

SERVICE MANUAL



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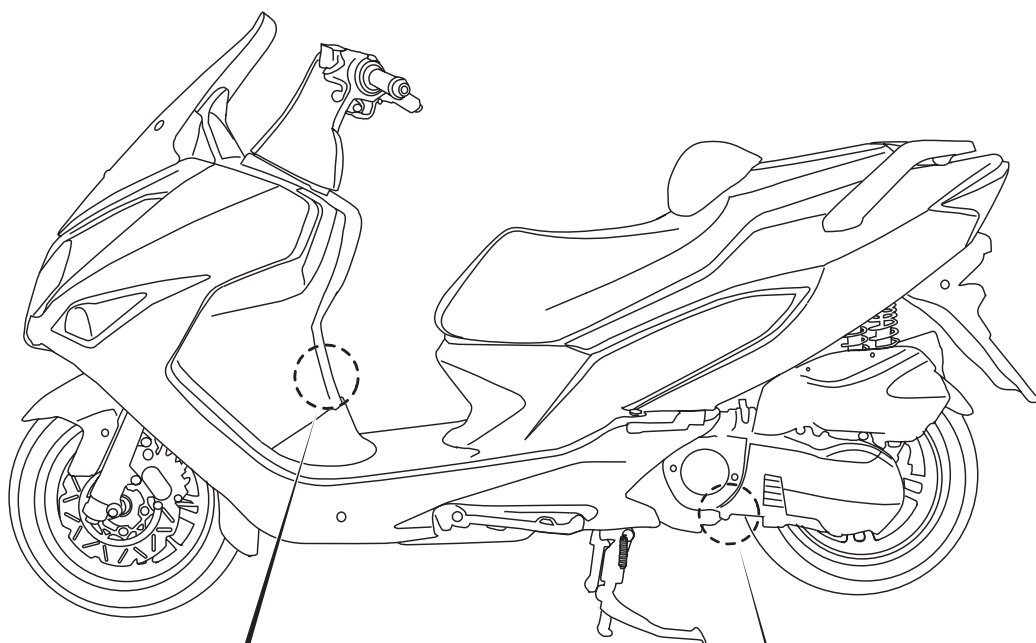
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SERIAL NUMBER LOCATIONS



○ FRAME SERIAL NUMBER LOCATION



○ ENGINE SERIAL NUMBER LOCATION



SPECIFICATION

ITEM		SPECIFICATION	
		13 inch	14 inch
DIMENSIONS	OVERALL LENGTH	2,110 mm	2,140 mm
	OVERALL WIDTH	750 mm	750 mm
	OVERALL HEIGHT	1,200 mm	1,215 mm
	WHEEL BASE	1,500 mm	1,500 mm
	SEAT HEIGHT	745 mm	762 mm
	GROUND CLEARANCE	136 mm	143 mm
	DRY WEIGHT	159 kgs	159 kgs
	GROSS WEIGHT	170 kgs	170 kgs
FRAME	TYPE	Underbone	Underbone
	FRONT SUSPENSION/ STROKE	Telescopic / 85mm	Telescopic/ 85mm
	REAR SUSPENSION/ STROKE	Unit Swing Arm/ 80mm	Unit Swing Arm/80mm
	FRONT TIRE SIZE	120/70-13 (tubeless)	120/70-14(tubeless)
	REAR TIRE SIZE	140/60-13 (tubeless)	140/60-13(tubeless)
	TIRE PRESSURE 1 person FRONT	2.00kgf/cm ² (200kpa)	2.00kgf/cm ² (200 kpa)
	REAR	2.40kgf/cm ² (240kpa)	2.40kgf/cm ² (200 kpa)
	2 persons FRONT	2.00kgf/cm ² (200kpa)	2.00kgf/cm ² (200 kpa)
	REAR	2.50kgf/cm ² (250kpa)	2.50kgf/cm ² (200 kpa)
	FRONT BRAKE	Hydraulic Disk	Hydraulic Disk
	REAR BRAKE	Hydraulic Disk	Hydraulic Disk
	FUEL TANK CAPACITY Full capacity	11.5L	11.5L
	Reserve capacity	1.9L	1.9L
ENGINE	CASTER ANGLE	27°	27°
	TRAIL	94.5mm	94.5mm
	TYPE	Air cooled 4cycle DOHC engine (4 valves)	
	CYLINDERS, ARRANGEMENT	1(single cylinder), front angle 80°	
	BORE X STROKE	56.5mm × 49.5mm	
	DISPLACEMENT	124cm ³	
	COMPRESSION RATIO	11.8:1	
	COMPRESSION PRESSURE	13.0kg/cm ² (600 rpm)	
	OIL CAPACITY FULL	1.30L(Full capacity)	
	REPLACEMENT	1.10L(at changing)	
	LUBRICATION	0.1L(Full capacity)	
	AIR CLEANER	Forced pressure splash type	
	VALVES	Dry filter paper	
	VALVE SYSTEM	DOHC chain operation	
	INTAKE VALVE IN VALVE OPEN	DOHC 4 Valves	
	CLOSE	15° BTDC	
	EX VALVE OPEN	39° ABDC	
	CLOSE	57.4° BBDC	
	VALVE CLEARANCE INTAKE	12.6° ATDC	
	EXHAUST	0.15±0.02mm	
	ENGINE DRY WEIGHT	0.23±0.02mm	
		38kg	

ITEM		SPECIFICATION
TRANSMISSION	CLUTCH	DRY PLATE SHOE TYPE
	TRANSMISSION	Automatic Transmission(V-belt type)
	TRANSMISSION PRIMARY REDUCTION RATIO	2.786(39T/14T)
	TRANSMISSION SECONDARY REDUCTION RATIO	3.462(45T/13T)
ELECTRICAL SYSTEM	IGNITION SYSTEM	TRANSISTOR
	IGNITION TIMING IDLE	0° BTDC / 1,600(rpm)
	AC GENERATOR	12V-17A / 5,000(rpm)
	BATTERY CAPACITY	12V 10AH
	SPARK PLUG	CR8EH - 9
	SPARK PLUG GAP	0.8 - 0.9mm
	FUSE CAPACITY	30A(main), 15A X 4
	STARTING SYSTEM	CELL STARTING(STARTER MOTOR)
	HEADLIGHT(HIGH / LOW)	60/55W
	POSITION LAMP	5W
	WINKERS	16W×2, 10W×2
	TAIL/STOP LAMP	LED (8EA)
	COMBI METER LAMP (SPEEDOMETER/TACHOMETER)	LED
	NEUTRAL INDICATOR LAMP	LED x 1
	HIGH BEAM INDICATOR LAMP	LED
	TURN SIGNAL INDICATOR LAMP	LED x 1
	NUMBER PLATE POSITION LAMP	LED
	TACHOMETER LAMP	LED x 1

TORQUES

FRAME

ITEM	THREAD DIA (mm)	TORQUE VALUE (kgf·m)	REFERENCE
STEERING STEM NUT	M26×1.0	6~8	
STEERING TOP THREAD	M26×1.0	0.2~0.3	
BOTTOM BRIDGE(FORK PIPE) BOLT	M10×1.25	7.0~8.0	
HANDLE POST NUT	M10×1.25	5.5~6.5	U-NUT
FRONT WHEEL AXLE NUT	M12×1.25	5.0~7.0	U-NUT
REAR WHEEL AXLE NUT	M16×1.5	12~13	U-NUT
BRAKE OIL BOLT(FRONT/REAR)	M10×1.25	3.0~4.0	
CALIPER BRACKET BOLT(FRONT/REAR)	M8×1.25	2.8~3.4	
MASTER CYLINDER HOLDER	M6×1.0	1.0~1.4	
BOLT(FRONT/REAR)	M8×1.25	4.0~4.5	
DISK PLATE BOLT(FRONT/REAR)	M5×0.8	0.35~0.5	
SPEEDOMETER GEAR BOX SCREW	M8×1.25	1.5~2.5	
FRONT FORK BOTTOM BOLT	M22×1.0	1.5~3.0	
FORK BOLT	M10×1.25	3.5~4.5	
REAR CUSHION UPPER BOLT	M10×1.25	3.5~4.5	
REAR CUSHION UNDER BOLT	M10×1.25	3.0~4.0	
REAR CUSHION ROAD LOCK NUT	M12×1.25	5.0~5.5	
ENGINE HANGER UPPER BOLT	M10×1.25	4.0~5.0	U-NUT
ENGINE HANGER LOW NUT	M10×1.25	3.5~4.5	
MAIN STAND BOLT	M10×1.25	1.0~2.0	
SIDE STAND PIVOT SCREW	M10×1.25	4.0~5.0	
SIDE STAND PIVOT NUT			

ENGINE

ITEM	THREAD DIA (mm)	TORQUE VALUE (kgf-m)	REFERENCE
CYLINDER HEAD COVER BOLT	M6×1.0	1.0~1.2	Engine oil applied
CAP HOLER BOLT	M6×1.0	1.0~1.2	
CAM CHAIN GUIDE BOLT	M6×1.0	1.0~1.2	
CYLINDER HEAD SOCKET	M10×1.25	3.5~4.5	
CYLINDER BOLT	M6×1.0	1.0~1.2	
SPARK PLUG	M10×1.0	1.5~1.7	
ENGINE TEMPERATURE SENSOR	M12×1.25	1.6~2.0	
TENSIONER PIVOT BOLT	M6×1.0	0.8~1.2	
TENSIONER LIFT BOLT	M6×1.0	1.0~1.4	
TENSIONER LIFT SCREW	M6×1.0	0.35~0.5	
ACG FLYWHEEL NUT	M16 1.0	6.0~6.7	
STARTER CLUTCH OUTER SOCKET	M8×1.25	3.0~3.4	
OIL PUMP ASS BOLT	M6×1.0	1.0~1.2	
OIL SEPERATOR	M6×1.0	1.0~1.2	
ACG STATOR COMP SCREW	M5	0.35~0.5	
TAPPET ADJUST HOLE CAP	M30×1.5	1.0~1.2	
WATER PUMP IMPELLER	M7×1.0	1.0~1.4	
DRIVE FACE NUT	M12×1.25	5.0~6.0	
DRIVE PLATE NUT	M28	5.0~6.0	
CLUTCH OUTER NUT	M12 1.25	5.0~6.0	
MISSION COVER BOLT	M8×1.25	3.0~4.0	
MISSION CASE BOLT	M8×1.25	3.0~4.0	
MISSION COVER BOLT	M8×1.25	1.6~2.0	
MISSION COVER CHECK BOLT	M8×1.25	1.6~2.0	
STARTER MOTOR BOLT	M6×1.0	1.0~1.4	

※ Torque values listed above ate for specific tightening points. Torque values for other items are listed in the following tables.

STANDARD TWIST TORQUE

ITEM	TORQUE VALUE	ITEM	TORQUE VALUE
	kgf-m		kgf-m
4mm BOLT, NUT	0.15~0.4	4mm SCREW	0.15~0.3
5mm BOLT, NUT	0.45~0.6	5mm SCREW	0.35~0.5
6mm BOLT, NUT	0.8~1.2	6mm SCREW	0.7~1.1
(SH Flange bolt included)		(SH TYPE included)	
8mm BOLT, NUT	1.8~2.5	6mm FLANGE BOLT,NUT	1.0~1.4
10mm BOLT, NUT	3.0~4.0	8mm FLANGE BOLT,NUT	2.4~3.0
12mm BOLT, NUT	5.0~6.0	10mm FLANGE BOLT,NUT	3.5~4.5

※ SH(Small Head) : presents 6mm bolt of 8mm flange head

TOOL

SPECIAL TOOL

TOOL NAME	USAGE	CHAPTER
ACG ROTOR PULLER	Used for disassembly ACG Rotor from Crank shaft	9
VALVE GUIDE DRIVER	Used at the time of replacing valve guide	10
VALVE GUIDE RIMMER	//	
BEARING REMOVER SET	Used at the time of disassembling bearings of crank case	12
THREAD ADAPTER	Used at the time of assembling crank shaft to crank case	
ASSEMBLY SHAFT	//	
CRANK ASSEMBLY COLLAR	//	
BALL RACE DRIVER	Used at the time of disassembling top ball race and bottom ball race	13
STEERING STEM DRIVER	Used at the time of pressing bottom cone race to steering stem	
FORK SEAL DRIVER	Used at the time of inputting the oil seal of front fork	
STEERING STEM SOCKET	Used at the time of disassembling steering head top thread	
SNAPRING PLIER	Used at the time of disassembling the cir clip of master cylinder	15

TESTER GAUGE

TOOL NAME	USAGE POSITION	CHAPTER
COMPRESSION GAUGE	Used at the time of measuring the compression power of cylinder	2
MULTI TESTER	Used at measuring electrical parts	5,16,17,18,19
PVA TESTER	//	5,16,17,18,19
SCANNER	Used at diagnosis of ECU and sensors	5

SYMBOLS / ABBREVIATIONS

The following symbols are used in this manual to represent job-related warnings or cautions

SYMBOL	MEANING	SYMBOL	MEANING
WARNING	Indicates dangerous areas. Serious accidents may result if instructions are not followed.	WARNING	Indicates important work. Minor injury or vehicle part damage may result if instructions are not followed
		WARNING	Indicates general cautions. Provides safety and appropriate handling procedures.

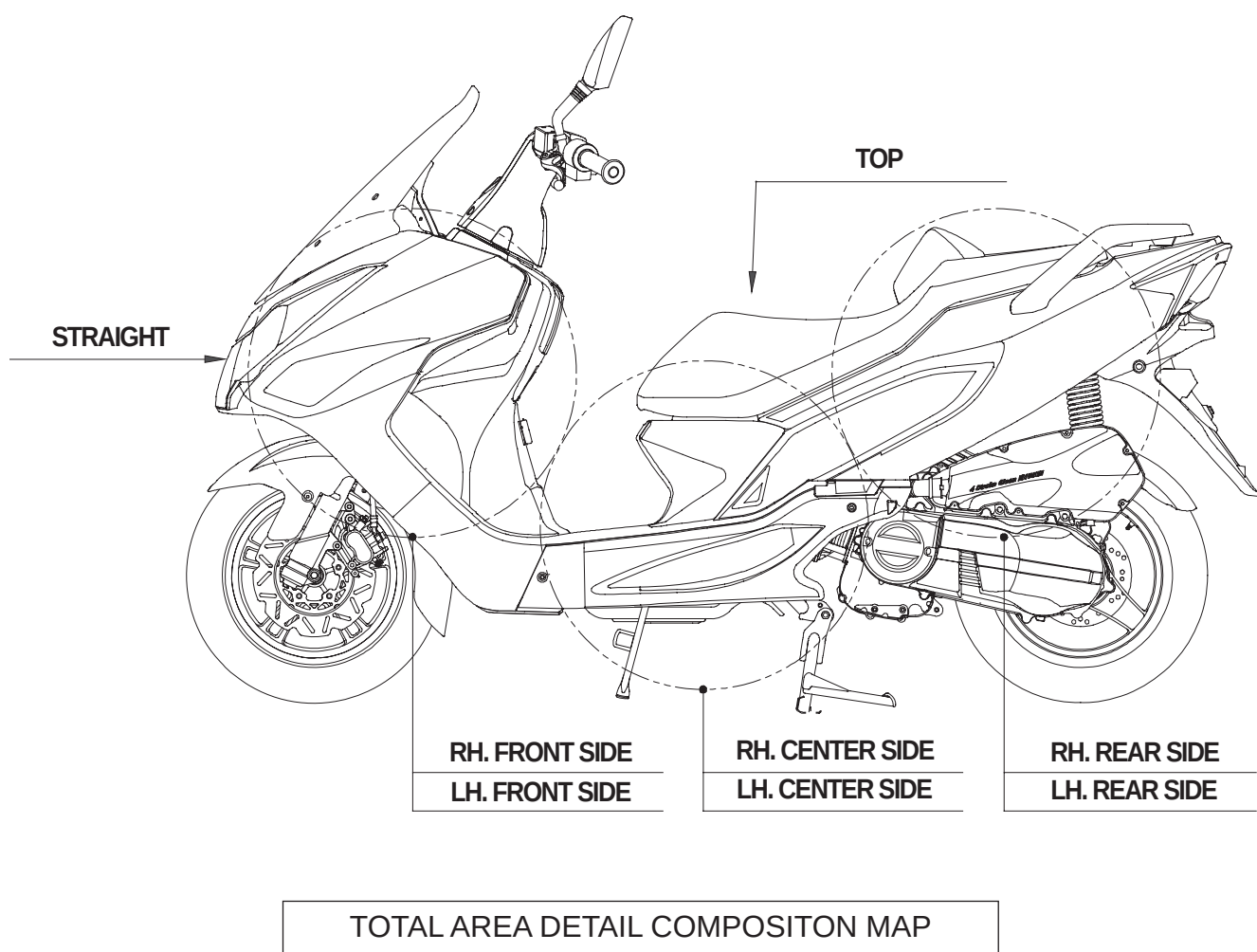
The following abbreviations are used in this manual.

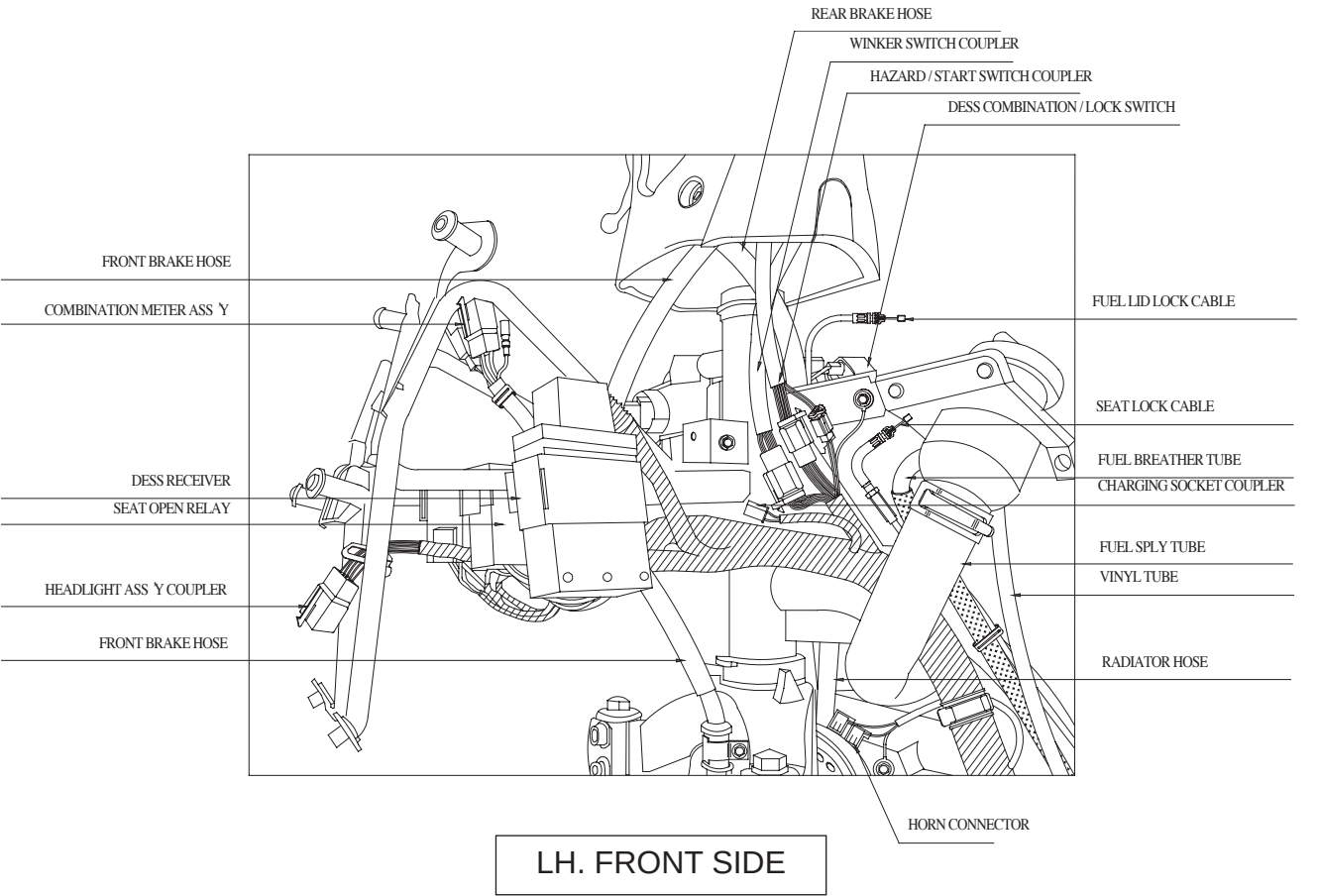
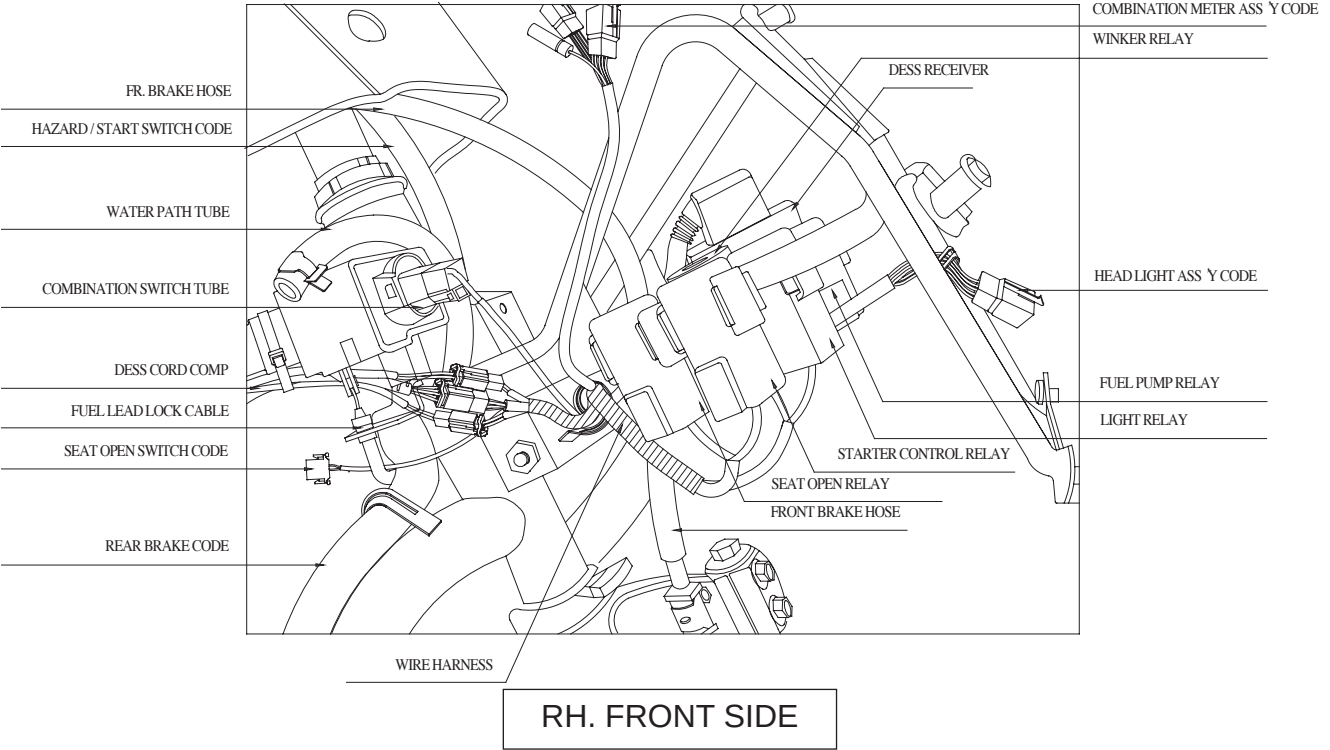
ASS Y	Assembled part
LH	Left
RH	Right

