (Dual riding)	Front	200 kPa (2.00 kgf/cm², 29 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Tire size	Front	130/90-16M/C 67H	—
	Rear	170/80-15 M/C 77H	—
Tire type	Front	IRC GS-23F	—
	Rear	IRC GS-23R	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

FUEL + OIL + COOLANT

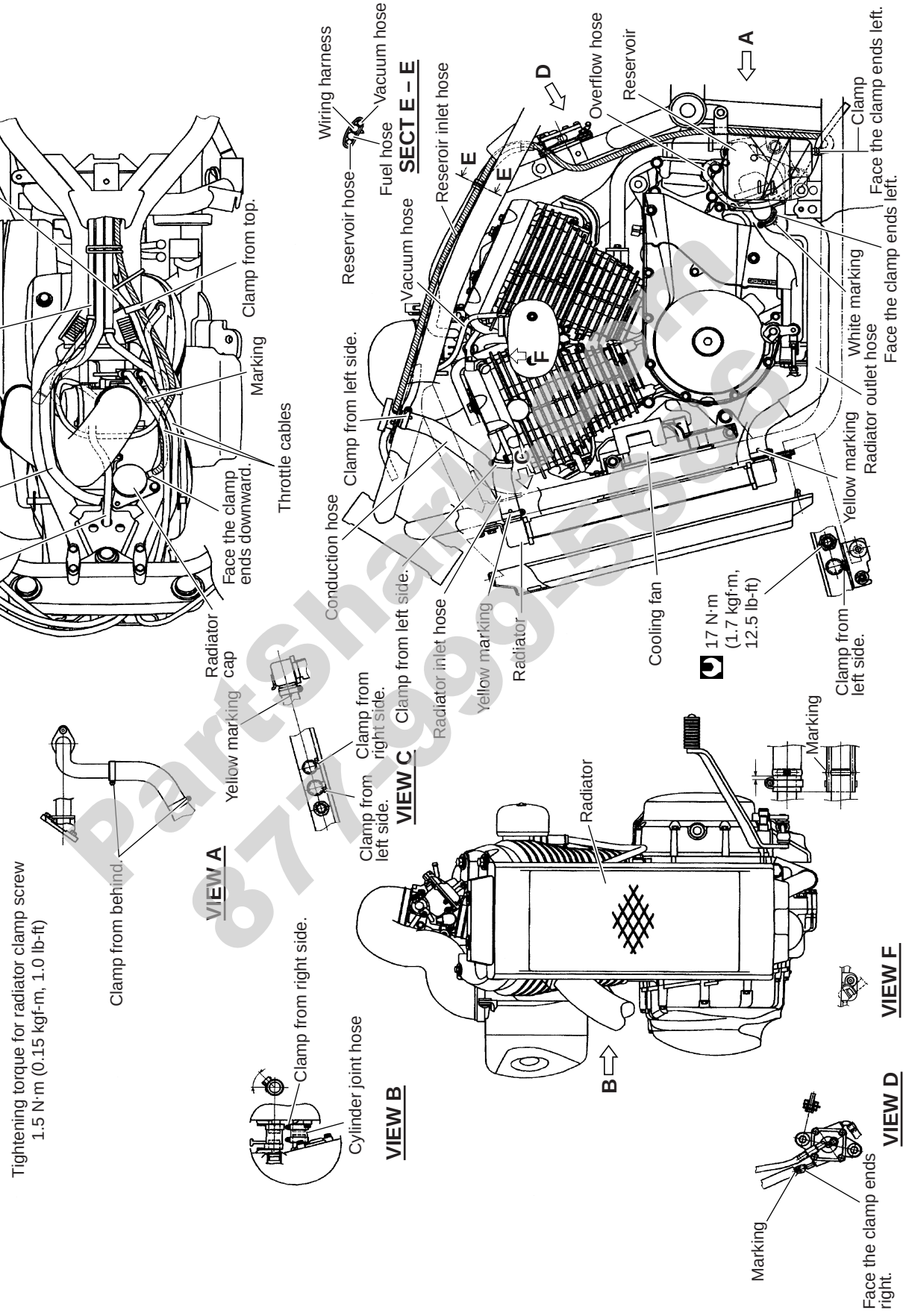
ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) or higher rated by the Research Method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		Other models
Fuel tank including reserve	17.0 L (4.5/3.7 US/lmp gal)		
reserve (flicker)	1.5 L (0.4/0.3 US/lmp gal)		
Engine oil type	SAE 10W-40, API SF or SG		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/lmp qt)	
	Filter change	3 400 ml (3.6/3.0 US/lmp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/lmp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/lmp oz)		
Brake fluid type	DOT 4		
Coolant capacity	1 500 ml (1.6/1.3 US/lmp qt)		

PERIODIC MAINTENANCE CHART

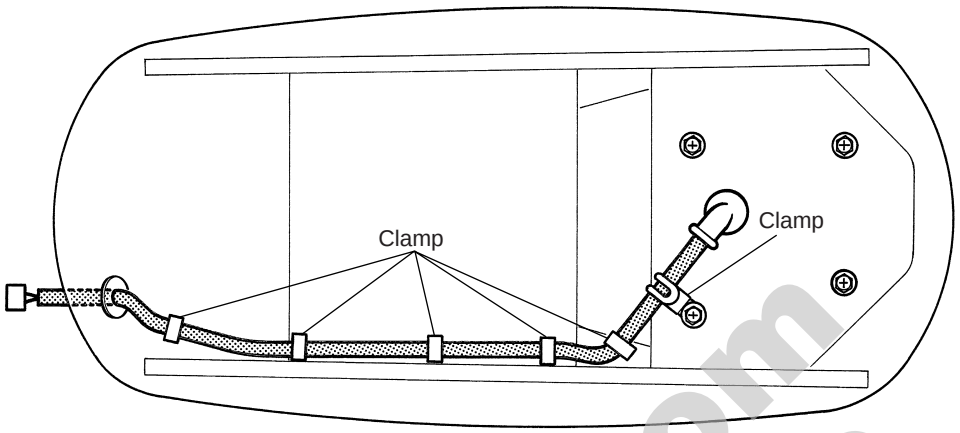
Item \ Interval	km	1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	15 000
	months	2	12	24	36	48
Air cleaner element		—	I	I	R	I
Spark plugs		—	I	R	I	R
Valve clearance		I	—	I	—	I
Engine oil		R	R	R	R	R
Engine oil filter		R	—	—	R	—
Fuel line		—	I	I	I	I
		Replace fuel hose every 4 years.				
Idle speed		I	I	I	I	I
Evaporative emission control system (E-33 only)		—	—	I	—	I
		Replace vapor hose every 4 years.				
PAIR (air supply) system		—	—	I	—	I
Throttle cable play		I	I	I	I	I
Clutch		—	I	I	I	I
Radiator hoses		—	I	I	I	I
Engine coolant		Replace every 2 years.				
Final gear oil		R	—	I	—	I
Brakes		I	I	I	I	I
Brake hoses		—	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
Exhaust pipe bolts and muffler bolt and nut		T	—	T	—	T
Chassis bolts and nuts		T	T	T	T	T

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

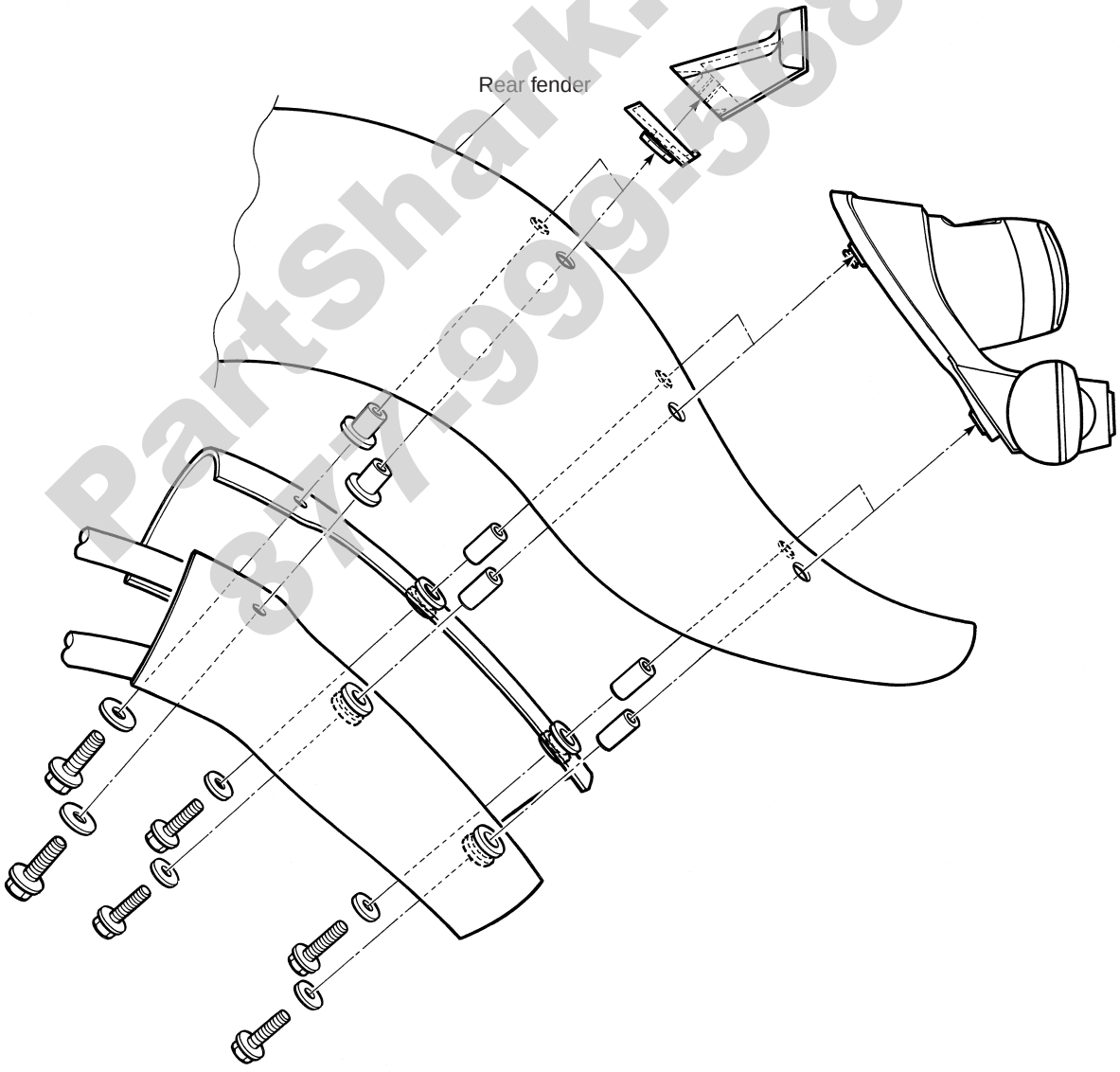
COOLING HOSE ROUTING



REAR COMBINATION LIGHT INSTALLATION

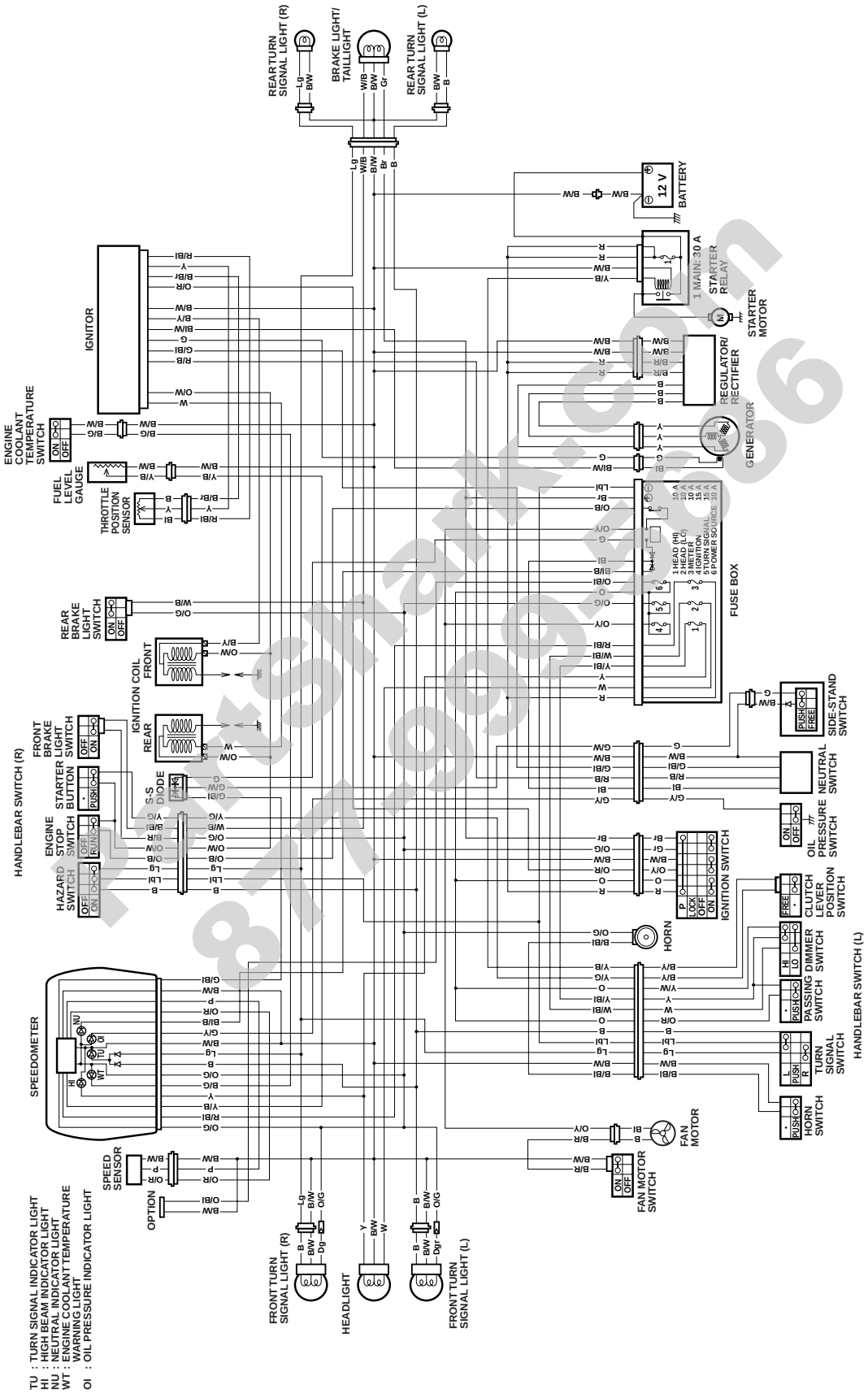


Inside of the rear fender

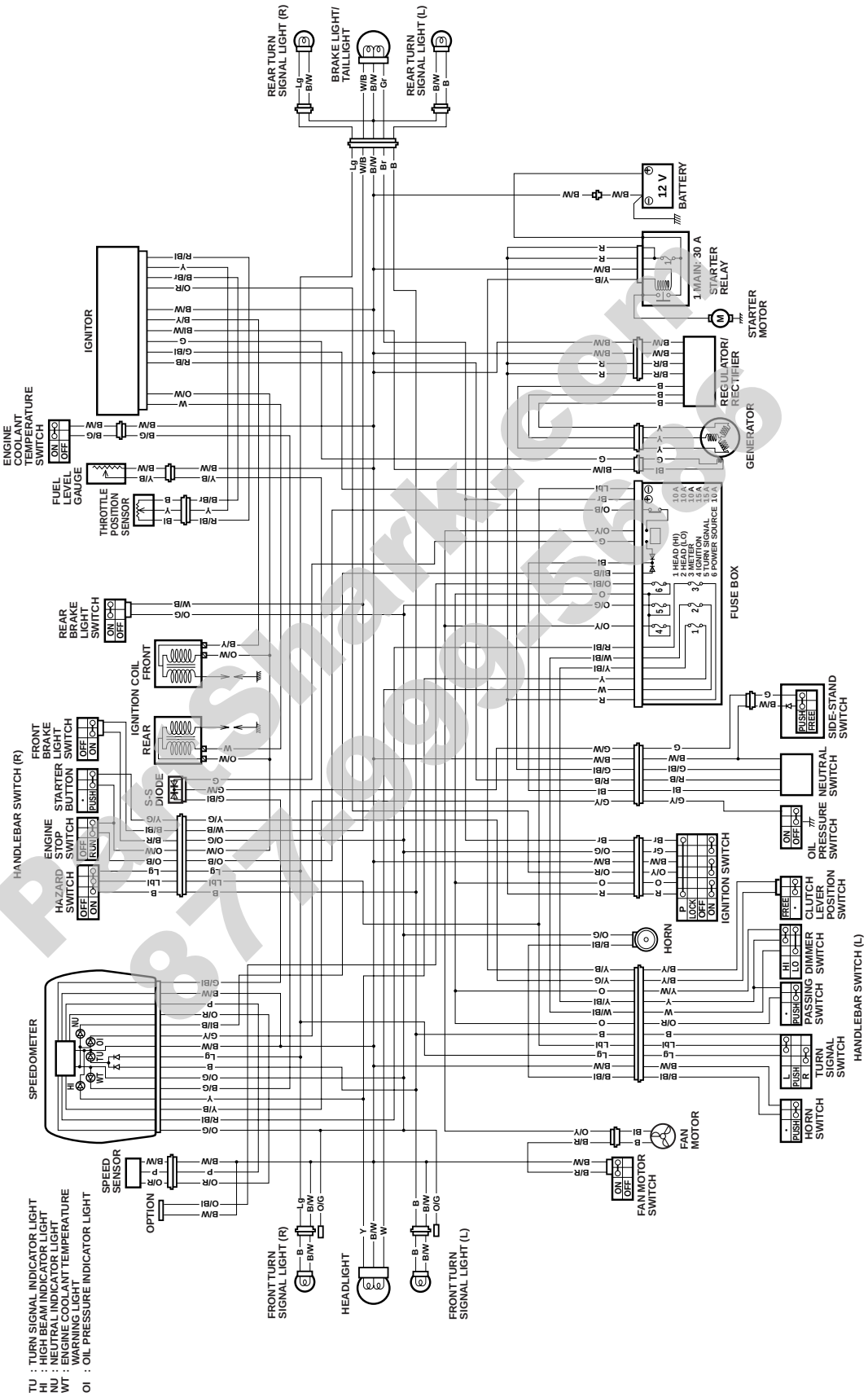


WARNING DIAGRAM

For E-03, 28, 33



For E-24


REAR TURN SIGNAL LIGHT (R)
BRAKE LIGHT/ TAILLIGHT
REAR TURN SIGNAL LIGHT (L)
12 V BATTERY
1 MAIN 30 A
STARTER RELAY
STARTER MOTOR
REGULATOR/ RECTIFIER
GENERATOR
IGNITOR
ENGINE COOLANT TEMPERATURE SWITCH
FUEL LEVEL GAUGE
THROTTLE POSITION SENSOR
REAR BRAKE LIGHT SWITCH
IGNITION COIL FRONT
IGNITION COIL REAR
FUSE BOX
1 HEAD (HI)
2 HEAD (LO)
3 METER
4 IGNITION
5 TURN SIGNAL
6 POWER SOURCE
SIDE-STAND SWITCH
NEUTRAL SWITCH
OIL PRESSURE SWITCH
IGNITION SWITCH
CLUTCH LEVER POSITION SWITCH
HORN
DIMMER SWITCH
PASSING SWITCH
TURN SIGNAL SWITCH
HORN SWITCH
HANDLEBAR SWITCH (L)
HANDLEBAR SWITCH (R)
FRONT BRAKE LIGHT SWITCH
STARTER BUTTON
S-S DIODE
ENGINE STOP SWITCH
HAZARD SWITCH
SPEEDOMETER
SPEED SENSOR
OPTION
FAN MOTOR
FAN MOTOR SWITCH
FRONT TURN SIGNAL LIGHT (R)
HEADLIGHT
FRONT TURN SIGNAL LIGHT (L)
TU : TURN SIGNAL INDICATOR LIGHT
HI : HIGH BEAM INDICATOR LIGHT
NU : NEUTRAL INDICATOR LIGHT
WT : ENGINE COOLANT TEMPERATURE WARNING LIGHT
OI : OIL PRESSURE INDICATOR LIGHT

VL800K5 ('05-MODEL)

This manual described the service specifications, service data, FI system and servicing procedurers which differ from those of the VL800K4 ('04-MODEL).

NOTE:
** Any differences between the VL800K4 ('04-MODEL) and VL800K5 ('05-MODEL) in specifications and service data are cleary indicated with an asterisk (*) mark.*
** Please refer to the chapter 1 through 13 for details which are not given in this chapter.*

CONTENTS

COUNTRY AND AREA CODES

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

CODE	COUNTRY or AREA	EFFECTIVE FRAME NO.
000	Japan	————
E-02	U.K.	JS1BM111200101117-
E-19	EU	JS1BM111100112285-
E-24	Australia	JS1BM121300100613-
E-03	U.S.A. (Except for california)	JS1VS55A 52100001-
E-28	Canada	JS1VS55A 52100001-
E-33	California (U.S.A.)	JS1VS55A 52100001-

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 510 mm (98.8 in)
Overall width	985 mm (38.8 in)
Overall height	1 100 mm (43.3 in)
Wheelbase	1 655 mm (65.2 in)
Ground clearance	140 mm (5.5 in)
Seat height.	700 mm (27.6 in)
Dry mass	*246 kg (542 lbs)

ENGINE

Type	4-stroke, Liquid-cooled, OHC
Number of cylinders	2
Bore	83 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Fuel system.	*Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

DRIVE TRAIN

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.690 (71/42)
Secondary reduction	1.000 (30/30)
Gear ratios, Low	2.461 (32/13)
2nd	1.631 (31/19)
3rd	1.227 (27/22)
4th	1.000 (25/25)
Top	0.814 (22/27)
Final reduction ratio	3.503 (17/15 × 34/11)
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.	105 mm (4.1 in)
Caster	30° 20'
Trail	141 mm (5.55 in)
Steering angle	38° (right & left)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake
Rear brake	Drum brake
Front tire size	130/90-16 M/C 67H, tube type
Rear tire size	170/80-15 M/C 77H, tube type

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing.	5° B.T.D.C. at 1 100 r/min
Spark plug	NGK DPR7EA-9 or DENSO X22EPR-U9
Battery	12V 36 kC (10 Ah) /10 HR
Generator	Three-phase A.C. generator
Main fuse	30A
Fuse	*15/10/10/10/10/10A
Headlight	12V 60W/55W (H4)
Position/Parking light	*12V 5W..... E-02, 19
Brake light/Taillight	12V 21/5W
Front turn signal light	12V 21/5W.... E-02, 19, 24
	12V 21/5W.... E-03, 28, 33
Rear turn signal light	12V 21W
Speedometer light	LED
Turn signal indicator light	LED
Neutral indicator light	LED
High beam indicator light	LED
*Fuel indicator light	LED
Oil pressure/Water temperature/FI warning light	LED

CAPACITIES

Fuel tank	*15.5 L (4.1/3.4 US/Imp gal)
Engine oil, oil change	3 000 ml (3.2/2.6 US/Imp qt)
with filter change	3 400 ml (3.6/3.0 US/Imp qt)
overhaul.	3 700 ml (3.9/3.3 US/Imp qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)

These specifications are subject to change without notice.

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, AP Sensor)
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)
ECT Sensor : Engine Coolant Temperature Sensor (ECTS), Water Temp. Sensor (WTS)
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
SDS : Suzuki Diagnosis System
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)

SAE-TO-FORMER SUZUKI TERM

This table lists SAE (Society of Automotive Engineers) J1930 terms and abbreviations which may be used in this manual in compliance with SAE recommendations, as well as their former SUZUKI names.

SAE TERM		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
A		
Air Cleaner	ACL	Air Cleaner, Air Cleaner Box
B		
Barometric Pressure	BARO	Barometric Pressure, Atmospheric Pressure (APS, AP Sensor)
Battery Positive Voltage	B+	Battery Voltage, +B
C		
Camshaft Position Sensor	CMP Sensor	Camshaft Position Sensor (CMPS)
Crankshaft Position Sensor	CKP Sensor	Crankshaft Position Sensor (CKPS), Crank Angle
D		
Data Link Connector	DLC	Dealer Mode Coupler
Diagnostic Test Mode	DTM	——
Diagnostic Trouble Code	DTC	Diagnostic Code, Malfunction Code
E		
Electronic lgnition	EI	——
Engine Control Module	ECM	Engine Control Module (ECM) FI Control Unit, Engine Control Unit (ECU)
Engine Coolant Level	ECL	Coolant Level
Engine Coolant Temperature	ECT	Coolant Temperature, Engine Coolant Temperature, Water Temperature
Engine Oil Temperature	EOT	Oil Temorature, Engine Oil Tempereture
Engine Speed	RPM	Engine Speed (RPM)
Evaporative Emission	EVAP	Evaporative Emission
Evaporative Emission Canister	EVAP Canister	—— (Canister)
F		
Fan Control	FC	——
Fuel Level Sensor	——	Fuel Level Sensor, Fuel Level Gauge
Fuel Pump	FP	Fuel Pump (FP)
G		
Generator	GEN	Generator
Ground	GND	Ground (GND, GRD)
H		
Heated Ocygen Sensor	HO2S	Heated Oxygen Sensor (HO2S), O2 Sensor

SAE TERM		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
I		
Idle Speed Control	ISC	——
Ignition Control	IC	Electronic Spark Advance (ESA)
Ignition Control Module	ICM	——
Intake Air Temperature	IAT	Intake Air Temperature (IAT), Air Temperature
M		
Malfunction Indicator Lamp	MIL	LED Lamp Malfunction Indicator Lamp (MIL)
Manifold Absolute Pressure	MAP	Intake Air Pressure (IAP), Intake Vacuum
Mass Air Flow	MAF	Air Flow
O		
On-Board Diagnostic	OBD	Self-Diagnosis Function Diagnostic
Open Loop	OL	——
P		
Programmable Read Only Memory	PROM	——
Pulsed Secondary Air Injection	PAIR	Pulse Air Control (PAIR)
Purge Valve	Purge Valve	Purge Valve (SP Valve)
R		
Random Access Memory	RAM	——
Read Only Memory	ROM	ROM
S		
Secondary Air Injection	AIR	——
Secondary Throttle Control System	STCS	STC System (STCS)
Secondary Throttle Valve	STV	ST Valve (STV)
Secondary Throttle Valve Actuator	STVA	STV Actuator (STVA)
T		
Throttle Body	TB	Throttle Body (TB)
Throttle Body Fuel Injection	TBI	Throttle Body Fuel Injection (TBI)
Throttle Position Sensor	TP Sensor	TP Sensor (TPS)
V		
Voltage Regulator	VR	Voltage Regulator
Volume Air Flow	VAF	Air Flow

SERVICE DATA
VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	—
	EX.	26 (1.02)	—
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	—
	EX.	0.17 – 0.22 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	INNER	—	38.3 (1.51)
	OUTER	—	40.1 (1.58)
Valve spring tension	INNER	64 – 73 N (6.51 – 7.49 kgf) (14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	—
	OUTER	119 – 136 N (12.09 – 13.91 kgf) (26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	Front	IN.	35.95 – 35.99 (1.415 – 1.417)	35.65 (1.404)
		EX.	36.92 – 36.96 (1.454 – 1.455)	36.62 (1.442)
	Rear	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
		EX.	36.52 – 36.62 (1.438 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)			0.150 (0.0059)
Camshaft journal holder I.D.	Rear left side Front right side		20.012 – 20.025 (0.7879 – 0.7884)	—
	Rear right side Front left side		25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Rear left side Front right side		19.959 – 19.980 (0.7858 – 0.7866)	—
	Rear right side Front left side		24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	—			0.10 (0.004)
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	1 300 – 1 700 kPa (13 – 17 kgf/cm², 185 – 242 psi)	1 100 kPa (11 kgf/cm² 156 psi)
Compression pressure difference	—	200 kPa (2 kgf/cm² 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)	0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)	83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.	82.880 (3.2630)
Cylinder distortion	—	0.05 (0.002)

ITEM	STANDARD		LIMIT
Piston ring free end gap	1st	Approx. 9.6 (0.38)	7.7 (0.30)
	2nd R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring to groove clearance	1st	—	0.180 (0.007)
	2nd	—	0.150 (0.006)
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	—
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	—
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	—
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	—

ITEM	STANDARD	LIMIT
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 pressure (at 60 °C, 140 °F)	350 – 600 kPa (3.5 – 6.5 kgf/cm², 50 – 92 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.690 (71/42)		—
Secondary reduction ratio		1.133 (17/15)		—
Final reduction ratio		3.090 (34/11)		—
Gear ratios	Low	2.461 (32/13)		—
	2nd	1.631 (31/19)		—
	3rd	1.227 (27/22)		—
	4th	1.000 (25/25)		—
	Top	0.814 (22/27)		—
Shift fork to groove clearance		No.1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No.2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)

ITEM	STANDARD		LIMIT
Shift fork groove width	No.1	5.50 – 5.60 (0.217 – 0.220)	—
	No.2	4.50 – 4.60 (0.177 – 0.181)	—
Shift fork thickness	No.1	5.30 – 5.40 (0.209 – 0.213)	—
	No.2	4.30 – 4.40 (0.169 – 0.173)	—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		—
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	—
Damper spring free length	—		58.5 (2.30)

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		NOTE
Thermostat valve opening temperature	Approx. 75 °C (167 °F)		—
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		—
ECT sensor 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	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105 °C (221 °F)	—
	ON→OFF	Approx. 100 °C (212 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant capacity	1 500 ml (1.6/1.3 US/Imp qt)		—

* INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
* Injector resistance	11 – 13 Ω at 20 °C (68 °F)	
* Fuel pump discharge amount	Approx. 168 ml (5.7/5.9 US/lmp oz) and more/10 sec.	
* Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm², 43 psi)	

* FI SENSORS+ SECONDARY THROTTLE VALVE ACTUATOR

ITEM	SPECIFICATION		NOTE
* CKP sensor resistance	184 – 276 Ω		
* CKP sensor peak voltage	4.0 V and more		When cranking
* IAP sensor input voltage	4.5 – 5.5 V		
* IAP sensor output voltage	Approx. 2.6 V at idle speed		
* TP sensor input voltage	4.5 – 5.5 V		
* TP sensor resistance	Closed	Approx. 1.1 kΩ	
	Opened	Approx. 4.3 kΩ	
* TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
* ECT sensor input voltage	4.5 – 5.5 V		
* ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
* IAT sensor input voltage	4.5 – 5.5 V		
* IAT sensor resistance	Approx. 2.6 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	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		

* THROTTLE BODY

ITEM	SPECIFICATION
Bore size	* 34 mm
I.D. No.	* 41F1 (For E-33), 41F0 (For the others)
Idle r/min.	* 1 100 ± 100 r/min.
Fast idle r/min.	* 2 100 r/min. (When cold engine)
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION		NOTE	
Firing order			1·2			
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			184 – 276 Ω			
* CKP sensor peak voltage			4.0 V and more			
* Ignition coil resistance			Primary	2.8 – 4.7 Ω	Terminal – Terminal	
			Secondary	24 – 36 kΩ	Plug cap – Terminal	
* Ignition coil primary peak voltage			200 V and more		Front	⊕ B/Y ⊖ O/W
					Rear	⊕ W ⊖ O/W
Generator coil resistance			0.2 – 1.5 Ω			
Generator no-load voltage (when engine is cold)			70 V (AC) and more at 5 000 r/min.		Y – Y	
Regulated voltage			14.0 – 15.5 V at 5 000 r/min.		Y – Y	
Generator maximum output			375 W at 5 000 r/min			
Starter relay resistance			3 – 7 Ω			
GP switch voltage			0.6 V and more (From 1st to top without neutral)			
Battery	Type designation		FTX12-BS			
	Capacity		12 V 36 kC (10 Ah)/10 HR			
Fuse size	Headlight	HI	10 A			
		LO	10 A			
	Signal		10 A			
	Ignition		15 A			
	Meter		10 A			
	Main		30 A			
	Power source		10 A			

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	Others
Headlight	HI	60 W	←	←
	LO	55 W	←	←
Position/Parking light				4 W
Brake light/Taillight		21/5 W	←	←
Turn signal light		21/5 W (Front), 21 W (Rear)	21 W	←
Speedometer light		LED	←	←
Engine coolant temp. warning light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure indicator light		LED	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20 – 30 (0.8 – 1.2)		—
Rear brake pedal height	75 – 85 (3.0 – 3.3)		—
Brake drum I.D.	Rear	—	180.7 (7.11)
Brake disc thickness	Front	4.8 – 5.2 (0.19 – 0.21)	4.5 (0.18)
Brake disc runout	—		0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	—
Brake fluid type	DOT 4		—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel rim size	Front	J16 M/C × MT 3.00	—
	Rear	J15 M/C × MT 4.00	—

TIRE

ITEM	STANDARD		LIMIT
Cold inflation tire pressure (Solo riding)	Front	200 kPa (2.00 kgf/cm², 29 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Cold inflation tire pressure (Dual riding)	Front	200 kPa (2.00 kgf/cm², 29 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Tire size	Front	130/90 – 16 M/C 67H	—
	Rear	170/80 – 15 M/C 77H	—
Tire type	Front	IRC GS-23F	—
	Rear	IRC GS-23R	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT
Front fork stroke	140 (5.51)	—
Front fork spring free length	551.7 (21.73)	540.6 (21.29)
Front fork oil level (without spring)	177 (6.96)	—
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	—
Front fork oil capacity (each leg)	412 ml (24.0/25.0 US/Imp oz)	—
Front fork inner tube outside diam.	41 (1.61)	—
Front fork spring adjuster	—	—
Rear shock absorber spring adjuster	(4)	—
Rear wheel travel	105 (4.13)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) 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.		Others
Fuel tank capacity	Including reserve	17.0 L (4.5/3.7 US/Imp gal)	
	Fuel level indicator light lighting	1.5 L (0.4/0.3 US/Imp gal)	
Engine oil type	SAE 10 W-40, API, SF or SG		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 400 ml (3.6/3.0 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)		

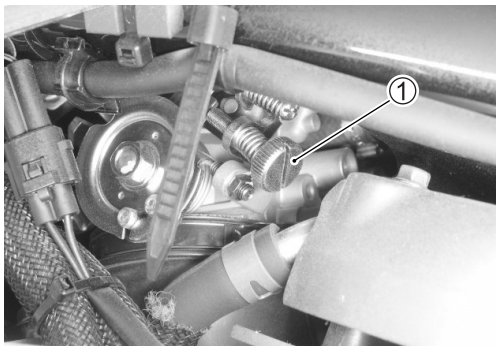
PERIODIC MAINTENANCE CHART

Item \ Interval	miles	600	4 000	7 500	11 000	14 500
	km	1 000	6 000	12 000	18 000	24 000
	months	2	12	24	36	48
Air cleaner element		—	I	I	R	I
Spark plug		—	I	R	I	R
Valve clearance		I	—	I	—	I
Engine oil		R	R	R	R	R
Engine oil filter		R	—	—	R	—
Fuel line		—	I	I	I	I
		Replace fuel hose every 4 years.				
Idle speed		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
Throttle cable play		I	I	I	I	I
Clutch cable play		—	I	I	I	I
Radiator hose		—	I	I	I	I
Engine coolant		Replace every 2 years.				
Final gear oil		R	—	I	—	I
Brake		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.				
Tire		—	I	I	I	I
Steering		I	—	I	—	I
Front fork		—	—	I	—	I
Rear suspension		—	—	I	—	I
Exhaust pipe bolts and muffler bolt and nut		T	—	T	—	T
Chassis bolt and nut		T	T	T	T	T

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

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.

- Start the engine, turn the throttle stop screw ① and set the engine idle speed as follows.
- Connect the multit tester to the high-tension cord.

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

TOOL **09900-26006: Engine tacho tester set**

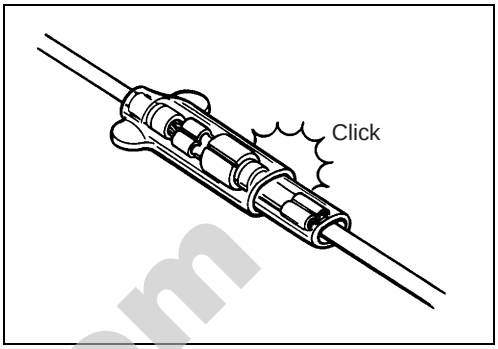
PRECAUTIONS IN SERVICING

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

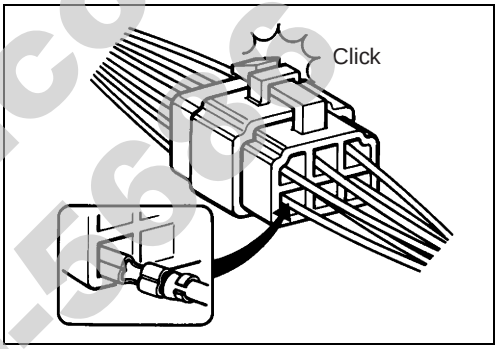
ELECTRICAL PARTS

CONNECTOR/COUPLER

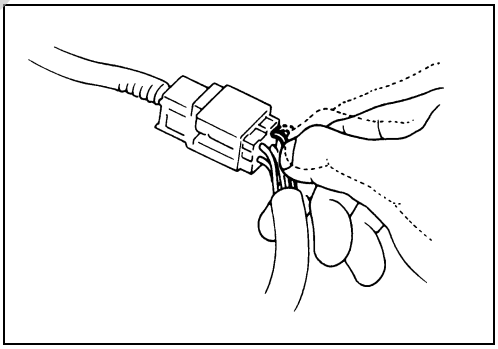
- When connecting a connector, be sure to push it in until a click is felt.



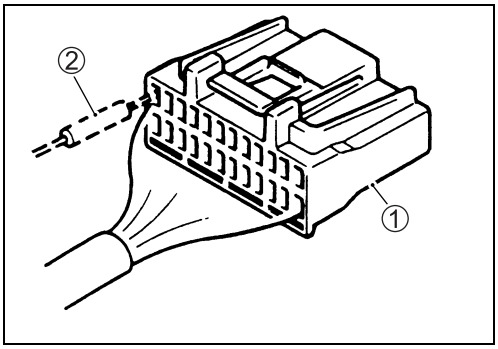
- With a lock type coupler, be sure to release the lock when disconnecting, and push in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.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

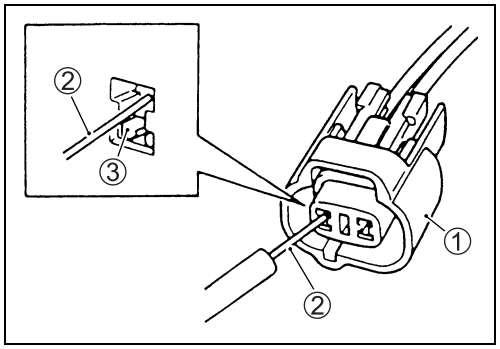


- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (backside) of the connector/coupler.



① Coupler
② Probe

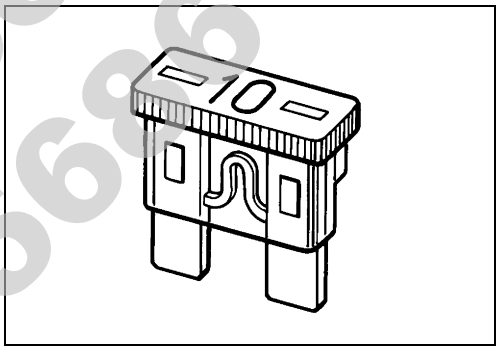
- When connecting meter probe from the terminal side of the coupler (where connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.
  Connect the probe as shown to avoid opening of female terminal.
  Never push in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



① Coupler
② Probe
③ Where male terminal fits

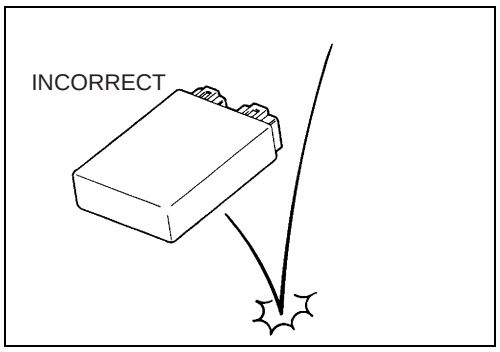
FUSE

- 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.

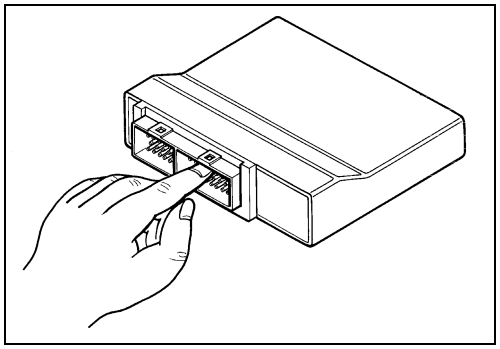


ECM/VARIOUS SENSORS

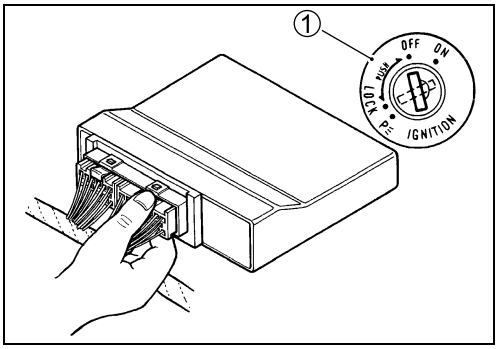
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



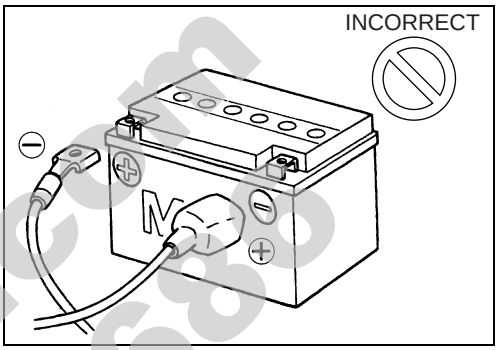
- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



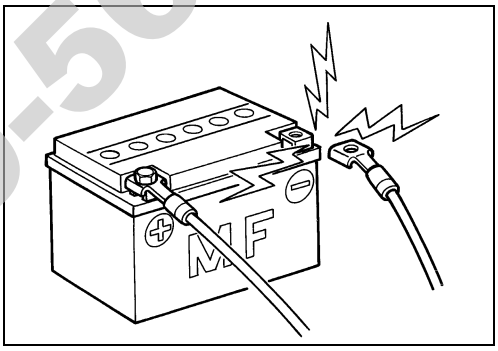
- When disconnecting and connecting the ECM, make sure to turn OFF the ignition switch ①, or electronic parts may get damaged.



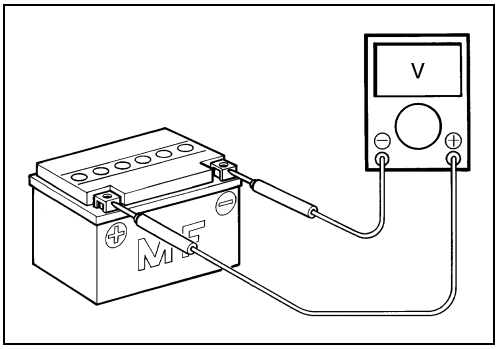
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



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



- Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Terminal voltage check 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 ECM may result.
- Never connect an ohmmeter to the ECM with its coupler connected. If attempted, damage to ECM or sensors may result.
- Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained and personal injury may result.

ELECTRICAL CIRCUIT INSPECTION PROCEDURE

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

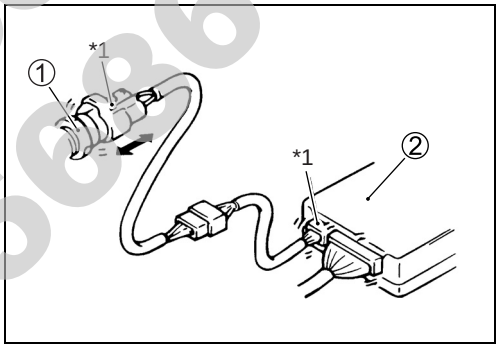
OPEN CIRCUIT CHECK

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

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

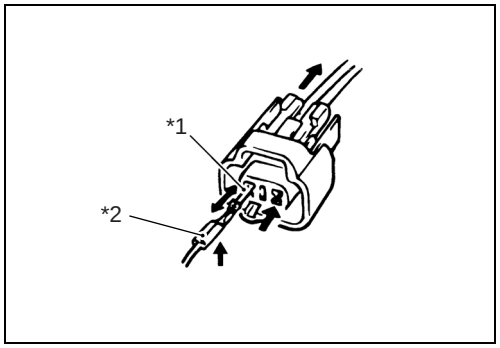
- Disconnect the negative cable from the battery.
- Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.

① Sensor
② ECM
*1 Check for loose connection.



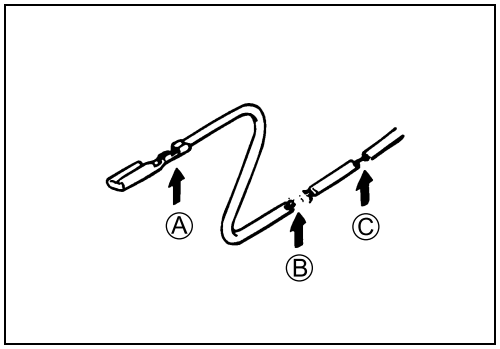
- Using a test male terminal, check the female terminals of the circuit being checked for contact tension.
  Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted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

*1 Check contact tension by inserting and removing.
*2 Check each terminal for bend and proper alignment.



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

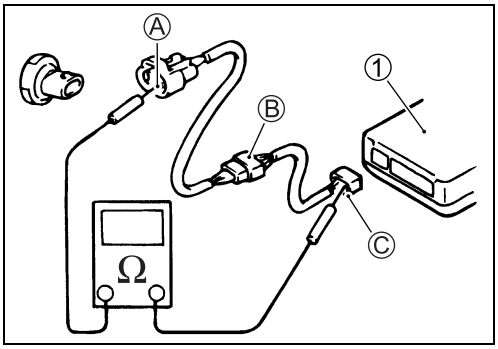
Ⓐ Looseness of crimping
Ⓑ Open
Ⓒ Thin wire (a few strands left)



Continuity check

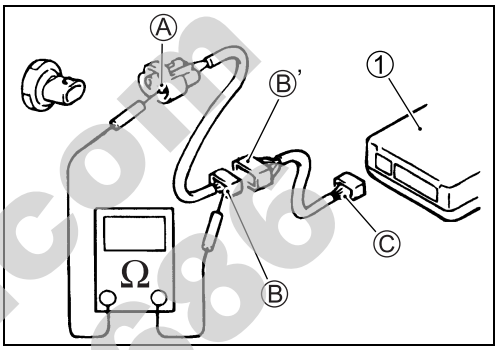
- Measure resistance across coupler Ⓑ (between Ⓐ and Ⓒ in the figure).
  If no continuity is indicated (infinity or over limit), the circuit is open between terminals Ⓐ and Ⓒ.

① ECM



- 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 Ⓒ.

① ECM



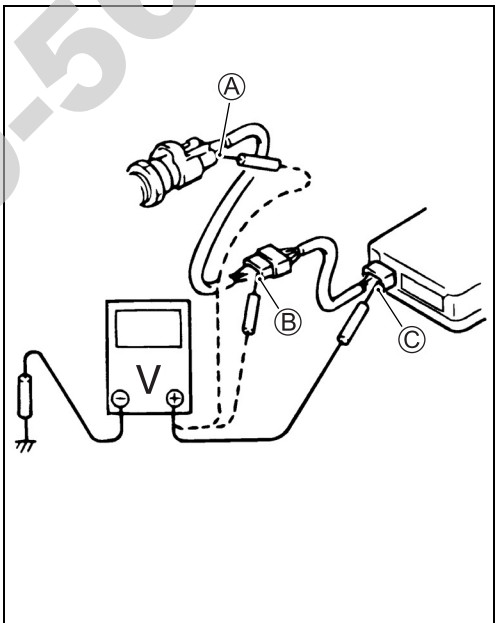
VOLTAGE CHECK

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

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

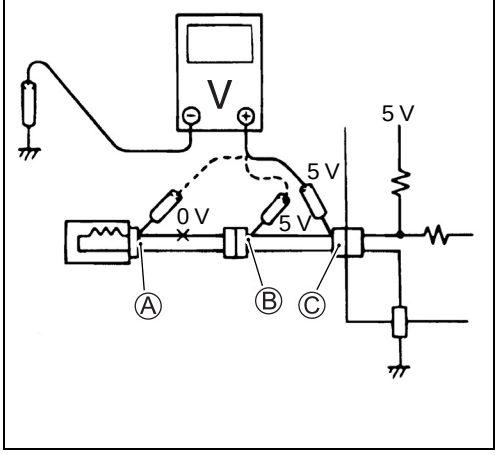
If measurements were taken as shown in the figure at the right and results are as listed below, it means that the circuit is open between terminals Ⓐ and Ⓑ.

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 ——— 2 V voltage drop
Ⓐ and body ground: 3 V ———



SHORT CIRCUIT CHECK (WIRE HARNESS TO GROUND)

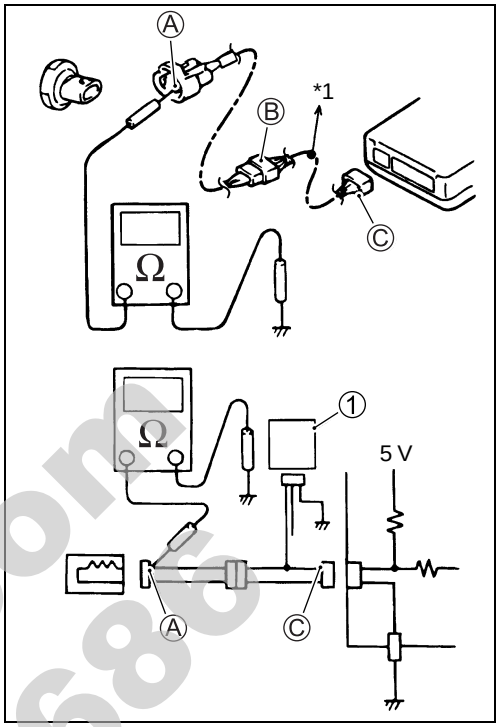
- Disconnect the negative cable from the battery.
- Disconnect the connectors/couplers at both ends of the circuit to be checked.

NOTE:

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

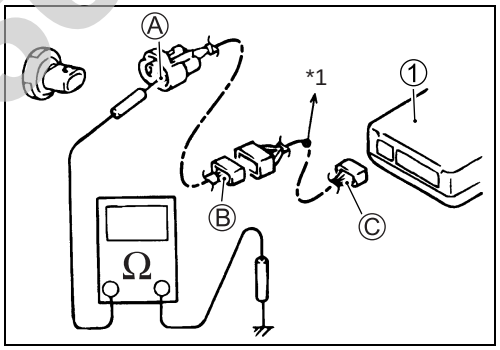
- Measure resistance between terminal at one end of circuit (Ⓐ terminal in figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals Ⓐ and Ⓒ.

① Other parts
*1 To other parts.



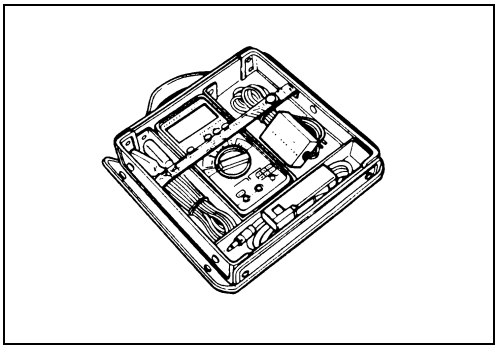
- Disconnect the connector/coupler included in circuit (coupler Ⓑ) and measure resistance between terminal Ⓐ and body ground.
  If continuity is indicated, the circuit is shorted to the ground between terminals Ⓐ and Ⓑ.

① ECM
*1 To other parts.



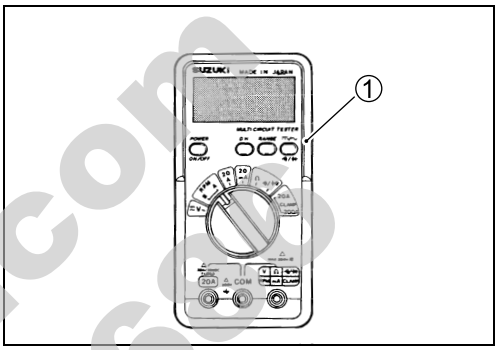
USING THE MULTI-CIRCUIT TESTER

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



USING THE TESTER

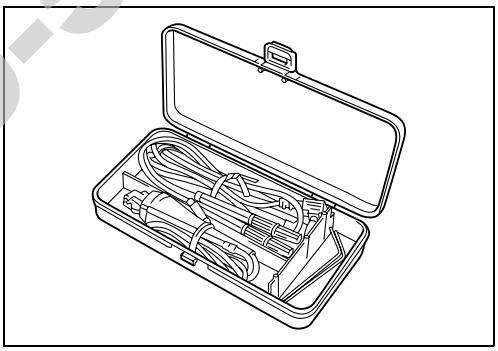
- Incorrectly connecting the ⊕ and ⊖ probes may cause the inside of the tester to burnout.
- If the voltage and current are not known, make measurements using the highest range.
- When measuring the resistance with the multi-circuit tester ①, ∞ will be shown as 10.00 MΩ and "1" flashes in the display.
- 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 the needle pointed probe to the back side of the lead wire coupler and connect the probes of tester to them.*
* *Use the needle pointed probe to prevent the rubber of the water proof coupler from damage.*



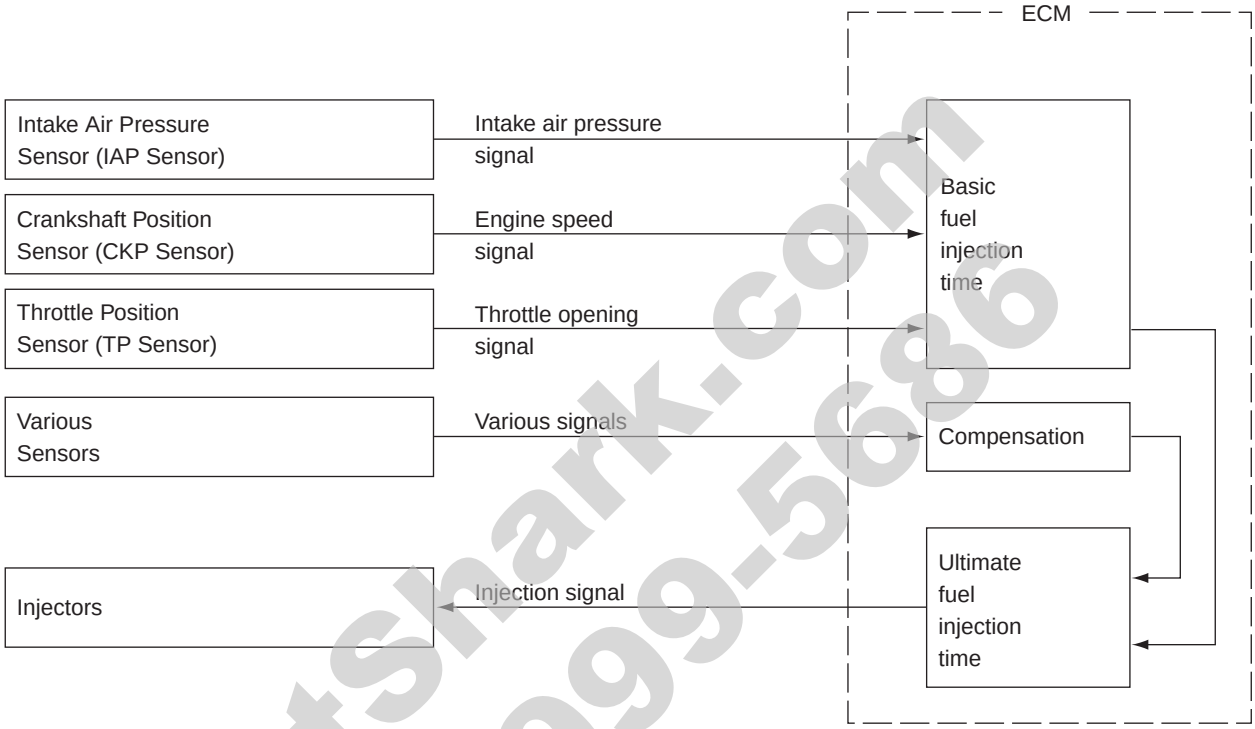
TOOL 09900-25009: Needle pointed probe set

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 intake air pressure, engine speed and throttle opening angle, and various compensations.

These compensations are determined according to the signals from various sensors that detect the engine and driving conditions.



COMPENSATION OF INJECTION TIME (VOLUME)

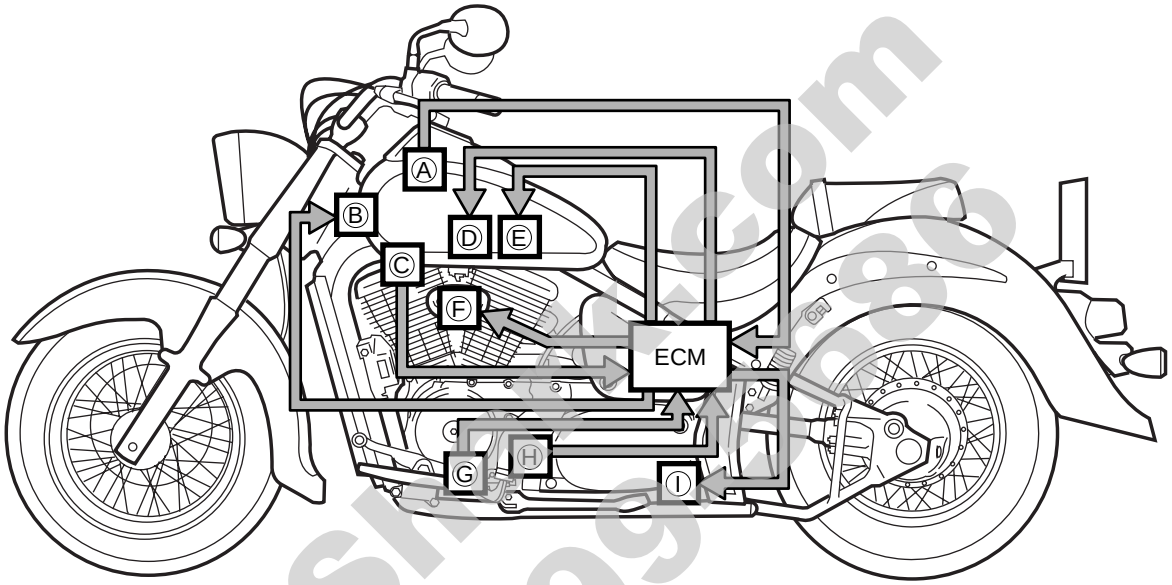
The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

SIGNAL	DESCRIPTION
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL	When engine coolant temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
BATTERY VOLTAGE SIGNAL	ECM operates on the battery voltage and at the same time, it monitors the voltage signal for compensation of the fuel injection time (volume). A longer injection time is needed to adjust injection volume in the case of low voltage.
ENGINE RPM SIGNAL	At high speed, the injection time (volume) is increased.
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.

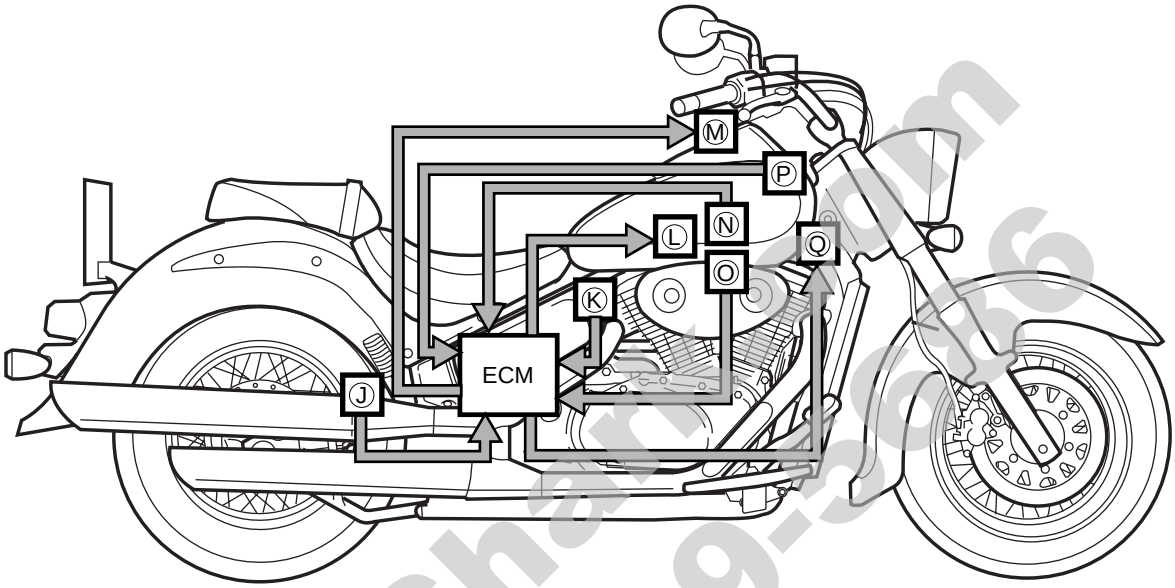
INJECTION STOP CONTROL

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.

FI SYSTEM PARTS LOCATION

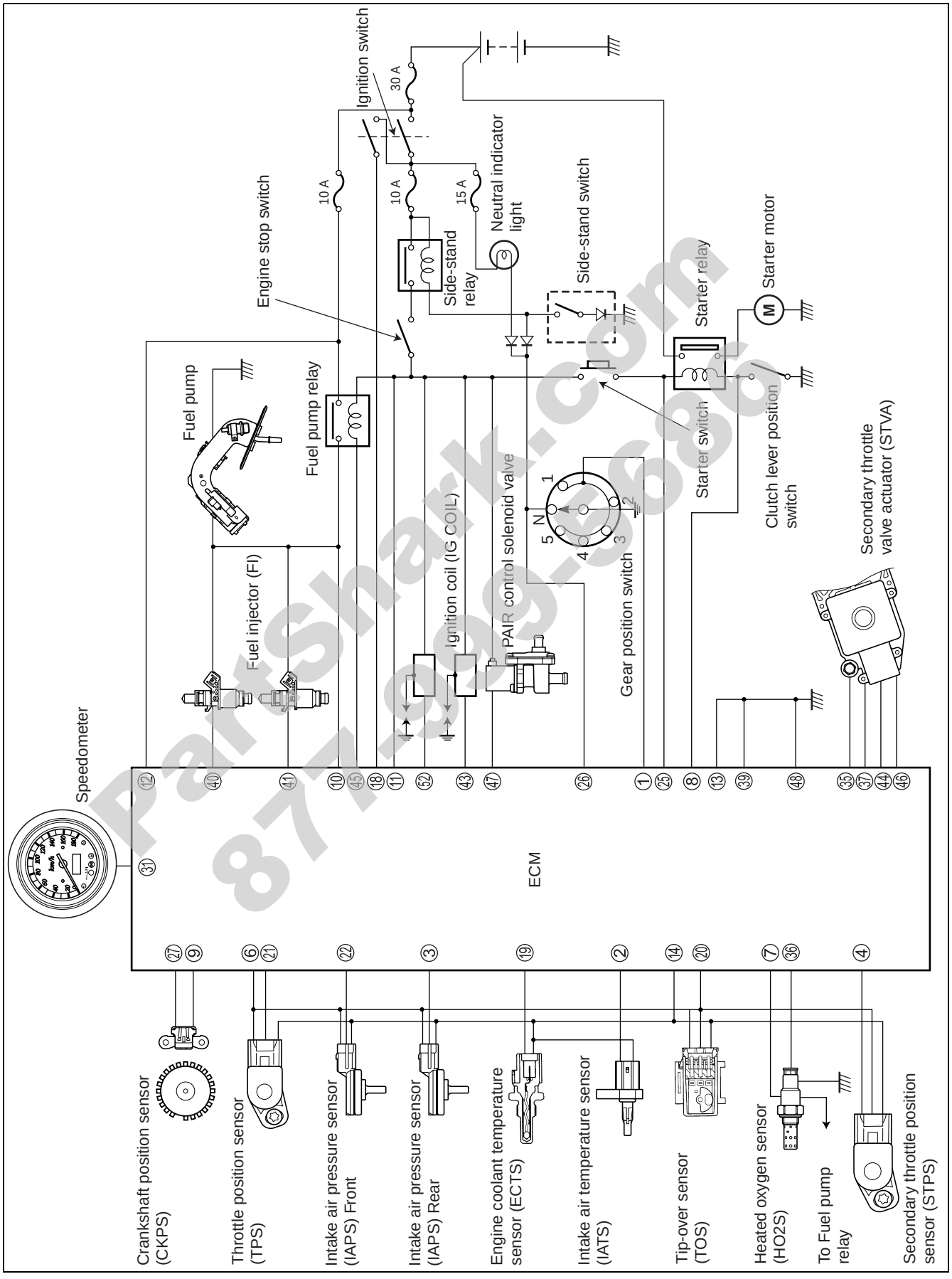


Ⓐ IAP sensor (Rear cylinder)
Ⓑ Ignition coil No.1 (Rear cylinder)
Ⓒ ECT sensor
Ⓓ Fuel injector (Rear cylinder)
Ⓔ Fuel injector (Front cylinder)
Ⓕ PAIR control solenoid valve
Ⓖ CKP sensor
Ⓗ GP switch
Ⓘ FP relay



Ⓙ HO2 sensor
Ⓚ TO sensor
Ⓛ STVA
Ⓜ Speedometer
Ⓝ STP sensor
Ⓞ TP sensor
Ⓟ IAP sensor (Front cylinder)
Ⓠ Ignition coil No.2 (Front cylinder)

FI SYSTEM WIRING DIAGRAM



SELF-DIAGNOSIS FUNCTION

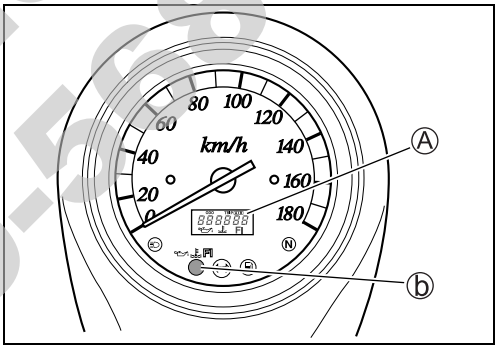
The self-diagnosis function is incorporated in the ECM. The function has two modes, "User mode" and "Dealer mode". The user can only be notified by the LCD (DISPLAY) panel and LED (FI light). To check the function of the individual FI system devices, the dealer mode is prepared. In this check, the special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

USER MODE

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

*1

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



*2

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

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

For Example

: The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the speedometer does not receive any signal from 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 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 (IAPS)	For Front cylinder
C14	Throttle position sensor (TPS)	*1
C15	Engine coolant temperature sensor (ECTS)	
C17	Intake air pressure sensor (IAPS)	For Rear cylinder
C21	Intake air temperature 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)	*2
C29	Secondary throttle position sensor (STPS)	
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	

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 position, upper, middle or lower line. If the indication is upper or lower line when engine rpm is 1 100 rpm, slightly turn the throttle position sensor and bring the line to middle.

In the normal condition, the throttle valve stop screw pushes throttle valves slightly, and indication point is middle line.

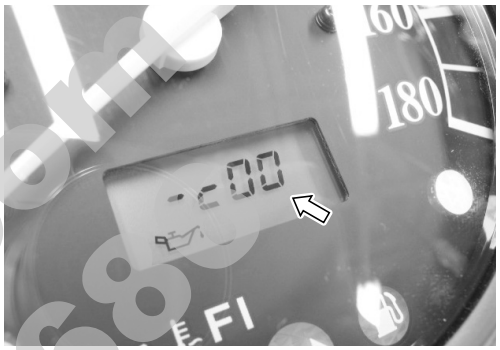
*2

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.

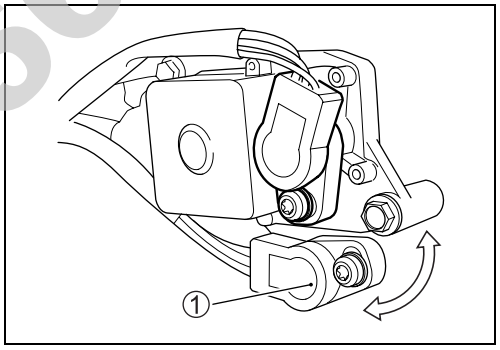
TPS ADJUSTMENT

1. Lift and support the fuel tank. (☞14-93)
2. Adjust the engine rpm to 1 100 rpm.

NOTE:
Warm up the engine before adjustment.



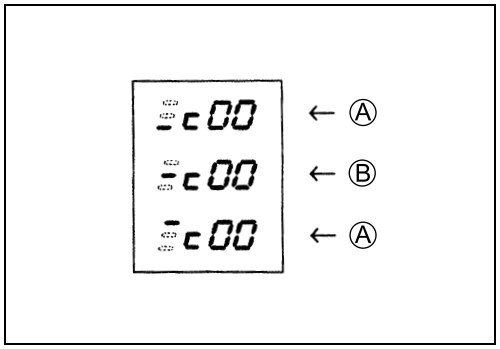
3. Connect the special tool (Mode select switch) to the dealer mode coupler at the wiring harness.



4. If the throttle position sensor adjustment is necessary, loosen the screw and turn the throttle position sensor ① and bring the line to middle.
5. Then, tighten the screw to fix the throttle position sensor.

TOOL 09930-82720: Mode select switch

The LCD indicates 0.4 sec./time, and two times show the correct position, where it 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"
ECT sensor	Engine coolant 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	"YES"	"YES"
		Front cylinder can run.	
	#2 Ignition-off	"YES"	"YES"
		Rear cylinder can run.	
Injection signal	#1 Fuel-cut	"YES"	"YES"
		Front cylinder can run.	
	#2 Fuel-cut	"YES"	"YES"
		Rear cylinder can run.	
Secondary throttle valve actuator	Secondary throttle valve is fixed to full close position. When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"
STP sensor	Secondary throttle valve is fixed to full close position.	"YES"	"YES"
Gear position signal	Gear position signal is fixed to 5th gear.	"YES"	"YES"
Heated oxygen sensor (E-02, 19, 24)	Fuel-air compensation ratio is fixed to normal condition.	"YES"	"YES"
PAIR control solenoid valve	ECM stops controlling PAIR control solenoid valve.	"YES"	"YES"

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

FI SYSTEM TROUBLESHOOTING

CUSTOMER COMPLAINT ANALYSIS

Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of 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 (°F/ °C) ☐ 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 condition 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. (☞2-8)
* Engine coolant level and leakage. (☞2-13)
* Fuel level and leakage. (☞2-10)
* Clogged air cleaner element. (☞2-4)
* Battery condition. (☞8-31)
* Throttle cable play. (☞2-11)
* Vacuum hoses looseness, bend and disconnection.
* Broken fuse.
* Each warning light operation. (☞8-21)
* Exhaust gas leakage and noise. (☞2-19)
* Each coupler disconnection.
* Clogged radiator core. (☞6-5)

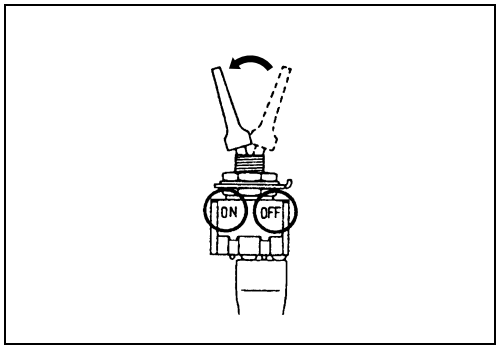
SELF-DIAGNOSTIC PROCEDURES

NOTE:

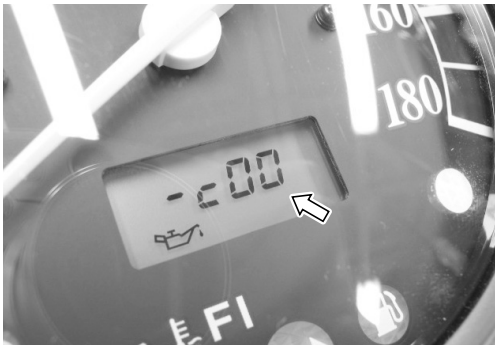
* *Don't disconnect couplers from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in the memory. Such disconnection will erase the memorized information in ECM memory.*
* *Malfunction 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" (☞14-30 and -31) carefully to have good understanding as to what functions are available and how to use it.*
* *Be sure to read "PRECAUTIONS for Electrical Circuit Service" (☞14-18) before inspection and observe what is written there.*

- Remove the right frame cover. (☞7-2)
- 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

NOTE:

** 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 for Electrical Circuit Service" (☞14-18) before inspection and observe what is written there.*

- Remove the right frame cover. (☞7-2)
- 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 (displaing data at the time of DTC) according to instructions displayed on SDS.

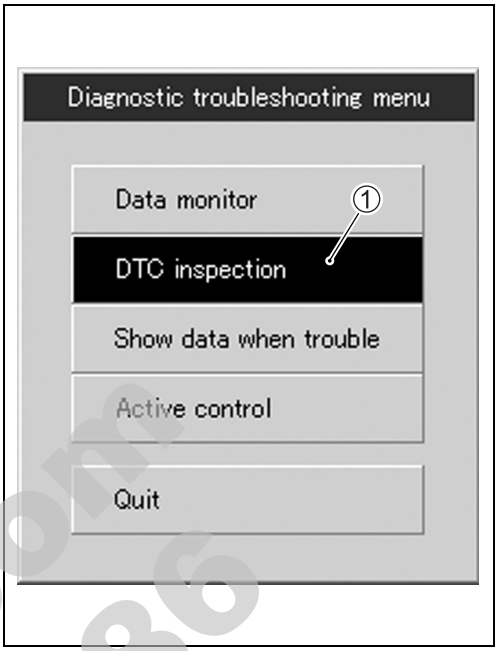
- Not only is SDS used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.
- How to use trigger. (Refer to the SDS operation manual for further details)

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

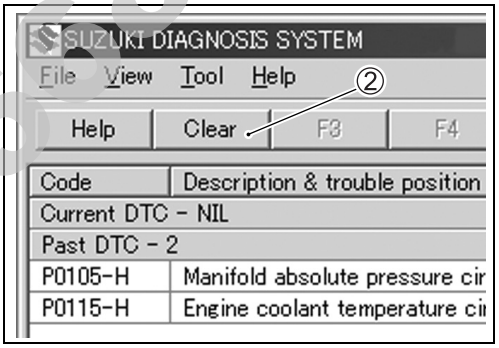
USE OF SDS DIAGNOSIS RESET PROCEDURE

- 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.

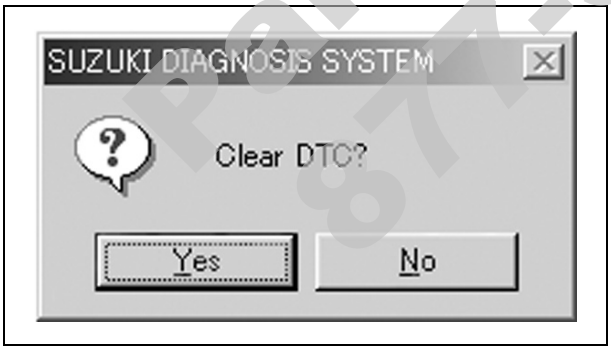
NOTE:
The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.



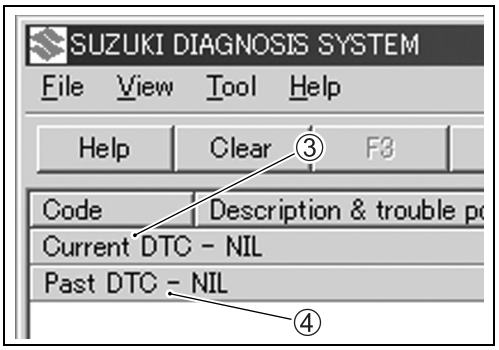
- Click "Clear" ② to delete history code (Past DTC).



- Follow the displayed instructions.

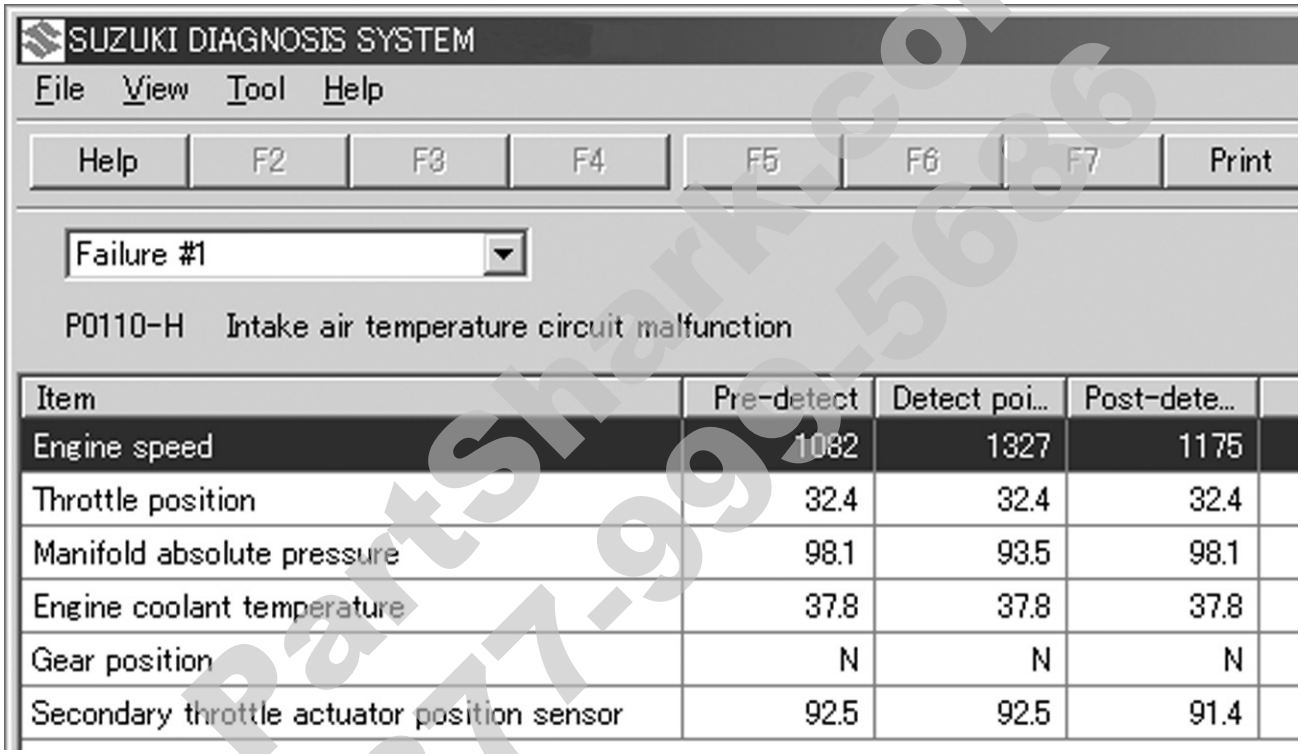


- Check that both "Current DTC" ③ and "Past DTC" ④ are deleted (NIL).