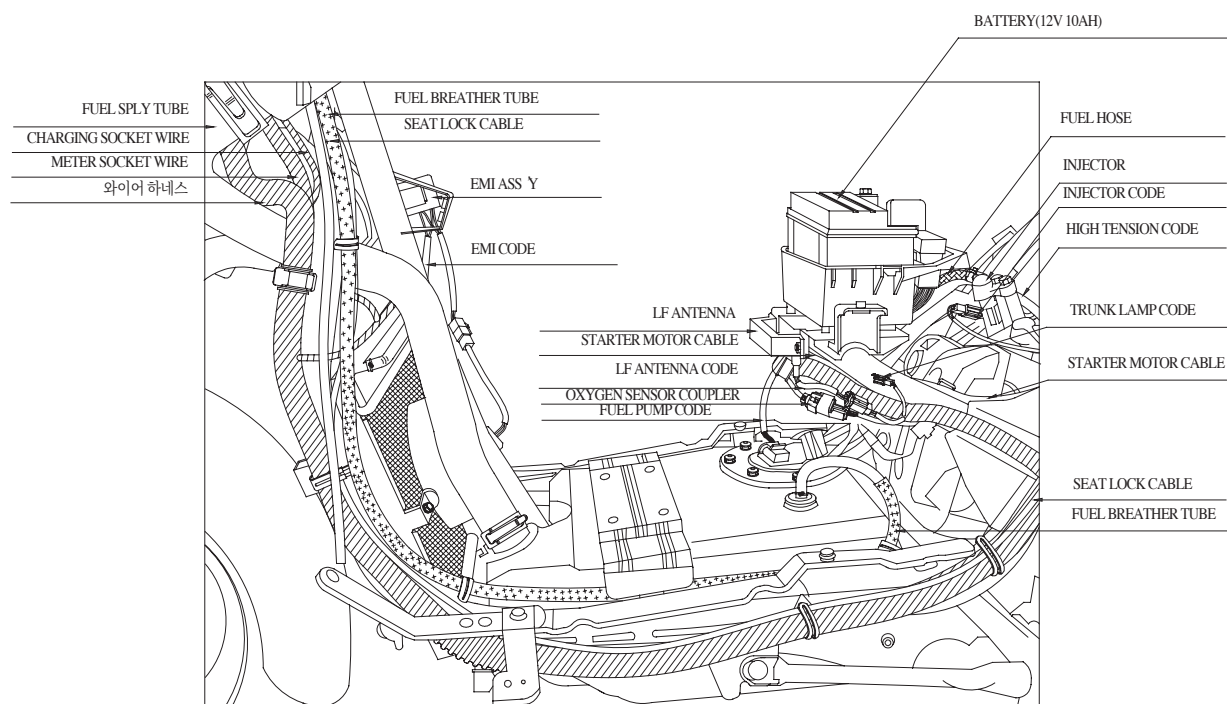
SYMBOL	MEANING
	Indicates oil applying. If there is no specific oil indicated, use the designated or recommended engine oil
	Indicates molybdenum solution applying. Molybdenum solution is made by mixing engine oil and molybdenum grease as 1:1 mixing ratio.
	Indicates to apply grease(NLG 1#2)
	Indicates to apply molybdenum grease(Containing more than 30% molybdenum disulfide, NLG 1#2 or equivalent)
	Indicates to apply molybdenum best(Containing more than 40% molybdenum disulfide, NLG 1#2 or equivalent)
	Indicates to apply silicone grease.
	Indicates to apply ointment onto screw lock. If not designated, use medium strength one.
	Indicates to seal
	Indicates the replacement part as new one whenever disassembly
	Indicates to apply brake fluid. Use the recommended one(DOT3 or DOT4)
	Indicates to apply the recommended oil
	Indicates to use special tools
	Indicates to use optional tools. Because this kind of tool is dealt as spare part, refer to the parts list to check the correct tool number.
(⇒ 3 - 1)	Indicates the reference. For left example, indicates the reference 3-1.

In case of special greases not written on above, they have not any specific symbols.

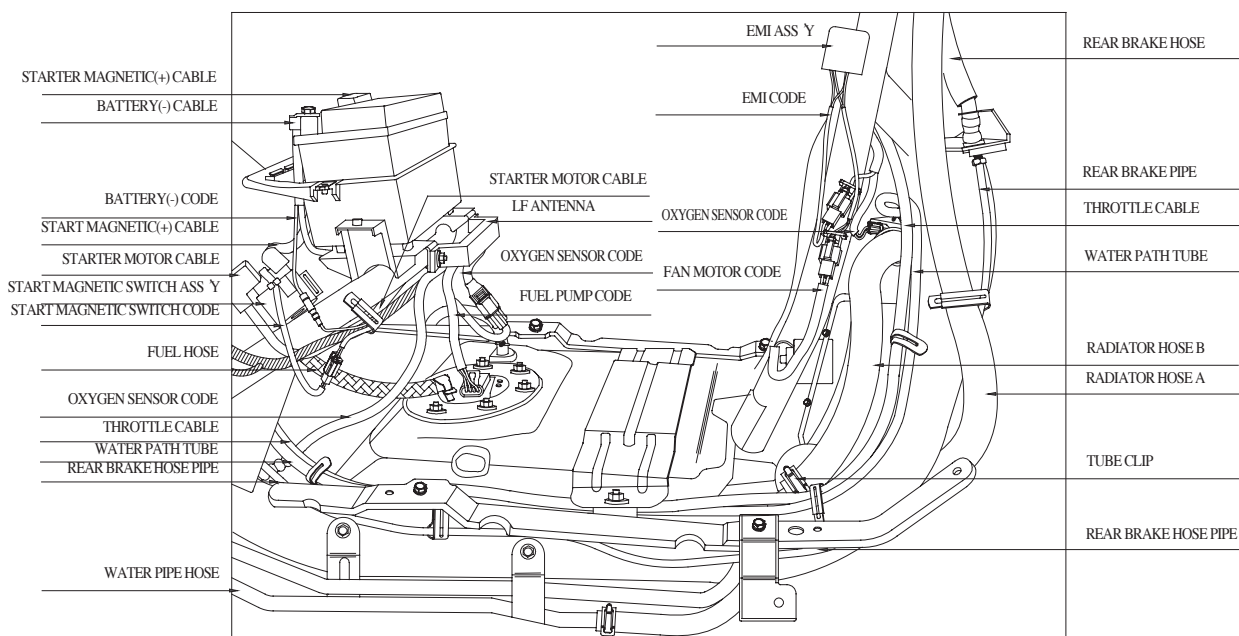
PARTS COMPOSITION MAP



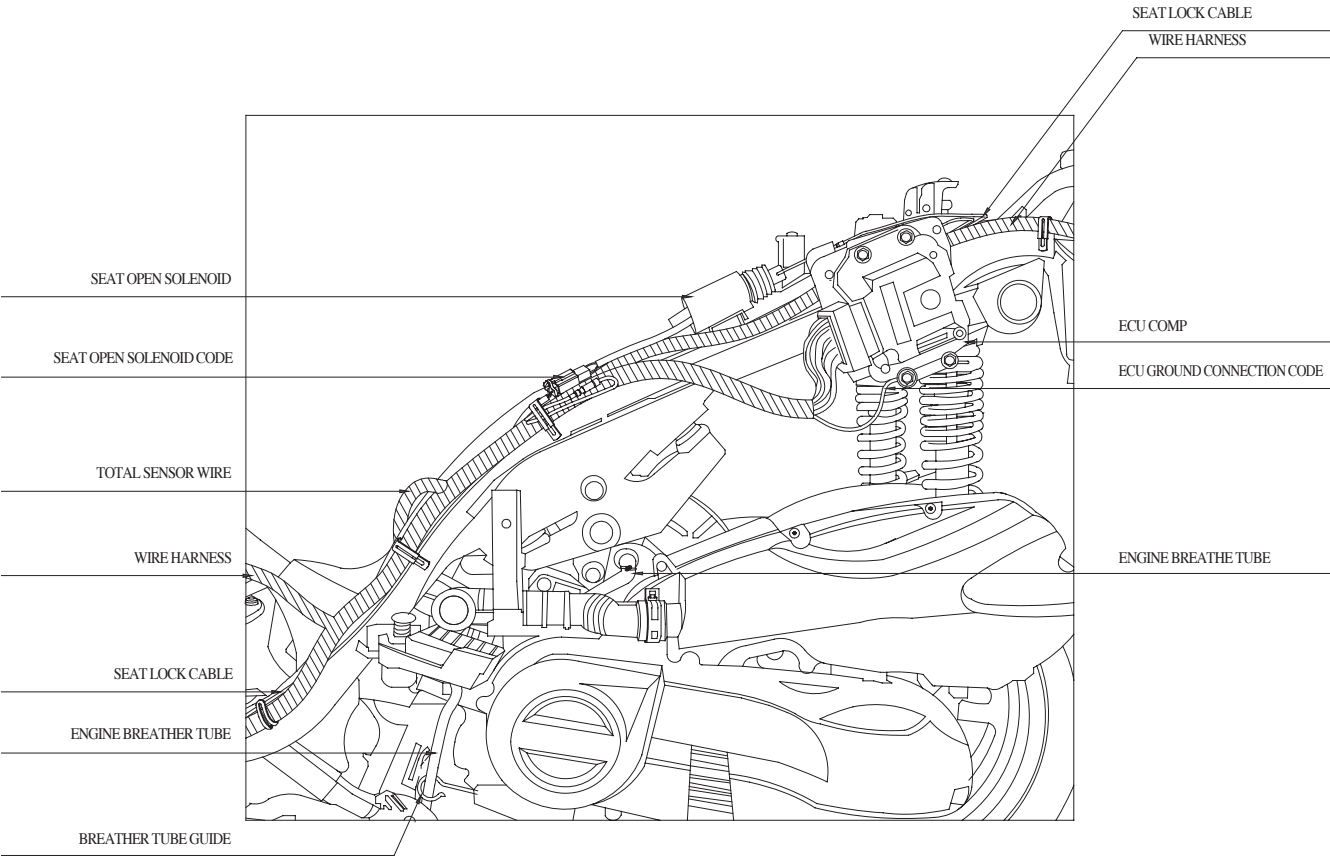




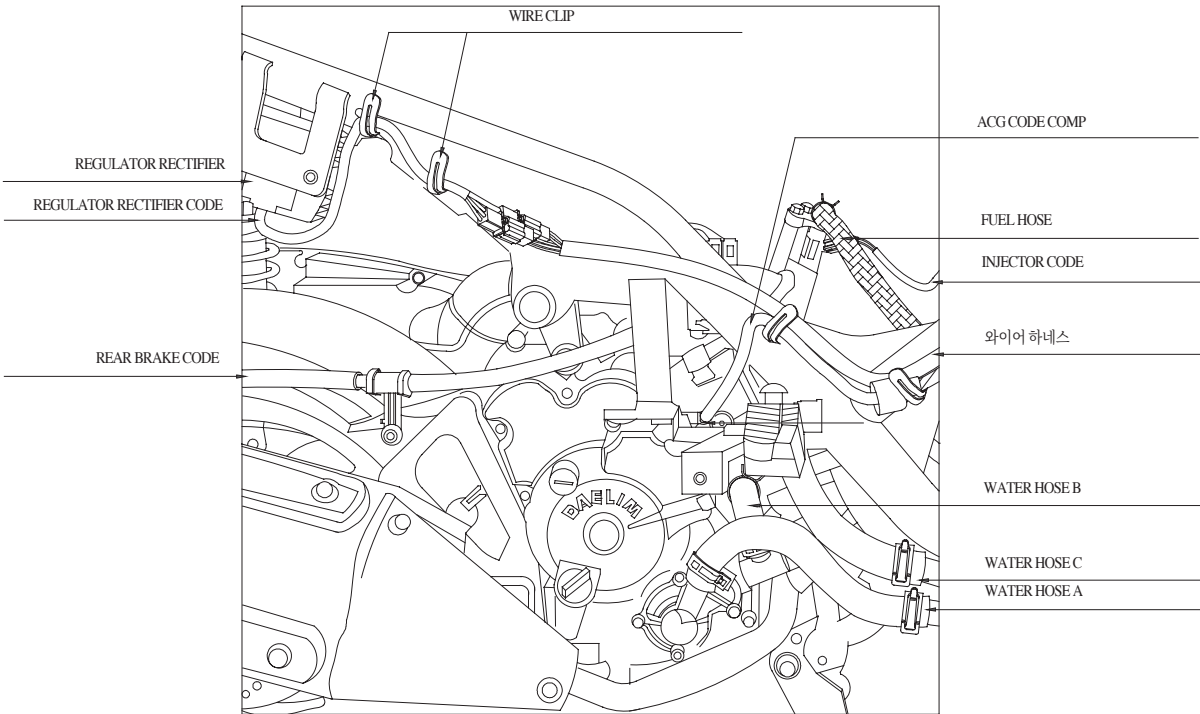
LH. CENTER SIDE



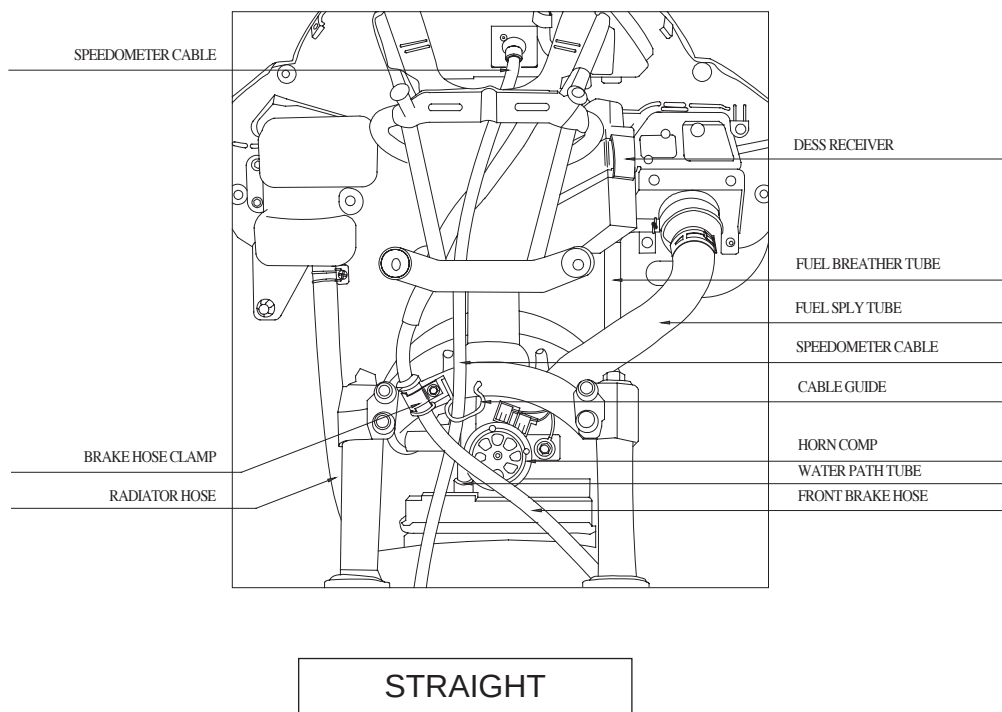
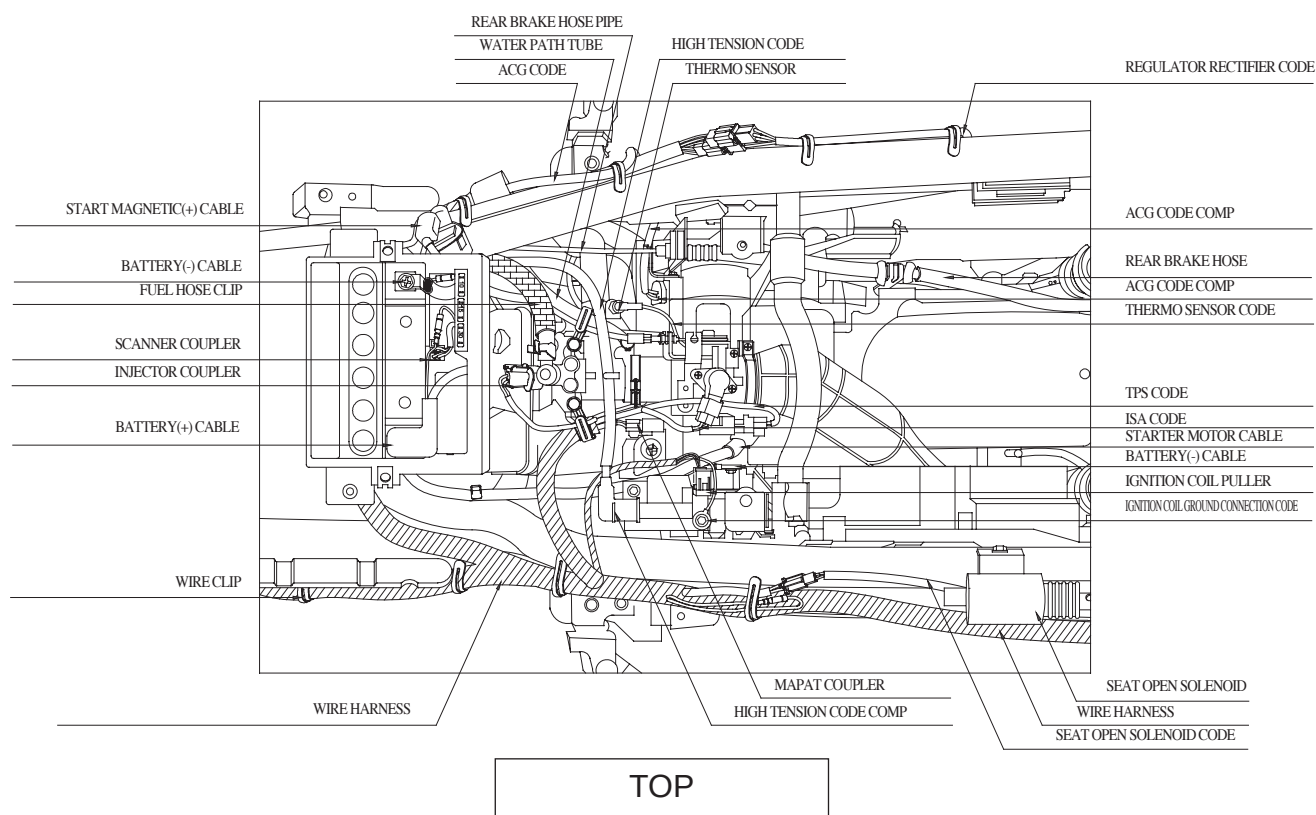
RH. CENTER SIDE



LH. REAR SIDE



RH. REAR SIDE



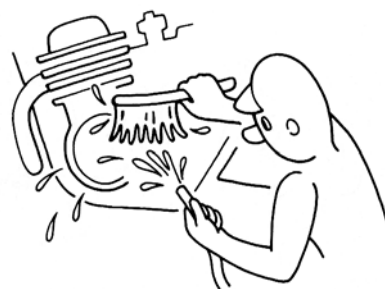
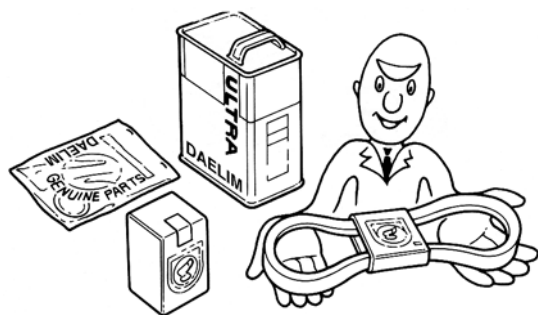
GENERAL SAFETY

WARNING

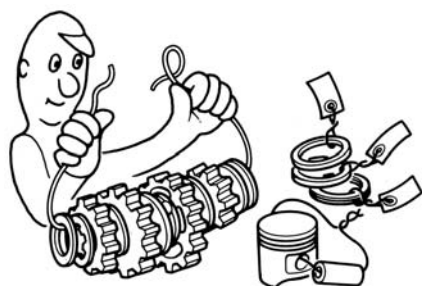
1. Do not run the engine for a long time in closed or not well-ventilated area because the exhaust gas contains toxic substances such as carbon monoxide, hydrocarbon, nitric oxide.
2. The battery fluid(lean sulfuric acid) is extremely toxic. It is dangerous if skin is exposed to it or if it enters into the eye. Be careful in handling. When exposed to the battery fluid, wash it with water and get a medical check up.(store the battery fluid in a safe place to avoid touching by the children)
3. Pay attention not to be burned and always put on the protection gears because the engine or the muffler is hot right after engine stops.
4. Gasoline is extremely flammable. Maintenance must performed in the place free of the open fire or electric spark.
5. When more than two person are working, always pay attention to other worker's action and always have safety in mind.
6. The skin exposed to used engine oil can be a major reason of the skin cancer. Pay attention not to exposed and wash carefully with soap and water after handling.
7. If compressed air is used to clean the brake, dust scattered in the air can be breathed in by workers. Please take action not to scatter dust in the brake cleaner, etc.
8. Flammable nitrogen gas is generated during charging the battery so charging must be performed in well-ventilated area and free of the open fire and spark.

SERVICE RULES

1. Parts and lubrication oil must be DAELIM genuine or recommended parts.
2. Before maintenance, remove deposit or dust from the chasis.



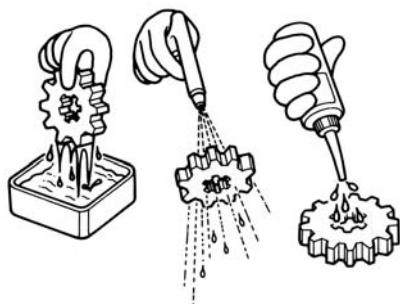
3. Store the parts of each system discriminatively to install each part in the right place.
4. After removing gasket, O-ring, piston pin clip and cotter pin, always replace them with the new one. When removing the snap ring, it can be easily missed after transformation or installation.



SERVICE INFORMATION

1

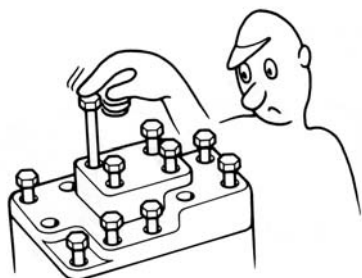
5. Clean the parts after the overhaul and before the test and remove the cleaning oil with compressed air. Apply oil to seal face during installation.



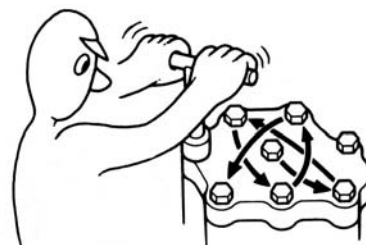
6. Check necessary place and measure necessary data during installation. When installing, return to the state before removing.



7. Align the bolts to uniform the tightening points before tightening them when you don't know the bolt length.



8. Bolts, nuts and pieces must be tightened from the bigger diameter to the smaller one, from inside to outside and diagonally with the specified torque.



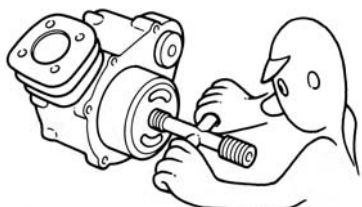
9. Check to see if the rubber part is worn out when removing it and replace it if necessary. Some rubber part is weak to gasoline and kerosene, so pay attention not to soak with gasoline or oils.



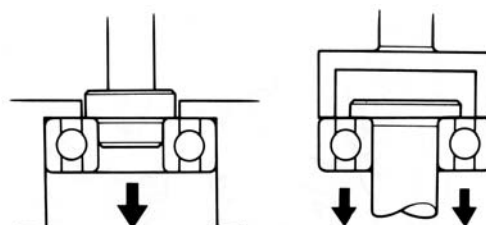
10. Recommended grease must be applied to or filled in the specified place.



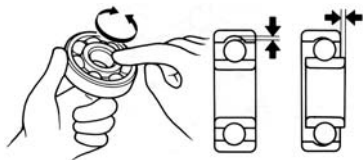
11. Maintenance needed to use the specialized tools must be performed with the right tool.



12. Never reuse the ball bearing removed with the ball applied pressure when removing press-fitted the bearing.



13. Check the smooth rotation of inner or outer race of the ball bearing by rotating it manually.
 - Replace the ball bearing having excessive axial/longitudinal hanging.
 - Wipe the ball bearing likely to have hanging with cleaning oil.(except double-sided sealed type ball bearing)
 - Replace the ball bearing of which press-fitted part is slacked at the case or shaft.



15. When blowing the ball bearing with compressed air after cleaning, keep the race from rotating. High speed rotation of the race may damage the bearing. Prior to installation, apply oil or grease to the bearing.

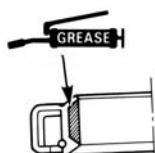


17. Check each part for proper tightening and operation after installation.



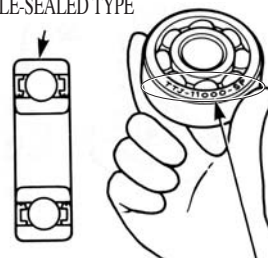
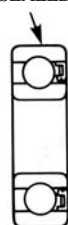
19. Install the oil seal so that the manufacturer marked surface directs outer surface.(direction not covered with oil)
 - Pay attention not to bend or damage the lip
 - Apply the grease to the lip

MANUFACTURER'S NAME



14. Pay attention to installation direction in case of the single-sided sealed ball bearing. Install the open-direction or double-sided sealed bearing in the way that the face marked with manufacturer and size should direct to the outer axle.

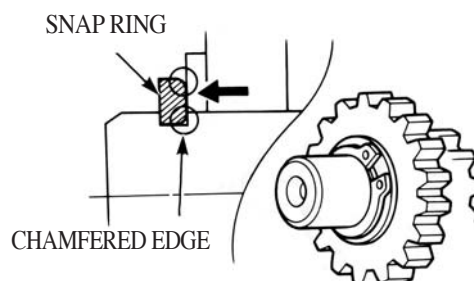
SINGLE-SEALED TYPE DOUBLE-SEALED TYPE



OPEN TYPE

MANUFACTURER'S NAME, BEARING No.

16. Install the snap ring so that chamfered side directs to the load-applied side. After installation, check the proper installation by rotating the snap ring.



18. The brake fluid and coolant can damage the painted plastic or rubber parts. Keep these parts from contacting with them and wash these parts with water in case of contact.

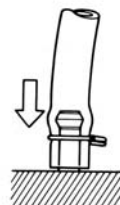
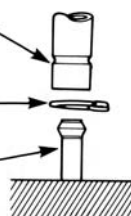


20. Connect the tube until the tube fully inserted in the joint. Install the clip if it is supplied. Replace the tube having slacked end.

CAVI-

CLIP

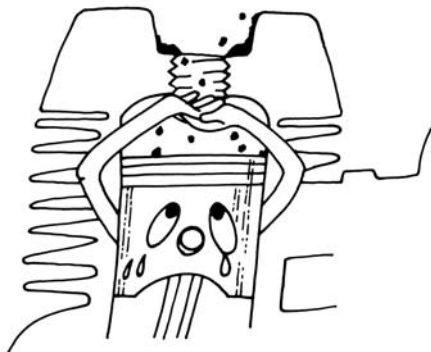
FITTING



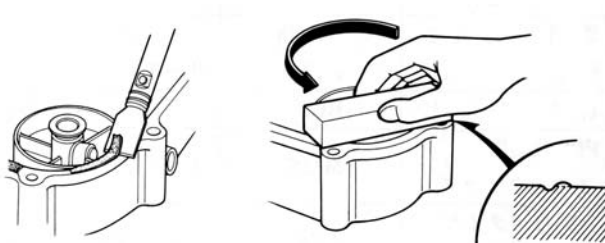
SERVICE INFORMATION

1

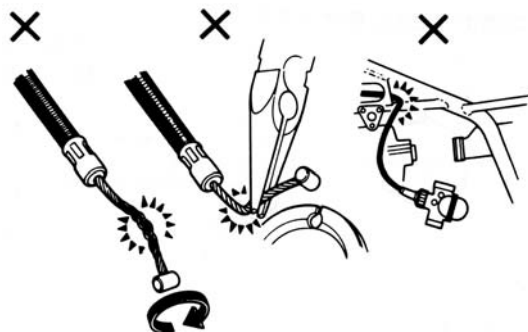
21. Keep the pneumatic system interior or the engine interior from the infiltration of dust.



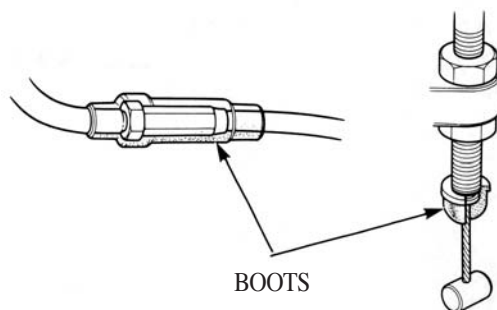
22. Install the gasket mounted in the contact surface of each case of the engine while removing gasket material completely. Remove damaged contact surface by wiping with the oil stone equally.



23. Pay attention not to bend the cable excessively. Transformed or damaged cable may cause malfunction or damage.

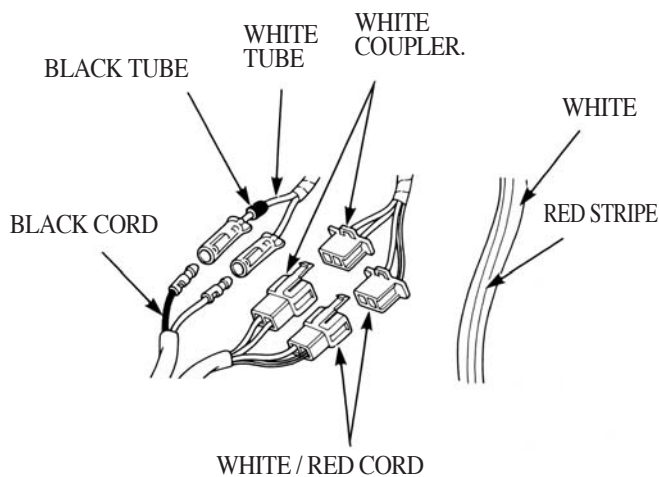


24. Install the boots with the installing groove by inserting the boots into the groove.

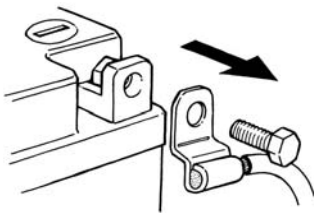


CAUTION WHEN WIRING

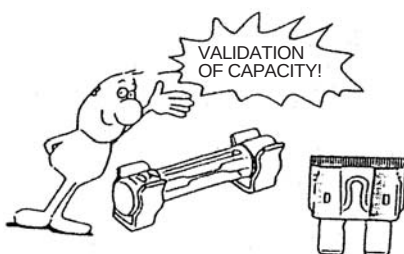
- Each cord must be connected depending on its color. When connecting different cord, attach color tube around the connector. Connect the coupler to the connector with same color and same pin number.
- Identify the two-colored cord by main color first and then striped color.



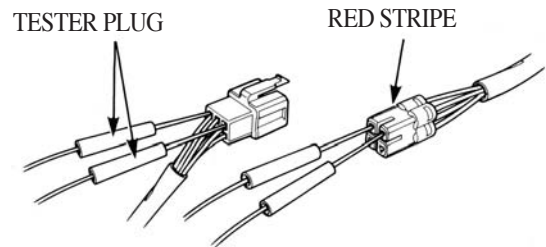
- When disconnecting the battery, the minus terminal must be disconnected first.
- Make sure that the tool such as spanner do not contact with the frame.



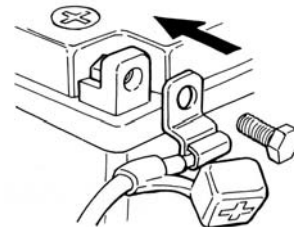
- If the fuse is short-circuited, find out the cause and repair. Replace with the fuse having the specified capacity.



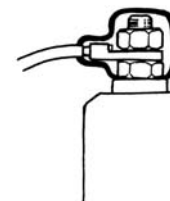
- When measuring voltage or resistance of the cord terminal using tester, contact the tester plug behind of the coupler. Pay attention not to open the cord terminal and contact the tester plug from the front of the coupler in case of water-proof coupler.



- Recheck the condition of contact, securing and continuity of each part after maintenance.
- When connecting the battery, the plus terminal must be connected first.
- After connecting the terminal, apply the grease to the terminal.



- Connect covers to the terminal after maintenance.



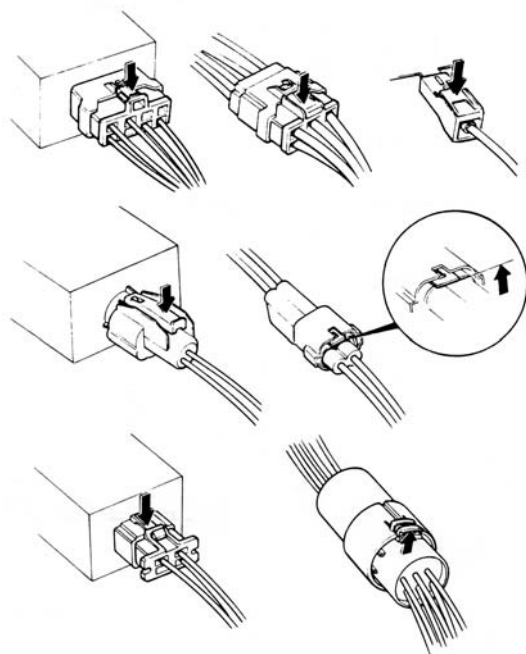
- If there is rust in the terminal, remove the rust with sand paper prior to connecting.



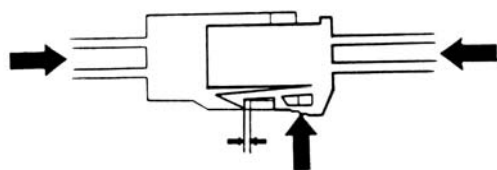
SERVICE INFORMATION

1

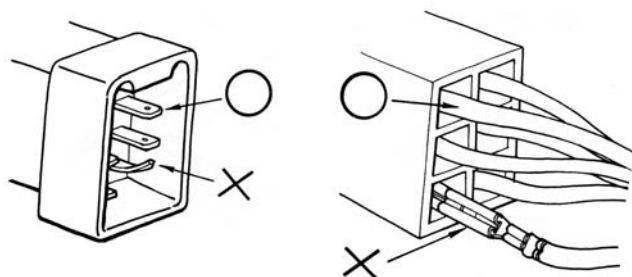
- Turn off the main switch before connecting/disconnecting.
- Release the lock to disconnect the lock of the coupler.
- The lock of the coupler has two types according to releasing method (press type and pull type) so release it properly according to the shape.
- Typical releasing method of the coupler is illustrated in the following.



- Release the lock by inserting the coupler slightly and then narrowing connection to remove the coupler.



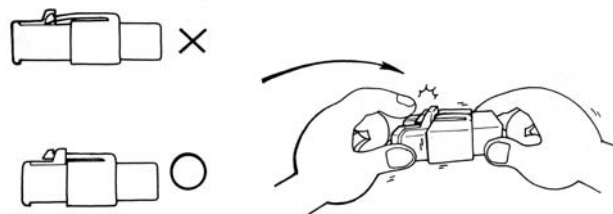
- Check to see if there is bended terminal and secure it to avoid disconnecting.



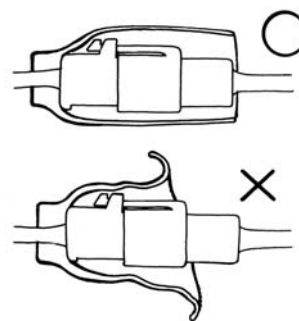
- When disconnecting the coupler, disconnect it while holding the coupler body. Pull while holding the wire harness cord and do not remove the coupler connection.



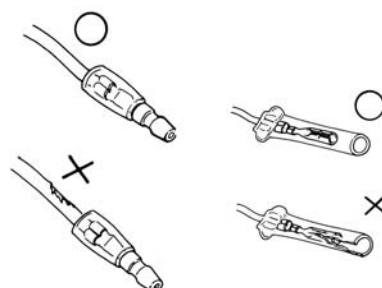
- Insert the lock of the coupler until the lock is fully secured.



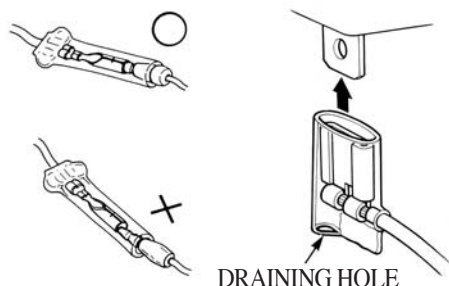
- Pay attention not to damage the vinyl cover of the coupler.



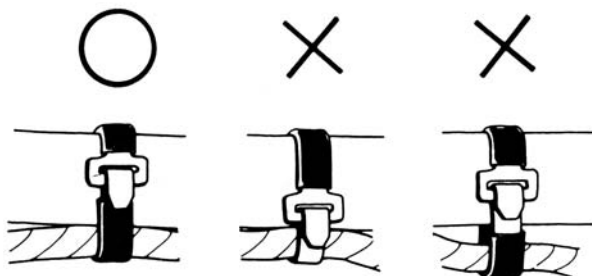
- If the wire harness coating is damaged, repair by winding vinyl tape or replace it.
- Prior to connecting the connector, make sure that the cover is not damaged and the mess terminal is not opened.



- Insert the connector until the vinyl cover is fully inserted into the terminal.
- The opening of the vinyl cover must face at the ground direction but in case of the plain connector, the draining opening must face at the sky direction.



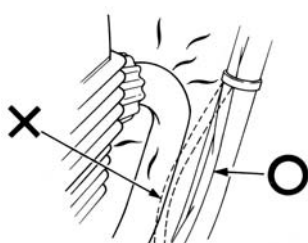
- Wire band must be secured firmly in the specified location of the frame. In case of aluminium band, secure the wire harness to the coated part.



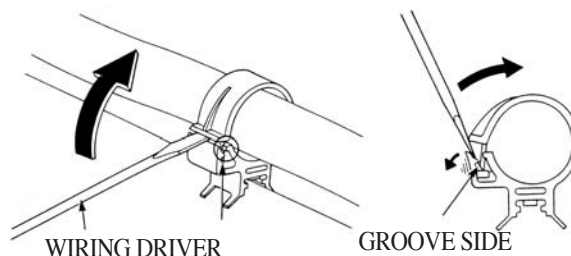
- In case of the weld clamp, do not clamp in the welded part.



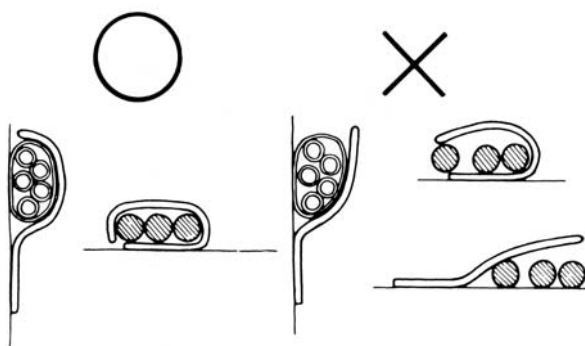
- When clamping the wire, pay attention not to contact with hot part.



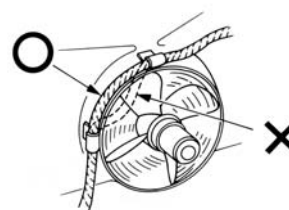
- When removing T-start, broaden the groove of T-start using the wiring driver and release the torque.
- Connect the harness and the hose to T-start and then insert until the groove is locked.
- When removing T-start from the frame, replace it with the new one.



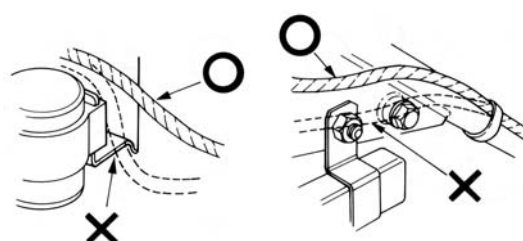
- Secure the wire harness firmly using the clamp.



- When clamping the wire harness, make sure that the harness is not contacted with the shaft or rotating part.



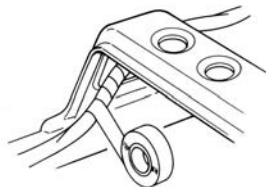
- The wire harness must be routed without contacting with the end of the lamp or any sharp edge.
- The wire harness must be routed without contacting with the end of the bolt or the piece.



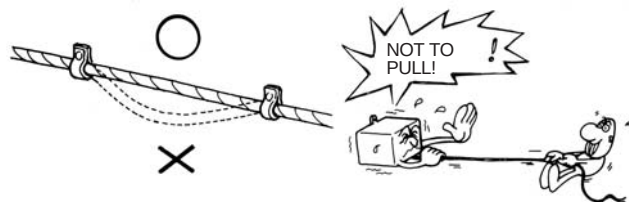
SERVICE INFORMATION

1

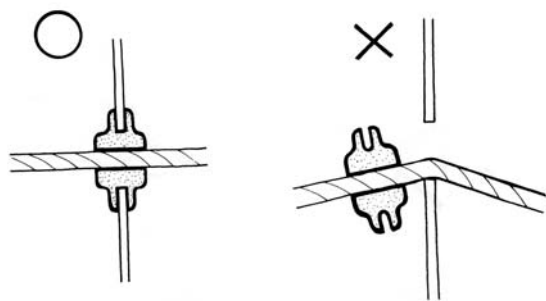
- In case that the wire harness is contacted with the end or the sharp edge, protect both parts with tube or tape.



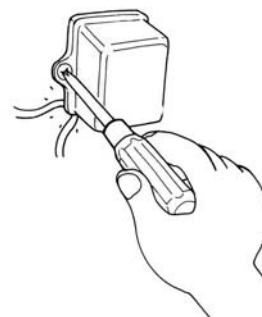
- The wire must not hang down or be pulled excessively.



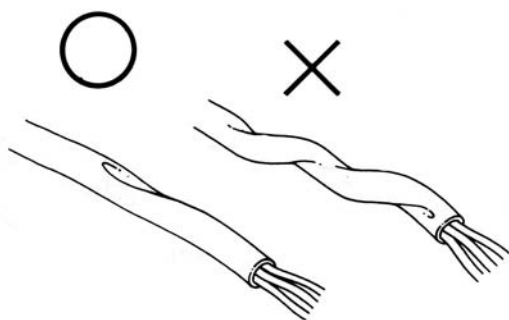
- If necessary, lock the wire harness properly.



- When mounting parts, make sure that the wire harness is not pressed by the parts.



- Do not twist the wire harness.

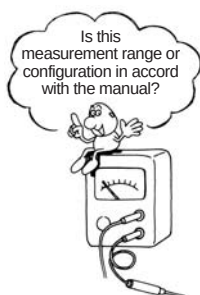


- Wire the wire harness not to be pulled or expanded when the handle is turned to the right or the left completely. Avoid excessive bending or chewing and interference with the engine.



- Prior to using the tester, please read the manual carefully and understand the contents.
- When testing the resistance of the tester, the zero adjustment must be performed before testing.

- Do not drop or throw the parts especially semiconductor contained parts because these parts may be damaged by the impact of the drop.