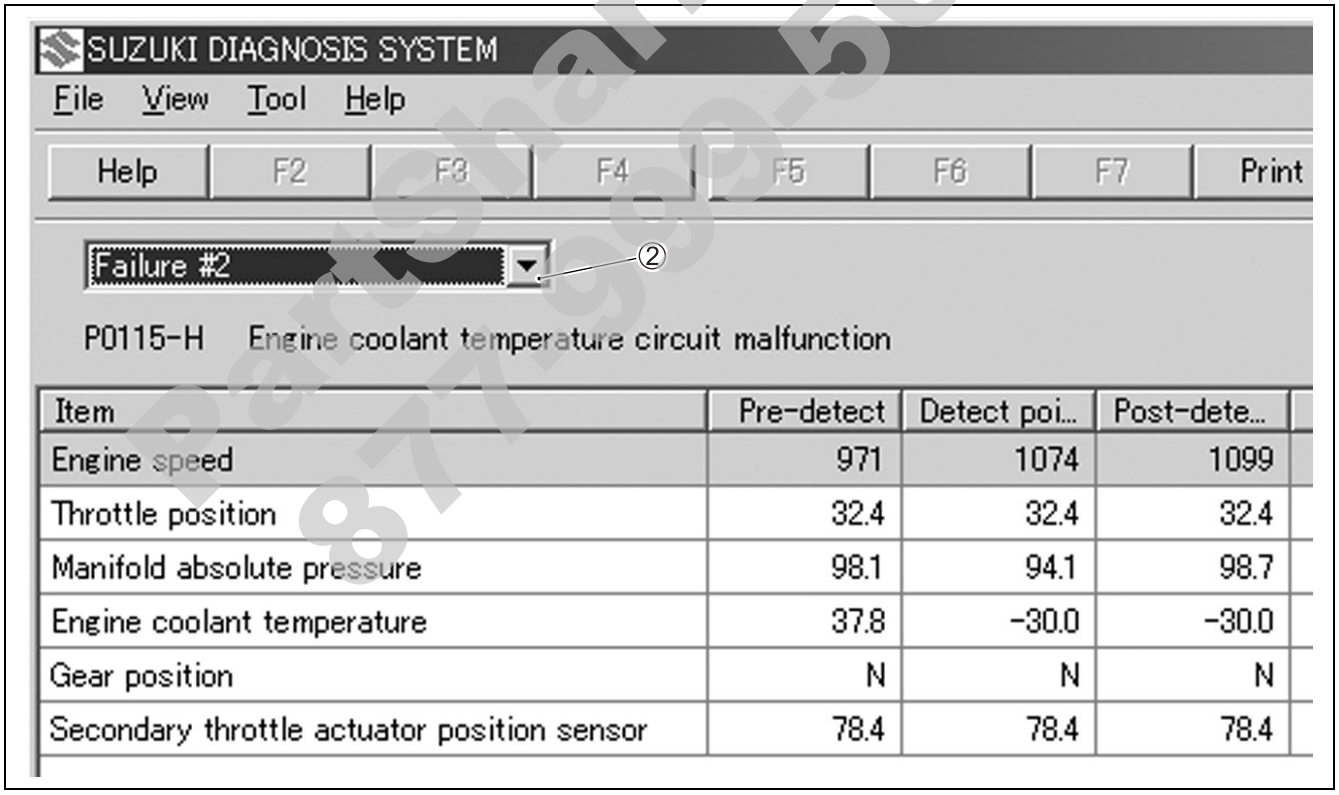
SHOW DATA WHEN TROUBLE (DISPLAYING DATA AT THE TIME OF DTC)

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.



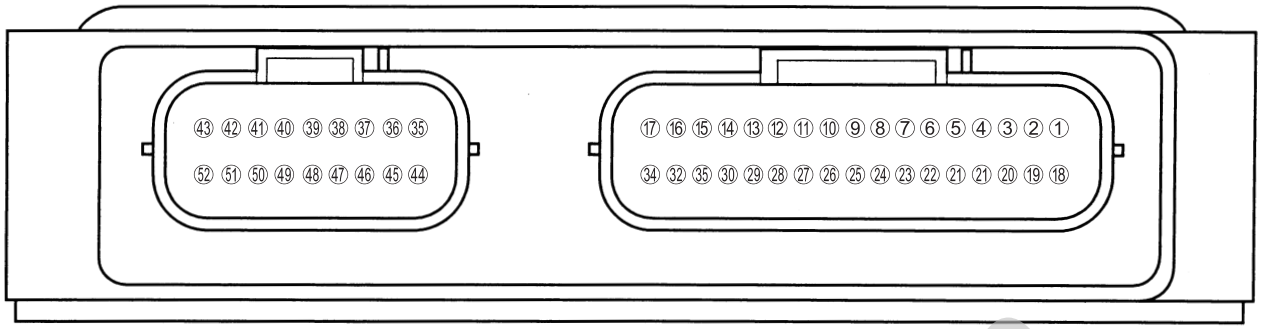
Item	Pre-detect	Detect poi...	Post-dete...
Engine speed	1082	1327	1175
Throttle position	32.4	32.4	32.4
Manifold absolute pressure	98.1	93.5	98.1
Engine coolant temperature	37.8	37.8	37.8
Gear position	N	N	N
Secondary throttle actuator position sensor	92.5	92.5	91.4

- 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.



Item	Pre-detect	Detect poi...	Post-dete...
Engine speed	971	1074	1099
Throttle position	32.4	32.4	32.4
Manifold absolute pressure	98.1	94.1	98.7
Engine coolant temperature	37.8	-30.0	-30.0
Gear position	N	N	N
Secondary throttle actuator position sensor	78.4	78.4	78.4

ECM TERMINAL



TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
①	GP switch signal (GP)	⑱	Ignition switch signal (AT)
②	IAT sensor signal (IAT)	⑲	ECT sensor signal (ECT)
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	Blank
㊶	Rear cylinder Fuel injector (#2)	㊿	Blank
㊷	Blank	(51)	Blank
㊸	Front cylinder Ignition coil (IG2)	(52)	Rear cylinder Ignition coil (IG1)

MALFUNCTION CODE AND DEFECTIVE CONDITION

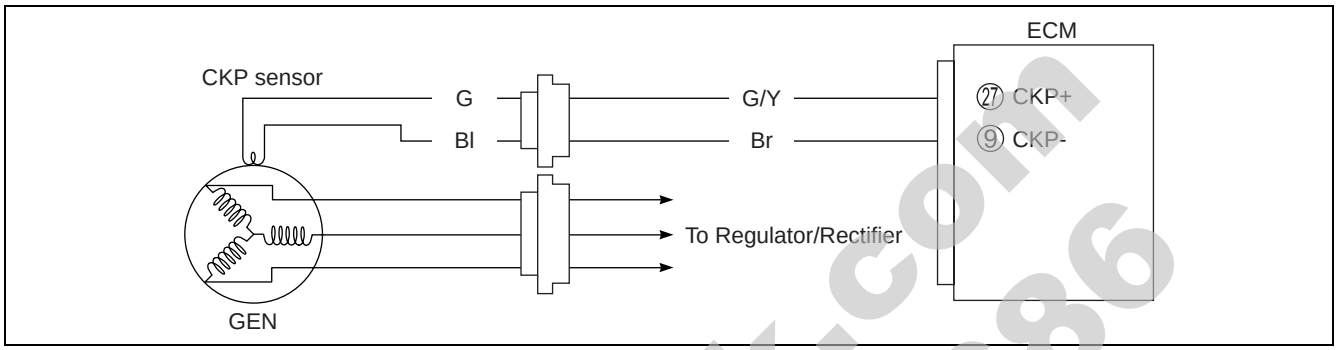
DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C00		NO FAULT	————	————
C12		CKP sensor	The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	CKP sensor wiring and mechanical parts. (CKP sensor, lead wire/coupler connection)
P0335				
C13/C17		IAP sensor	The 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		ECT 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.	ECT sensor, lead wire/coupler connection.
P0115	H		Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open.
	L		Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground.

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 moter, 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 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 (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

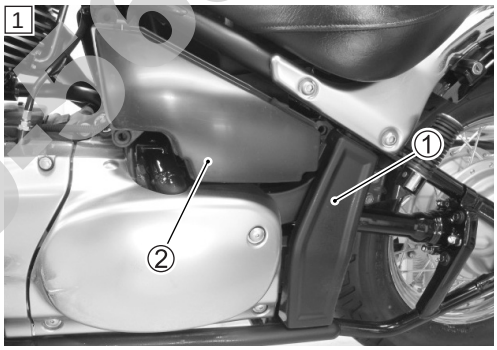
DETECTED CONDITION	POSSIBLE CAUSE
The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	• Metal particles or foreign material being stuck on the CKP sensor and rotor tip. • CKP sensor circuit open or short. • CKP sensor malfunction. • ECM malfunction.



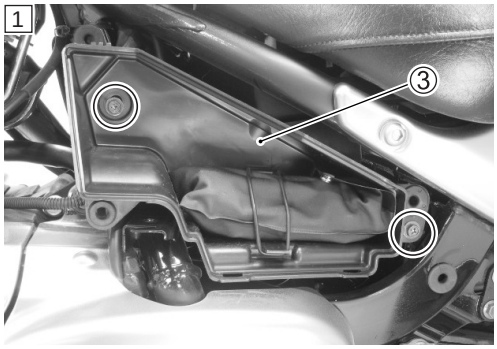
INSPECTION

Step 1

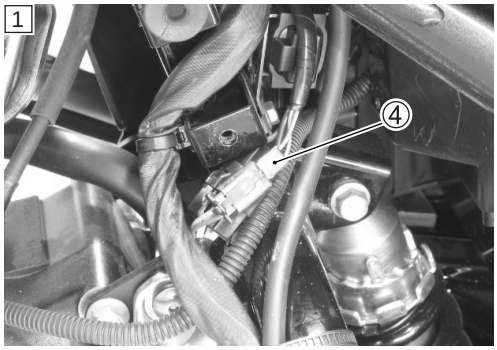
1) Remove the left frame cover. (☞7-2)
2) Remove the left frame lower cover ① and tool box cover ②.



3) Remove the tool box ③.



4) Check the CKP sensor coupler ④ for loose or poor contacts. If OK, then measure the CKP sensor resistance.

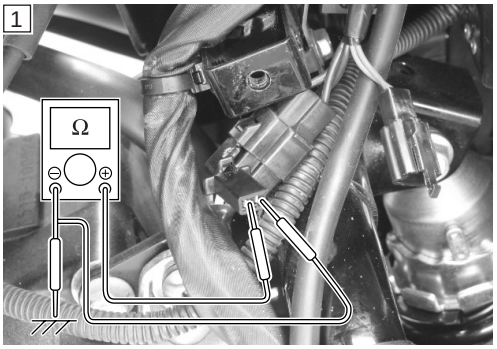


5) Disconnect the CKP sensor coupler and measure the resistance.

DATA CKP sensor resistance: 184 – 276 Ω
(Blue – Green)

6) Also, 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.

7) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Step 2

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

DATA CKP sensor peak voltage: 4.0 V and more
(⊕ Green – ⊖ Blue)

① Peak volt adaptor

3) Repeat the above test procedure a few times and measure the highest peak voltage.

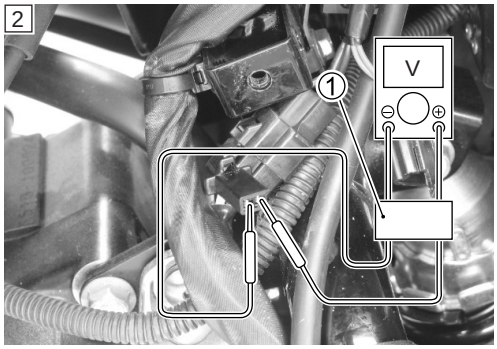
TOOL 09900-25008: Multi-circuit tester set

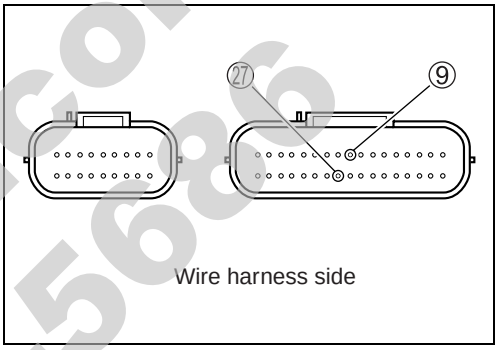
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• Brown or G/Y wire open or shorted to ground, or poor ⑨ or ㉗ 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 CKP sensor coupler or ECM coupler. • Replace the CKP sensor with a new one.

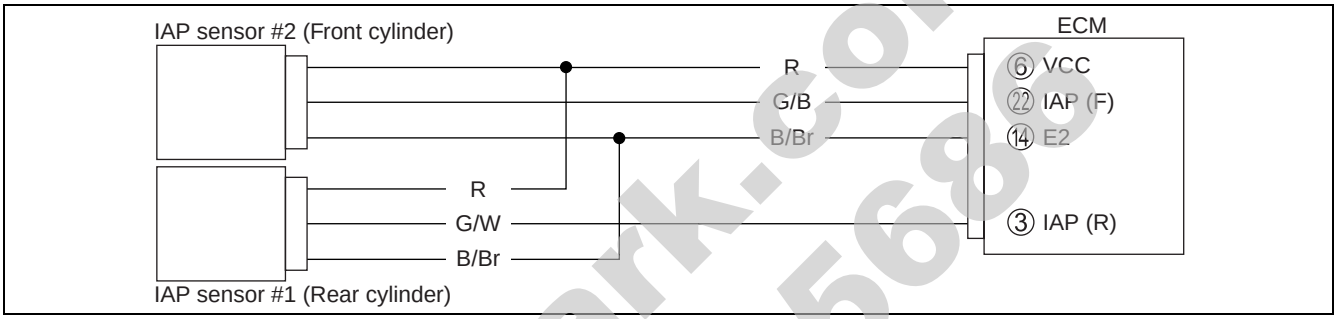
4) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)





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

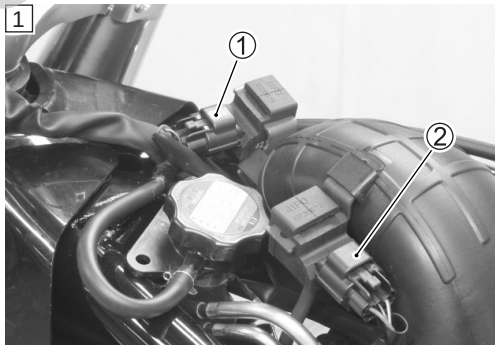
DETECTED CONDITION		POSSIBLE CAUSE
C13/C17	IAP sensor voltage is not within the following range. 0.1 V ≦ Sensor voltage < 4.8 V *NOTE:* *Note that atmospheric pressure varies depending on weather conditions as well as altitude.* *Take that into consideration when inspecting voltage.*	• Clogged vacuum 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.



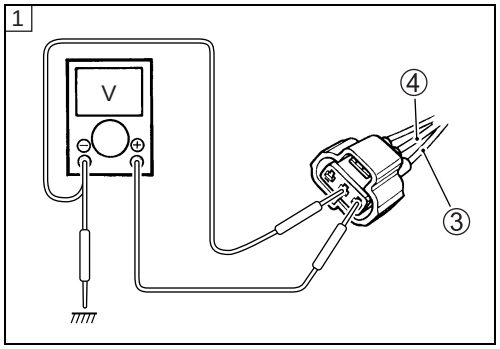
INSPECTION

Step 1

1) Remove the fuel tank. (☞14-93)
2) Turn the ignition switch OFF.
3) Check the IAP sensor couplers (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 couplers.
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

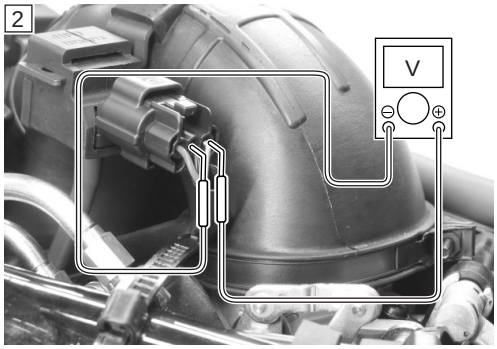
Tester knob indication: Voltage (⎓)

Is the voltage OK?

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

Step 2

1) Connect the IAP sensor couplers and install the fuel tank.
2) Insert the needle pointed probes to the lead wire coupler.
   Start the engine at idle speed and measure the IAP sensor output voltage at the wire side coupler (between G/B and B/Br wires or between G/W and B/Br wires).



DATA IAP sensor output voltage: Approx. 2.6 V at idle speed
(Front cylinder: ⊕ G/B – ⊖ B/Br)
(Rear cylinder: ⊕ G/W – ⊖ B/Br)

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

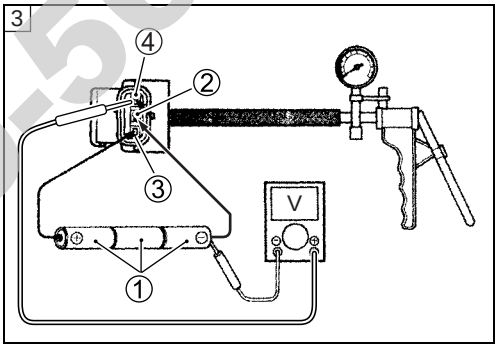
Tester knob indication: Voltage (⎓)

YES	Go to Step 3.
NO	• Check the vacuum hose for crack or damage. • Open or short circuit in the G/B or G/W wire. • Replace the IAP sensor with a new one.

3) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Step 3

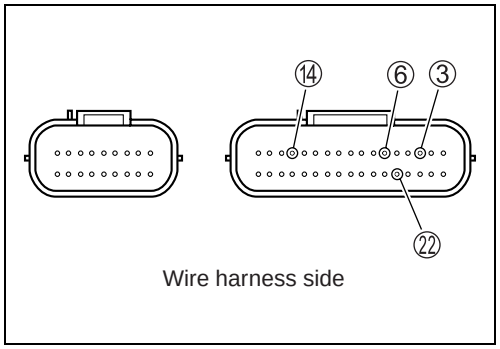
1) Remove the IAP sensor.
2) Connect the vacuum pump gauge to the vacuum port of the IAP sensor.
   Arrange 3 new 1.5 V batteries in series ① (check that total voltage is 4.5 – 5.5 V) and connect ⊖ terminal to the ground terminal ② and ⊕ terminal to the Vcc terminal ③.
3) Check the voltage between Vout ④ and ground. Also, check if voltage reduces when vacuum is applied up to 400 mmHg by using vacuum pump gauge. (☞14-50)



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

Tester knob indication: Voltage (⎓)

Is the voltage OK?



YES	• G/B, G/W, R or B/Br wire open or shorted to ground, or poor ㉒, ③, 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 IAP sensor with a new one.

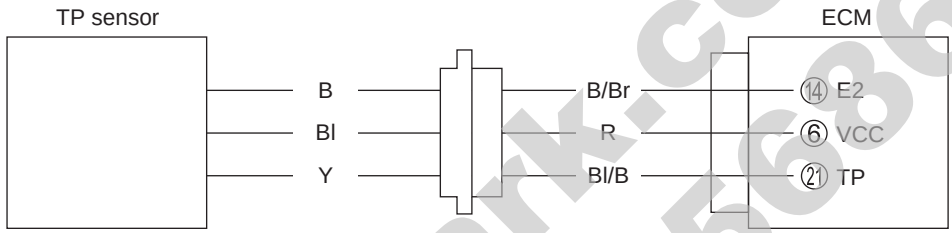
4) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Output voltage (Vcc voltage 4.5 – 5.5 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	1 524 | 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) TP SENSOR CIRCUIT MALFUNCTION

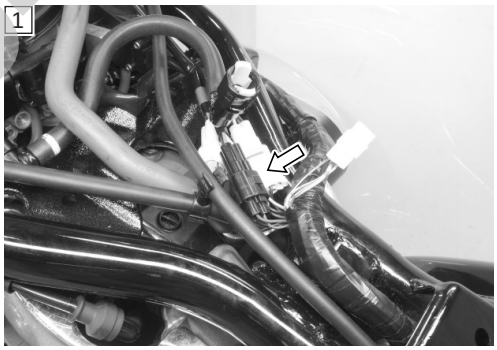
DETECTED CONDITION			POSSIBLE CAUSE
C14		Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.1 V ≦ Sensor voltage < 4.8 V	• TP sensor maladjusted. • TP sensor circuit open or short. • TP sensor malfunction.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



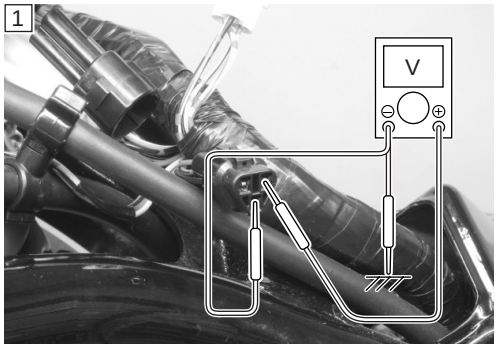
INSPECTION

Step 1 (When indicating C14:)

1) Remove the fuel tank. (☞14-93)
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**

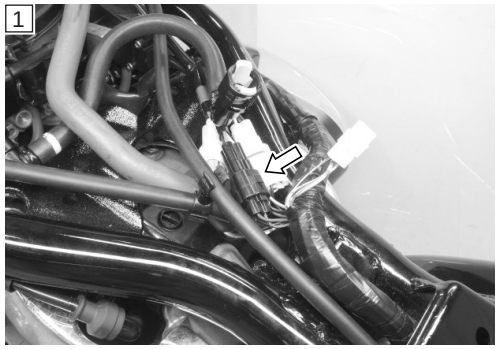
Tester knob indication: Voltage (⎓)

Is the voltage OK?

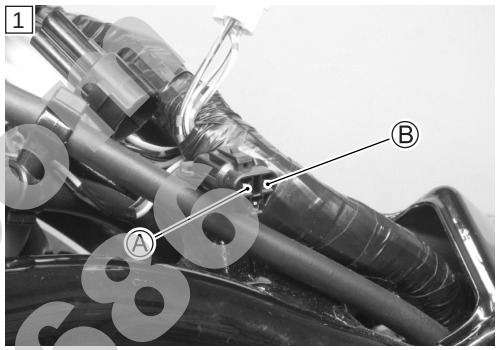
YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the Red wire or B/Br wire.

Step 1 (When indicating P0120-H:)

1) Remove the fuel tank. (☞14-93)
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 Bl/B wire Ⓐ and Red wire Ⓑ. If sound is not heard from the tester, the circuit condition is OK.
6) Disconnect the ECM coupler.



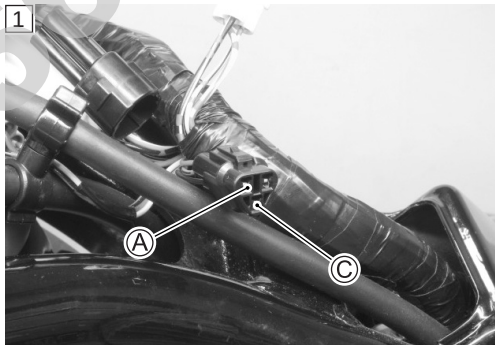
7) Check the continuity between Bl/B wire Ⓐ and terminal ㉑.
8) Also, check the continuity between B/Br wire Ⓒ and terminal ⑭.

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

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

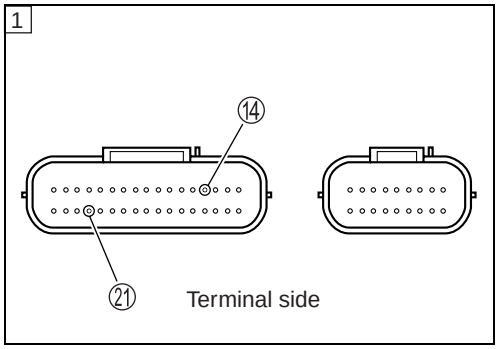
Tester knob indication: Continuity test (•))))

Is the continuity OK?

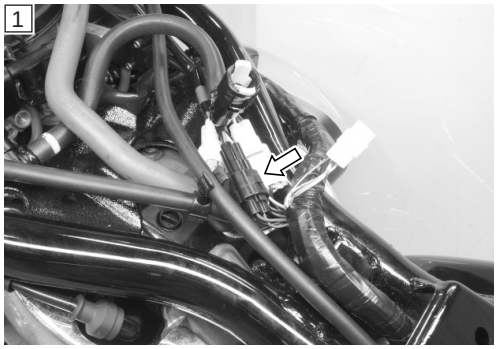


YES	Go to Step 2.
NO	Bl/B wire shorted to VCC or B/Br wire open.

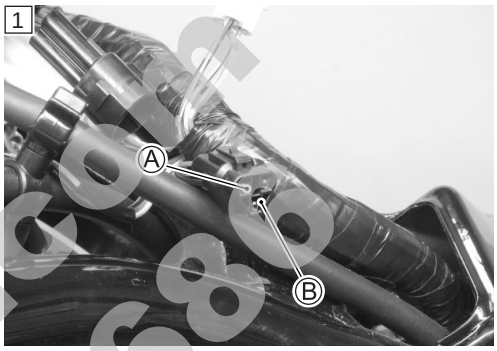
9) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)



Step 1 (When indicating P0120-L:)
1) Remove the fuel tank. (☞14-93)
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 Bl/B wire Ⓐ and ground.
6) Also, check the continuity between Bl/B wire Ⓐ and B/Br wire Ⓑ. If sound is not heard from the tester, the circuit condition is OK.
7) Disconnect the ECM coupler.



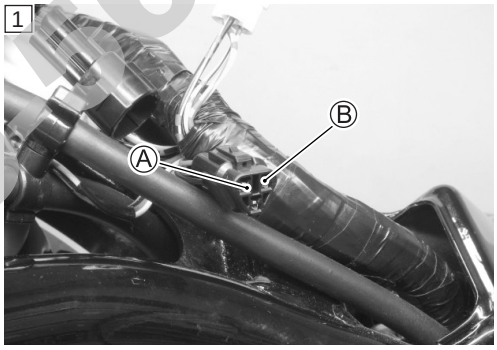
8) Check the continuity between Red wire Ⓑ and terminal ⑥.
9) Also, check the continuity between Bl/B wire Ⓐ and terminal ㉑.

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

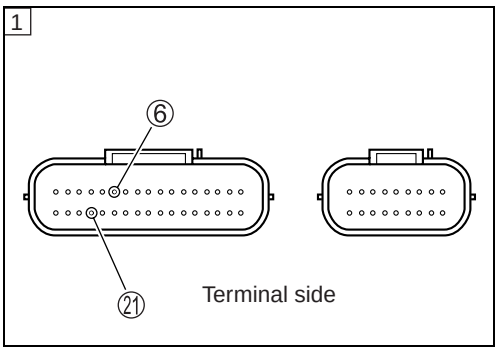
TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

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

Is the continuity OK?



YES	Go to Step 1 (☞14-52) and Go to Step 2.
NO	Red or Bl/B wire open, or Bl/B wire shorted to ground.

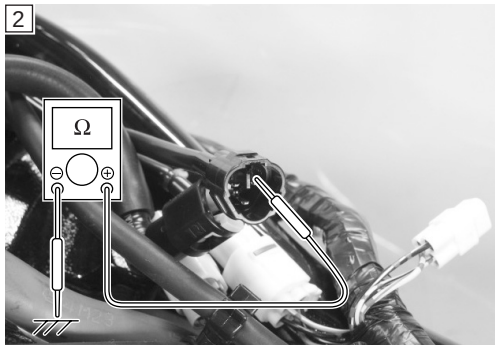


10) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Step 2

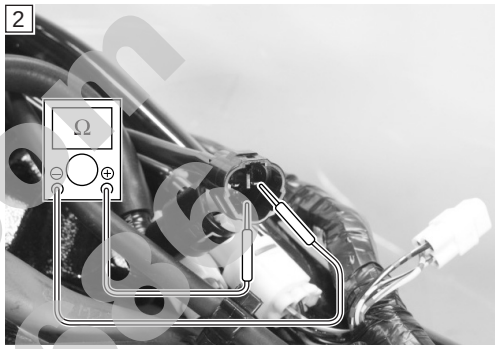
1) Turn the ignition switch OFF.
2) Disconnect the TP sensor coupler.
3) Check the continuity between Yellow wire and ground.

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



4) If OK, then measure the TP sensor resistance at the terminals (between Yellow wire and Black wire).
5) Turn the throttle grip and measure the resistance.

DATA **TP sensor resistance**
Throttle valve is closed : Approx. 1.1 kΩ
Throttle valve is opened: Approx. 4.3 kΩ



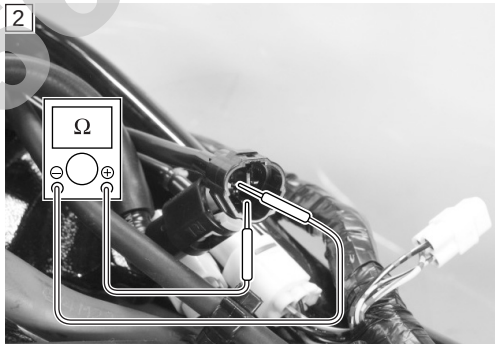
6) Also, measure the TP sensor resistance at the test harness terminals (between Blue wire and Black wire).

DATA **TP sensor resistance: Approx. 4.66 kΩ**
(Blue wire – Black wire)

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

Tester knob indication: Resistance (Ω)

Are the continuity and resistance OK?

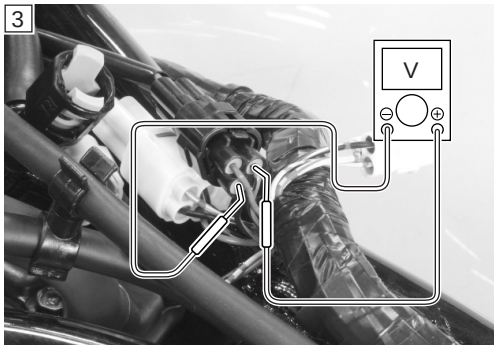


YES	Go to Step 3.
NO	• Reset the TP sensor position correctly. • Replace the TP sensor with a new one.

7) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Step 3

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

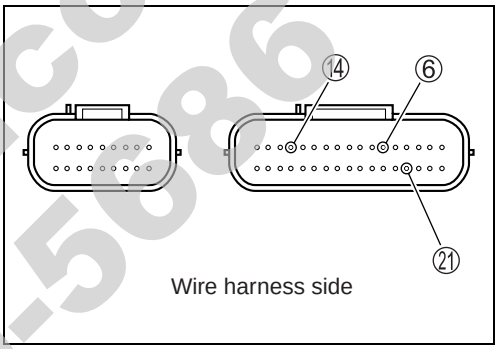


DATA TP sensor output voltage
Throttle valve is closed : Approx. 1.1 V
Throttle valve is opened: Approx. 4.3 V

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

Tester knob indication: Voltage (⎓)

Is the voltage OK?

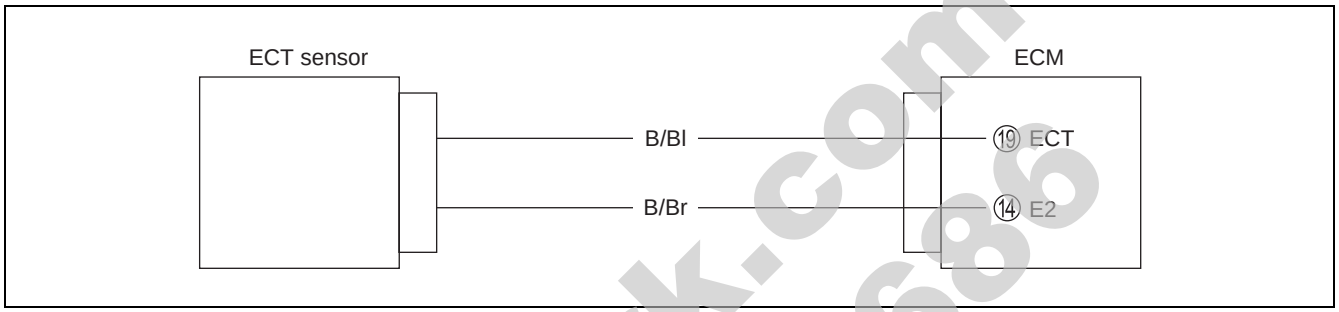


YES	• R, B/Br or Bl/B wire open or shorted to ground, or poor ⑥, ⑭ or ㉑ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	If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

5) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

"C15" (P0115) ECT SENSOR CIRCUIT MALFUNCTION

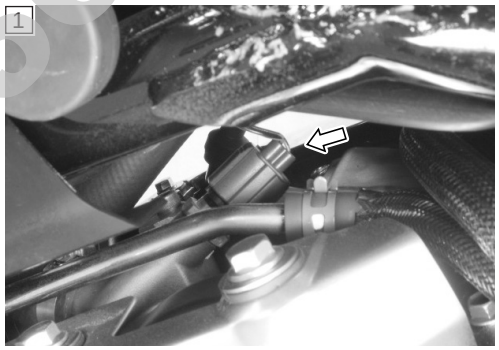
DETECTED CONDITION			POSSIBLE CAUSE
C15		Output voltage is not within the following range. 0.1 ≦ Sensor voltage < 4.6 V	• ECT sensor circuit open or short. • ECT sensor malfunction. • ECM malfunction.
P0115	H	Sensor voltage is higher than specified value.	• ECT sensor circuit open or ground circuit open.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



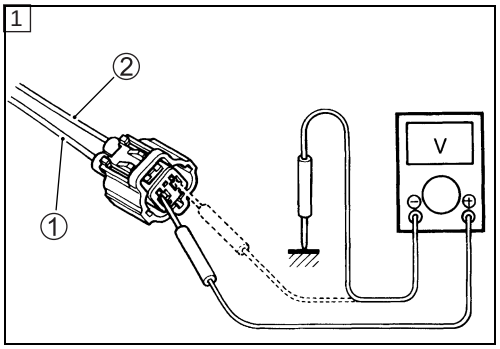
INSPECTION

Step 1 (When indicating C15:)

1) Remove the fuel tank. (☞14-93)
2) Turn the ignition switch OFF.
3) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then measure the ECT sensor voltage at the wire side coupler.



4) Disconnect the coupler and turn the ignition switch ON.
5) Measure the voltage between B/Bl wire terminal ① and ground.
6) Also, measure the voltage between B/Bl wire terminal ① and B/Br wire terminal ②.



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

TOOL 09900-25008: Multi-circuit tester set

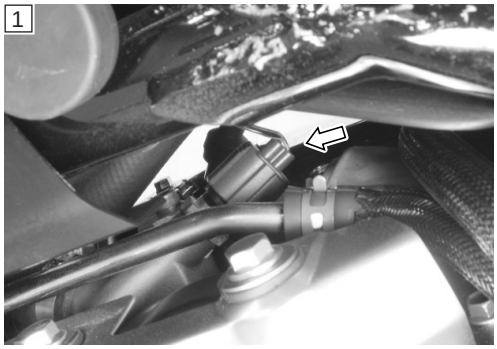
Tester knob indication: Voltage (⎓)

Is the voltage OK?

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

Step 1 (When indicating P0115-H:)

1) Remove the fuel tank. (☞14-93)
2) Turn the ignition switch OFF.
3) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then check the ECT sensor lead wire continuity.

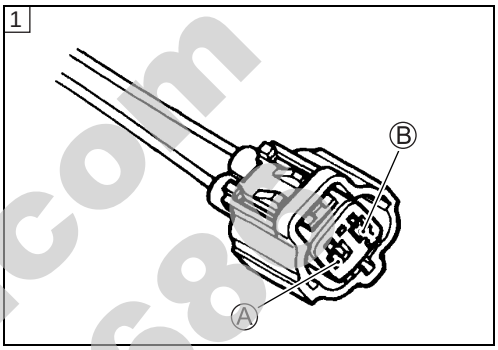


4) Disconnect the ECT sensor coupler and ECM coupler.
5) Check the continuity between B/Bl wire Ⓐ and terminal ⑲.
6) Also, check the continuity between B/Br wire Ⓑ and terminal ⑭.

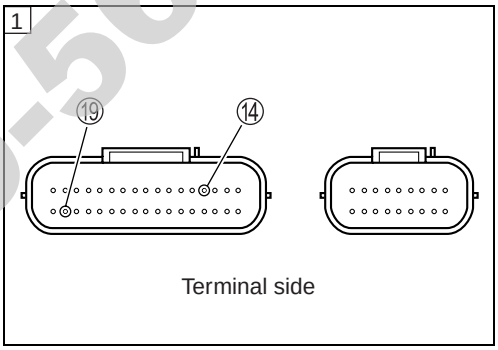
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

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

Is the continuity OK?



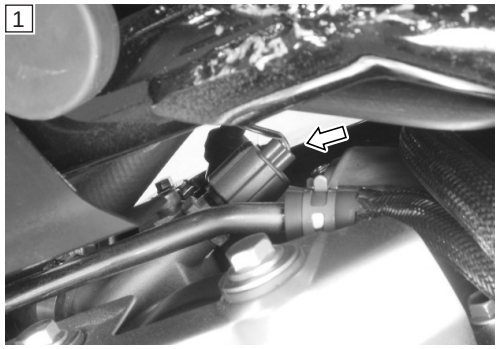
YES	Go to Step 2.
NO	B/Bl or B/Br wire open.



7) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

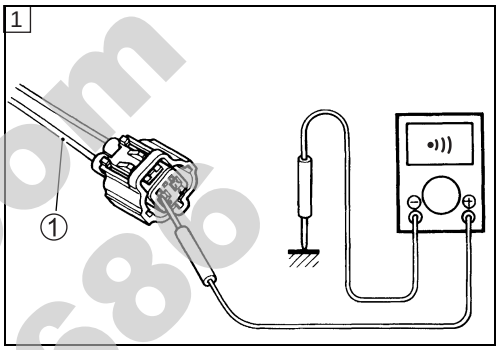
Step 1 (When indicating P0115-L:)

1) Remove the fuel tank. (☞14-93)
2) Turn the ignition switch OFF.
3) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then check the ECT sensor lead wire continuity.



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

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

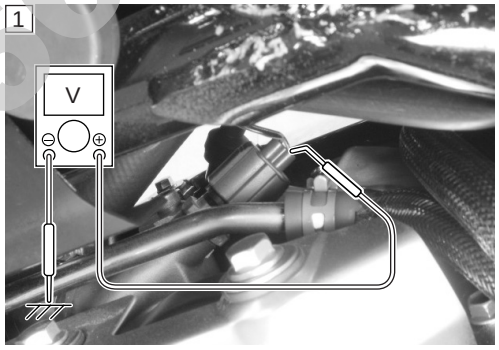


6) Connect the ECT sensor coupler.
7) Turn the ignition switch ON.
8) Measure the voltage between B/Bl wire and ground.

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 1 (☞14-57) and Go to Step 2.
NO	B/Bl wire shorted to ground.

9) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

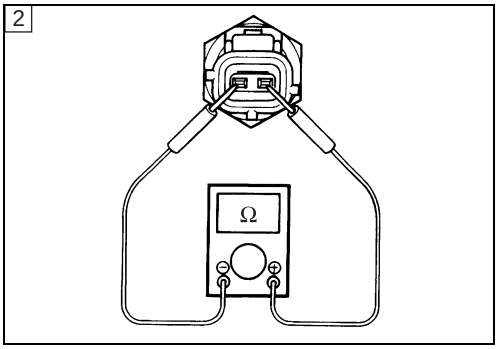
Step 2

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

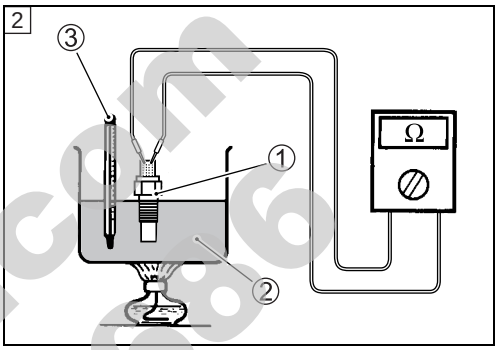
DATA ECT sensor resistance:
Approx. 2.3 – 2.6 kΩ at 20 °C (68 °F)
(Terminal – Terminal)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



3) Remove the ECT sensor.
4) Check the ECT sensor by testing it at the bench as shown in the figure. Connect the ECT sensor ① to a circuit tester and place it in the oil ② contained in a pan, which is placed on a stove.
5) Heat the oil to raise its temperature slowly and read the column thermometer ③ and the ohmmeter.



DATA Temperature sensor specification

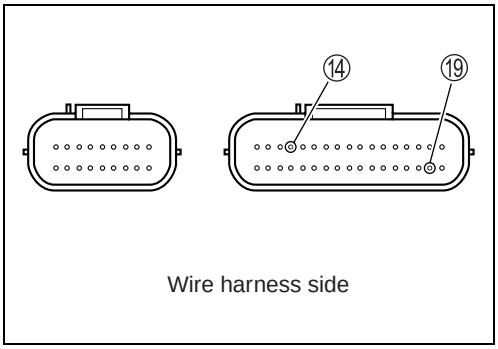
Engine Coolant Temp	Resistance
20 °C (68 °F)	Approx. 2.45 kΩ
40 °C (104 °F)	Approx. 1.148 kΩ
60 °C (140 °F)	Approx. 0.587 kΩ
80 °C (176 °F)	Approx. 0.322 kΩ

CAUTION

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

Is the resistance OK?

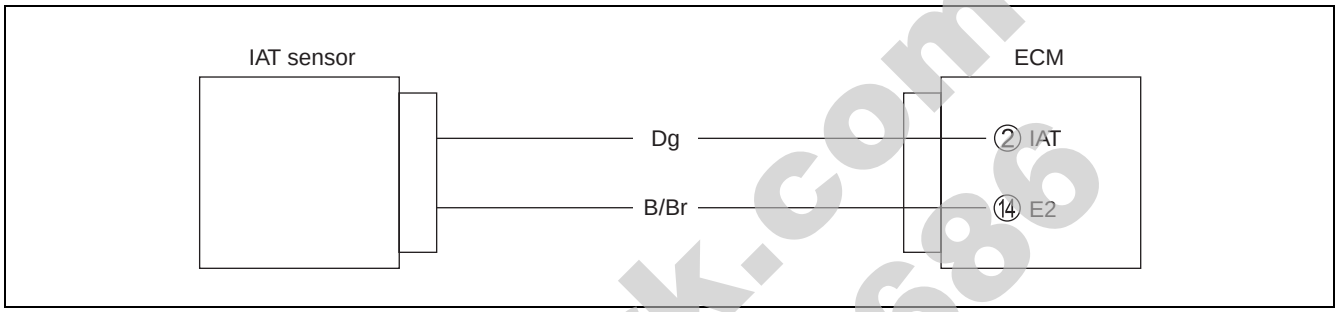
YES	• B/Br or B/Bl wire open or shorted to ground, or poor ⑭ or ⑲ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the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



6) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

"C21" (P0110) IAT SENSOR CIRCUIT MALFUNCTION

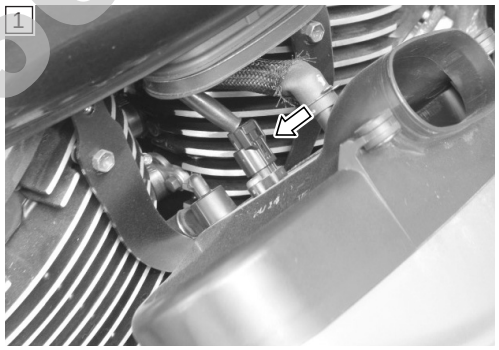
DETECTED CONDITION			POSSIBLE CAUSE
C21		Output voltage is not within the following range. 0.1 ≦ Sensor voltage < 4.6 V	• IAT sensor circuit open or short. • IAT sensor malfunction. • ECM malfunction.
P0110	H	Sensor voltage is higher than specified value.	• IAT sensor circuit open or ground circuit open.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



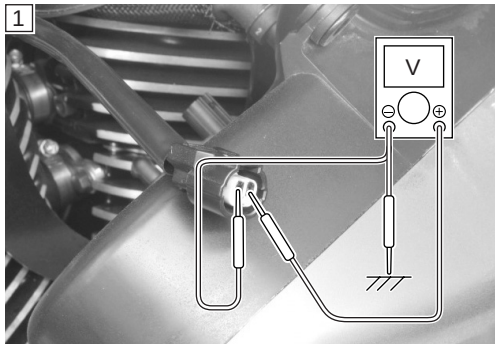
INSPECTION

Step 1 (When indicating C21:)

1) Remove the air cleaner box. (☞14-103)
2) Turn the ignition switch OFF.
3) Check the IAT sensor coupler for loose or poor contacts.
   If OK, then measure the IAT sensor voltage at the wire side coupler.
4) Disconnect the coupler and turn the ignition switch ON.



5) Measure the voltage between Dg wire terminal and ground.
6) Also, measure the voltage between Dg wire terminal and B/Br wire terminal.



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

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

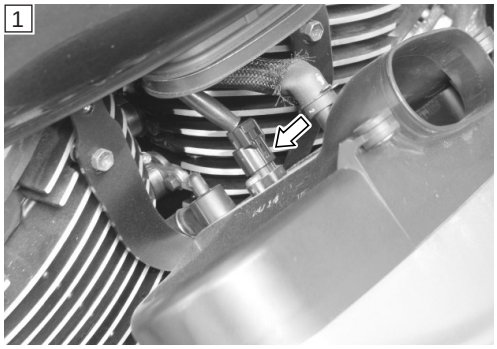
Tester knob indication: Voltage (⎓)

Is the voltage OK?

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

Step 1 (When indicating P0110-H:)

1) Remove the air cleaner box. (☞14-103)
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.

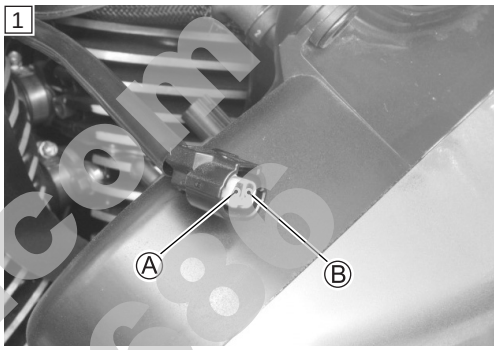


4) Disconnect the IAT sensor coupler and ECM coupler.
5) Check the continuity between Dg wire Ⓐ and terminal ②.
6) Also, check the continuity between B/Br wire Ⓑ and terminal ⑭.

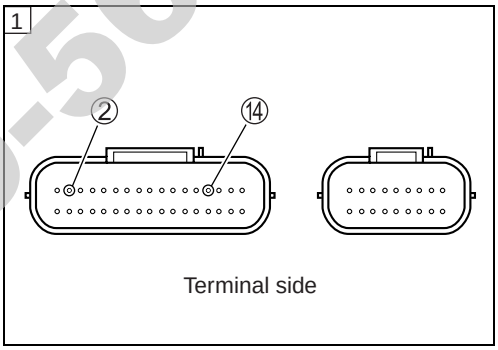
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

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

Is the continuity OK?



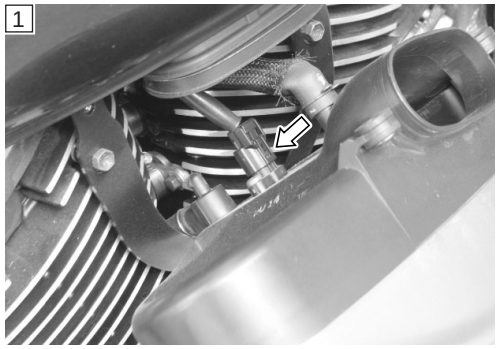
YES	Go to Step 2.
NO	Dg or B/Br wire open.



7) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

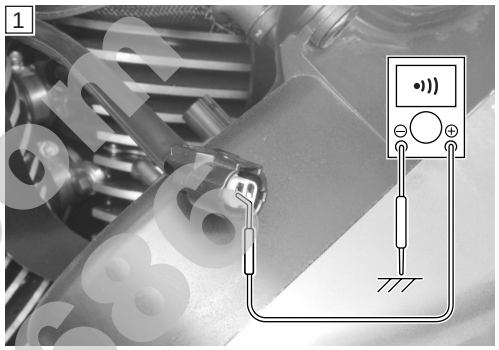
Step 1 (When indicating P0110-L:)

1) Remove the air cleaner box. (☞14-103)
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 and ground. If sound is not heard from the tester, the circuit condition is OK.

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

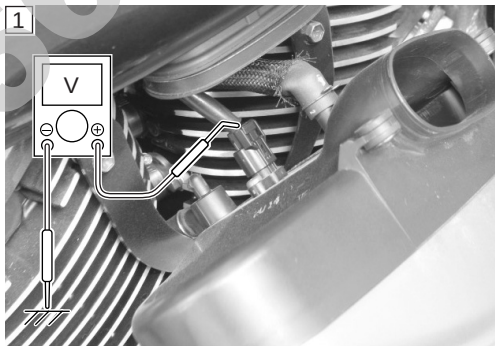


6) Connect the IAT sensor coupler.
7) Turn the ignition switch ON.
8) Measure the voltage between Dg wire and ground.

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 1 (☞14-61) and Go to Step 2.
NO	Dg wire shorted to ground.

9) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

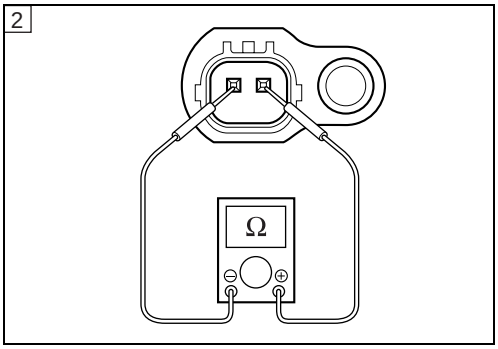
Step 2

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

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

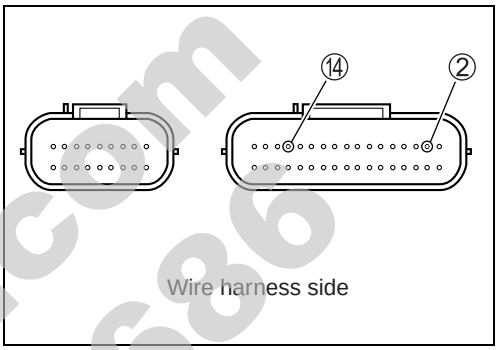
TOOL 09900-25008: Multi-circuit tester set

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.



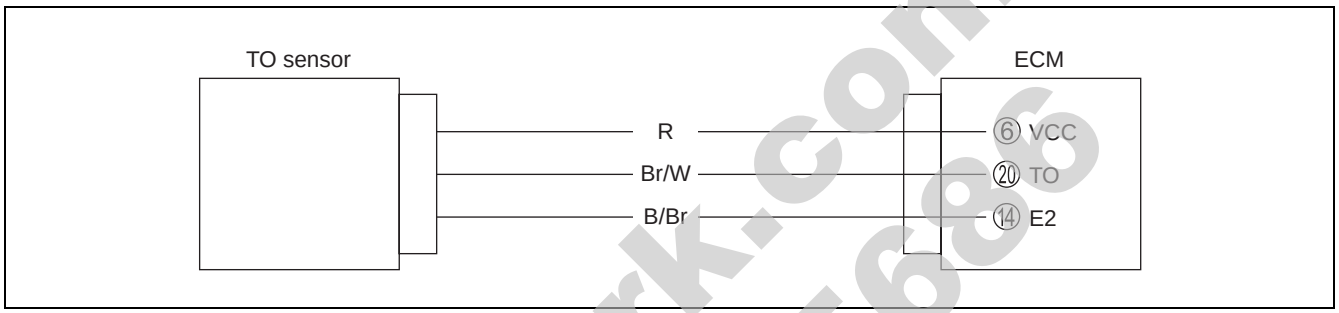
Intake Air Temp	Resistance
20 °C (68 °F)	Approx. 2.6 kΩ
50 °C (122 °F)	Approx. 0.8 kΩ
80 °C (176 °F)	Approx. 0.3 kΩ
110 °C (230 °F)	Approx. 0.2 kΩ

NOTE:
IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to Page 14-61 for details.

3) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

"C23" (P1651) TO SENSOR CIRCUIT MALFUNCTION

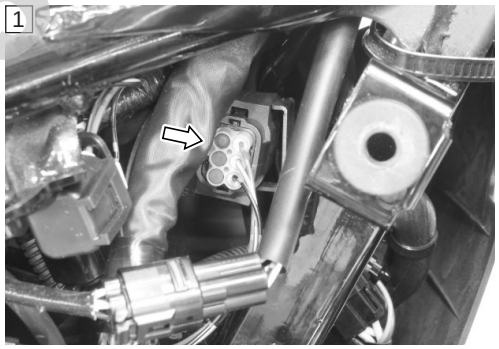
DETECTED CONDITION			POSSIBLE CAUSE
C23		The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 ≦ Sensor voltage < 4.6 V	• TO sensor circuit open or short. • TO sensor malfunction. • ECM malfunction.
P1651	H	Sensor voltage is higher than specified value.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



INSPECTION

Step 1 (When indicating C23:)

1) Remove the right frame cover. (☞7-2)
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.



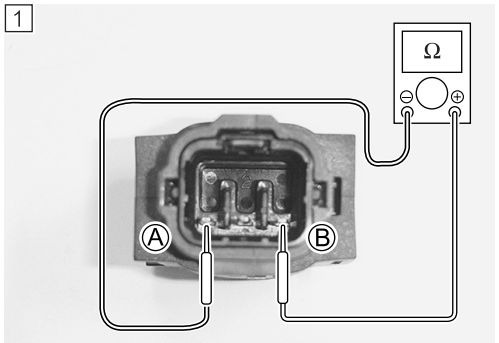
5) Measure the resistance between terminal Ⓐ and terminal Ⓑ.

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

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

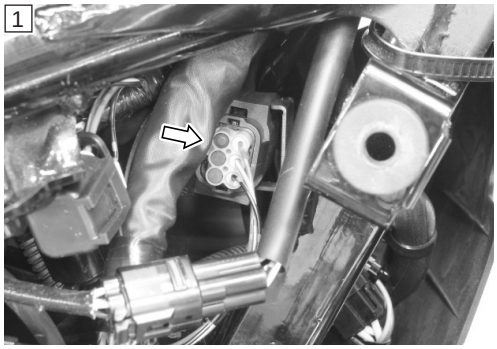
Is the resistance OK?



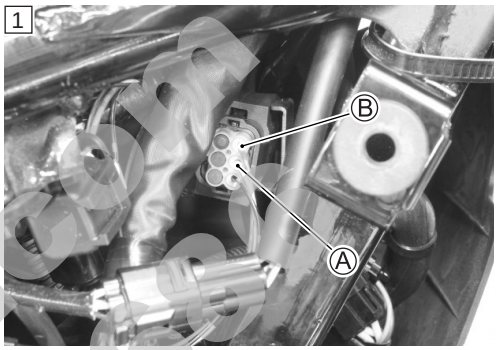
YES	Go to Step 2.
NO	Replace the TO sensor with a new one.

Step 1 (When indicating P1651-H:)

1) Remove the right frame cover. (☞7-2)
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.



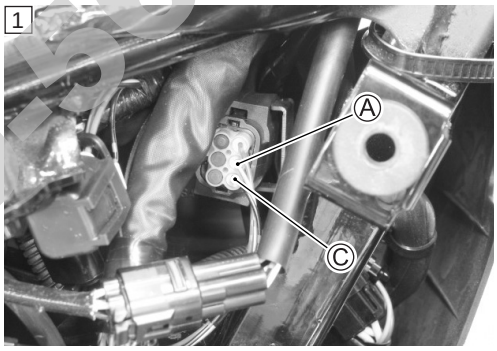
4) Disconnect the TO sensor coupler.
5) Check the continuity between Br/W wire Ⓐ and Red wire Ⓑ.
   If sound is not heard from the tester, the circuit condition is OK.
6) Disconnect the ECM coupler.



7) Also, Check the continuity between Br/W wire Ⓐ and terminal ⑳.
8) Also, check the continuity between B/Br wire Ⓒ and terminal ⑭.

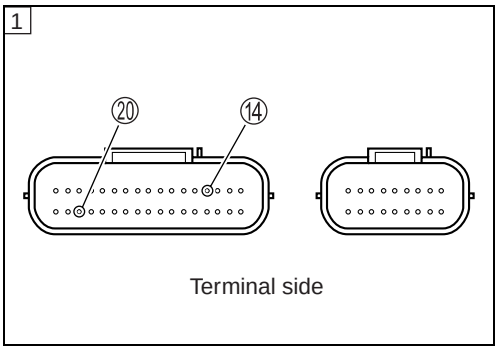
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))



Is the continuity OK?

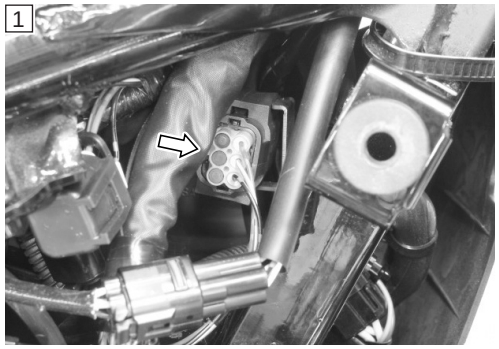
YES	Go to Step 2.
NO	Br/W wire shorted to VCC, or B/Br wire open.



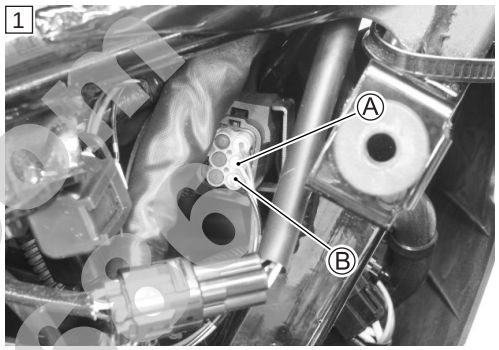
9) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Step 1 (When indicating P1651-L:)

1) Remove the right frame cover. (☞7-2)
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.



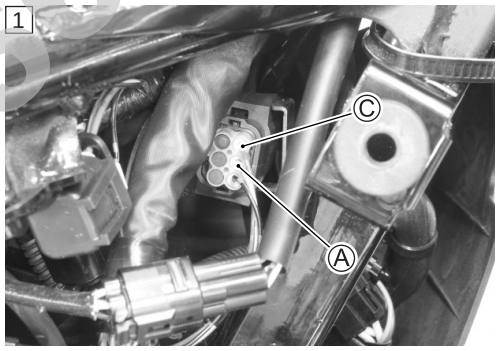
4) Disconnect the TO sensor coupler.
5) Check the continuity between Br/W wire Ⓐ and ground.
6) Also, check the continuity between Br/W wire Ⓐ and B/Br wire Ⓑ. If sound is not heard from the tester, the circuit condition is OK.
7) Disconnect the ECM coupler.



8) Also, check the continuity between Red wire Ⓒ and terminal ⑥.
9) Also, check the continuity between Br/W wire Ⓐ and terminal ⑳.

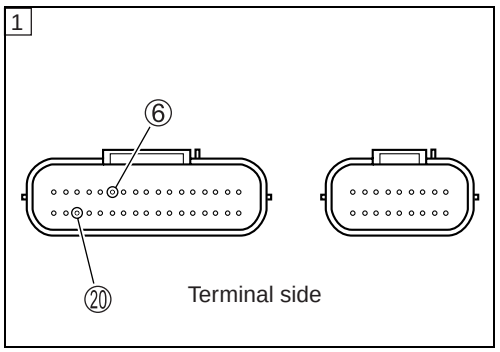
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

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.



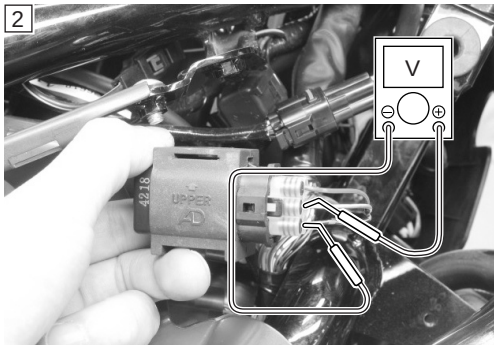
10) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

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 Br/W and B/Br wires.

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

Also, measure the voltage when leaning the motorcycle.

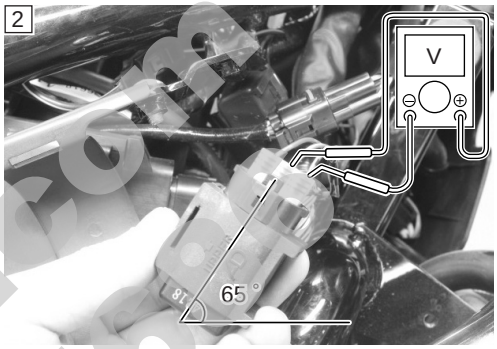


5) Dismount the TO sensor from its bracket and measure the voltage when it is leaned 65 ° and more, left and right, from the horizontal level.

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

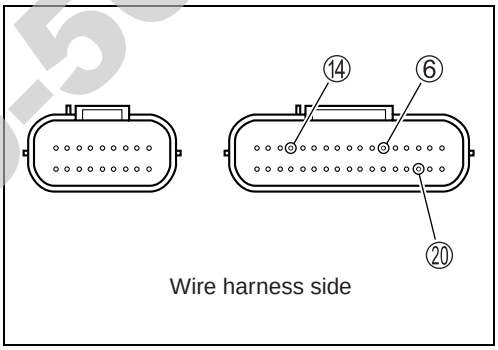
TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)



Is the voltage OK?

YES	• Red, B/Br or Br/W 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.



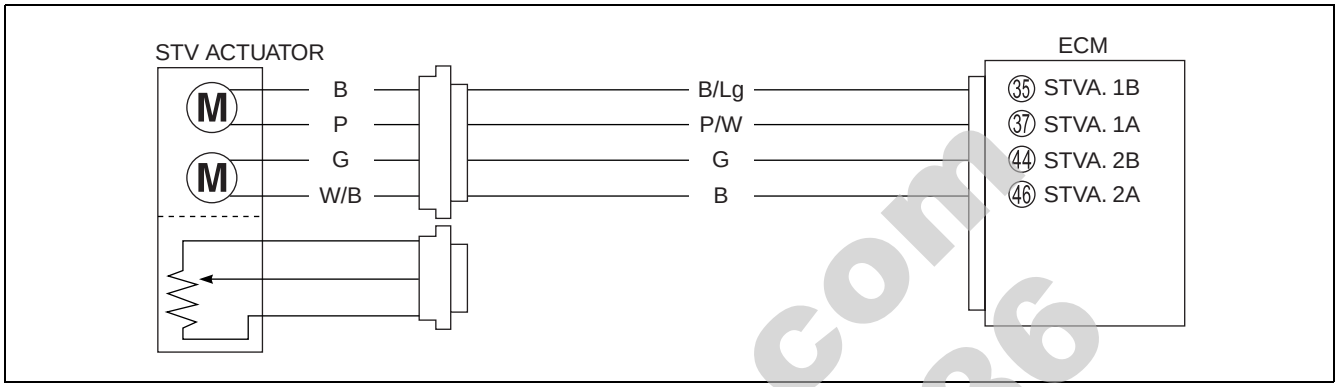
6) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

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

***Refer to the IGNITION SYSTEM for details. (☞8-18)**

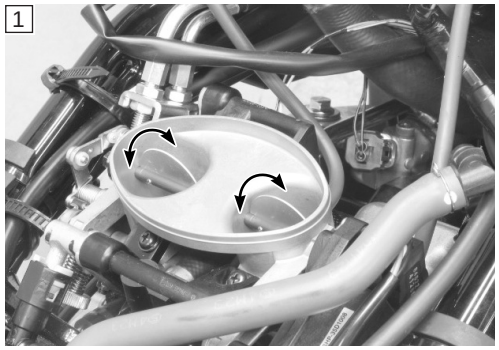
"C28" (P1655) STV ACTUATOR CIRCUIT MALFUNCTION

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 fuel tank. (☞14-93)
2) Turn the ignition switch OFF.
3) Check the STVA lead wire coupler for loose or poor contacts.

4) Remove the air intake pipe. (☞14-103)
5) Turn the ignition switch ON to check the STVA operation.
(STV operating order: 95% open → Full open → 95% open)



Is the operation OK?

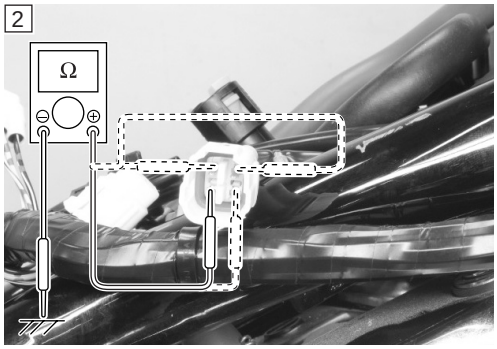
YES	Go to Step 2.
NO	• Loose or poor contacts on the STVA coupler. • Open or short circuit in the (P/W or Black) and (B/Lg or Green) wires.

6) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Step 2

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

DATA **STVA continuity: ∞ Ω (Infinity)**



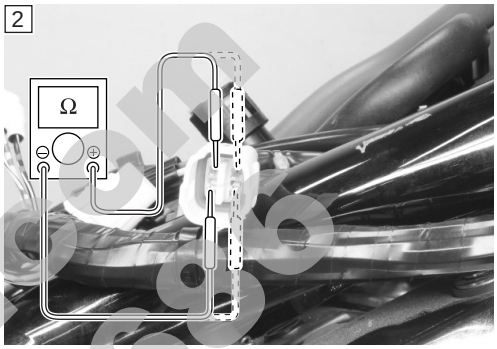
4) If OK, then measure the STVA resistance. (between Black wire terminal and Pink wire terminal) and (between Green wire terminal and W/B wire terminal)

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

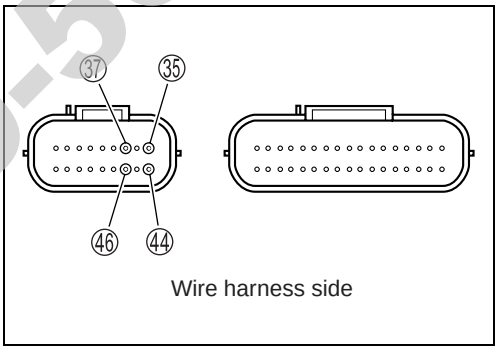
TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Resistance (Ω)

Is the resistance OK?



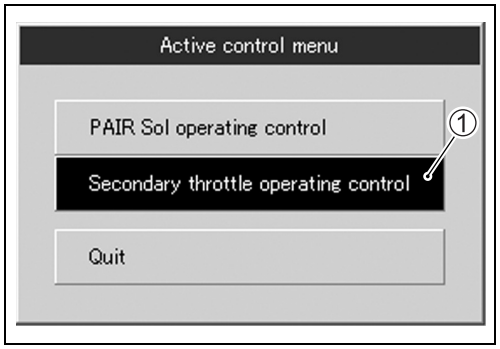
YES	• B/Lg, P/W, Green and Black wire open or shorted to ground, or poor ㉟ , ㊲ , ㊹ and ㊻ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect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



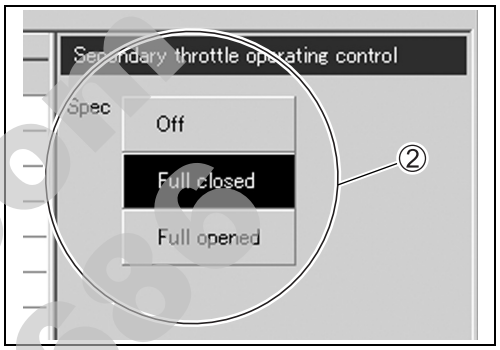
5) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

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.



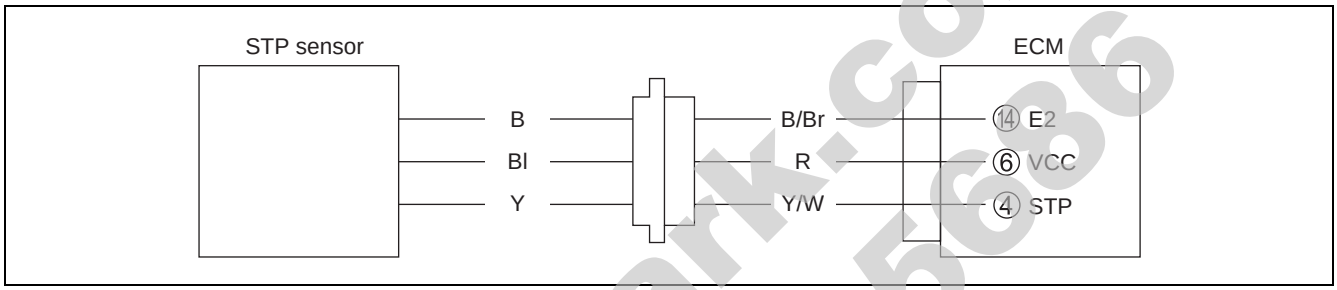
4) Click each button ②.
   At this time, if an operation sound is heard from STVA, the function is normal.



	N	
sensor	1.6	%
	Off	
	Except full opn	
	Full closed	
	Normal	
	Off	

"C29" (P1654) STP SENSOR CIRCUIT MALFUNCTION

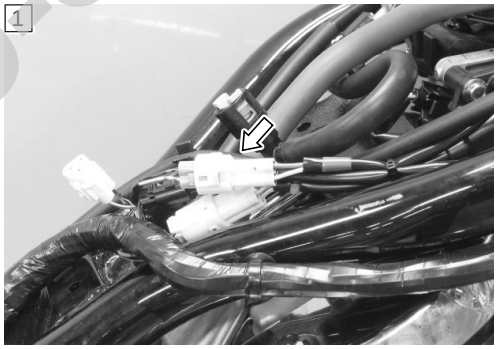
DETECTED CONDITION			POSSIBLE CAUSE
C29		Signal voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.1 V ≦ Sensor voltage < 4.8 V	• STP sensor maladjusted. • STP sensor circuit open or short. • STP sensor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



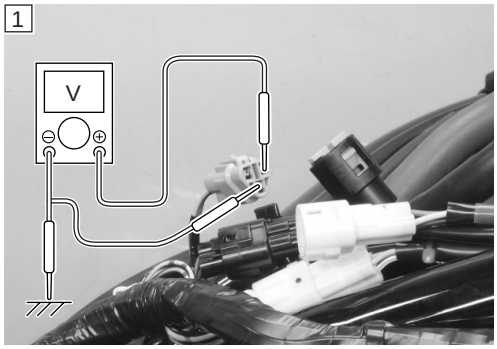
INSPECTION

Step 1 (When indicating C29:)

1) Remove the fuel tank. (☞14-93)
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

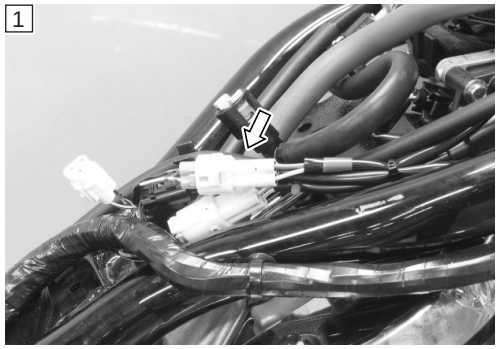
Tester knob indication: Voltage (⎓)

Is the voltage OK?

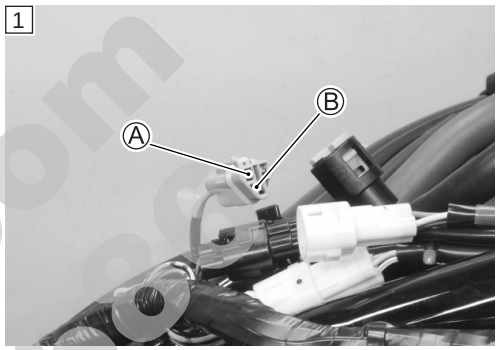
YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the Red wire or B/Br wire.

Step 1 (When indicating P1654-H:)

1) Remove the fuel tank. (☞14-93)
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 sound of the continuity is not heard from the tester, the circuit condition is OK.
6) Disconnect the ECM coupler.

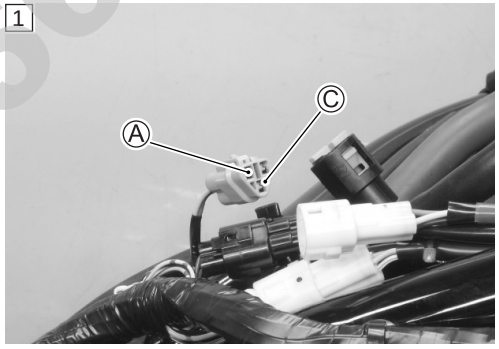


7) Check the continuity between Y/W wire Ⓐ and terminal ④.
8) Also, check the continuity between B/Br wire Ⓒ and terminal ⑭.

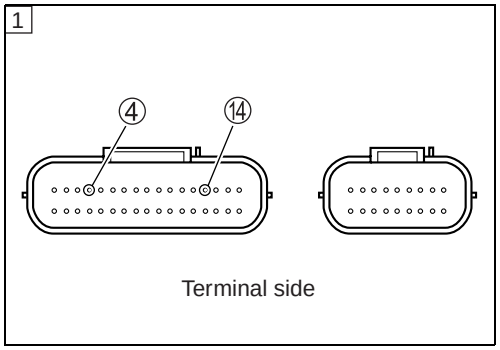
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))

Is the continuity OK?



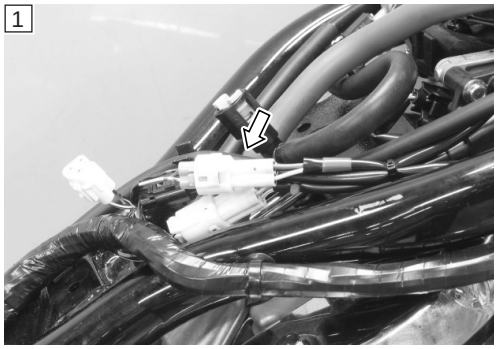
YES	Go to Step 2.
NO	Y/W wire shorted to VCC or B/Br wire open.



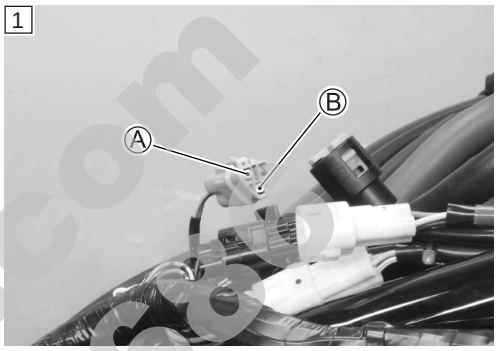
9) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Step 1 (When indicating P1654-L:)

1) Remove the fuel tank. (☞14-93)
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.



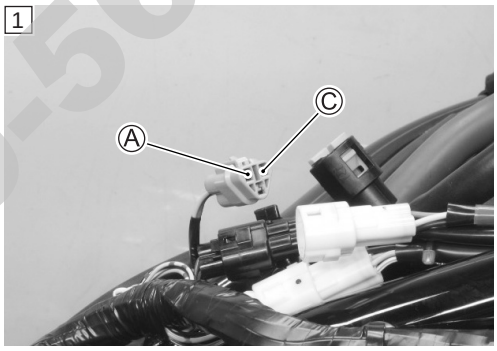
4) Disconnect the STP sensor coupler.
5) Check the continuity between Y/W wire Ⓐ and ground.
6) Also, check the continuity between Y/W wire Ⓐ and B/Br wire Ⓑ. If sound is not heard from the tester, the circuit condition is OK.
7) Disconnect the ECM coupler.



8) Check the continuity between Red wire Ⓒ and terminal ⑥.
9) Also, check the continuity between Y/W wire Ⓐ and terminal ④. If sound of the continuity is not heard from the tester, the circuit condition is OK.

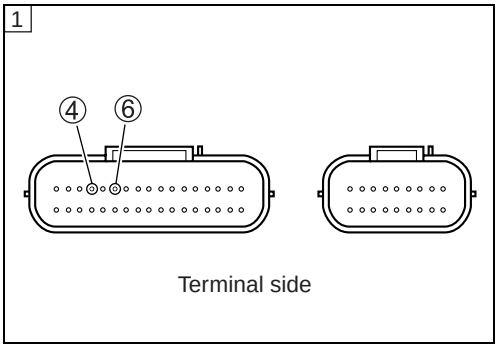
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

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



Is the continuity OK?

YES	Go to Step 1 (☞14-72) 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. (☞14-39)

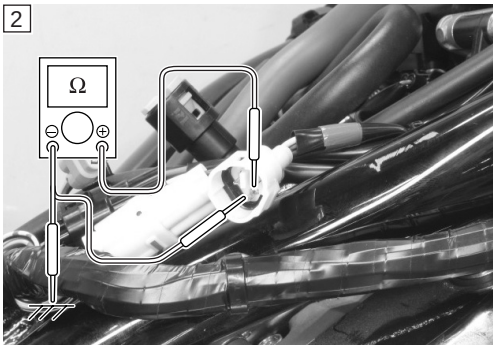
Step 2

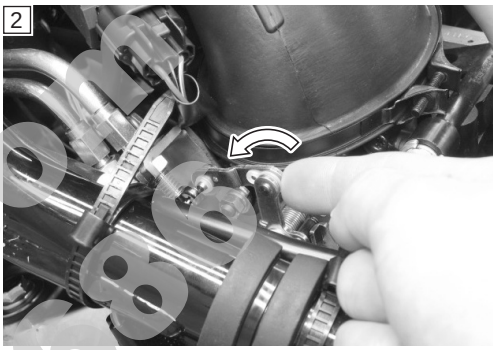
1) Turn the ignition switch OFF.
2) Disconnect the STP sensor coupler.
3) Check the continuity between Yellow wire terminal and ground.

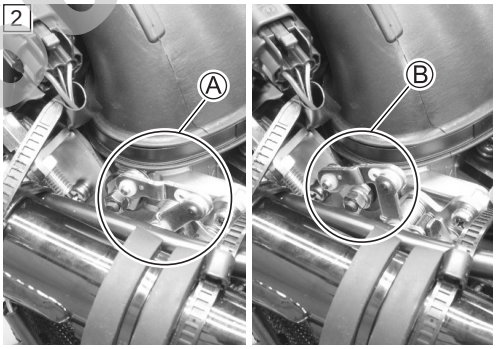
DATA **STP sensor continuity: ∞ Ω (Infinity)**
(Yellow – Ground)

6) If OK, then measure the STP sensor resistance at the coupler (between Yellow and Black wires).
7) Close and open the secondary throttle valve fully by moving the fast idle link, 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







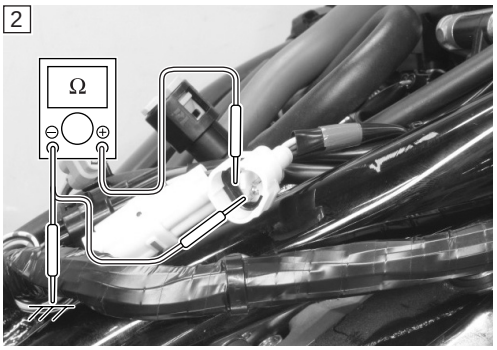
8) If OK, then measure the STP sensor resistance at the wire terminals (between Blue wire and Black wire).

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?

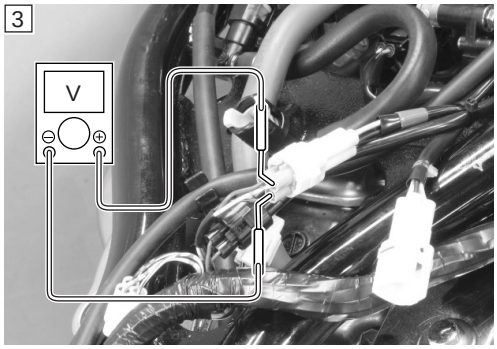


YES	Go to Step 3.
NO	• Reset the STP sensor position correctly. • Replace the STP sensor with a new one.

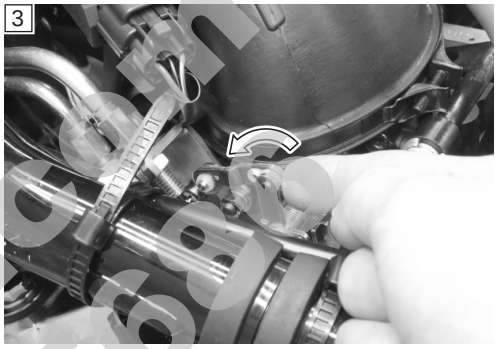
9) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

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 and ⊖ B/Br wires) when the secondary throttle valve is full closed and opened by moving the fast idle link.

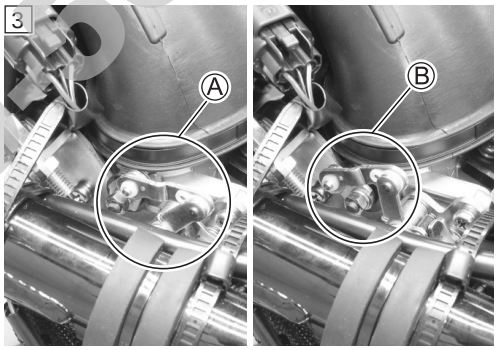


DATA STP sensor output voltage
Throttle valve is closed Ⓐ : Approx. 0.5 V
Throttle valve is opened Ⓑ: Approx. 3.9 V



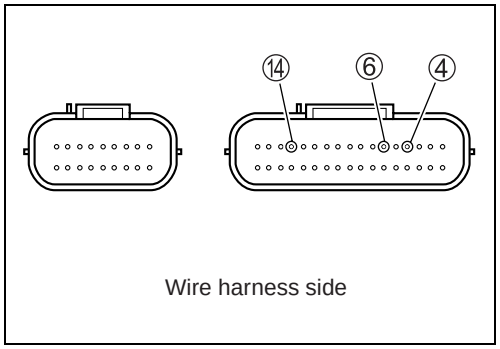
TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)



Is the voltage OK?

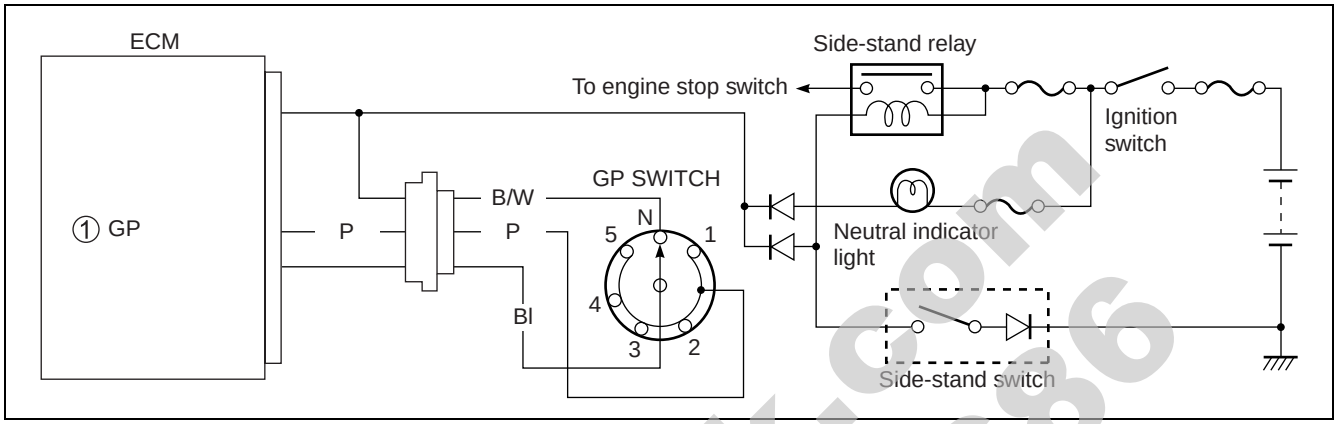
YES	• Y/W, R or B/Br wire open or shorted to ground, or poor ④, ⑥ or ⑭ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	If check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



6) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

"C31" (P0705) GP SWITCH CIRCUIT MALFUNCTION

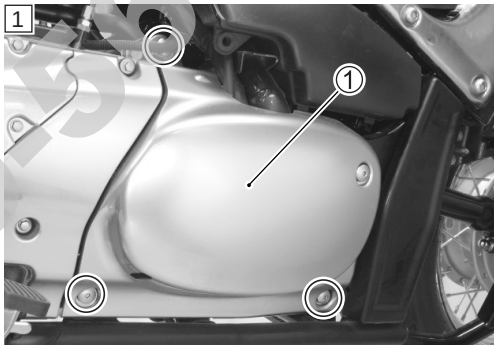
DETECTED CONDITION	POSSIBLE CAUSE
No Gear Position switch voltage. Switch voltage is not within the following range. Switch voltage > 0.6 V	• Gear Position switch circuit open or short. • Gear Position switch malfunction. • ECM malfunction.



INSPECTION

Step 1

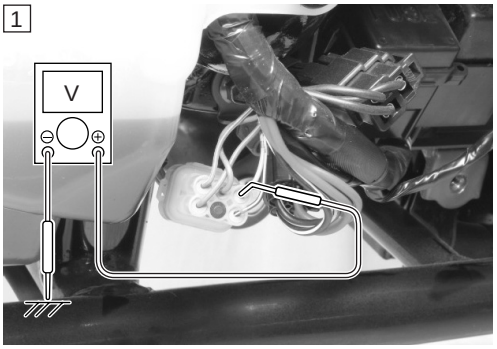
1) Remove the left frame cover. (☞7-2)
2) Remove the secondary gear case cover ①.



3) Turn the ignition switch OFF.
4) Check the GP switch coupler for loose or poor contacts.
   If OK, then measure the GP switch voltage.

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

1



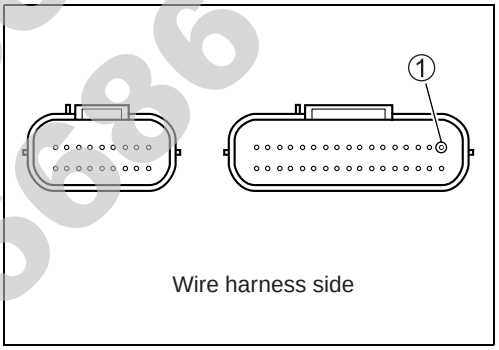
DATA GP switch voltage: 0.6 V and more (Pink – Ground)

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

Tester knob indication: Voltage (⎓)

Is the voltage OK?

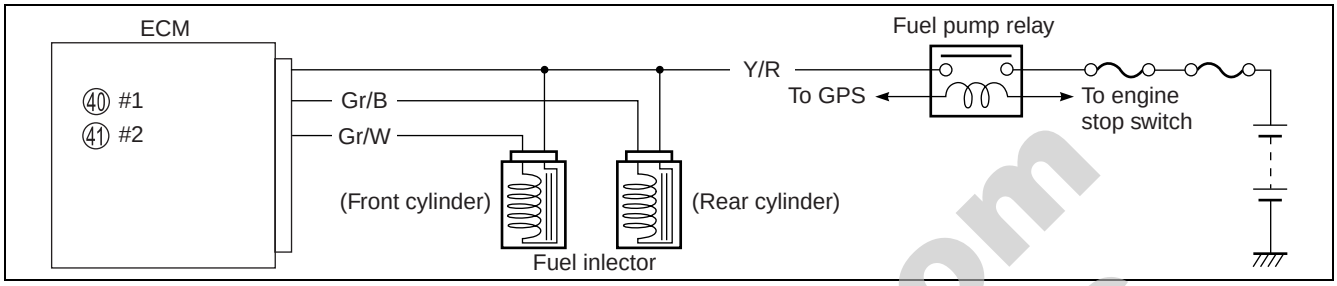
YES	• Pink wire open or shorted to ground, or poor ① connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• Open or short circuit in the Pink wire. • Replace the GP switch with a new one.



11) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

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

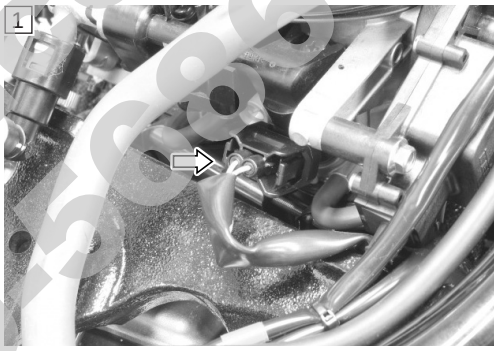
DETECTED CONDITION	POSSIBLE CAUSE
CKP signal is produced but fuel injector signal is interrupted 4 times or more continuously.	• Injector circuit open or short. • Injector malfunction. • ECM malfunction.



INSPECTION

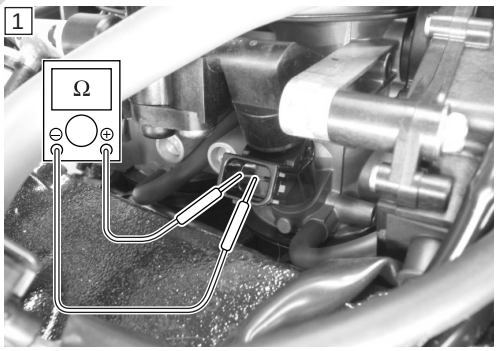
Step 1

1) Remove the air intake pipe. (☞14-103)
2) Turn the ignition switch OFF.
3) Check the injector coupler 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)

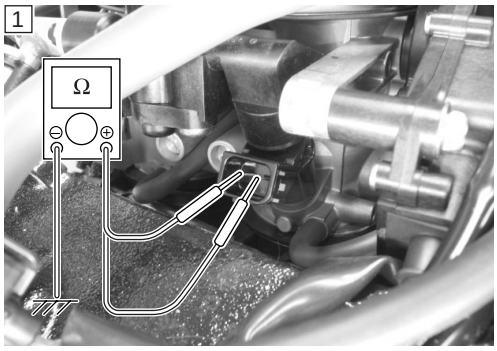


5) If OK, then check the continuity between each terminal and ground.

DATA **Injector continuity: ∞ Ω (Infinity)**
(Terminal – 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 Injector with a new one. (☞14-111)

6) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

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 for 3 seconds after ignition switch is turned ON.

TOOL 09900-25008: Multi-circuit tester set

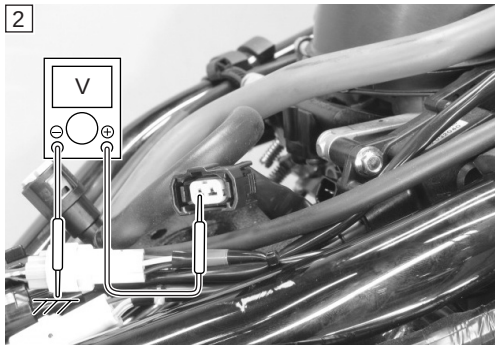
Tester knob indication: Voltage (⎓)

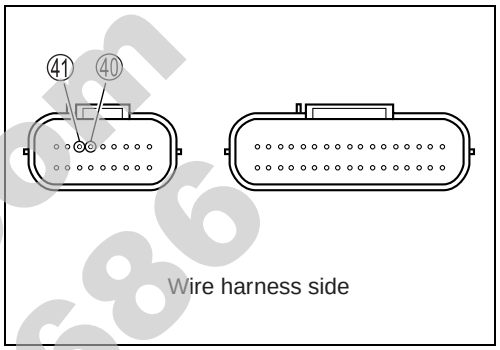
Is the voltage OK?

YES	• Gr/B or Gr/W wire open or shorted to ground, or poor ㊵ or ㊶ 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 circuit in the Y/R wire.

3) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

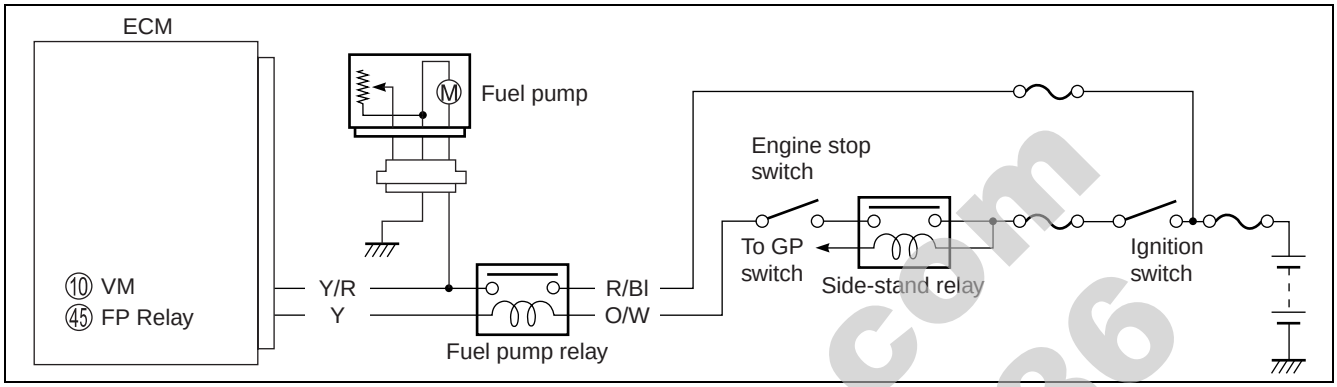
2





"C41" (P0230) FP RELAY CIRCUIT MALFUNCTION

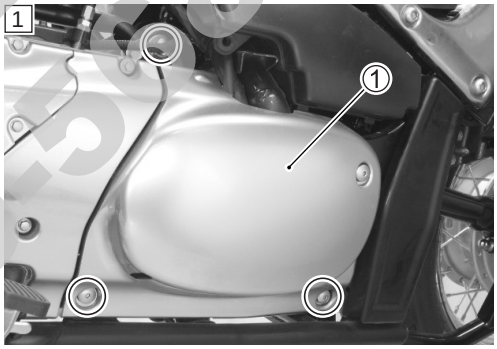
DETECTED CONDITION	POSSIBLE CAUSE
No voltage is applied to fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump, although fuel pump relay is turned OFF.	• Fuel pump relay circuit open or short. • Fuel pump relay malfunction. • ECM malfunction.



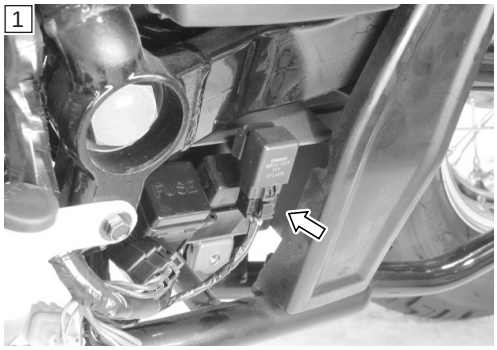
INSPECTION

Step 1

1) Remove the secondary gear case cover ①.

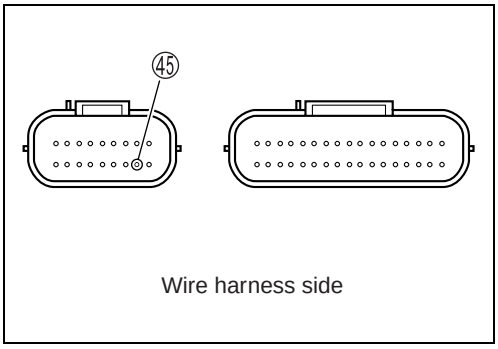


2) Turn the ignition switch OFF.
3) Check the FP relay coupler for loose or poor contacts.
4) If OK, then check the insulation and continuity. Refer to Page 96 for details.
   Is the FP relay OK?



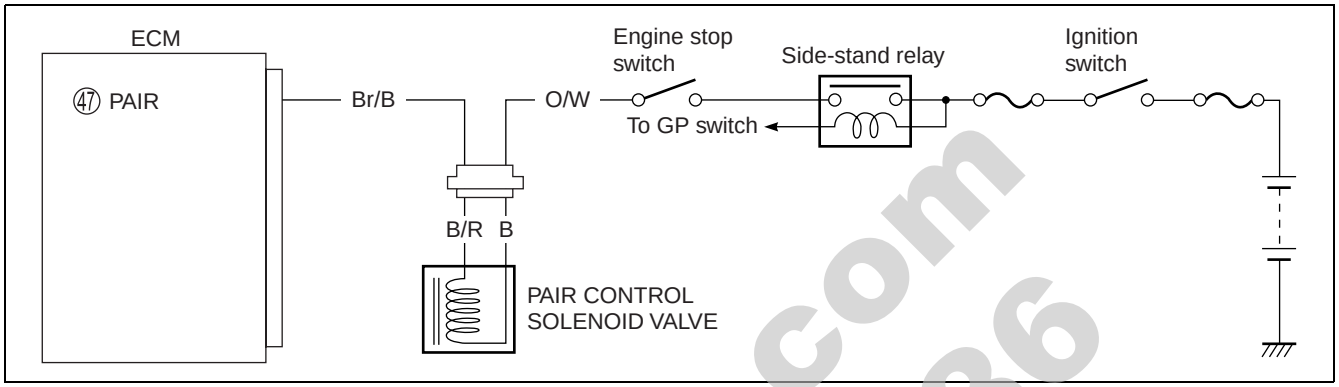
YES	• Yellow wire open or shorted to ground, or poor ㊺ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the FP relay with a new one.

5) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)



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

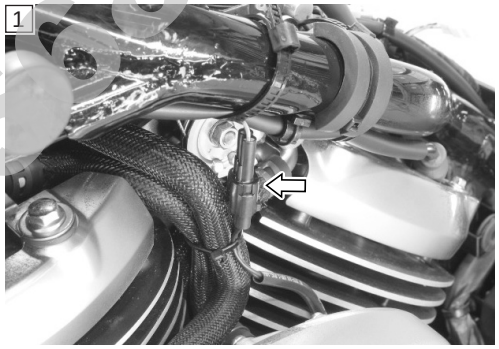
DETECTED CONDITION	POSSIBLE CAUSE
PAIR control solenoid valve voltage is not input to ECM.	• PAIR control solenoid valve circuit open or short. • PAIR control solenoid valve malfunction. • ECM malfunction.



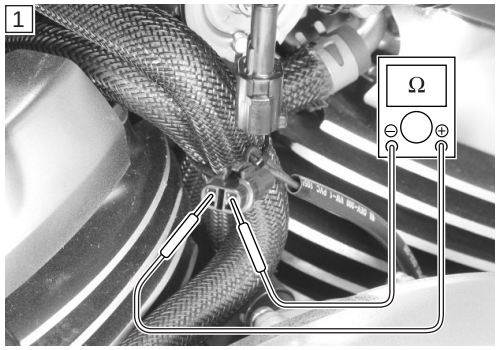
INSPECTION

Step 1

1) Remove the fuel tank. (☞14-93)
2) Turn the ignition switch OFF.
3) Check the PAIR control solenoid valve coupler for loose or poor contacts.
   If OK, then measure the PAIR control solenoid valve resistance.



4) Disconnect the PAIR control solenoid valve coupler.
5) Measure the resistance between terminals.



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

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

Tester knob indication: Resistance (Ω)

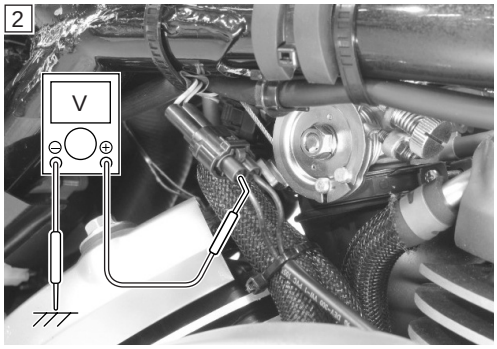
Is the resistance OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler. • Replace the PAIR control solenoid valve with a new one.

6) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

Step 2

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

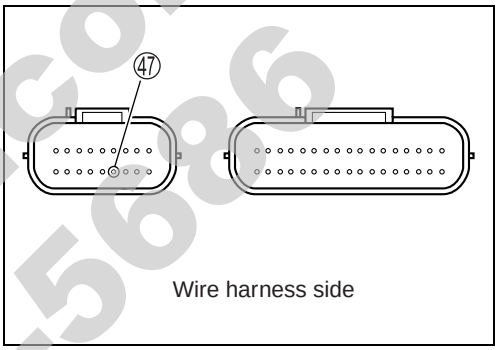


DATA PAIR control solenoid valve voltage: Battery voltage (⊕ Black – ⊖ Ground)

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

Tester knob indication: Voltage (⎓)

Is the voltage OK?

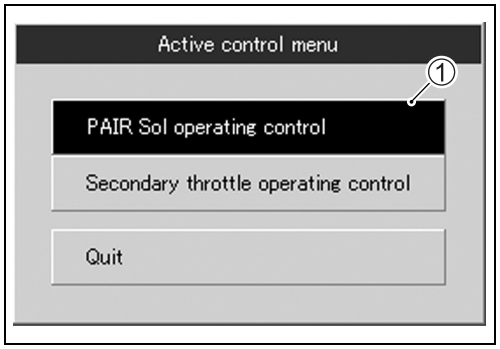


YES	• Br/B wire open or shorted to ground, or ㊼ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Open or short circuit in the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

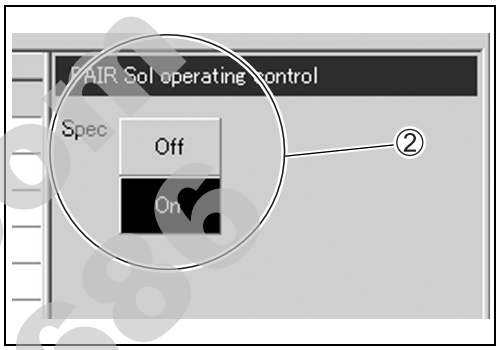
3) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

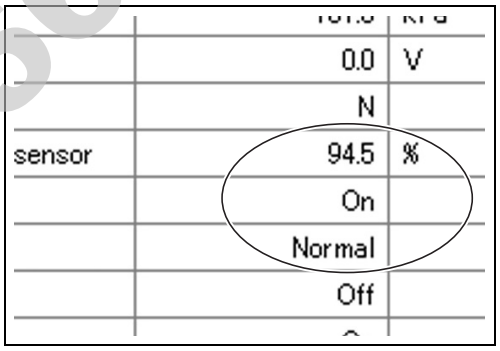
ACTIVE CONTROL INSPECTION

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.



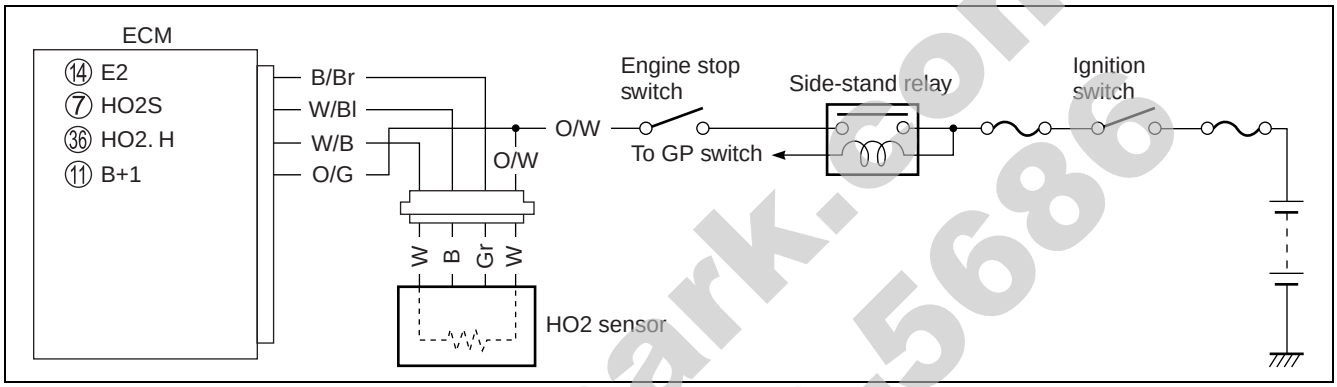
4) Click each button ②.
   At this time, if an operation sound is heard from the PAIR control solenoid valve, the function is normal.





"C44" (P0130/P0135) HO2 SENSOR (HO2S) CIRCUIT MALFUNCTION (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 ≦ 0.1 V)	• HO2 sensor circuit open or shorted to ground. • HO2 sensor 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 right frame cover. (☞7-2)
2) Turn the ignition switch OFF.
3) Check the HO2 sensor coupler for loose or poor contacts.

   If OK, then check the HO2 sensor lead wire continuity.

4) Disconnect the HO2 sensor coupler and ECM coupler.
5) Check the continuity between W/Bl wire Ⓐ and terminal ⑦.
6) Also, check the continuity between W/Bl wire Ⓐ and ground. If sound of the continuity is not heard from the tester, the circuit condition is OK.

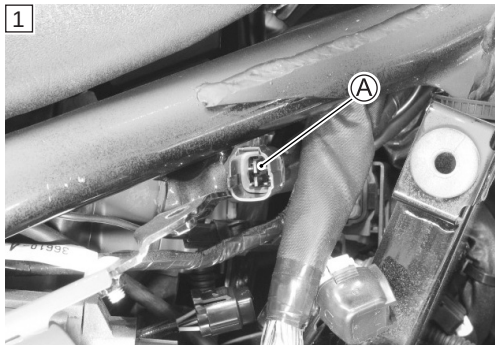
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

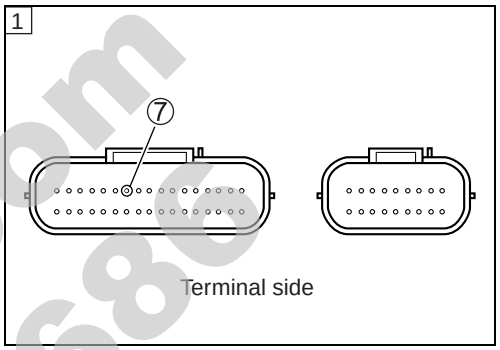
Tester knob indication: Continuity test (•))))

Is the continuity OK?

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

7) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)





Step 2 (When indicating C44/P0130:)
1) Warm up the engine enough.
2) Insert the needle pointed probes to the HO2 sensor coupler.
3) If OK, then disconnect the PAIR solenoid valve hose and close the air inlet with a prop plug, measure the HO2 sensor output voltage while holding the engine speed at 5 000 r/min.

HO2 sensor output voltage at idle speed:
0.4 V and less (⊕ W/Bl – ⊖ B/Br)
HO2 sensor output voltage at 5 000 r/min:
0.6 V and more (⊕ W/Bl – ⊖ B/Br)

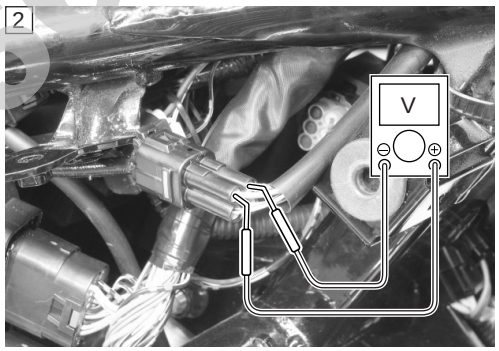
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

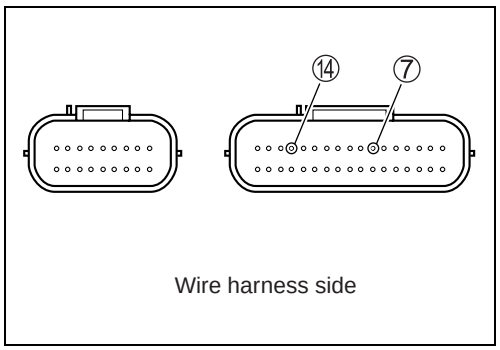
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• W/Bl 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.

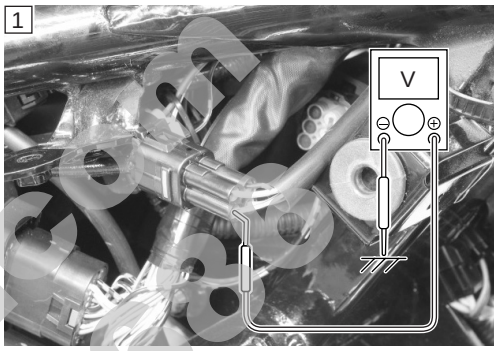
4) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)





Step 1 (When indicating C44/P0135:)
1) Remove the right frame cover. (☞7-2)
2) Turn the ignition switch OFF.
3) Check the HO2 sensor coupler for loose or poor contacts.

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



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

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

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

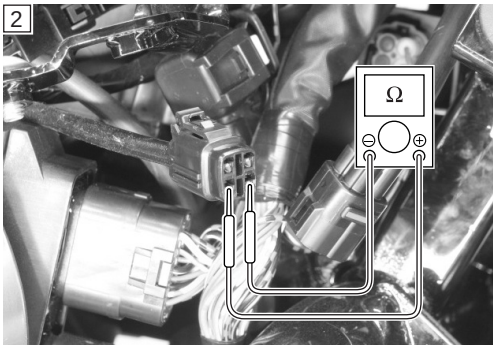
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	Go to Step 2 (When indicating C44/P0135:).
NO	• Loose or poor contacts on the ECM coupler. • Open circuit in the W/B wire.

Step 2 (When indicating C44/P0135:)

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



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

NOTE:

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

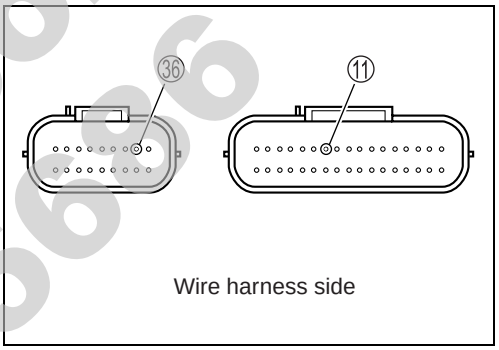
** Make sure that the sensor heater is at correct temperature.*

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

Is the resistance OK?

YES	• O/W or W/B wire open or shorted to ground, or poor ⑪ or ㊱ 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.

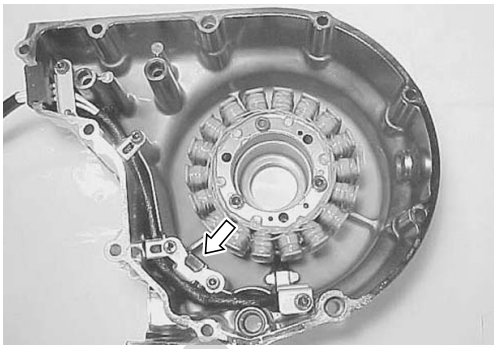


4) After repairing the trouble, clear the DTC using SDS tool. (☞14-39)

SENSORS

CKP SENSOR INSPECTION

The crankshaft position sensor is installed in the generator cover. (☞14-46)

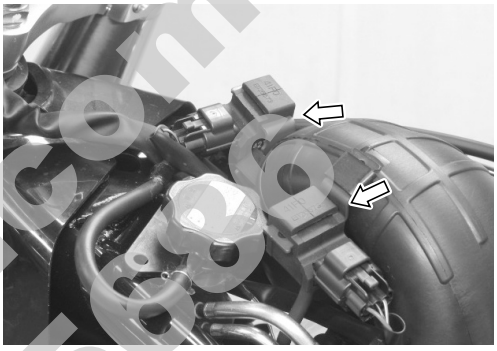


CKP SENSOR REMOVAL AND INSTALLATION

- Remove the generator cover. (☞3-18)
- Install the generator cover in the reverse order of removal.

IAP SENSOR INSPECTION

The intake air pressure sensor is installed on the air intake pipe. (☞14-49)

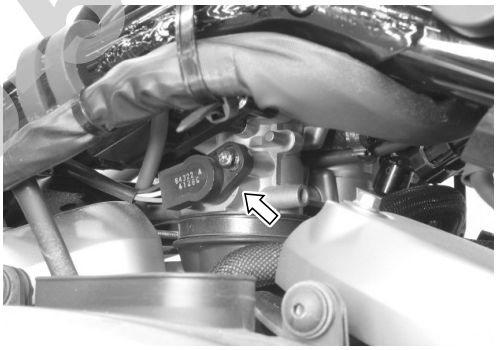


IAP SENSOR REMOVAL AND INSTALLATION

- Remove the fuel tank. (☞14-93)
- Remove the IAP sensor from the air intake pipe.
- Install the IAP sensor in the reverse order of removal.

TP SENSOR INSPECTION

The throttle position sensor is installed at the right side of the No.2 (Front cylinder) throttle body. (☞14-52)



TP SENSOR REMOVAL AND INSTALLATION

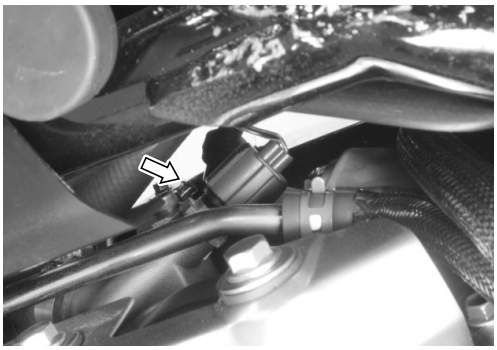
- Remove the TP sensor. (☞14-105)
- Install the TP sensor in the reverse order of removal.

TPS ADJUSTMENT

- Adjust the TP sensor. (☞14-33)

ECT SENSOR INSPECTION

The engine coolant temperature sensor is installed at the cylinder head cover. (☞14-57)



ECT SENSOR REMOVAL AND INSTALLATION

- Remove the fuel tank. (☞14-93)
- Remove the ECT sensor.
- Install the ECT sensor in the reverse order of removal.

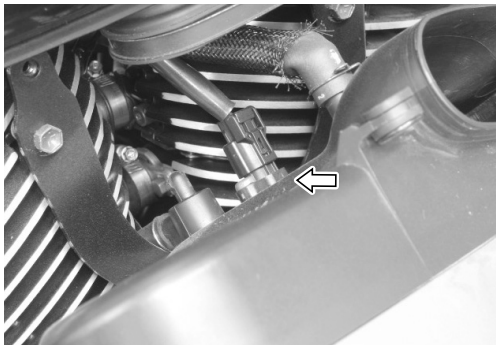
ECT sensor: 18 N·m (1.8 kgf-m, 13.0 lb-ft)

IAT SENSOR INSPECTION

The intake air temperature sensor is installed at the back side of the air cleaner box. (☞14-61)

IAT SENSOR REMOVAL AND INSTALLATION

- Remove the air cleaner box. (☞14-103)
- Remove the IAT sensor from the air cleaner box.
- Install the IAT sensor in the reverse order of removal.



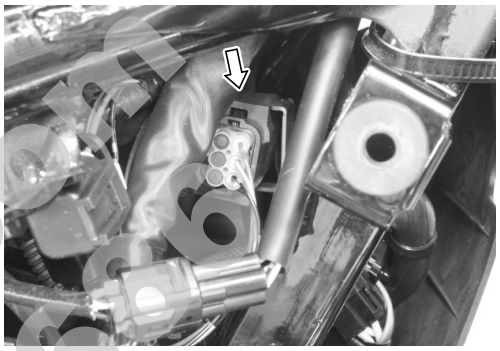
TO SENSOR INSPECTION
TO SENSOR REMOVAL AND INSTALLATION

The tip-over sensor is located in under the seat. (☞14-65)

- Remove the right frame cover. (☞7-2)
- Remove the TO sensor from the frame.
- Install the TO sensor in the reverse order of removal.

NOTE:

When installing the TO sensor, the arrow mark must be pointed upward.



STP SENSOR INSPECTION
STP SENSOR REMOVAL AND INSTALLATION

The secondary throttle position sensor is installed at the right side of the No.2 (Front cylinder) throttle body (☞14-72).

- Remove the STP sensor. (☞14-106)
- Install the STP sensor in the reverse order of removal.

STP SENSOR ADJUSTMENT

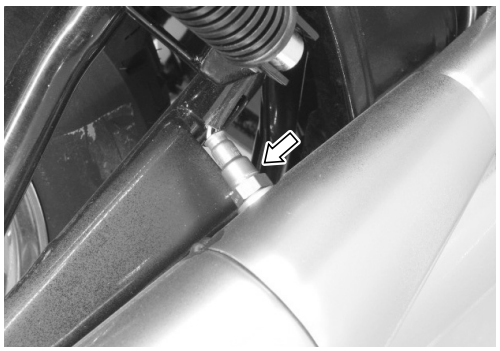
- Adjust the STP sensor. (☞14-111)

HO2 SENSOR INSPECTION (E-02, 19, 24)
HO2 SENSOR REMOVAL AND INSTALLATION

The HO2 sensor is installed at the muffler.

- Remove the right frame cover. (☞7-2)
- Disconnect the HO2 sensor lead wire coupler and remove the HO2 sensor.
- Install the HO2 sensor in the reverse order of removal.

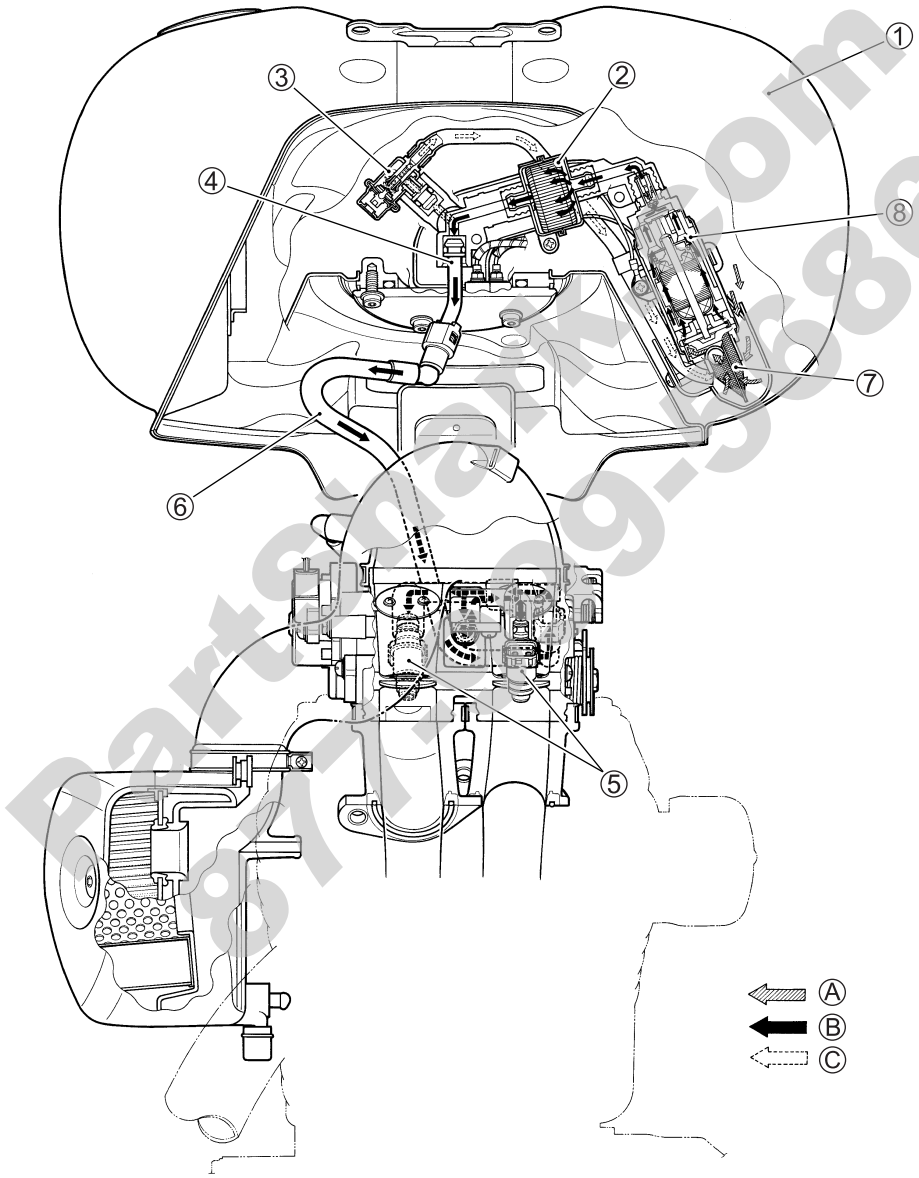
HO2 sensor: 48.4 N·m (4.84 kgf-m, 35.0 lb-ft)



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 3.0 kgf/cm² (300 kPa, 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.

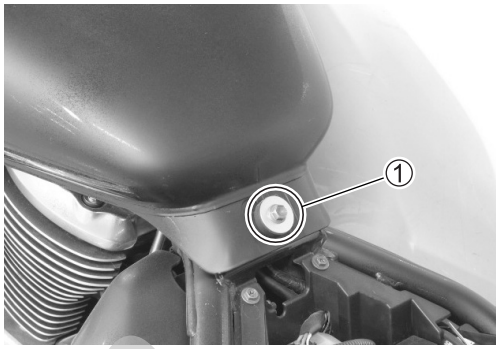


①	Fuel tank	⑦	Fuel mesh filter (For low pressure)
②	Fuel filter (For high pressure)	⑧	Fuel pump
③	Fuel pressure regulator	Ⓐ	Before-pressurized fuel
④	Fuel delivery pipe	Ⓑ	Pressurized fuel
⑤	Fuel injector	Ⓒ	Relieved fuel
⑥	Fuel feed hose		

FUEL SYSTEM

FUEL TANK LIFT-UP

- Remove the seat. (☞7-2)
- Remove the fuel tank mounting bolt ①.

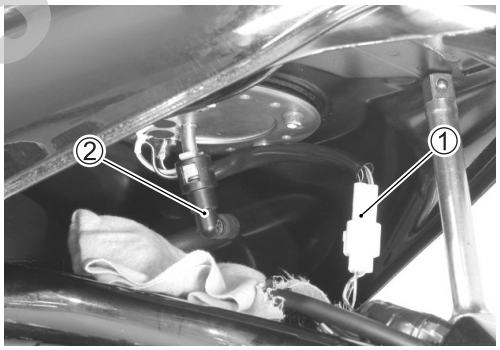


- Lift and support the fuel tank about 10 cm (3.94 in) with the prop stay.

NOTE:
Be careful not to lift the fuel tank more than about 10 cm (3.94 in), or hoses will be twisted.

FUEL TANK REMOVAL

- Remove the speedometer. (☞5-3)
- Lift and support the fuel tank. (☞14-93)
- Disconnect the fuel pump lead wire coupler ①.
- Place a rag under the fuel feed hose and remove the fuel feed hose ②.



CAUTION

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

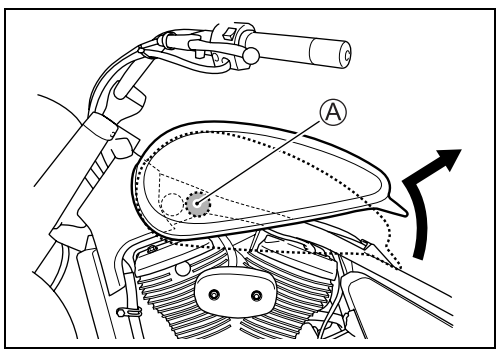
⚠ WARNING

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

- Remove the fuel tank.

CAUTION

Be careful not to damage the frame Ⓐ by the fuel tank.

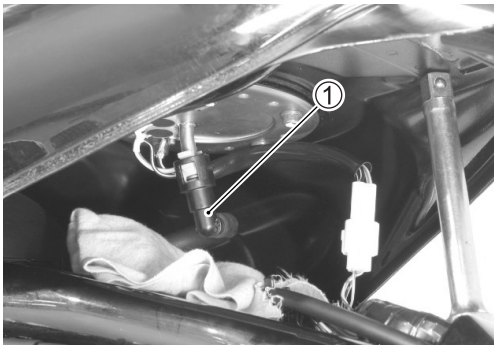


FUEL TANK INSTALLATION

- Installation is in the reverse order of removal.

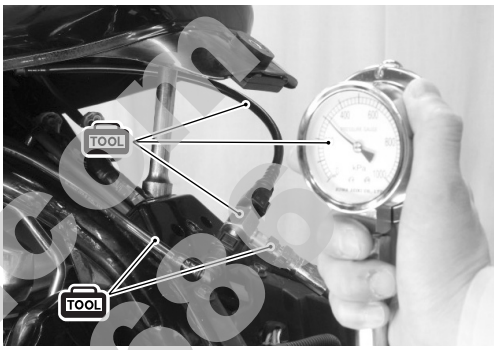
FUEL PRESSURE INSPECTION

- Lift and support the fuel tank. (☞14-93)
- 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
09915-77331: Oil pressure gauge
09915-74521: Oil pressure gauge hose



Turn the ignition switch ON and check the fuel pressure.

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

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

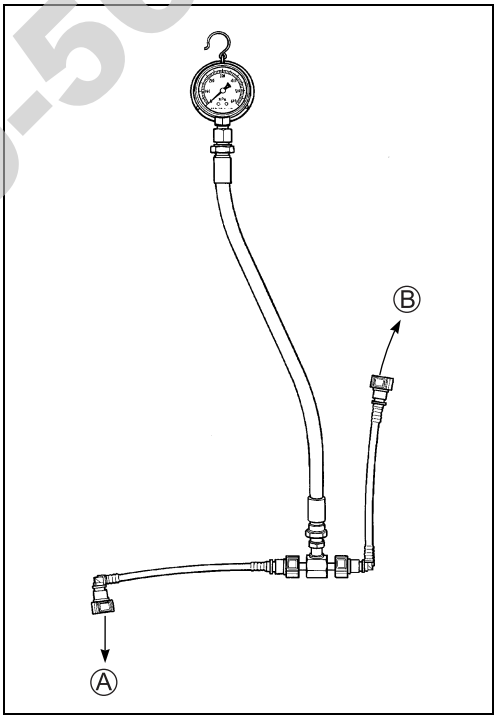
* Fuel hose leakage
* Clogged fuel filter
* Pressure regulator
* Fuel pump

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

* Fuel pump check valve
* Pressure regulator

⚠ WARNING

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



Ⓐ 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, replace the fuel pump assembly or inspect the fuel pump relay and tip-over sensor.

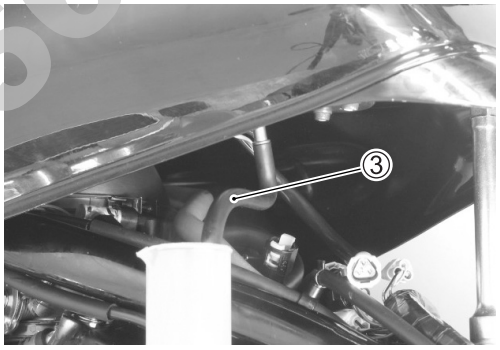
FUEL DISCHARGE AMOUNT INSPECTION

⚠ WARNING

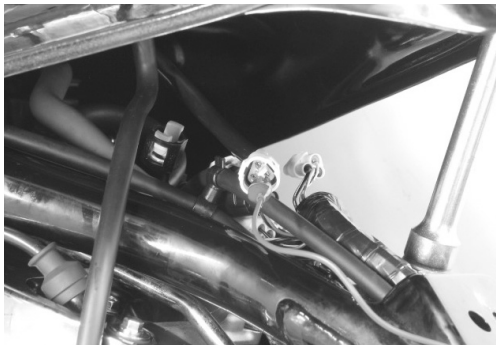
Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

- Lift and support the fuel tank. (☞14-93)
- Disconnect the fuel feed hose ① from the fuel pump and fuel pump lead wire coupler ②.

- Connect a proper fuel hose ③ to the fuel pump.
- Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



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



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

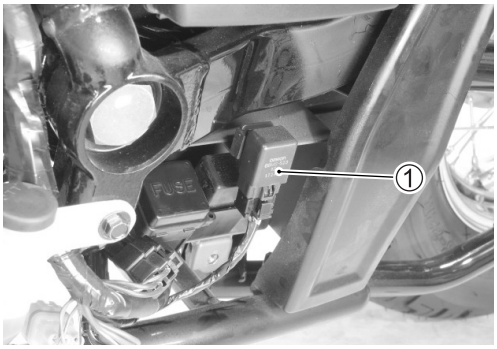
DATA Fuel discharge amount: 168 ml and more/10 sec.
(5.7/5.9 US/Imp oz)/10 sec.

NOTE:
The battery must be in fully charged condition.

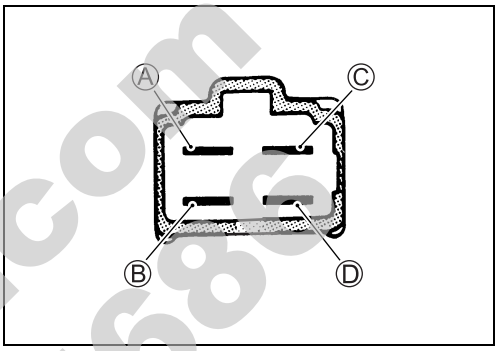
FUEL PUMP RELAY INSPECTION

Fuel pump relay is located inside the secondary gear case cover.

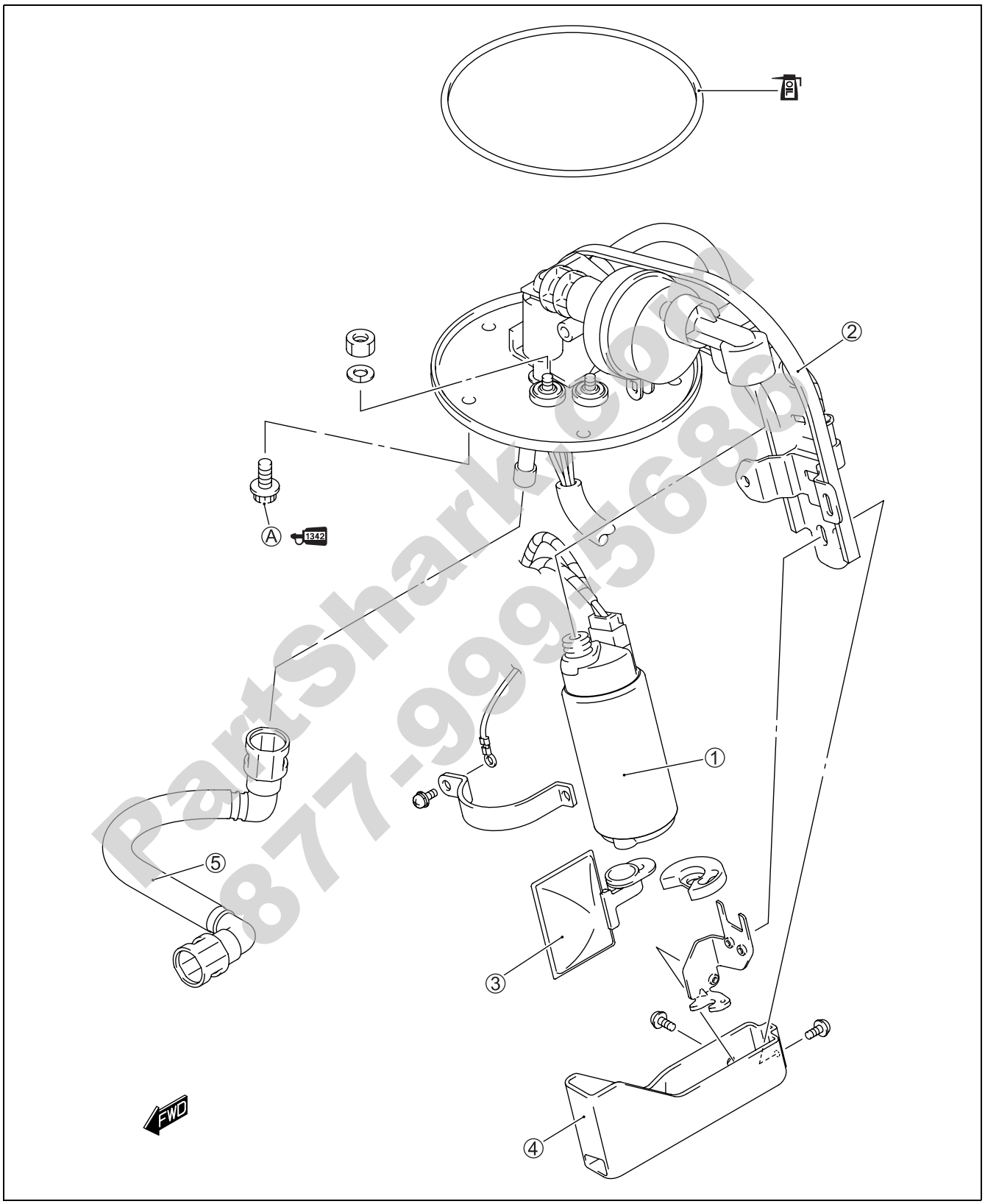
- Remove the secondary gear case cover.
- Remove the fuel pump relay ①.



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 CONSTRUCTION

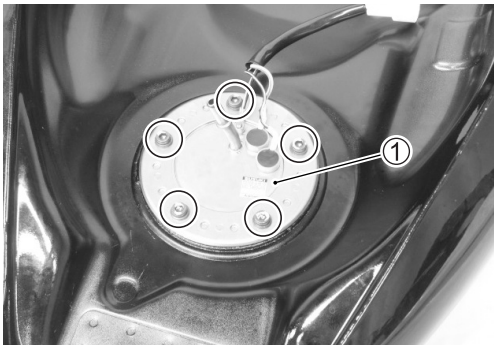


①	Fuel pump	④	Fuel mesh filter cover
②	Plate assy	⑤	Fuel feed hose
③	Fuel mesh filter	Ⓐ	Fuel pump mounting bolt

ITEM	N·m	kgf-m	lb-ft
Ⓐ	10	1.0	7.0

FUEL PUMP REMOVAL AND DISASSEMBLY

- Remove the fuel tank. (☞14-93)
- Remove the fuel pump assembly ① by removing its mounting bolts diagonally.

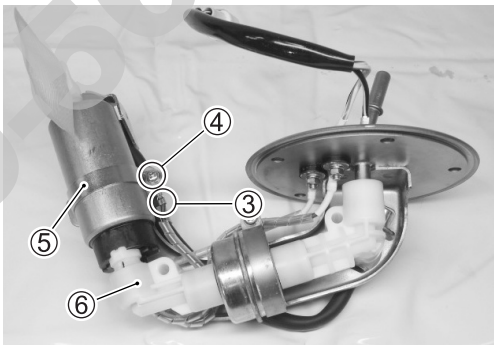


⚠ WARNING

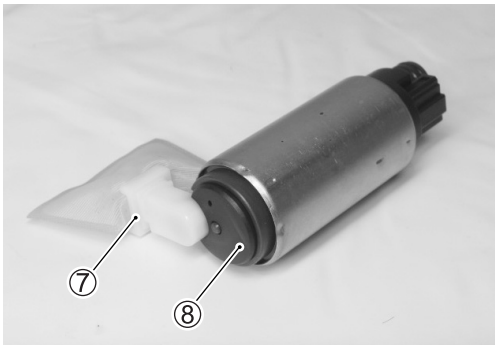
Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

- Remove the fuel mesh filter cover ②.

- Disconnect the fuel pump coupler ③.
- Remove the screw ④ and fuel pump holder ⑤.
- Separate the fuel pump and delivery pipe ⑥.



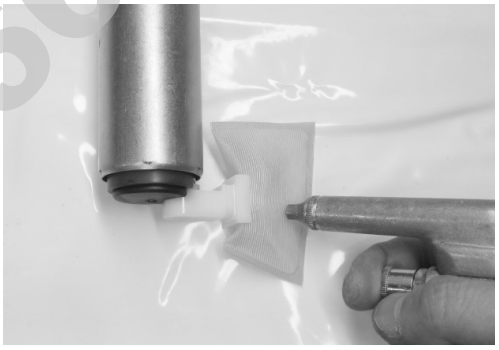
• Remove the fuel mesh filter ⑦ and rubber cushion ⑧.



FUEL MESH FILTER INSPECTION AND CLEANING

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

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



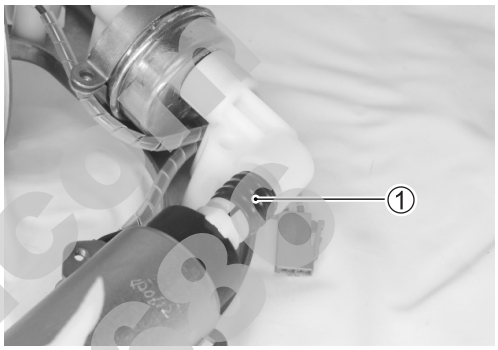
FUEL PUMP REASSEMBLY AND INSTALLATION

Install the fuel pump in the reverse order of removal and disassembly. Pay attention to the following points:

• Install a new bushing ① to the fuel pump.

CAUTION

Use the new bushing to prevent fuel leakage.



- Install a new O-ring and apply SUZUKI SUPER GREASE "A" to it.

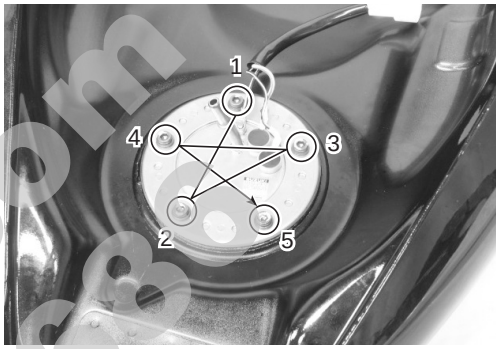
99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

⚠ WARNING

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

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

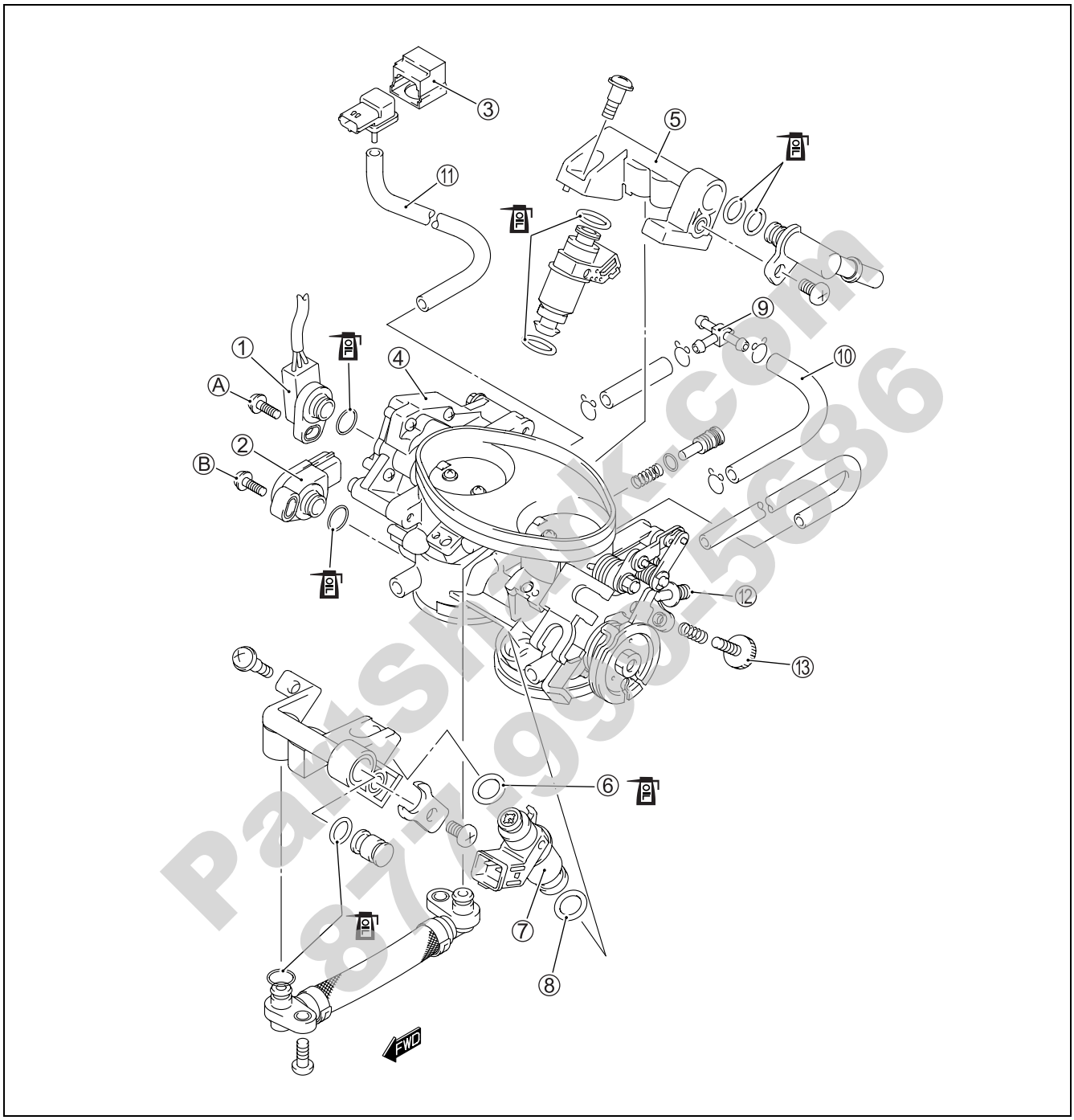
Fuel pump mounting bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)



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

99000-32050: THREAD LOCK "1342"

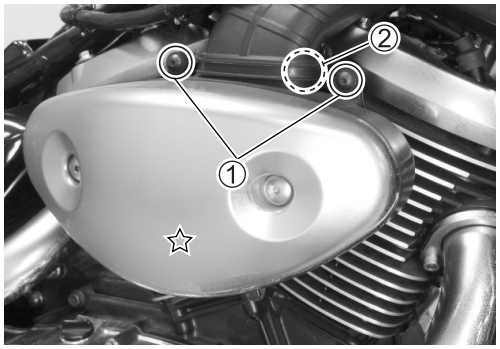
THROTTLE BODY
CONSTRUCTION



①	STP sensor	⑨	Three way joint (only E33)
②	TP sensor	⑩	Hose (only E33)
③	IAP sensor	⑪	Vacuum hoses
④	STVA	⑫	Fast idle screw
⑤	Fuel delivery pipe	⑬	Throttle stop screw
⑥	O-ring	Ⓐ	STP sensor mounting screw
⑦	Fuel injector	Ⓑ	TP sensor mounting screw
⑧	Cushion seal		

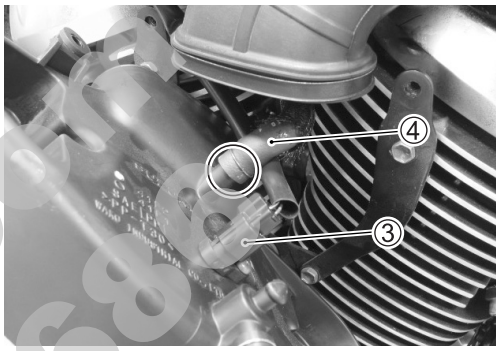
ITEM	N·m	kgf-m	lb-ft
Ⓐ	3.5	0.35	2.45
Ⓑ	3.5	0.35	2.45

AIR CLEANER BOX REMOVAL

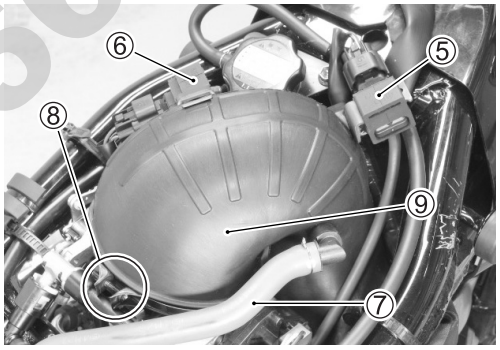


- Remove the fuel tank. (☞14-93)
- Remove the bolts ① and lossen the clamp screw ②.

NOTE:
"☆" indicates hook location.



- Disconnect the IAT sensor lead wire coupler ③.
- Disconnect the PAIR hose ④.



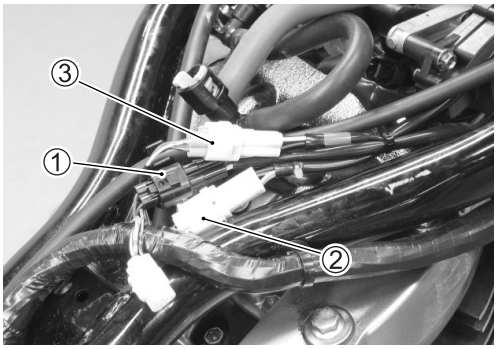
- Remove the IAP sensors (Front cylinder side ⑤ and Rear cylinder side ⑥) from the mount stay.
- Remove the PCV hose ⑦ and loosen the clamp screw ⑧.
- Remove the air intake pipe ⑨.

AIR CLEANER BOX INSTALLATION

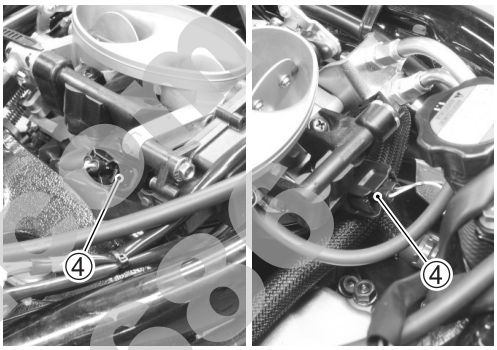
Installation is in the reverse order of removal.

THROTTLE BODY REMOVAL

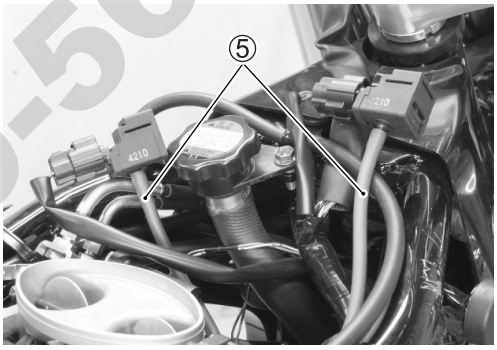
- Remove the air intake pipe. (☞14-103)
- Disconnect the TP sensor lead wire coupler ①, STVA lead wire coupler ② and STP sensor lead wire coupler ③.



- Disconnect the fuel injector lead wire couplers ④.



- Disconnect the vacuum hoses ⑤.

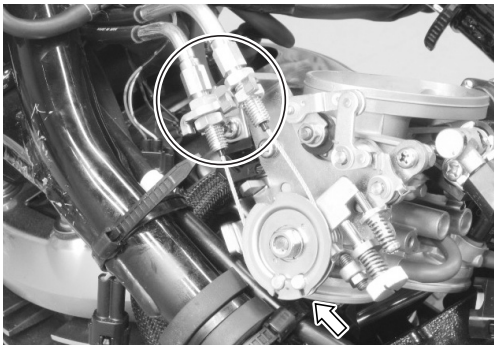


- Loosen the throttle body clamp screw at the intake pipe side.

- Disconnect the throttle cables from their drum.

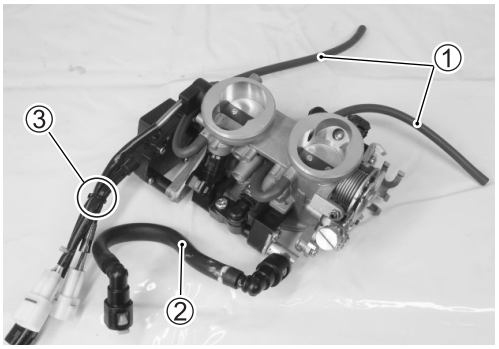
CAUTION

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.

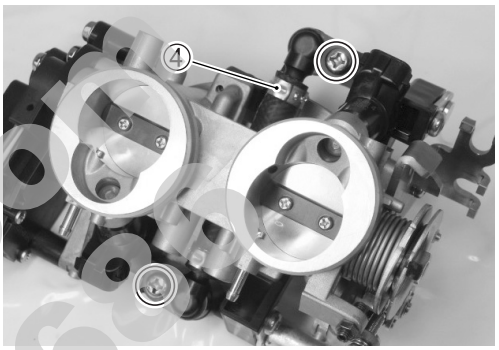


THROTTLE BODY DISASSEMBLY

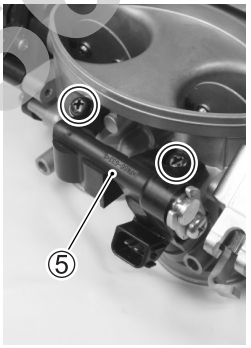
- Remove the vacuum hose ① and fuel feed hose ②.
- Remove the clamp ③.

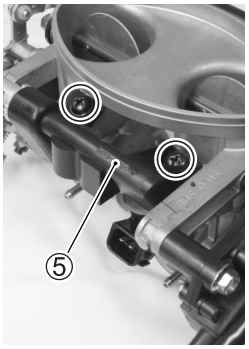


- Remove the fuel delivery hose ④.

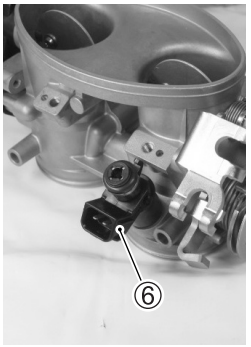


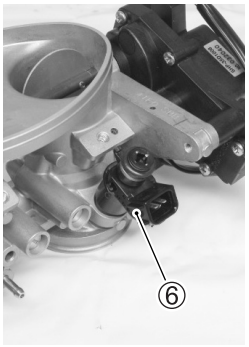
- Remove the fuel delivery pipes ⑤.





- Remove the fuel injectors ⑥.

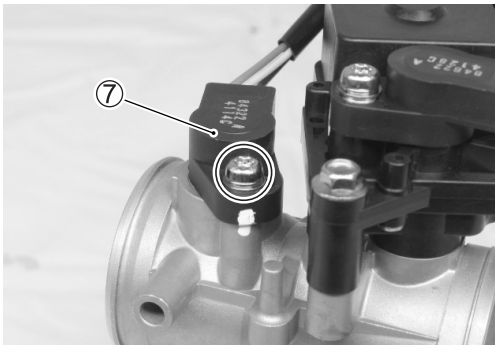




- Remove the TP sensor ⑦ with the special tool.

TOOL 09930-11950: Torx wrench

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



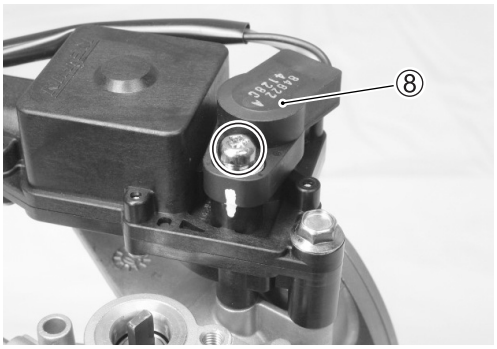
• Remove the STP sensor ⑧ with the special tool.

TOOL 09930-11950: Torx wrench

NOTE:

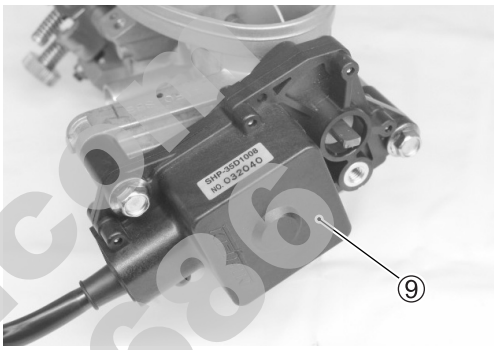
** Prior to disassembly, mark the STP sensor's original position with a paint or scribe for accurate reinstallation.*

** TP sensor and STP sensor look very much alike. To avoid confusion, mark identifications when removing.*



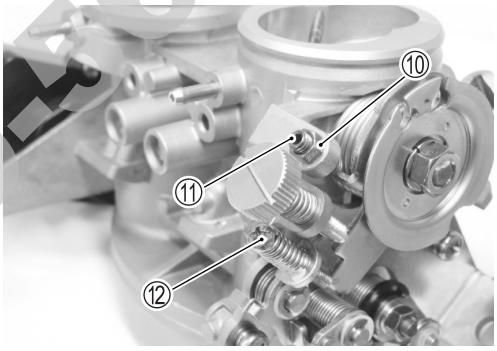
CAUTION

Never remove the STVA ⑨ from the throttle body.



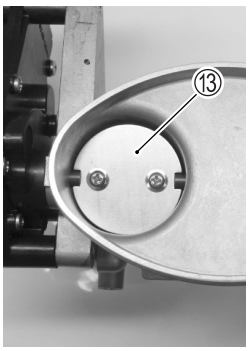
CAUTION

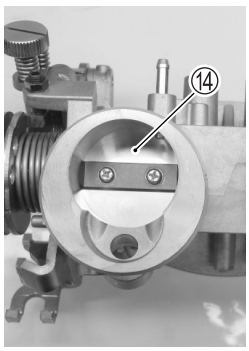
*** Do not loosen the nut ⑩.**
*** Do not turn the screw ⑪.**
*** The fast idle screw ⑫ is factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.**



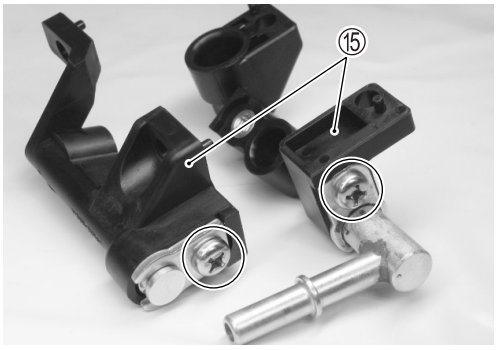
CAUTION

Never remove the secondary throttle valve ⑬ and throttle valve ⑭.





• Remove the fuel delivery pipes ⑮.



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

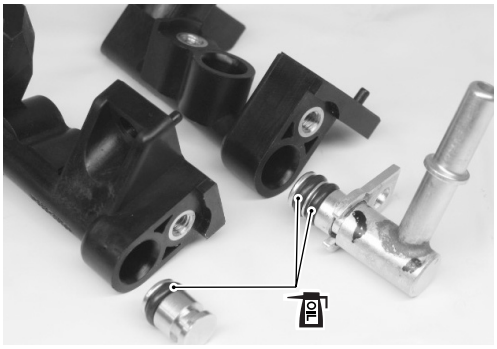
THROTTLE BODY REASSEMBLY

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

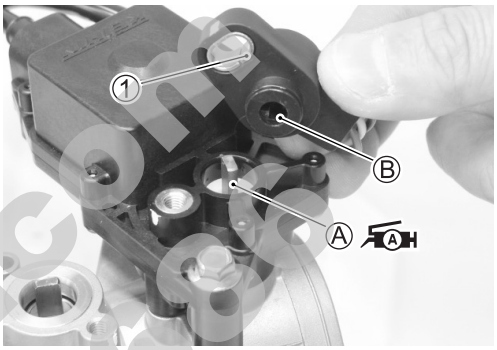
- Apply thin coat of the engine oil to the new O-rings.

CAUTION

Replace the O-rings with the new ones.



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



CAUTION

TPS and STPS resemble each other very closely in external appearance.
Make sure to check the color of coupler before installing.
STP sensor: Green color coupler
TP sensor: Black color coupler

NOTE:

** 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.*

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

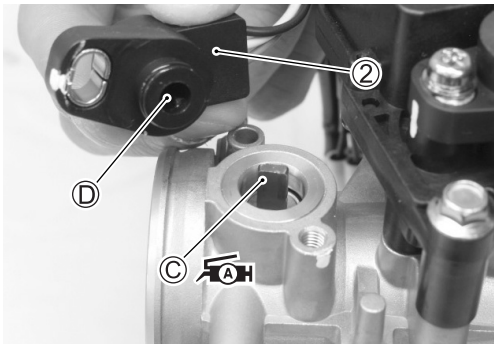
09930-11950: Torx wrench

STP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.45 lb-ft)

NOTE:

If the STP sensor adjustment is necessary, refer to page 111 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:

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

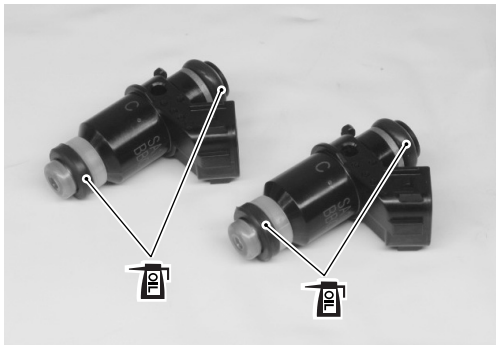
** Apply SUZUKI SUPER GREASE "A" to the throttle shaft end Ⓒ if necessary.*
TP sensor setting procedure. (☞14-118)

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

09930-11950: Torx wrench

TP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.45 lb-ft)

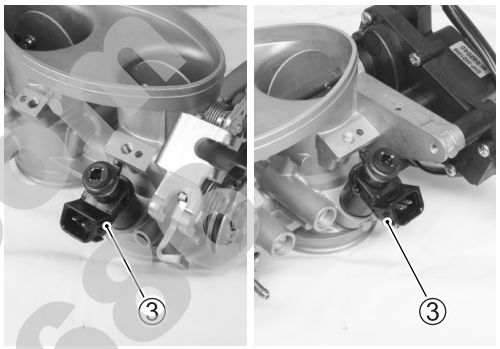
- Install the O-ring and dust seal to each fuel injector.
- Apply thin coat of the engine oil to the new O-ring and cushion seal.



CAUTION

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

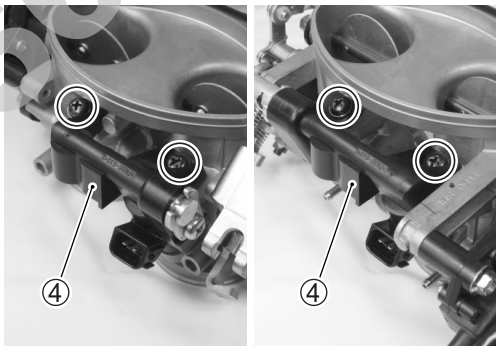
- Install the fuel injectors ③ by pushing them straight to each throttle body.



CAUTION

Never turn the injector while pushing it.

- Install the fuel delivery pipes ④ to the throttle body assembly.



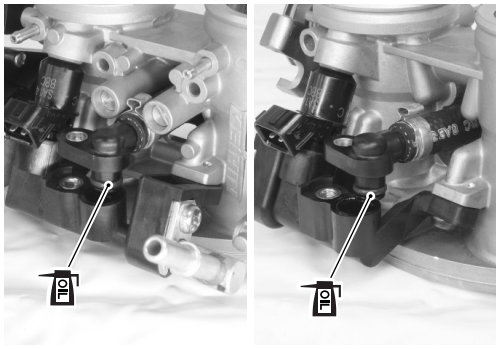
CAUTION

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, 2.45 lb-ft)

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



CAUTION

Replace the O-rings with the new ones.

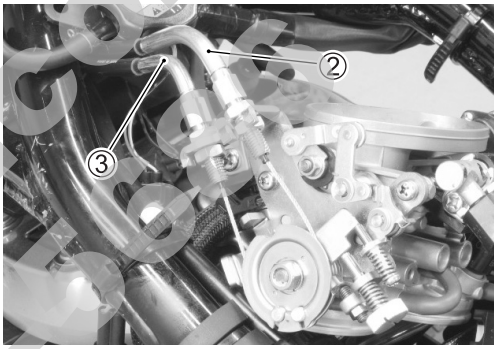
THROTTLE BODY INSTALLATION

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

• Connect the TP sensor lead wire coupler ①.

CAUTION

TP sensor lead wire coupler and STP sensor lead wire coupler resemble each other very closely in external appearance.
Make sure to check the color of coupler before installing.
TP sensor lead wire coupler: Black color
STP sensor lead wire coupler: Green color



• Connect the throttle pulling cable ② and throttle returning cable ③ to the throttle cable drum.

• Adjust the throttle cable play. (☞2-11)

STP SENSOR ADJUSTMENT

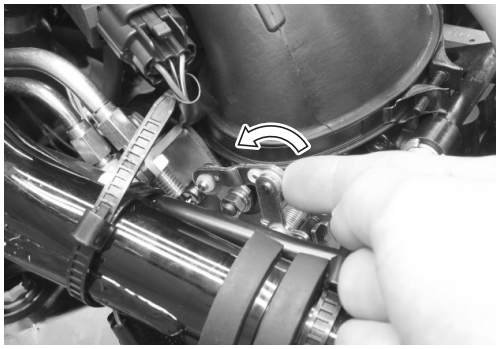
If the STP sensor adjustment is necessary, measure the sensor resistance and adjust the STP sensor position as follows:

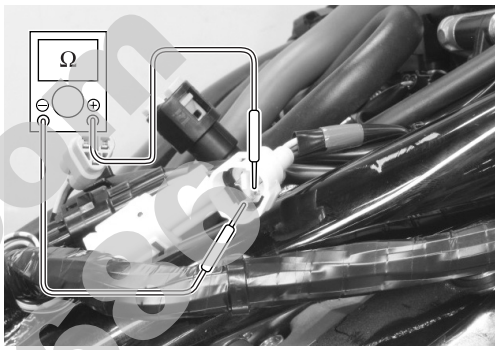
- Disconnect the STP sensor coupler.
- Close the secondary throttle valve fully by moving the fast idle link, and measure the STP sensor resistance (between Yellow wire terminal and Black wire terminal).