2. INSPECTIONS / ADJUSTMENTS

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SERVICE INFORMATION

WARNING

- The exhaust gas contains poisonous substance. Do not keep engine idling in a closed or poorly ventilated Place for a long period of time
- Refer to the chapter 4-3 about the engine fluid
- Stand the main stand prior to the beginning work

REPAIR STANDARDS

THROTTLE GRIP DIFFERENCE		2-6mm
SPARK PLUG		CR8EH-9
SPARK PLUG GAP		0.8-0.9mm
VALVE GAP	IN	$0.15 \pm 0.02\text{mm}$
	EX	$0.23 \pm 0.02\text{mm}$
CYLINDER COMPRESSION RATIO		11.8:1
CYLINDER COMPRESSION PRESSURE		13.0kgf/cm ² (600rpm)

TIRES

TIRE PRESSURE AT COLD ROLLING	ONE PERSON	FRONT	2.00 kgf · cm ²
		REAR	2.40 kgf · cm ²
	TWO PERSONS	FRONT	2.00 kgf · cm ²
		REAR	2.50 kgf · cm ²
TIRE SIZE		FRONT	120/70-13(TUBELESS)
		REAR	140/60-13(TUBELESS)
MINIMUM TREAD DEPTH		FRONT	0.5mm
		REAR	0.5mm

TORQUE

2

● SPARK PLUG	1.5~1.7 kgf-m
● CYLINDER HEAD COVER BOLT	1.0~1.2 kgf-m
● VALVE ADJUSTING NUT	1.0~1.2 kgf-m
● AIR CLEANER CASE COVER SCREW	0.7~1.0 kgf-m

TOOL

- COMPRESSION GAUGE

REGULAR INSPECTION SCHEDULE

According to each inspection schedule, please do preparatory inspection.

I : INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY

R : REPLACE L : LUBRICATE C: CLEAN A: ADJUST

ITEM	FREQUENCY ITEM	ODOMETER READING(NOTE 1)				REMARKS
		500km (1 month)	1,000km (6 months)	1,500km (12 months)	2,000km (18 months)	
*	FULE LINE(FUEL TUBE)	I	I	I	I	
*	THROTTLE GRIP OPERATION		I	I	I	
*	AIR CLEANER ELEMENT		R	R	R	
	CVT DUST COVER ELEMENT		I	I	I	
	SPARK PLUG		I	R	I	NOTE 2
*	VALVE GAP	I	I	I	I	
	ENGINE OIL	R	R	R	R	
* *	TRANSMISSION OIL	R	R		R	NOTE3
	OIL FILTER SCREEN	C	C	C	C	
	BRAKE FLUID		I	I	I	
	BRAKE PAD ABRASION		I	I	I	NOTE2
	BRAKE EQUIPMENT	I	I	I	I	
*	BRAKE STOP SWITCH		I	I	I	
*	HEAD LIGHT		I	I	I	
	SIDE STAND		I	I	I	
*	SUSPENSION		I	I	I	
*	BOLT, NUT FASTENING	I		I		
* *	WHEEL/TIRE		I	I	I	
* *	STEERING HEAD BEARING	I		I		
	RADIATOR COOLING WATER	I	I	R	I	
	WEIGHT ROLLER		I	I	I	
	SLIDE PIECE		I	I	I	
	DRIVE BELT		I	I	I	

* If there are no appropriate type of tools and maintenance data available, or if you do not have mechanical technology contact authorized maintenance shops, dealers or other designated repair shops for maintenance and inspections.

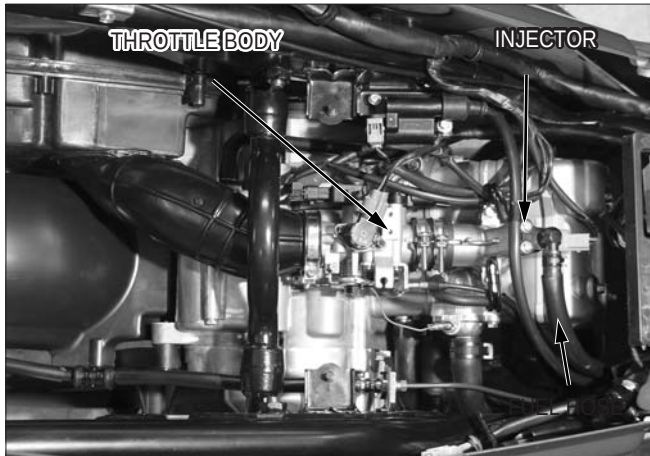
鞍 To ensure safety, inspections and maintenance of these parts must be carried out by authorized maintenance shops, dealers or other designated repair shops.

NOTE

After the odometer reading exceeds 12,000 km, repeat maintenance service at intervals indicated in the table.

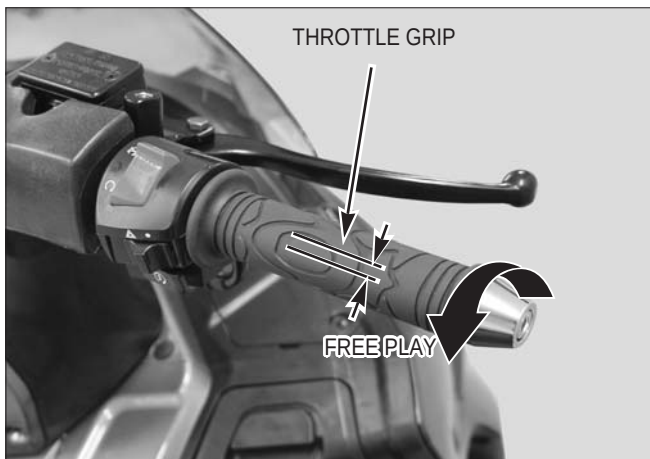
After riding in areas with high humidity or pollution, carry out maintenance service more frequently.

Replace every years. Proper technology is required for this job.



FUEL LINE (FUEL TUBE)

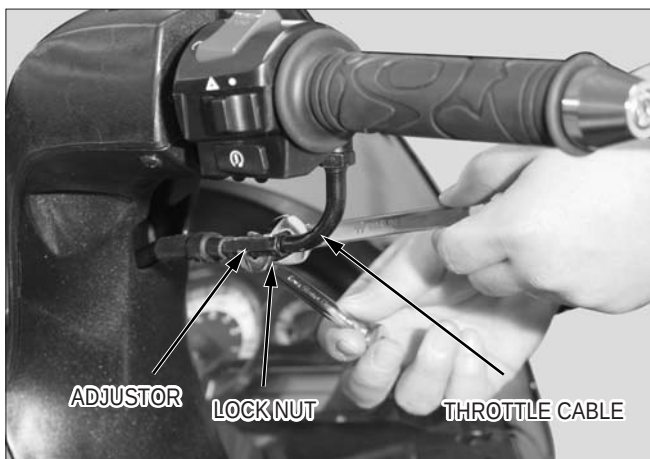
- Check the connection status between injector and fuel tube.
- Check fuel tube, replace whether it cracked, damaged or oil leaked.



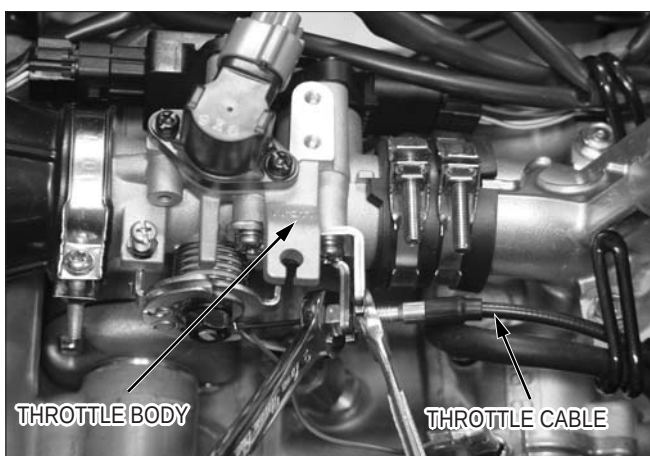
THROTTLE GRIP OPERATION

- Check to see if the throttle grip operates smoothly in any steering position.
- If the throttle grip does not operate properly, check the throttle cable for aging, damage or kinking.
- Check the throttle grip free play.

FREE PLAY : 2~6mm



- For main adjustment of the throttle grip freeplay, adjust the nut on the carburetor side.
- Loosen the lock nut, turn the adjuster nut and adjust of it.
- After adjusting, fasten lock nut.



- In case of main adjustment, do by the adjuster on the side of throttle body.
- Untie lock nut and adjust freeplay by turning adjuster.
- After completing adjustment, fasten lock nut and re-check about operation of throttle grip.
- If necessary, replace the damaged parts.



AIR CLEANER

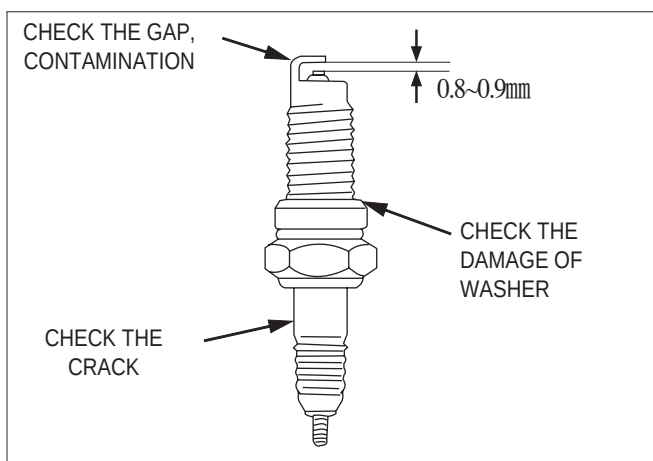
- Loosen the 8 screws securing the air cleaner case cover and remove it.



- Remove the air cleaner element.
- Whenever the filter gets seriously polluted or damaged, replace it as always.
- The assembly is done in the reverse order of disassembly.

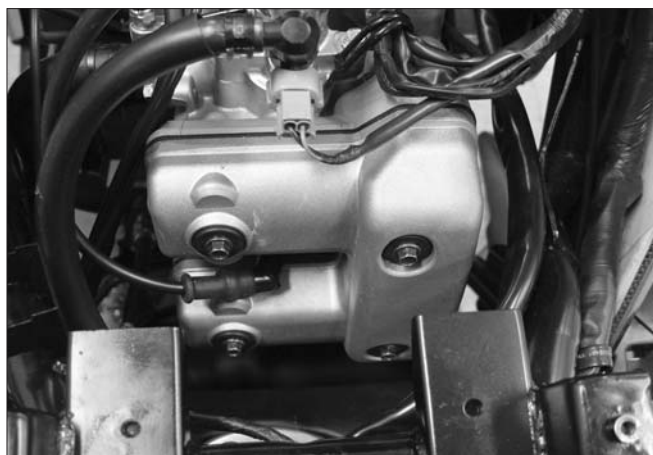
CAUTION

- The air cleaner element is made from dry type paper filter.
- Do NOT reuse the air cleaner element by blowing and cleaning by compressed air.



SPARK PLUG

- Remove the center cover.
- Remove the spark plug.
- Check the damage, pollution, accumulated materials in spark plug. If there is accumulated material, clean it by plug cleaner or wire brush.
- Measure the spark plug gap by filler gauge and adjust by bending the side pole.



- Rotate by the time plug washer meets to the cylinder head by hand.
- At this moment, assemble by rotating 3/4 by plug wrench.
- Assemble the spark plug cap.

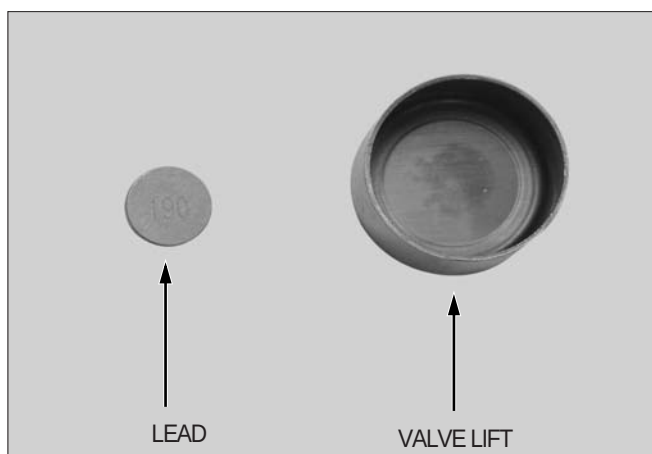
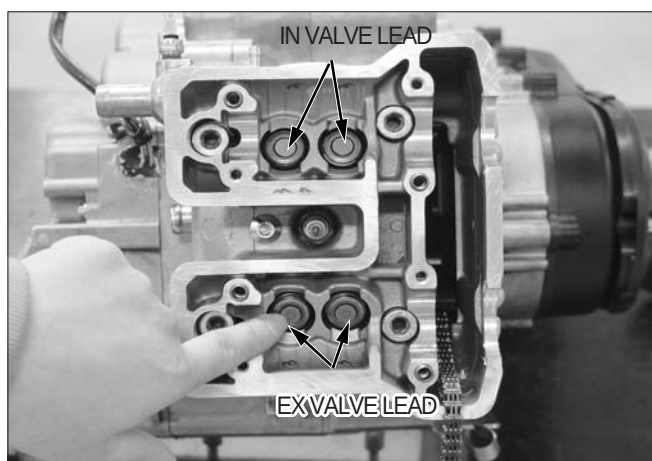
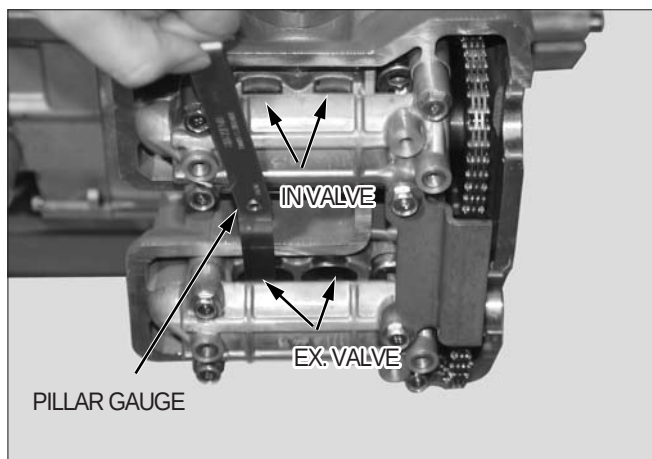
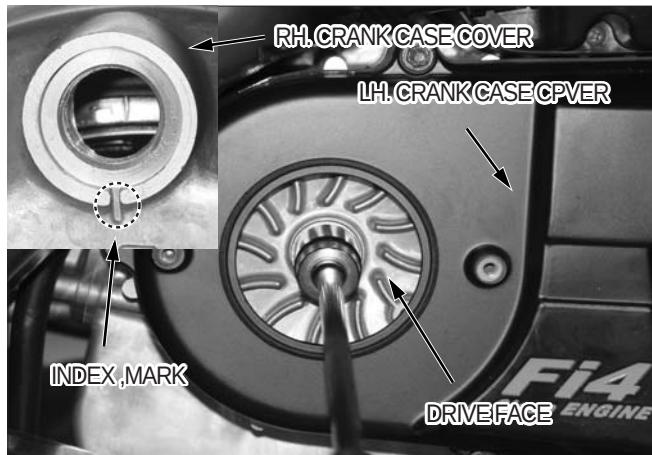
Genuine plug: CR8EH-9

The gap of spark plug : 0.8~0.9mm

Torque : 1.5~1.7 kgf.m

CAUTION

- Assemble the spark plug by plug wrench after semi-assembly by hand.



CHECK VALVE GAP

- Loosen the ACG cap in RH CRANK CASE COVER.
- Loosen the CVT dust cover in LH. Crank case cover, rotate the drive face to the rotating way of crank and fit the 'T' mark of fly wheel and index mark of RH. Crank case.

CAUTION

- Inspect and adjust the valve clearance when the engine is cold(35°C)
- Separate cylinder head cover. At this moment, fit it to the top of compression stroke.

- Measure the valve gap by pillar gauge
Valve gap : IN 0.15mm
EX 0.23mm

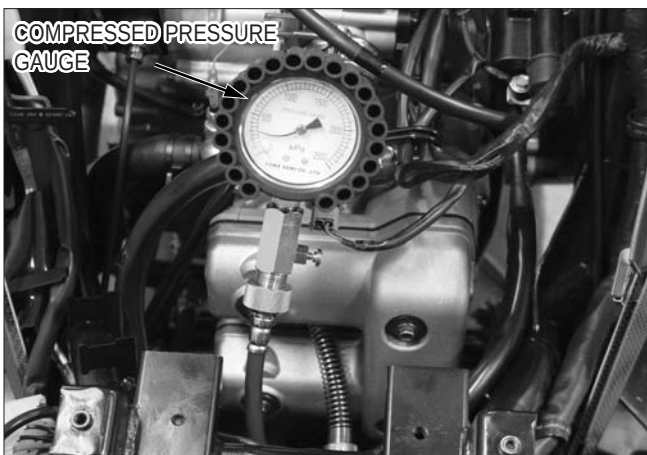
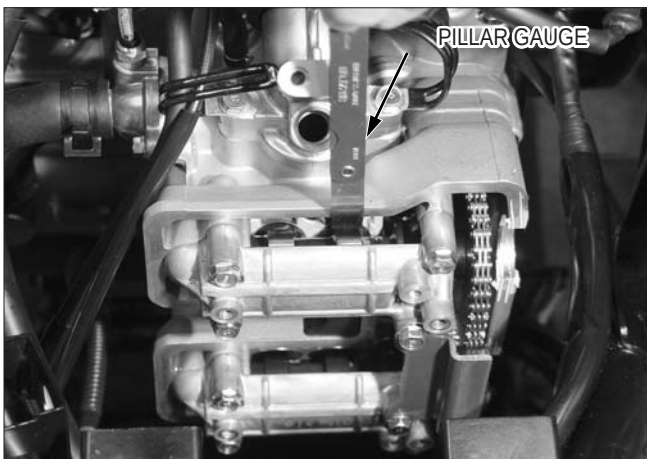
METHOD TO ADJUST LEAD

- If the valve gap is over the standard limit, adjust it according to designated method.
- Disassemble cam shaft
- Disassemble valve lift and lead
- Record valve lift and assembled position for lead, keep them in order to be distinguished each other.

CAUTION

- Use the magnet when disassembly of valve lift
- Be careful for the lead not to fall down inside the cylinder on condition that the valve lift stuck to valve lift.
- If the lead is difficult to be disassembled, use the pin set or magnet.

- Disassemble valve lift and lead, then clean inside by blowing the compressed air.
- Clean oil stuck to the lead, measure the thickness of micro meter, control it.



CAUTION

- There are various lead from 1.500mm to 2.300 mm, totally 33 leads.

Calculation for adjusting the valve gap lead : $A=(B-C)=D$

- Required lead thickness : A
- Recorded valve lifter gap : B
- Specified valve lifter gap : C(IN 0.15mm/EX 0.23mm)
- Disassembled lead thickness : D

Calculation valve lead(example)

- B : Recorded valve lifter lead : 0.06mm
- D : Disassembled lead thickness : 1.875mm
- C : Specified valve lifter gap : 0.15mm(IN)
- $A=(0.06-0.15)+1.875\text{mm}=1.785$
- New lead thickness : 1.775mm

*Because there is only 1.785mm to meet the required lead thickness from 1.500mm to 0.025mm, this lead will be choosed.

CAUTION

- Measure and check correctly new lead, disassembled lead thickness by micrometer.
- If the required lead thickness is over 2.300mm, check the valve seat and remove carbon accumulated material and adjust the valve seat.

- Assemble the selected lead to valve spring retainer according to specified sequence.
- Apply molybdenum fluid to sliding side of valve lifter and assemble lifter
- Assemble cam shaft. Rotate crank shaft, make the lead positioned, re-check valve gap.

COMPRESSION PRESSURE OF CYLINDER

- Start the engine and heat it
- Turn off starting and disassemble spark plug cap and sparkplug. Assemble compression gauge. Open completely throttle and idle the engine by starter motor by the time when raising of gauge stops.

TOOL : Compression gauge

CAUTION

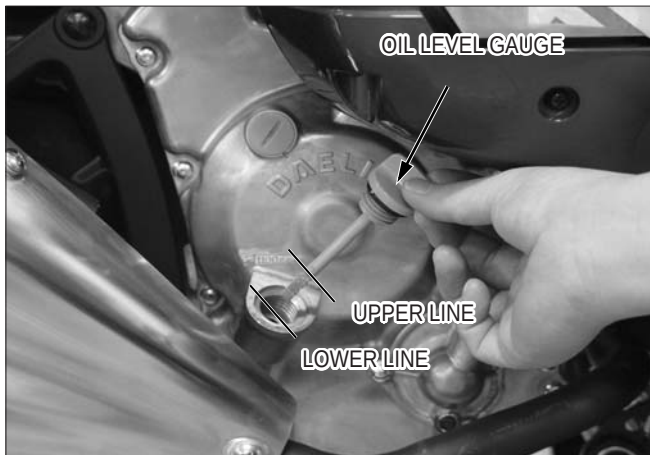
- Generally, from 4 to 7 seconds, it raises maximally.
- Compressed pressure : 13.0 kgf/cm²

If the pressure is low, check the followings.

- Bad adjustment of valve gap
- Leaking of valve
- Leaking from cylinder head gasket
- Abrasion of piston and cylinder

If the pressure is high, check the followings.

- Carbon accumulation of head side of piston, cylinder head.



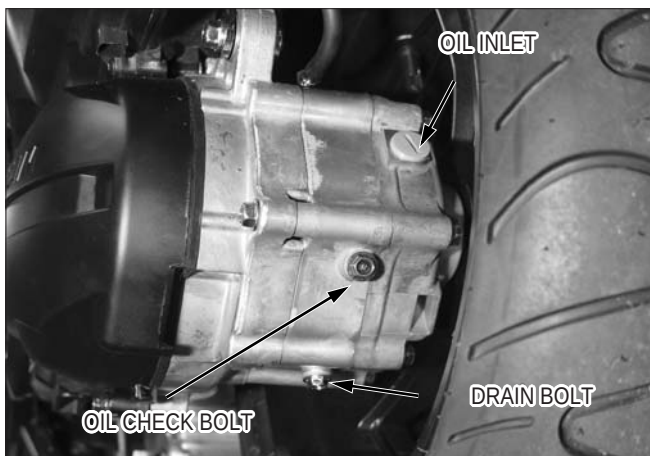
ENGINE OIL

INSPECTION

- Do warming up the engine and warm up the engine oil enough.
- Stop the engine and loosen oil level gauge, clean oil in gauge by cleaned towel. Rotate level gauge and insert it to check the oil capacity.
- If the oil is between the upper and lower level, it is OK. If the oil is close or below the lower level, replenish it to the upper level.