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)

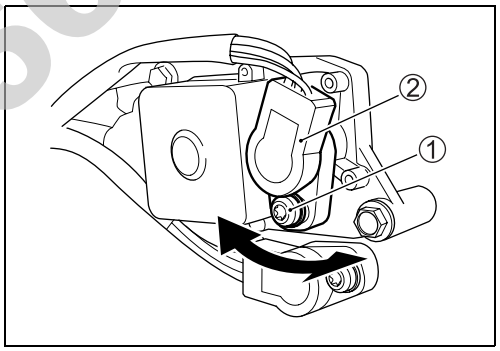




- Loosen the STP sensor mounting screw ①.
- Adjust the STP sensor ② until resistance comes to specification and tighten the STP sensor mounting screw.

TOOL 09930-11950: Torx wrench

STP sensor mounting screw: 3.5 N·m
(0.35 kgf-m, 2.45 lb-ft)



FUEL INJECTOR REMOVAL

- Remove the fuel tank. (☞14-93)
- Remove the air intake pipe. (☞14-103)
- With battery negative cable disconnected, disconnect the injector couplers.
- Remove the fuel delivery pipes. (☞14-105)
- Remove the fuel injectors No.1 and No.2. (☞14-105)

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.
The fuel injector can be checked without removing it from the throttle body.
Refer to page 80 for details.

FUEL INJECTOR INSTALLATION

- Apply thin coat of the engine oil to new injector O-rings.
- Install the injector by pushing it straight to the throttle body. Never turn the injector while pushing it.

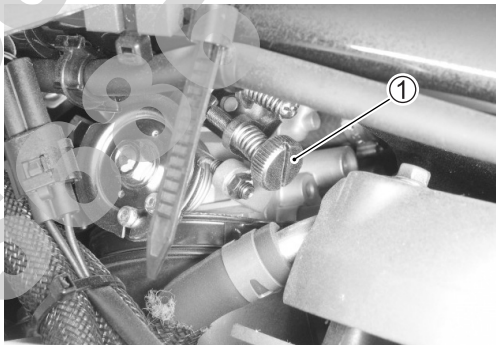
FAST IDLE

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 water 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)	1 500 – 2 100 rpm	Approx. 100 sec.
15 °C (59 °F)	1 500 – 2 100 rpm	Approx. 60 sec.
25 °C (77 °F)	1 500 – 2 100 rpm	Approx. 50 sec.

FAST IDLE ADJUSTMENT

- Lift and support the fuel tank. (☞14-93)
- Start up the engine and run it in idling condition for warming up.
- Set the idle rpm to 1 100 rpm by the throttle stop screw ①.
- Check and adjust the TP sensor. (☞14-118)

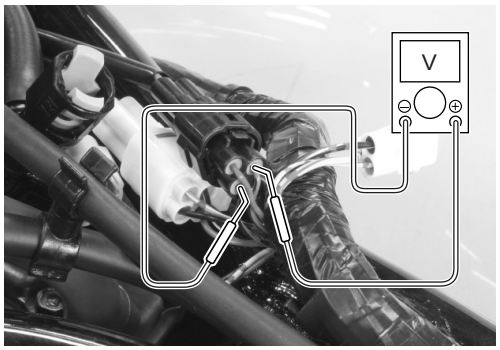


- Start up the engine.
- Measure the TP sensor output voltage at the coupler (between ⊕ Bl/B wire and ⊖ B/Br wire).

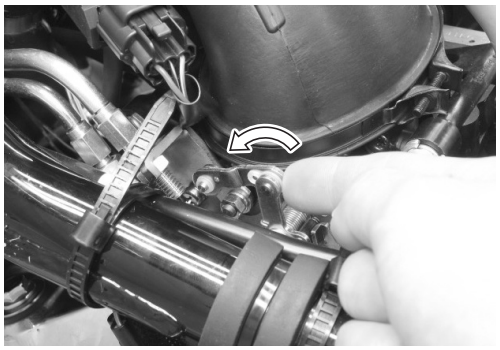
DATA TP sensor output voltage at idle position: Approx. 1.12 V

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

Tester knob indication: Voltage (⎓)



- Turn the ignition switch OFF.
- Disconnect the STVA coupler.
- Turn the ignition switch ON.
- Open the secondary throttle valve fully by moving the fast idle link with your finger.
- With the secondary throttle valve held at this position, measure the output voltage of the TP sensor as shown.



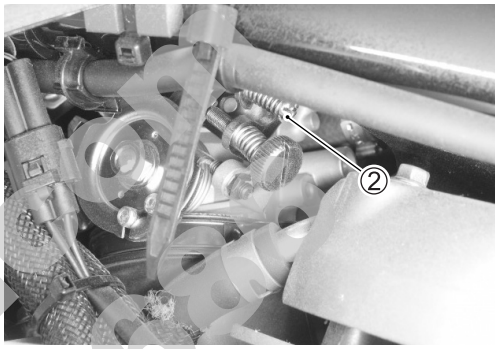
• Calculate the voltage difference between TP sensor output voltage at idle and TP sensor output voltage with the STV full opened.

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 ② 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: 1 500 – 2 100 rpm/Cold engine
Idle rpm : 1 100 ± 100 rpm/Warmed engine

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

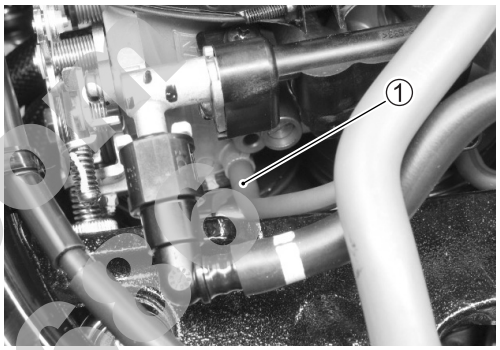
THROTTLE VALVE SYNCHRONIZATION

Check and adjust the throttle valve synchronization among two cylinders.

USE OF DIGITAL VACUUM TESTER

Step 1

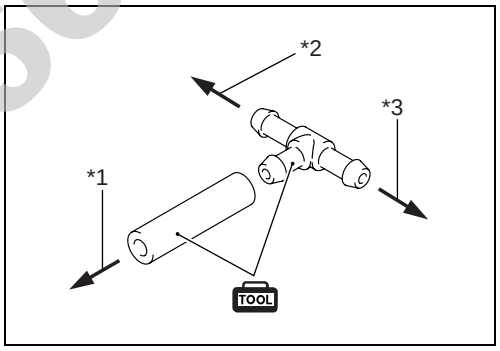
- Lift and support the fuel tank. (☞14-93)
- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Disconnect the vacuum hose ① from each throttle body.



- Connect the vacuum tester hose to each vacuum nipple on the throttle body with the special tools.

TOOL **13685-02FA0: Three way joint**
13681-39F00-225: Hose

*1: To each vacuum nipple.
*2: To each vacuum hose. (IAP Sensor)
*3: To vacuum tester hose.

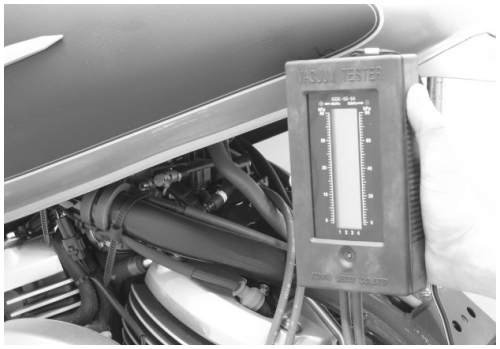


Step 2

- Connect a tachometer and start up the engine.
- Bring the engine rpm to 1 100 rpm by the throttle stop screw.

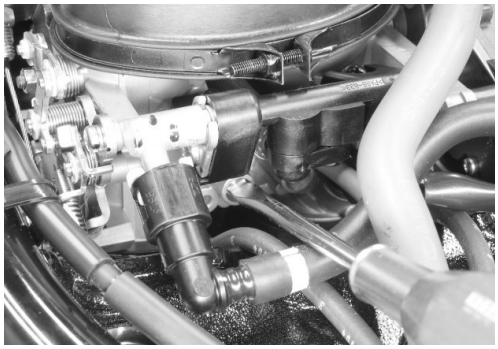
CAUTION

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



Step 3

- Turn in two idle air screws to the complete close position.
- Check for difference of vacuum between front cylinder and rear cylinder.
- Equalize these two by gradually turning back the air screw on the higher vacuum side until the vacuum comes down to the lower.



NOTE:

** During balancing the throttle valves, always set the engine rpm at 1 100 rpm, using throttle stop screw.*

** After balancing the two valves, set the idle rpm to 1 100 rpm by the throttle stop screw.*

Step 4

- 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.*

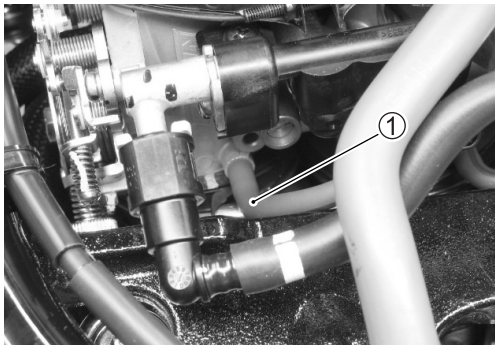
** Make a note of how many turns were made so the screw can be reset correctly after cleaning.*

** If the above procedures cannot still synchronize the valves, proceed to the Step 3.*

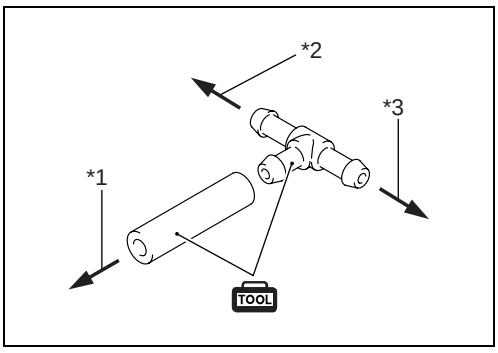
USE OF VACUUM BALANCER GAUGE

Calibrating each vacuum gauge

- Stop the warmed-up engine.
- Disconnect the vacuum hose ① from the No.1 (Rear cylinder) throttle body.



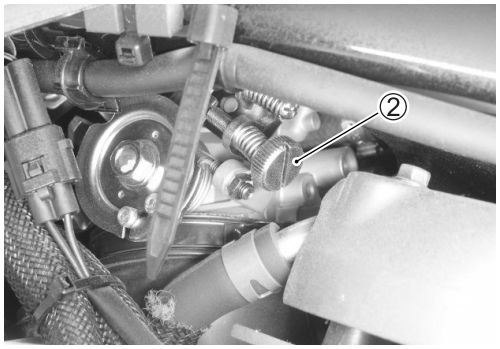
- Connect one of the vacuum balancer gauge hose to the vacuum nipple on the No.1 throttle body with the special tools.



TOOL **13685-02FA0: Three way joint**
13681-39F00-225: Hose

*1: To vacuum nipple.
*2: To vacuum hose.
*3: To vacuum balancer gauge hose.

- Connect a tachometer.
- Start up the engine and keep it running at 1 100 rpm by turning throttle stop screw ②.

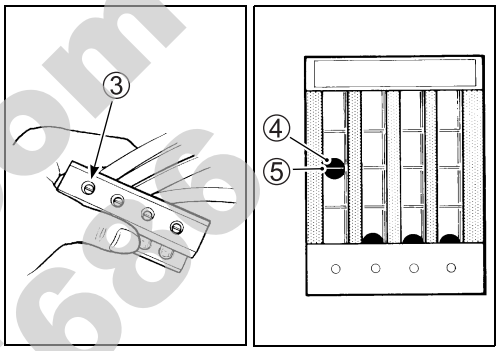


CAUTION

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

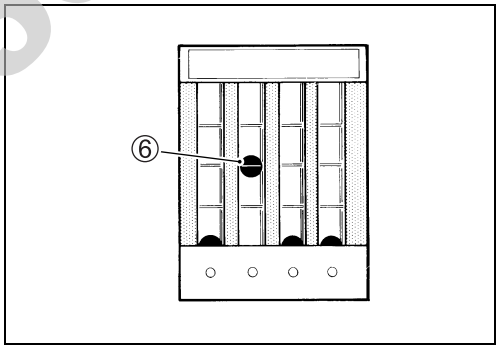
- Turn the air screw ③ of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ④ in the tube to the center line ⑤.

NOTE:
The vacuum gauge is positioned vertical 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 ⑥ to the center line.

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

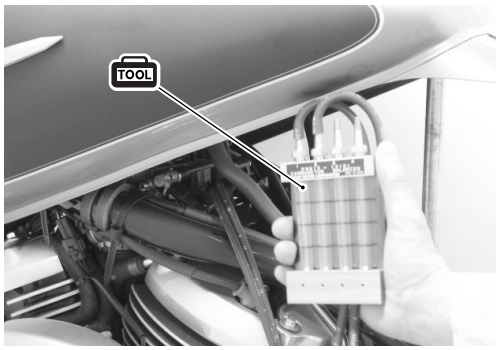


Throttle valve synchronization

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

The vacuum gauge is positioned vertical level, and in this position the two balls should be within one ball dia. If the difference is larger than one ball, turn the balance adjusting 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.



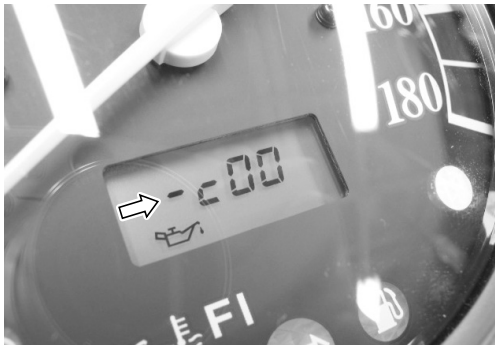
TOOL 09913-13121: Vacuum balancer gauge

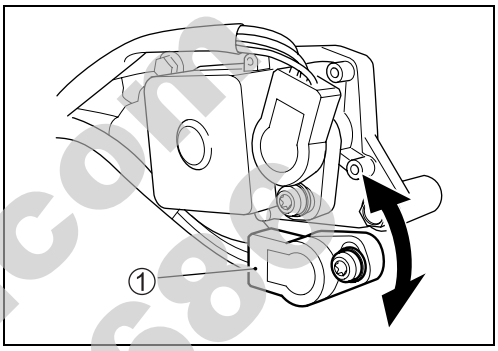
NOTE:

* *During balancing the throttle valves, always set the engine rpm at 1 100 rpm, using throttle stop screw.*
* *After balancing the two valves, set the idle rpm to 1 100 rpm by the throttle stop screw.*

THROTTLE POSITION SENSOR (TPS) SETTING

After all adjustments are completed, check or adjust the TPS ① setting condition.

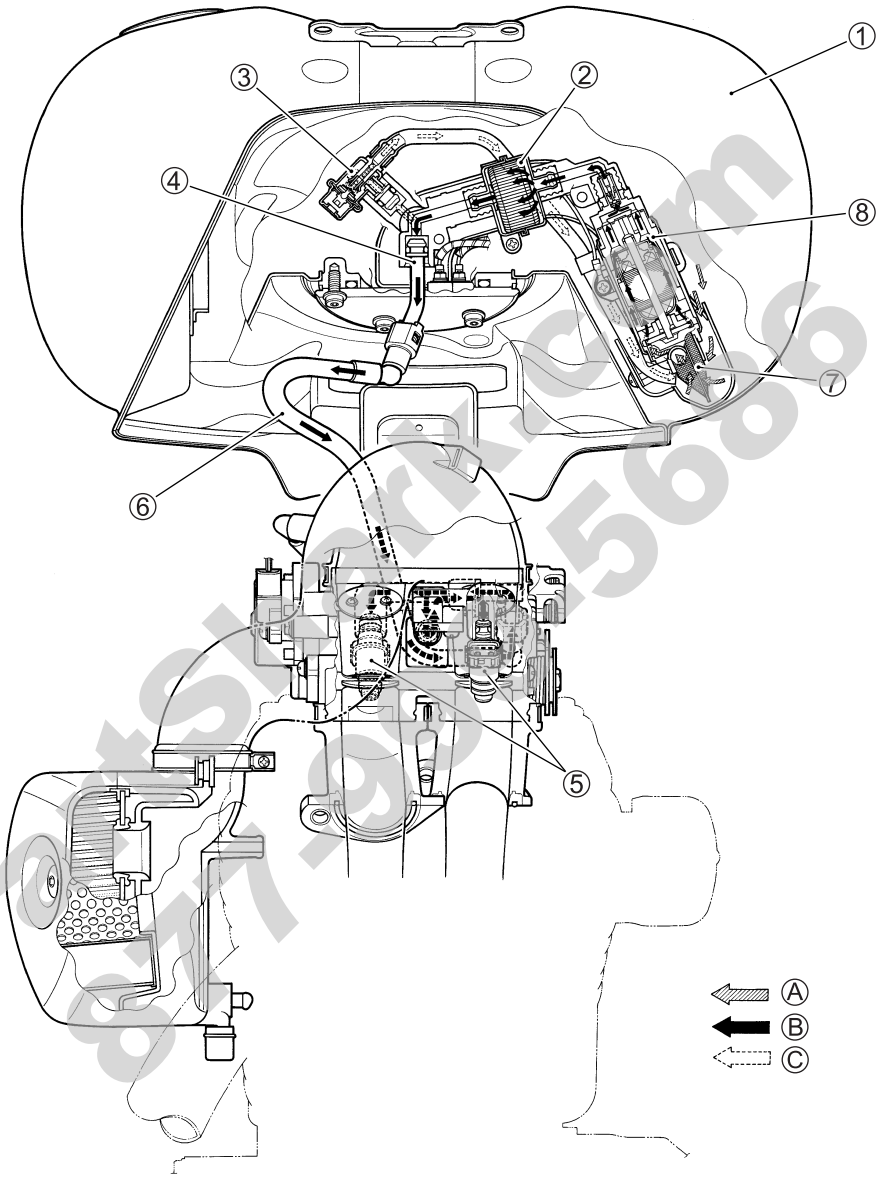




EMISSION CONTROL SYSTEMS

FUEL INJECTION SYSTEM

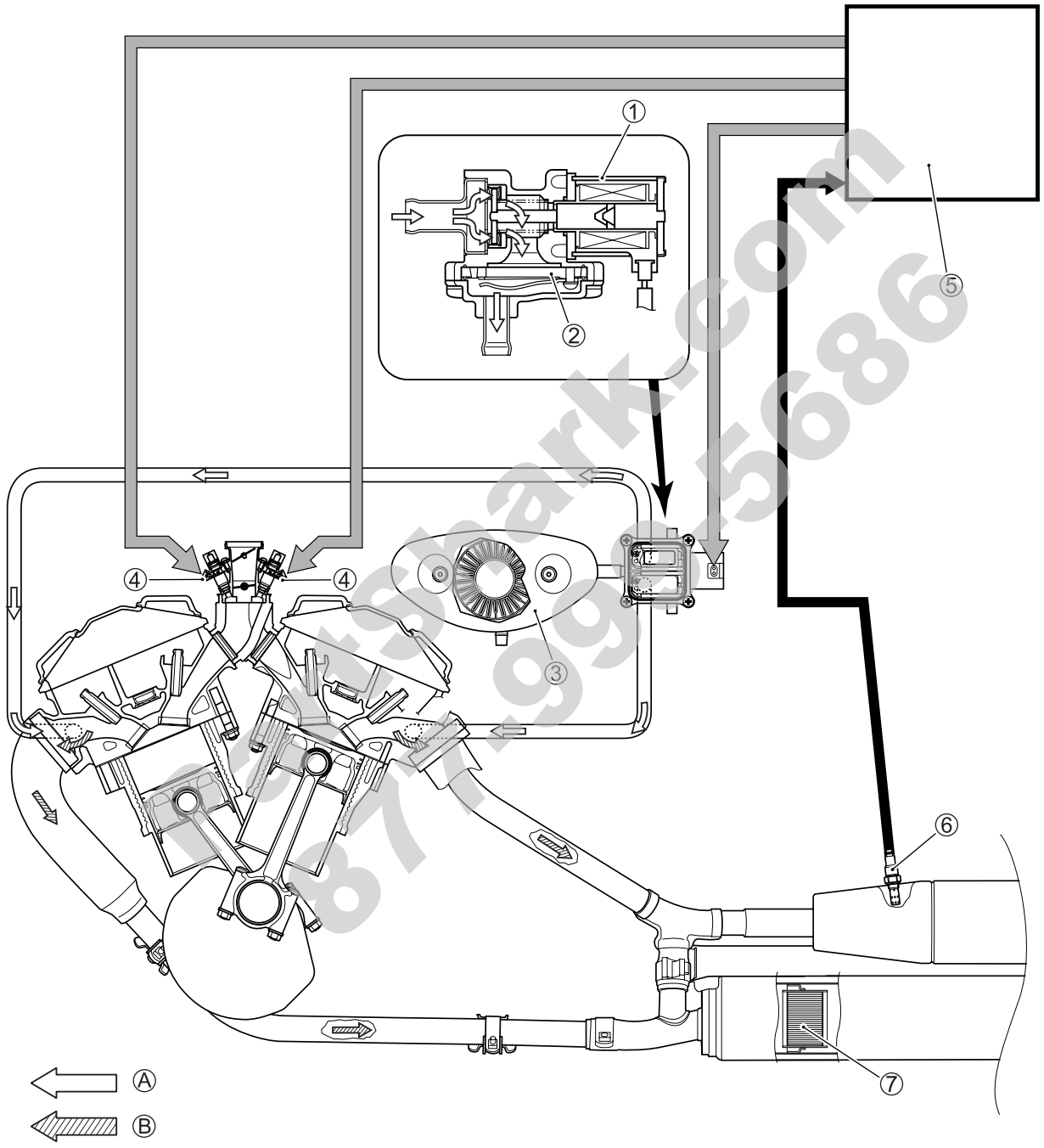
VL800 motorcycles are equipped with a fuel injection system for emission level control.
This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits.



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		

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 with the PAIR control solenoid valve and PAIR reed valve. The PAIR control solenoid valve is operated by the ECM, and the fresh air flow is controlled according to the TPS, ECTS, IATS, IAPS and CKPS.



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

NOISE EMISSION CONTROL SYSTEM

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

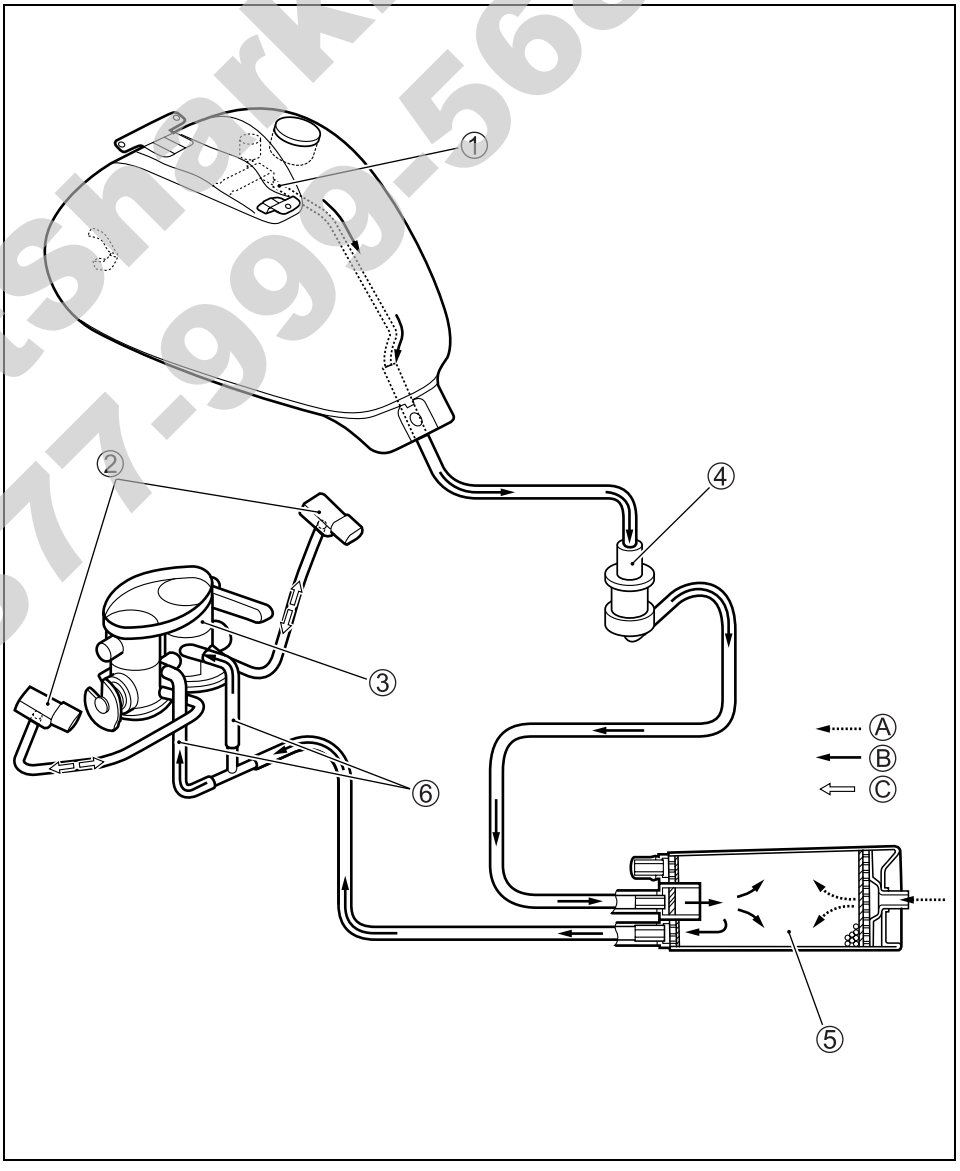
1. The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or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

EVAPORATIVE EMISSION CONTROL SYSTEM (Only for E-33)

①	Fuel-vapor separator
②	IAP sensor
③	Throttle body
④	Fuel shut-off valve
⑤	EVAP Canister
⑥	Purge hose
Ⓐ	FRESH AIR
Ⓑ	HC VAPOR
Ⓒ	VACUUM



PAIR (AIR SUPPLY) SYSTEM AND EMISSION CONTROL SYSTEM INSPECTION

PCV HOSE

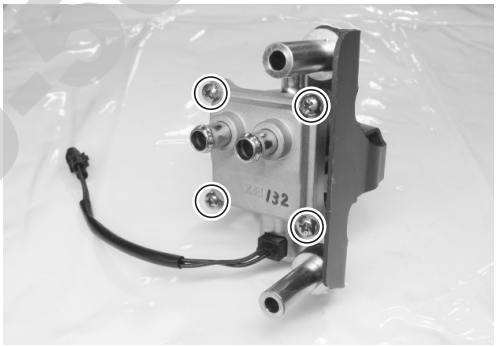
- Remove the PCV hose from the crankcase breather cover.
- Inspect the PCV hose for wear or damage.
- If it is worn or damaged, replace the PCV hose with a new one.

PAIR HOSES

- Inspect the PAIR hoses for wear or damage.
- Inspect the PAIR hoses for secure connection.

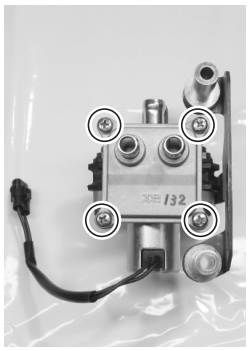
PAIR REED VALVE

- Remove the PAIR control solenoid valve. (☞14-123)
- Remove the PAIR reed valve.

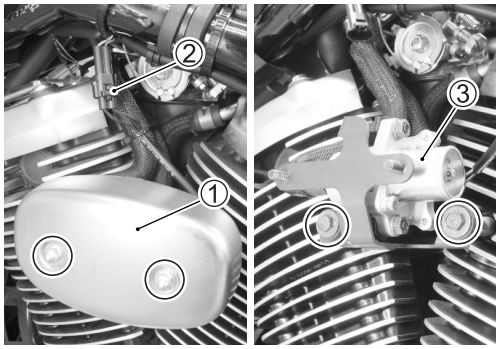


- Inspect the reed valve for the carbon deposit.
- If the carbon deposit is found in the reed valve, replace the PAIR reed valve with a new one.

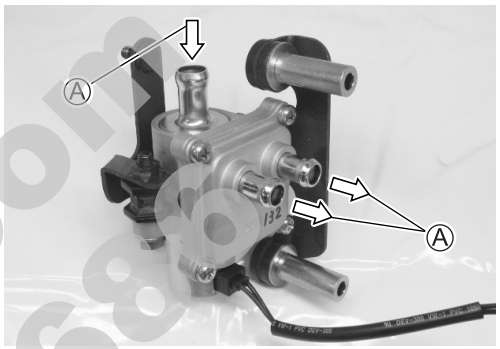
- Install the PAIR reed valve and PAIR reed valve cover as shown.
- Install the PAIR control solenoid valve. (☞14-123)



PAIR CONTROL SOLENOID VALVE

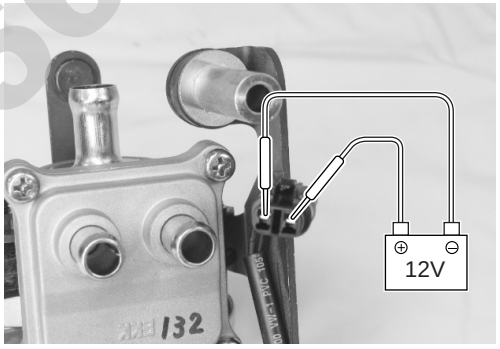


- Lift and support the fuel tank. (☞14-93)
- Remove the PAIR control solenoid valve cover ①.
- Disconnect the PAIR control solenoid valve lead wire coupler ②.
- Disconnect the PAIR hoses.
- Remove the PAIR control solenoid valve ③.

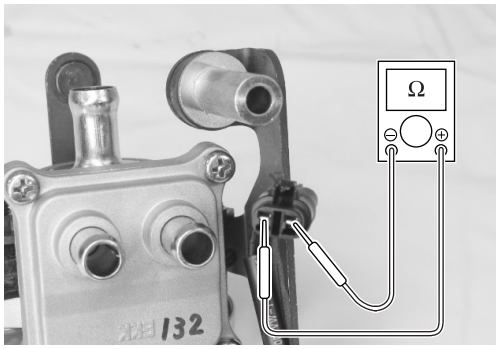


- Check that air flows through the air inlet port to the air outlet port.
- If air does not flow out, replace the PAIR control solenoid valve with a new one.

Ⓐ Air flow



- 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: 18 – 22 Ω at 20 – 30 °C (68 – 86 °F)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

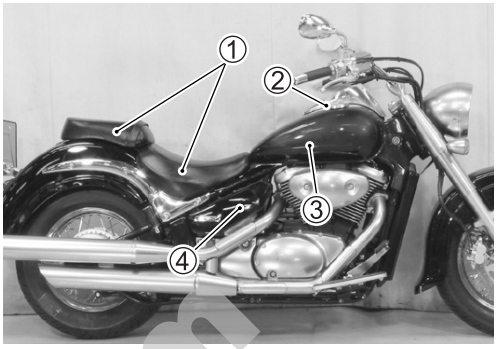
If the resistance is not within the standard range, replace the PAIR control solenoid valve with a new one.

Installation is in the reverse order of removal.

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

EVAPORATIVE EMISSION CONTROL SYSTEM INSPECTION (Only for E-33)

- Remove the seats ①. (☞7-2)
- Remove the speedometer ②. (☞5-3)
- Remove the fuel tank ③. (☞14-93)
- Remove the fuel frame cover ④. (☞7-2)



HOSES (EVAP hose)

Inspect the hoses for wear or damage.
Make sure that the hoses are securely connected.

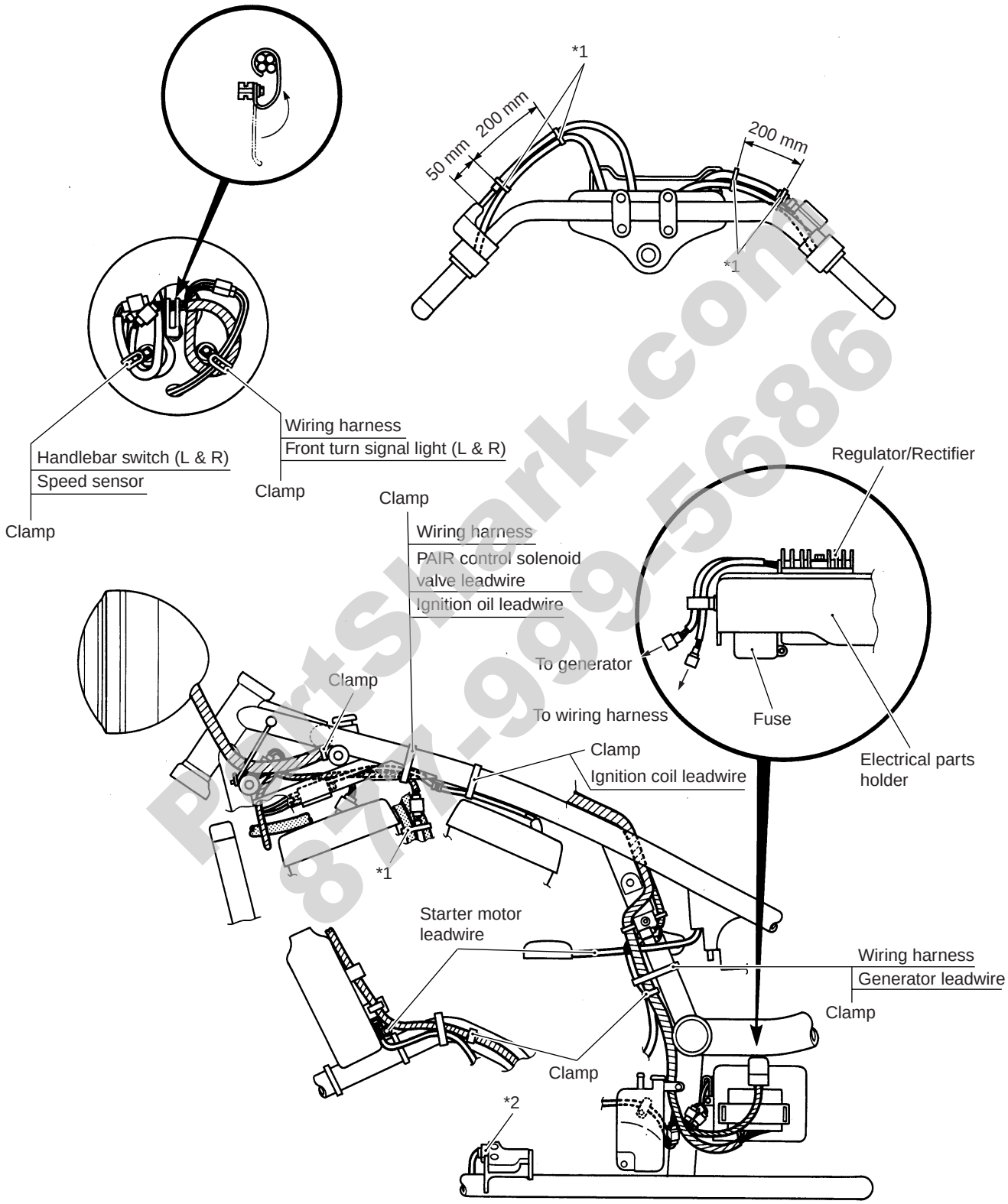
EVAP CANISTER

Inspect the canister for damage to the body.

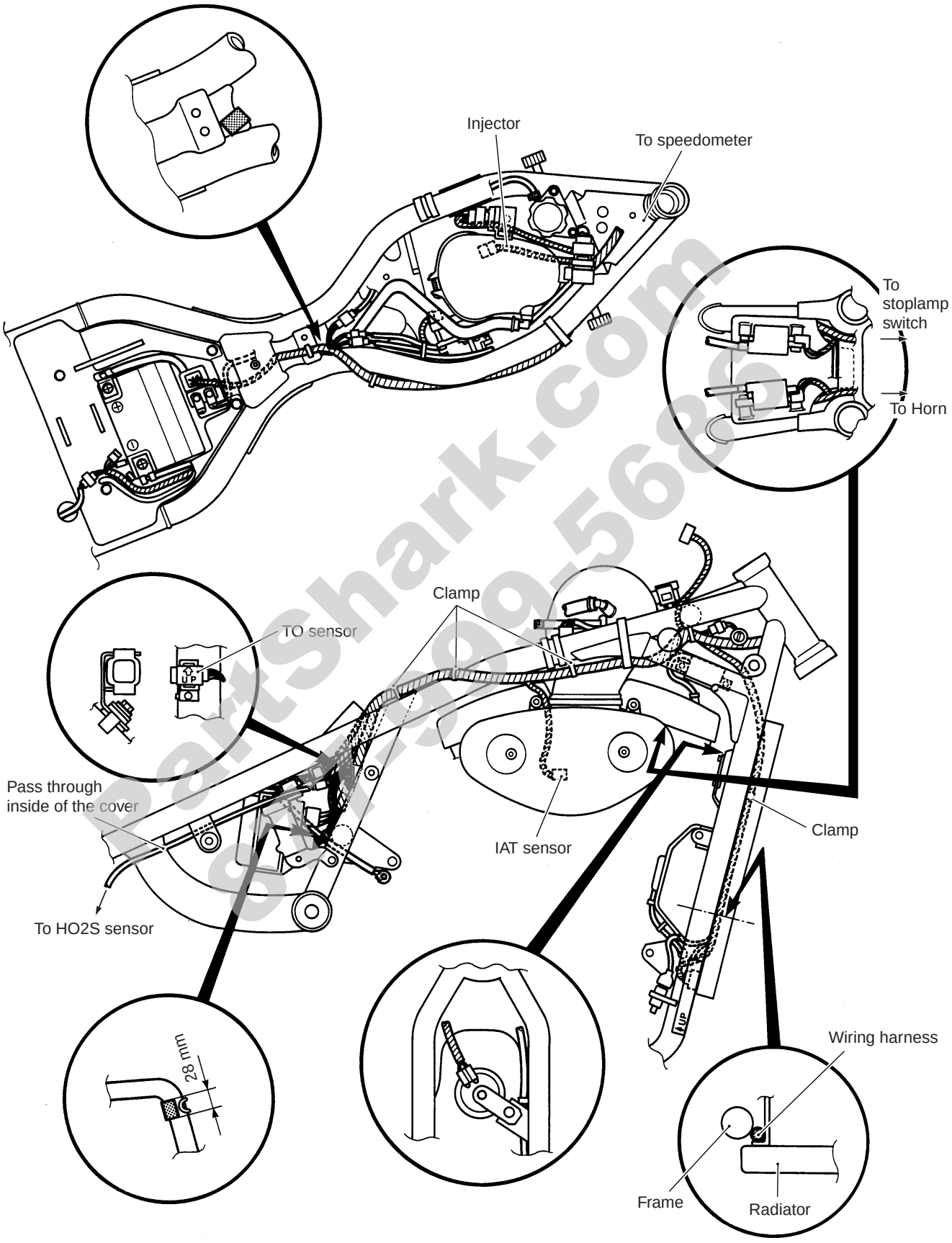
TIGHTENING TORQUE
CHASSIS

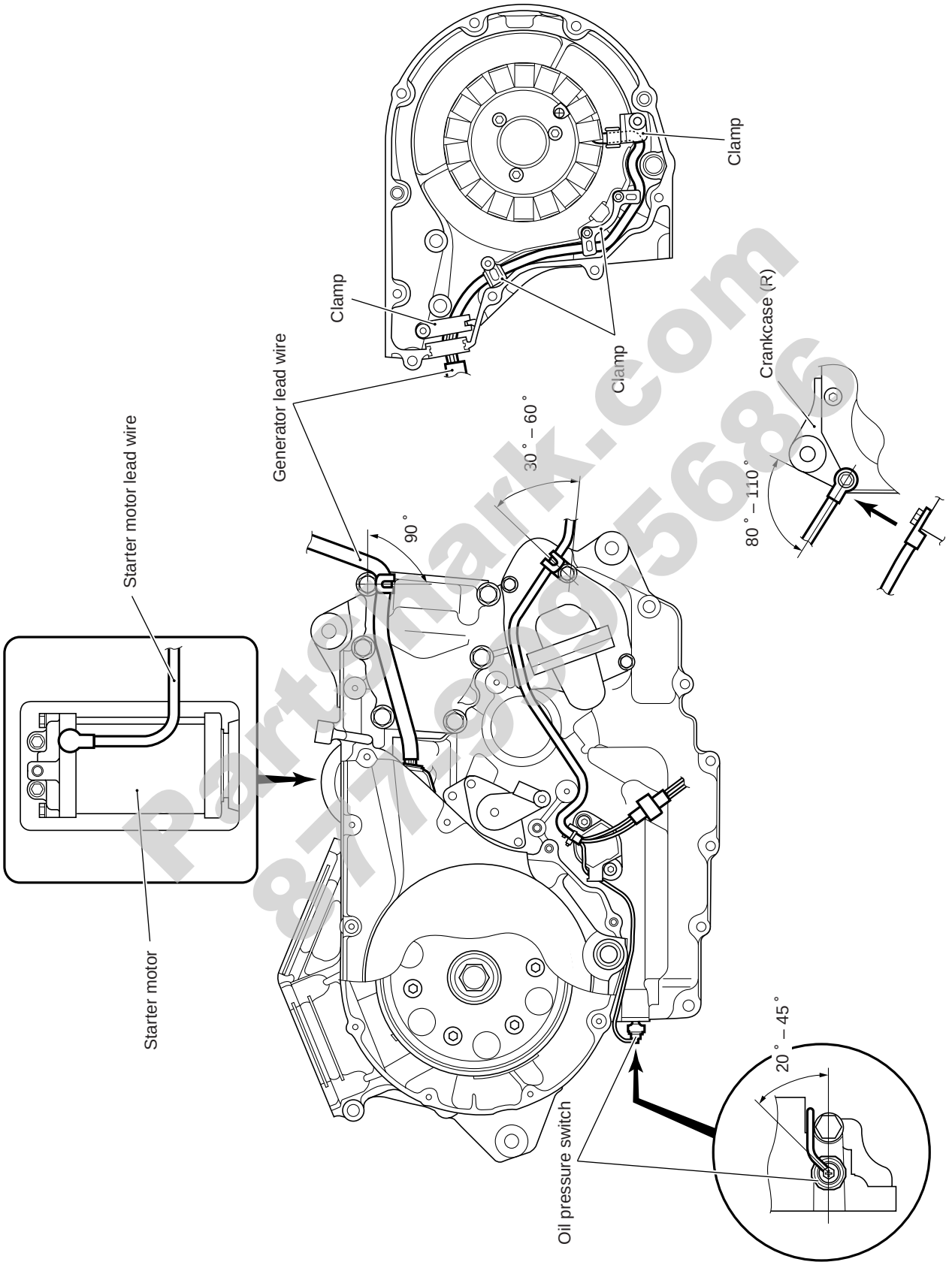
ITEM	N·m	kgf-m	lb-ft
Front axle	65	6.5	47.0
Front axle pinch bolt	33	3.3	24.0
Brake disc bolt	23	2.3	16.5
Front fork cap bolt	45	4.5	33.1
Front fork spring stopper nut	35	3.5	25.5
Front fork damper rod bolt	20	2.0	14.5
*Front fork upper clamp bolt	23	2.3	16.5
Front fork lower clamp bolt	33	3.3	24.0
Steering stem head nut	90	9.0	65.0
Front master cylinder mounting bolt	10	1.0	7.0
Front brake caliper mounting bolt	39	3.9	28.0
Brake hose union bolt	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	55	5.5	40.0
Frame down tube mounting bolt (M8)	23	2.3	16.5
Frame down tube mounting bolt (M10)	50	5.0	36.0
Rear brake pedal bolt	11	1.1	8.0
Rear swingarm pivot bolt (Left)	100	10.0	72.5
Rear swingarm pivot bolt (Right)	9.5	0.95	7.0
Rear swingarm pivot bolt lock nut	100	10.0	72.5
Rear shock absorber monting nut (Upper and Lower)	50	5.0	36.0
Rear cushion lever/rod mounting nut	78	7.8	57.5
Rear axle nut	65	6.5	47.0
Rear torque link nut (front)	35	3.5	25.5
Rear torque link nut (rear)	25	2.5	18.0
Rear brake cam lever bolt	10	1.0	7.3
Driven joint stopper bolt	10	1.0	7.0
Frame handle grip mounting bolt (M10)	50	5.0	36.0
Fuel level gauge mounting bolt	10	1.0	7.0

WIRING HARNESS, CABLE AND HOSE ROUTING
WIRING HARNESS ROUTING

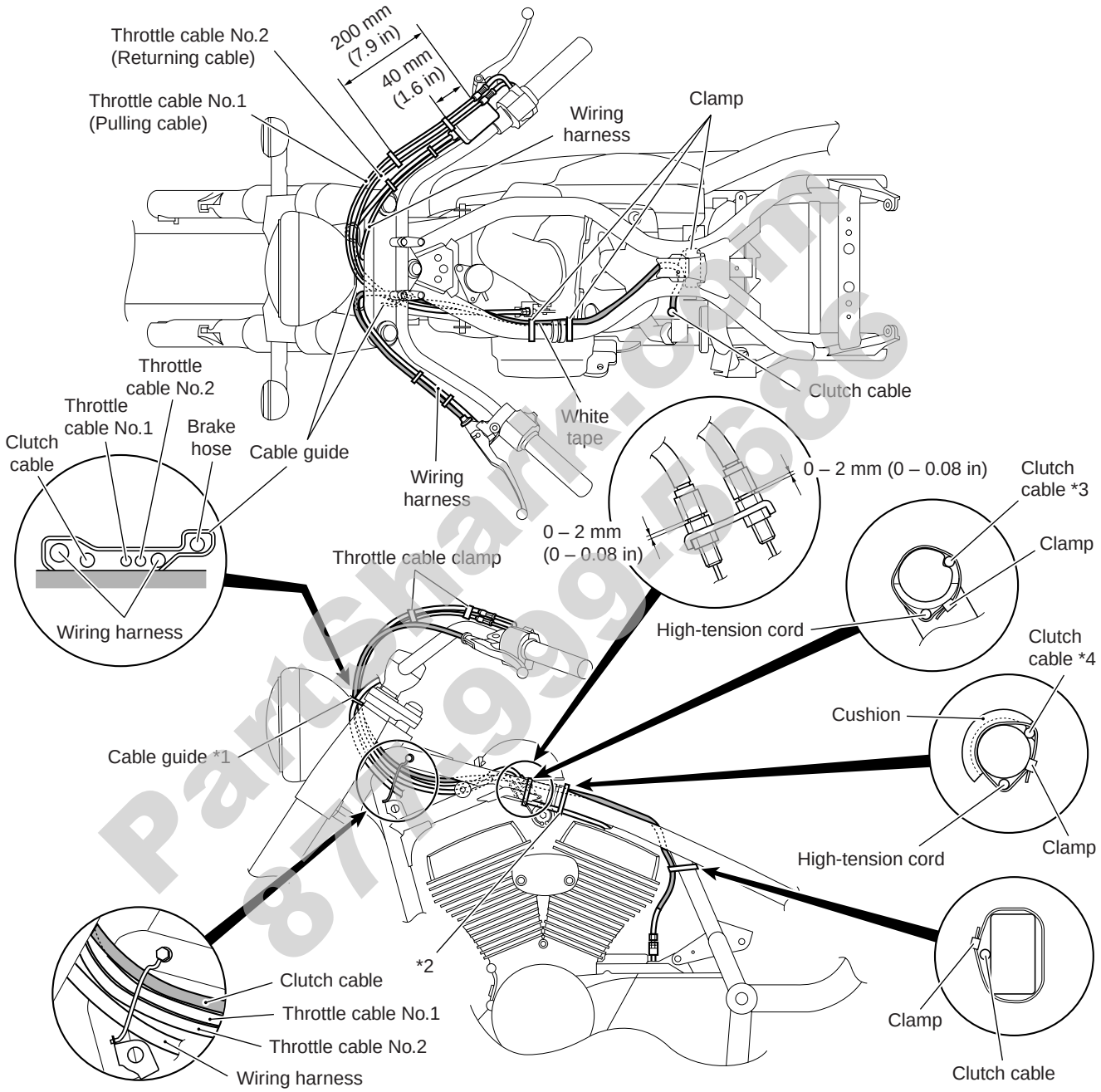


*1	After clamping, cut the excessive end.	*2	Connect with the neutral switch in the cover.



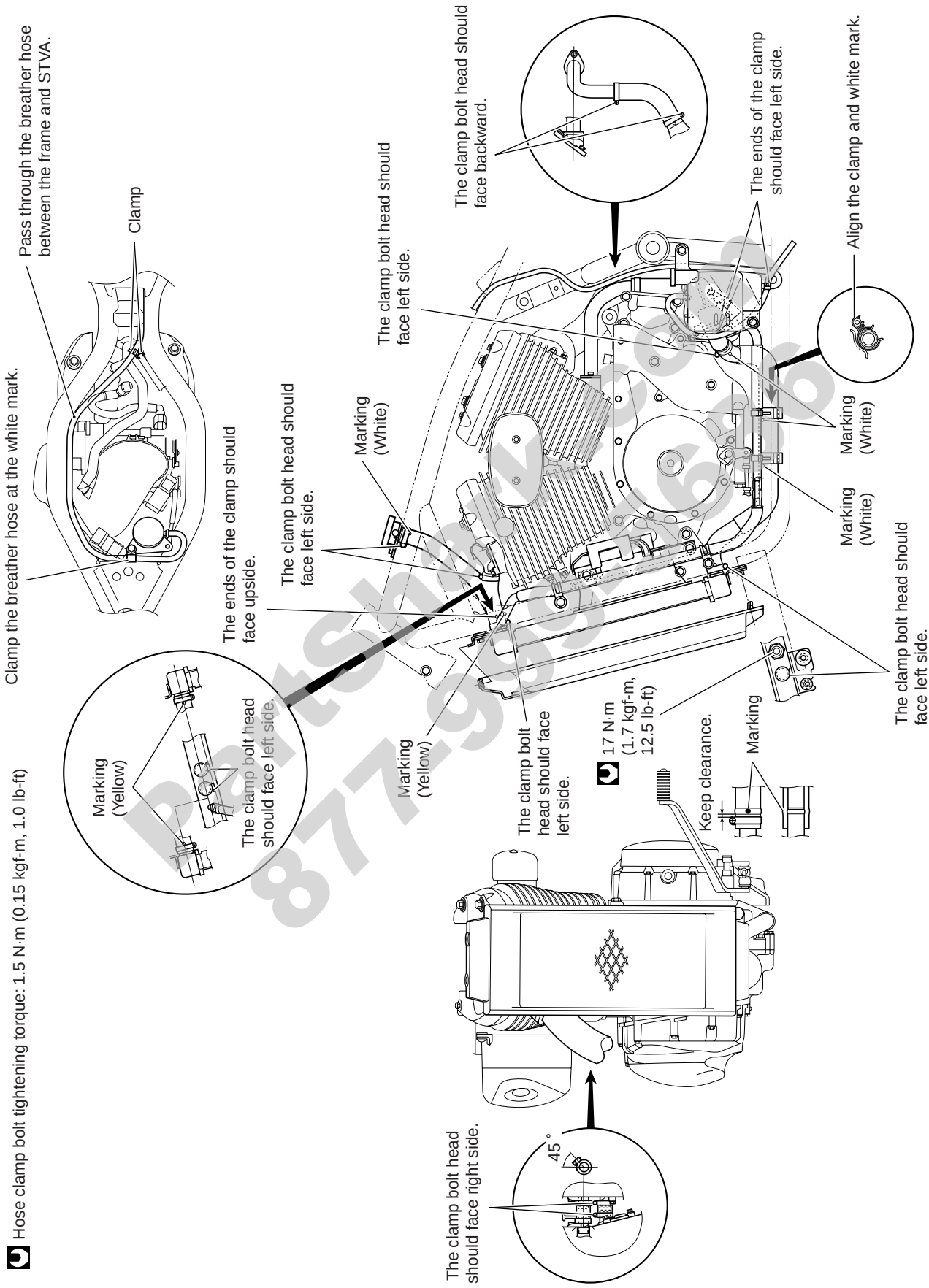


CABLE ROUTING

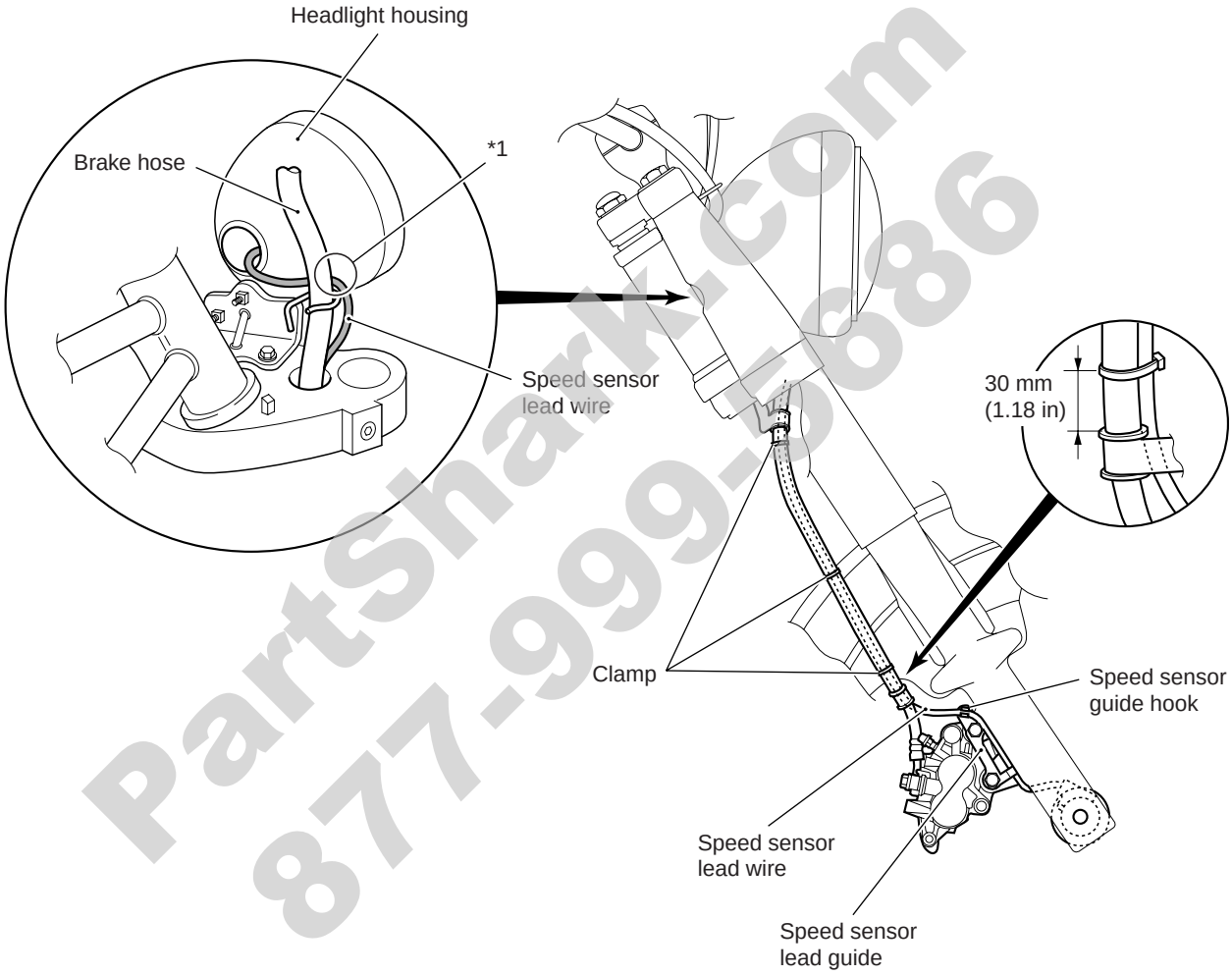


*1	Pass through the clutch cable and throttle cable inside the wiring harness.	*3	Clamp the clutch cable on the frame with the cable's white tape brought to the recess of the frame.
*2	Clamp the high-tension cord immediately on the side of the cushion.	*4	The clutch cable must be contacted with the cushion when clamped.

COOLING SYSTEM HOSE ROUTING

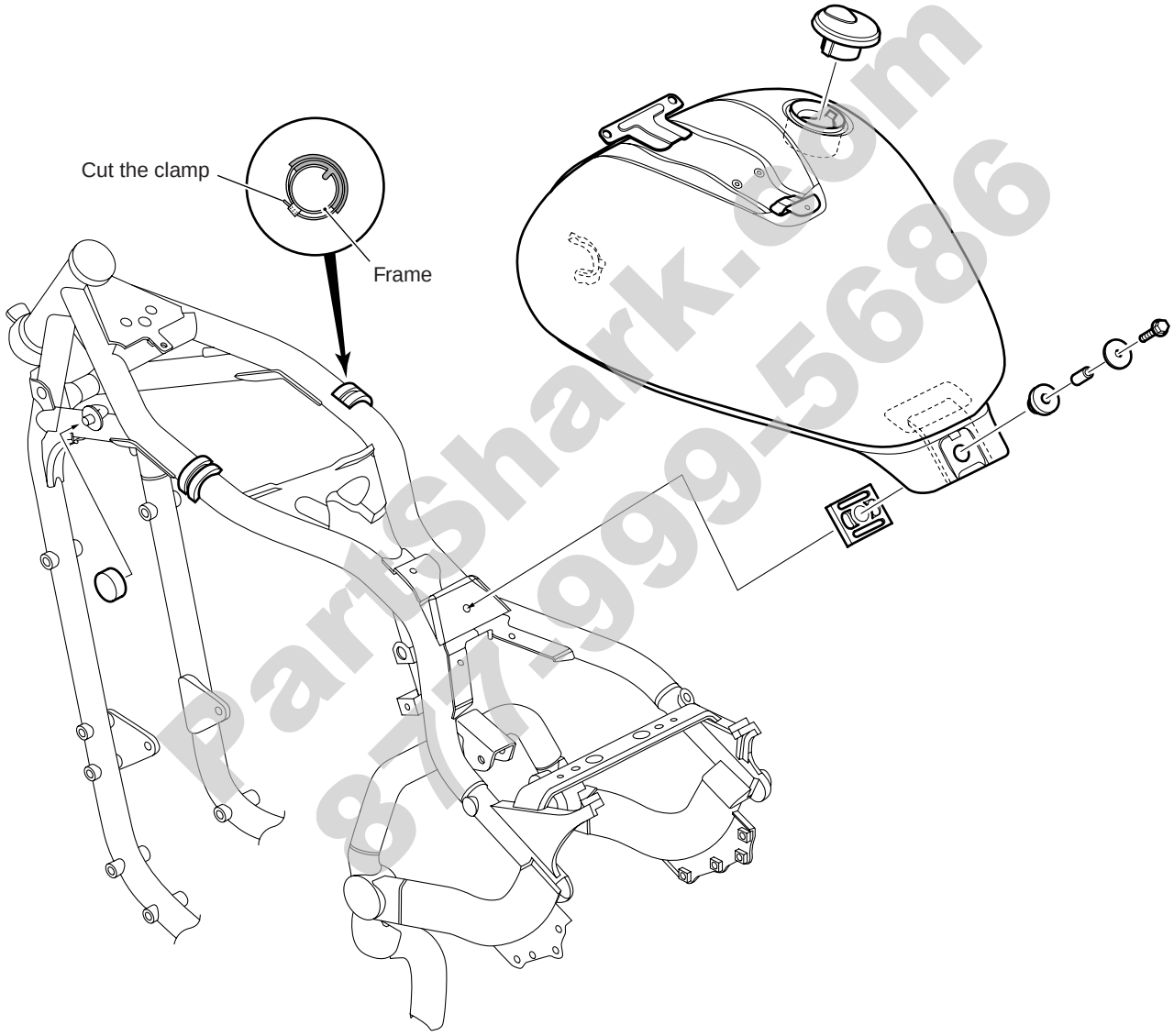


SPEED SENSOR LEAD WIRE ROUTING

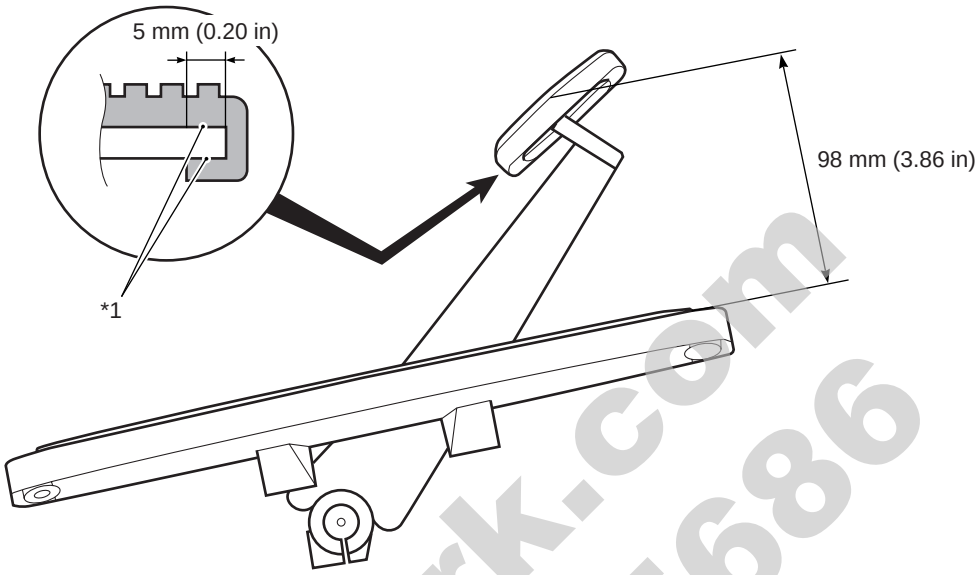


*1	Pass through the speed sensor lead wire between the headlight housing and brake hose.

FUEL TANK INSTALLATION

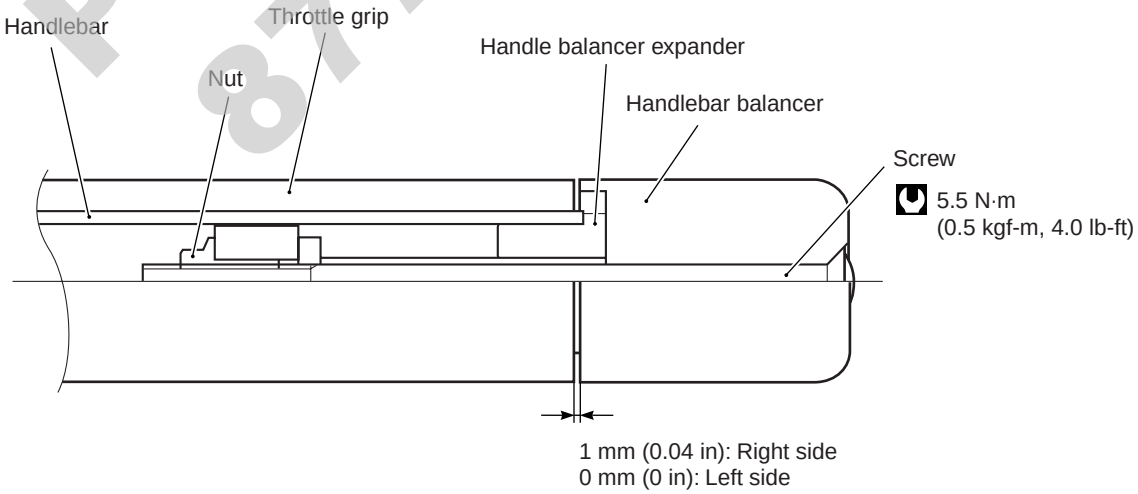


BRAKE PEDAL INSTALLATION

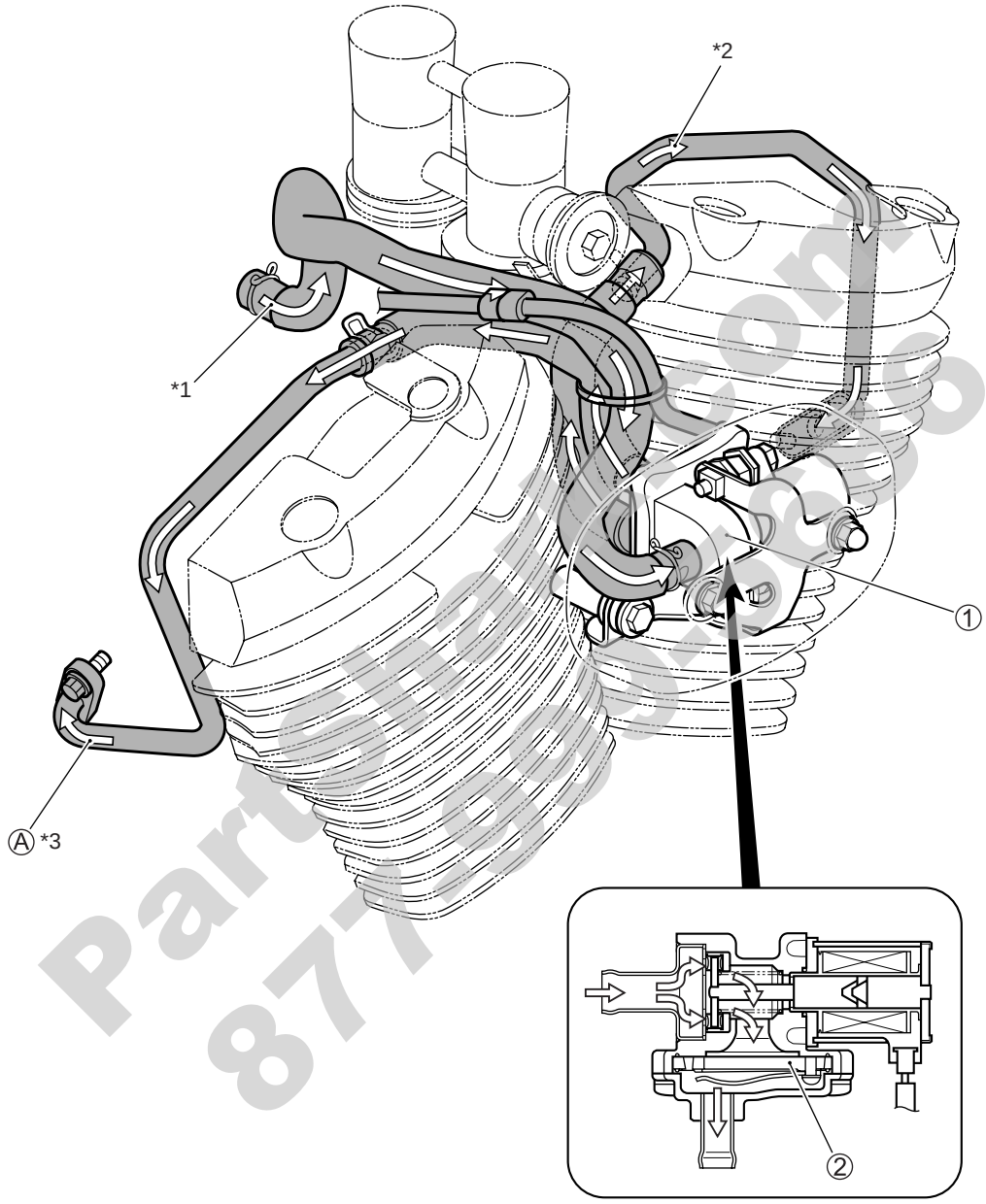


*1	Apply an adhesive agent.

HANDLEBAR BALANCER



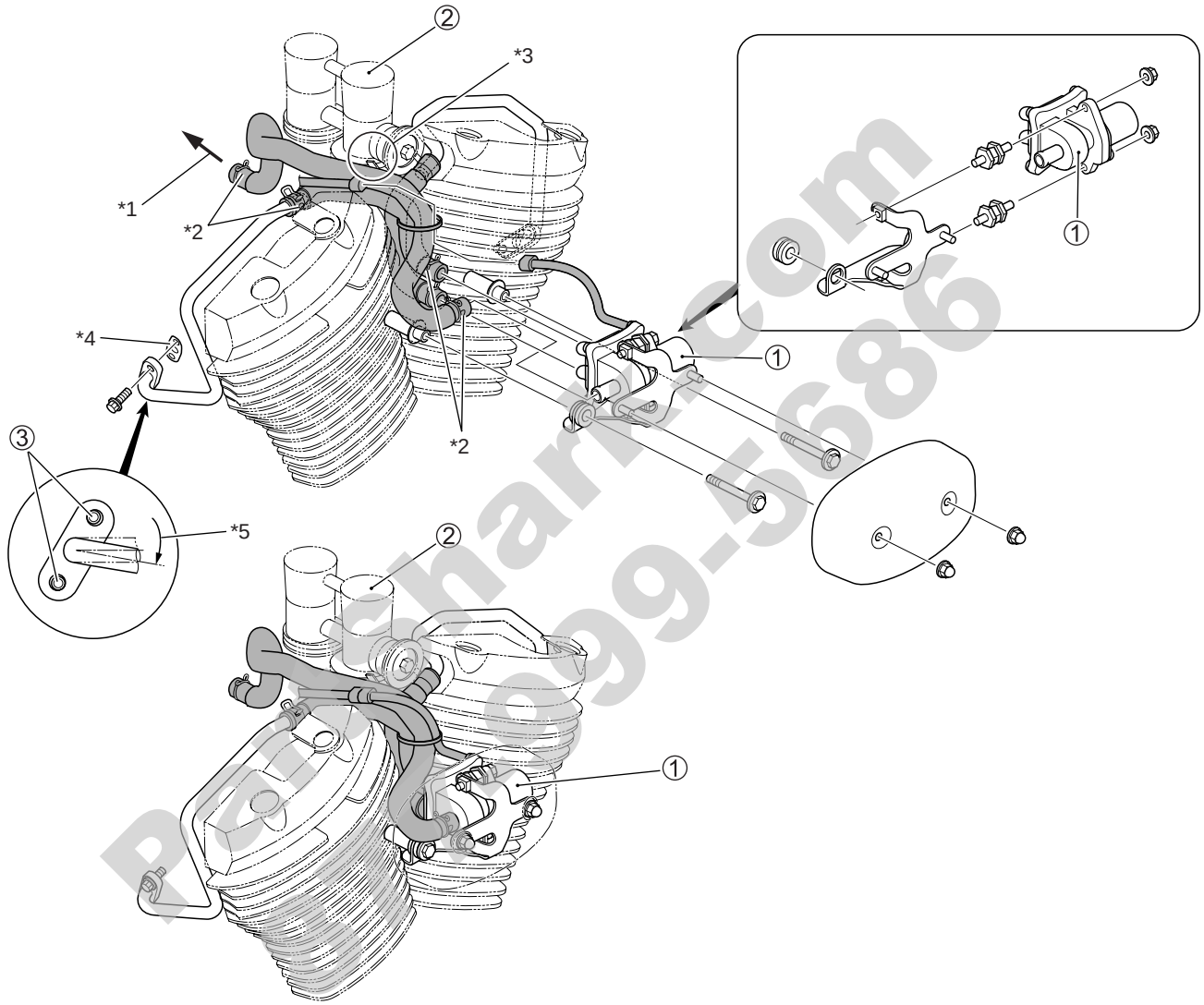
PAIR (AIR SUPPLY) SYSTEM DIAGRAM



⇦ Ⓐ

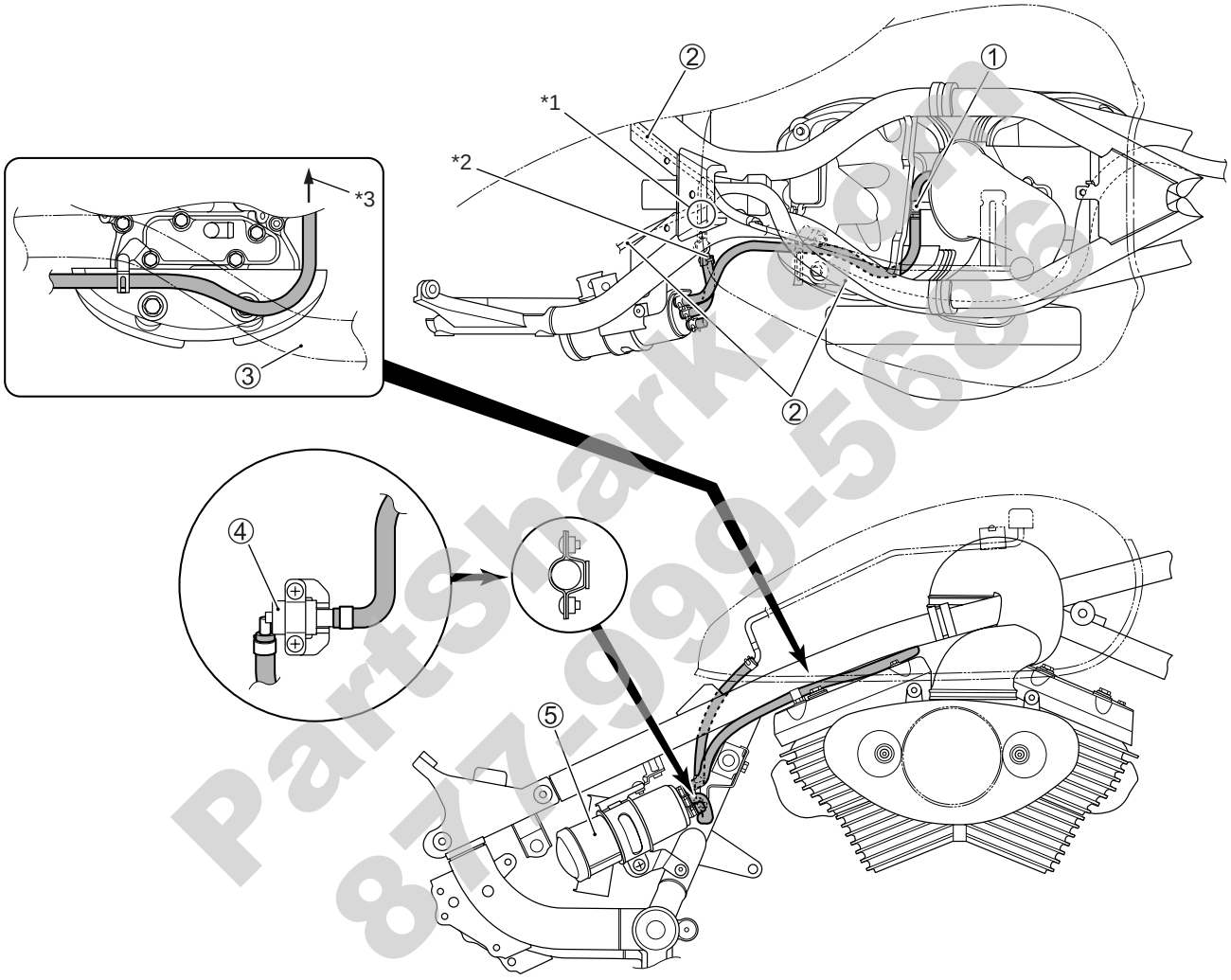
①	PAIR control solenoid valve	*1	From air cleaner.
②	PAIR reed valve	*2	To #1 cylinders.
Ⓐ	FRESH AIR	*3	To #2 cylinders.

PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



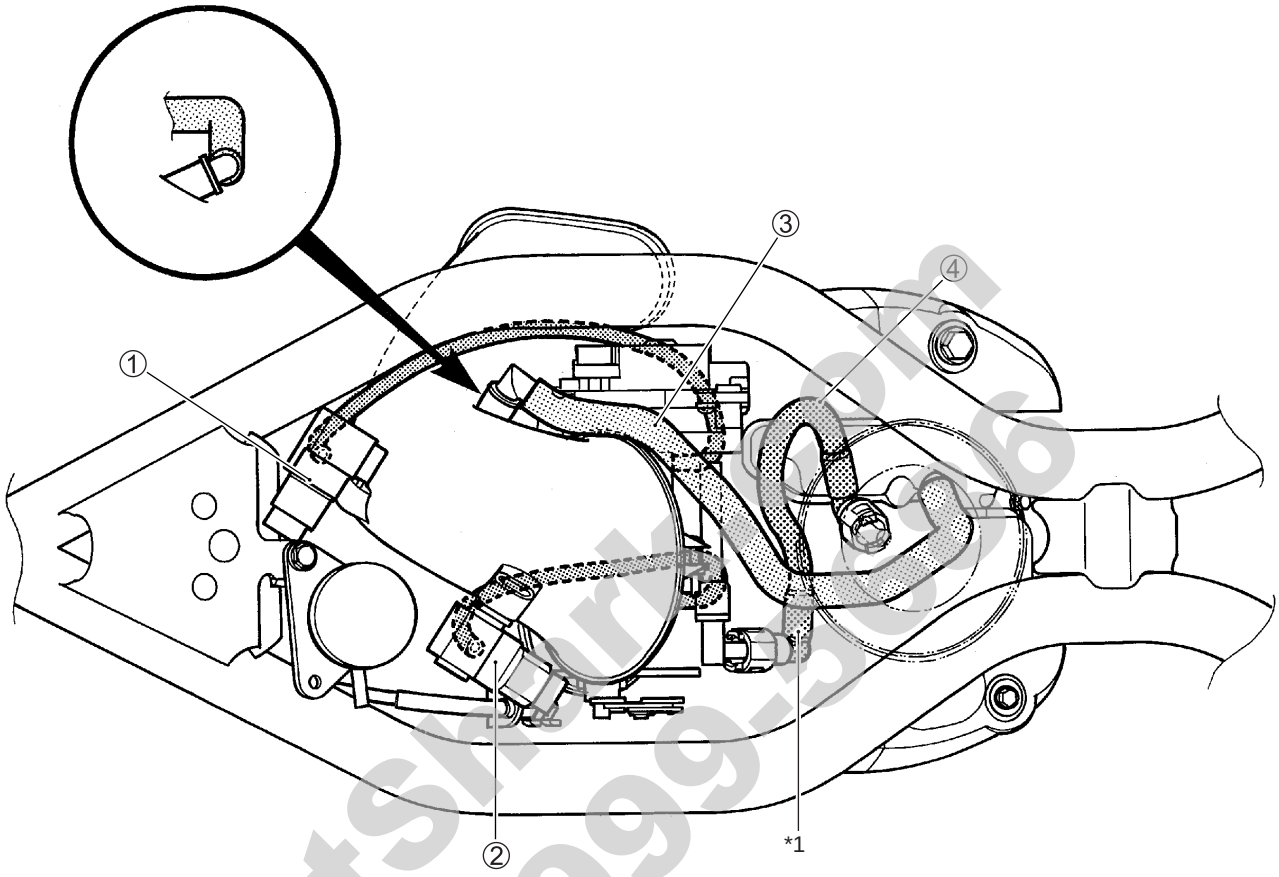
①	PAIR control solenoid valve	*2	Matching mark
②	Throttle body	*3	Do not contact the hose and throttle cable drum.
③	Bolt	*4	The sealant side should face PAIR pipe side.
*1	To air cleaner box.	*5	With the bolt lightly contacted with the PAIR pipe, tighten the bolt.

EVAP CANISTER HOSE ROUTING (Only for E-33)



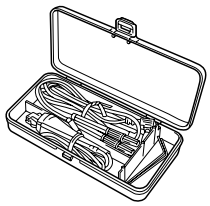
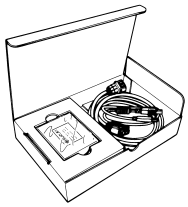
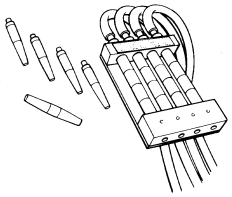
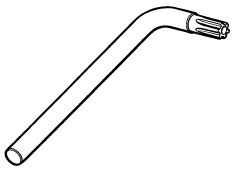
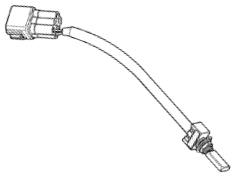
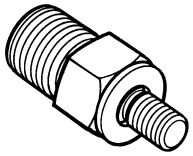
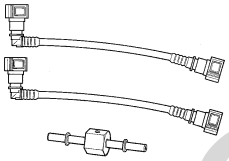
①	Three way joint	⑤	EVAP Canister
②	Wiring harness	*1	Pass through the purge hose over the wiring harness.
③	Frame	*2	White paint mark should face upside.
④	Fuel shut-off valve	*3	To three way joint.

FUEL FEED HOSE ROUTING



①	IAP sensor (Front cylinder)
②	IAP sensor (Rear cylinder)
③	PCV (Breather) hose
④	Fuel feed hose
*1	Match mark (White)

SPECIAL TOOLS

 **09900-25009 Needle pointed probe set**	 **09904-41010 SDS Set**	 **99565-01010-004 CD-ROM Ver.4**	 **09913-13121 Vacuum balancer gauge**	 **09930-11950 Torx wrench**
 **09930-82720 Mode select switch**	 **09940-40211 Fuel pressure gauge adaptor**	 **09940-40220 Fuel pressure gauge hose attachment**		

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

WIRE COLOR

B	: Black	Gr	: Gray	R	: Red
Bl	: Blue	Lbl	: Light blue	W	: White
Br	: Brown	Lg	: Light green	Y	: Yellow
Dg	: Dark green	O	: Orange		
G	: Green	P	: Pink		

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

VL800TK5 ('05-MODEL)

This chapter describes service specifications, service data and servicing procedures which differ from those of the VL800K5 ('05-MODEL).

NOTE:

** Any differences between the VL800K5 ('05-MODEL) and VL800TK5 ('05-MODEL) in specifications and service data are indicated with an asterisk mark (*).*

** Please refer to the chapter 1 through 14 for details which are not given in this chapter.*

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 510 mm (98.8 in)
Overall width	985 mm (38.8 in)
Overall height	1 100 mm (43.3 in)
Wheelbase	1 655 mm (65.2 in)
Ground clearance	140 mm (5.5 in)
Seat height	700 mm (27.6 in)
Dry mass	246 kg (542 lbs)

ENGINE

Type	4-stroke, Liquid-cooled, OHC
Number of cylinders	2
Bore	83 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Fuel system	Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

DRIVE TRAIN

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.690 (71/42)
Secondary reduction ratio	1.000 (30/30)
Gear ratios, Low	2.461 (32/13)
2nd	1.631 (31/19)
3rd	1.227 (27/22)
4th	1.000 (25/25)
Top	0.814 (22/27)
Final reduction ratio	3.503 (17/15 × 34/11)
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	105 mm (4.1 in)
Caster	33° 20'
Trail	141 mm (5.55 in)
Steering angle	38° (right & left)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake
Rear brake	Drum brake
Front tire size	130/90-16 M/C 67H, tube type
Rear tire size	170/80-15 M/C 77H, tube type

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	5° B.T.D.C. at 1 100 r/min
Spark plug	NGK DPR7EA-9 or DENSO X22EPR-U9
Battery	12 V 36 kC (10 Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	30 A
Fuse	15/10/10/10/10/10 A
Headlight	12 V 60/55 W (H4)
Position/Parking light	12 V 5 W..... E-02, 19
Brake light/Taillight	12 V 21/5 W
Front turn signal light	12 V 21 W..... E-02, 19, 24
	12 V 21/5 W..... E-03, 28, 33
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
Fuel indicator light	LED
Oil pressure/Water temperature/FI warning light	LED

CAPACITIES

Fuel tank	15.5 L (4.1/3.4 US/Imp gal)
Engine oil, oil change	3 000 ml (3.2/2.6 US/Imp qt)
with filter change	3 400 ml (3.6/3.0 US/Imp qt)
overhaul	3 700 ml (3.9/3.3 US/Imp qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	—
	EX.	26 (1.02)	—
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	—
	EX.	0.17 – 0.22 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	INNER	—	38.3 (1.51)
	OUTER	—	40.1 (1.58)
Valve spring tension	INNER	64 – 73 N (6.51 – 7.49 kgf, 14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	—
	OUTER	119 – 136 N (12.09 – 13.91 kgf, 26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	Front	IN.	35.95 – 35.99 (1.415 – 1.417)	35.65 (1.404)
		EX.	36.92 – 36.96 (1.454 – 1.455)	36.62 (1.442)
	Rear	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
		EX.	36.52 – 36.62 (1.438 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)			0.150 (0.0059)
Camshaft journal holder I.D.	Rear left side Front right side		20.012 – 20.025 (0.7879 – 0.7884)	—
	Rear right side Front left side		25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Rear left side Front right side		19.959 – 19.980 (0.7858 – 0.7866)	—
	Rear right side Front left side		24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	—			0.10 (0.004)
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	1 300 – 1 700 kPa (13 – 17 kgf/cm², 185 – 242 psi)			1 100 kPa (11 kgf/cm², 156 psi)
Compression pressure difference	—			200 kPa (2 kgf/cm², 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)			0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)			83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.			82.880 (3.2630)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st		Approx. 9.6 (0.38)	7.7 (0.30)
	2nd	R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring to groove clearance	1st		—	0.180 (0.007)
	2nd		—	0.150 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	—
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	—
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	—
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	—
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 pressure (at 60 °C, 140 °F)	350 – 650 kPa (3.5 – 6.5 kgf/cm², 50 – 92 psi) at 3 000 r/min	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.690 (71/42)		—
Secondary reduction ratio		1.133 (17/15)		—
Final reduction ratio		3.090 (34/11)		—
Gear ratios	Low	2.461 (32/13)		—
	2nd	1.631 (31/19)		—
	3rd	1.227 (27/22)		—
	4th	1.000 (25/25)		—
	Top	0.814 (22/27)		—
Shift fork to groove clearance		No.1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No.2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width		No.1	5.50 – 5.60 (0.217 – 0.220)	—
		No.2	4.50 – 4.60 (0.177 – 0.181)	—
Shift fork thickness		No.1	5.30 – 5.40 (0.209 – 0.213)	—
		No.2	4.30 – 4.40 (0.169 – 0.173)	—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		—
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	—
Damper spring free length	—		58.5 (2.30)

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		NOTE
Thermostat valve opening temperature	Approx. 75 °C (167 °F)		—
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		—
ECT sensor 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	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105 °C (221 °F)	—
	ON→OFF	Approx. 100 °C (212 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant capacity	1 500 ml (1.6/1.3 US/Imp qt)		—

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	Approx. 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 SENORS+ SECONDARY THROTTLE VALVE ACTUATOR

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	184 – 276 Ω		
CKP sensor peak voltage	4.0 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.6 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 1.1 kΩ	
	Opened	Approx. 4.3 kΩ	
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.6 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	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		

THROTTLE BODY

ITEM	SPECIFICATION
Bore size	34 mm
I.D. No.	41F1 (For E-33), 41F0 (For the others)
Idle r/min	1 100 ± 100 r/min
Fast idle r/min	2 100 r/min (When cold engine)
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE	
Firing order		1·2			
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		184 – 276 Ω			
CKP sensor peak voltage		4.0 V and more			
Ignition coil resistance		Primary	2.8 – 4.7 Ω	Terminal – Terminal	
		Secondary	24 – 36 kΩ	Plug cap – Terminal	
Ignition coil primary peak voltage		200 V and more		Front	⊕ B/Y ⊖ O/W
				Rear	⊕ W ⊖ O/W
Generator coil resistance		0.2 – 1.5 Ω			
Generator no-load voltage (when engine is cold)		70 V (AC) and more at 5 000 r/min		Y – Y	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min		Y – Y	
Generator maximum output		375 W at 5 000 r/min			
Starter relay resistance		3 – 7 Ω			
GP switch voltage		0.6 V and more (From 1st to top without neutral)			
Battery	Type designation	FTX12-BS			
	Capacity	12 V 36 kC (10 Ah)/10 HR			
Fuse size	Headlight	10 A			
	Signal	10 A			
	Ignition	15 A			
	Meter	10 A			
	Main	30 A			
	Power source	10 A			

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	Others
Headlight	HI	60 W	←	←
	LO	55 W	←	←
Position/Parking light				4 W
Brake light/Taillight		21/5 W	←	←
Turn signal light		21/5 W (Front), 21 W (Rear)	21 W	←
Speedometer light		LED	←	←
Engine coolant temp. warning light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure indicator light		LED	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal free travel		20 – 30 (0.8 – 1.2)	—
Rear brake pedal height		75 – 85 (3.0 – 3.3)	—
Brake drum I.D.	Rear	—	180.7 (7.11)
Brake disc thickness	Front	4.8 – 5.2 (0.19 – 0.21)	4.5 (0.18)
Brake disc runout		—	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	—
Brake fluid type		DOT 4	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel rim size	Front	J16 M/C × MT 3.00	—
	Rear	J15 M/C × MT 4.00	—

TIRE

ITEM	STANDARD		LIMIT
Cold inflation tire pressure (Solo riding)	Front	* 225 kPa (2.25 kgf/cm², 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Cold inflation tire pressure (Dual riding)	Front	* 225 kPa (2.25 kgf/cm², 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Tire size	Front	130/90 – 16 M/C 67H	—
	Rear	170/80 – 15 M/C 77H	—
Tire type	Front	* IRC GS-23F RW	—
	Rear	* IRC GS-23R RW	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT
Front fork stroke	140 (5.51)	—
Front fork spring free length	551.7 (21.73)	540.6 (21.29)
Front fork oil level (without spring)	177 (6.96)	—
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	—
Front fork oil capacity (each leg)	412 ml (24.0/25.0 US/Imp oz)	—
Front fork inner tube outside diam.	41 (1.61)	—
Front fork spring adjuster	—	—
Rear shock absorber spring adjuster	(4)	—
Rear wheel travel	105 (4.13)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) 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.		Others
Fuel tank capacity	Including reserve	17.0 L (4.5/3.7 US/Imp gal)	
	Fuel level indicator light lighting	1.5 L (0.4/0.3 US/Imp gal)	
Engine oil type	* SAE 10W-40, API, SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 400 ml (3.6/3.0 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)		

VL800/TK6 ('06-MODEL)

This chapter describes service specifications, service data and servicing procedures which differ from those of the VL800TK5 ('05-MODEL).
*NOTE:*Any differences between the VL800TK6 ('06-MODEL) and VL800TK5 ('05-MODEL) in specifications and service data are indicated with an asterisk mark (*).*
**Please refer to the chapter 1 through 15 for details which are not given in this chapter.*

CONTENTS

16

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 510 mm (98.8 in)
Overall width	985 mm (38.8 in)
Overall height	1 100 mm (43.3 in)
Wheelbase	1 655 mm (65.2 in)
Ground clearance	140 mm (5.5 in)
Seat height	700 mm (27.6 in)
Dry mass	246 kg (542 lbs)

ENGINE

Type	4-stroke, Liquid-cooled, OHC
Number of cylinders	2
Bore	83 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Fuel system	Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

DRIVE TRAIN

Clutch	Wet multi-plate type
Transmission	5-speed constant mesh
Gearshift pattern	1-down, 4-up
Primary reduction ratio	1.690 (71/42)
Secondary reduction ratio	1.000 (30/30)
Gear ratios, Low	2.461 (32/13)
2nd	1.631 (31/19)
3rd	1.227 (27/22)
4th	1.000 (25/25)
Top	0.814 (22/27)
Final reduction ratio	3.503 (17/15 × 34/11)
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	105 mm (4.1 in)
Caster	33° 20'
Trail	141 mm (5.55 in)
Steering angle	38° (right & left)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake
Rear brake	Drum brake
Front tire size	130/90-16 M/C 67H, tube type
Rear tire size	170/80-15 M/C 77H, tube type

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	5° B.T.D.C. at 1 100 r/min
Spark plug	NGK DPR7EA-9 or DENSO X22EPR-U9
Battery	12V 36 kC (10Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	30 A
Fuse	15/10/10/10/10/10 A
Headlight	12 V 60/55 W (H4)
Position/Parking light	12 V 5 W E-02, 19
Brake light/Taillight	12 V 21/5 W
Front turn signal light	12 V 21 W E-02, 19, 24
	12 V 21/5 W ...E-03, 28, 33
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
Fuel indicator light	LED
Oil pressure/Water temperature/FI warning light	LED

CAPACITIES

Fuel tank	15.5 L (4.1/3.4 US/Imp gal)
Engine oil, oil change	3 000 ml (3.2/2.6 US/Imp qt)
with filter change	3 400 ml (3.6/3.0 US/Imp qt)
overhaul	3 700 ml (3.9/3.3 US/Imp qt)
Final gear oil	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)

SERVICE DATA
VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	—
	EX.	26 (1.02)	—
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	—
	EX.	0.17 – 0.22 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	INNER	—	38.3 (1.51)
	OUTER	—	40.1 (1.58)
Valve spring tension	INNER	64 – 73 N (6.51 – 7.49 kgf, 14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	—
	OUTER	119 – 136 N (12.09 – 13.91 kgf, 26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	Front	IN.	35.95 – 35.99 (1.415 – 1.417)	35.65 (1.404)
		EX.	36.92 – 36.96 (1.454 – 1.455)	36.62 (1.442)
	Rear	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
		EX.	36.52 – 36.62 (1.438 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)			0.150 (0.0059)
Camshaft journal holder I.D.	Rear left side Front right side		20.012 – 20.025 (0.7879 – 0.7884)	—
	Rear right side Front left side		25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Rear left side Front right side		19.959 – 19.980 (0.7858 – 0.7866)	—
	Rear right side Front left side		24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	—			0.10 (0.004)
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	1 300 – 1 700 kPa (13 – 17 kgf/cm², 185 – 242 psi)			1 100 kPa (11 kgf/cm², 156 psi)
Compression pressure difference	—			200 kPa (2 kgf/cm², 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)			0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)			83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.			82.880 (3.2630)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st		Approx. 9.6 (0.38)	7.7 (0.30)
	2nd	R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring to groove clearance	1st		—	0.180 (0.007)
	2nd		—	0.150 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	—
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	—
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	—
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	—
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 pressure (at 60 °C, 140 °F)	350 – 650 kPa (3.5 – 6.5 kgf/cm², 50 – 92 psi) at 3 000 r/min	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.690 (71/42)		—
Secondary reduction ratio		1.133 (17/15)		—
Final reduction ratio		3.090 (34/11)		—
Gear ratios	Low	2.461 (32/13)		—
	2nd	1.631 (31/19)		—
	3rd	1.227 (27/22)		—
	4th	1.000 (25/25)		—
	Top	0.814 (22/27)		—
Shift fork to groove clearance		No. 1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No. 2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width		No. 1	5.50 – 5.60 (0.217 – 0.220)	—
		No. 2	4.50 – 4.60 (0.177 – 0.181)	—
Shift fork thickness		No. 1	5.30 – 5.40 (0.209 – 0.213)	—
		No. 2	4.30 – 4.40 (0.169 – 0.173)	—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		—
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	—
Damper spring free length	—		58.5 (2.30)

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		NOTE
Thermostat valve opening temperature	Approx. 75 °C (167 °F)		—
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		—
ECT sensor 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	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105 °C (221 °F)	—
	ON→OFF	Approx. 100 °C (212 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant capacity	1 500 ml (1.6/1.3 US/lmp qt)		—

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	Approx. 168 ml (5.7/5.9 US/lmp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm², 43 psi)	

FI SENORS+ SECONDARY THROTTLE VALVE ACTUATOR

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	184 – 276 Ω		
CKP sensor peak voltage	4.0 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.6 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 1.1 kΩ	
	Opened	Approx. 4.3 kΩ	
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.6 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	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		

THROTTLE BODY

ITEM	SPECIFICATION
Bore size	34 mm
I.D. No.	41F1 (For E-33), 41F0 (For the others)
Idle r/min	1 100 ± 100 r/min
Fast idle r/min	2 100 r/min (When cold engine)
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE	
Firing order		1·2			
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		184 – 276 Ω			
CKP sensor peak voltage		4.0 V and more			
Ignition coil resistance		Primary	2.8 – 4.7 Ω	Terminal – Terminal	
		Secondary	24 – 36 kΩ	Plug cap – Terminal	
Ignition coil primary peak voltage		200 V and more		Front	⊕ B/Y ⊖ O/W
				Rear	⊕ W ⊖ O/W
Generator coil resistance		0.2 – 1.5 Ω			
Generator no-load voltage (when engine is cold)		70 V (AC) and more at 5 000 r/min		Y – Y	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min		Y – Y	
Generator maximum output		375 W at 5 000 r/min			
Starter relay resistance		3 – 7 Ω			
GP switch voltage		0.6 V and more (From 1st to top without neutral)			
Battery	Type designation	FTX12-BS			
	Capacity	12 V 36 kC (10 Ah)/10 HR			
Fuse size	Headlight	10 A			
	Signal	10 A			
	Ignition	15 A			
	Meter	10 A			
	Main	30 A			
	Power source	10 A			

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	Others
Headlight	HI	60 W	←	←
	LO	55 W	←	←
Position/Parking light				4 W
Brake light/Taillight		21/5 W	←	←
Turn signal light		21/5 W (Front), 21 W (Rear)	21 W	←
Speedometer light		LED	←	←
Engine coolant temp. warning light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure indicator light		LED	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal free travel		20 – 30 (0.8 – 1.2)	—
Rear brake pedal height		75 – 85 (3.0 – 3.3)	—
Brake drum I.D.	Rear	—	180.7 (7.11)
Brake disc thickness	Front	4.8 – 5.2 (0.19 – 0.21)	4.5 (0.18)
Brake disc runout		—	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	—
Brake fluid type		DOT 4	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel rim size	Front	J16 M/C × MT 3.00	—
	Rear	J15 M/C × MT 4.00	—

TIRE

ITEM	STANDARD			LIMIT
Cold inflation tire pressure (Solo riding)	Front	VL800	200 kPa (2.00 kgf/cm², 29 psi)	—
		VL800T	225 kPa (2.25 kgf/cm², 33 psi)	
	Rear	250 kPa (2.50 kgf/cm², 36 psi)		—
Cold inflation tire pressure (Dual riding)	Front	VL800	200 kPa (2.00 kgf/cm², 29 psi)	—
		VL800T	225 kPa (2.25 kgf/cm², 33 psi)	
	Rear	250 kPa (2.50 kgf/cm², 36 psi)		—
Tire size	Front	130/90 – 16 M/C 67H		—
	Rear	170/80 – 15 M/C 77H		—
Tire type	Front	VL800	IRC GS-23F	—
		VL800T	IRC GS-23F RW	
	Rear	VL800	IRC GS-23R	—
		VL800T	IRC GS-23R RW	
Tire tread depth	Front	—		1.6 (0.06)
	Rear	—		2.0 (0.08)

SUSPENSION

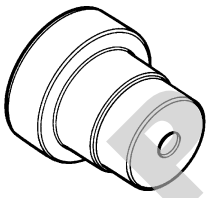
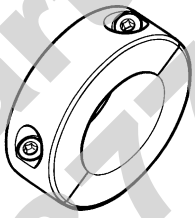
Unit: mm (in)

ITEM	STANDARD	LIMIT
Front fork stroke	140 (5.51)	—
Front fork spring free length	551.7 (21.73)	540.6 (21.29)
Front fork oil level (without spring)	177 (6.96)	—
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	—
Front fork oil capacity (each leg)	412 ml (24.0/25.0 US/Imp oz)	—
Front fork inner tube outside diam.	41 (1.61)	—
Front fork spring adjuster	—	—
Rear shock absorber spring adjuster	(4)	—
Rear wheel travel	105 (4.13)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) 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.		Others
Fuel tank capacity	Including reserve	17.0 L (4.5/3.7 US/Imp gal)	
	Fuel level indicator light lighting	1.5 L (0.4/0.3 US/Imp gal)	
Engine oil type	SAE 10W-40, API, SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 400 ml (3.6/3.0 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)		

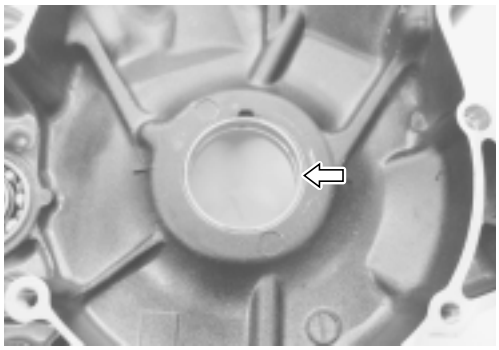
SPECIAL TOOLS

	
09913-60230 **Journal bearing remover/installer**	**09913-60241** **Journal bearing remover/installer**

CONROD/CRANKSHAFT

CRANKCASE/CRANKSHAFT BEARING INSPECTION

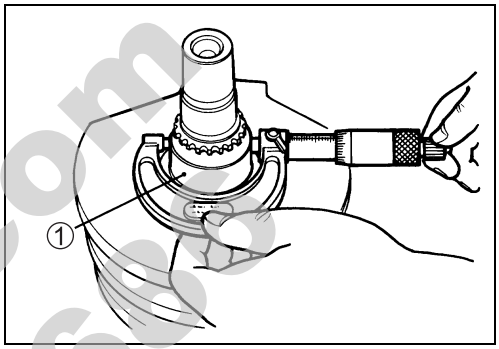
- Inspect the crankshaft and crankshaft journal bearings for any damage. If any, replace them with a specified set of bearings.



- Measure the crankshaft journal O.D. ① by using the special tool.

DATA Crankshaft journal O.D. ①
Standard: 47.965 – 47.980 mm (1.8884 – 1.8890 in)

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

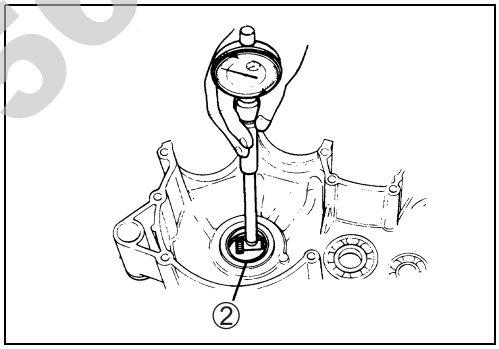


- Measure the crankshaft journal bearing I.D. ② by using the special tool.

DATA Crankshaft journal bearing I.D. ②
Standard: 48.000 – 48.015 mm (1.8898 – 1.8904 in)

TOOL 09900-20508: Cylinder gauge set

- If each crankshaft journal bearing I.D. is not within the standard range, replace them with new ones.

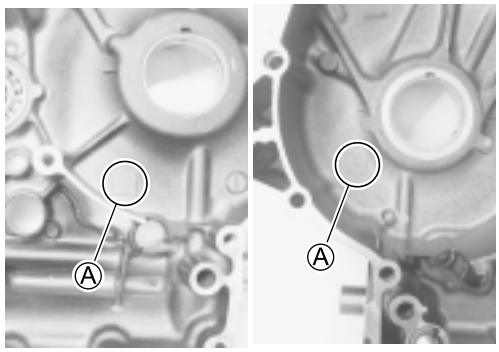


CRANKCASE-CRANKSHAFT BEARING SELECTION

Select the specified bearings from the crankcase bore I.D. code. The crankcase bore I.D. code Ⓐ "A", "B" or "C", is stamped on the inside of each crankcase half.

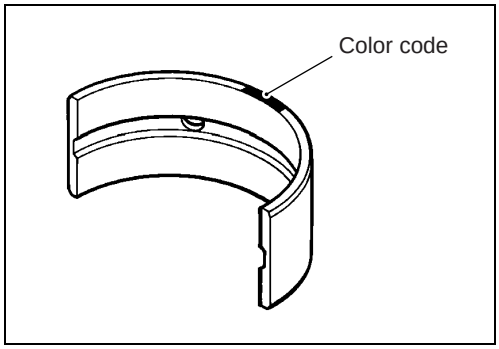
Bearing selection table

I.D. code Ⓐ	I.D. specification	Bearing
A	52.000 – 52.006 mm (2.0472 – 2.0475 in)	Green
B	52.006 – 52.012 mm (2.0475 – 2.0477 in)	Black
C	52.012 – 52.018 mm (2.0477 – 2.0479 in)	Brown



Bearing thickness

Color (Part No.)	Thickness
Green (12229-39G00-0A0)	2.006 – 2.009 mm (0.0789 – 0.0790 in)
Black (12229-39G00-0B0)	2.009 – 2.012 mm (0.0790 – 0.0792 in)
Brown (12229-39G00-0C0)	2.012 – 2.015 mm (0.0792 – 0.0793 in)



CAUTION

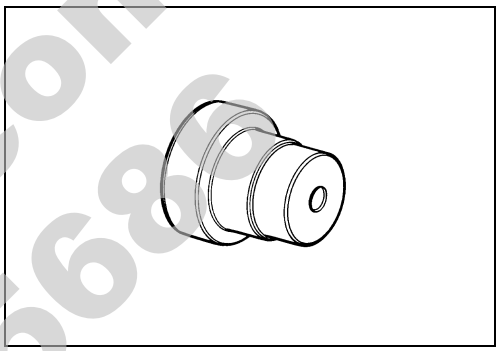
Bearing must be replaced as a set.

CRANKSHAFT JOURNAL BEARING REPLACEMENT

Use the special tool to replace the crankshaft journal bearings. The replacement procedure is as follows:

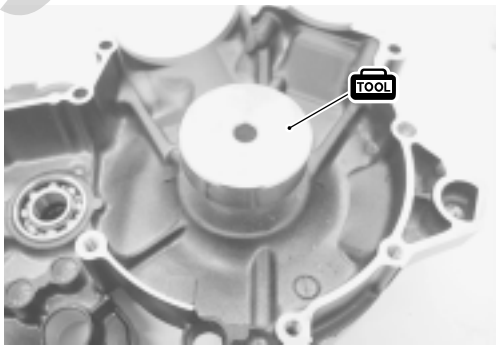
TOOL 09913-60230: Journal bearing remover/installer

- Set the special tool as shown to remove the crankshaft journal bearings.

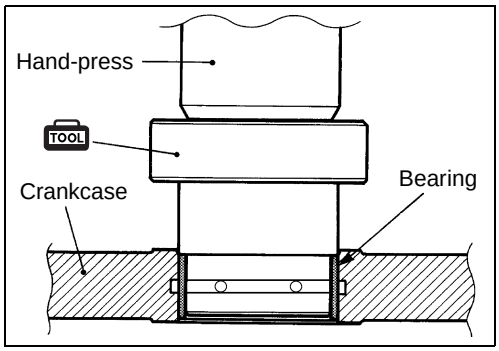


NOTE:

Remove the crankshaft journal bearings in only one direction, from inside to outside of each crankcase half.



- Gradually press out the bearing with the special tool by using the hand-press.

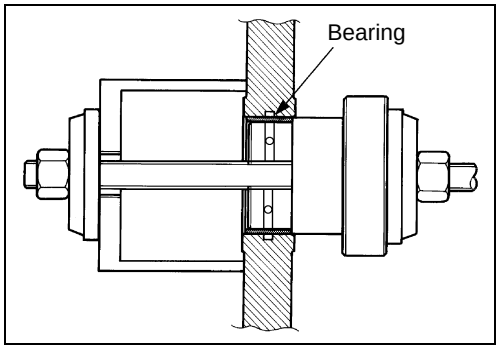


CAUTION

The removed bearings must be replaced with new ones.

NOTE:
Using the hand-press is recommended to remove the crankshaft journal bearings. However, the crankshaft journal bearings can be removed by using with the following special tools.

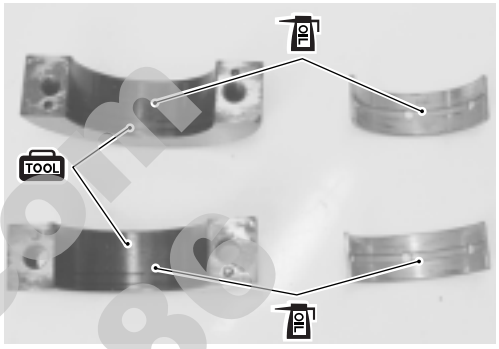
09924-84510: Bearing installer set
09924-74570: Final drive gear bearing remover/installer



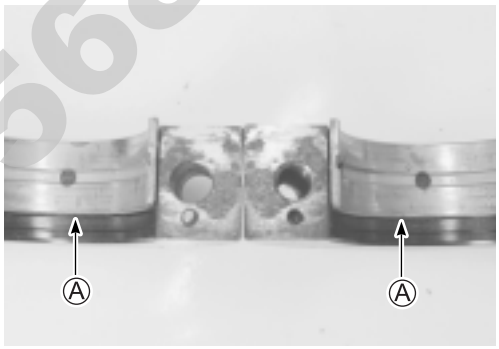
- Set the specified crankshaft journal bearings to the special tool.

CAUTION

*** Before setting the bearing, apply enough engine oil to the special tool and bearings.**
*** When setting the bearing, align the bearing side with the engraved line Ⓐ and also the bearing edge with the mating surface of the special tool.**



09913-60241: Journal bearing remover/installer

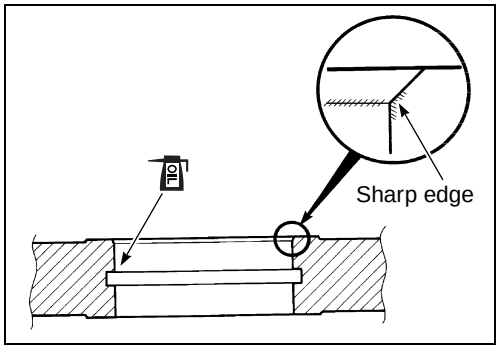


- Tighten the special tool bolt to the specified torque.

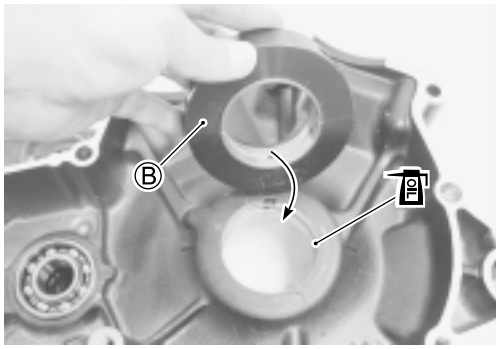
Special tool bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

CAUTION

Before installing the bearings, lightly shave off the sharp edge part of the crankcase chamfer by using an oilstone and wash the crankcase bore with enough engine oil.



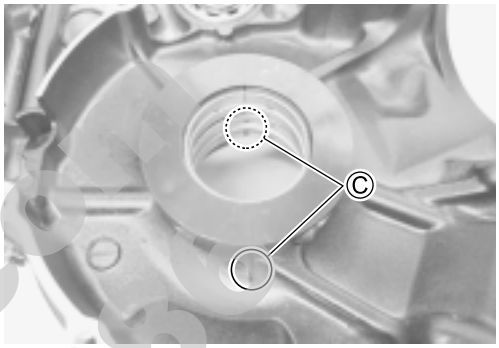
- Set the bearings installed in the special tool to the crankcase half as shown.



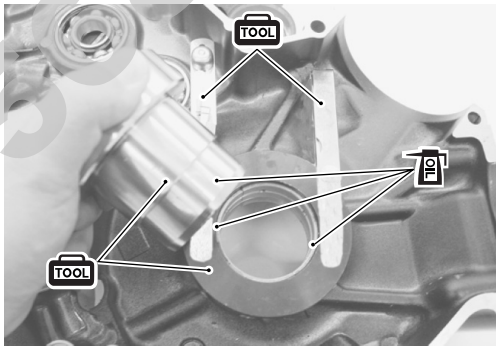
CAUTION

*** Be sure the bearing protruded side Ⓑ faces the crankcase bore.**
*** Align the special tool mating surface with the line mark Ⓒ on the crankcase.**

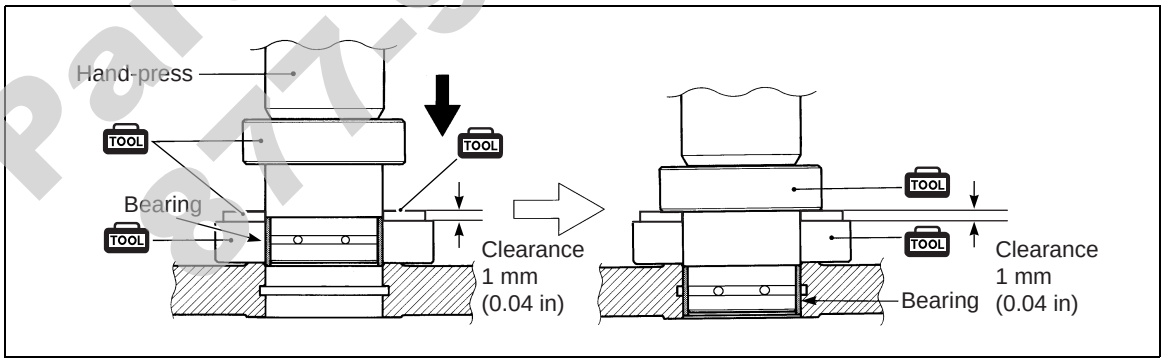
NOTE:
The upper and lower bearings are same.



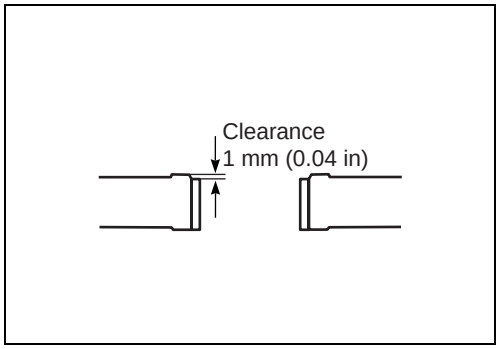
- Insert the thickness gauge ① between the special tool ② and ③ for 1 mm (0.04 in) clearance.
- Apply enough engine oil to the special tool and the bearings and then set the special tool carefully.
- Gradually press in the bearing into the main journal bore by using the hand-press until the special tool ② stops the special tool ③.



TOOL 09913-60230: Journal bearing remover/installer
09900-20803: Thickness gauge

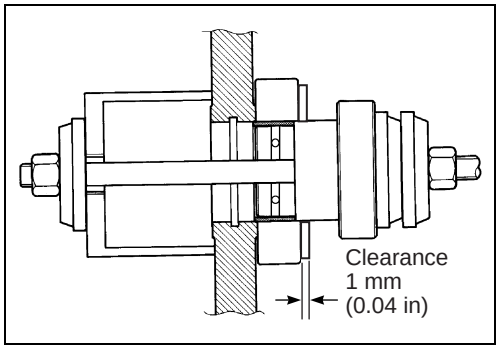


- Measure the clearance from case surface to bearing.

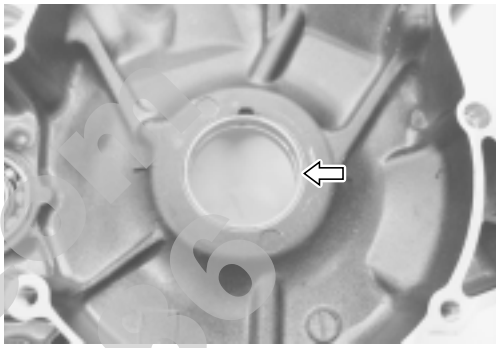


NOTE:
Using the hand-press is recommended to install the crankshaft journal bearings. However, the crankshaft journal bearings can be installed by using the following special tools.

09924-84510: Bearing installer set
09924-74570: Final drive gear bearing remover/installer



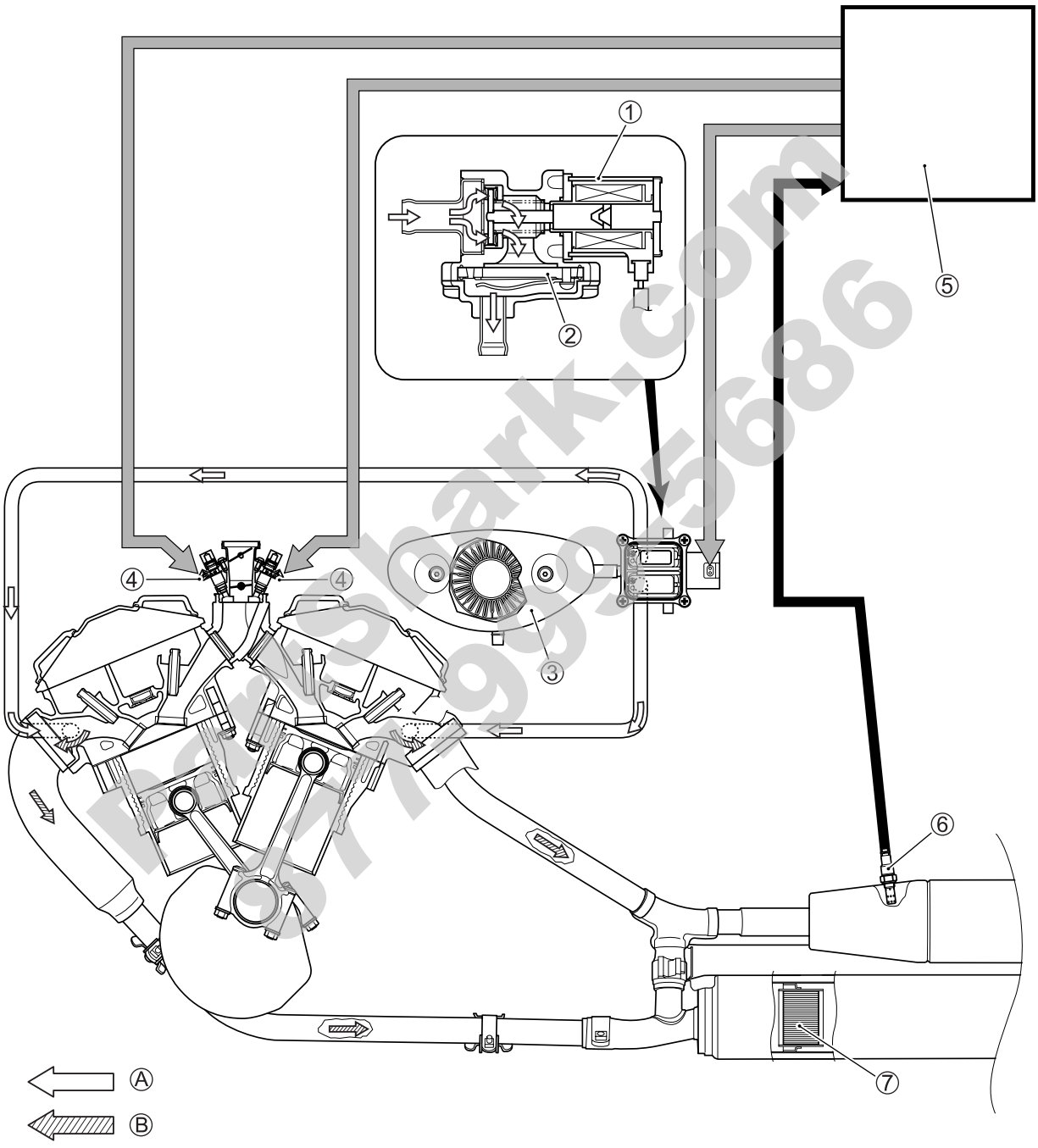
- After installing the bearings, check the bearing surface for any scratch or damage.



EMISSION CONTROL SYSTEMS

EXHAUST EMISSION CONTROL SYSTEM (PAIR SYSTEM)

The exhaust emission control system is composed of the PAIR system and THREE-WAY CATALYST system. The fresh air is drawn into the exhaust port with the PAIR control solenoid valve and PAIR reed valve. The PAIR control solenoid valve is operated by the ECM, and the fresh air flow is controlled according to the TPS, ECTS, IATS, IAPS and CKPS.



①	PAIR control solenoid valve	⑥	HO2 sensor (E-02, 19, 24)
②	PAIR reed valve	⑦	Threeway catalyst (E-02, 19, 24, 33) * Addition to (E-03, 28)
③	Air cleaner box		
④	Fuel injector	Ⓐ	FRESH AIR
⑤	ECM	Ⓑ	EXHAUST GAS

VL800/TK7 ('07-MODEL)

This chapter describes service specifications, service data and servicing procedures which differ from those of the VL800TK6 ('06-MODEL).
*NOTE:*Any differences between the VL800TK6 ('06-MODEL) and VL800/TK7 ('07-MODEL) in specifications and service data are indicated with an asterisk mark (*).*
**Please refer to the chapter 1 through 16 for details which are not given in this chapter.*

CONTENTS

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length		2 510 mm (98.8 in)
Overall width	*	970 mm (38.2 in)
Overall height	*	1 105 mm (43.5 in)
Wheelbase		1 655 mm (65.2 in)
Ground clearance		140 mm (5.5 in)
Seat height		700 mm (27.6 in)
Dry mass		246 kg (542 lbs)

ENGINE

Type	4-stroke, Liquid-cooled, OHC
Number of cylinders	2
Bore	83 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Fuel system	Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

DRIVE TRAIN

Clutch		Wet multi-plate type
Transmission		5-speed constant mesh
Gearshift pattern		1-down, 4-up
Primary reduction ratio		1.690 (71/42)
Secondary reduction ratio		1.000 (30/30)
Gear ratios,	Low	2.461 (32/13)
	2nd	1.631 (31/19)
	3rd	1.227 (27/22)
	4th	1.000 (25/25)
	Top	0.814 (22/27)
Final reduction ratio		3.503 (17/15 × 34/11)
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	105 mm (4.1 in)
Caster	33° 20'
Trail	141 mm (5.55 in)
Steering angle	38° (right & left)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake
Rear brake	Drum brake
Front tire size	130/90-16 M/C 67H, tube type
Rear tire size	170/80-15 M/C 77H, tube type

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	5° B.T.D.C. at 1 100 r/min
Spark plug	NGK DPR7EA-9 or DENSO X22EPR-U9
Battery	12V 36 kC (10Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	30 A
Fuse	15/10/10/10/10/10 A
Headlight	12 V 60/55 W (H4)
Position/Parking light	12 V 5 W E-02, 19
Brake light/Taillight	12 V 21/5 W
Front turn signal light	12 V 21 W E-02, 19, 24
	12 V 21/5 W ...E-03, 28, 33
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/Water temperatur	LED
FI warning light	LED

CAPACITIES

Fuel tank		15.5 L (4.1/3.4 US/Imp gal)
Engine oil,	oil change	3 000 ml (3.2/2.6 US/Imp qt)
	with filter change	3 400 ml (3.6/3.0 US/Imp qt)
	overhaul	3 700 ml (3.9/3.3 US/Imp qt)
Final gear oil		200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)

SERVICE DATA
VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	—
	EX.	26 (1.02)	—
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	—
	EX.	0.17 – 0.22 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	INNER	—	38.3 (1.51)
	OUTER	—	40.1 (1.58)
Valve spring tension	INNER	64 – 73 N (6.51 – 7.49 kgf, 14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	—
	OUTER	119 – 136 N (12.09 – 13.91 kgf, 26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	Front	IN.	35.95 – 35.99 (1.415 – 1.417)	35.65 (1.404)
		EX.	36.92 – 36.96 (1.454 – 1.455)	36.62 (1.442)
	Rear	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
		EX.	36.52 – 36.62 (1.438 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)			0.150 (0.0059)
Camshaft journal holder I.D.	Rear left side Front right side		20.012 – 20.025 (0.7879 – 0.7884)	—
	Rear right side Front left side		25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Rear left side Front right side		19.959 – 19.980 (0.7858 – 0.7866)	—
	Rear right side Front left side		24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	—			0.10 (0.004)
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	1 300 – 1 700 kPa (13 – 17 kgf/cm², 185 – 242 psi)			1 100 kPa (11 kgf/cm², 156 psi)
Compression pressure difference	—			200 kPa (2 kgf/cm², 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)			0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)			83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.			82.880 (3.2630)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st		Approx. 9.6 (0.38)	7.7 (0.30)
	2nd	R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring to groove clearance	1st		—	0.180 (0.007)
	2nd		—	0.150 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	—
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	—
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	—
Crankshaft journal oil clearance	0.020 – 0.050 (0.0008 – 0.0020)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	—
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 pressure (at 60 °C, 140 °F)	350 – 650 kPa (3.5 – 6.5 kgf/cm², 50 – 92 psi) at 3 000 r/min	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.690 (71/42)		—
Secondary reduction ratio		1.133 (17/15)		—
Final reduction ratio		3.090 (34/11)		—
Gear ratios	Low	2.461 (32/13)		—
	2nd	1.631 (31/19)		—
	3rd	1.227 (27/22)		—
	4th	1.000 (25/25)		—
	Top	0.814 (22/27)		—
Shift fork to groove clearance		No. 1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No. 2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width		No. 1	5.50 – 5.60 (0.217 – 0.220)	—
		No. 2	4.50 – 4.60 (0.177 – 0.181)	—
Shift fork thickness		No. 1	5.30 – 5.40 (0.209 – 0.213)	—
		No. 2	4.30 – 4.40 (0.169 – 0.173)	—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		—
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	—
Damper spring free length	—		58.5 (2.30)

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		NOTE
Thermostat valve opening temperature	Approx. 75 °C (167 °F)		—
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		—
ECT sensor 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	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105 °C (221 °F)	—
	ON→OFF	Approx. 100 °C (212 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant capacity	1 500 ml (1.6/1.3 US/lmp qt)		—

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	Approx. 168 ml (5.7/5.9 US/lmp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm², 43 psi)	

FI SENORS+ SECONDARY THROTTLE VALVE ACTUATOR

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	184 – 276 Ω		
CKP sensor peak voltage	4.0 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.6 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 1.1 kΩ	
	Opened	Approx. 4.3 kΩ	
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.6 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	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		

THROTTLE BODY

ITEM	SPECIFICATION
Bore size	34 mm
I.D. No.	41F1 (For E-33), 41F0 (For the others)
Idle r/min	1 100 ± 100 r/min
Fast idle r/min	2 100 r/min (When cold engine)
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE	
Firing order		1·2			
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		184 – 276 Ω			
CKP sensor peak voltage		4.0 V and more			
Ignition coil resistance		Primary	2.8 – 4.7 Ω	Terminal – Terminal	
		Secondary	24 – 36 kΩ	Plug cap – Terminal	
Ignition coil primary peak voltage		200 V and more		Front	⊕ B/Y ⊖ O/W
				Rear	⊕ W ⊖ O/W
Generator coil resistance		0.2 – 1.5 Ω			
Generator no-load voltage (when engine is cold)		70 V (AC) and more at 5 000 r/min		Y – Y	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min		Y – Y	
Generator maximum output		375 W at 5 000 r/min			
Starter relay resistance		3 – 7 Ω			
GP switch voltage		0.6 V and more (From 1st to top without neutral)			
Battery	Type designation	FTX12-BS			
	Capacity	12 V 36 kC (10 Ah)/10 HR			
Fuse size	Headlight	10 A			
	Signal	10 A			
	Ignition	15 A			
	Meter	10 A			
	Main	30 A			
	Power source	10 A			

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	Others
Headlight	HI	60 W	←	←
	LO	55 W	←	←
Position/Parking light				4 W
Brake light/Taillight		21/5 W	←	←
Turn signal light		21/5 W (Front), 21 W (Rear)	21 W	←
Speedometer light		LED	←	←
Engine coolant temp. warning light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure indicator light		LED	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal free travel		20 – 30 (0.8 – 1.2)	—
Rear brake pedal height		75 – 85 (3.0 – 3.3)	—
Brake drum I.D.	Rear	—	180.7 (7.11)
Brake disc thickness	Front	4.8 – 5.2 (0.19 – 0.21)	4.5 (0.18)
Brake disc runout		—	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	—
Brake fluid type		DOT 4	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel rim size	Front	J16 M/C × MT 3.00	—
	Rear	J15 M/C × MT 4.00	—

TIRE

ITEM	STANDARD			LIMIT
Cold inflation tire pressure (Solo riding)	Front	VL800	200 kPa (2.00 kgf/cm², 29 psi)	—
		VL800T	225 kPa (2.25 kgf/cm², 33 psi)	
	Rear	250 kPa (2.50 kgf/cm², 36 psi)		—
Cold inflation tire pressure (Dual riding)	Front	VL800	200 kPa (2.00 kgf/cm², 29 psi)	—
		VL800T	225 kPa (2.25 kgf/cm², 33 psi)	
	Rear	250 kPa (2.50 kgf/cm², 36 psi)		—
Tire size	Front	130/90 – 16 M/C 67H		—
	Rear	170/80 – 15 M/C 77H		—
Tire type	Front	VL800	IRC GS-23F	—
		VL800T	IRC GS-23F RW	
	Rear	VL800	IRC GS-23R	—
		VL800T	IRC GS-23R RW	
Tire tread depth	Front	—		1.6 (0.06)
	Rear	—		2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT
Front fork stroke	140 (5.51)	—
Front fork spring free length	551.7 (21.73)	540.6 (21.29)
Front fork oil level (without spring)	177 (6.96)	—
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	—
Front fork oil capacity (each leg)	412 ml (24.0/25.0 US/Imp oz)	—
Front fork inner tube outside diam.	41 (1.61)	—
Front fork spring adjuster	—	—
Rear shock absorber spring adjuster	(4)	—
Rear wheel travel	105 (4.13)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

FUEL + OIL

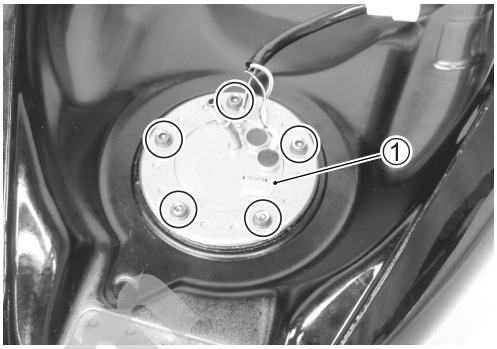
ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) or higher rated by the Research Method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		Others
Fuel tank capacity	Including reserve	17.0 L (4.5/3.7 US/Imp gal)	
	Fuel level indicator light lighting	1.5 L (0.4/0.3 US/Imp gal)	
Engine oil type	SAE 10W-40, API, SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 400 ml (3.6/3.0 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)		

FUEL PUMP AND FUEL LEVEL GAUGE REMOVAL

REMOVAL

• Remove the fuel tank. (☞VL800K5-93)

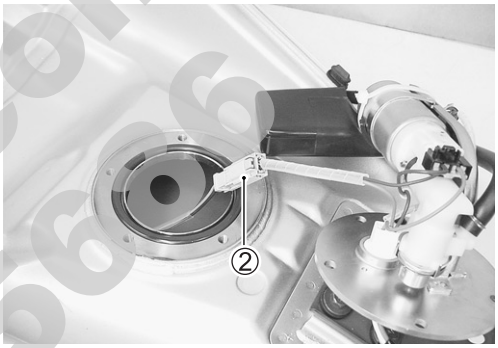
• Remove the fuel pump assembly ① mounting bolts diagonally.



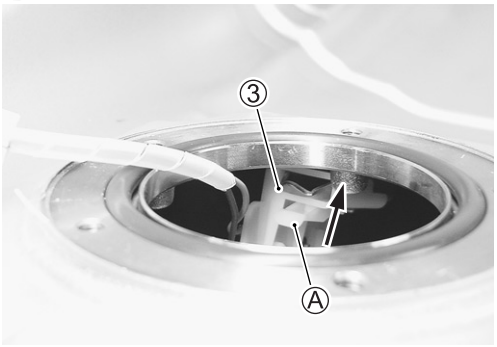
⚠ WARNING

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

• Disconnect the fuel gauge lead wire coupler ② before remove the fuel pump assembly.

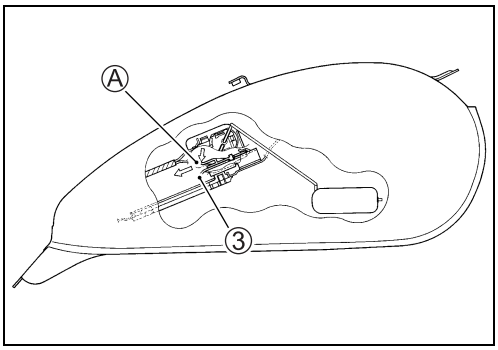


• Remove the fuel level gauge ③ from the fuel tank by pushing the pawl end Ⓐ.



CAUTION

Do not pull the lead wire when removing the fuel level gauge.



FUEL LEVEL GAUGE INSPECTION

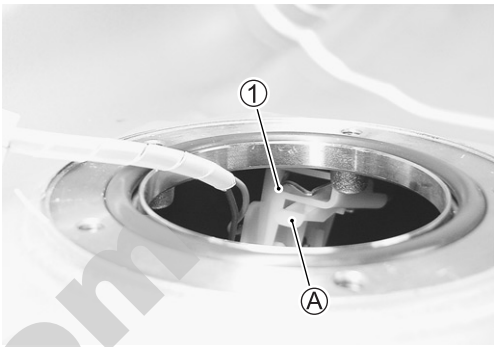
(☞VL800K7-14)

FUEL PUMP AND FUEL LEVEL GAUGE INSTALLATION

Install the fuel pump and fuel level gauge in the reverse order of removal and disassembly. Pay attention to the following points:

- Install the fuel level gauge ① into the fuel tank.

NOTE:
Push the lock portion Ⓐ fully until the clicking sound heard.



- Install a new O-ring and apply SUZUKI SUPER GREASE "A" to it.

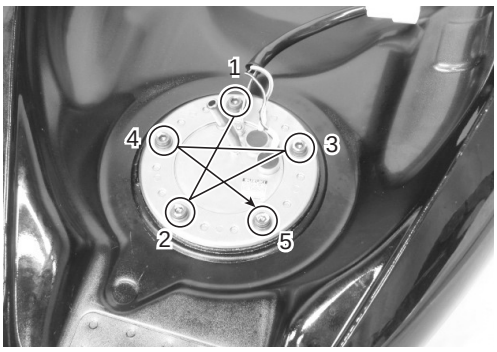
99000-25010: SUZUKI SUPER GREASE "A" (or equivalent grease)

⚠ WARNING

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

- When installing the fuel pump assembly, first tighten all the fuel pump 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, 7.0 lb-ft)

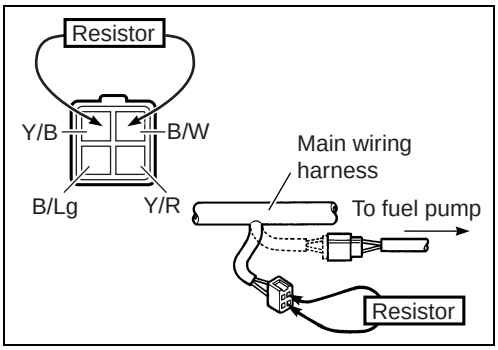


NOTE:
Apply a small quantity of the THREAD LOCK to the thread portion of fuel pump mounting bolt.

1342 99000-32050: THREAD LOCK "1342"

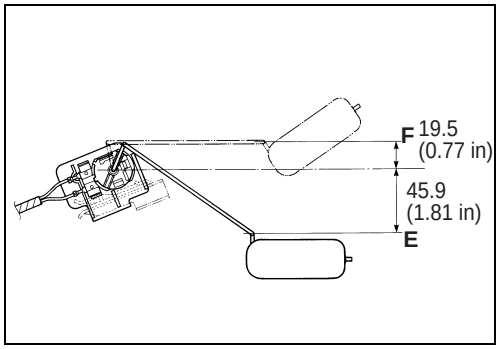
FUEL LEVEL METER INSPECTION

- Remove the fuel tank. (☞VL800K5-93)
- Connect the speedometer.
- Connect each resistor between the Yellow/Black and Black/White lead wire at the wire harness.
- Turn the ignition switch "ON" position and wait for approx, 13 seconds.
- Check the display of fuel meter as shown below. If any abnormality is found, replace the speedometer with a new one.



Resistance	Less than 10 Ω	25 – 41 Ω	60 – 81 Ω	107 – 136 Ω	172 – 216 Ω	More than 216 Ω
Fuel level meter	■■■■■	■■■■□	■■■□□	■■□□□	■□□□□	Flicker □□□□
Thermistor	OFF	OFF	OFF	OFF	OFF	ON

FUEL LEVEL GAUGE INSPECTION



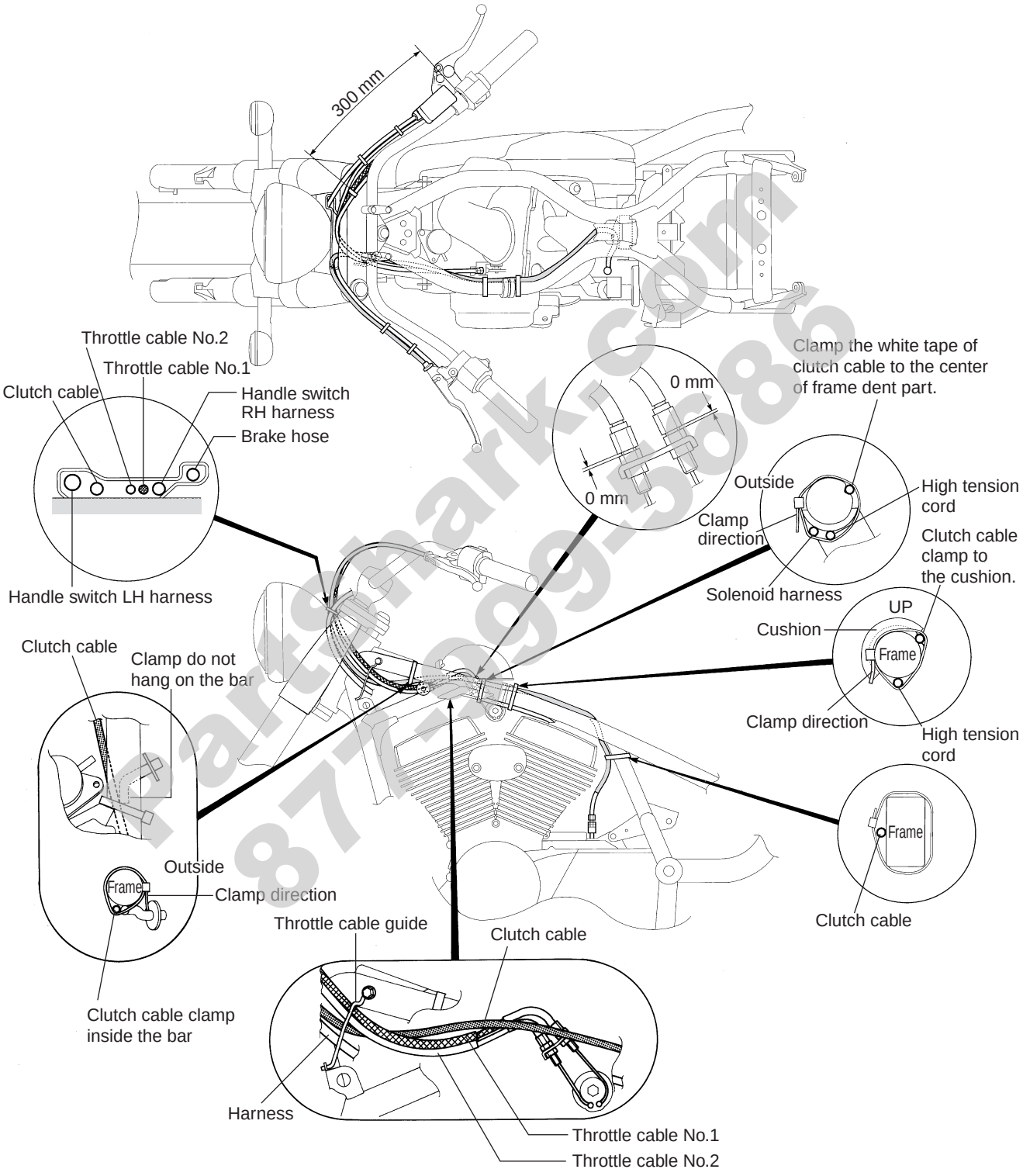
- Remove the fuel level gauge assembly.
- Measure the resistance at each fuel level gauge float position. If the resistance is incorrect, replace the fuel level gauge with a new one.

Float position	Resistance
19.5 mm (0.77 in)	Approx. 10 Ω
45.9 mm (1.81 in)	Approx. 216 Ω

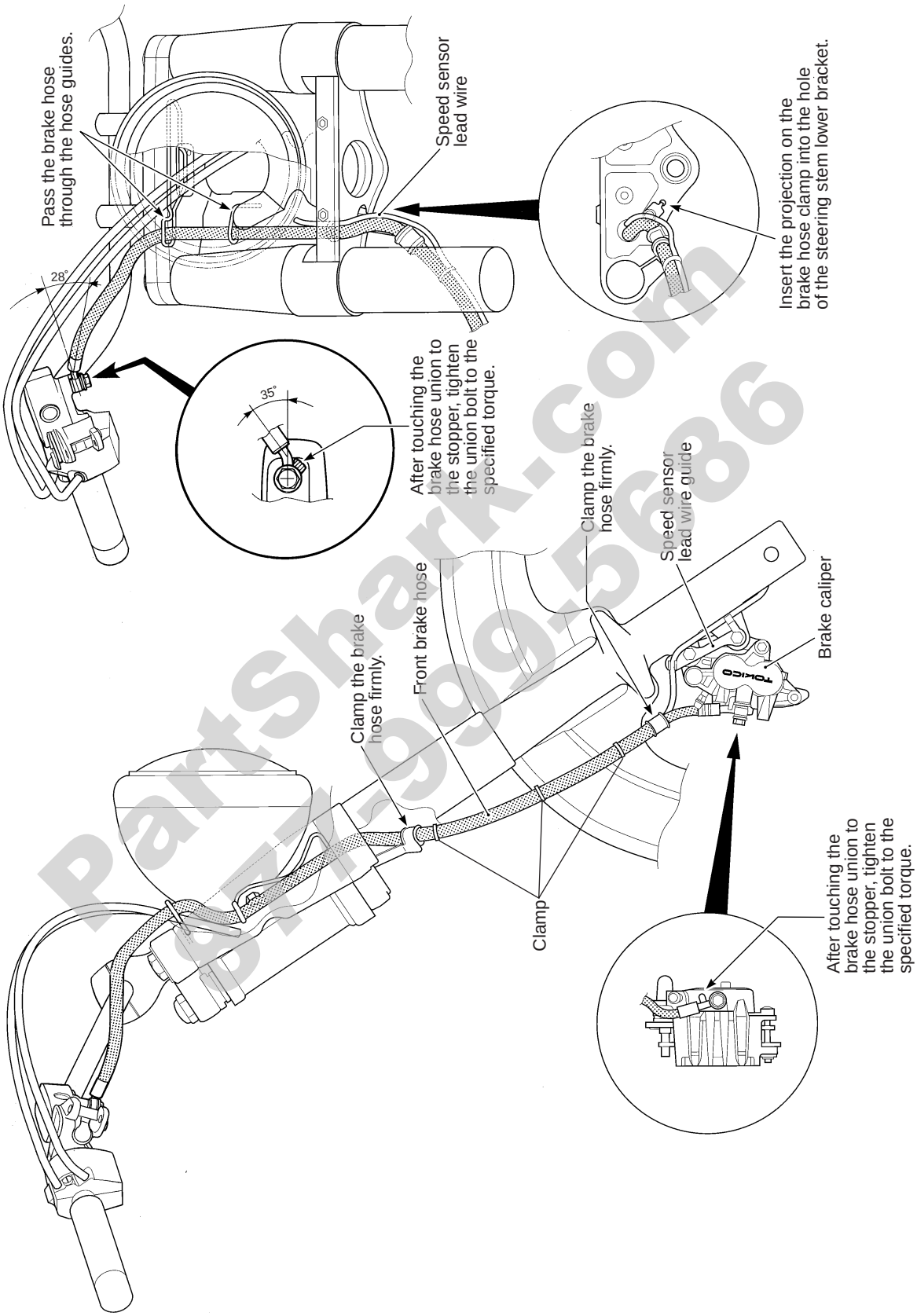
09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

CABLE ROUTING



FRONT BRAKE HOSE ROUTING



VL800/C/TK9 ('09-MODEL)

This information describes service data, service specifications, FI and servicing procedures which differ from those of the VL800/C/TK8 ('08-model).

NOTE:
- *Any differences between the VL800/C/TK8 ('08-model) and VL800/C/TK9 ('09-model) in specifications and service data are indicated with an asterisk mark (*).*

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VL800/C/TK9 ('09-MODEL)

CONTENTS

ABBREVIATIONS USED IN THIS MANUAL

NOTE:
Please refer to the VL800 ('06-model) service manual and VL800/C/T ('07/'08-models) service informations for other abbreviations which are not given in this manual.

E

EVAP : Evaporative Emission

I

ISC Valve : Idle Speed Control Valve (ISCV)

SAE-TO-FORMER SUZUKI TERM

This table lists SAE (Society of Automotive Engineers) J1930 terms and abbreviations which may be used in this manual in compliance with SAE recommendations, as well as their former SUZUKI names.

NOTE:
Please refer to the VL800 ('06-model) service manual and VL800/C/T ('07/'08-models) service informations for other former SUZUKI terms which are not given in this manual.

SAE TERM		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
I		
Idle Speed Control	ISC	—
Idle Speed Control Valve	—	ISC Valve

COUNTRY AND AREA CODES

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

MODEL	CODE	COUNTRY or AREA	EFFECTIVE FRAME NO.
VL800	E-02	U.K.	JS1BM111200****** –
	E-03	U.S.A. (Except for california)	JS1VS55A 92100031 –
	E-19	E.U.	JS1BM111100119991 –
	E-24	Australia	JS1BM111300****** –
	E-28	Canada	JS1VS55A 92100031 –
	E-33	California (U.S.A.)	JS1VS55A 92100031 –
VL800C	E-02	U.K.	JS1BM111500****** –
	E-03	U.S.A. (Except for california)	JS1VS55A 92100051 –
	E-19	E.U.	JS1BM111400100081 –
	E-24	Australia	JS1BM111600****** –
	E-28	Canada	JS1VS55A 92100051 –
	E-33	California (U.S.A.)	JS1VS55A 92100051 –
VL800T	E-03	U.S.A. (Except for california)	JS1VS55A 92100041 –
	E-28	Canada	JS1VS55A 92100041 –
	E-33	California (U.S.A.)	JS1VS55A 92100041 –
VL800UE	E-19	E.U.	JS1BM211100****** –
VL800CUE	E-19	E.U.	JS1BM211400100001 –

SPECIFICATIONS

DIMENSIONS AND CURB MASS

Overall length	*	2 500 mm (98.4 in)
Overall width	*	955 mm (37.6 in)
Overall height	*	1 110 mm (43.7 in)
Wheelbase		1 655 mm (65.2 in)
Ground clearance		140 mm (5.5 in)
Seat height		700 mm (27.6 in)
* Curb mass		277 kg (611 lbs)

ENGINE

Type	4-stroke, Liquid-cooled, OHC, 45° V-twin
Number of cylinders	2
Bore	83.0 mm (3.268 in)
Stroke	74.4 mm (2.929 in)
Displacement	805 cm^3 (49.1 cu. in)
Compression ratio	9.4 : 1
Fuel system	Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 100 ± 100 r/min

DRIVE TRAIN

Clutch		Wet multi-plate type
Transmission		5-speed constant mesh
Gearshift pattern		1-down, 4-up
Primary reduction ratio		1.690 (71/42)
Secondary reduction ratio		1.000 (30/30)
Gear ratios, Low		2.461 (32/13)
2nd		1.631 (31/19)
3rd		1.227 (27/22)
4th		1.000 (25/25)
Top		0.814 (22/27)
Final reduction ratio		3.503 (17/15 × 34/11)
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		105 mm (4.1 in)
Caster		33° 20'
Trail		141 mm (5.55 in) VL800/T/UE
		138 mm (5.43 in) VL800C/CUE
Steering angle		38° (right & left)
Turning radius		3.0 m (9.8 ft)
Front brake		Disc brake
Rear brake		Drum brake
Front tire		130/90-16 M/C 67H, tube type VL800/T/UE
		130/90-16 M/C 67H, tubeless VL800C/CUE
Rear tire		170/80-15 M/C 77H, tube type VL800/T/UE
		170/80-15 M/C 77H, tubeless VL800C/CUE

ELECTRICAL

Ignition type		Electronic ignition (Transistorized)
Ignition timing	*	7° B.T.D.C. at 1 100 r/min
Spark plug	*	NGK DR7EA or DENSO X22ESR-U E-02, 19, 24, 33
		NGK DPR7EA-9 or DENSO X22EPR-U9 ..... E-03, 28
Battery		12V 36.0 kC (10Ah)/10 HR
Generator		Three-phase A.C. generator
Main fuse		30 A
Fuse	*	20/10/10/10/10/10 A
Headlight		12 V 60/55 W (H4)
Position/Parking light		12 V 5 W E-02, 19
Brake light/Taillight	*	LED
* License light		12 V 5 W
Front turn signal light		12 V 21 W E-02, 19, 24
Front turn signal/Position light		12 V 21/5 W E-03, 28, 33
Rear turn signal light		12 V 21 W
Speedometer light		LED
Neutral indicator light		LED
High beam indicator light		LED
Turn signal indicator light		LED
Oil pressure/Coolant temperatur indicator light		LED
* Fuel injection indicator light		LED

CAPACITIES

Fuel tank		15.5 L (4.1/3.4 US/Imp gal)
Engine oil, oil change		3 000 ml (3.2/2.6 US/Imp qt)
with filter change		3 400 ml (3.6/3.0 US/Imp qt)
overhaul		3 700 ml (3.9/3.3 US/Imp qt)
Final gear oil		200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)
Coolant		1.5 L (1.6/1.3 US/Imp gal)

These specifications are subject to change without notice.

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 months for your convenience.

IMPORTANT: The periodic maintenance intervals and service requirements have been established in accordance with EPA regulations. Following these instructions will ensure that the motorcycle will not exceed emission standards and it will also ensure the reliability and performance of the motorcycle.

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 bolts and muffler bolts		T	—	T	—	T
Valve clearance		I	—	I	—	I
Spark plugs		—	I	R	I	R
Fuel line		—	I	I	I	I
Engine oil		R	R	R	R	R
Engine oil filter		R	—	—	R	—
Throttle cable play		I	I	I	I	I
Throttle valve synchronization		I (CA. only)	—	I	—	I
Evaporative emission control system (E-33 only)		—	—	I	—	I
		Replace vapor hose every 4 years.				
PAIR (air supply) system		—	—	I	—	I
Engine coolant		Replace every 2 years.				
Radiator hose		—	I	I	I	I
Clutch		—	I	I	I	I
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 fork		—	—	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

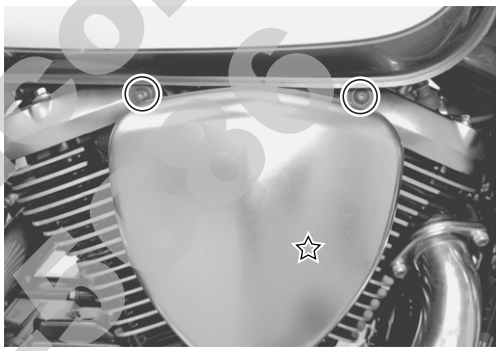
MAINTENANCE AND TUNE-UP PROCEDURES

This section describes the servicing procedures for each Periodic Maintenance item which differ from those of the VL800K6 ('06-MODEL).
For details other than the following items, refer to the VL800 Service Manual.

AIR CLEANER

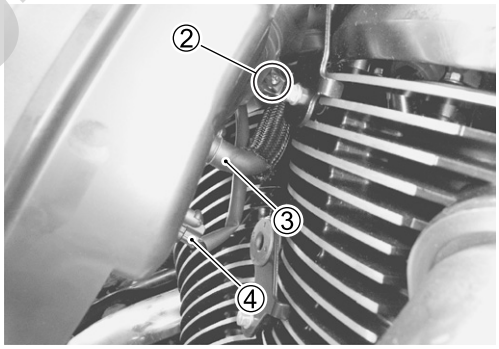
Inspect every 6 000 km (4 000 miles, 12 months) and replace every 18 000 km (11 000 miles, 36 months).

- Remove the air cleaner box mounting bolts ①.

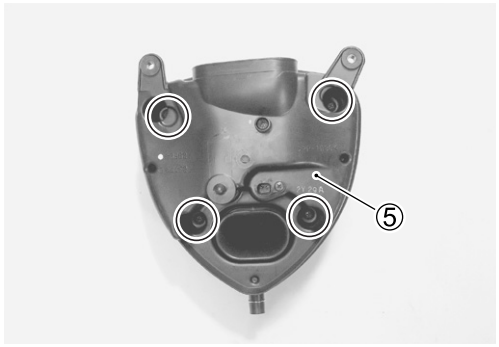


☆: Hooked part

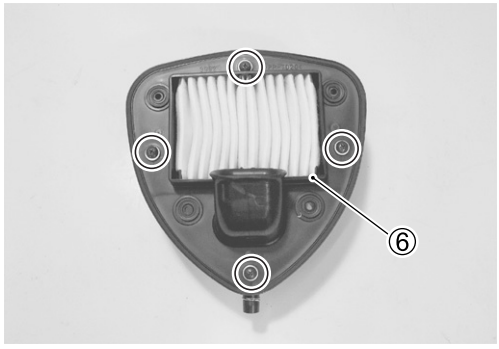
- Loosen the clamp screw ②.
- Disconnect the PAIR hose ③ and IAT sensor coupler ④.



- Remove the air cleaner case ⑤.



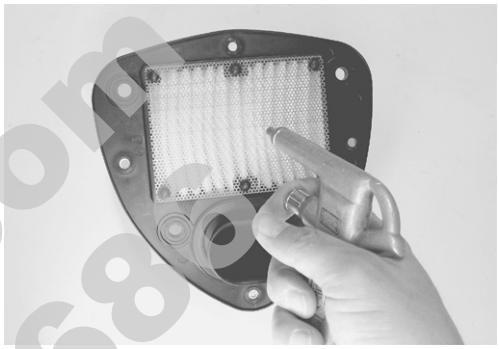
• Remove the air cleaner element ⑥.



• Carefully use compressed air to clean the air cleaner element.

CAUTION

Always apply compressed air to the inside of the air cleaner element. If compressed air is applied to the outside, dirt will be forced into the pores of the air cleaner element, restricting air flow through the air cleaner element.

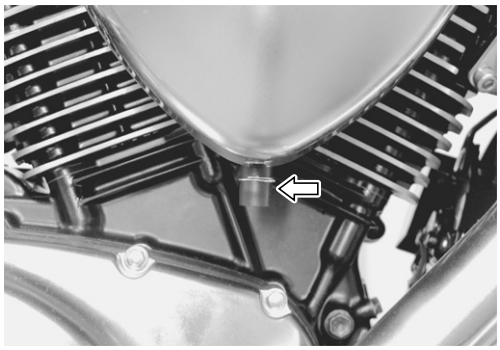


• Reinstall the cleaned or new air cleaner element in the reverse order of removal.

CAUTION

If driving under dusty condition, clean the air cleaner element more frequently. The surest way to accelerate engine wear is to use the engine without the element or to use a ruptured element. Make sure that the air cleaner is in good condition at all times. Life of the engine depends largely on this component.

NOTE:
When cleaning the air cleaner element, drain water from the air cleaner by removing the drain plug.

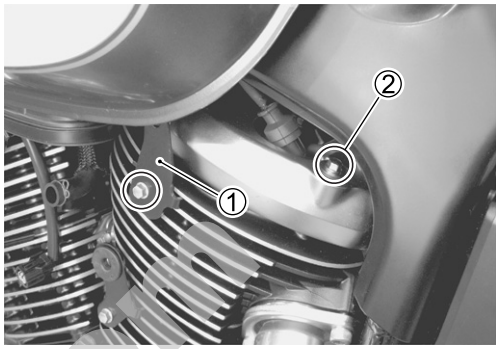


SPARK PLUG

Inspect every 6 000 km (4 000 miles, 12 months) and replace every 12 000 km (7 500 miles, 24 months).

No.2 (FRONT) SPARK PLUG REMOVAL (For E-02, 19, 24, 33)

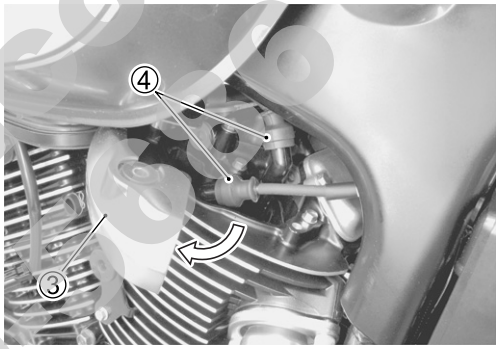
- Remove the air cleaner. (☞Page 18-6)
- Remove the air cleaner bracket ①.
- Remove the cylinder head cover cap bolt ②.



- Open the cylinder head cover cap ③ as shown.
- Disconnect the spark plug caps ④.

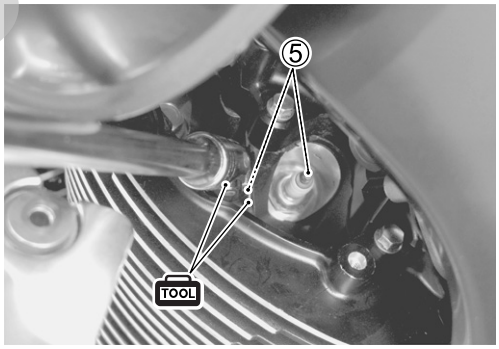
⚠ WARNING

The hot engine can burn you. Wait until the engine is cool enough to touch.



- Remove the spark plugs ⑤ with the special tools.

TOOL **09930-10121: Spark plug socket wrench set**
09930-14530: Universal joint

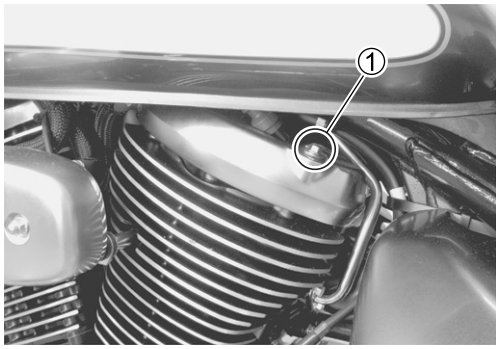


NO.2 (FRONT) SPARK PLUG REMOVAL (For E-03, 28)

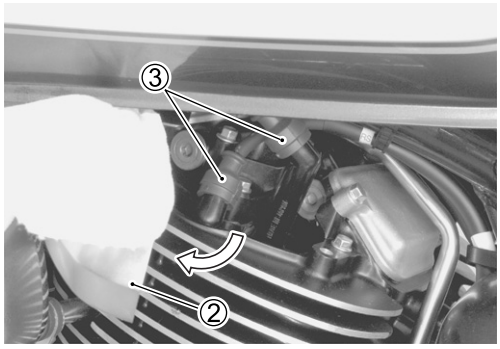
☞Page 2-4

NO.1 (REAR) SPARK PLUG REMOVAL (For E-02, 19, 24, 33)

- Remove the cylinder head cover cap bolt ①.



- Place a rug on the cylinder head cap ②.
- Open the cylinder head cover cap ② as shown.
- Disconnect the spark plug caps ③.

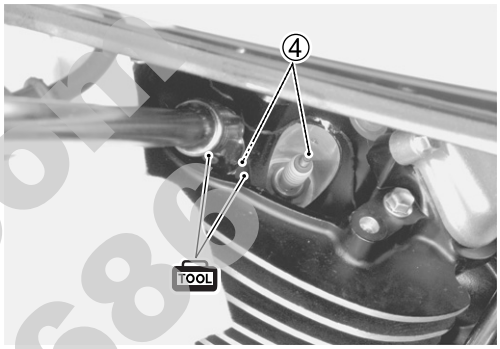


⚠ WARNING

The hot engine can burn you. Wait until the engine are cool enough to touch.

- Remove the spark plugs ④ with the special tools.

TOOL 09930-10121: Spark plug socket wrench set
09930-14530: Universal joint



NO.1 (REAR) SPARK PLUG REMOVAL (For E-03, 28)
☞ Page 2-4

HEAT RANGE

- Check spark plug heat range by observing electrode color. If it is white or glazed appearing, replace the spark plug with colder type one.

(For E-02, 19, 24, 33)

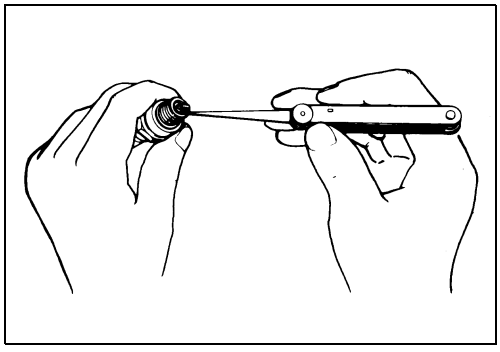
	Standard	Cold type
NGK	DR7EA	DR8EA
DENSO	X22ESR-U	X24ESR-U

(For E-03, 28)

	Standard	Cold type
NGK	DPR7EA-9	DPR8EA-9
DENSO	X22EPR-U9	X24EPR-U9

CARBON DEPOSITS

- Check carbon deposits on the spark plug.
- If carbon is deposited, remove it using a spark plug cleaner machine or carefully use a tool with a pointed end.