CAUTION

- Stand the vehicle by main stand and check



TRANSMISSION OIL

- Stand the vehicle by main stand and check
- Stop the engine and separate oil check bolt.
- Check the oil level through the oil check hole.
- If the oil level is low, replenish oil(SAE90#)
- Assemble oil check bolt

CAUTION

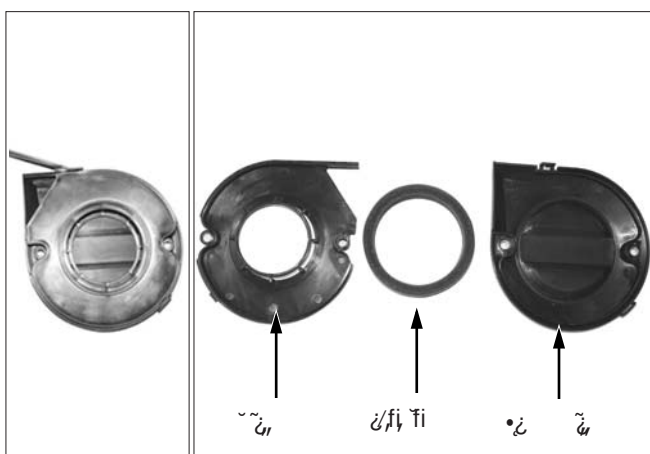
- The sealing washer shall be good
- Stand the vehicle by main stand and check



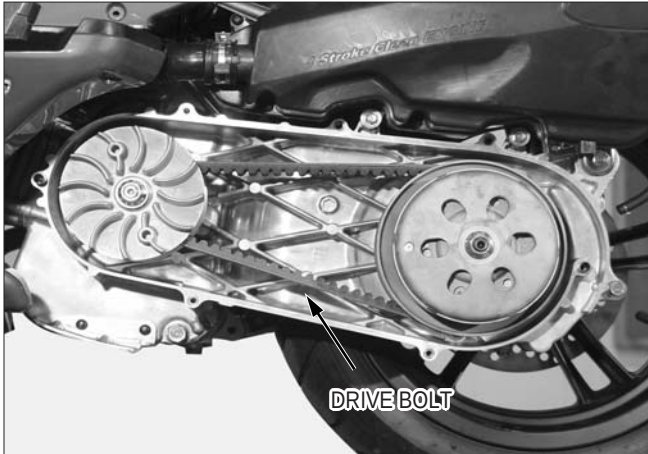
CVT DUST COVER ELEMENT

CHECK

- Untie 2 bolts in LH. Crank case cover and CVT Dust cover ass'y.

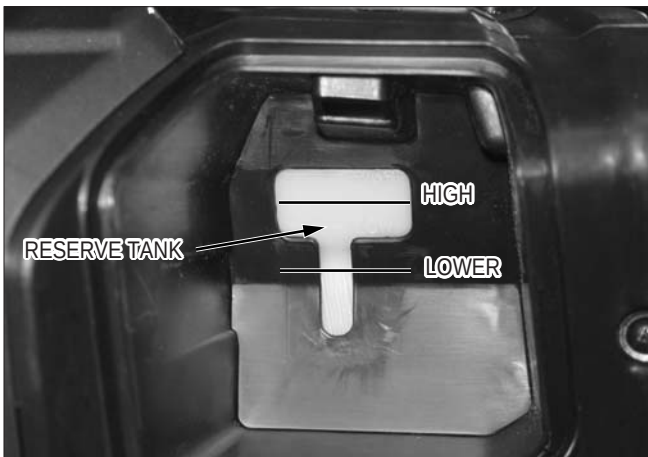


- Disassemble CVT Dust upper cover and element, check.
- If it gets dirty due to dust, other material, clean.
- The assembly is done in the reverse order of disassembly.



DRIVE BELT

- Disassemble LH. Crank case cover.
- Check whether drive belts is seriously damaged or broken. According to regular inspection schedule, check and if possible, replace with the new one.



CHECK COOLING WATER

- Stand the vehicle by main stand and check
- Open RH. Inner box cover and check the cooling water's level in the reserve tank.
- The cooling water level shall be between high and low level line.
- If the cooling is not enough, replenish it to the high level(H).

CAUTION

- If do not replace or replenish the cooling water, the engine can be over heated or cooled, then replenish it to the high level(H).



REPLACEMENT OF COOLING WATER

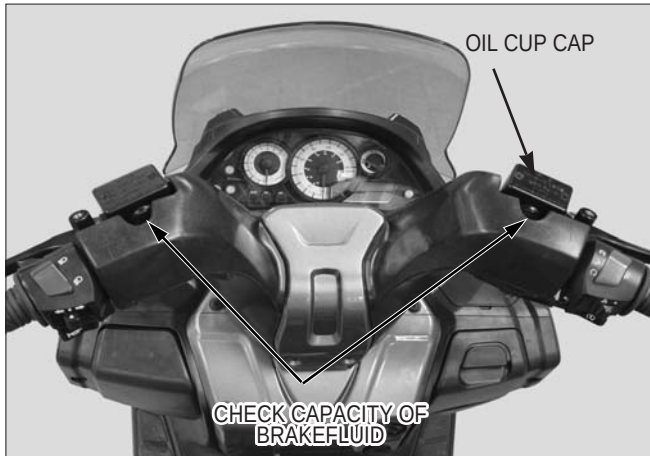
- Untie the drain bolt and pull out the cooling water(lean the vehicle to the right for cooling water to easily come out.
- Disassemble the reserve tank cap
- Assemble the drain bolt

- Replenish the cooling water to the reserve tank.

The capacity of cooling water : 1,500 i 20cc

- Start the engine and remove air of cooling water, check whether the level of cooling water is stable or not.
- Close the reserve tank cap.



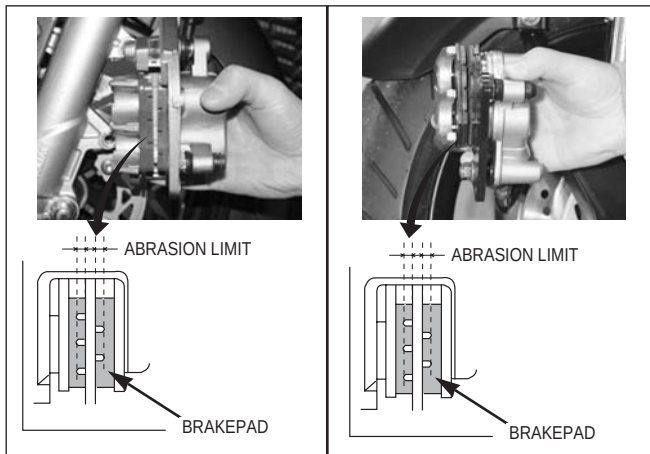


BRAKE FLUID

- Check the oil level of front master cylinder.
- If the oil level is near the lower limit level, remove the oil cup cap, diaphragm and fill DOT3 or DOT4 brake fluid to the top limit line.
- If the brake fluid reaches to the lower limit line, check the leaking of the brake system entirely.

CAUTION

- If the brake pad is worn severely, brake fluid level can be down.



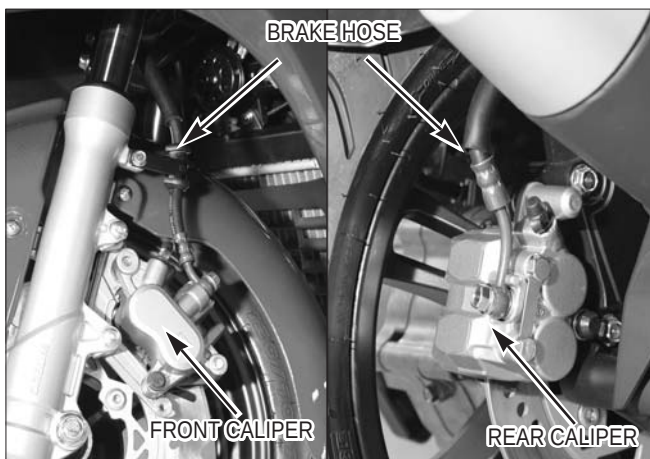
BRAKE PAD

BRAKE PAD REPLACEMENT

- Check the brake pads for wear.
- If the brake pad is worn under the abrasion limit of pad, replace the brake pad with the new one.
- Refer to how to replace the brake pad(→15-5)

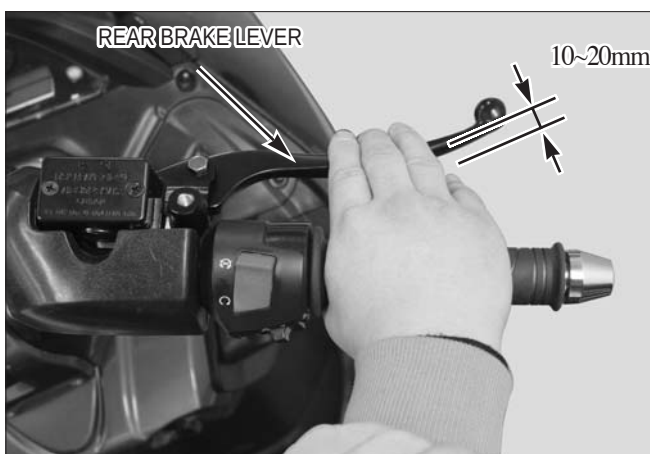
CAUTION

- Replace with the brake pad as a set.



BRAKE EQUIPMENT

- Check whether there is crack, damage in front/rear brake hose, and if the brake fluid leaks, replace it with the new one promptly.



FREEPLAY OF BRAKE LEVER

- When pulling the lever, measure its freeplay
FRONT : 10~20mm
REAR : 10~20mm



SIDE STAND

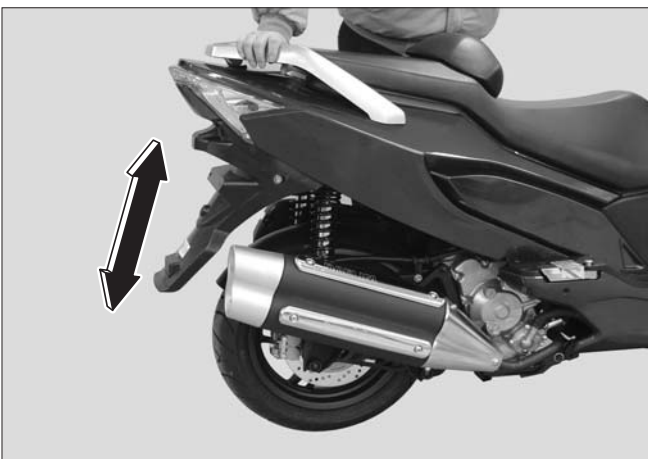
- Stand the vehicle by main stand
- If pull the lower end of side stand by hand, check whether it moves smoothly.
- If it doesn't move freely, pour grease into its pivot side.
- If it moves too freely, check the side stand spring.
- Check the axial movement of side stand.



SUSPENSION

CAUTION

- Do not ride motorcycle with an unsatisfactory suspension. Loosen or worn suspension parts will lead to deterioration in the vehicle's safety and operation efficiency.

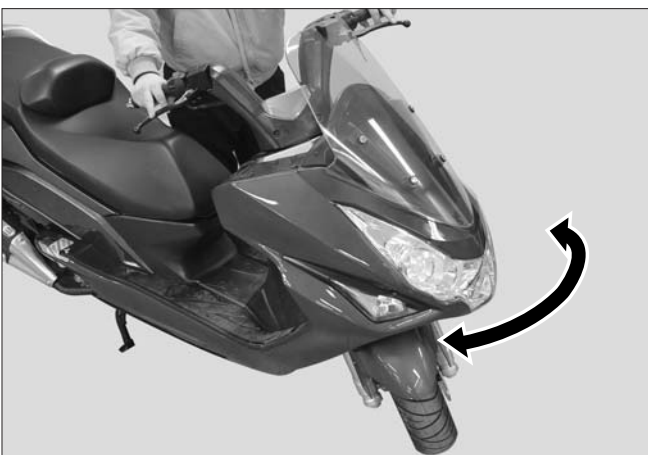


FRONT WHEEL

- Hold the brake lever, and compress the front cushion up and down several times to check the efficient operation.
- Check the front fork for oil leakage, parts damage or looseness.

REAR WHEEL

- Compress the rear cushion up and down several times to check the operating conditions.
- Check the front fork for oil leakage, parts or looseness.



STEERING STEM

CAUTION

- Check the cable if it interferes with the handle operation.

- Lift the front wheel and check if the handle moves right and left smoothly.
- If the handle moves heavily, check if the cable or electric codes interfere with the handle. If the handle moves normally, remove the steering stem and check the ball race for being worn or damaged.



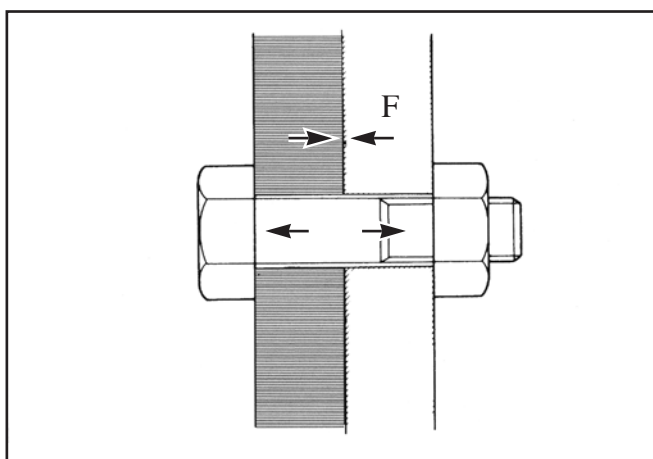
WHEELS / TIRES

CAUTION

- Check the tire pressure when the tires have been cooled off. Check the thread (the part making contact with the road surface) and side for being worn, cracked or damaged. Replace damaged tires.

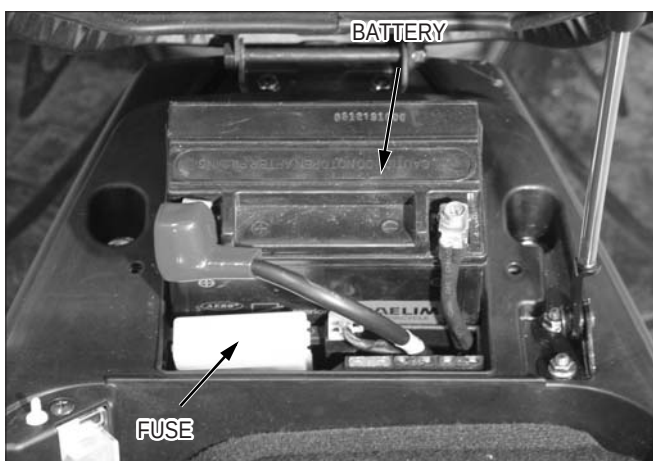
STANDARD PRESSURE

	kgf/cm ²	
	front wheel	front wheel
one person	2.00(28psi)	2.40(34psi)
two persons	2.00(28psi)	2.50(36psi)



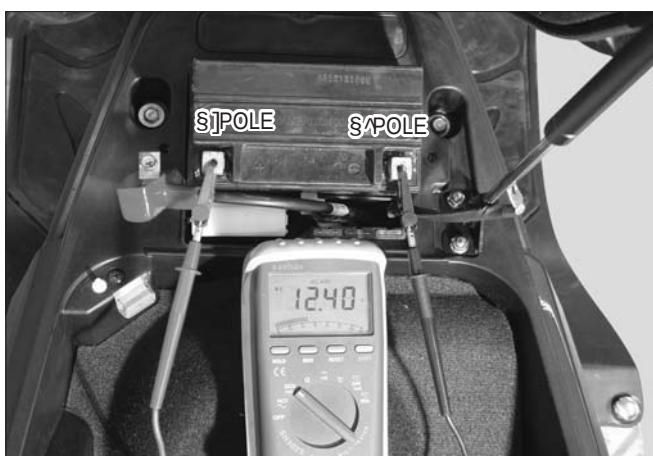
FASTENING BOLTS, NUTS

- Meeting the schedule of regular inspection,
- Check whether the nuts, bolts of all vehicles are fastened by specified torques.
- Check all pins, clips, hose clamp and cable stay



BATTERY

- Remove the battery cover.
- Check the looseness of the terminals.
- If the terminals are loose, check and clean the contacted area.
- Check the fuse



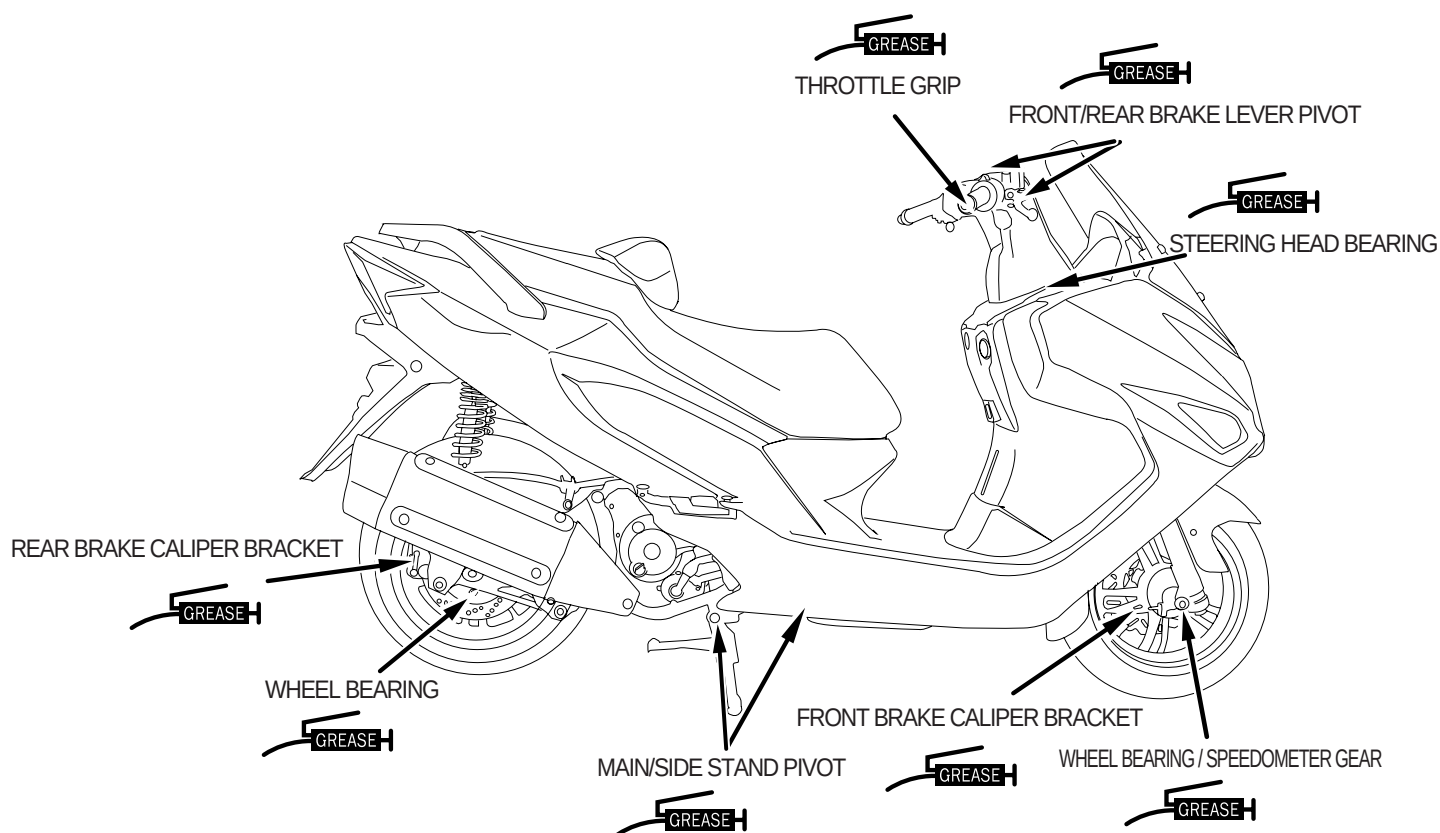
- Measure the battery voltage
 - COMPLETE CHARGING :12.6~13.0 V
 - INCOMPLETE CHARGING : UNDER 12.4 V
- If the terminal part get rusted, remove the battery and pour the warm water then, clean it with a wire brush.

LUBRICATION POINTS

- Use the general grease unless specified here.
- Apply oil or grease to the other operating surfaces not shown here.

CONTROL CABLE LUBRICATION

- Periodically disassemble the upper end of the throttle cable then apply oil after cleaning. Change it when the cable lengthened.