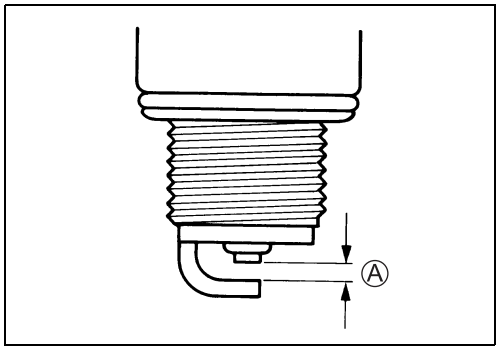
SPARK PLUG GAP

- Measure the plug gap with a thickness gauge. If out of specification, adjust it to the following gap.

TOOL 09900-20803: Thickness gauge

DATA Spark plug gap Ⓐ

Standard: 0.6 – 0.7 mm (0.024 – 0.028 in)
.....For E-02, 19, 24, 33
0.8 – 0.9 mm (0.031 – 0.035 in)
.....For E-03, 28



ELECTRODES CONDITION

- Check to see the worn or burnt condition of the electrodes.
- If it is extremely worn or burnt, replace the plug. And also replace the plug if it has a broken insulator, damaged thread.

CAUTION

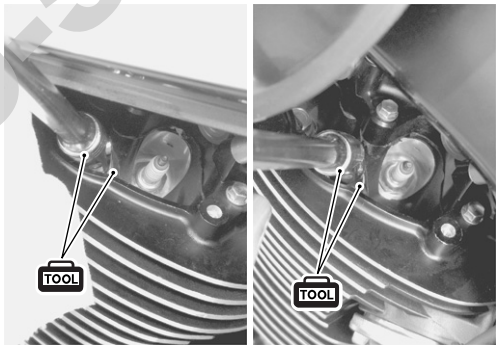
Confirm the thread size and reach when replacing the plug. If the reach is too short, carbon will be deposited on the screw portion of the plug hole and engine damage may result.

SPARK PLUG INSTALLATION (For E-02, 19, 24, 33)

- Screw the spark plug into the cylinder head with fingers, and then tighten it to the specified torque.

Spark plug: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

TOOL 09930-10121: Spark plug socket wrench set
09930-14530: Universal joint



CAUTION

Do not cross thread or over tighten the spark plug, or such an operation will damage the aluminum threads of the cylinder head.

- Install the spark plug caps.

SPARK PLUG INSTALLATION (For E-03, 28)

☞ Page 2-6

VALVE CLEARANCE

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

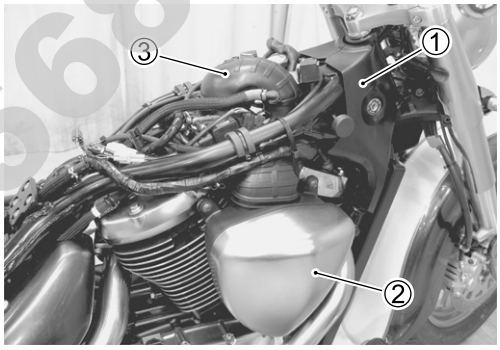
Valve clearance must be checked and adjusted when:
(1) the valve mechanism is service, and
(2) the camshafts are serviced.
Check and adjust the clearance to the specification.

DATA **Valve clearance (when cold):**
IN. 0.08 – 0.13 mm (0.003 – 0.005 in)
EX. 0.17 – 0.22 mm (0.007 – 0.009 in)

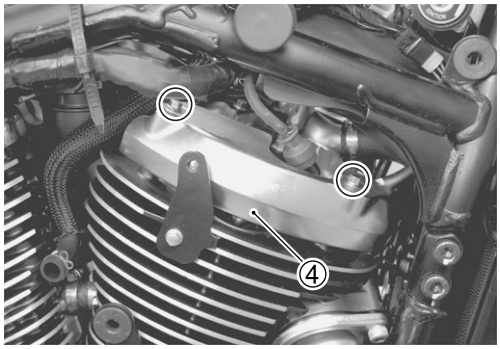
NOTE:
* *The clearance specification is for COLD state.*
* *Both intake and exhaust valves must be checked and adjusted when the piston is at Top Dead Center (TDC) of the compression stroke.*

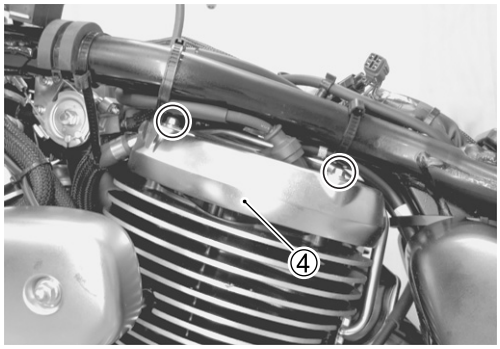
INSPECTION AND ADJUSTMENT (For E-02, 19, 24, 33)

- Remove the rear and front seats. (☞ Page 7-2)
- Remove the fuel tank. (☞ Page 14-93)
- Remove the right frame head cover ①. (☞ Page 3-3)
- Remove the air cleaner box ② and air cleaner outlet tube ③. (☞Page 18-6, 18-40)

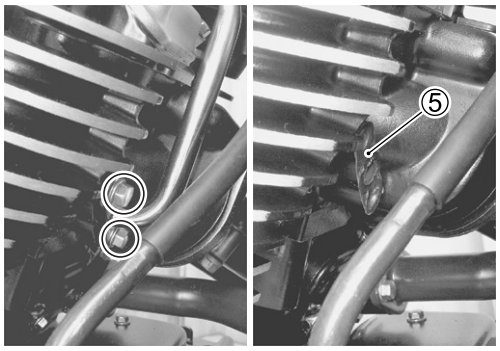


- Remove the cylinder head cover caps ④.
- Disconnect the spark plug caps and remove the spark plugs. (☞Page 18-8)





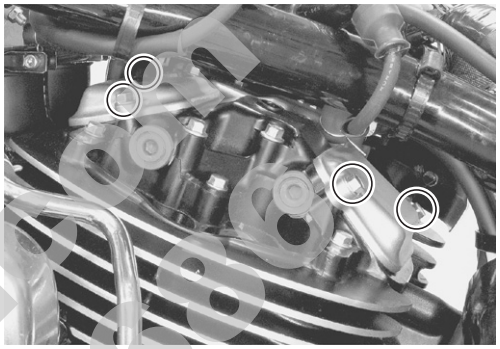
- Remove the PAIR pipe bolts (Rear cylinder).
- Remove the gasket ⑤.

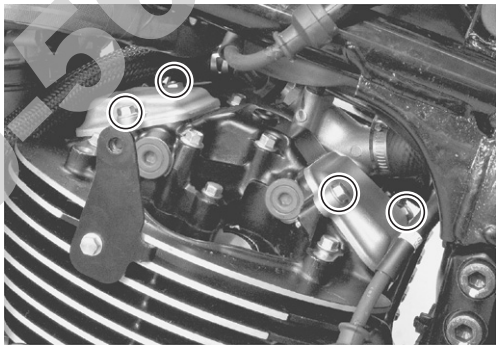


CAUTION

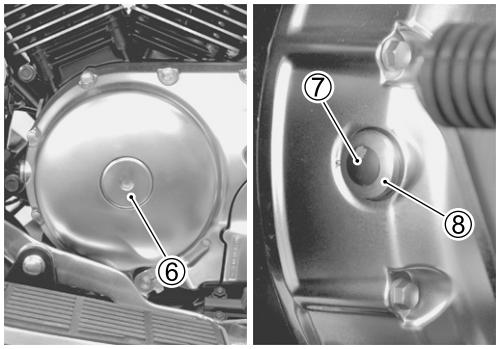
Do not reuse the removed gasket.

- Remove the inspection caps.

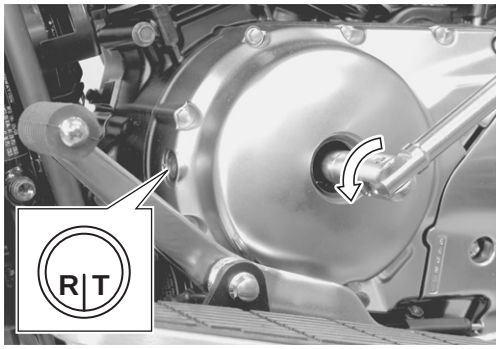




- Remove the generator cover plug ⑥.
- Remove the cap ⑦ and timing inspection plug ⑧.



- Rotate the generator rotor to set the No.1 (Rear) cylinder at TDC of the compression stroke. (Rotate the rotor until the "R I T" line on the rotor is aligned with the center of hole on the generator cover.)

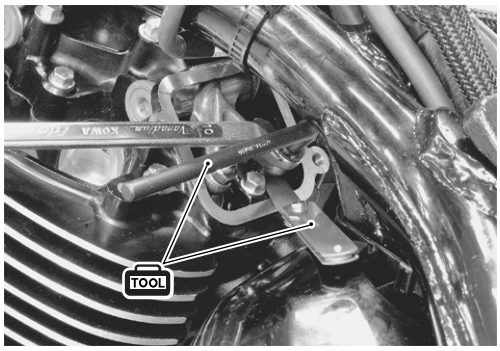


- To inspect the No.1 (Rear) cylinder valve clearance, insert the thickness gauge to the clearance between the valve stem end and the adjusting screw on the rocker arms.

TOOL 09900-20806: Thickness gauge

- If the clearance is out of the specification, bring it into the specified range by using the special tool.

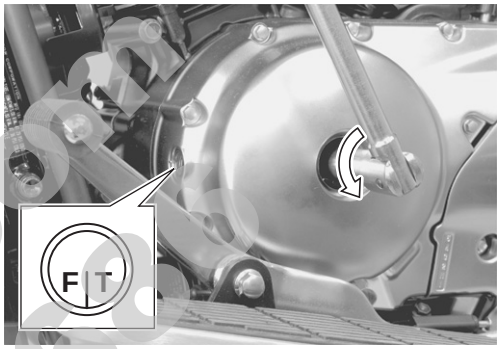
TOOL 09917-10410: Valve adjust driver



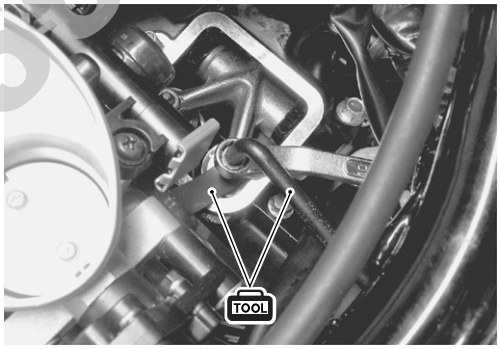
CAUTION

Both right and left valve clearances should be as closely set as possible.

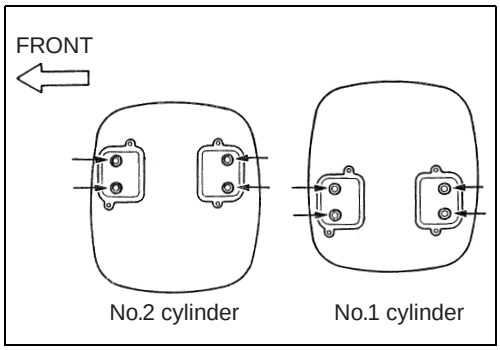
- Rotate the generator rotor 450 degrees (1 and 1/4 turns) and align the "F I T" line on the rotor with the center of hole on the generator cover.



- Inspect the No.2 (Front) cylinder valve clearance as the same manner above.



NOTE:
Use the thickness gauge from the arrow marks as shown in the illustration.



INSPECTION AND ADJUSTMENT (For E-03, 28)
☞ Page 2-6

ENGINE OIL AND OIL FILTER

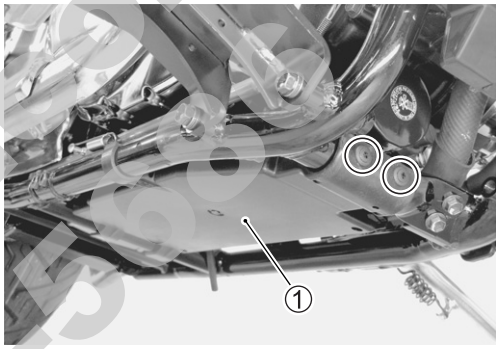
(ENGINE OIL)
Replace initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter.

(OIL FILTER)
Replace initially at 1 000 km (600 miles, 2 months) and every 18 000 km (11 000 miles, 36 months) thereafter.

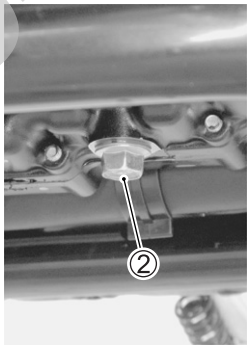
Oil should be changed while the engine is warm. Oil filter replacement at the above intervals, should be done together with the engine oil change.

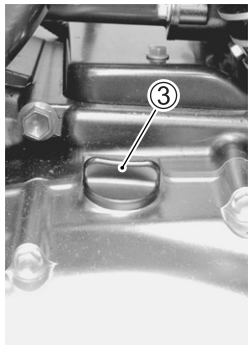
ENGINE OIL REPLACEMENT

- Remove the engine under cover ① by removing the fasteners. (For E-02, 19, 24)



- Keep the motorcycle upright.
- Place an oil pan below the engine, and drain oil by removing the drain plug ② and filler cap ③.

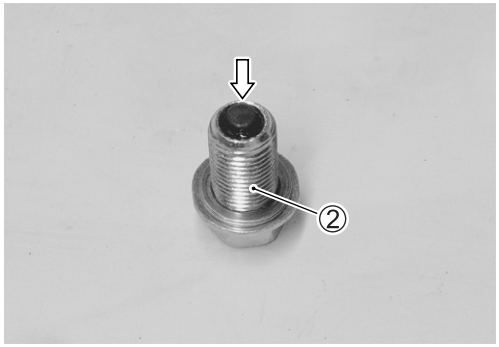




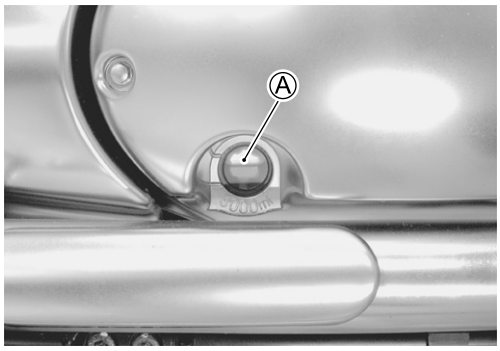
- Clean the drain plug ②.

- Tighten the drain plug ② to the specified torque, and pour fresh oil through the oil filler. The engine will hold about 3.0 L (3.2/2.6 US/Imp qt) of oil. Use of API SF/SG or SH/SJ with JASO MA.

Oil drain plug: 21 N·m (2.1 kgf-m, 15.0 lbf-ft)

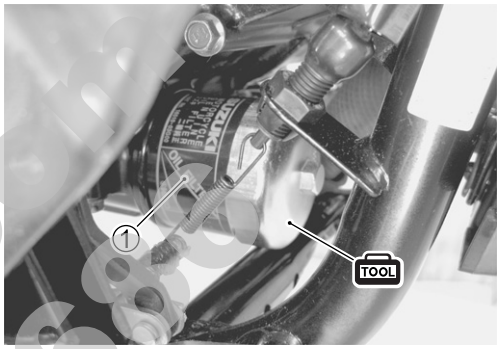


- Start up the engine and allow it to run for several minutes at idling speed.
- Turn off the engine and wait about three minutes, then check the oil level through the inspection window Ⓐ. If the level is below mark "L", add oil to "F" level. If the level is above mark "F", drain oil to "F" level.



OIL FILTER REPLACEMENT

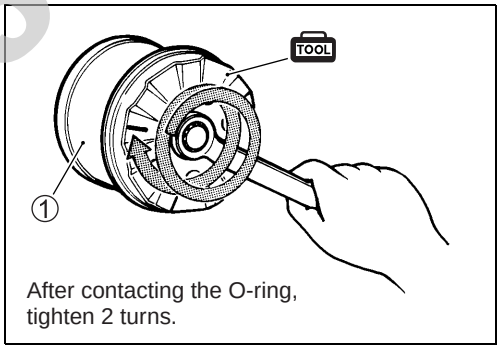
- Drain engine oil in the same manner of engine oil replacement procedure.
- Remove the oil filter ① by using the oil filter wrench. (Special tool)
- Apply engine oil lightly to the O-ring of the new filter before installation.
- Install the new filter turning it by hand until you feel that the filter O-ring contacts the mounting surface. Then tighten it 2 turns using the oil filter wrench. (20 N·m, 2.0 kgf-m, 14.5 lbf-ft)



TOOL 09915-40620: Oil filter wrench

NOTE:
To properly tighten the filter, use the special tool. Never tighten the filter by hand.

- Pour fresh engine oil and check the oil level in the same manner of engine oil replacement procedure.



After contacting the O-ring, tighten 2 turns.

DATA Engine oil capacity

Oil change:	**3.0 L (3.2/2.6 US/Imp qt)**
Filter change:	**3.4 L (3.6/3.0 US/Imp qt)**
Overhaul engine:	**3.7 L (3.9/3.3 US/Imp qt)**

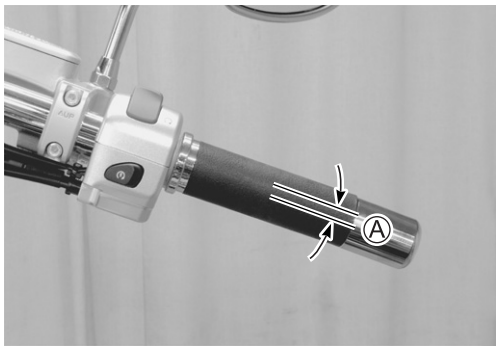
CAUTION

ONLY USE A GENUINE SUZUKI MOTORCYCLE OIL FILTER. Other manufacturer's oil filters may differ in thread specifications (thread diameter and pitch), filtering performance and durability which may lead to engine damage or oil leaks. Also, do not use a genuine Suzuki automobile oil filter on this motorcycle.

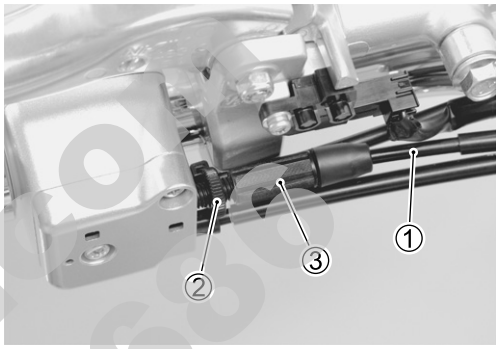
THROTTLE CABLE PLAY

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

Adjust the throttle cable play Ⓐ as follows.



- Loosen the lock-nut ② of the throttle pulling cable ①.
- Turn the adjuster ③ 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 ② 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.

THROTTLE VALVE SYNCHRONIZATION

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

- Inspect the throttle valve synchronization periodically. (☞Page 18-55)

EVAPORATIVE EMISSON CONTROL SYSTEM (E-33 ONLY)

Inspect every 12 000 km (7 500 miles, 24 months). Replace vapor hose every 4 years.

- Inspect the evaporative emission control system periodically. (☞Page 18-88)

COMPRESSION PRESSURE CHECK

The compression of a cylinder is a good indicator of its internal condition.
The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.

COMPRESSION PRESSURE SPECIFICATION (Automatic de-comp. actuated)

Standard	Limit	Difference
1 300 – 1 700 kPa (13 – 17 kgf/cm², 185 – 242 psi)	1 100 kPa (11 kgf/cm², 156 psi)	200 kPa (2 kgf/cm², 28 psi)

Low compression pressure can indicate any of the following conditions:

* Worn-down piston or piston rings
* Piston rings stuck in grooves
* Poor seating of valves
* Ruptured or otherwise defective cylinder head gasket

Overhaul the engine in the following cases:

* Compression pressure in one of the cylinders is less than 1 100 kPa (11 kgf/cm², 156 psi).
* Difference in compression pressure between two cylinders is more than 200 kPa (2 kgf/cm², 28 psi).
* All compression pressure are below 1 300 kPa (13 kgf/cm², 185 psi) even when they measure more than 1 100 kPa (11 kgf/cm², 156 psi).

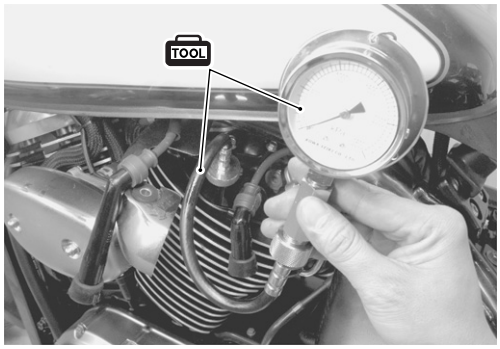
COMPRESSION TEST PROCEDURE

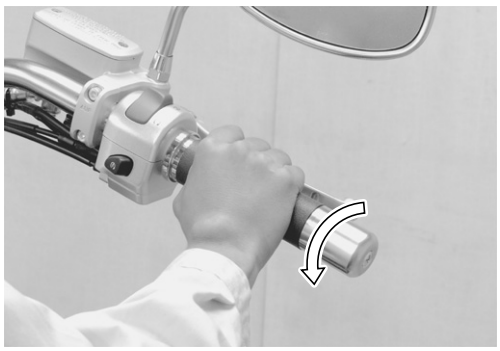
NOTE:

* *Before testing the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque values and the valves are properly adjusted.*
* *Have the engine warmed up before testing.*
* *Make sure that the battery is fully-charged.*

Remove the related parts and test the compression pressure in the following manner:

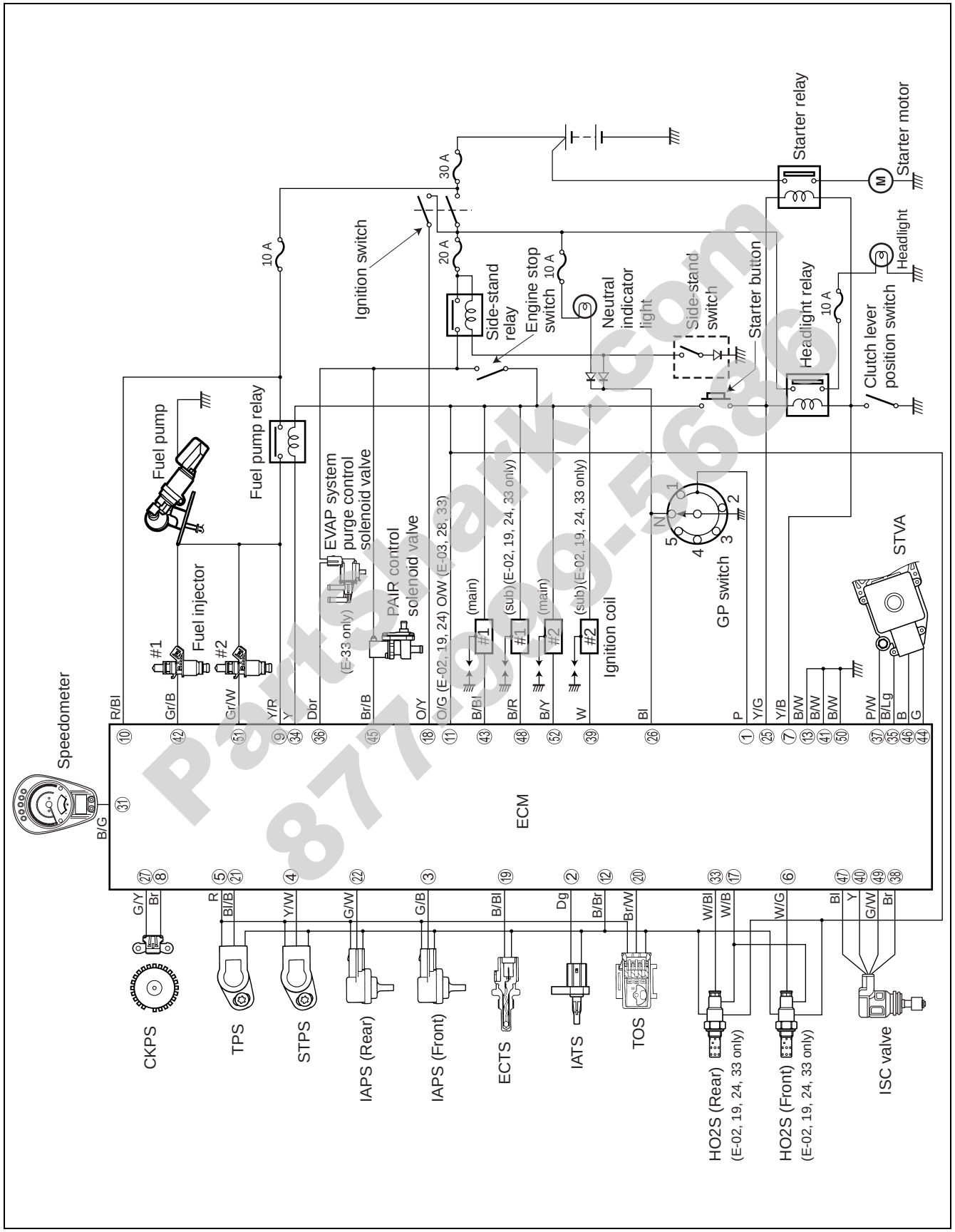
- Lift and support the fuel tank. (☞ Page 14-93)
- Remove the all spark plug caps and outside spark plugs (#1 & #2) [For E-02, 19, 24, 33]. (☞Page 18-8)
- Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.
- Keep the throttle grip in the fully opened position.
- Press the starter button and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.
- Repeat this procedure with the other cylinder.



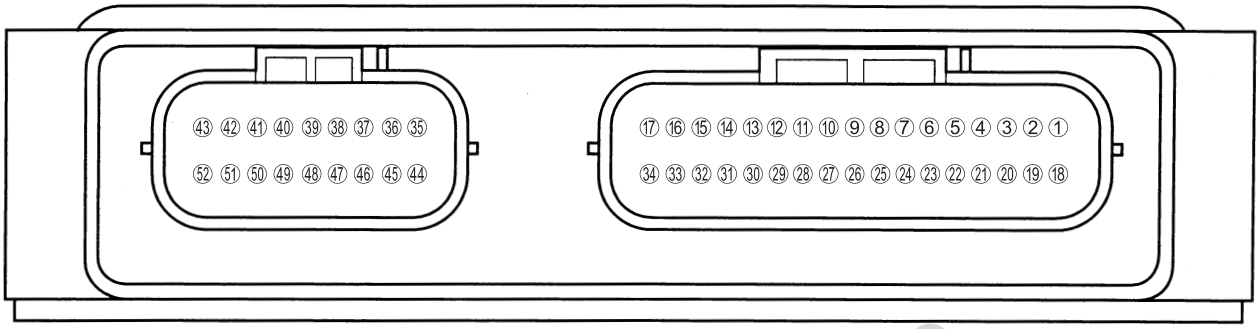


TOOL **09915-64512: Compression gauge set**
09915-63210: Adaptor

FI SYSTEM DIAGNOSIS
FI SYSTEM WIRING DIAGRAM



ECM TERMINAL



TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
①	GP switch signal (GP)	⑱	—
②	IAT sensor signal (IAT)	⑲	ECT sensor signal (ECT)
③	IAP sensor signal #2 (IAP. F)	⑳	TO sensor signal (TOS)
④	STP sensor signal (STP)	㉑	TP sensor signal (TP)
⑤	Power source for sensors (VCC)	㉒	IAP sensor signal #1 (IAP. R)
⑥	HO2 sensor signal #2 (HO2S. F) [For E-02, 19, 24, 33]	㉓	—
⑦	Clutch lever position switch (CLT)	㉔	—
⑧	CKP sensor signal (CKP–)	㉕	Starter switch signal
⑨	Power source for fuel injectors (VM)	㉖	Neutral switch signal
⑩	Power source for back-up	㉗	CKP sensor signal (CKP+)
⑪	Power source	㉘	Mode select switch
⑫	Sensor ground (E2)	㉙	—
⑬	ECM ground (E1)	㉚	—
⑭	—	㉛	Serial data for speedometer (TECH)
⑮	—	㉜	Serial data for self-diagnosis
⑯	—	㉝	HO2 sensor signal #1 (HO2S. R) [For E-02, 19, 24, 33]
⑰	HO2 sensor heater (HO2. H) [For E-02, 19, 24, 33]	㉞	Fuel pump relay (FP Relay)

TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
㉟	STVA signal (STVA. 1B)	㊹	STVA signal (STVA. 2B)
㊱	EVAP system purge control solenoid valve (EVAP) [E-33 only]	㊺	PAIR control solenoid valve (PAIR)
㊲	STVA signal (STVA. 1A)	㊻	STVA signal (STVA. 2A)
㊳	ISC signal (ISC. 2B)	㊼	ISC signal (ISC. 1A)
㊴	Ignition coil #2 (sub) [For E-02, 19, 24, 33]	㊽	Ignition coil #1 (sub) [For E-02, 19, 24, 33]
㊵	ISC signal (ISC. 1B)	㊾	ISC signal (ISC. 2A)
㊶	Ground	㊿	Ground
㊷	Fuel injector #1 (#1)	(51)	Fuel injector #2 (#2)
㊸	Ignition coil #1 (main)	(52)	Ignition coil #2 (main)

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 (Front or Rear)	Intake air pressure is fixed to 550 mmHg.	"YES"	"YES"
TP sensor	The throttle opening is fixed at approx. 3/4 open position. Ignition timing is also fixed.	"YES"	"YES"
ECT sensor	Engine coolant 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 (main)	* [#1 Fuel-cut]	"YES"	"YES"
		* (#1) & #2 cylinder(s) can run.	
Ignition signal #1 (sub) [For E-02, 19, 24, 33]	—	"YES"	"YES"
		* (#1) & #2 cylinder(s) can run.	
Ignition signal #2 (main)	* [#2 Fuel-cut]	"YES"	"YES"
		* #1 & (#2) cylinder(s) can run.	
Ignition signal #2 (sub) [For E-02, 19, 24, 33]	—	"YES"	"YES"
		* #1 & (#2) cylinder(s) can run.	
Injection signal #1	—	"YES"	"YES"
		#2 cylinder can run.	
Injection signal #2	—	"YES"	"YES"
		#1 cylinder can run.	
Secondary throttle valve actuator	Secondary throttle valve is fixed to full close position. When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"
STP sensor	Secondary throttle valve is fixed to full close position.	"YES"	"YES"
Gear position signal	Gear position signal is fixed to 4th gear.	"YES"	"YES"
Heated oxygen sensor (E-02, 19, 24, 33)	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	"YES"	"YES"
PAIR control solenoid valve	ECM stops controlling PAIR control solenoid valve.	"YES"	"YES"
ISC valve	When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"
EVAP system purge control solenoid valve (E-33 only)	ECM stops controlling EVAP system purge control solenoid valve.	"YES"	"YES"

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

When ECM does not receive all the ignition signals for one cylinder, the fuel cut function takes place for that cylinder.

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

* ( ) ... For E-02, 19, 24, 33 * [ ] ... For E-03, 28

DTC TABLE 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
P0335				CKP sensor, lead wire/coupler connection
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		ECT 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.	ECT sensor, lead wire/coupler connection
P0115	H		Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground
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

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
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 C26/C27		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), C25 (P0352), C26 (P0353) or C27 (P0354) is indicated.	Ignition coil, lead wire/coupler connection, power supply from the battery
P0351/P0352 P0353/P0354				
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 properly or its motor locked.	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 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
C31		Gear position signal	Gear position signal voltage should be higher than the following for 3 sec. and more. Gear position sensor voltage > 0.2 V If lower than the above value, C31 (P0705) is indicated.	GP switch, lead wire/coupler connection, Gearshift cam, etc.
P0705				
C32/C33		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
P0201/P0202				

DTC No.	DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C40/P0505	ISC valve	The circuit voltage of motor drive is unusual.	ISC valve circuit open or shorted to the ground Power source circuit open
C40/P0506		Idle speed is lower than the desired idle speed.	Air passage clogged ISC valve is fixed ISC valve preset position is incorrect
C40/P0507		Idle speed is higher than the desired idle speed.	ISC valve hose connection ISC valve is fixed ISC valve preset position is incorrect
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/C64 P0156/P0130	HO2 sensor (E-02, 19, 24, 33)	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 (P0156) or C64 (P0130) is indicated.	HO2 sensor circuit open or shorted to ground
C44/64 P0161/P0135		The Heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit, C44 (P0161) or C64 (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
C62 P0443	EVAP system purge control solenoid valve (E-33 only)	EVAP system purge control solenoid valve voltage is not input to ECM.	EVAP system purge control solenoid valve, lead wire/coupler connection

NOTE:

HO2 SENSOR VOLTAGE MEASURING CONDITION

** Warm up the engine as follows:*

10 minutes at idling or 100 seconds over 2 000 r/min.

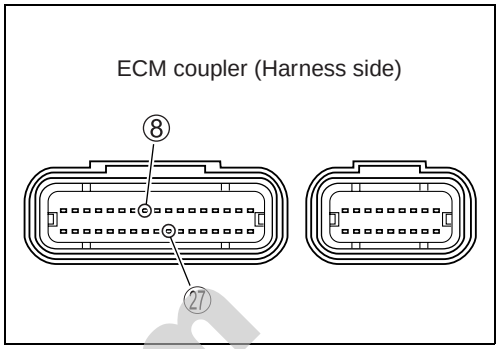
** Coolant temperature is upper 45 °C (113 °F).*

DTC TROUBLESHOOTING

"C12" (P0335) CKP SENSOR CIRCUIT MALFUNCTION

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

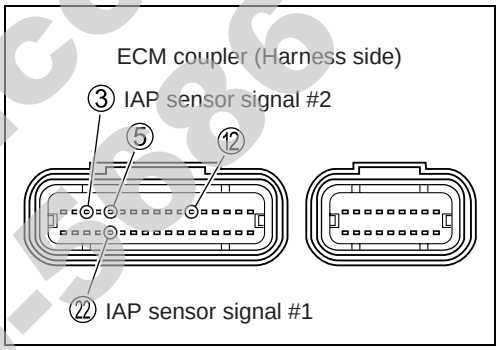
*** Refer to page 14-46 for details.**



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

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

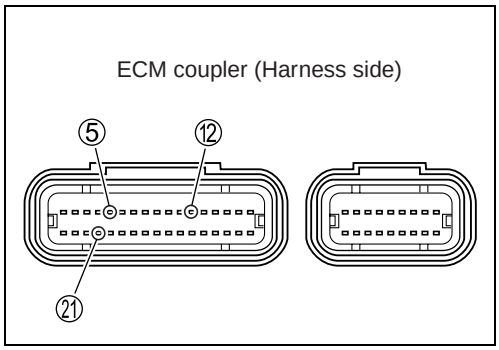
*** Refer to page 14-49 for details.**



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

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

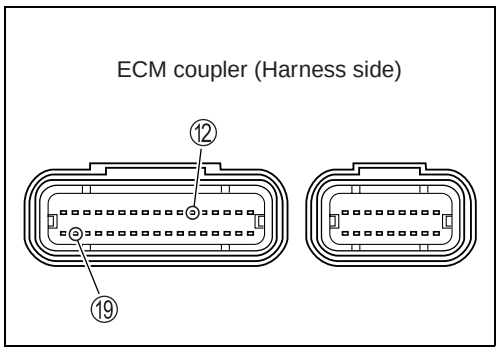
*** Refer to page 14-52 for details.**



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

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

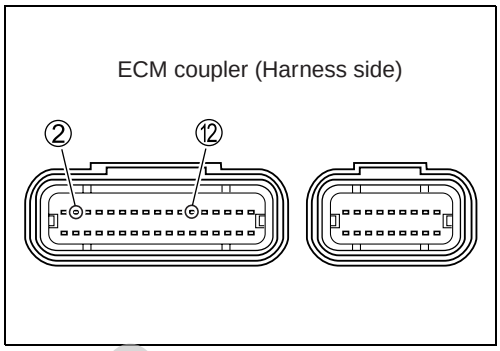
*** Refer to page 14-57 for details.**



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

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

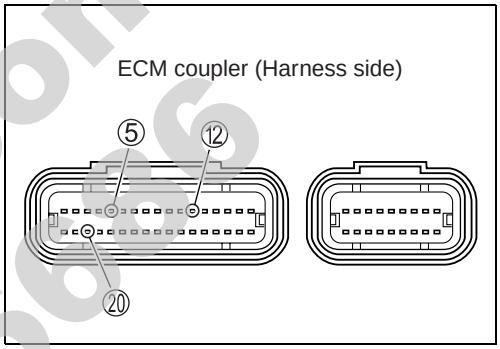
*** Refer to page 14-61 for details.**



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

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

*** Refer to page 14-65 for details.**



"C24" (P0351), "C25" (P0352), "C26" (P0353) or "C27" (P0354) IGNITION SYSTEM MALFUNCTION

[When indicating C24/P0351 for IG coil #1 (main)]
[When indicating C25/P0352 for IG coil #2 (main)]
[When indicating C26/P0353 for IG coil #1 (sub)] ..... E-02, 19, 24, 33 only
[When indicating C27/P0354 for IG coil #2 (sub)] ..... E-02, 19, 24, 33 only

*** Refer to the IGNITION SYSTEM for details. (☞Page 18-57)**

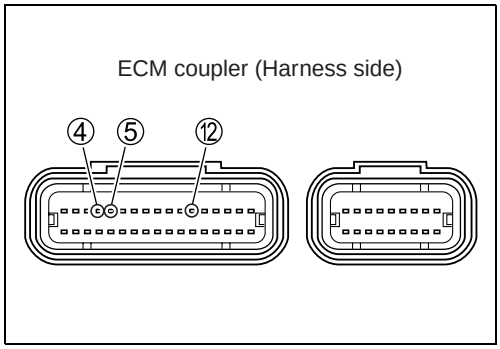
"C28" (P1655) STV ACTUATOR CIRCUIT MALFUNCTION

*** Refer to page 14-69 for details.**

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

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

*** Refer to page 14-72 for details.**

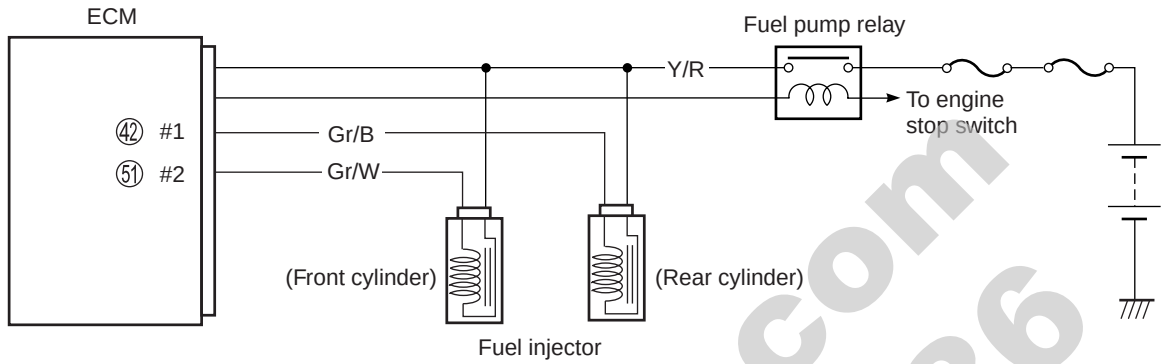


"C31" (P0705) GP SWITCH CIRCUIT MALFUNCTION

*** Refer to page 14-78 for details.**

"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.



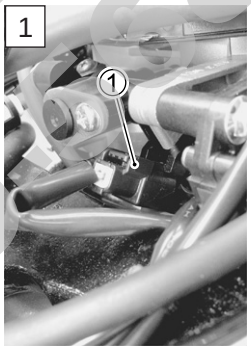
INSPECTION

NOTE:

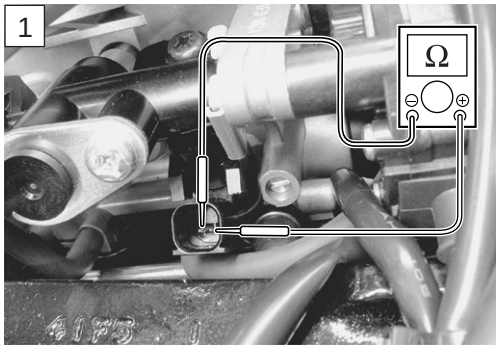
After repairing the trouble, clear the DTC using SDS tool.

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

1) Turn the ignition switch OFF.
2) Remove the fuel tank. (☞ Page 14-93)
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) Loosen the air cleaner outlet tube screw and lift up the air cleaner outlet tube. (☞Page 18-40)
5) Disconnect the injector coupler and measure the resistance between terminals.



DATA **Injector resistance: 9.5 – 11.5 Ω at 20 °C (68 °F)**
(Terminal – Terminal)

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

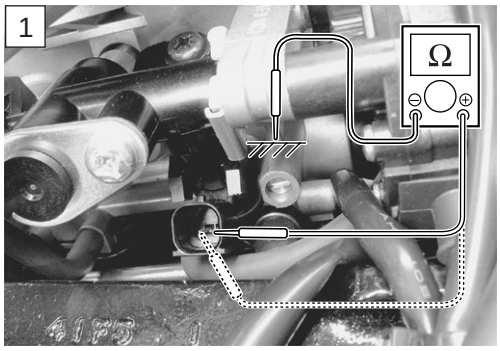
DATA STP sensor continuity: ∞Ω (Infinity)

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 18-43)



Step 2

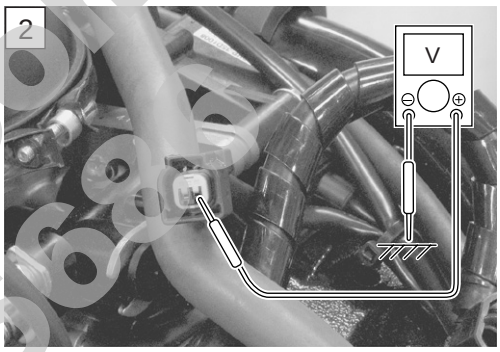
1) Turn the ignition switch ON.
2) Measure the injector voltage between Y/R wire and ground.

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

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

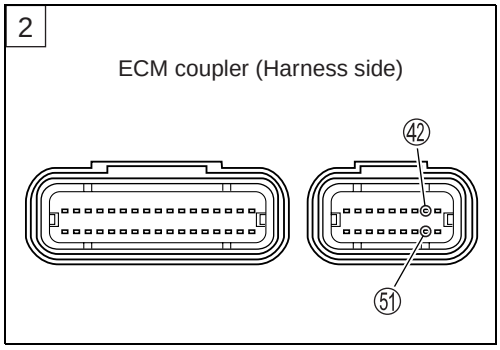
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)



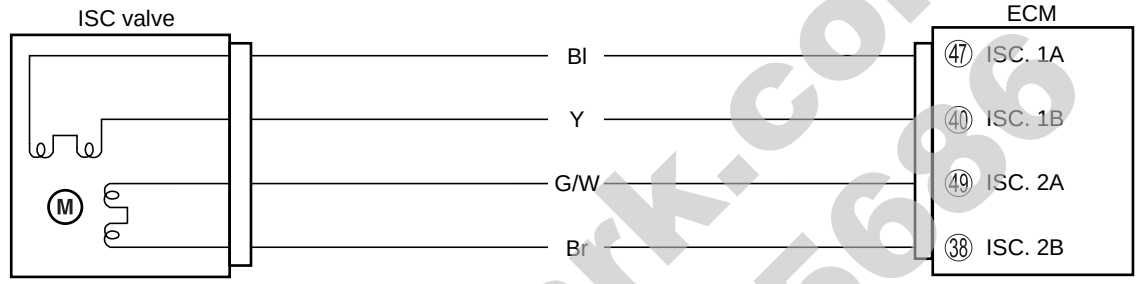
Is the voltage OK?

YES	• Gr/W wire open or shorted to ground, or poor ⑤① connection. (Front cylinder side) • Gr/B wire open or shorted to ground, or poor ④② 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.



"C40" (P0505/P0506/P0507) ISC VALVE CIRCUIT MALFUNCTION

DETECTED CONDITION		POSSIBLE CAUSE
C40 (P0505)	The circuit voltage of motor drive is unusual.	• ISC valve circuit open or shorted to ground
C40 (P0506)	Idle speed is lower than the desired idle speed.	• Air passage clogged • ISC valve is fixed • ISC valve preset position is incorrect
C40 (P0507)	Idle speed is higher than the desired idle speed.	• Disconnected ISC valve hose • ISC valve is fixed • ISC valve preset position is incorrect



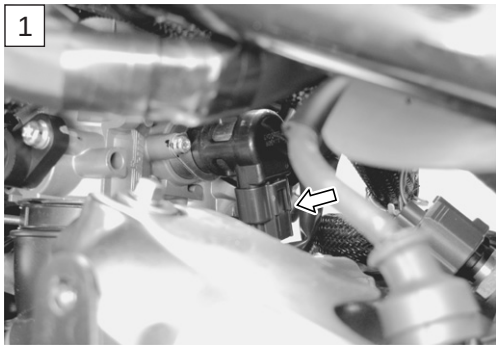
CAUTION

*** Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF.**
If the ECM coupler or ISC valve coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual valve position being written in ECM and causing an error of ISC valve operation.
*** Once the ISC valve has been removed or replaced, the ISC valve preset must be performed using SDS tool. (☞ Page 18-54)**

INSPECTION

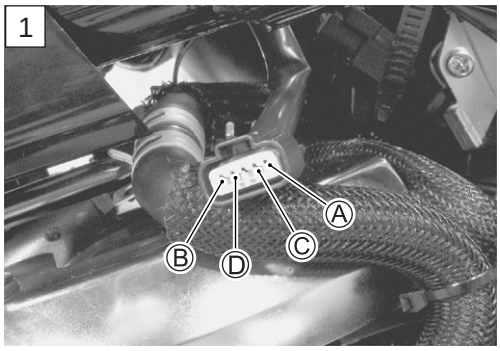
NOTE:
After repairing the trouble, clear the DTC using SDS tool.

Step 1
1) Turn the ignition switch OFF.
2) Remove the fuel tank. (☞ Page 14-93)
3) Check the ISC valve coupler for loose or poor contacts.
If OK, then check the ISC valve lead wire continuity.



4) Disconnect the ISC valve coupler and ECM coupler.
5) Check the continuity between terminals Ⓐ and ㊼, terminals Ⓑ and ㊵, terminals Ⓒ and ㊾, terminals Ⓓ and ㊳.

1



CAUTION

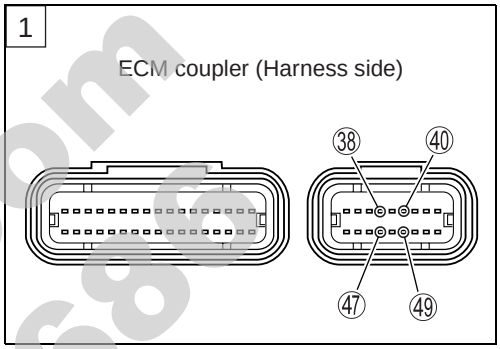
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

DATA ISC valve wire continuity: Continuity (•))))

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

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

1

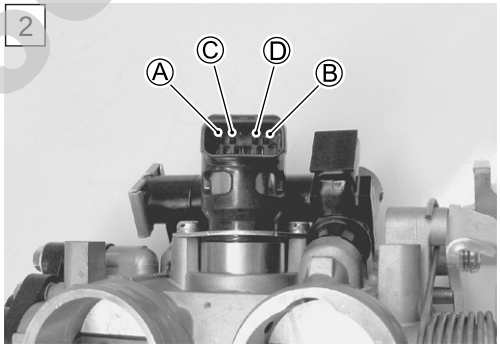


Is the continuity OK?

YES	Go to Step 2.
NO	Bl, Y, G/W or Br wire open.

Step 2
1) Remove the throttle body. (☞Page 18-40)
2) Check the continuity between each ISC valve terminal and ground.

2



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

3) If OK, then measure the resistance between terminals Ⓐ and Ⓑ, terminals Ⓒ and Ⓓ.

DATA ISC valve resistance: Approx. 80 Ω at 20 °C (68 °F)
(Terminal Ⓐ – Terminal Ⓑ)
(Terminal Ⓒ – Terminal Ⓓ)

Is the resistance OK?

YES	If wire is OK, intermittent trouble or faulty ECM.
NO	Replace the ISC valve with a new one. (☞Page 18-53)

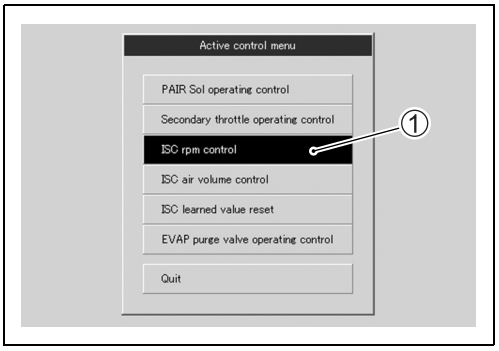
ACTIVE CONTROL INSPECTION (ISC RPM CONTROL)

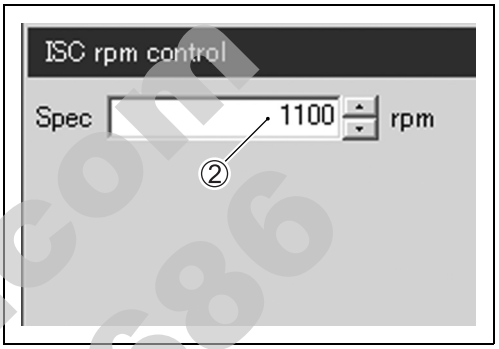
Check 1

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

TOOL 09904-41010: SDS set tool
99565-01010-017: CD-ROM Ver.17

2) Check that the engine is running.
3) Click the "Active control".
4) Click the "ISC rpm control" ①.
5) Check that the "Spec" ② is idle speed 1 100 ± 100 rpm.
6) Check that the "Desired idle speed" ③ is within the specified idle rpm.

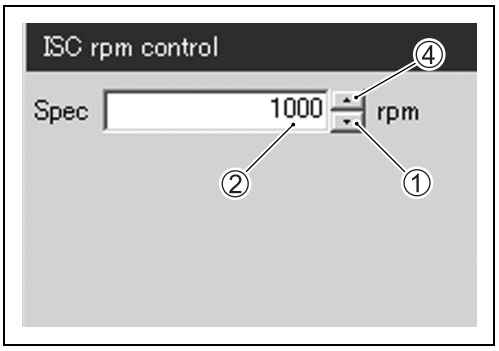




Item	Value	Unit
Engine speed	1129	rpm
Manifold absolute pressure 1	77.0	kPa
Manifold absolute pressure 2	98.3	kPa
Desired idle speed	③ 1104	rpm
ISC valve position	116	step
Engine coolant / oil temperature	108.0	℃
Intake air temperature	56.0	℃

Check 2

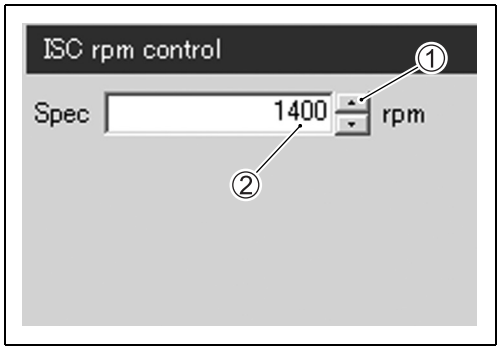
1) Click the button ① and decrease the "Spec" ② to 1 000 rpm slowly.
2) Check that the "Desired idle speed" ③ is nearly equal to the "Spec" ②. At the same time, check that the number of steps ⑤ in the ISC valve position decreases.
3) Click the button ④ and increase the "Spec" ② slowly.
4) Check that the "Desired idle speed" ③ is nearly equal to the "Spec" ②. Also, check that the number of steps ⑤ in the ISC valve position increases.



Item	Value	Unit
Engine speed	1004	rpm
Manifold absolute pressure 1	47.2	kPa
Manifold absolute pressure 2	83.4	kPa
Desired idle speed	③ 1016	rpm
ISC valve position	⑤ 96	step
Engine coolant / oil temperature	106.0	℃
Intake air temperature	57.0	℃

Check 3

1) Click the button ① and increase the "Spec" ② to 1 400 rpm slowly.
2) Check that the "Desired idle speed" ③ is nearly equal to the "Spec" ②. Also, check that the number of steps ④ in the ISC valve position increases.

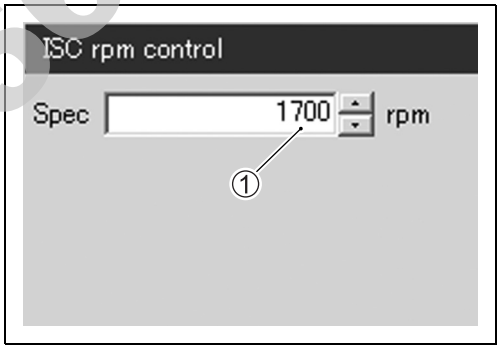


Item	Value	Unit
Engine speed	1380	rpm
Manifold absolute pressure 1	36.2	kPa
Manifold absolute pressure 2	73.0	kPa
Desired idle speed	③ 1405	rpm
ISC valve position	④ 120	step
Engine coolant / oil temperature	109.0	℃
Intake air temperature	56.0	℃

Check 4

1) Click the button ① and increase the "Spec" ② to 1 700 rpm.
2) Check that the "Desired idle speed" ③ is approx. 1 700 rpm.
3) Check that the "Engine speed" ④ is close to 1 700 rpm.

NOTE:
Be careful not to increase the "Spec" to more than 1 800rpm, or the "Engine speed" may reach the upper limit.



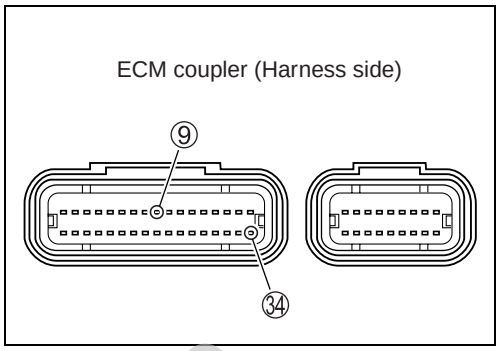
Item	Value	Unit
Engine speed	③ 1694	rpm
Manifold absolute pressure 1	90.4	kPa
Manifold absolute pressure 2	39.7	kPa
Desired idle speed	② 1719	rpm
ISC valve position	135	step
Engine coolant / oil temperature	109.0	℃
Intake air temperature	56.0	℃

If the ISC valve does not function properly, replace the ISC valve or inspect the ISC valve. (☞Page 18-53)

"C41" (P0230) FP RELAY CIRCUIT MALFUNCTION

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

*** Refer to page 14-82 for details.**



"C42" (P1650) IG SWITCH CIRCUIT MALFUNCTION

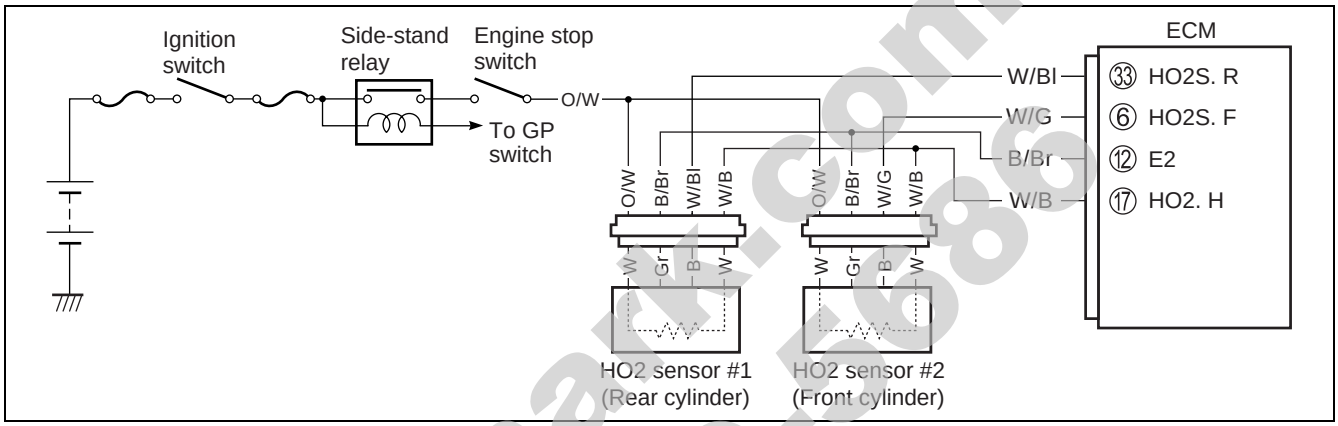
DETECTED CONDITION	POSSIBLE CAUSE
Ignition switch signal is not input in the ECM.	• Ignition system circuit open or short. • ECM malfunction.

INSPECTION

*** Refer to the IGNITION SWITCH INSPECTION for details. (☞ Page 8-30)**

"C44" (P0156/P0161) or "C64" (P0130/P0135) HO2 SENSOR (HO2S) CIRCUIT MALFUNCTION (FOR E-02, 19, 24, 33)

DETECTED CONDITION		POSSIBLE CAUSE
C44/C64 (P0156/ P0130)	HO2 sensor output voltage is not input to ECM during engine operation and running condition. (Sensor voltage ≦ 0.1 V)	• HO2 sensor circuit open or shorted to ground. • Fuel system malfunction. • ECM malfunction.
C44/C64 (P0161/ 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.

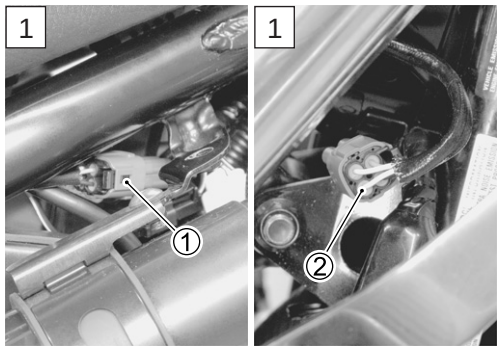


INSPECTION

NOTE:
After repairing the trouble, clear the DTC using SDS tool.

Step 1 (Sensor circuit check)
(When indicating C44/P0156 for HO2 sensor #1)
(When indicating C64/P0130 for HO2 sensor #2)

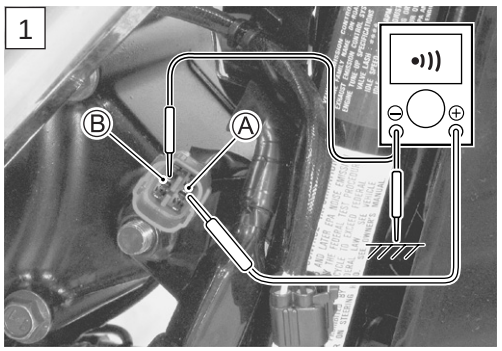
1) Turn the ignition switch OFF.
2) Remove the right frame cover. (For HO2 sensor #1) (☞ Page 7-2)
3) Check the HO2 sensor coupler (Rear cylinder side ① or Front cylinder side ②) for loose or poor contacts.
   If OK, then check the HO2 sensor lead wire continuity.



4) Disconnect the HO2 sensor coupler.
5) Check the continuity between W/Bl wire (#1) or W/G wire (#2) Ⓐ and ground.
6) Also, check the continuity between W/Bl wire (#1) or W/G wire (#2) Ⓐ 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) Disconnect the ECM coupler.
8) Check the continuity between W/Bl wire (#1) Ⓒ and terminal ㉝. (For HO2 sensor #1)
   Check the continuity between W/G wire (#2) Ⓐ and terminal ⑥. (For HO2 sensor #2)
9) Also, check the continuity between B/Br wire Ⓑ and terminal ⑫.

CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

HO2 sensor lead wire continuity: Continuity (•))))

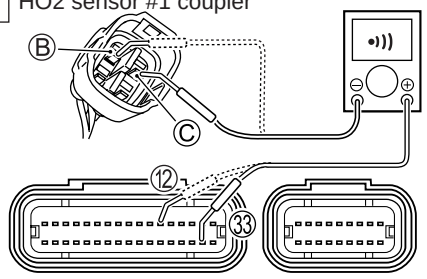
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

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

Is the continuity OK?

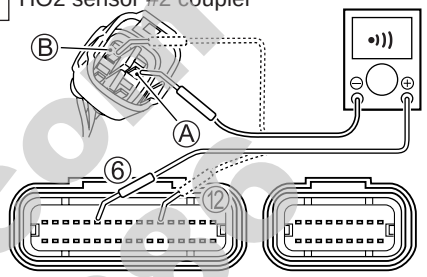
YES	Go to Step 2 (Sensor circuit check).
NO	• W/Bl (For HO2 sensor #1) or W/G (For HO2 sensor #2) wire shorted to ground. • W/Bl (For HO2 sensor #1) or W/G (For HO2 sensor #2) or B/Br wire open.

1 HO2 sensor #1 coupler



ECM coupler (Harness side)

1 HO2 sensor #2 coupler

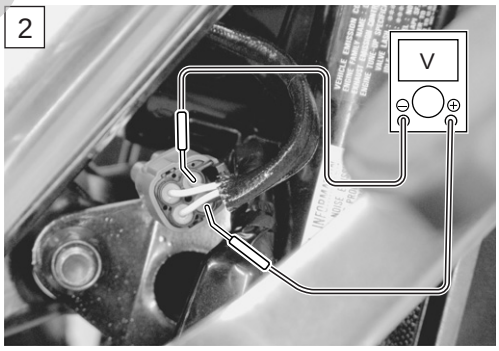


ECM coupler (Harness side)

Step 2 (Sensor circuit check)
1) Connect the ECM coupler and HO2 sensor coupler.
2) Warm up the engine enough.
3) Measure the HO2 sensor output voltage between B wire and Gr wire [W/Bl wire (#1) or W/G wire (#2) and B/Br wire], when idling condition.

HO2 sensor output voltage at idle speed:
0.3 V and less (⊕ B – ⊖ Gr)

2



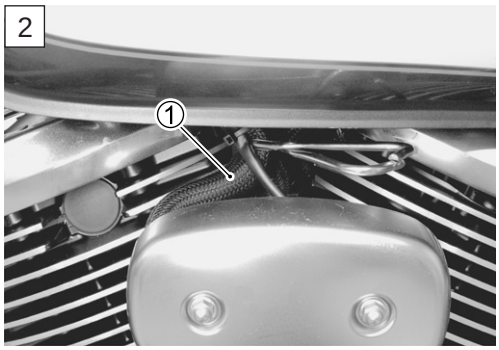
4) If OK, then pinch the PAIR hose ① with a proper hose clamp.
5) Measure the HO2 sensor output voltage while holding the engine speed at 5 000 r/min.

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

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

Tester knob indication: Voltage (⎓)

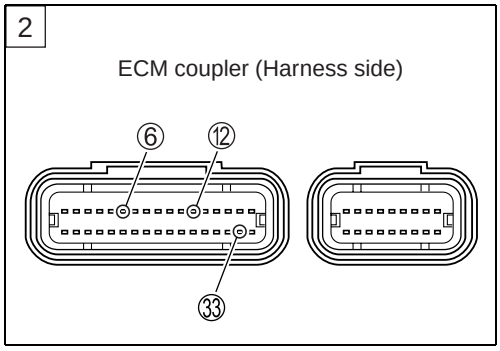
2



NOTE:
HO2 SENSOR VOLTAGE MEASURING CONDITION
** Warm up the engine as follows:*
10 minutes at idling or 100 seconds over 2 000 r/min.
** Coolant temperature is upper 45 °C (113 °F).*

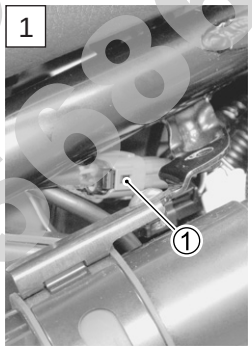
Is the voltage OK?

YES	• W/Bl wire or B/Br wire open or shorted to ground, or poor ㉝ or ⑫ connection. (Rear cylinder side) • W/G wire or B/Br wire open or shorted to ground, or poor ⑥ or ⑫ connection. (Front 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	Replace the HO2 sensor with a new one.

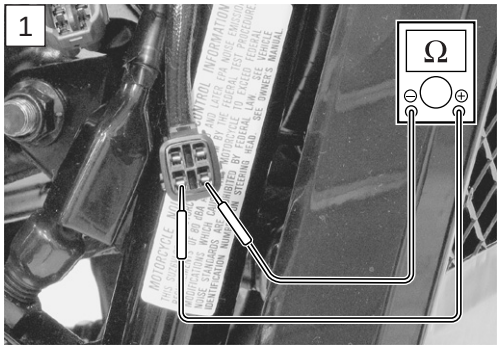


Step 1 (Heater circuit check)
(When indicating C44/P0161 for HO2 sensor #1)
(When indicating C64/P0135 for HO2 sensor #2)

1) Turn the ignition switch OFF.
2) Remove the right frame cover. (For HO2 sensor #1) (☞ Page 7-2)
3) Check the HO2 sensor coupler (Rear cylinder side ① or Front cylinder side ②) for loose or poor contacts.
   If OK, then measure the HO2 sensor resistance.



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



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

DATA HO2 heater resistance: 6.7 – 9.5 Ω at 23 °C (73.4 °F) (W – W)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

Is the voltage OK?

YES	Go to Step 2 (Heater circuit check).
NO	Replace the HO2 sensor with a new one.

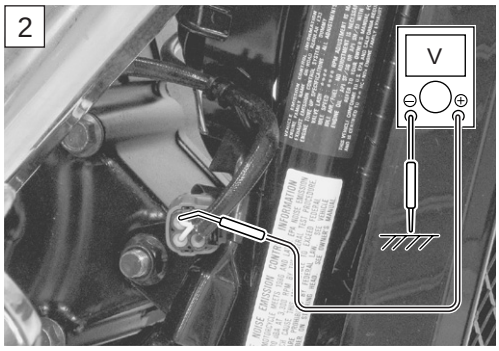
Step 2 (Heater circuit check)
1) Connect the HO2 sensor coupler.
2) Insert the needle pointed probes to the HO2 sensor coupler.
3) Turn the ignition switch ON and measure the heater voltage between W (O/W) wire and ground.
4) If the tester voltage indicates the battery voltage, it is good condition.

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

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

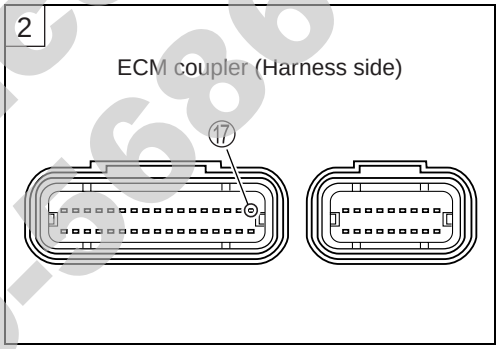
TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)



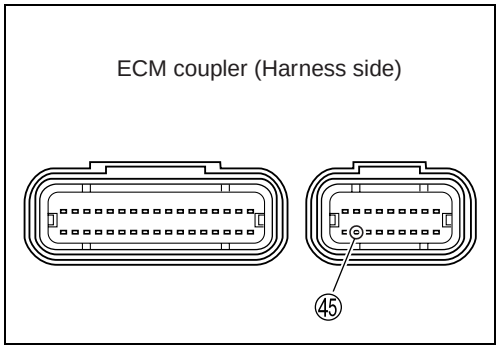
Is the voltage OK?

YES	• O/W or W/B wire open or shorted to ground, or poor ⑰ 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 ⑰) or HO2 sensor coupler.



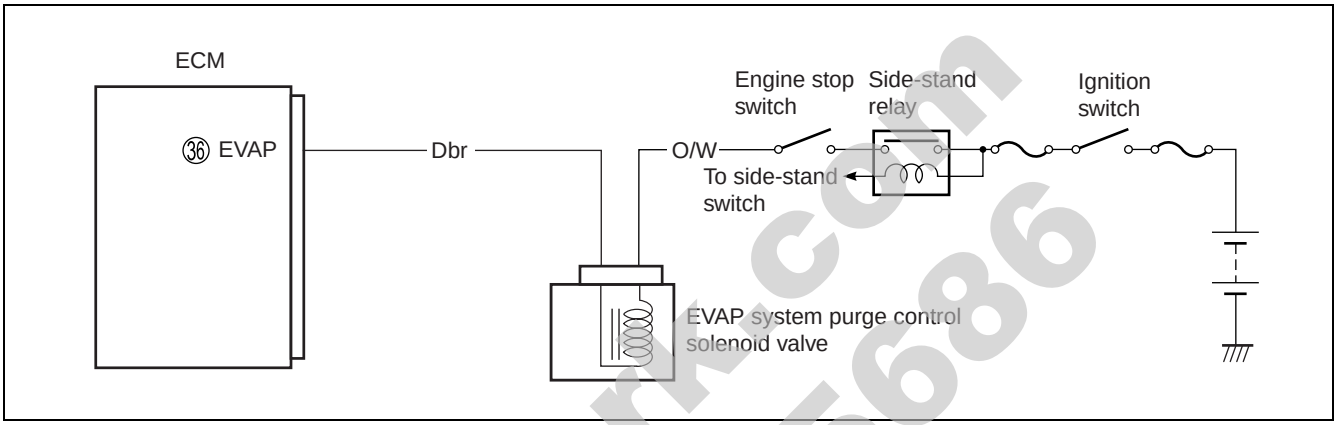
"C49" (P1656) PAIR CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION

On model K9, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.
*** Refer to page 14-83 for details.**



"C62" (P0443) EVAP SYSTEM PURGE CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION (E-33 only)

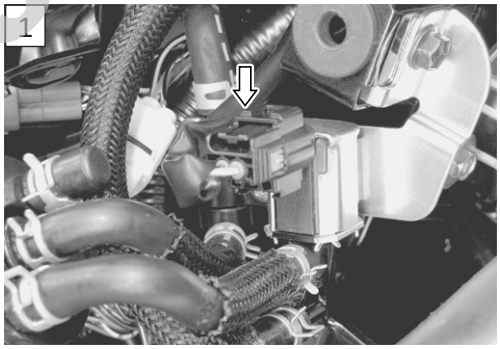
DETECTED CONDITION	POSSIBLE CAUSE
EVAP system purge control solenoid valve voltage is not input to ECM.	• EVAP system purge control solenoid valve circuit open or short. • EVAP system purge control solenoid valve malfunction. • ECM malfunction.



INSPECTION

NOTE:
After repairing the trouble, clear the DTC using SDS tool.

Step 1
1) Turn the ignition switch OFF.
2) Remove the right frame cover. (☞ Page 7-2)
3) Check the purge control solenoid valve coupler for loose or poor contacts.
   If OK, then measure the EVAP system purge control solenoid valve resistance.



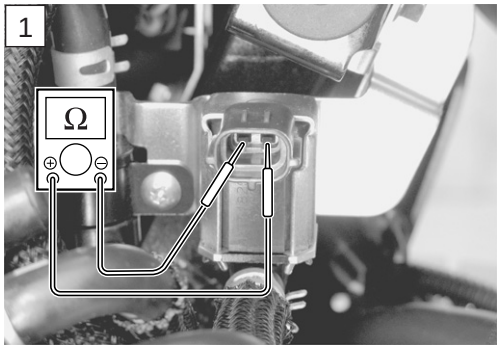
4) Disconnect the purge control solenoid valve coupler and measure the resistance between terminals.

DATA EVAP system purge control solenoid valve resistance:
Approx. 32 Ω at 20 °C (68 °F)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

Is the resistance OK?



YES	Go to Step 2
NO	Replace the EVAP system purge control solenoid valve with a new one.

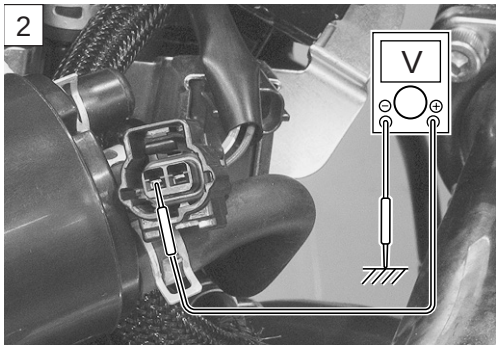
Step 2

1) Connect the purge control solenoid valve coupler.
2) Turn the ignition switch ON.
3) Measure the voltage at the wire side coupler between O/W wire and ground.

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

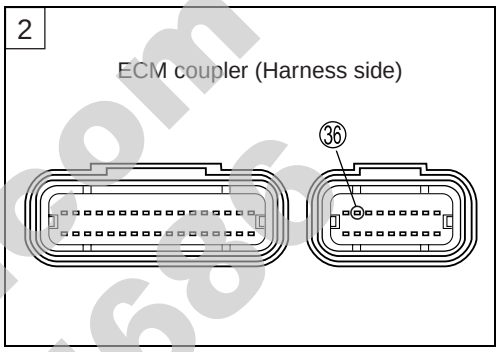
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)



Is the voltage OK?

YES	• Dbr wire open or shorted to ground, or ㊱ 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.

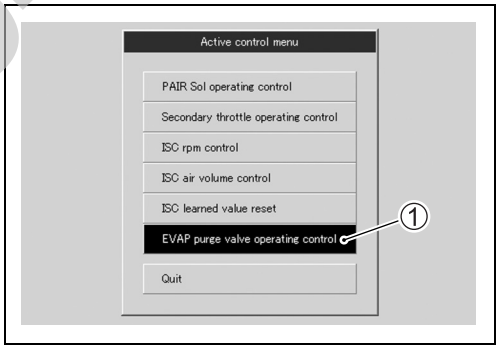


ACTIVE CONTROL INSPECTION

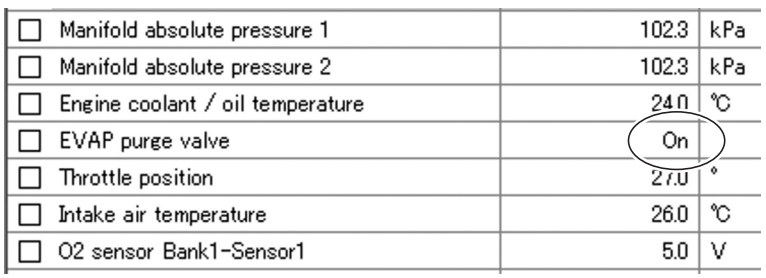
1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

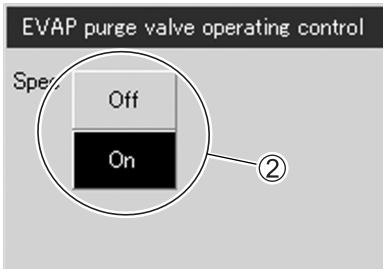
TOOL 09904-41010: SDS set tool
99565-01010-017: CD-ROM Ver.17

2) Turn the ignition switch ON.
3) Click "EVAP purge valve operating control" ①.

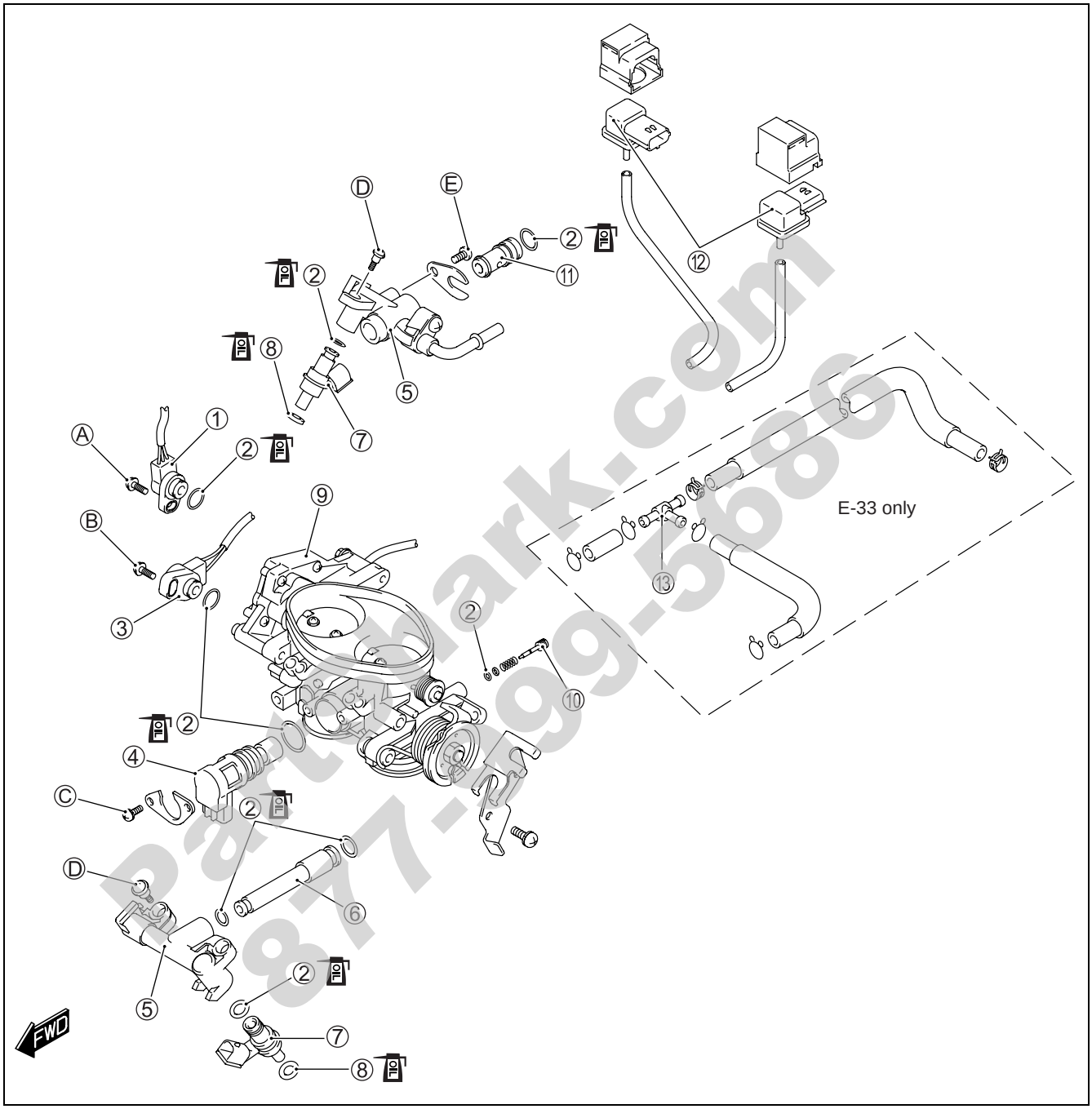


4) Click each button ②.
At this time, if an operation sound is heard from the EVAP system purge control solenoid valve, the function is normal.





THROTTLE BODY
CONSTRUCTION

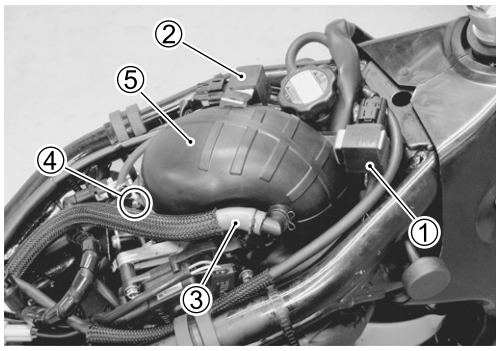


①	STP sensor	⑩	Air screw
②	O-ring	⑪	Straight plug
③	TP sensor	⑫	IAP sensor
④	ISC valve	⑬	3-way joint (E-33 only)
⑤	Delivery pipe	Ⓐ	STP sensor mounting bolt
⑥	Straight joint	Ⓑ	TP sensor mounting bolt
⑦	Fuel injector	Ⓒ	ISC valve mounting screw
⑧	Cushion seal	Ⓓ	Delivery pipe mounting screw
⑨	STVA	Ⓔ	Straight plug mounting screw

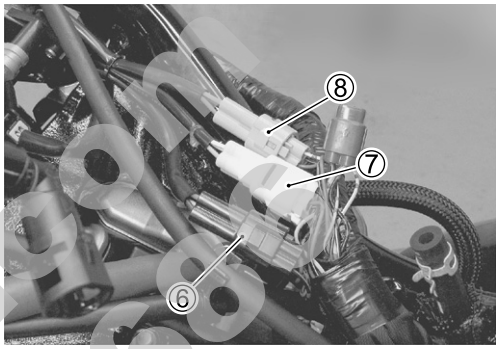
ITEM	N·m	kgf-m	lbf-ft
Ⓐ	3.5	0.35	2.5
Ⓑ	3.5	0.35	2.5
Ⓒ	2.1	0.21	1.5
Ⓓ	3.5	0.35	2.5
Ⓔ	5	0.5	3.5

THROTTLE BODY REMOVAL

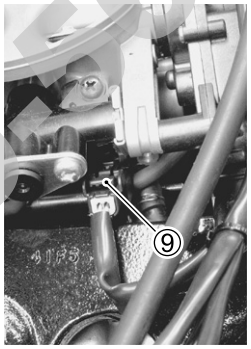
- Remove the air cleaner box. (☞Page 18-8)
- Remove the IAP sensors (Front cylinder side ① and Rear cylinder side ②) from the mounting stay.
- Remove the PCV hose ③ and loosen the clamp screw ④.
- Remove the air cleaner outlet tube ⑤.

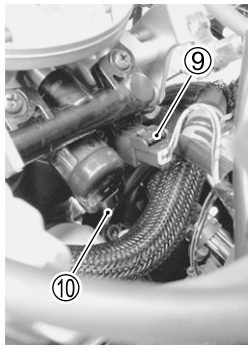


- Disconnect the TP sensor lead wire coupler ⑥, STVA lead wire coupler ⑦ and STP sensor lead wire coupler ⑧.



- Disconnect the fuel injector couplers ⑨ and ISC valve coupler ⑩.



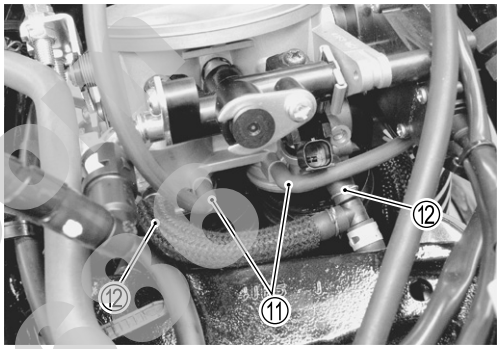


CAUTION

Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF. If the ECM coupler or ISC valve coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual valve position being written in ECM and causing an error of ISC valve operation.

- Loosen the throttle body clamp screw at the intake pipe side.
- Move the throttle body upward.

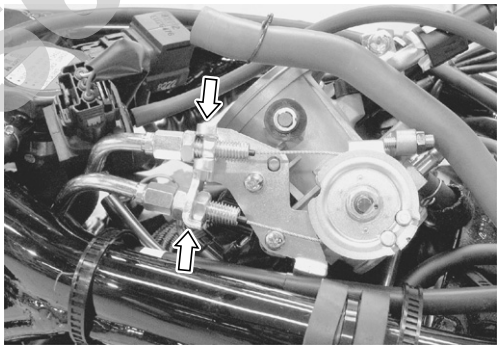
- Disconnect the vacuum hoses ⑪.
- Disconnect the hoses ⑫. (For E-33)



- Disconnect the throttle cables from their drum.

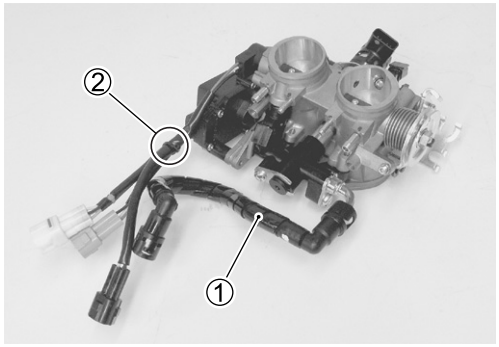
CAUTION

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.

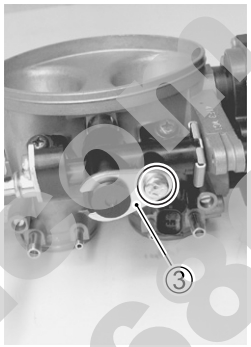


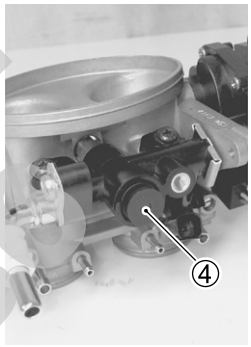
THROTTLE BODY DISASSEMBLY

- Remove the fuel feed hose ①.
- Remove the clamp ②.

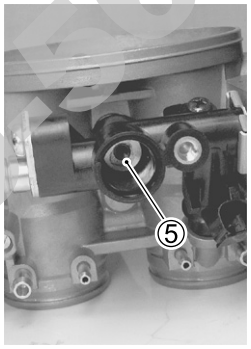


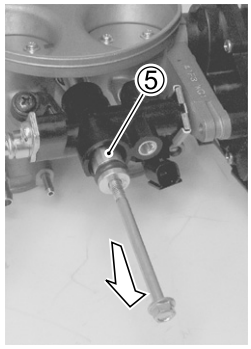
- Loosen the screw and remove the plate ③.
- Pull on the straight plug ④ straightly outward to remove it so as not to cause scratches on the O-ring seat of the delivery pipe.



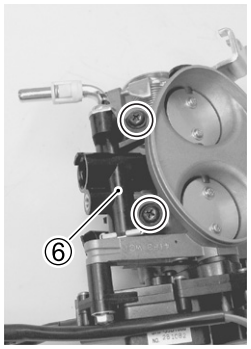


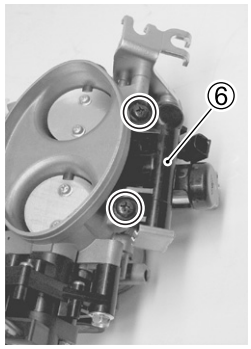
- Screw an appropriate bolt with the size of M5 × 0.8 into the straight joint ⑤ at least ten turns (8 mm).
- Pull on the straight joint ⑤ straightly outward to remove it so as not to cause scratches on the O-ring seat of the delivery pipe.



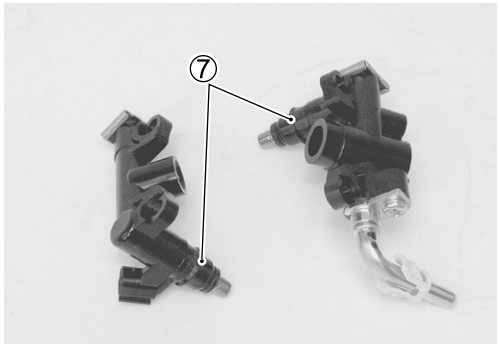


- Loosen screws and remove the delivery pipe ⑥ straightly outward so as not to cause scratches on the fuel injector.



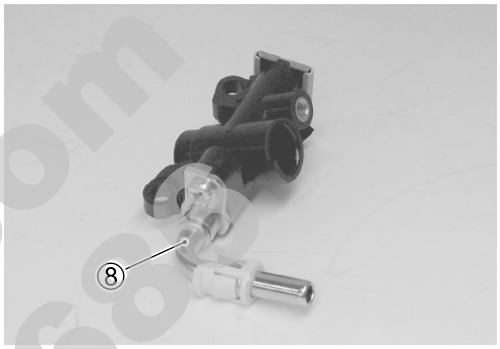


- When removing the fuel injector ⑦, pull it straightly so as not to cause scratches on the O-ring seat of delivery pipe.



CAUTION

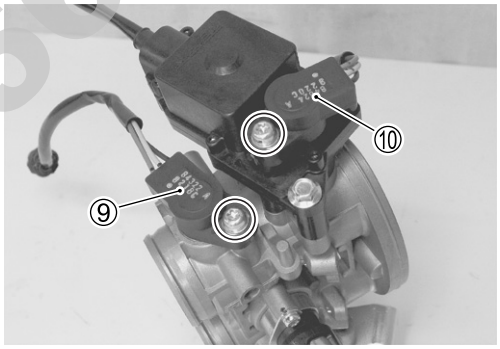
Never remove the L-joint ⑧.



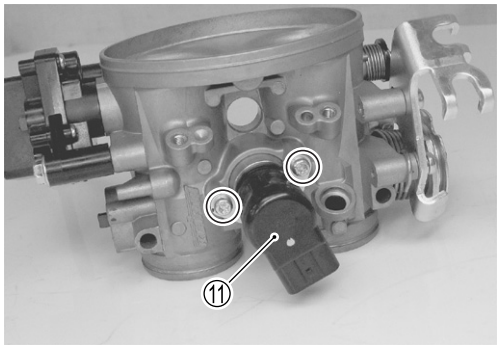
- Remove the TP sensor ⑨ and STP sensor ⑩ with the special tool.

TOOL 09930-11950: Torx wrench

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

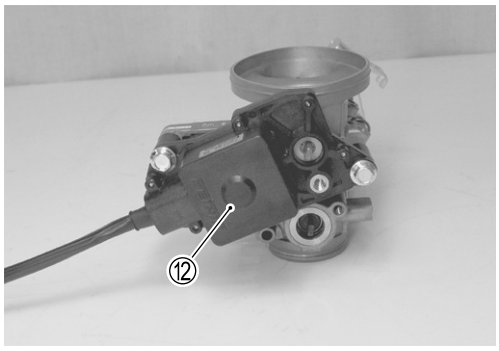


- Remove the ISC valve ⑪ straightly outward.



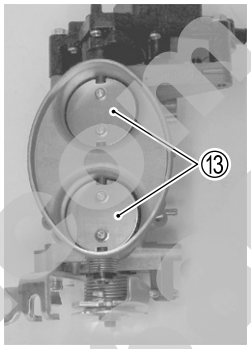
CAUTION

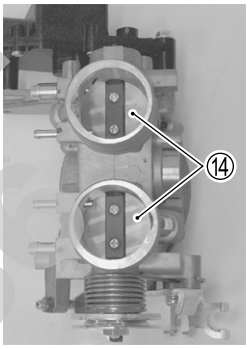
Never remove the STVA ⑫ from the throttle body.



CAUTION

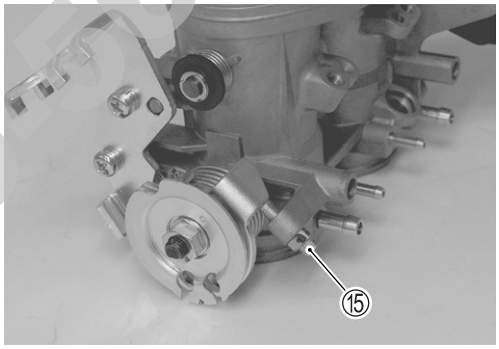
Never remove the secondary throttle valve ⑬ and throttle valve ⑭.





CAUTION

The adjusting screw ⑮ is factory-adjusted at the time of delivery and do not turn or remove it.



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.

THROTTLE BODY INSPECTION

- Check following items for any damage or clogging.

* O-ring
* Throttle valve
* Secondary throttle valve
* Vacuum hose
* Fuel hose/pipe
* Injector cushion seal

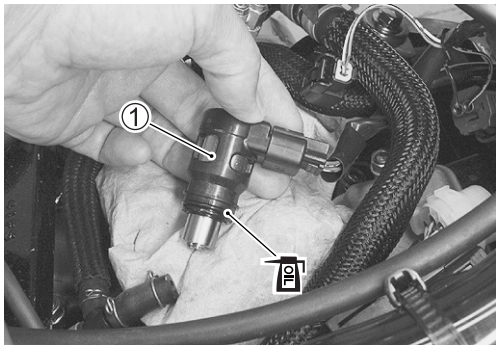
THROTTLE BODY REASSEMBLY

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

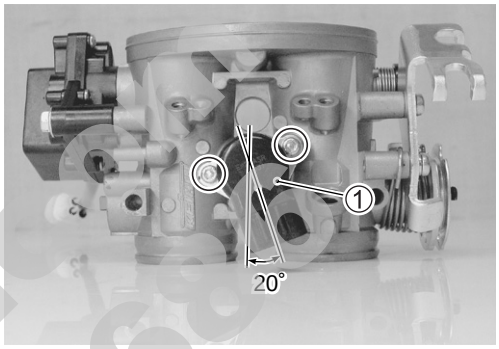
- Apply thin coat of engine oil to the O-ring.

CAUTION

Replace the O-ring with a new one.



- Connect the ISC valve ① to the ISC lead wire coupler.
- Turn the ignition switch ON and then OFF, and the ISC valve operates. Disconnect the ISC lead wire coupler when the valve has contracted fully (full open position).
- Insert the ISC valve ① straightly along the bore and position it at 20 degrees as shown in the photograph.
- Tighten the ISC valve mounting screws to the specified torque.

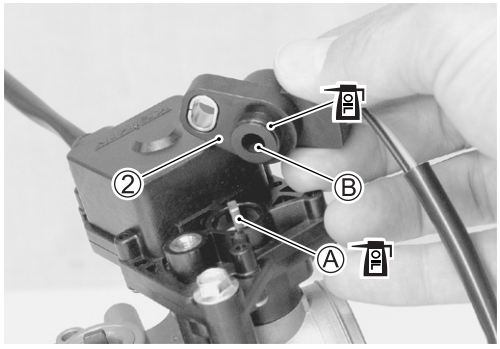


ISC valve mounting screw: 2.1 N·m (0.21 kgf-m, 1.5 lbf-ft)

CAUTION

*** The ISC valve ① must be installed with the valve fully contracted (full open position).**
*** Once the ISC valve ① has been removed or installed, the ISC valve preset and DTC clear must be performed using SDS tool with the throttle body assembled. (☞Page 18-54)**

• With the STV fully opened, install the STP sensor ② and tighten the STP sensor mounting screw to the specified torque.

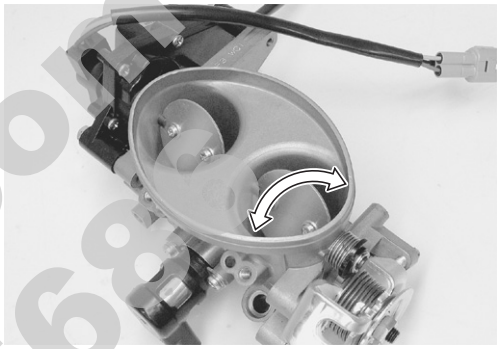


CAUTION

TPS and STPS resemble each other very closely in external appearance.
Make sure to check the color of coupler before installing.

STP sensor ②: Green color coupler

NOTE:
** Apply thin coat of engine oil to the new O-ring.*
** Align the secondary throttle shaft end Ⓐ with the groove Ⓑ of STP sensor.*
** Apply engine oil to the secondary throttle shaft end Ⓐ if necessary.*

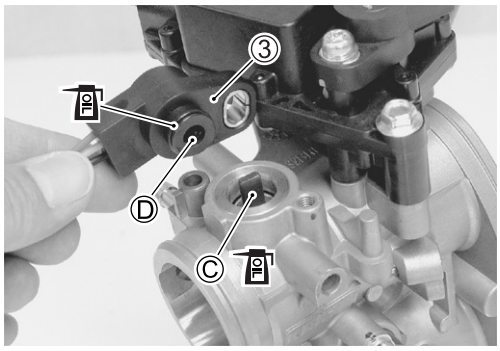


09930-11950: Torx wrench

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

NOTE:
** Make sure the STP valve open or close smoothly.*
** If the STP sensor adjustment is necessary, refer to page 51 for STP sensor setting procedure.*

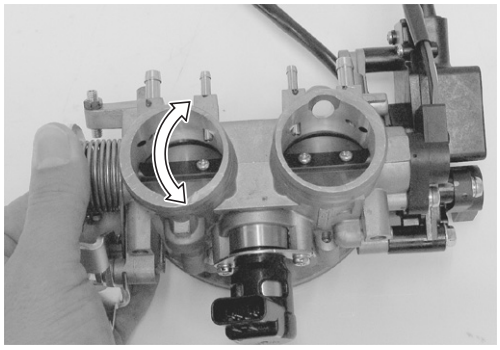
• With the throttle valve fully closed, install the TP sensor ③ and tighten the TP sensor mounting screw to the specified torque.



NOTE:
** Apply thin coat of engine oil to the new O-ring.*
** Align the throttle shaft end Ⓒ with the groove Ⓓ of TP sensor.*
** Apply engine oil to the throttle shaft end Ⓒ if necessary.*

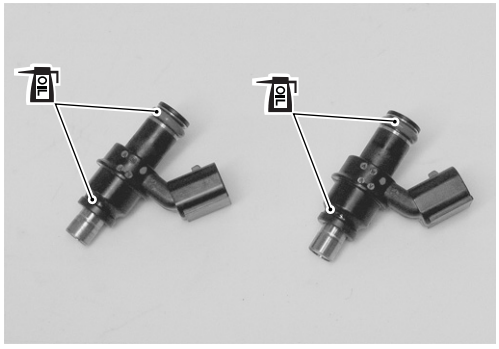
09930-11950: Torx wrench

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



NOTE:
** Make sure throttle valve open or close smoothly.*
** TP sensor setting procedure. (☞Page 18-52)*

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

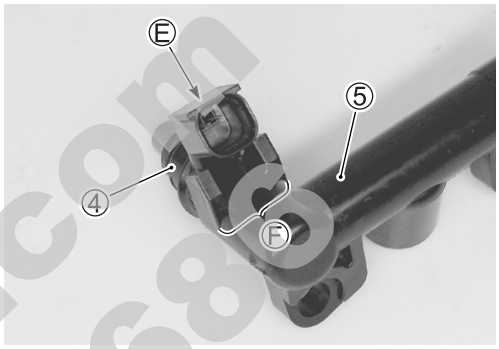


CAUTION

Replace the O-rings and cushion seals with the new ones.

• Install the fuel injector ④ by pushing it straight to the delivery pipe ⑤.

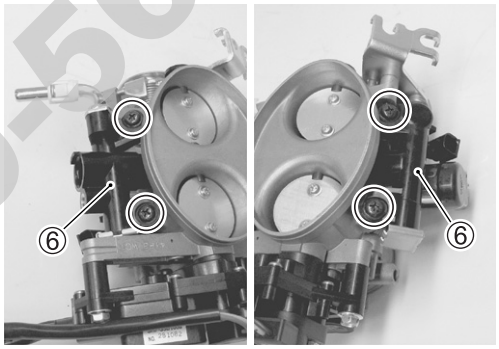
NOTE:
Align the coupler Ⓔ of the injector with the groove Ⓕ of the delivery pipe.



CAUTION

Never turn the injector while pushing it.

• Install the fuel delivery pipes ⑥ to the throttle body.



CAUTION

Never turn the fuel injectors while installing them.

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

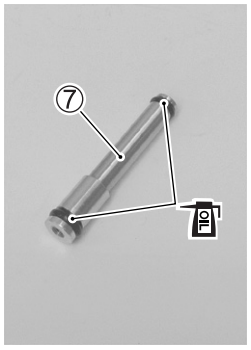
Fuel delivery pipe mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)

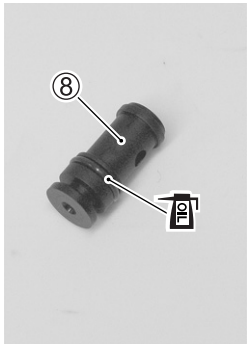
- Before installing the straight joint ⑦, clean its inside and outside.
- Apply thin coat of the engine oil to the O-rings.

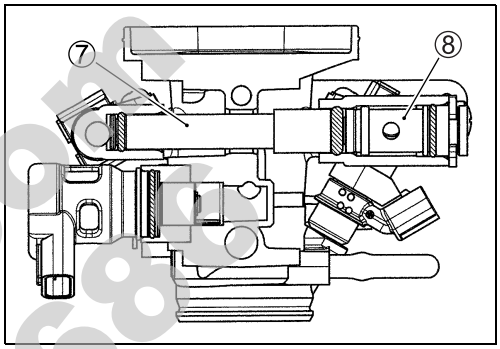
CAUTION

Replace the O-rings with the new ones.

- Insert both the straight joint ⑦ and straight plug ⑧ straightly into the delivery pipe.

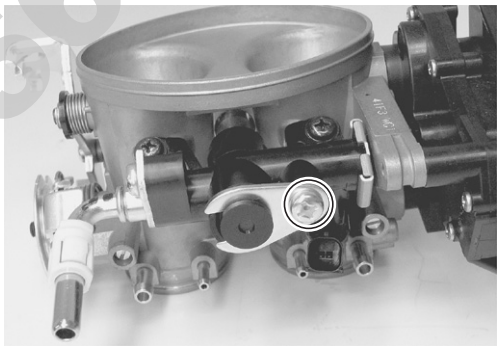






- Tighten the straight plug mounting screw to the specified torque.

Straight plug mounting screw: 5 N·m (0.5 kgf-m, 3.5 lbf-ft)



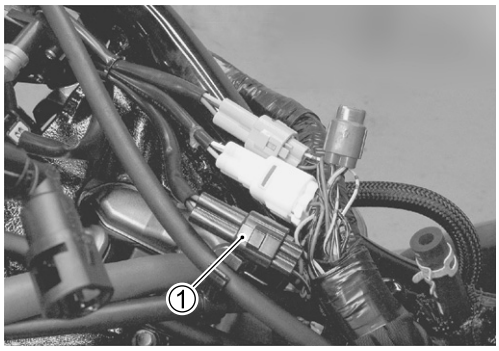
THROTTLE BODY INSTALLATION

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

- Connect the sensor lead wire couplers.

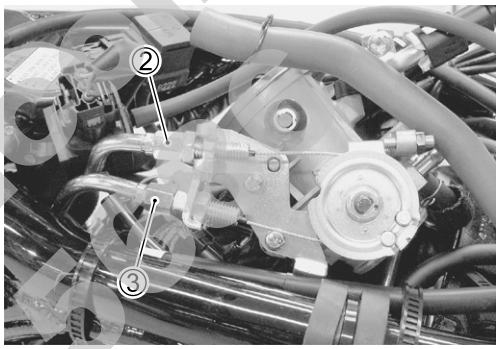
CAUTION

*** TP sensor lead wire coupler and STP sensor lead wire coupler resemble each other very closely in external appearance.**
*** Make sure to check the color of coupler before installing.**

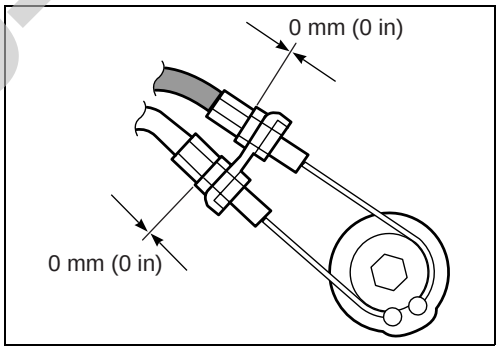


TP sensor lead wire coupler ①: Black

- Connect the throttle pulling cable ② and throttle returning cable ③ 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 mm (0 in).
- Tighten each lock-nut.
- Adjust the throttle cable play. (☞Page 18-16)



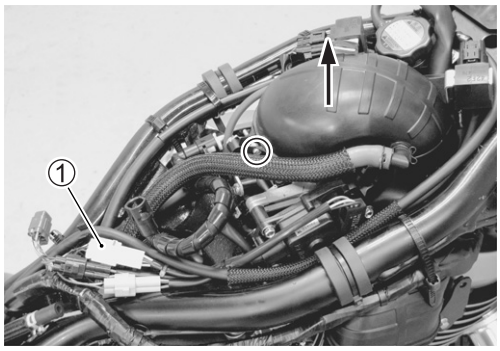
CAUTION

Once the ISC valve has been removed or replaced, the ISC valve preset and DTC clear must be performed using SDS tool with the throttle body assembled. (☞Page 18-54)

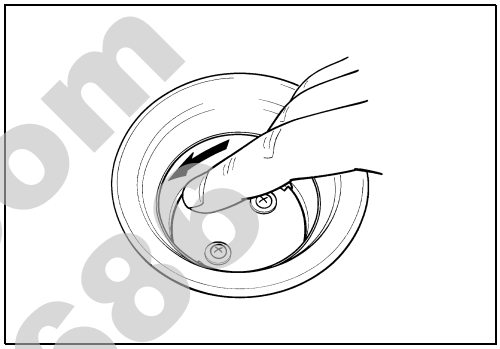
STP SENSOR ADJUSTMENT

If the STP sensor adjustment is necessary, measure the sensor out put voltage and adjust the STP sensor position as follows:

- Remove the fuel tank. (☞ Page 14-93)
- Disconnect the STVA coupler ①.
- Loosen the clamp screw and move the air cleaner outlet tube upward.



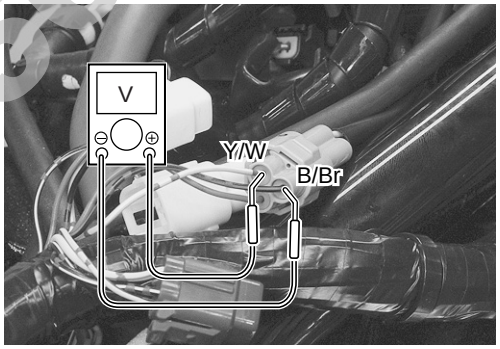
- Insert the needle pointed probes to the lead wire coupler.
- Turn the ignition switch ON.
- Close the secondary throttle valve by finger, and measure the STP sensor out put voltage.



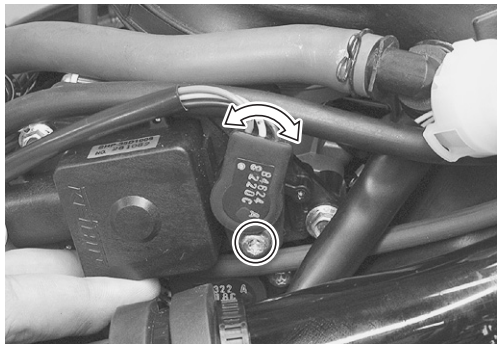
DATA STP sensor out put voltage
ST valve is fully closed: Approx. 0.5 V
(⊕ Y/W – ⊖ B/Br)

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

Tester knob indication: Voltage (⎓)



- If the STP sensor voltage is out of specification, loosen the throttle body clamp screw at the intake pipe side. (☞Page 18-41)
- Move the throttle body upward.
- Loosen the STP sensor mounting screw and adjust the STP sensor voltage to specification.



TOOL 09930-11950: Torx wrench

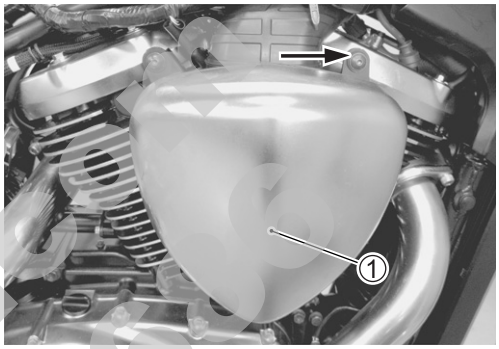
STP sensor mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)

TP SENSOR ADJUSTMENT

After all adjustments are completed, check or adjust the TPS setting condition.

1. Remove the right frame cover. (☞ Page 7-2)
2. Connect the special tool (Mode select switch) to the dealer mode coupler at the wiring harness. (☞ Page 14-37)
3. Turn the ignition switch ON and mode select switch ON.

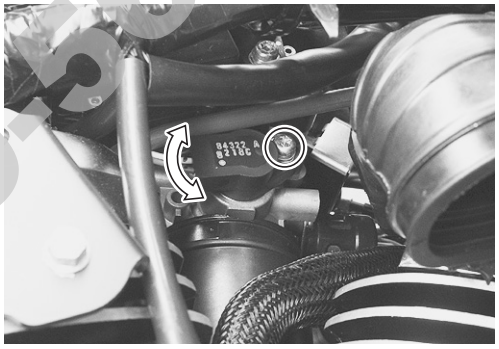
4. If the throttle position sensor adjustment is necessary, lift and support the fuel tank. (☞ Page 14-93)
5. Remove the air cleaner box ①. (☞Page 18-8)
6. Move the air cleaner outlet tube forward.



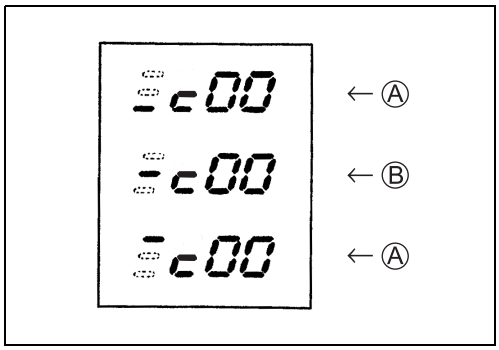
7. Loosen the screw and turn the throttle position sensor and bring the line to the middle.
8. Then, tighten the screw to fix the throttle position sensor.

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

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



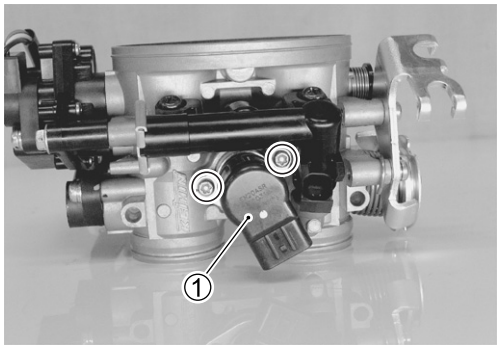
The LCD displays the line for 0.4 sec. at a time, and when such a display repeats two times, it indicates the current position where the sensor is fixed.



Ⓐ Incorrect
Ⓑ Correct position

ISC VALVE REMOVAL

- Remove the throttle body. (☞Page 18-40)
- Remove the ISC valve ①.



ISC VALVE INSTALLATION

Install the ISC valve in the reverse order of removal.
Pay attention to the following points:

CAUTION

*** The ISC valve must be installed with the valve fully contracted (full open position). (☞Page 18-46)**
*** Once the ISC valve has been removed or replaced, the ISC valve preset and DTC clear must be performed using SDS tool with the throttle body assembled. (☞Page 18-54)**

ISC VALVE INSPECTION

- Inspect the ISC valve for carbon deposition or damage.
- Clean or replace the ISC valve if necessary.

NOTE:
The ISC valve can be checked without removing it.
(☞Page 18-30)

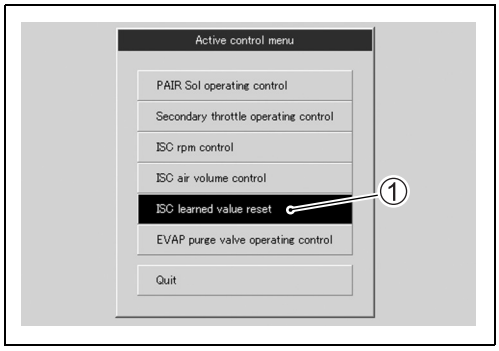
ISC VALVE PRESET AND OPENING INITIALIZATION

When removing or replacing the ISC valve, set the ISC valve in the following procedures:

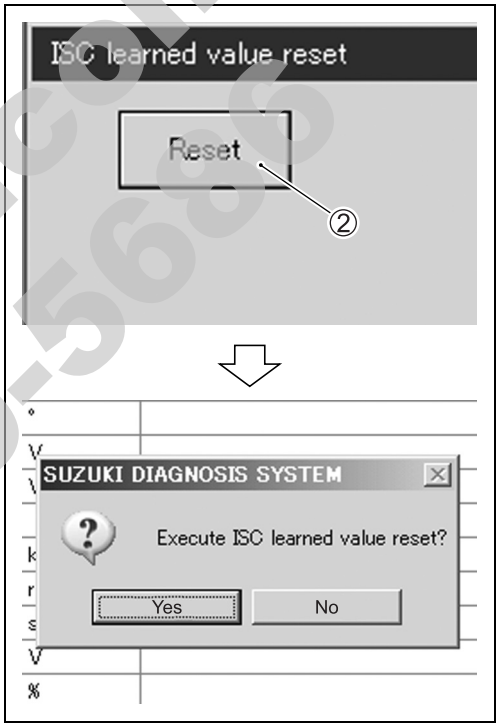
1) Turn the ignition switch ON.
2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

TOOL 09904-41010: SDS set tool
99565-01010-017: CD-ROM Ver.17

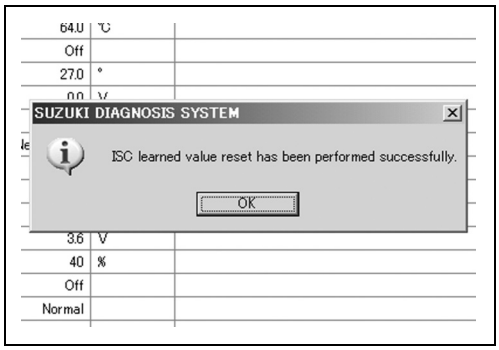
3) Click "Active control".
4) Click "ISC learned value reset" ①.



5) Click "Reset" button ② to clear the ISC learned value.



NOTE:
The learned value of the ISC valve is set at preset position.



6) Close the SDS tool.
7) Turn the ignition switch OFF.

NOTE:
The ISC valve opening initialization is automatically started after the ignition switch is turned OFF.

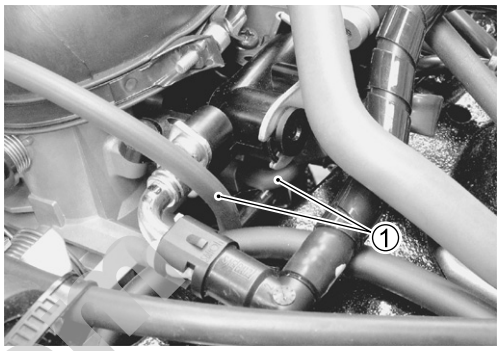
THROTTLE VALVE SYNCHRONIZATION

USE OF SDS TOOL

Check and adjust the throttle valve synchronization between two cylinders.

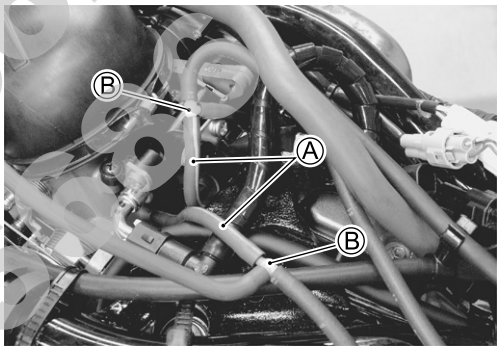
Step 1

- Lift and support the fuel tank. (☞ Page 14-93)
- Disconnect the vacuum hoses ① from the throttle body.



- Connect the respective vacuum tester hoses and IAP sensor vacuum hoses to each vacuum nipple on the throttle body with the tools (Ⓐ, Ⓑ).

  13681-39F00-225: Hose Ⓐ
  13685-02FA0: Three way joint Ⓑ



Step 2

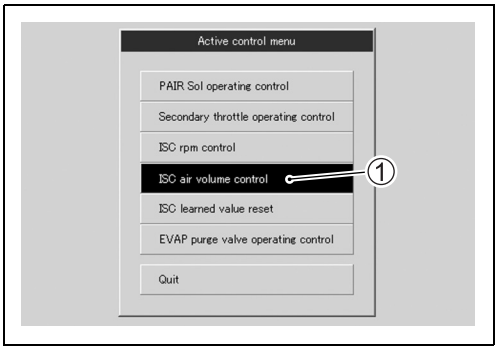
- Temporary install the fuel tank.
- Set up the SDS tool. (Refer to the SDS operation manual for further details.)

TOOL **09904-41010: SDS set tool**
99565-01010-017: CD-ROM Ver.17

- Start the engine.
- Click "Data monitor".
- Warm up the engine (Water temp. more than 90 °C (194 °F)).

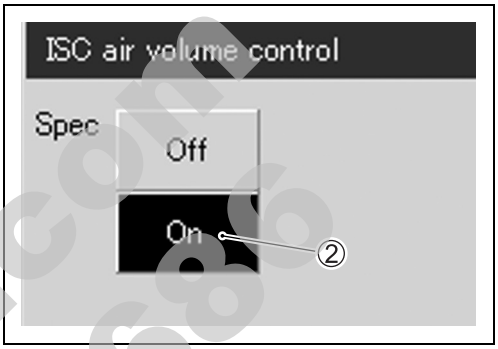
Item	Value	Unit
☐ Engine speed	1129	rpm
☐ Manifold absolute pressure 1	77.9	kPa
☐ Manifold absolute pressure 2	95.8	kPa
☐ Desired idle speed	1104	rpm
☐ Engine coolant / oil temperature	92.0	℃
☐ Intake air temperature	60.0	℃
☐ Secondary throttle actuator position sensor	40	%

- Click "Active control".
- Click "ISC air volume control" ①.

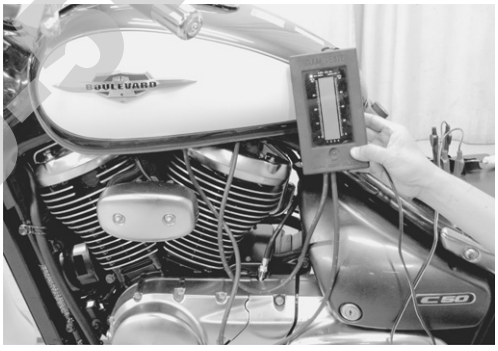


- Click "ON" bottom ② to fix the ISC air volume of two cylinders.

NOTE:
When making this synchronization, be sure that the water temperature is within 90 – 110 °C (194 – 230 °F).



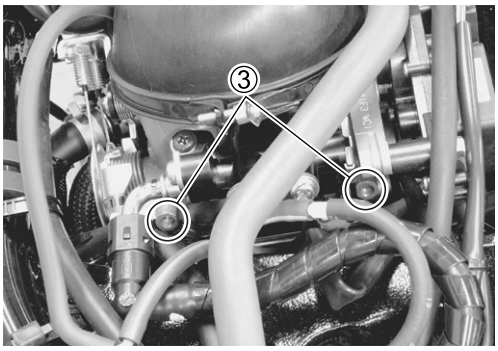
- Check for the synchronization of vacuum of #1 and #2 cylinders.



- Equalize the vacuum of the cylinders by turning each air screw ③ and keep it running at idling speed.

NOTE:
Always set the engine rpm at idle rpm.

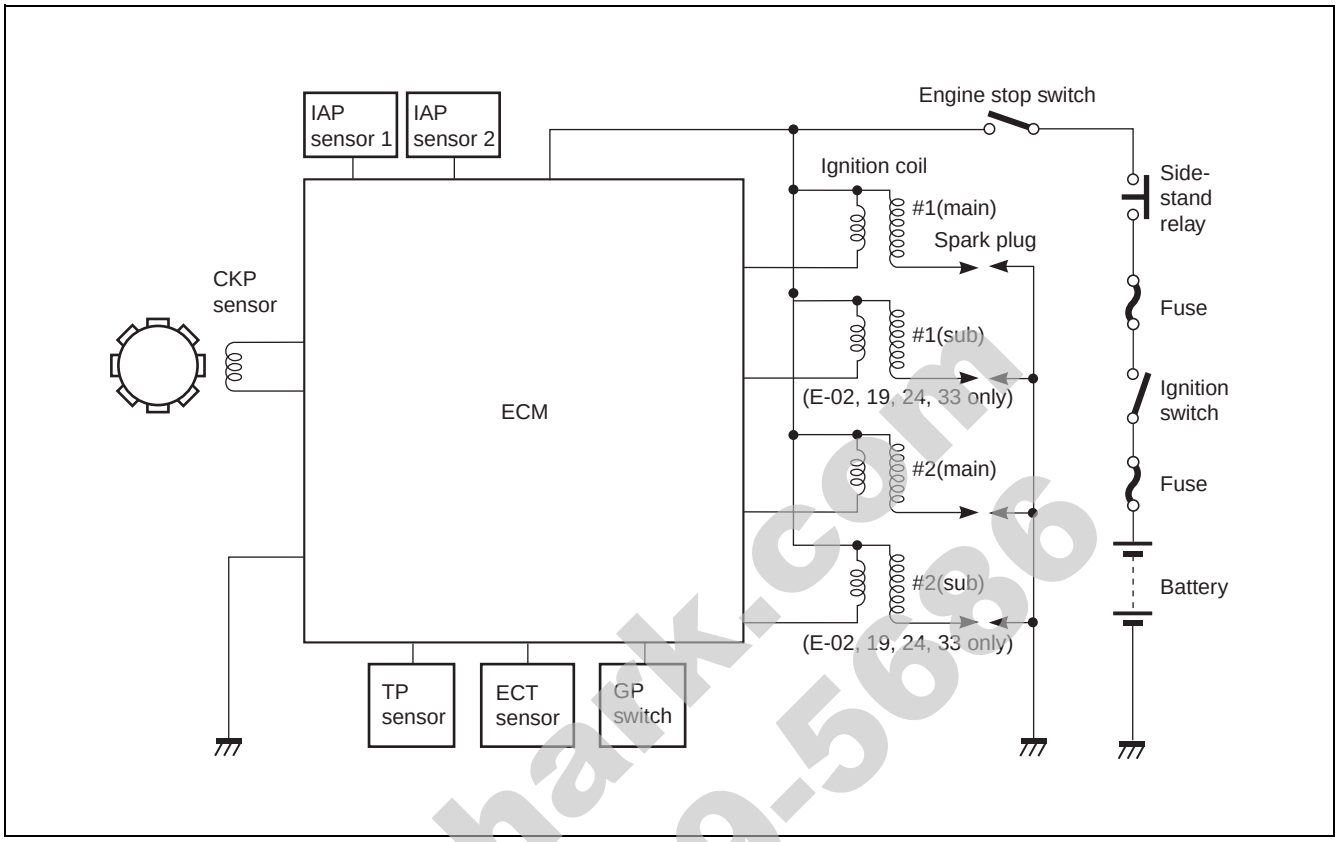
- If the adjustment is not yet correct, remove each air screw and clean them with a spray-type carburetor cleaner and blow dry with a compressed air. Also, clean the air screw passageways.



NOTE:
* *Slowly turn the 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.*

Step 3
Repeat the procedures of Step 2.

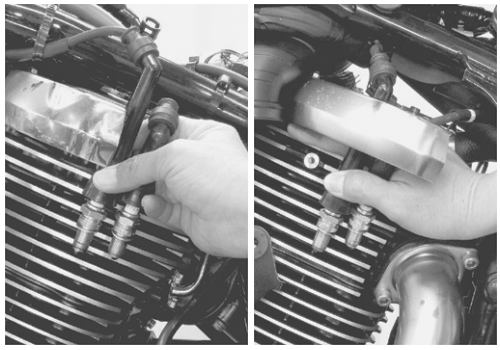
IGNITION SYSTEM



INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE (For E-02, 19, 24, 33)

- Remove the fuel tank. (☞ Page 14-93)
- Remove the frame head covers. (☞ Page 3-3)
- Disconnect the spark plug caps. (☞ Page 18-8)
- Connect new spark plugs to each spark plug cap and ground them to the cylinder head.



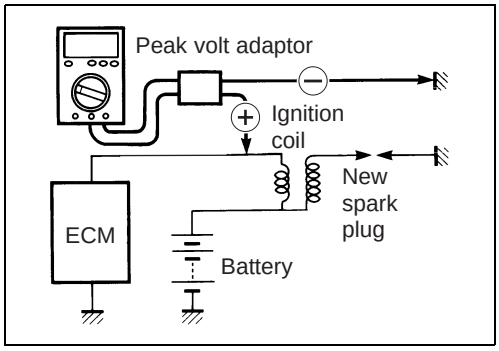
NOTE:

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

Measure the ignition coils primary peak voltage in the following procedures:

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

#1 ignition coil (main): ⊕ Probe: B/Bl terminal
⊖ Probe: Ground
#1 ignition coil (sub): ⊕ Probe: B/R terminal
⊖ Probe: Ground
#2 ignition coil (main): ⊕ Probe: B/Y terminal
⊖ Probe: Ground
#2 ignition coil (sub): ⊕ Probe: White terminal
⊖ Probe: Ground

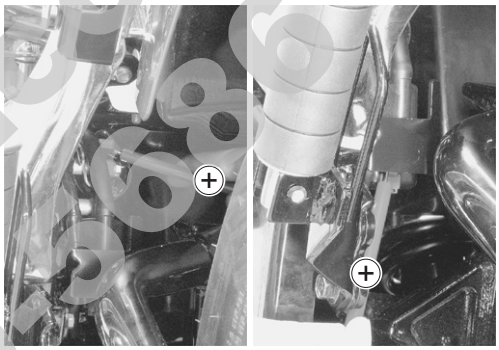


NOTE:
Do not disconnect the ignition coil primary wire coupler.

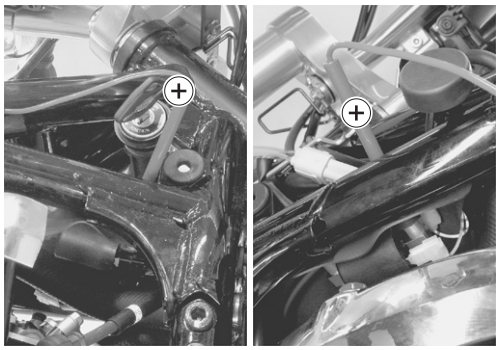
TOOL 09900-25008: Multi-circuit tester set

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 the ignition switch "ON".
- Pull the clutch lever.
- 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: 200 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 PRIMARY PEAK VOLTAGE (For E-03, 28)

For details other than the following, refer to the VL800 service manual 8-18.

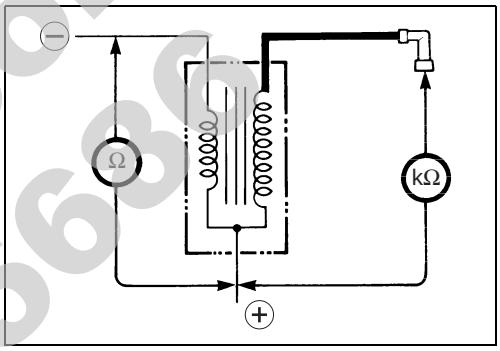
- Connect the multi-circuit tester with peak voltage adaptor as follows.

#1 ignition coil: ⊕ Probe: B/Bl terminal
⊖ Probe: Ground
#2 ignition coil: ⊕ Probe: B/R terminal
⊖ Probe: Ground

DATA **Ignition coil primary peak voltage: 200 V and more**

IGNITION COIL RESISTANCE

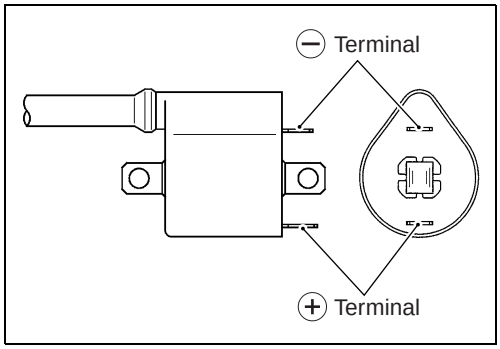
- Remove the fuel tank. (☞ Page 14-93)
- Remove the frame head covers. (☞ Page 3-3)
- Disconnect the spark plug caps.
- Remove the left frame cover, left frame lower cover and tool box. (☞ Page 7-2)
- Measure the ignition coil resistance in both the primary and secondary windings. If the resistance is not within the standard range, replace the ignition coil with a new one.



DATA **Ignition coil resistance**
Primary: 2.8 – 4.7 Ω (⊕ Terminal – ⊖ Terminal)
Secondary: 24 – 36 kΩ (Plug cap – ⊕ Terminal)

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

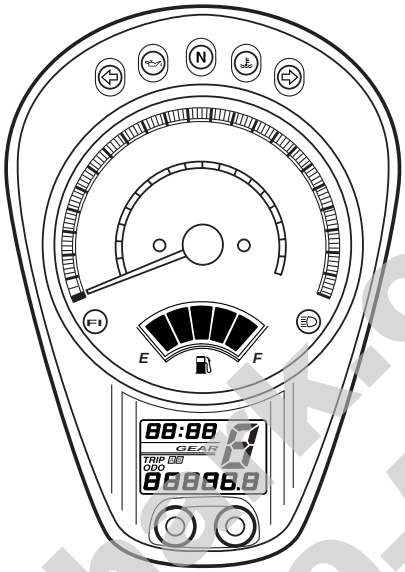
Tester knob indication: Resistance (Ω)



COMBINATION METER INSPECTION

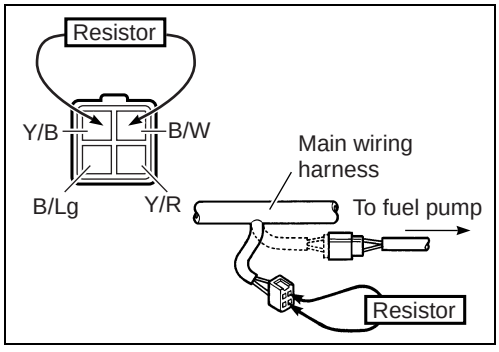
LED (LIGHT EMITTING DIODE)

Check that the LED lights (FI indicator light, Oil pressure indicator light and Engine coolant indicator light) immediately after turning the ignition switch ON. Also, other LED lights (Neutral indicator light, High-beam indicator light and Turn signal indicator light) can be checked by depending on each switch position.
If the LED fails in operation, replace the combination meter until with a new one after checking its wire harness/coupler.



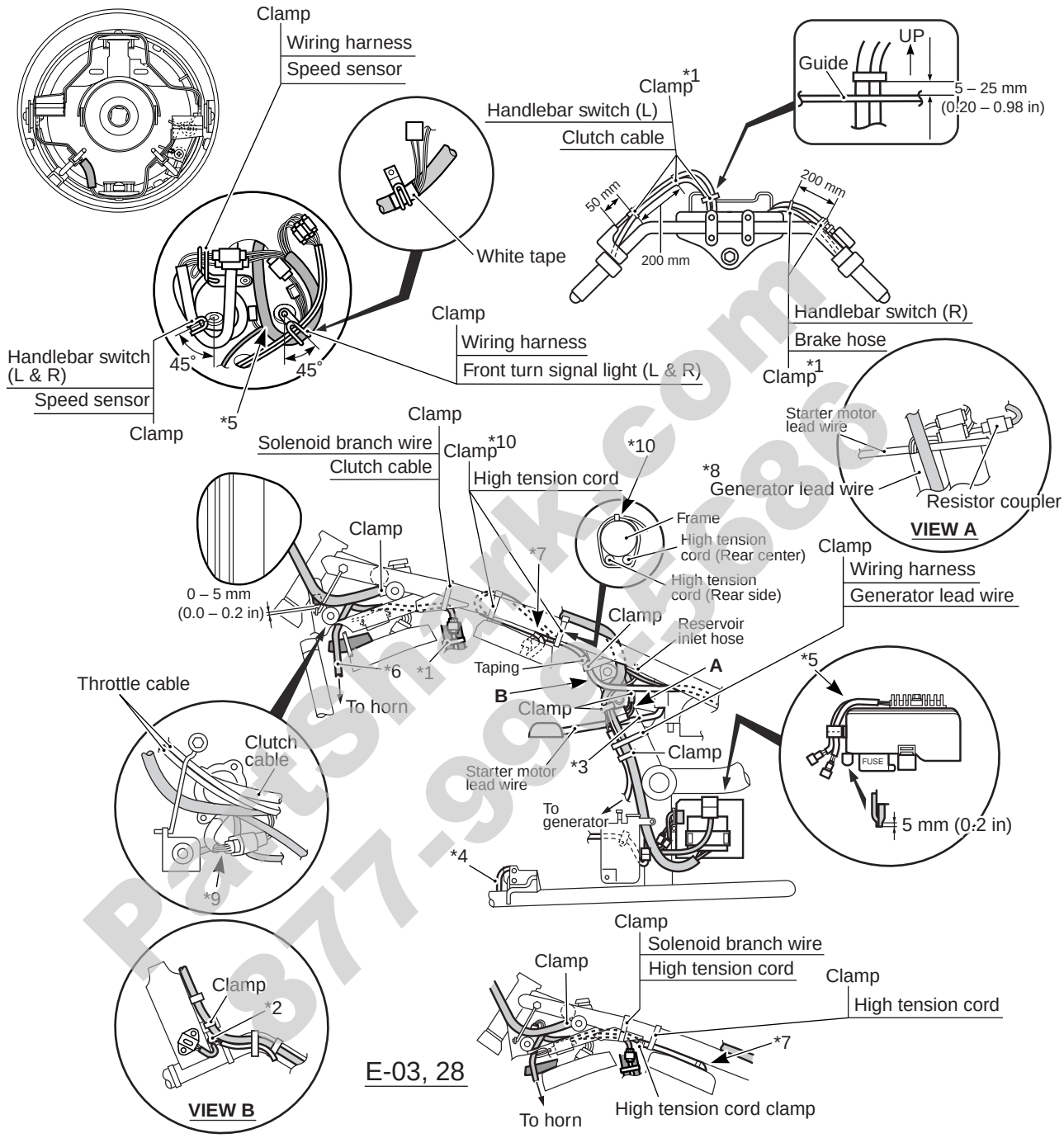
FUEL LEVEL METER INSPECTION

- Keep the motorcycle upright with a jack or wooden block.
- Release the side-stand or push the side-stand switch.
- Remove the fuel tank. (☞ Page 14-93)
- Connect the speedometer.
- Connect each resistor between the Y/B and B/W lead wire at the wire harness.
- Turn the ignition switch "ON" position and wait for approx. 26 seconds.
- Check the display of fuel meter as shown below. If any abnormality is found, replace the speedometer with a new one.

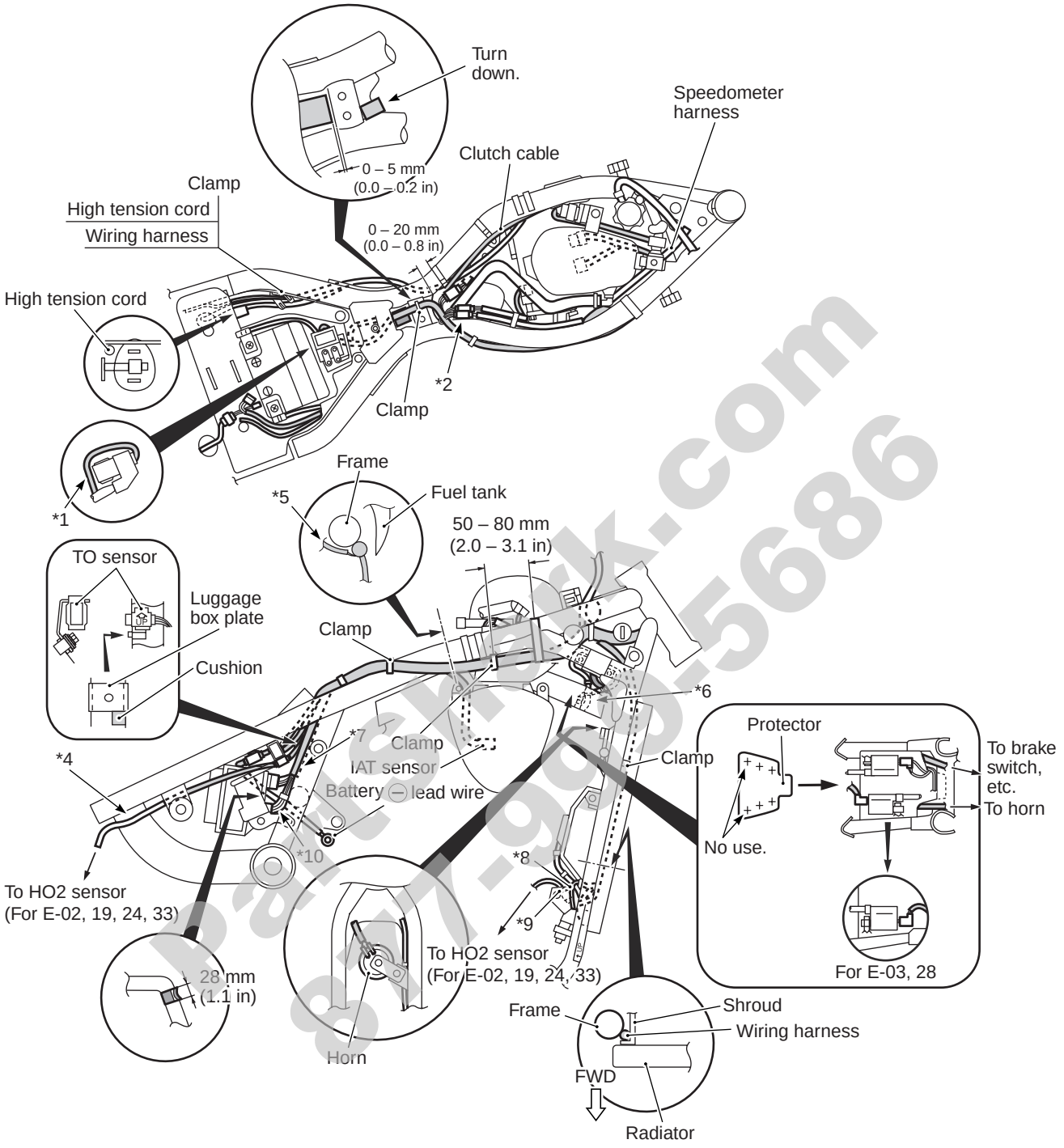


Resistance	Less than 13 Ω	21 – 64 Ω	76 – 115 Ω	129 – 187 Ω	More than 203 Ω	
Fuel level meter						Flicker 
Thermistor	OFF	OFF	OFF	OFF	OFF	ON

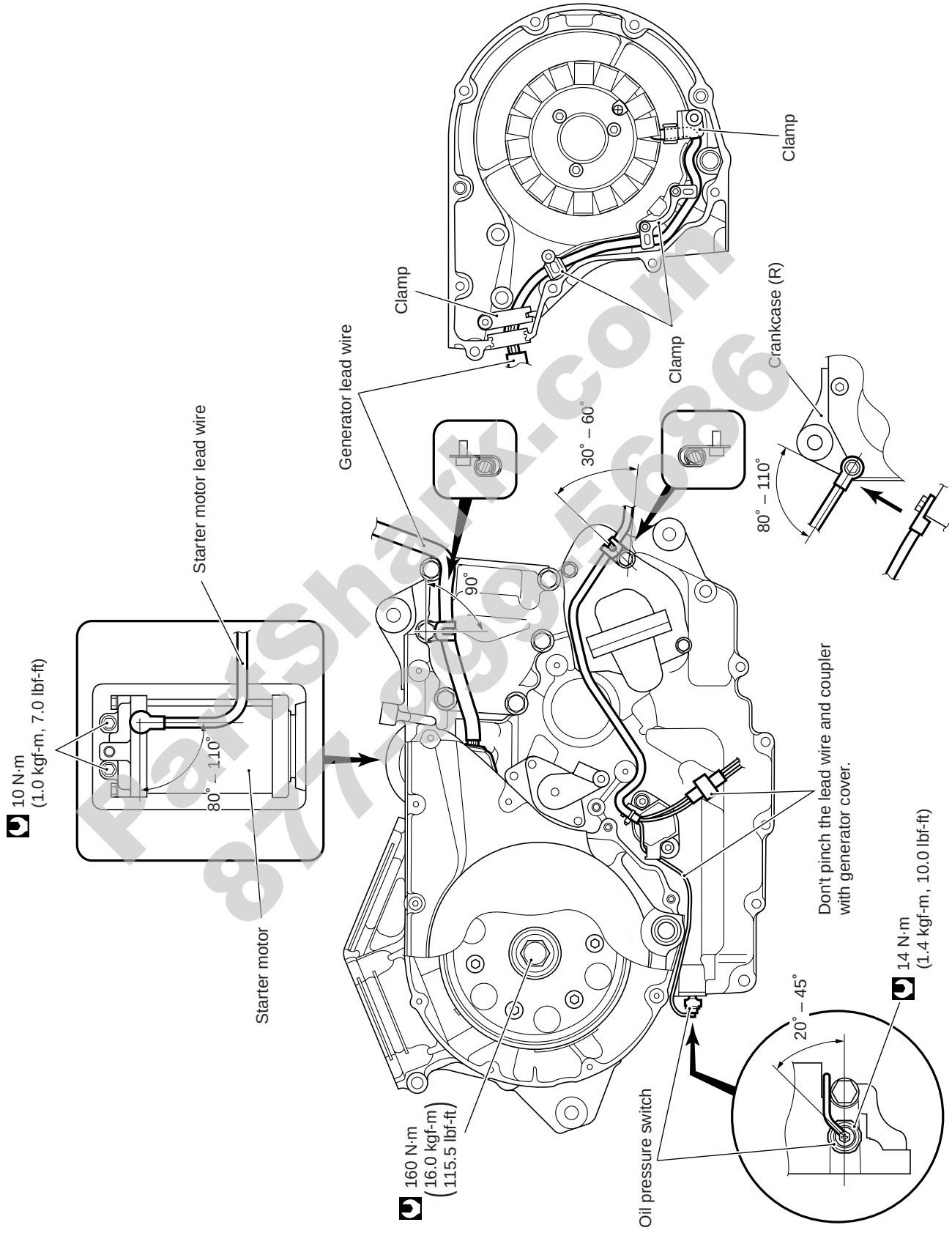
WIRING HARNESS ROUTING



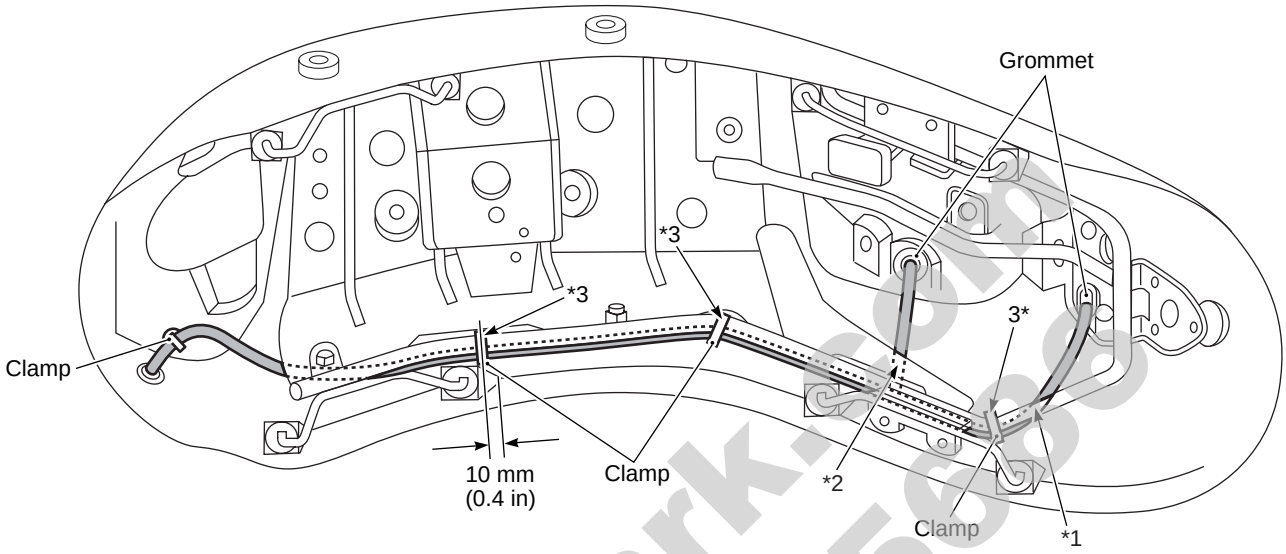
*1	Cut off the excess end of the clamp.	*6	Do not pinch the wiring harness with PAIR pipe and water hose.
*2	Pass the starter motor lead wire inside of the coupler.	*7	Do not contact the plug cap(s) with cylinder head cover cap.
*3	Do not pass the starter motor lead wire over the bracket.	*8	Pass the generator lead wire over the starter lead wire.
*4	Connect the gear position switch inside of the cover.	*9	Do not pinch the IG switch lead wire with cable, wiring harness and IG switch.
*5	Do not make slacked part.	*10	Face the lock part of the clamp upside and tip inside.



*1	Set the lead wire under the starter relay.	*6	Do not contact the plug cap(s) with cylinder head cover cap.
*2	Set the couplers inside of the frame.	*7	Pass the harness inside of the frame.
*3	Set the coupler behind the IG switch body.	*8	Pass the lead wire over the engine mounting bracket.
*4	Pass the HO2 sensor lead wire inside of the cover.	*9	After connecting the HO2 sensor coupler, set the coupler in the inside of bracket.
*5	Pass the lead wires under the frame. Do not contact the lead wires with fuel tank.	*10	Pass the battery ⊖ lead wire inside of the ECM.

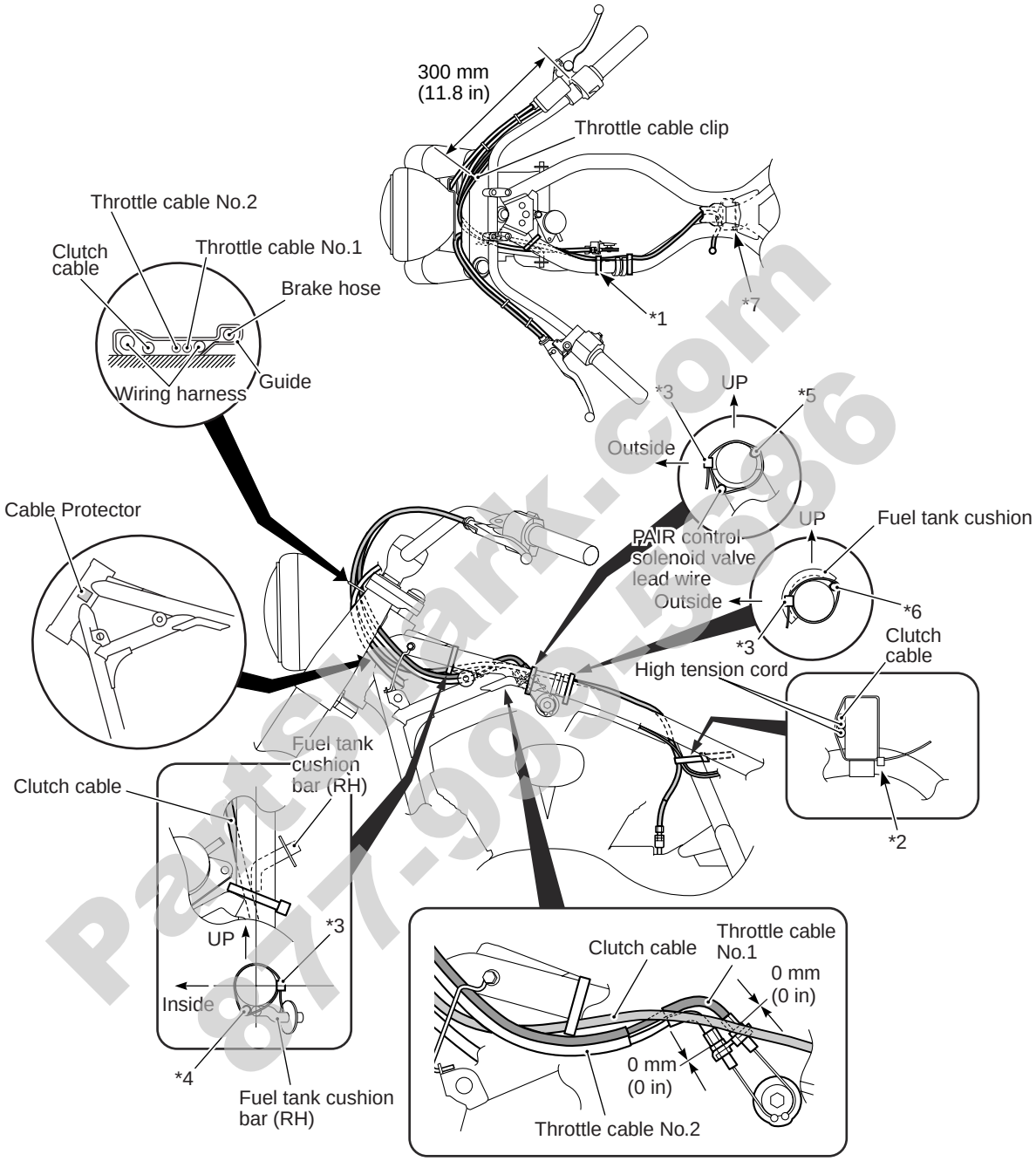


FWD ⇦



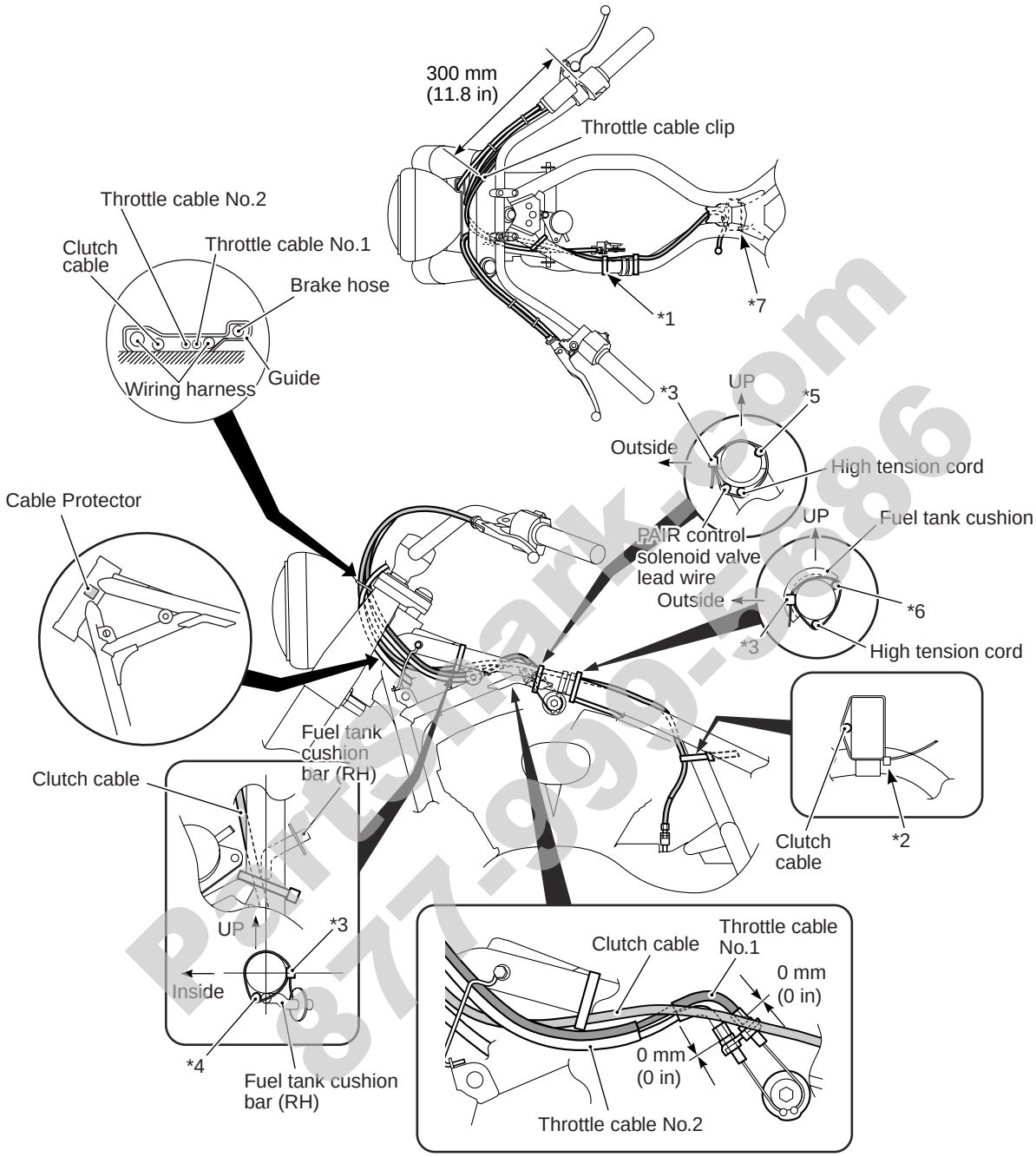
*1	Set the wire harness between the fender and fender brace.
*2	Set the wire harness between the fender and reinforcement.
*3	Cut the tip of clamp within 5 mm (0.2 in) from the lock part.

CABLE ROUTING
For E-02, 19, 24, 33



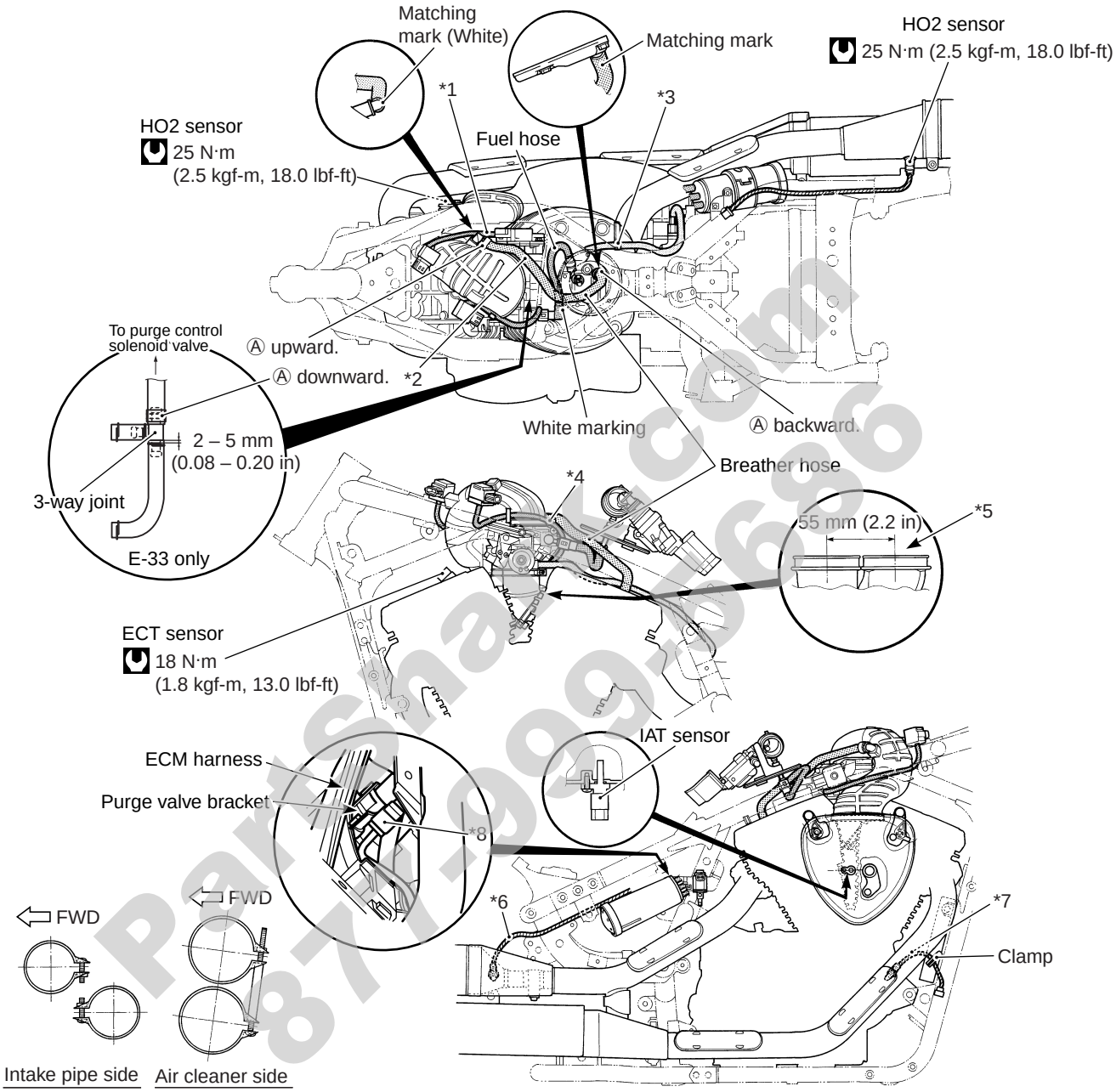
*1	When clamping, locate clutch cable so that its white tape comes closely adjacent to throttle cable bracket.	*5	Position the white tape of the clutch cable on the dent of the frame.
*2	Be careful not to contact the stopper of clamp and left side cover.	*6	Bring clutch cable into contact with cushion and clamp it on the rear side of cushion.
*3	Clamp in this direction.	*7	Clamp in this direction. Also, put the excess end of the clamp inside of the seat rail.
*4	Clamp the clutch cable inside of the bar.		

For E-03, 28



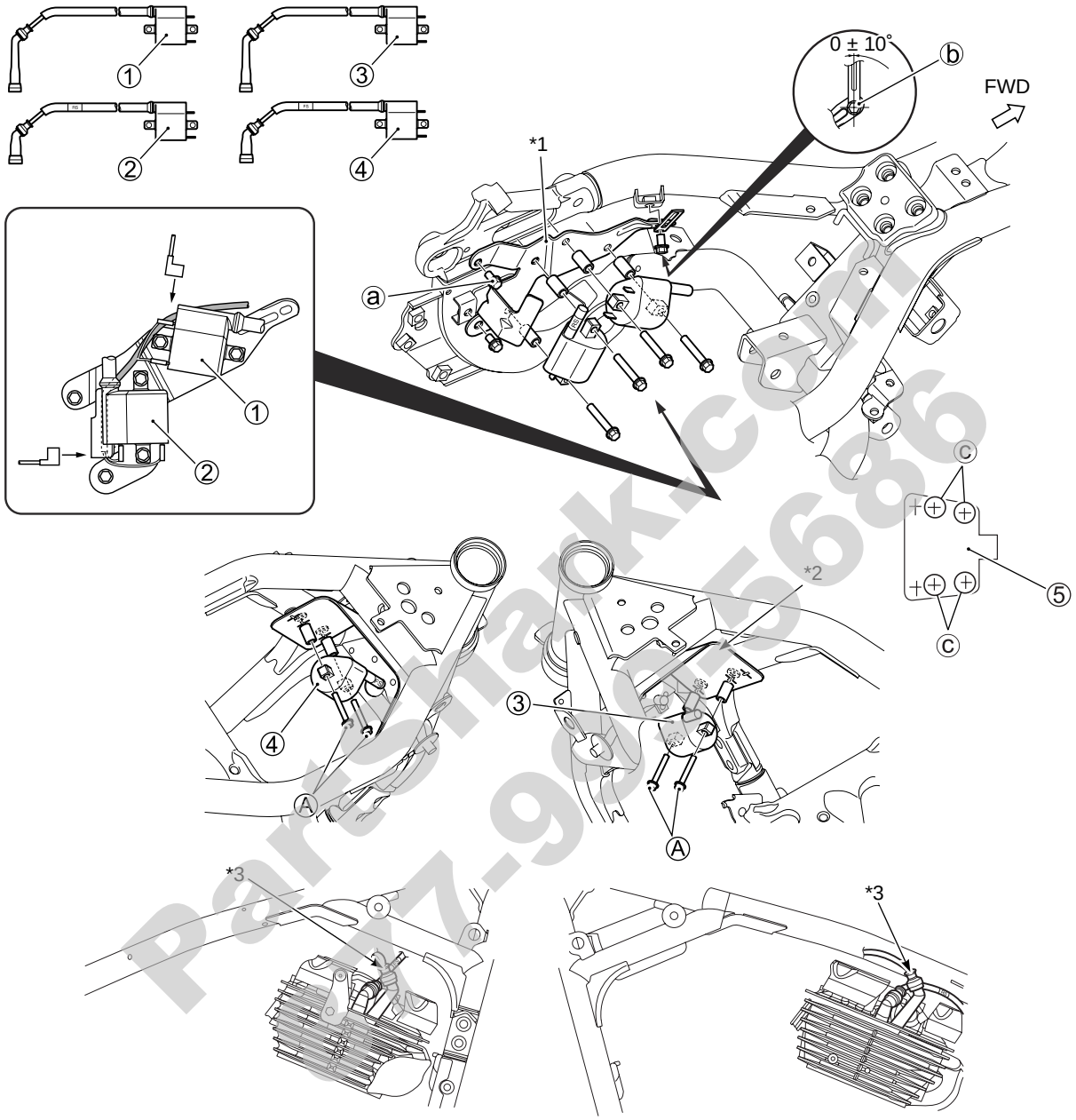
*1	When clamping, locate clutch cable so that its white tape comes closely adjacent to throttle cable bracket.	*5	Position the white tape of the clutch cable on the dent of the frame.
*2	Be careful not to contact the stopper of clamp and left side cover.	*6	Bring clutch cable into contact with cushion and clamp it on the rear side of cushion.
*3	Clamp in this direction.	*7	Clamp in this direction. Also, put the excess end of the clamp inside of the seat rail.
*4	Clamp the clutch cable inside of the bar.		