MEMO

3. EXTERNAL PARTS

SERVICE INFORMATION . . . 3-1	WIND SCREEN ASSEMBLY/DISASSEMBLY . 3-7
FLOW CHART OF ASSEMBLY/DISASSEMBLY 3-2	FRONT COVER ASSEMBLY/DISASSEMBLY . 3-7
SEAT DIASSEMBLY/ ASSEMBLY . 3-3	FRONT UNDER A COVER ASSEMBLY/
LUGGAGE BOX ASSEMBLY/ DISASSEMBLY . 3-3	DISASSEMBLY 3-7
REAR CARRIER ASSEMBLY/DISASSEMBLY 3-3	FRONT UNDER B COVER ASSEMBLY/
CENTER COVER ASSEMBLY/DISASSEMBLY 3-4	DISASSEMBLY 3-8
BODY COVER ASSEMBLY/DISASSEMBLY 3-4	SPEEDOMETER ASSEMBLY/DISASSEMBLY . 3-8
REAR FENDER ASSEMBLY/DISASSEMBLY 3-5	INNER BOX ASSEMBLY/DISASSEMBLY . 3-9
FLOOR SIDE COVER ASSEMBLY/DISASSEMBLY 3-5	FRONT FENDER ASSEMBLY/DISASSEMBLY . 3-10
FLOOR PANEL ASSEMBLY/DISASSEMBLY 3-5	REAR WHEEL MUD GUARD ASSEMBLY/
UNDER COVER ASSEMBLY/DISASSEMBLY 3-6	DISASSEMBLY 3-10
HANDLE COVER ASSEMBLY/DISASSEMBLY 3-6	MUFFLER ASSEMBLY/DISASSEMBLY . 3-10

SERVICE INFORMATION

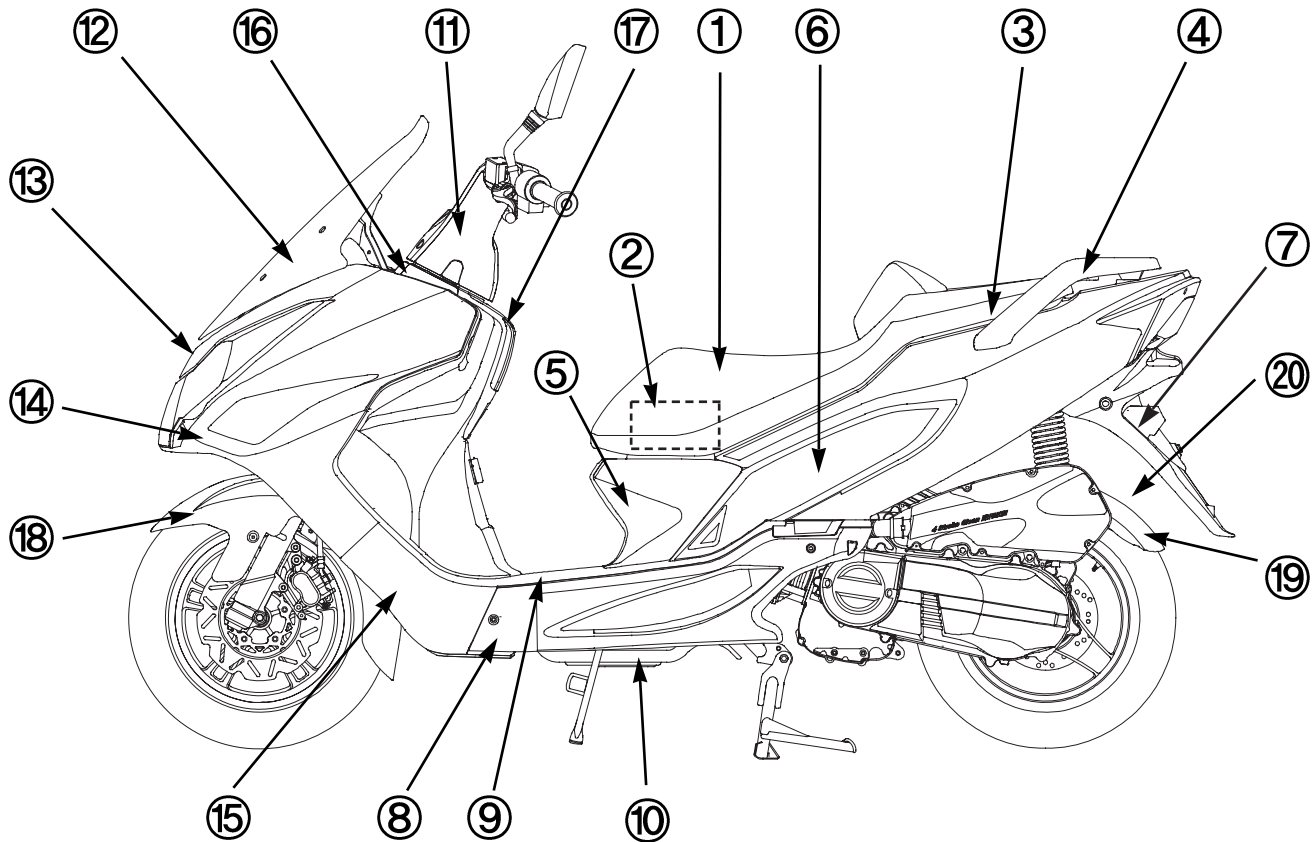
CAUTION

- This section describes external parts removal / installation
- Do not apply unreasonable force when disassembling or assembling covers to prevent their possible damage.
- Because the muffler is hot, do not service it immediately after the engine is stopped.

MAINTENANCE PROCEDURE

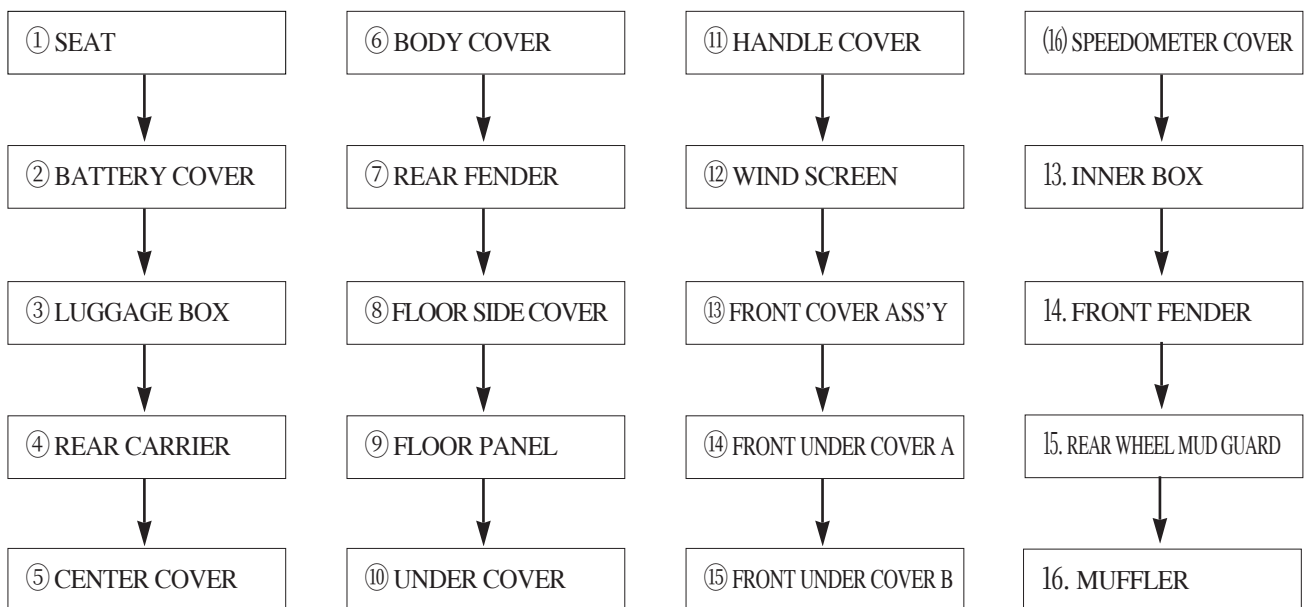
NAME OF FRAME COVERS

3



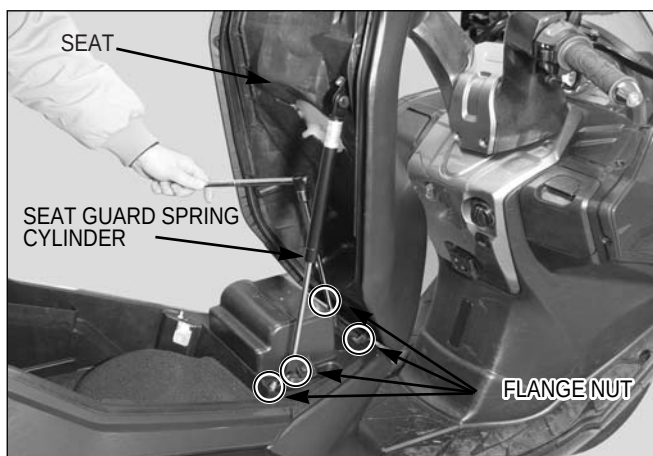
FLOW CHART(ASSEMBLY/DISASSEMBLY)

● This chart shows arrows connected in the order of disassembling covers.



NOTE

- At disassembly of front wheel, be careful about turn over of the vehicle.



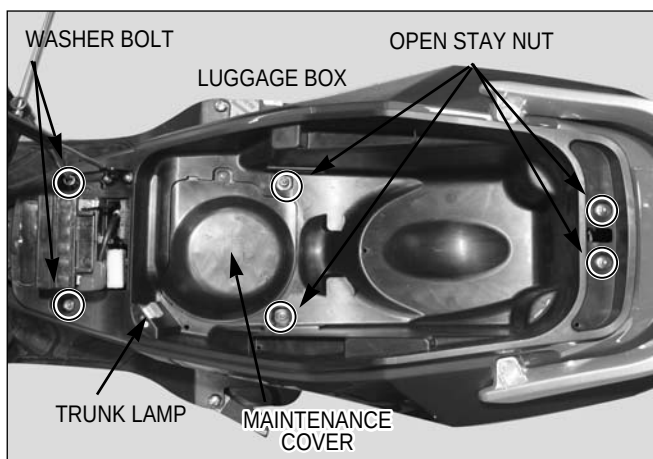
SEAT DISASSEMBLY/ ASSEMBLY

- Push the seat button and release seat lock
- Untie 2 flange nuts installed in seat guard spring cylinder
- Untie 2 flange nuts installed in seat, then remove the seat
- Install in the reverse order of disassembly.

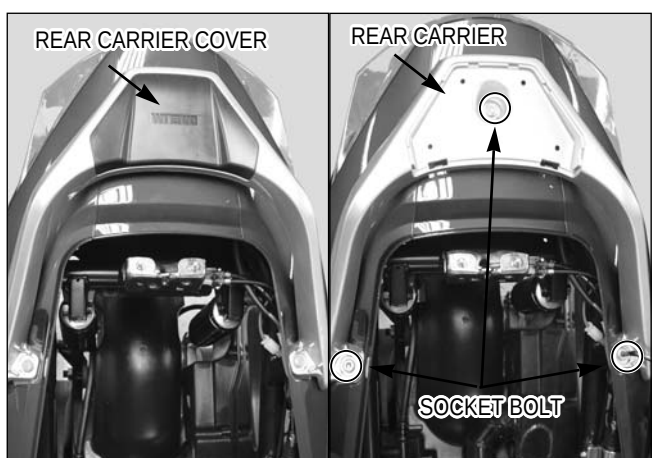


LUGGAGE BOX DISASSEMBLY/ ASSEMBLY

- Untie 2 special screws installed at the battery cover
- Disassemble luggage box mat



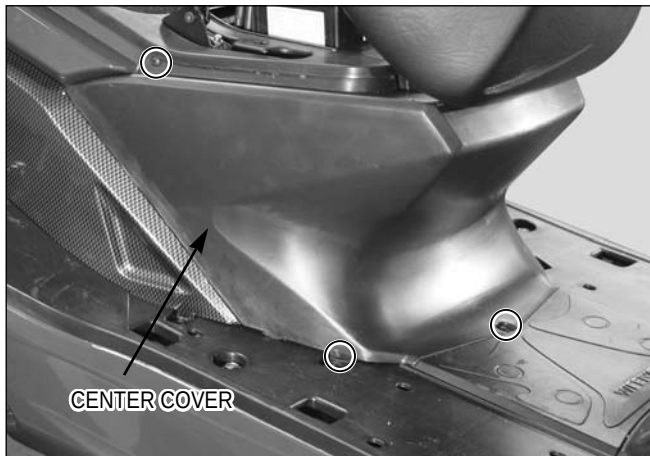
- Untie 2 washer bolts and 4 open stay nuts
- Lift up the luggage box and separate trunk lamp wires
- Separate the luggage box
- Install in the reverse order of disassembly



REAR CARRIER DIASSEMBLY / ASSEMBLY

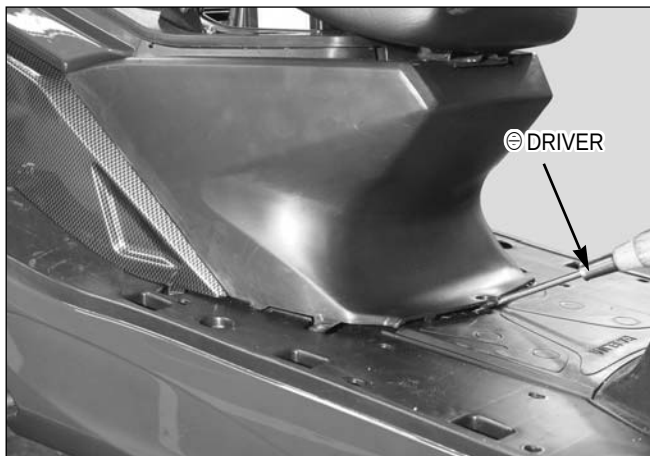
- Disassemble rear carrier cover
- Untie 3 socket bolts
- Disassemble rear carrier
- Install in the reverse order of disassembly

3

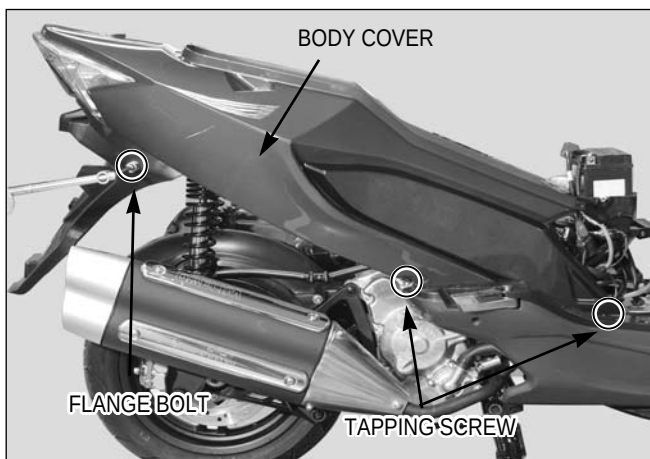


CENTER COVER REMOVAL/ ASSEMBLY

- Open the seat and erect
- Separate floor panel mat
- Untie 5 tapping screws installed at left and right of center cover

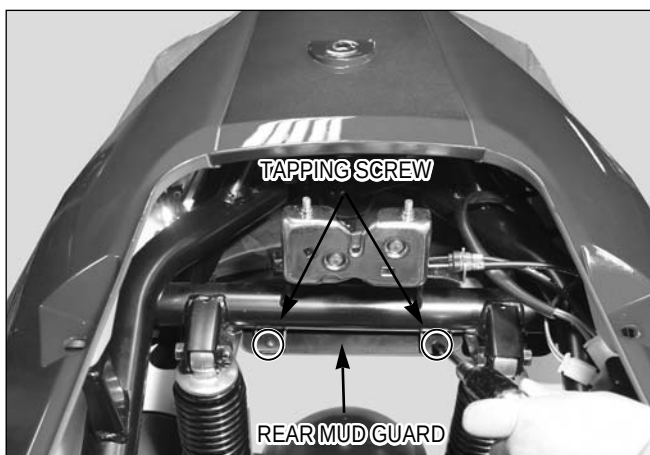


- Put ⊖ driver between center cover and floor panel, then disassemble center cover by lifting up
- Assemble in the reverse order of removal

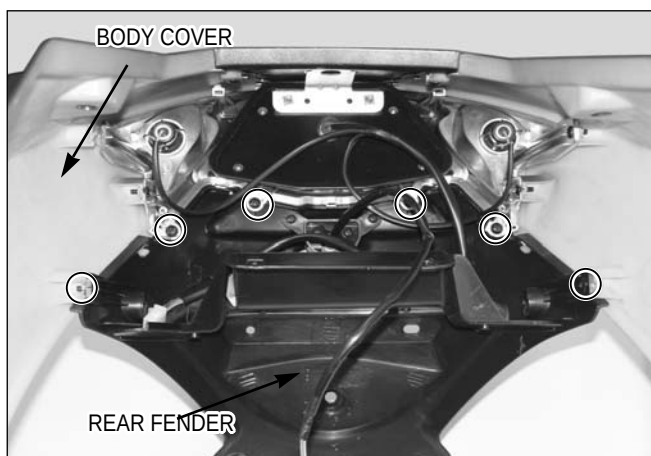


BODY COVER REMOVAL/ ASSEMBLY

- Untie 2 flange bolts and 4 tapping screws installed at left and right of body cover



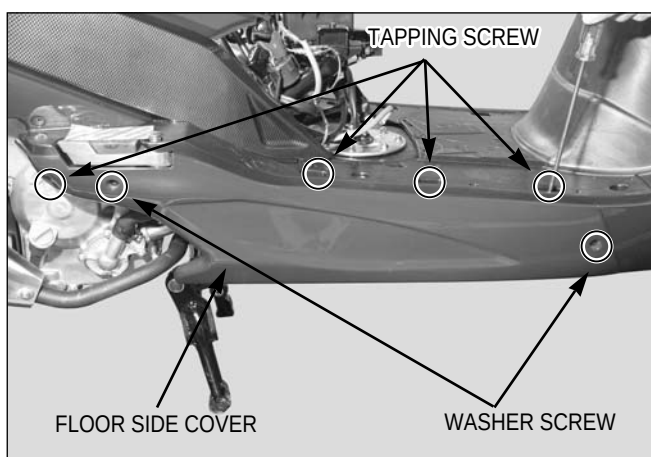
- Untie 2 tapping screws installed at rear mud guard
- Disassemble rear combination light and winker wire coupler
- Broaden gap the body cover to left and right side, lift up slightly and pull backward, disassemble it.



REAR FENDER REMOVAL / ASSEMBLY

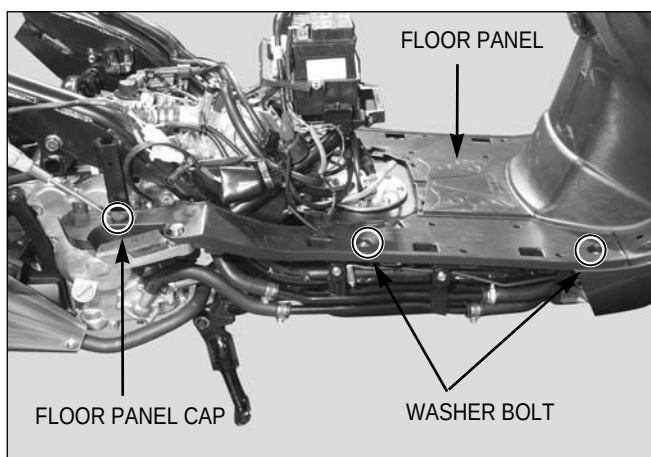
- Disassemble luggage box
- Disassemble body cover
- Untie 6 tapping screws installed at body cover and disassemble rear fender

3



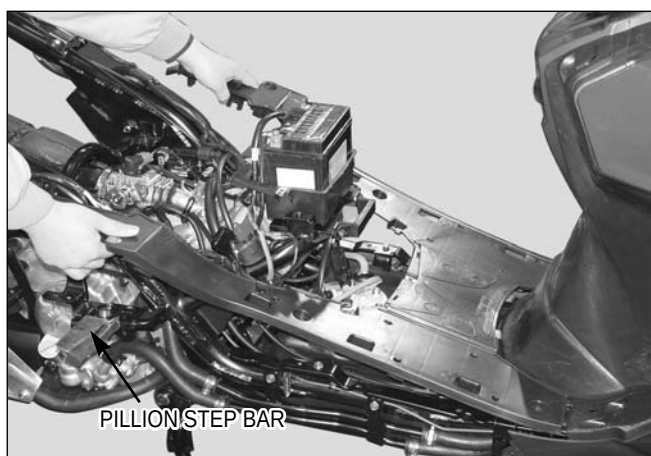
FLOOR SIDE COVER REMOVAL / ASSEMBLY

- Disassemble floor mat
- Untie 4 tapping screws installed at floor panel
- Untie 2 washer screws installed at floor side cover, disassemble
- floor side cover

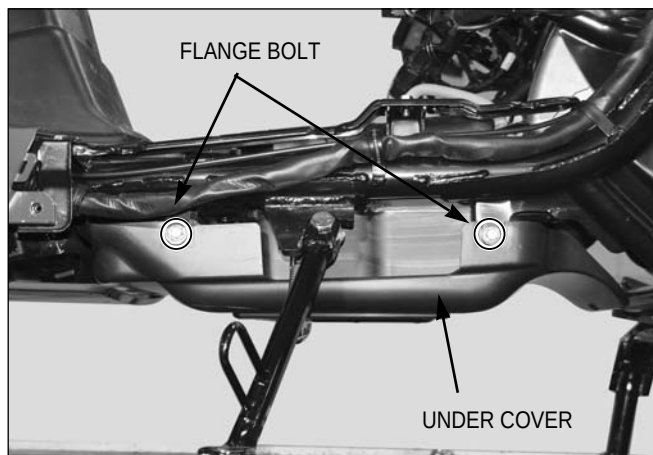


FLOOR PANEL REMOVAL / ASSEMBLY

- Disassemble luggage box
- Disassemble center cover
- Disassemble body cover
- Disassemble floor side cover
- Disassemble 4 floor panel caps

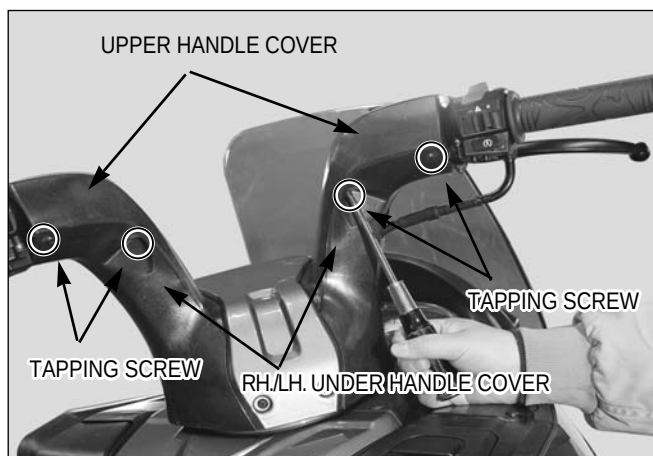


- Untie 4 washer bolts installed at floor panel
- Broaden wide pillion step bars and lift up slightly floor panel, then pull backward and disassemble.