THROTTLE BODY INSTALLATION



*1	Pass the vacuum hose over the outlet tube. Be careful not to pinch the vacuum hose between the STV actuator and TP sensor.	*6	Pass the HO2 sensor lead wire over the pillion footrest bracket. Pass the HO2 sensor lead wire between the side rear cover and frame. Be careful not to contact the HO2 sensor lead wire and swingarm.
*2	Pass the breather hose over the fuel hose.		
*3	Clamp the marking point of the hose. (E-33 only)	*7	Be careful not to slack the lead wire between the HO2 sensor and clamp.
*4	Pass the vacuum hose over the delivery pipe and purge hose (E-33 only). Pass the vacuum hose between the guide and outlet tube.	*8	Set the HO2 sensor coupler outside of the ECM harness and purge valve bracket (E-33 only).
		Ⓐ	The end of the clamp should face...
*5	Install the intake pipes with top surfaces being horizontal.		

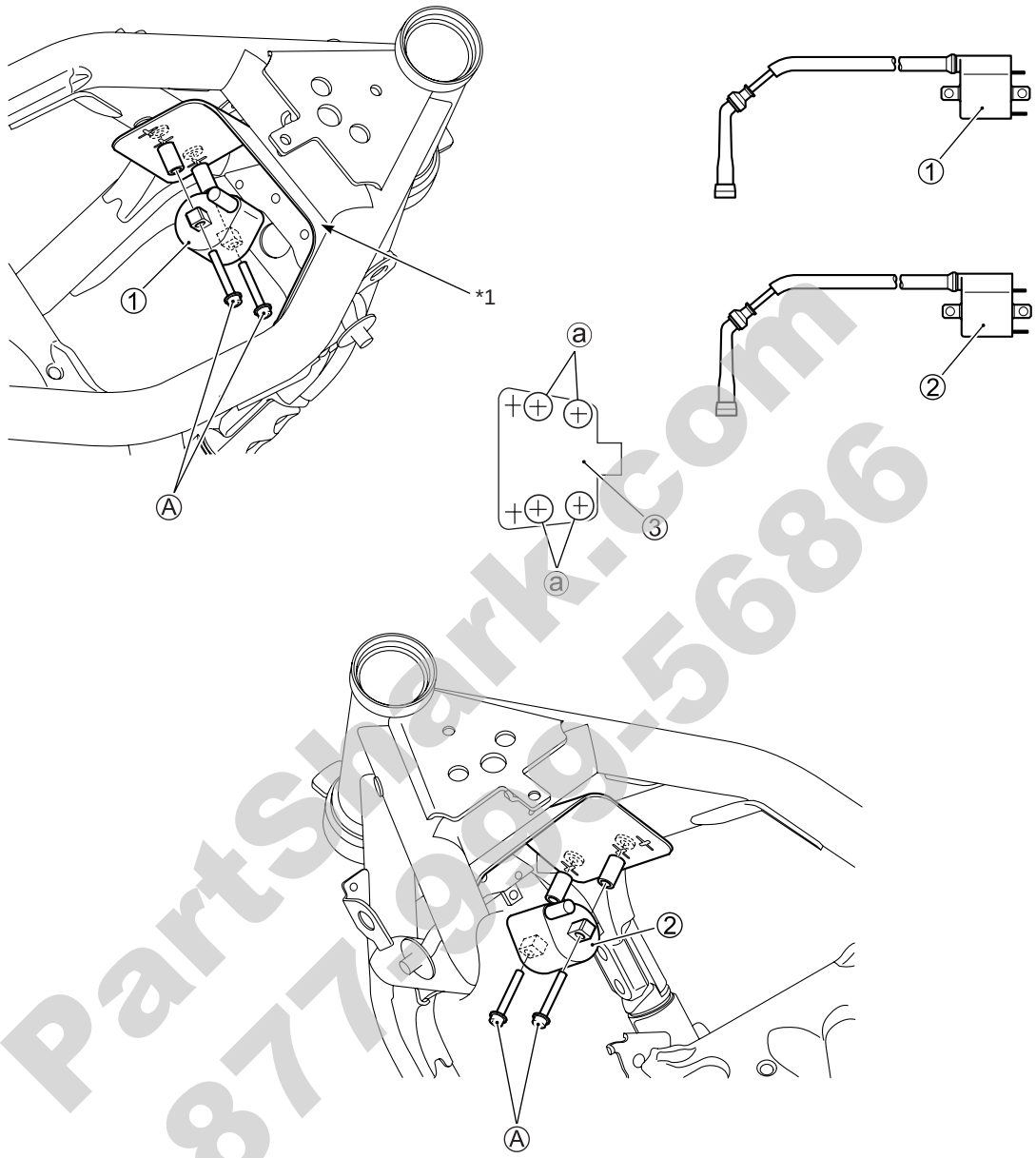
IGNITION COIL INSTALLATION
For E-02, 19, 24, 33



①	Ignition coil #1 (main)
②	Ignition coil #1 (sub)
③	Ignition coil #2 (main)
④	Ignition coil #2 (sub)
⑤	Protector
Ⓐ	Ignition coil bolt
*1	When installing the rear ignition coil bracket, temporarily tighten the bolts ⓐ and ⓑ first.
*2	Pass the spacer to the hole ⓒ of protector securely. Do not pinch the spacer between the protector and frame.
*3	Do not contact the plug cap with cylinder head cover cap.

ITEM	N·m	kgf-m	lbf-ft
Ⓐ	4.5	0.45	3.5

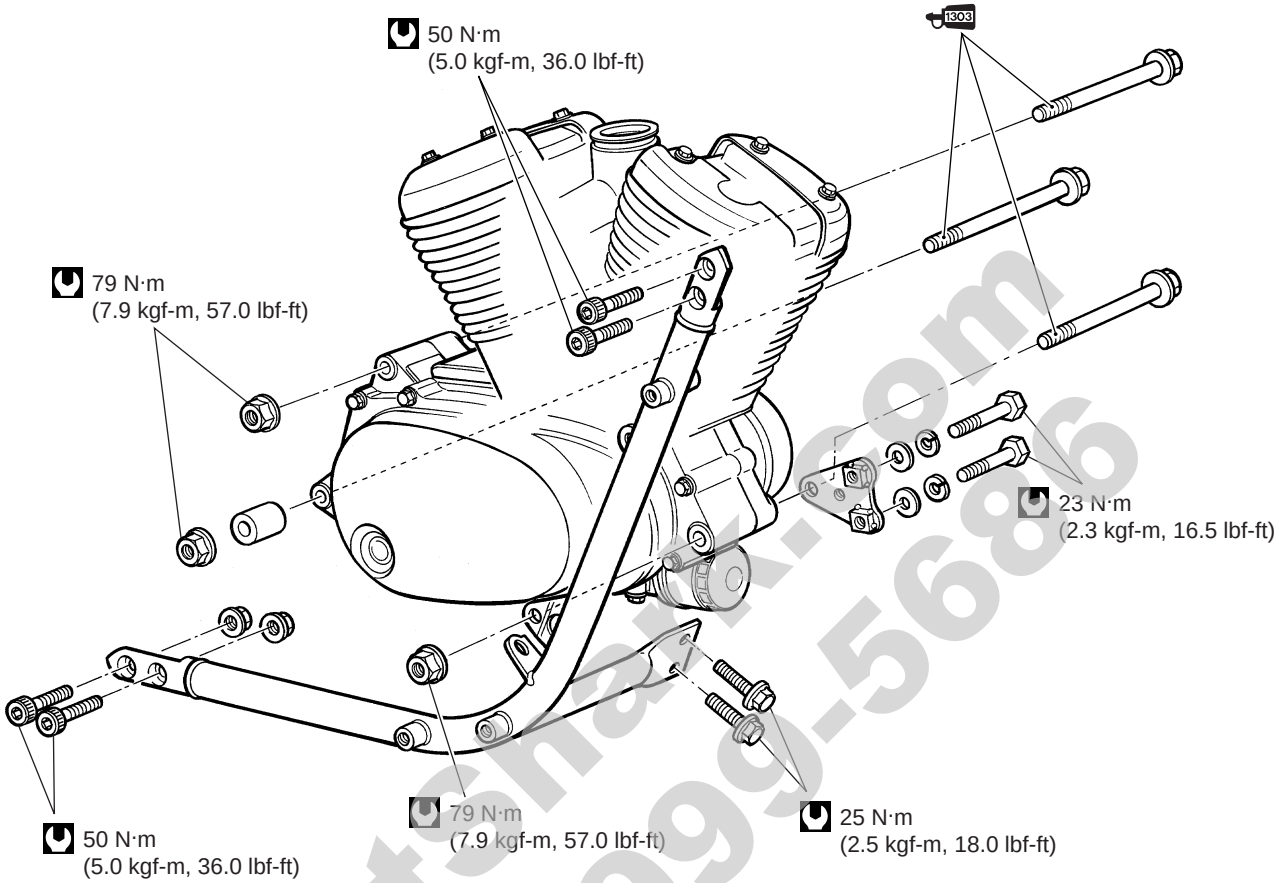
For E-03, 28



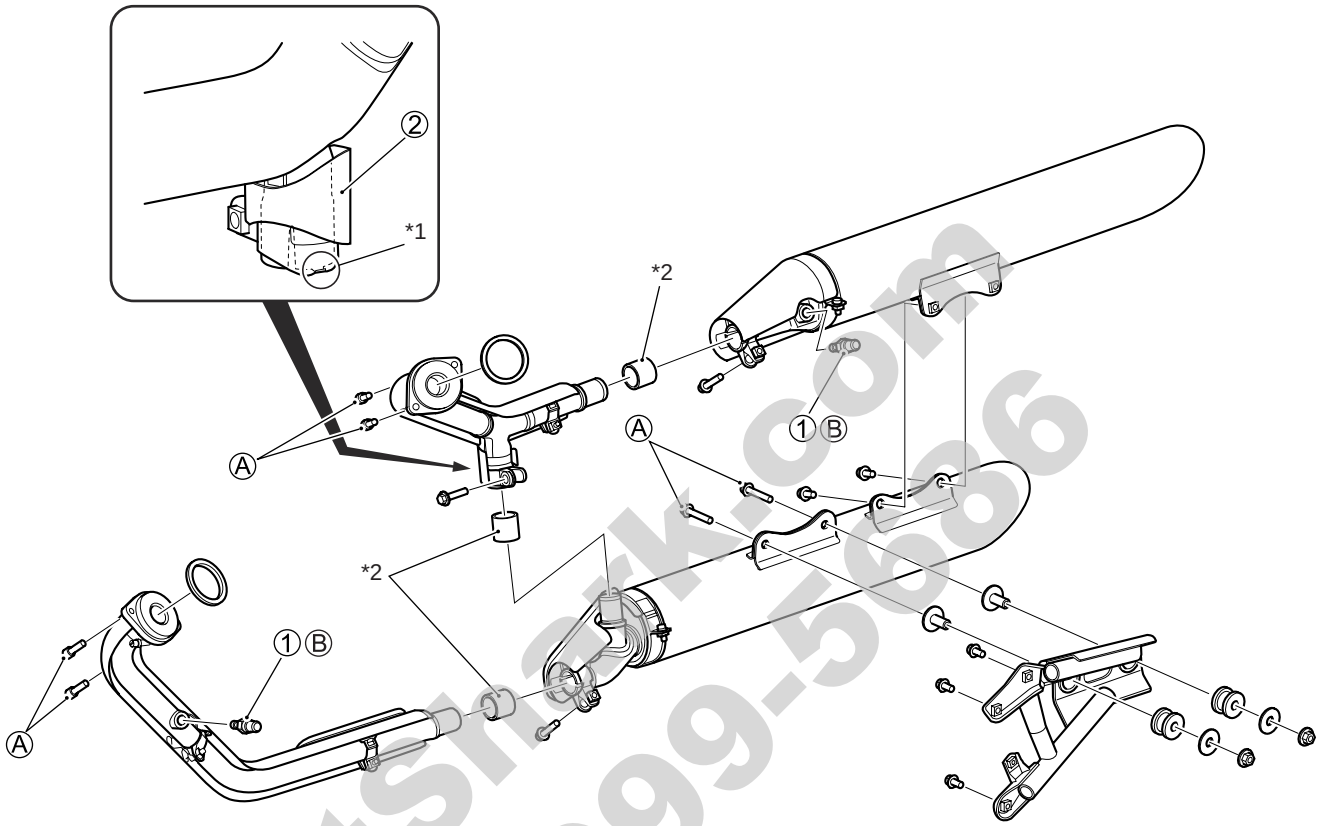
①	Ignition coil #1
②	Ignition coil #2
③	Protector
Ⓐ	Ignition coil bolt
*1	Pass the spacer to the hole ⓐ of protector securely. Do not pinch the spacer between the protector and frame.

ITEM	N·m	kgf-m	lbf-ft
Ⓐ	4.5	0.45	3.5

ENGINE MOUNTING



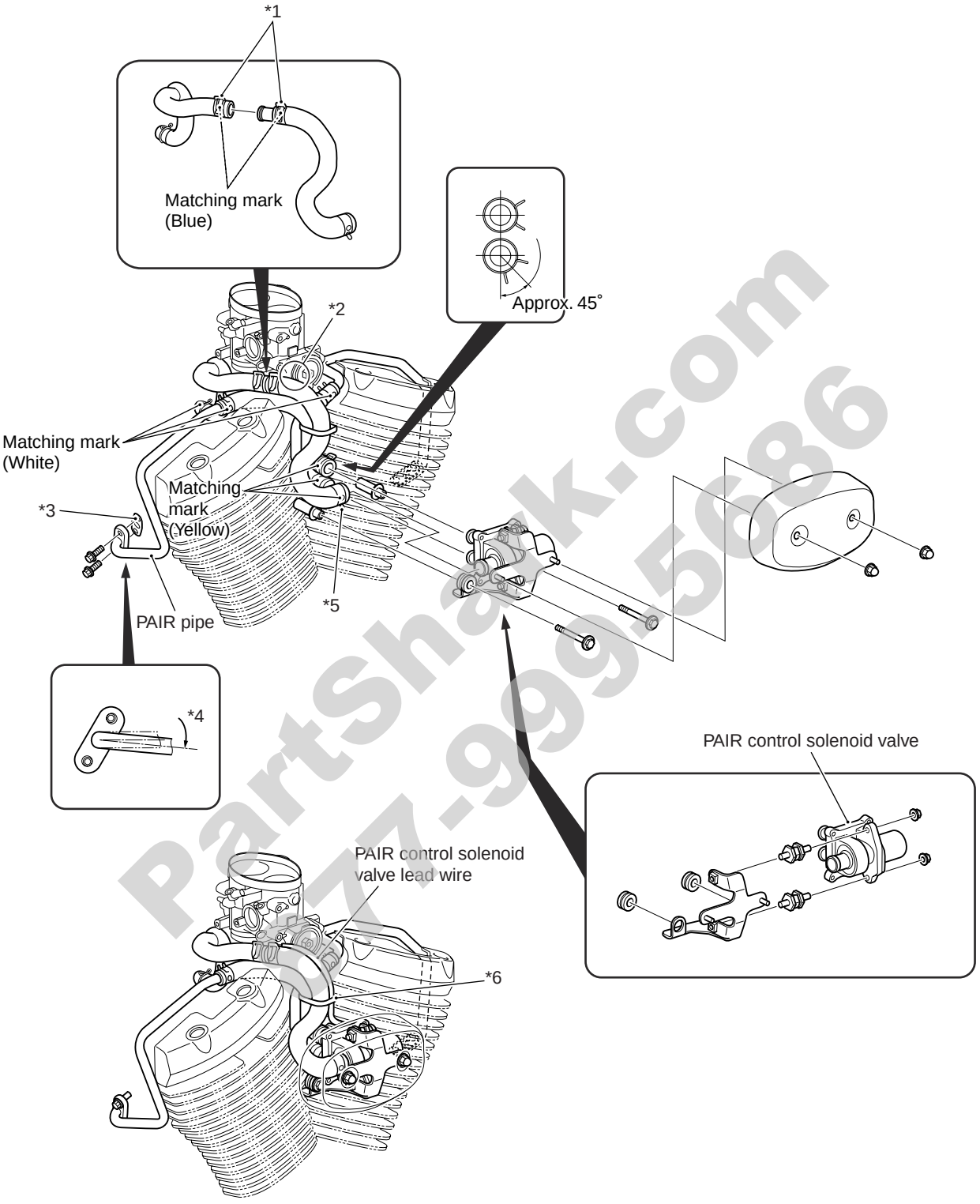
MUFFLER & EXHAUST PIPE INSTALLATION



①	HO2 sensor (E-02, 19, 24, 33)	*1	Install the body C with inlaying the claw of mouthpiece into the slit of muffler clamp.
②	Body C	*2	Apply muffler seal [MUFFLER SEAL LOC-TITE 5920 (commercially available) or equivalent]

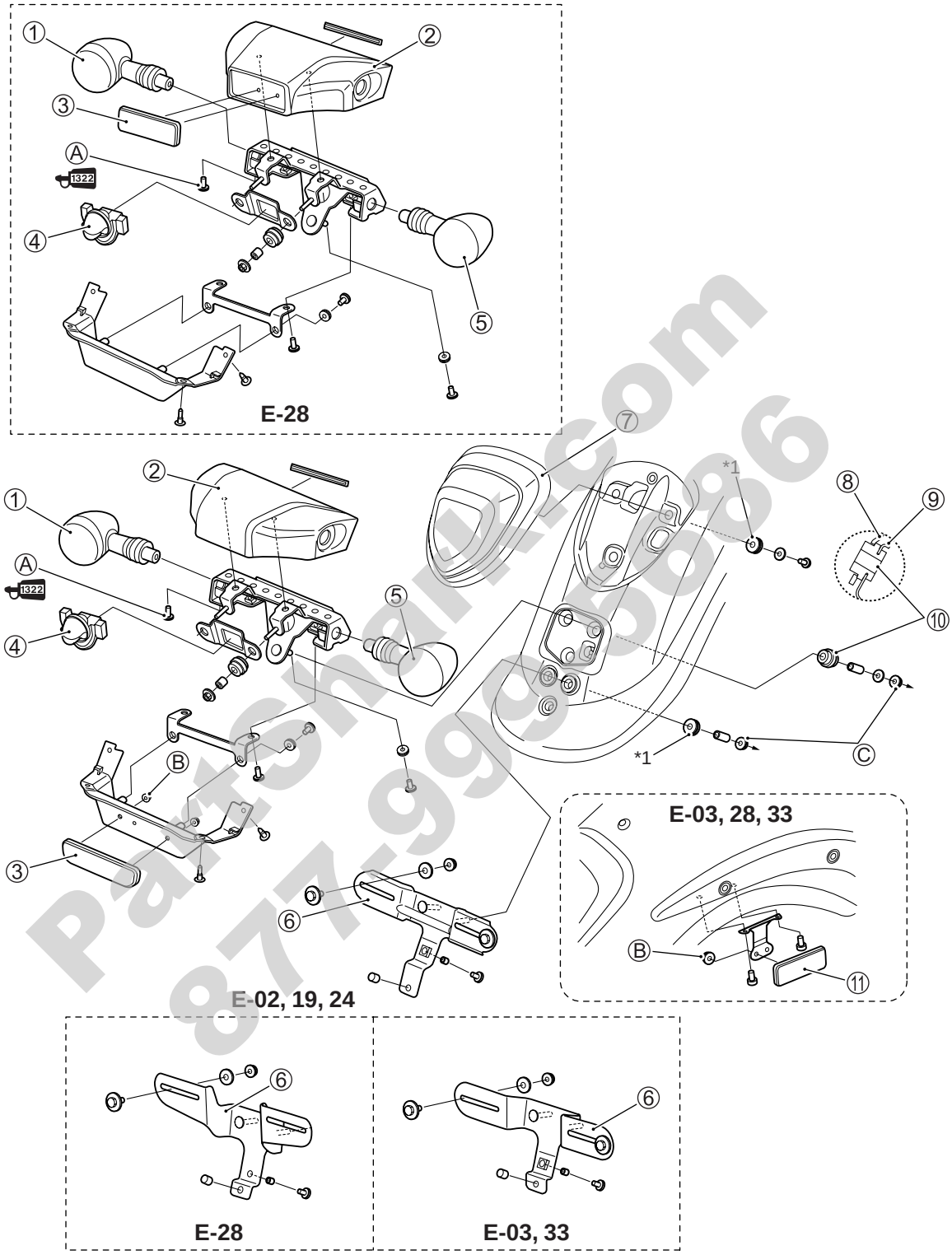
ITEM	N·m	kgf-m	lbf-ft
Ⓐ	23	2.3	16.5
Ⓑ	25	2.5	18.0

PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



*1	Fit hose ends onto hose joint all the way until stopper flange is securely contacted. Align hose clamp end with matching mark.	*4	Tighten bolts with PAIR pipe slightly tensioned clockwise.
*2	Hose should not contact throttle valve pulley.	*5	Hose clamp end should face downward.
*3	The sealant side of the gasket should face the PAIR pipe.	*6	Clamp the lead wire and hoses so as not to contact to the engine fins.

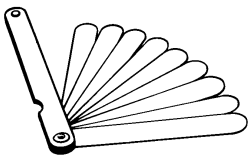
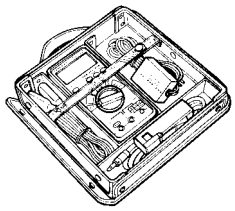
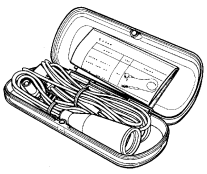
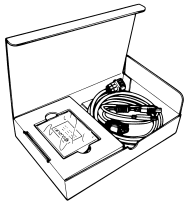
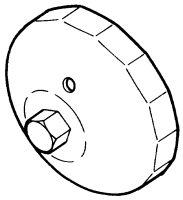
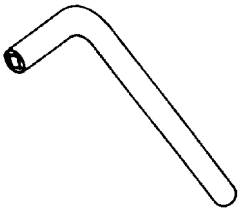
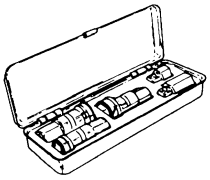
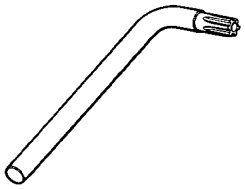
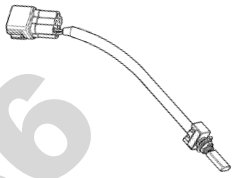
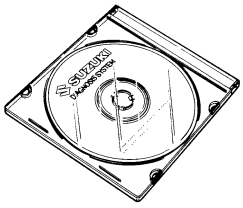
REAR COMBINATION LIGHT INSTALLATION



①	Rear turn signal light (LH)	⑦	Rear combination light	*1	Install the cushion to the rear fender.
②	Rear turn signal upper cover	⑧	Rear fender		
③	Rear reflector	⑨	Reinforcement		
④	License plate light	⑩	Cushion		
⑤	Rear turn signal light (RH)	⑪	Rear reflex reflector		
⑥	License plate bracket	Ⓐ	Rear turn signal light mounting bolt		

ITEM	N·m	kgf-m	lbf-ft
ⒶⒸ	11	1.1	8.0
Ⓑ	1.8	0.18	1.3

SPECIAL TOOLS

 **09900-20803** **09900-20806** **Thickness gauge**	 **09900-25008** **Multi-circuit tester set**	 **09900-25009** **Needle pointed probe set**	 **09904-41010** **SDS set tool**	 **09915-40620** **Oil filter wrench**
 **09917-10410** **Valve adjust driver**	 **09930-10121** **Spark plug socket wrench set**	 **09930-11950** **Torx wrench**	 **09930-14530** **Universal joint**	 **09930-82720** **Mode select switch**
 **99565-01010-017** **CD-ROM Ver.17**				

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

TIGHTENING TORQUE

ENGINE

ITEM	N·m	kgf-m	lbf-ft
Driveshaft bolt	55	5.5	40.0
Ignition coil bolt	4.5	0.45	3.5
Spark plug	11	1.1	8.0
Oil drain plug	21	2.1	15.0
Oil pressure switch	14	1.4	10.0
Generator rotor bolt	160	16.0	115.5
Starter motor mounting bolt	10	1.0	7.0
Exhaust pipe bolt	23	2.3	16.5
Muffler support bolt	23	2.3	16.5
Rear turn signal bolt	11	1.1	8.0
License plate bracket nut	11	1.1	8.0
Rear turn signal bracket nut	11	1.1	8.0
Rear reflector mounting nut	1.8	0.18	1.3

FI SYSTEM AND INTAKE AIR SYSTEM

ITEM	N·m	kgf-m	lbf-ft
ISC valve mounting screw	2.1	0.21	1.5
Straight plug mounting screw	5	0.5	3.5
STP sensor mounting bolt	3.5	0.35	2.5
TP sensor mounting bolt	3.5	0.35	2.5
ISC valve mounting bolt	2.1	0.21	1.5
Delivery pipe mounting screw	3.5	0.35	2.5
ECT sensor	18	1.8	13.0
HO2 sensor	25	2.5	18.0

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	—
	EX.	26 (1.02)	—
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	—
	EX.	0.17 – 0.22 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	INNER	—	38.3 (1.51)
	OUTER	—	40.1 (1.58)
Valve spring tension	INNER	64 – 73 N (6.51 – 7.49 kgf, 14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	—
	OUTER	119 – 136 N (12.09 – 13.91 kgf, 26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
	EX.	36.58 – 36.62 (1.440 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)		0.150 (0.0059)
Camshaft journal holder I.D.	Rear left side Front right side	20.012 – 20.025 (0.7879 – 0.7884)	—
	Rear right side Front left side	25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Rear left side Front right side	19.959 – 19.980 (0.7858 – 0.7866)	—
	Rear right side Front left side	24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	—		0.10 (0.004)
Rocker arm I. D.	IN. & EX.	12.000 – 12.018 (0.4724 – 0.4731)	—
Rocker arm shaft O. D.	IN. & EX.	11.977 – 11.995 (0.4715 – 0.4722)	—
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	1 300 – 1 700 kPa (13 – 17 kgf/cm², 185 – 242 psi)			1 100 kPa (11 kgf/cm² 156 psi)
Compression pressure difference	—			200 kPa (2 kgf/cm² 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)			0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)			83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.			82.880 (3.2630)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st		Approx. 9.6 (0.38)	7.7 (0.30)
	2nd	R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd		0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring to groove clearance	1st		—	0.180 (0.007)
	2nd		—	0.150 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	—
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	—
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (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.	40.982 – 41.000 (1.6135 – 1.6142)	—
Crankshaft journal oil clearance	0.002 – 0.029 (0.00008 – 0.0011)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	—
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 pressure (at 60 °C, 140 °F)	350 – 650 kPa (3.5 – 6.5 kgf/cm², 50 – 92 psi) at 3 000 r/min	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		1.690 (71/42)		—
Secondary reduction ratio		1.000 (30/30)		—
Final reduction ratio		3.503 (17/15 × 34/11)		—
Gear ratios	Low	2.461 (32/13)		—
	2nd	1.631 (31/19)		—
	3rd	1.227 (27/22)		—
	4th	1.000 (25/25)		—
	Top	0.814 (22/27)		—
Shift fork to groove clearance		No. 1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
		No. 2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width		No. 1	5.50 – 5.60 (0.217 – 0.220)	—
		No. 2	4.50 – 4.60 (0.177 – 0.181)	—
Shift fork thickness		No. 1	5.30 – 5.40 (0.209 – 0.213)	—
		No. 2	4.30 – 4.40 (0.169 – 0.173)	—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		—
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	—
Damper spring free length	—		58.5 (2.30)

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		NOTE
Thermostat valve opening temperature	Approx. 75 °C (167 °F)		—
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		—
ECT sensor 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	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermo-switch operating temperature	OFF → ON	Approx. 105 °C (221 °F)	—
	ON → OFF	Approx. 100 °C (212 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant capacity	1 500 ml (1.6/1.3 US/lmp qt)		—

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	* 9.5 – 11.5 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	Approx. 168 ml (5.7/5.9 US/lmp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm², 43 psi)	

FI SENSORS + SECONDARY THROTTLE VALVE ACTUATOR

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	184 – 276 Ω		
CKP sensor peak voltage	1.5 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.6 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 1.1 kΩ	
	Opened	Approx. 4.4 kΩ	
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.4 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.6 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	0.2 V and more		From 1st to Top
Injector voltage	Battery voltage		
STP sensor input voltage	4.5 – 5.5 V		
STP sensor resistance	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	* 0.3 V and less at idle speed		For E-02, 19, 24, 33
	* 0.6 V and more at 5 000 r/min		
Heated oxygen sensor resistance	* 6.7 – 9.5 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
Bore size	34 mm
I.D. No.	* 41F3 (For E-33), 41F2 (For the others)
Idle r/min	1 100 ± 100 r/min
Fast idle r/min	1 800 r/min (When cold engine)
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION		NOTE	
Firing order			1·2			
Spark plug		Type	* NGK: DR7EA DENSO: X22ESR-U		For E-02, 19, 24, 33	
			NGK: DPR7EA-9 DENSO: X22EPR-U9		For E-03, 28	
		Gap	* 0.6 – 0.7 (0.024 – 0.028)		For E-02, 19, 24, 33	
			0.8 – 0.9 (0.031 – 0.035)		For E-03, 28	
Spark performance			Over 8 (0.3) at 1 atm.			
CKP sensor resistance			184 – 276 Ω			
CKP sensor peak voltage			4.0 V and more			
Ignition coil resistance		Primary	2.8 – 4.7 Ω		Terminal – Terminal	
		Secondary	24 – 36 kΩ		Plug cap – Terminal	
Ignition coil primary peak voltage (For E-02, 19, 24, 33)		200 V and more			#1	⊕ B/Bl (main) ⊕ B/R (sub) ⊖ Ground
					#2	⊕ B/Y (main) ⊕ W (sub) ⊖ Ground
Ignition coil primary peak voltage (For E-03, 28)		200 V and more			#1	⊕ B/Bl ⊖ Ground
					#2	⊕ B/R ⊖ Ground
Generator coil resistance			0.2 – 1.5 Ω			
Generator no-load voltage (when engine is cold)			70 V (AC) and more at 5 000 r/min		Y – Y	
Regulated voltage			13.5 – 15.0 V at 5 000 r/min		Y – Y	
Generator maximum output			350 W at 5 000 r/min			
Starter relay resistance			3 – 7 Ω			
GP switch voltage			0.6 V and more (From 1st to top without neutral)			
Battery	Type designation		FTX12-BS			
	Capacity		12 V 36 kC (10 Ah)/10 HR			
Fuse size	Headlight	HI	10 A			
		LO	10 A			
	Signal		10 A			
	Ignition		* 20 A			
	Fuel		10 A			
	Main		30 A			
	Power source		10 A			

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	Others
Headlight	HI	60	←	←
	LO	55	←	←
Position/Parking light				5
Brake light/Taillight		LED	←	←
Turn signal light		21/5 (Front), 21 (Rear)	21	←
Licence plate light		5	←	←
Speedometer light		LED	←	←
Engine coolant temp. warning 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 free travel	20 – 30 (0.8 – 1.2)		—
Rear brake pedal height	* 95 – 105 (3.7 – 4.1)		—
Brake drum I.D.	Rear	—	180.7 (7.11)
Brake disc thickness	Front	4.8 – 5.2 (0.19 – 0.21)	4.5 (0.18)
Brake disc runout	—		0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	—
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)
Wheel rim size	Front	J16 M/C × MT 3.00	—
	Rear	J15 M/C × MT 4.00	—

TIRE

ITEM	STANDARD			LIMIT
Cold inflation tire pressure (Solo riding)	Front	VL800	200 kPa (2.00 kgf/cm², 29 psi)	—
		VL800C/T	225 kPa (2.25 kgf/cm², 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)		—
Cold inflation tire pressure (Dual riding)	Front	VL800	200 kPa (2.00 kgf/cm², 29 psi)	—
		VL800C/T	225 kPa (2.25 kgf/cm², 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)		—
Tire size	Front	130/90-16 M/C 67H		—
	Rear	170/80-15 M/C 77H		—
Tire type	Front	VL800	IRC GS-23F	—
		VL800T	IRC GS-23F RW	—
		VL800C	IRC GS-23F D	—
	Rear	VL800	IRC GS-23R	—
		VL800T	IRC GS-23R RW	—
		VL800C	IRC GS-23R D	—
Tire tread depth	Front	—		1.6 (0.06)
	Rear	—		2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT
Front fork stroke	140 (5.5)	—
Front fork spring free length	575.4 (22.65)	563 (22.2)
Front fork oil level (without spring)	158 (6.22)	—
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	—
Front fork oil capacity (each leg)	441 ml (24.0/25.0 US/Imp oz)	—
Front fork inner tube outside diam.	41 (1.61)	—
Rear shock absorber spring adjuster	4th	—
Rear wheel travel	105 (4.13)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

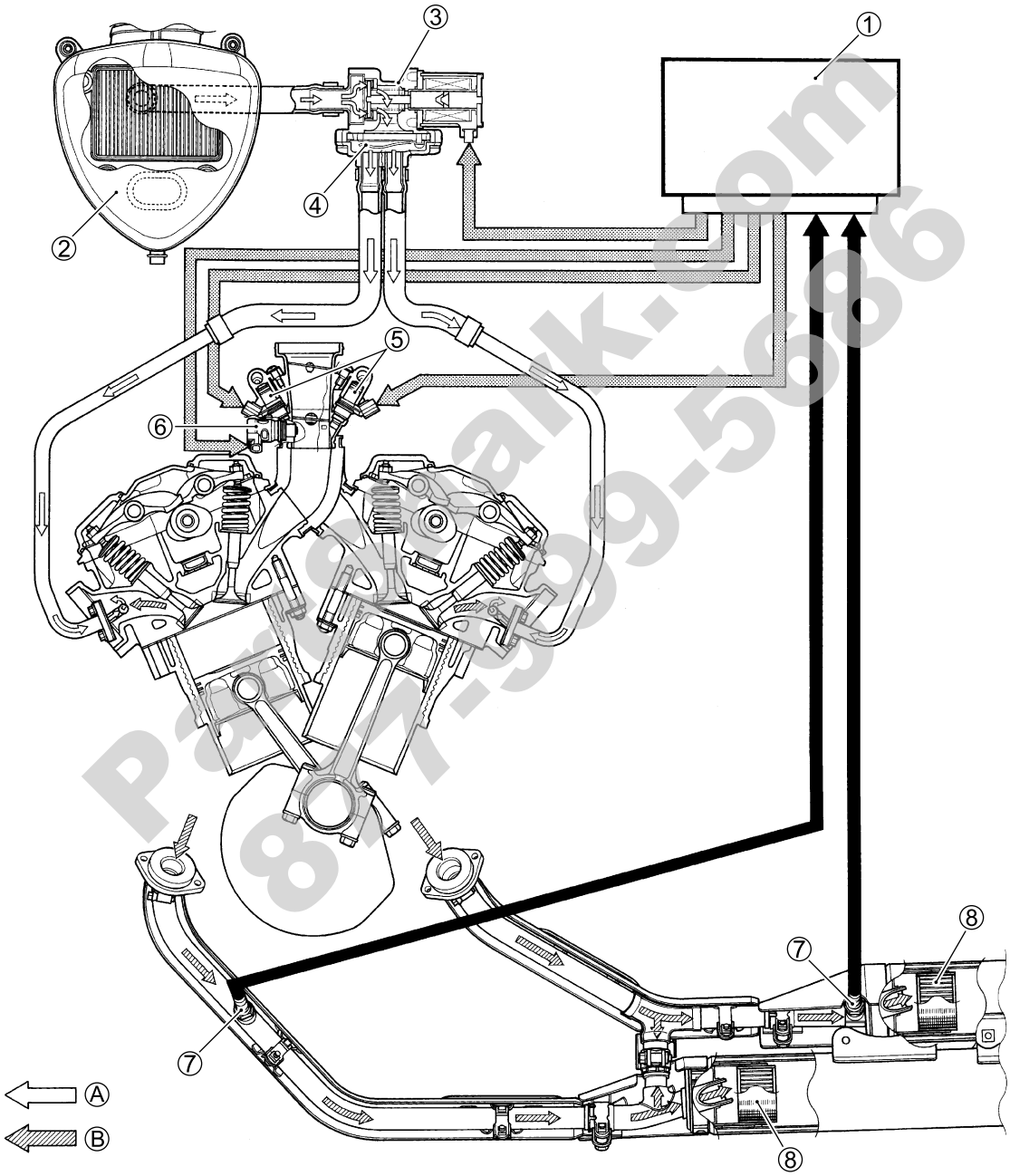
FUEL + OIL

ITEM	SPECIFICATION		NOTE
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.		Others
Fuel tank capacity	Including reserve	15.5 L (4.1/3.4 US/Imp gal)	
	Fuel level indicator light lighting	1.5 L (0.4/0.3 US/Imp gal)	
Engine oil type	SAE 10W-40, API, SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 400 ml (3.6/3.0 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)		
Brake fluid type	DOT 4		

EMISSION CONTROL SYSTEM

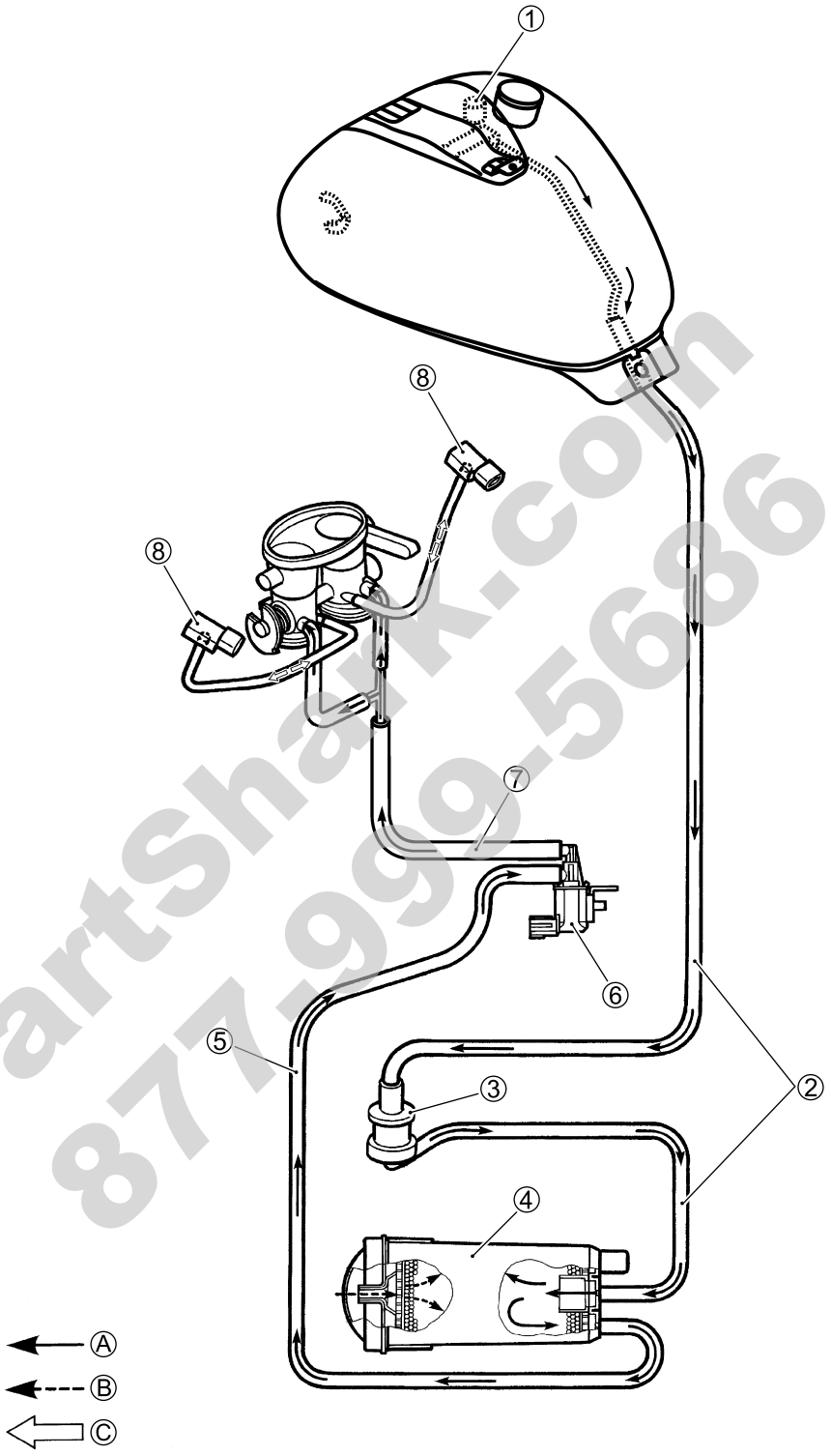
EXHAUST EMISSION CONTROL SYSTEM (PAIR SYSTEM)

The exhaust emission control system is composed of the PAIR system, HO2 sensor (For E-02, 19, 24, 33), catalyst system and ISC system. The fresh air is drawn into the exhaust port through the PAIR control solenoid valve and PAIR reed valve. The PAIR control solenoid valve is operated by the ECM, which is controlled according to the signals from TPS, ECTS, IATS, IAPS and CKPS. The ISC valve adjusts the bypass air volume of the throttle body to control engine idling speed with various sensor signals by varying engine running conditions and the idling control contributes to reduce exhaust emission level.



①	ECM	⑥	ISC valve
②	Air cleaner box	⑦	HO2 sensor (E-02, 19, 24, 33)
③	PAIR control solenoid valve	⑧	Catalyst
④	PAIR reed valve	Ⓐ	FRESH AIR
⑤	Fuel injector	Ⓑ	EXHAUST GAS

EVAPORATIVE EMISSION CONTROL SYSTEM (Only for E-33)



①	Fuel-vapor separator	⑦	Vacuum hose
②	Surge hose	⑧	IAP sensor
③	Fuel shut-off valve	Ⓐ	HC VAPOR
④	EVAP canister	Ⓑ	FRESH AIR
⑤	Purge hose	Ⓒ	VACUUM
⑥	EVAP system purge control solenoid valve		

PAIR (AIR SUPPLY) SYSTEM INSPECTION

HOSES

☞ Page 14-122

PAIR REED VALVE

☞ Page 14-122

PAIR CONTROL SOLENOID VALVE

☞ Page 14-123

HEATED OXYGEN SENSOR (HO2S) INSPECTION (For E-02, 19, 24, 33)

☞Page 18-33

EVAPORATIVE EMISSION CONTROL SYSTEM INSPECTION (Only for E-33)

HOSES

☞VL800K6 Page 14-124

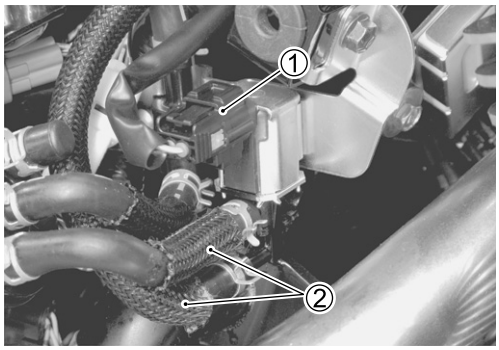
EVAP CANISTER

☞Page 14-124

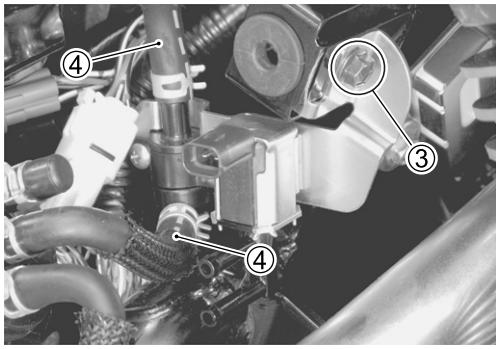
EVAP SYSTEM PURGE CONTROL SOLENOID VALVE

REMOVAL

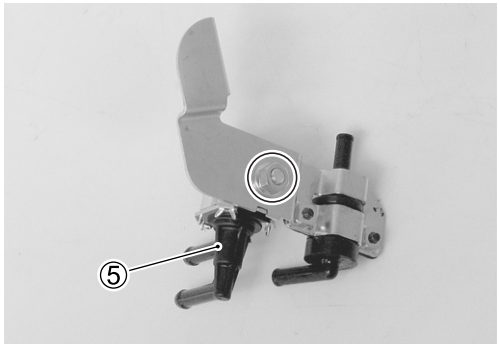
- Remove the right frame cover. (☞Page 7-2)
- Disconnect the purge control solenoid valve coupler ① and hoses ②.



- Remove the purge control solenoid valve bracket bolt ③ and disconnect the hoses ④.



- Remove the EVAP system purge control solenoid valve ⑤ from the purge control solenoid valve bracket.

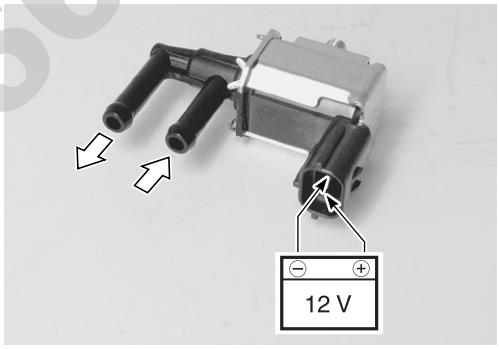


NOTE:
EVAP system purge control solenoid valve can be checked without removing it. (☞Page 18-38)

INSPECTION

- Check that no air flows through both of the air inlet and outlet ports.
- If air flows out, replace the EVAP system purge control solenoid valve with a new one.

- Connect 12 V battery to the terminals of the EVAP system purge control solenoid valve and check the air flow.
- If air flows out, the solenoid valve is in normal condition.

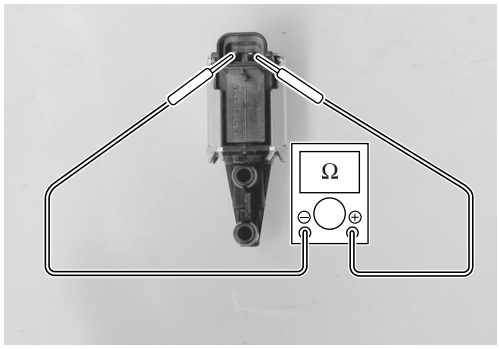


- Check the resistance between the terminals of the EVAP system purge control solenoid valve.

DATA EVAP system purge control solenoid valve resistance:
Approx. 32 Ω at 20 °C (68 °F)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



- If the resistance is not within the standard range, replace the EVAP system purge control solenoid valve with a new one.

INSTALLATION

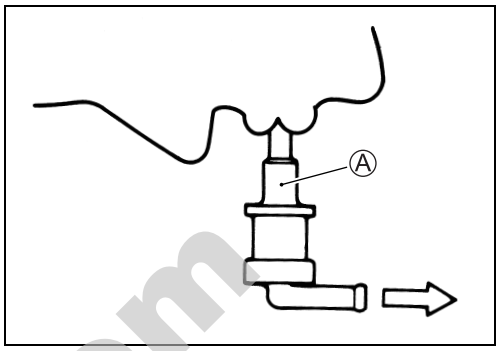
Installation is in the reverse order of removal. Pay attention to the following point:

- Connect the purge control solenoid valve coupler and canister hoses securely. (☞Page 18-92)

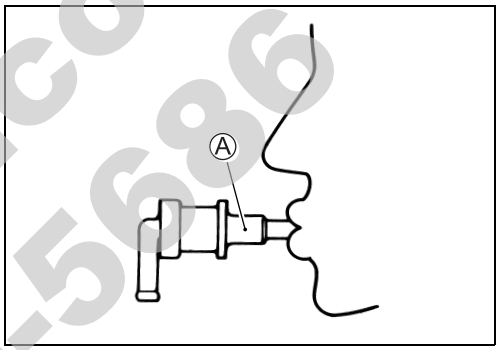
FUEL SHUT-OFF VALVE

Inspect the fuel shut-off valve body for damage.
Inspect the fuel shut-off valve operation in the following procedure.

- Remove the right frame cover. (☞Page 7-2)
- Remove the purge control solenoid valve bracket. (☞Page 18-86)
- Remove the fuel shut-off valve from the purge control solenoid valve bracket.
- When air is blown into the fuel shut-off valve with its side Ⓐ positioned upward, the air can pass through to the canister side.



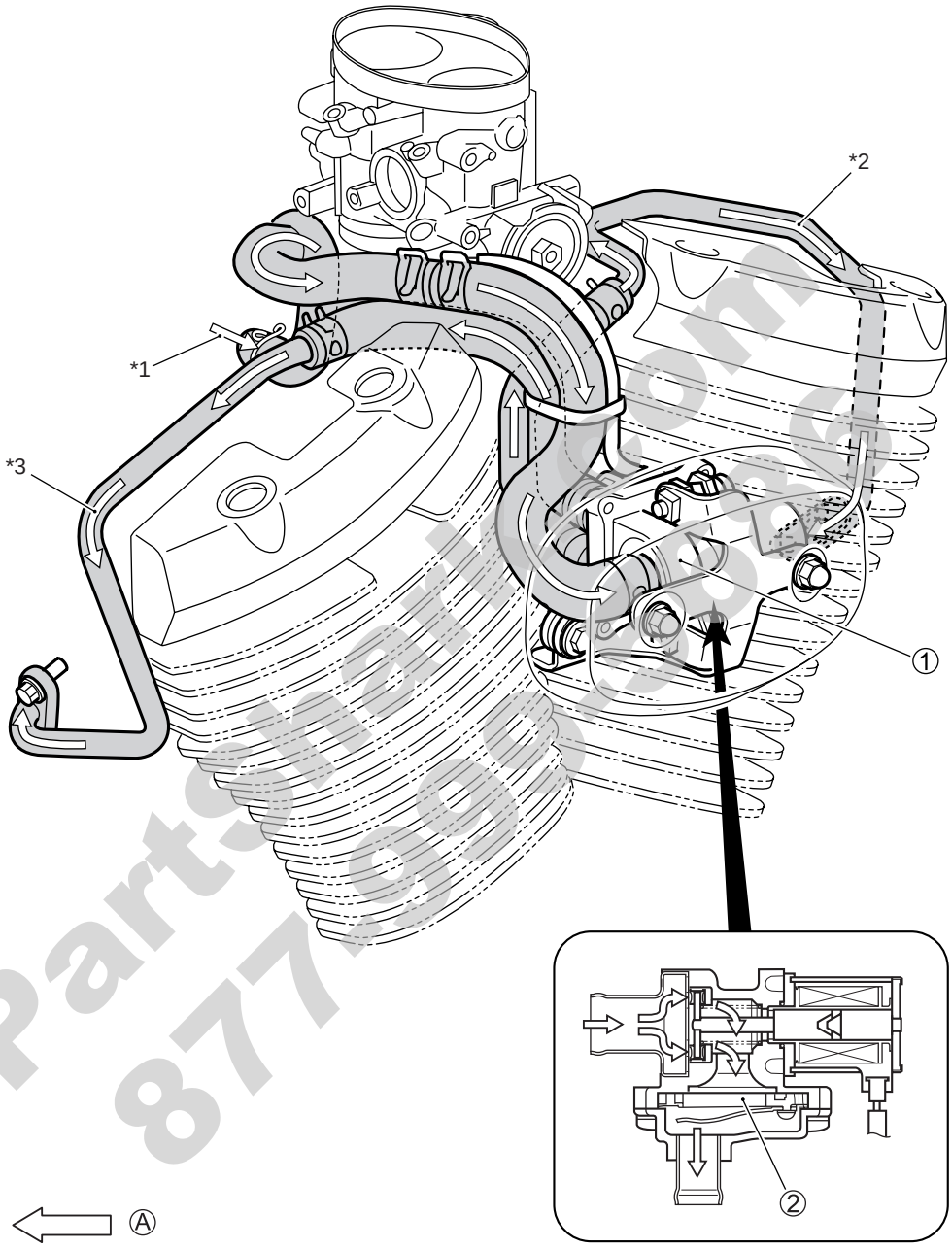
- When air is blown into the fuel shut-off valve with its side Ⓐ positioned sideways, the air cannot pass through to the canister side.
- If the fuel shut-off valve operates otherwise, it must be replaced.



⚠ WARNING

*** Gasoline and gasoline vapor is toxic. A small amount of fuel remains in the fuel shut-off valve when checking it.**
*** Do not swallow the fuel when blowing the fuel shut-off valve.**

PAIR (AIR SUPPLY) SYSTEM DIAGRAM

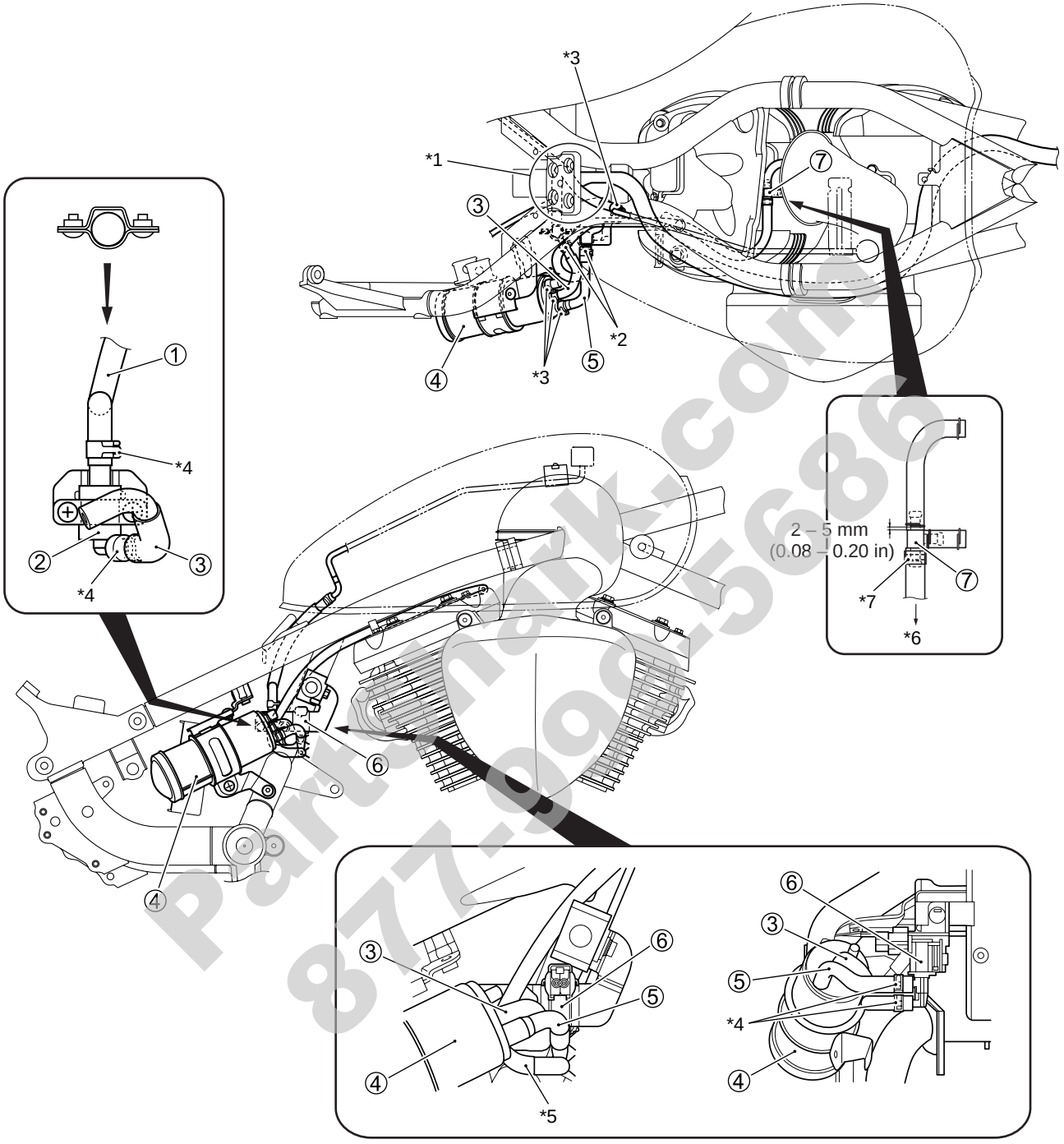


①	PAIR control solenoid valve	*1	From air cleaner
②	PAIR reed valve	*2	To #1 cylinder
Ⓐ	FRESH AIR	*3	To #2 cylinder

PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING

☞Page 18-72

EVAP CANISTER HOSE ROUTING (Only for E-33)

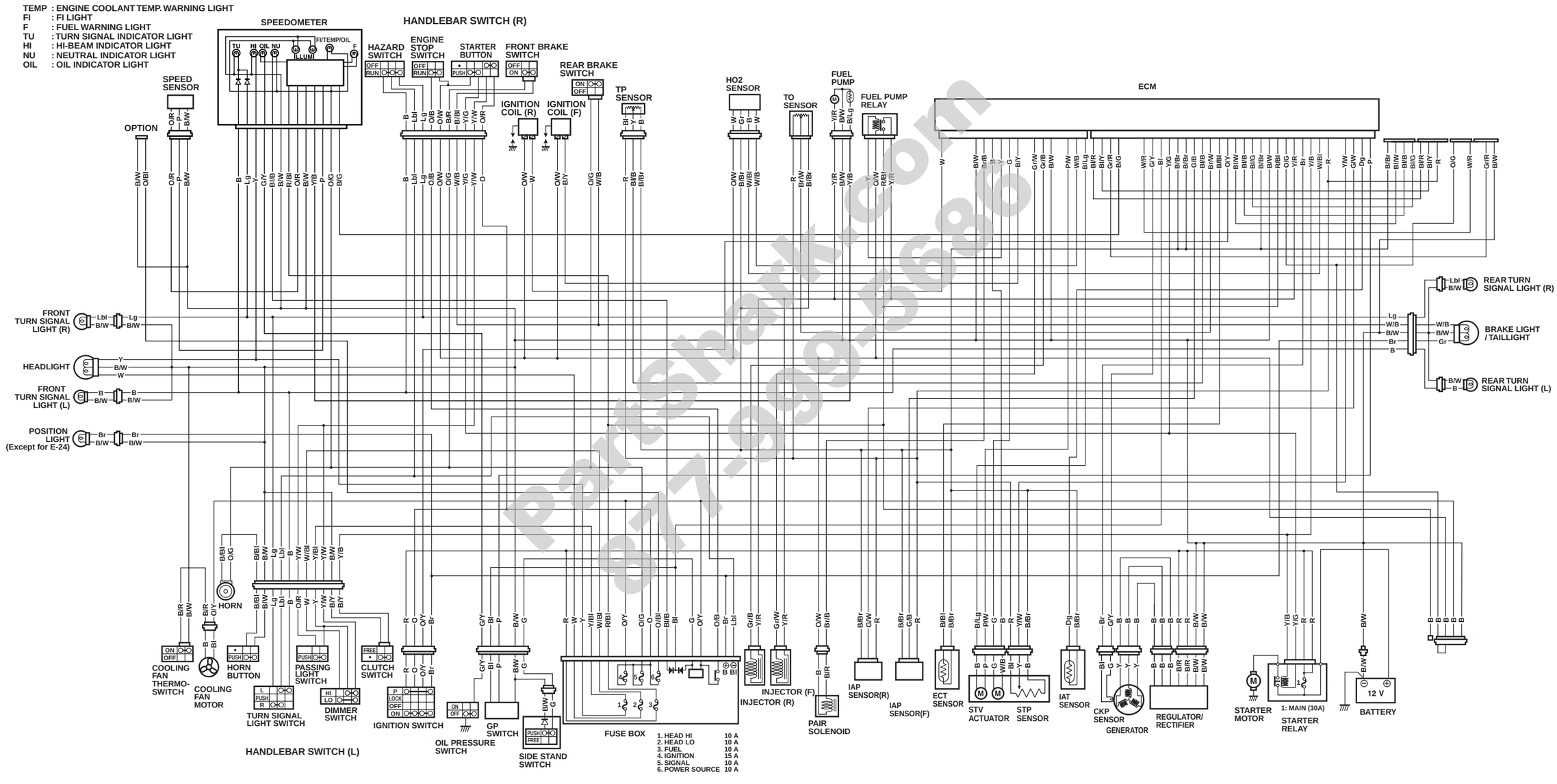


①	Surge hose	*2	Matching mark (White)
②	Fuel shut-off valve	*3	The end of the clamp should face right side.
③	Surge hose	*4	The end of the clamp should face forward.
④	EVAP canister	*5	Pass the purge hose under the hoses. Be careful not to contact the purge hose and hoses.
⑤	Purge hose		
⑥	EVAP system purge control solenoid valve	*6	To EVAP system purge control solenoid valve
⑦	3-way joint	*7	The end of the clamp should face downward.
*1	Pass the surge hose over the wiring harness.		

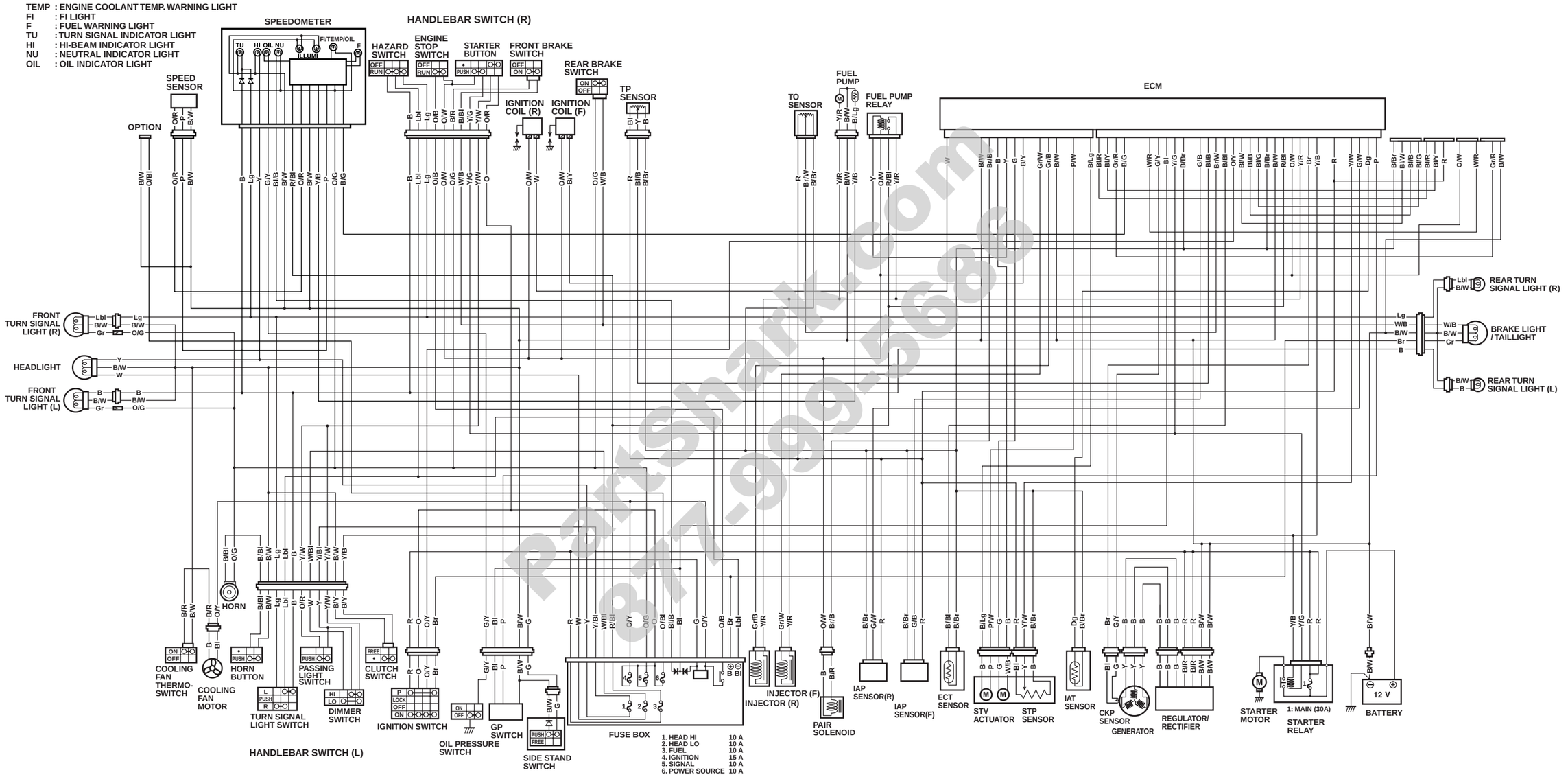
WIRING DIAGRAM

VL800K5 (’05-MODEL) E-02, 19, 24

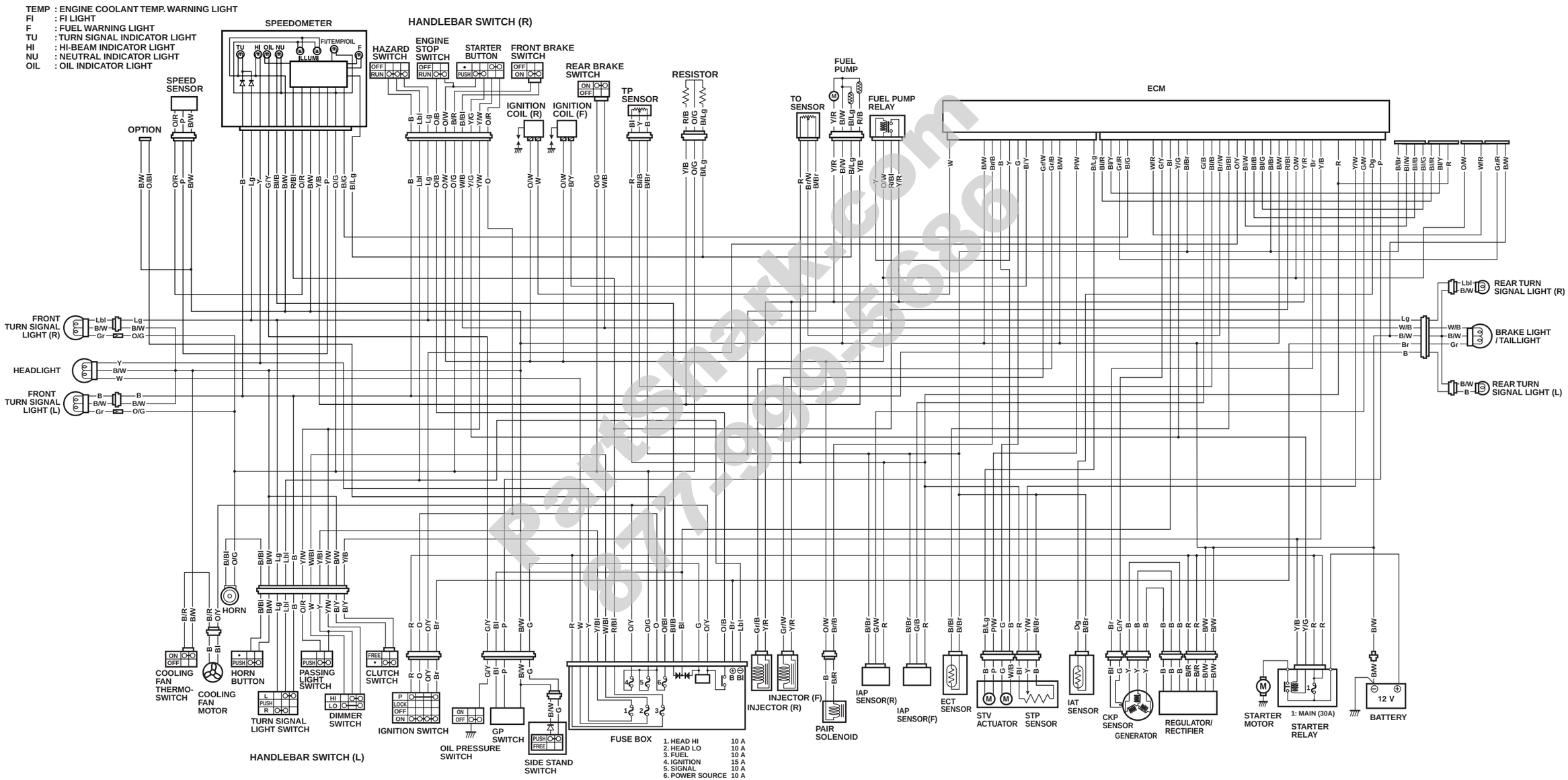
Wiring diagrams wire color, refer to section “WIRE COLOR”.



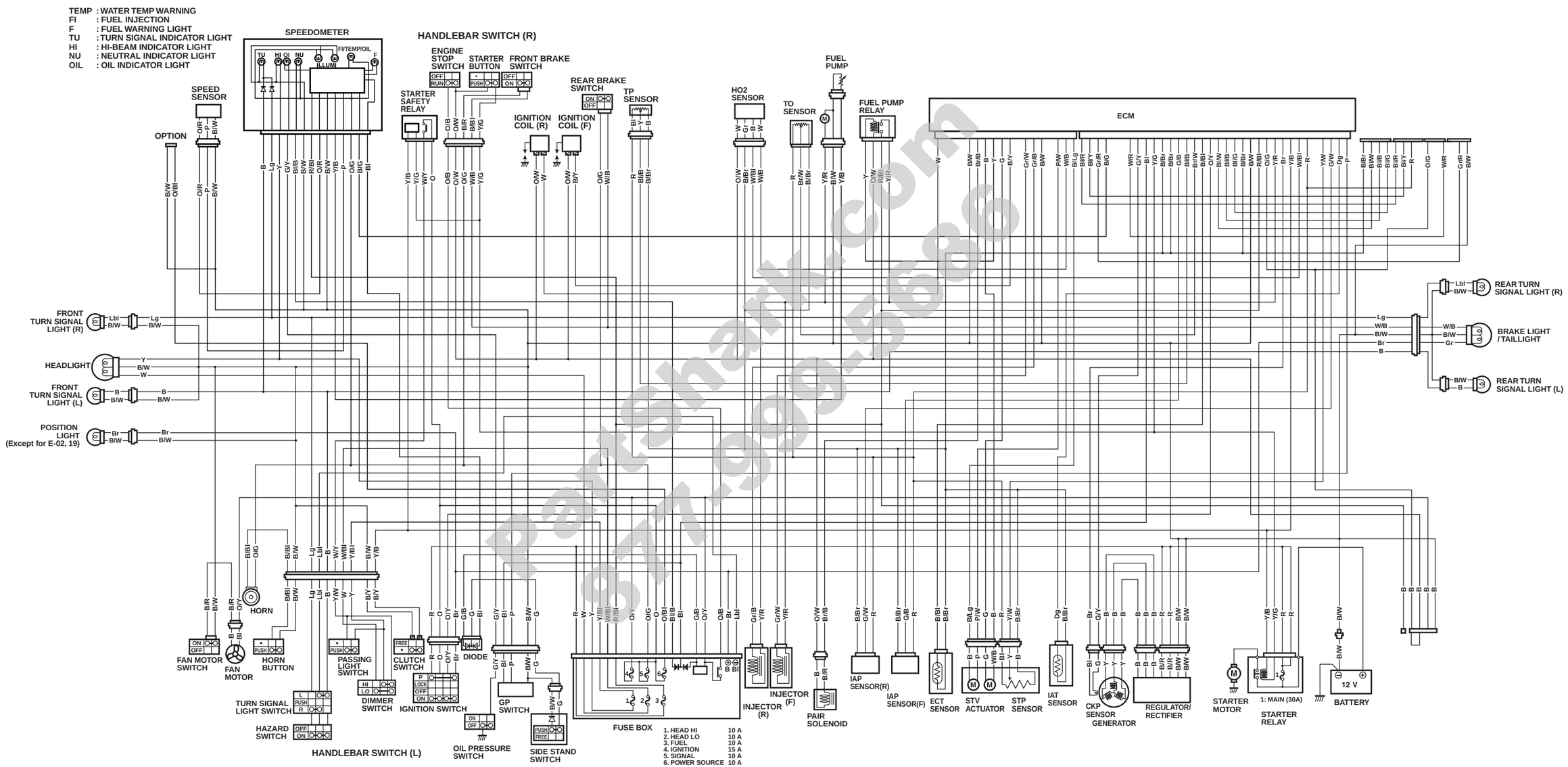
VL800K5 ('05-MODEL) E-03, 28, 33



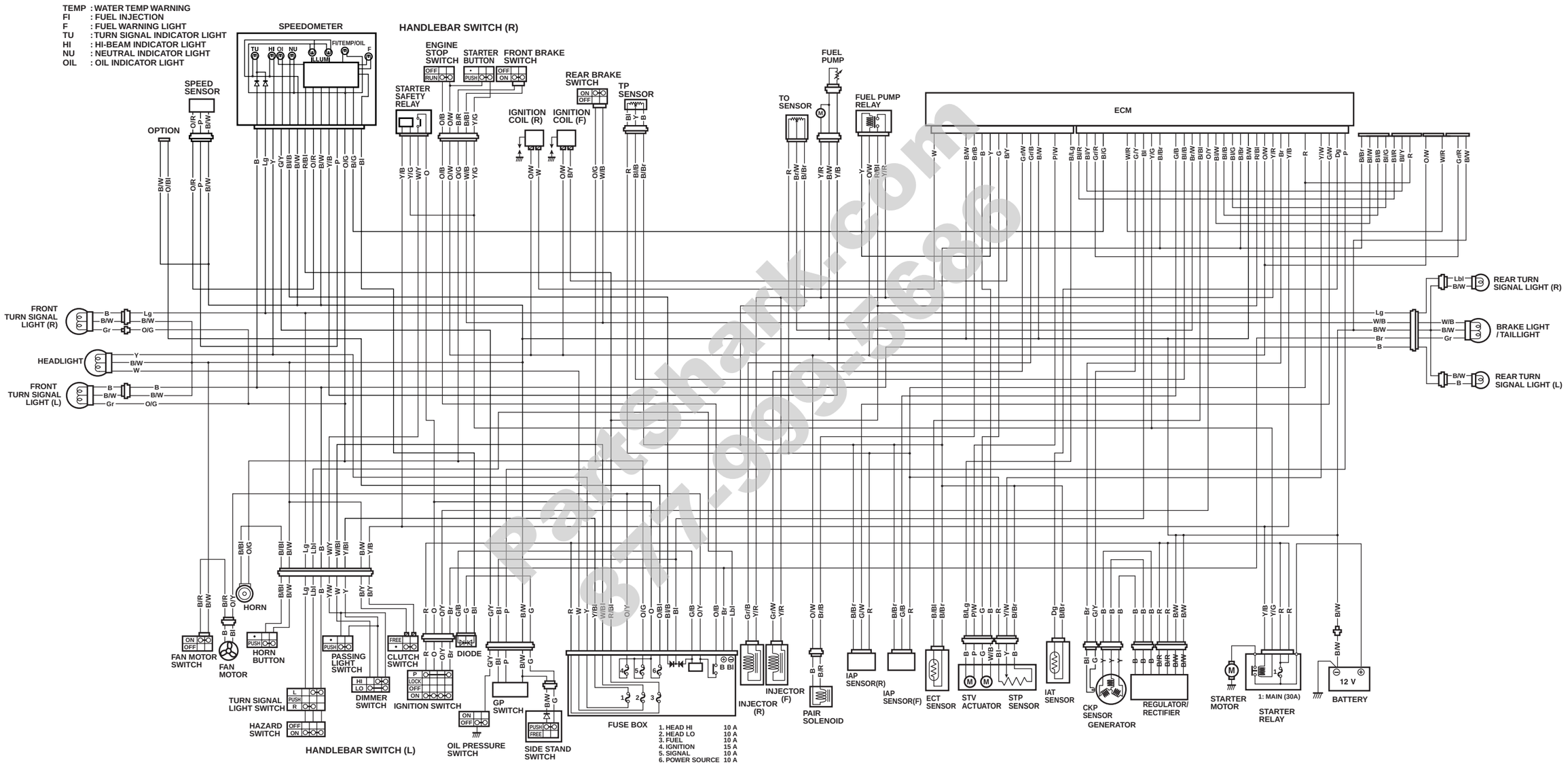
WIRING DIAGRAM
VL800/TK6
FOR E-03, 28, 33



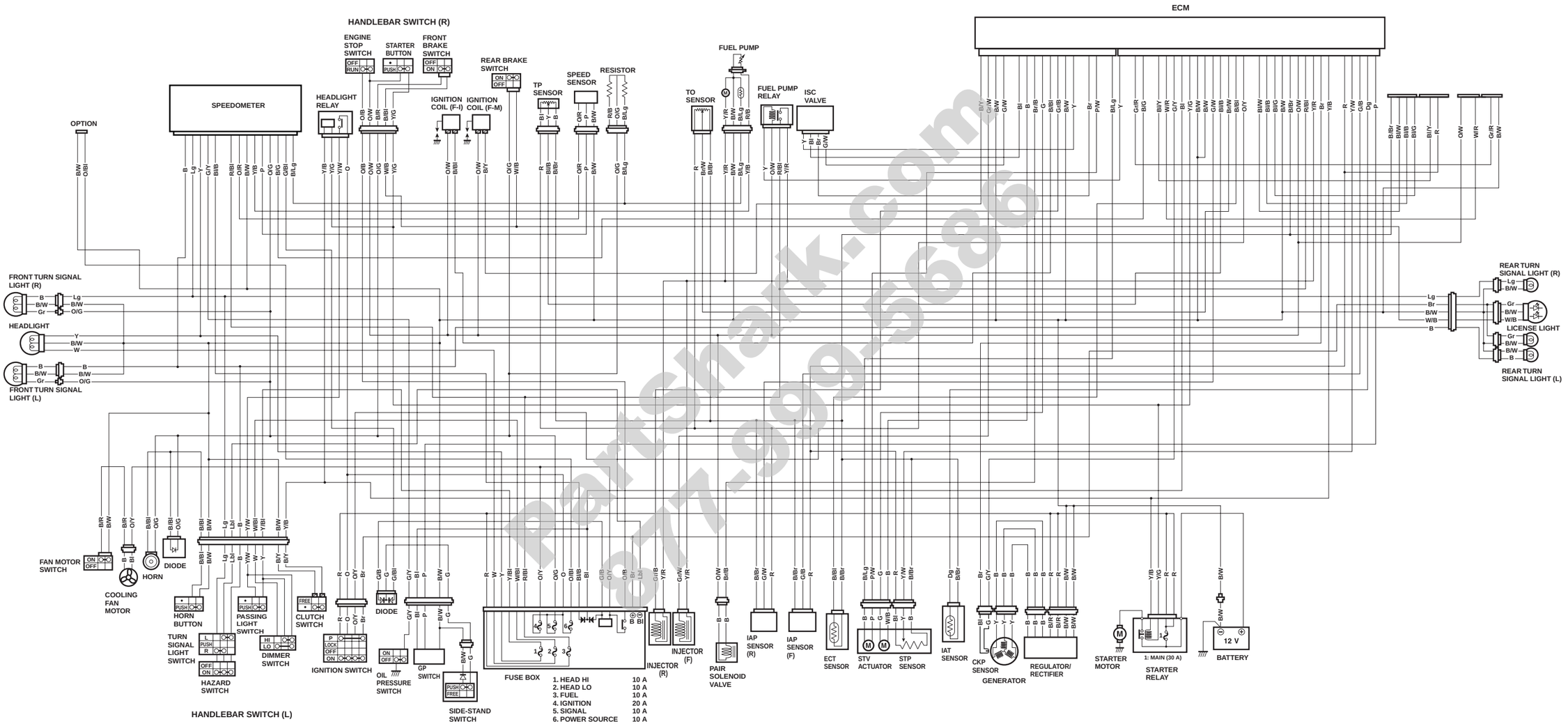
WIRING DIAGRAM
VL800K7
FOR E-02, 19, 24



FOR E-03, 28, 33



WIRING DIAGRAM
VL800/C/TK9
For E-03, 28



VL800/C/TK9
For E-33