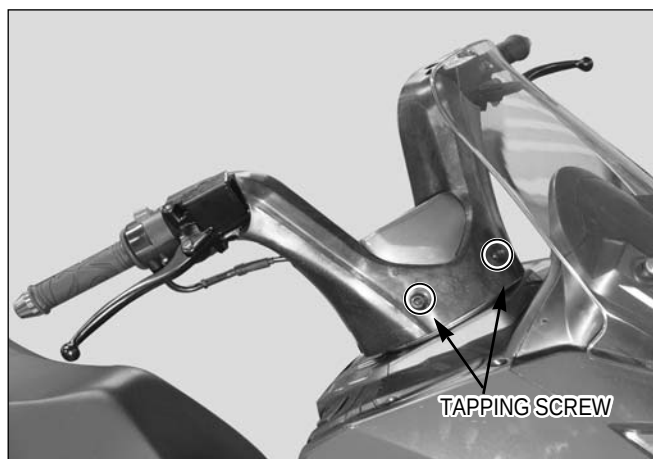
UNDER COVER REMOVAL / ASSEMBLY

- Disassemble floor side cover
- Untie 4 flange bolts and disassemble under cover

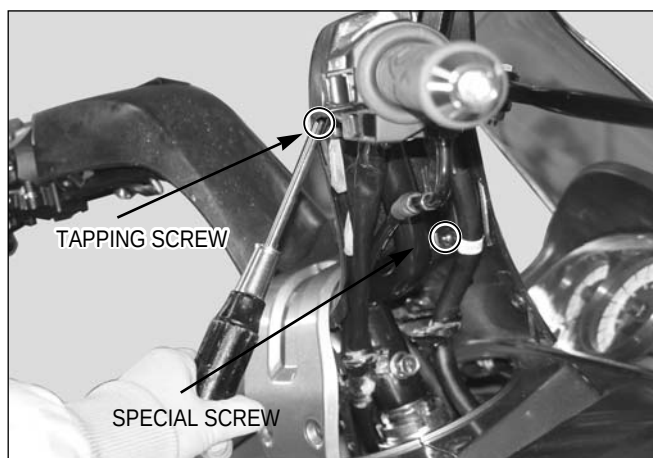


HANDLE COVER REMOVAL / ASSEMBLY

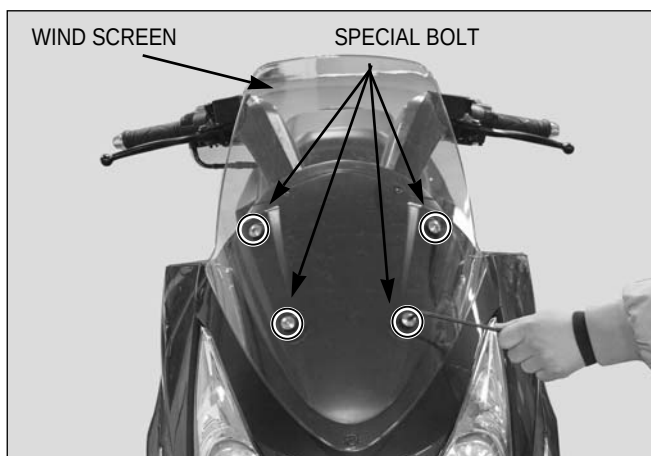
- Untie 4 tapping screws installed at RH / LH. Under handle cover



- Untie 2 tapping screws installed at upper handle cover
- Disassemble RH / LH under handle cover

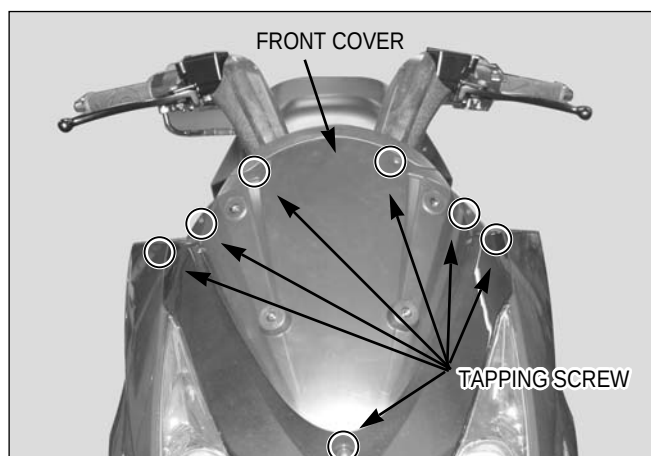


- Untie 2 tapping screws and 2 special screws installed at left, right of upper handle cover
- Disassemble upper handle cover
- Assemble in the reverse order of removal



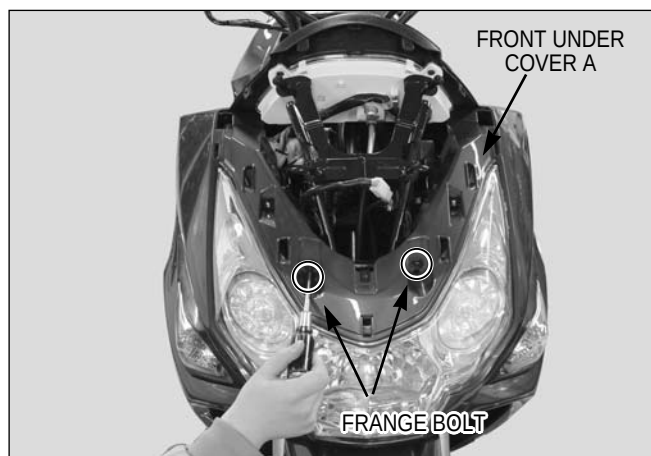
WIND SCREEN REMOVAL / ASSEMBLY

- Untie 4 special bolts and disassemble wind screen
- Assemble in the reverse order of removal



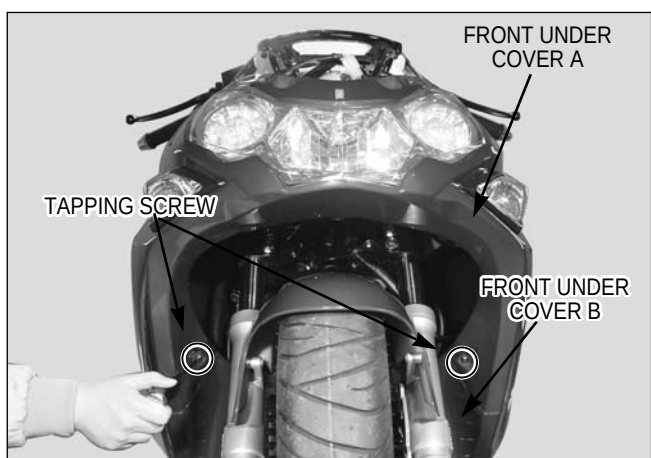
FRONT COVER REMOVAL / ASSEMBLY

- Untie 7 tapping screws installed at front cover and disassemble front cover.
- Assemble in the reverse order of removal

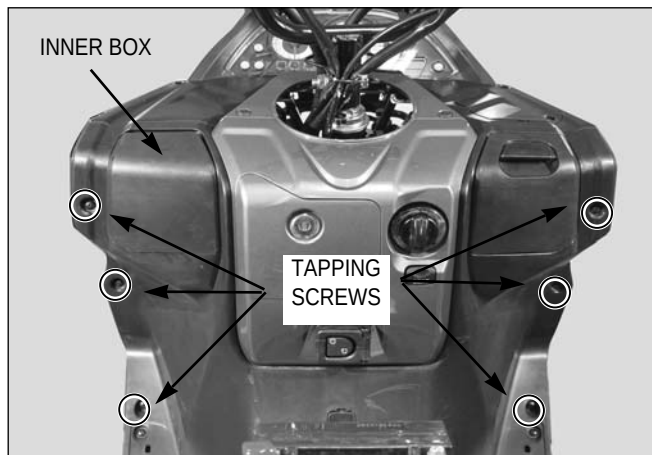


FRONT UNDER COVER A REMOVAL/ ASSEMBLY

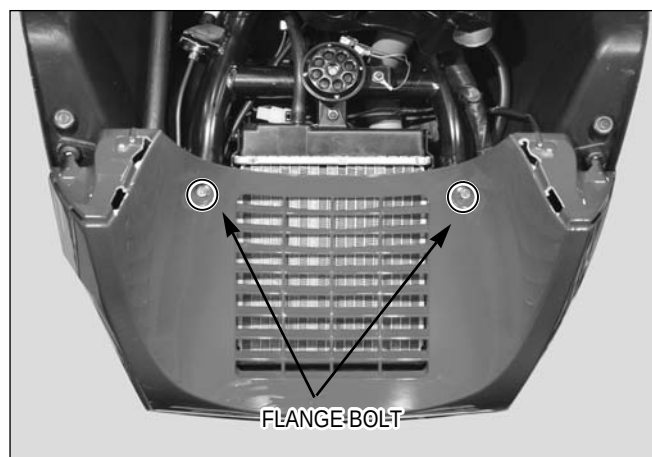
- Disassemble front cover
- Untie 2 flange bolts



- Untie 2 tapping screws installed at front under cover A

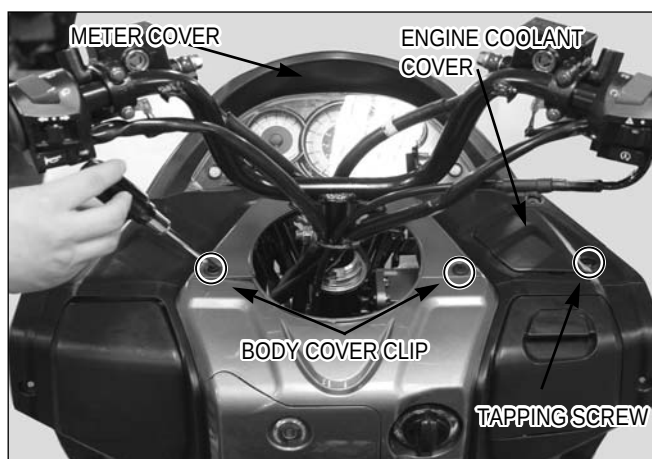


- Untie 6 tapping screws installed at inner box
- Disassemble front under cover A
- Assemble in the reverse order of removal



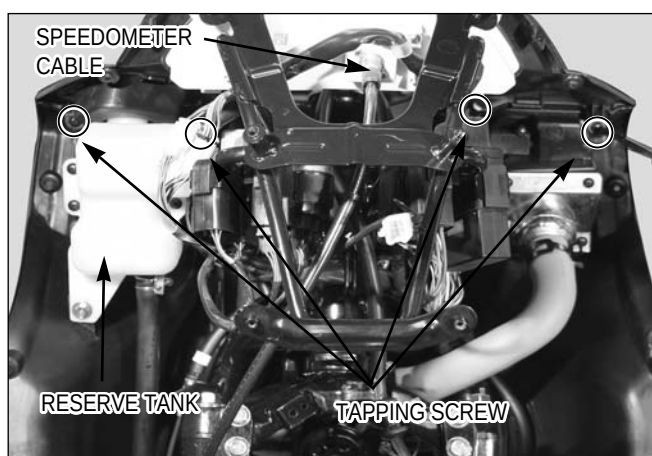
FRONT UNDER COVER B REMOVAL / ASSEMBLY

- Disassemble front under cover A
- Disassemble floor side cover
- Untie 2 flange bolts installed at front under cover B
- Untie 2 tapping screws installed at inner box and disassemble under cover

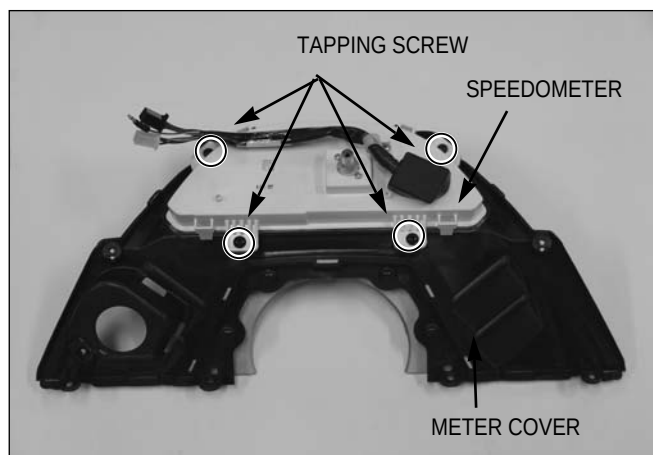


SPEEDOMETER REMOVAL / ASSEMBLY

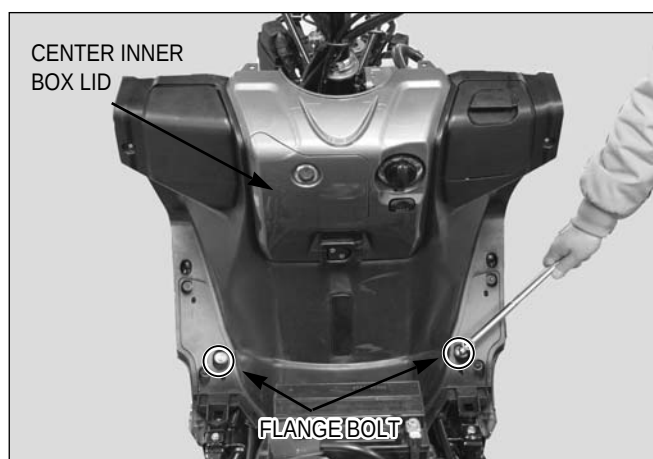
- Disassemble front cover
- Disassemble front under cover A
- Disassemble body cover clip installed at meter cover
- Untie tapping screw installed at engine coolant cover and disassemble cover
- Disassemble reserve tank cap



- Untie 4 tapping screws installed at meter cover
- Loosen the screw and bolt installed at reserve tank 1/2.
- Disassemble couplers of other wires
- Disassemble meter cover

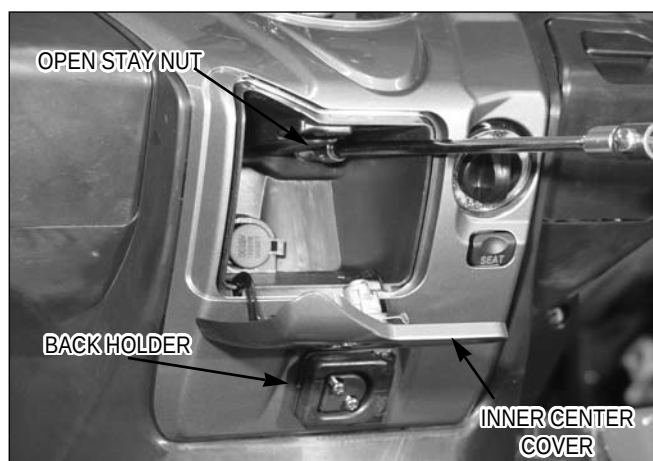


- Untie 4 tapping screws installed at meter cover, disassemble speedometer.
- Assemble in the reverse order of removal

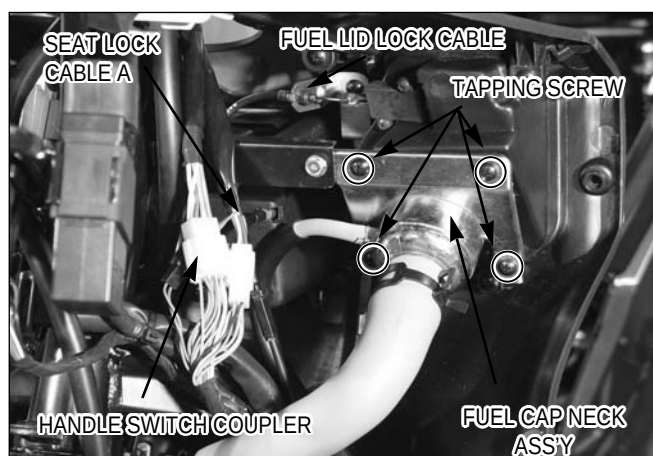


INNER BOX REMOVAL/ASSEMBLY

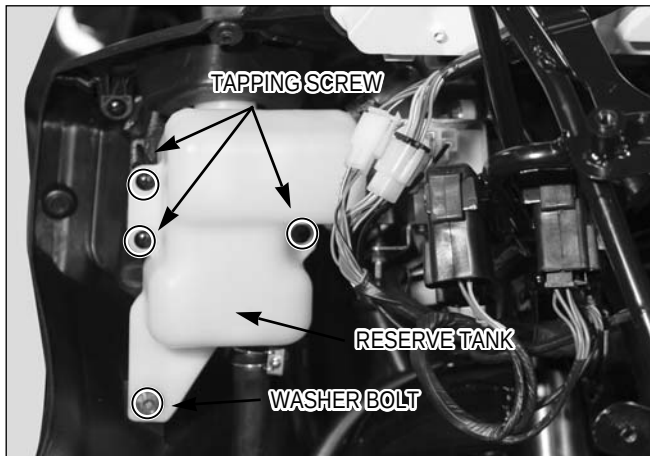
- Disassemble the following parts
 - luggage box
 - center cover
 - body cover
 - floor panel
 - wind screen
 - front cover
 - front under A, B cover
 - speedometer
- Untie 2 flange bolts installed at inner box



- Untie 1 open stay nut after opening center inner box lid
- Untie 2 screws installed at back holder and disassemble back holder



- Untie 4 tapping screws installed at fuel cap neck ass'y
- Disassemble fuel lid lock cable
- Disassemble seat lock cable
- Disassemble handle switch coupler

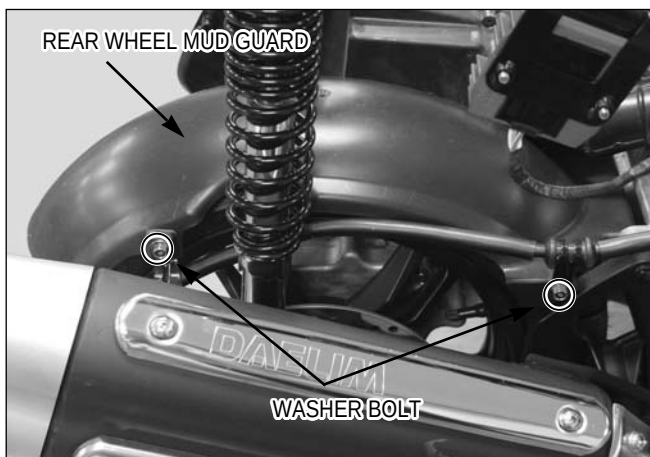


- Untie 3 tapping screws and 1 flange bolt installed at reserve tank
- Disassemble inner box
- Assemble in the reverse order of removal



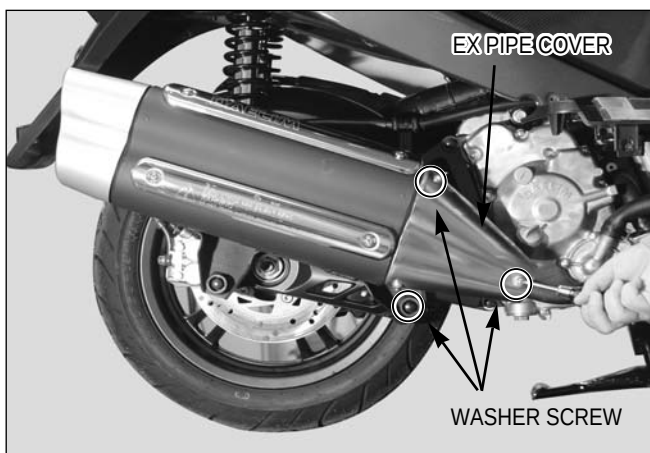
FRONT FENDER REMOVAL / ASSEMBLY

- Disassemble wire grommet installed at RH.
- Untie 4 special screws installed at front fender
- Disassemble front fender
- Assemble in the reverse order of removal



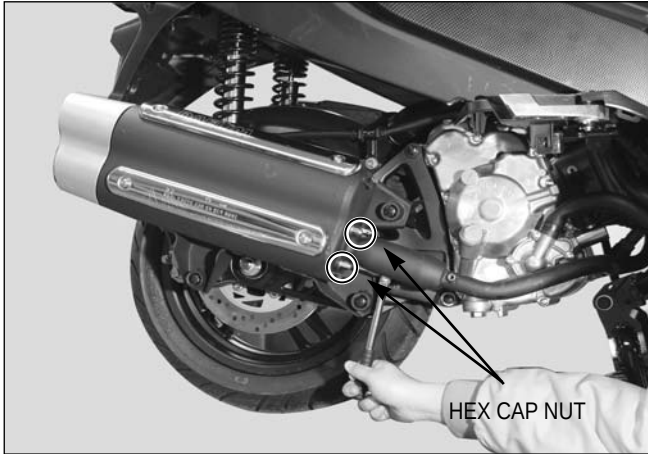
REAR WHEEL MUD GUARD REMOVAL / ASSEMBLY

- Untie 2 washer bolts installed at LH. Side of rear wheel mud guard
- Disassemble air cleaner
- Untie 1 washer bolt installed at RH. Side and disassemble rear wheel
- Assemble in the reverse order of removal



MUFFLER REMOVAL / ASSEMBLY

- Untie 3 washer screws installed at EX. Pipe cover and disassemble the muffler



- Untie 4 hex cap nuts installed at muffler comp



- Untie 3 flange bolts
- Disassemble muffler

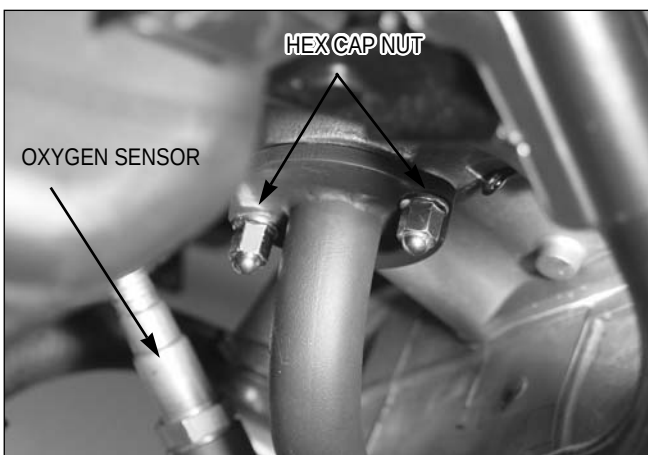
CAUTION

- Do not repair right now at stop because the muffler is hot



DISASSEMBLY OF EX. PIPE

- Disassemble oxygen sensor coupler



- Untie 2 hex cap nuts installed with cylinder head
- Pulling under slightly EX. Pipe, disassemble it.
- Assemble in the reverse order of removal

CAUTION

- Replace packing at disassembly-assembly of muffler and EX. Pipe.

MEMO

4-1 LUBRICATION SYSTEM

SERVICE INFORMATION 4-1	REPLACEMENT OF ENGIEN OIL . 4-3
TROUBLE SHOOTING 4-2	OIL FUMP 4-4
ENGINE OIL LEVEL CHECK . . 4-3	TRANSMISSION OIL 4-7

SERVICE INFORMATION

WARNING

- The exhaust gas contains poisonour substance. Do not keep engien idling in a closed or poorly ventilated place for a long time.
 - Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods.
- It is desirable not to handle used oul frequently ; however, wash your hands thoroughly with soap and water immediately after handling the used oil.
- The oil pump can be serviced without removing the engine from the frame.

ENGINE OIL

OIL CAPACITY	1.3L(full) 1.1L(replacement)	Temperature and viscosity
RECOMMENDED OIL	DAELIM Geguine oil API Service classification SL grade Viscosity : 10W - 40 (Use appropriate type of oil with viscosity satisfying the atmospheric temperature. In your riding area based on the table shown on the right side)	

TRANSMISSION OIL

OIL CAPACITY	0.15L(Full capacity) 0.14L(at changing)
RECOMMENDED OIL	DAELIM Geguine mission oil or SAE 80W/90

TORQUE VALUES

OIL PUMP BOLT	1.1kgf · m
PAPPET ADJUSTING HOLE CAP	1.1kgf · m
OIL DRAIN PLUG BOL	2.5kgf · m

TROUBLE SHOOTING

Oil level low

- Natural oil consumption
- External oil leaking
- Worn piston ring or incorrect piston ring installation
- Valve guide or stem seal abrasion

Oil contamination

- Irregular engine oil replacement
- Damage of cylinder head gasket
- Piston ring abrasion
- Water inflows

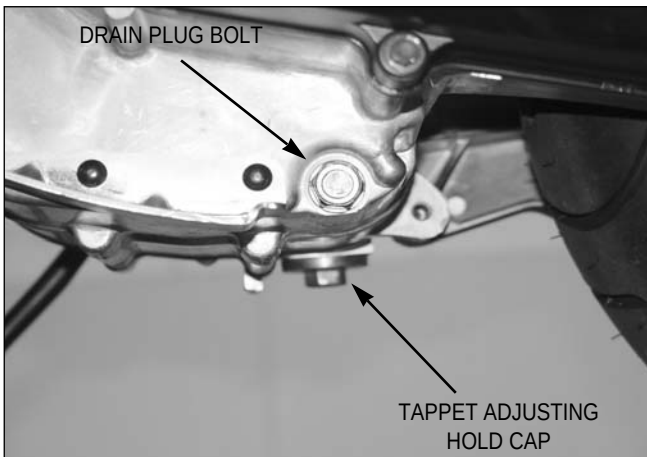
Low or no oil pressure

- Clogged oil strainer
- Abrasion or damage of oil pump
- Oil leakage inside engine
- Improper viscosity oil
- Low capacity oil
- Non-fitting of oil pump drive gear or sprocket



ENGINE OIL LEVEL INSPECTION

- Erect the motorcycle on the main stand.
- Start the engine and let it be warm fully.
- Stop the engine, untie oil level gauge and clean oil leaked near to gauge by clean towel. Without fastening by turning level gauge, put oil into engine to check oil capacity.
- If oil is between upper and lower line of level gauge, it is ok. But if the oil capacity decreases close to or under the lower line, replenish it to the upper line.



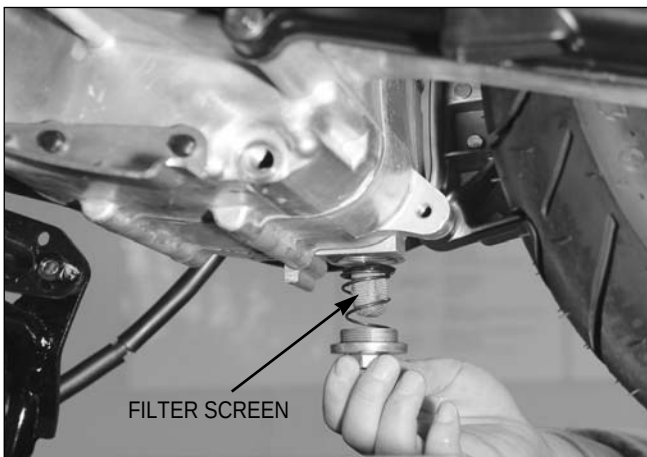
ENGINE OIL CHANGE

- Untie oil drain plug bolt and pull out oil.

NOTE

- Make the engine warm and erect the motorcycle with side stand in order to assure complete and rapid draining.

- Disassemble tappet adjusting hole cap
- Clean filter screen by cleaned cleansing oil
- Check whether tappet adjusting hole cap o-ring is good or not



CAUTION

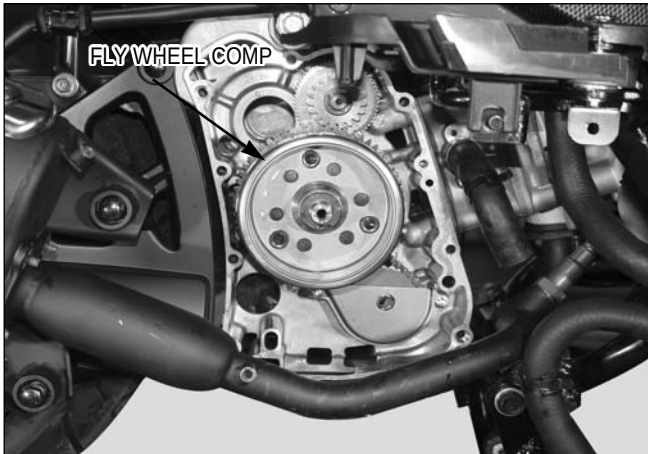
- It is extremely important to replace oil filter or clean the oil filter screen at the first maintenance interval 500Km by loosen the tappet adjust hole cap.

- Assemble tappet adjusting hole cap according specified torque.

TORQUE : 1.5 kgf · m

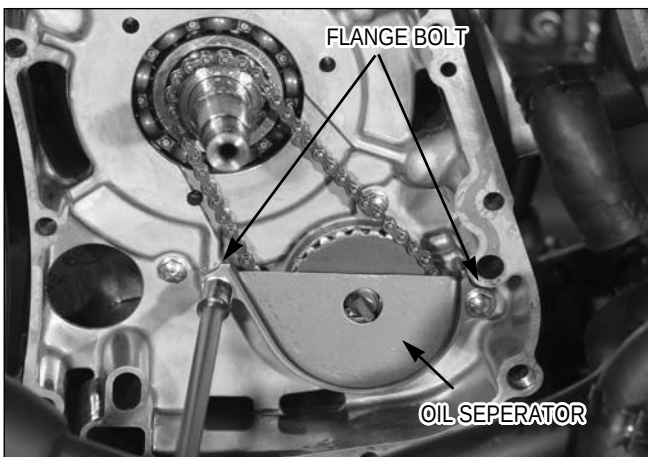


- Fill the recommended engine oil with engine oil cap.
OIL CAPACITY : 1.3 L (FULL)
1.1 L (REPLACEMENT)
- Recommended engine oil : DAELIM genuine oil.
API service classification SL grade
Viscosity : 10W-40
- Start the engine and let it idle for a few minutes.
- Stop the engine and check the engine oil level. If the oil level is low, add the recommended engine oil.
- Check to see if the oil is leak.

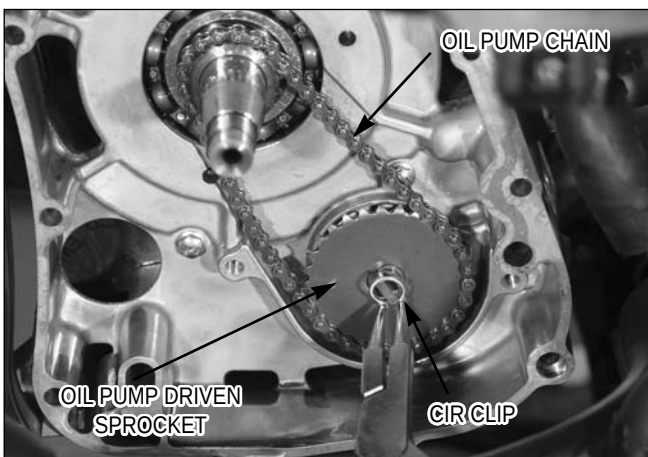


OIL PUMP

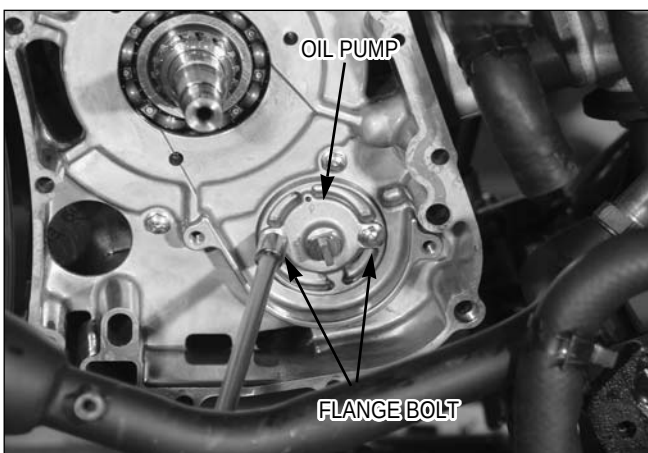
- Drain the engine oil.
- Drain cooling water
- Disassemble RH. Crank case cover(→9-2)
- Disassemble fly wheel comp(→9-2)



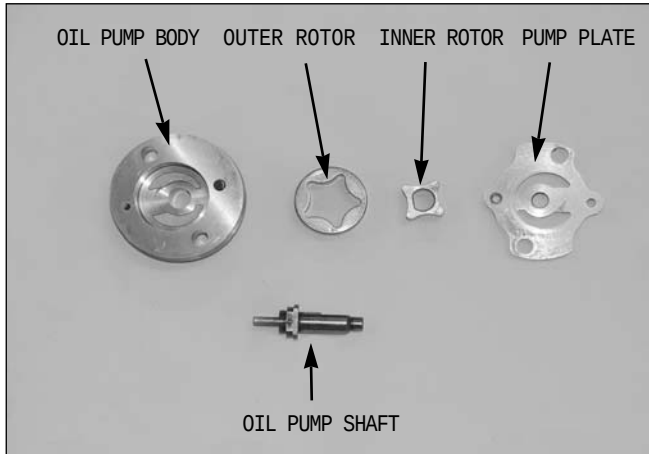
- Untie 2 flange bolts and separate oil separator



- Disassemble cir clip
- Disassemble oil pump chain and driven sprocket

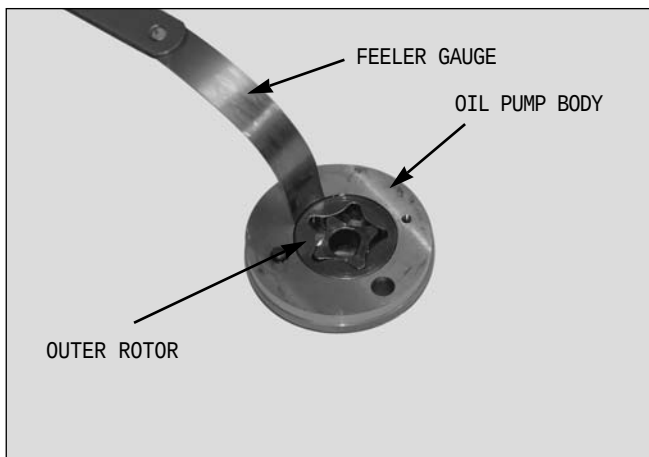


- Untie 2 flange bolts and disassemble oil pump



OIL PUMP DISASSEMBLY

- Loosen the screw securing the oil pump plate.
- Remove the oil pump body and oil pump plate.
- Clean the oil pump body, inner rotor, outer rotor with fresh cleaning oil.

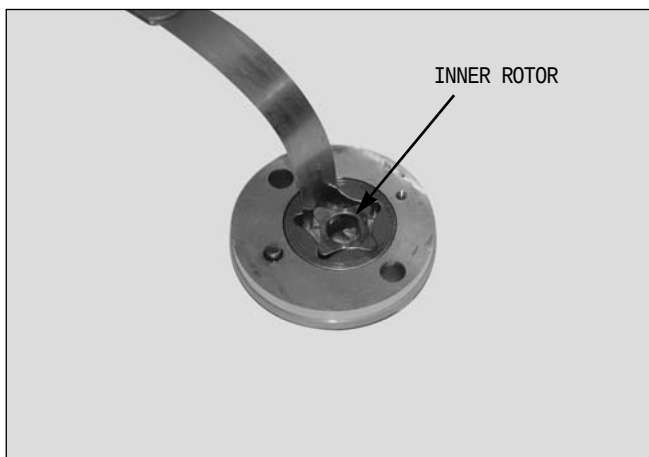


OIL PUMP INSPECTION

- Measure the end clearance pump body.

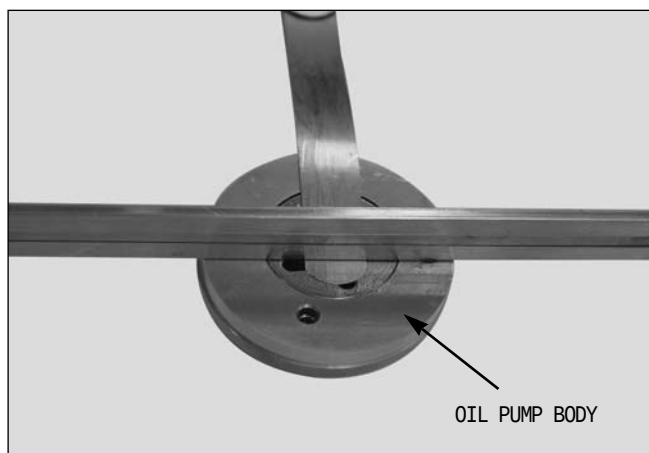
SERVICE LIMIT : 0.23 MM

TOOL : FEELER GAUGE



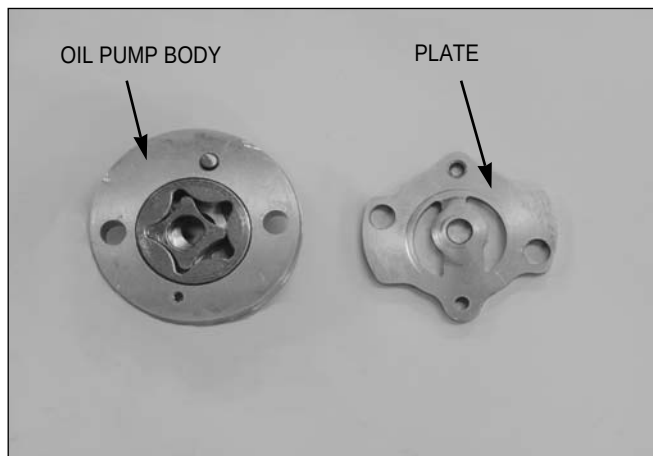
- Measure the end clearance between inner and outer rotor.

SERVICE LIMIT : 0.18 MM



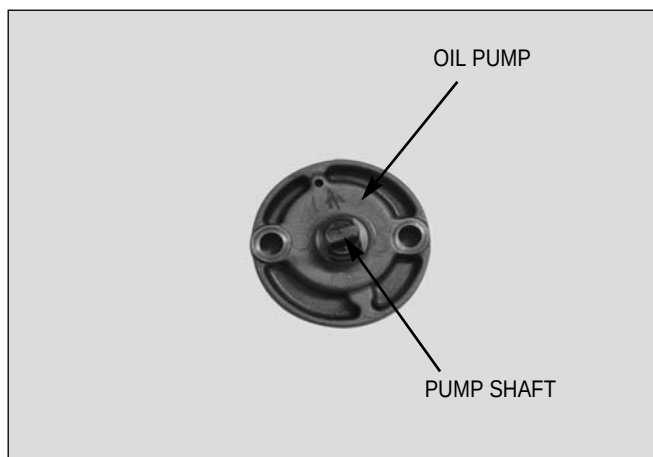
- Measure the twistiness of pump body by feeler gauge and square.

SERVICE LIMIT : 0.12 MM

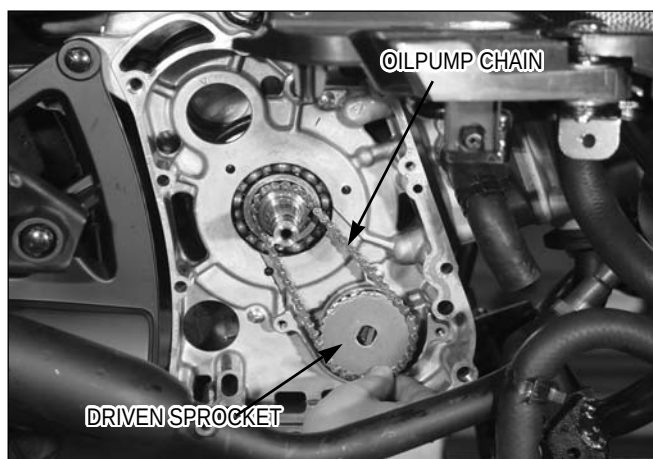


ASSEMBLY

- Clean all parts with fresh cleaning oil.
- Install the inner and outer rotors into the oil pump body.



- Install the oil pump plate into the pump body, then tighten the fan screw.
- Install pump shaft



- Assemble oil pump to RH. Crank case
- Assemble oil pump chain and driven sprocket
- Assemble cir clip

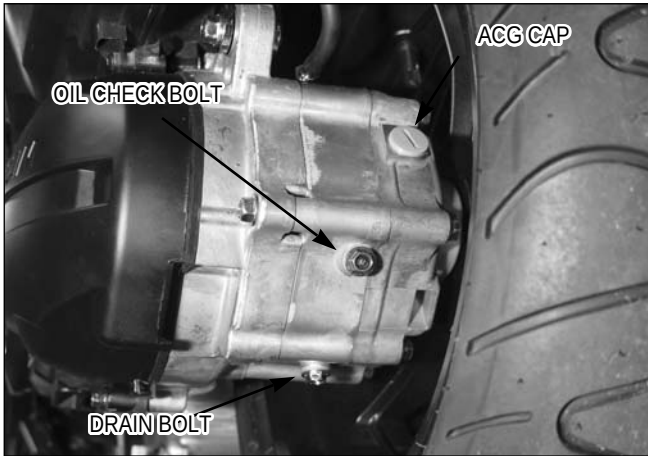
CAUTION

- By rotating pump shaft, check whether it operates well without hindrance.

- Assemble oil separator



- Assemble reduction gear and fly wheel
- Assemble new gasket and dowel pin
- Assemble RH. Crank case cover
- Replenish the genuine engine oil
- Replenish cooling water



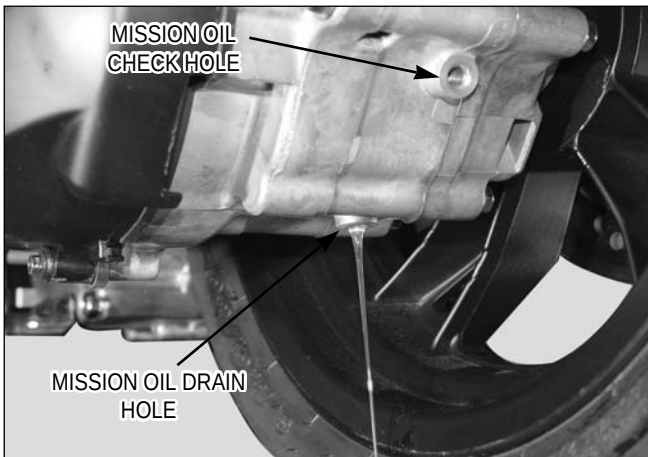
TRANSMISSION OIL

INSPECTION

- Check the connection part of case for any leak.
- Loosen the oil check bolt and check to see if the oil overflows from the oil check hole.

CAUTION

- Oil level inspection must be performed in the flat ground with the vehicle being straight by raising the main stand.



- If oil is insufficient, loosen ACG cap and replenish slowly the genuine mission oil to inlet by the check hole.



REPLACEMENT

- If the transmission oil is contaminated, loosen drain bolt and pull out mission oil, then insert recommended mission oil based on specified capacity.
- Oil capacity : 0.15L(full)
0.14L(replacement)

RECOMMENDED OIL : SAE 80W/90

- Assemble in the reverse order of removal

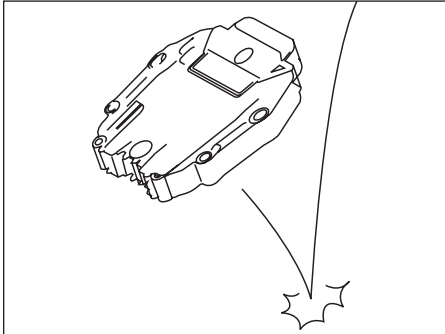
MEMO

5.EMS(ENGINE MANAGEMENT SYSTEM)

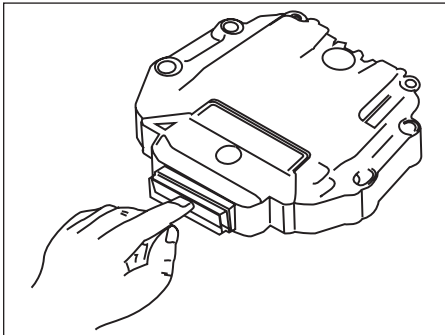
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1. CAUTION WHEN REPAIRING THE EMS PARTS.

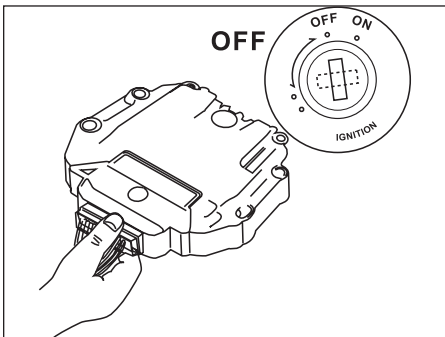
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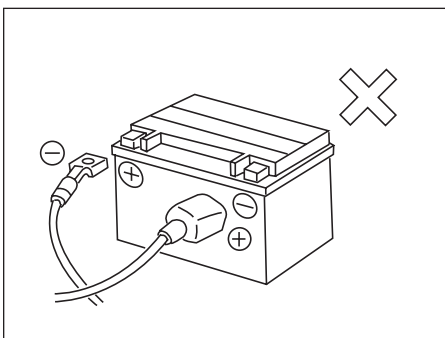
- If the fuse is short-circuited, find out the cause and repair.
Replace with the fuse having the specified capacity.
- Do not use the electric wires or others instead of the fuse.
- Do not drop or throw the EMS parts because these parts may be damaged by the impact of the drop.



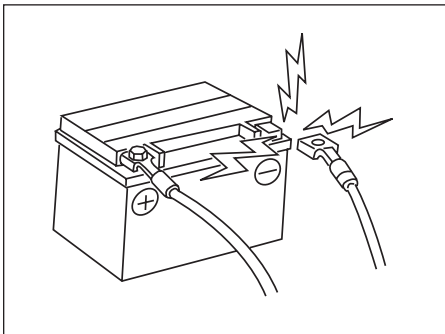
- Do not touch the ECU terminal, because it may be damaged by the static.



- Be sure to key OFF when assembly / disassembly of the coupler of ECU
- When assembly/disassembly at key ON, the ECU may be damaged.



- Do not connect adversely the polarity of battery. otherwise, It may be broken the EMS parts



- While engine operating, do not disassembly the battery terminal.
otherwise, it might cause damaged the EMS parts.
- Use the specified voltmeter and resistance meter.

2. STRUCTURE OF THE EMS

EMS CONSISTS OF INTAKE AND FULE, IGNITION AND CONTROL SYSTEM.

1) INTAKE SYSTEM

As a system which controls and measures air to be necessary for combustion in engine, the intake system is composed of pressure sensor of intake parts, intake on sensor, throttle position sensor, throttle body, air cleaner and ISA(Idle Speed Actuator), etc.

In idling, because throttle value is almost closed, the idle status of engine shall be controlled by means that idle speed control system is installed in order to control small of quantity of air being necessary for combustion.

2) FUEL SYSTEM

As a system to supply required fuel for consumption in engine combustion chamber from fuel tank to injector, this Fuel system is composed of fuel tank, fuel pump, fuel filter, fuel pressure regulator, division pipe and injector.

The fuel in tank, being high pressed by fuel pump, moves to the division pipe through fuel filter.

Next the fuel is supplied to injector being highly maintained as regulated pressure about the pressure of intake system.

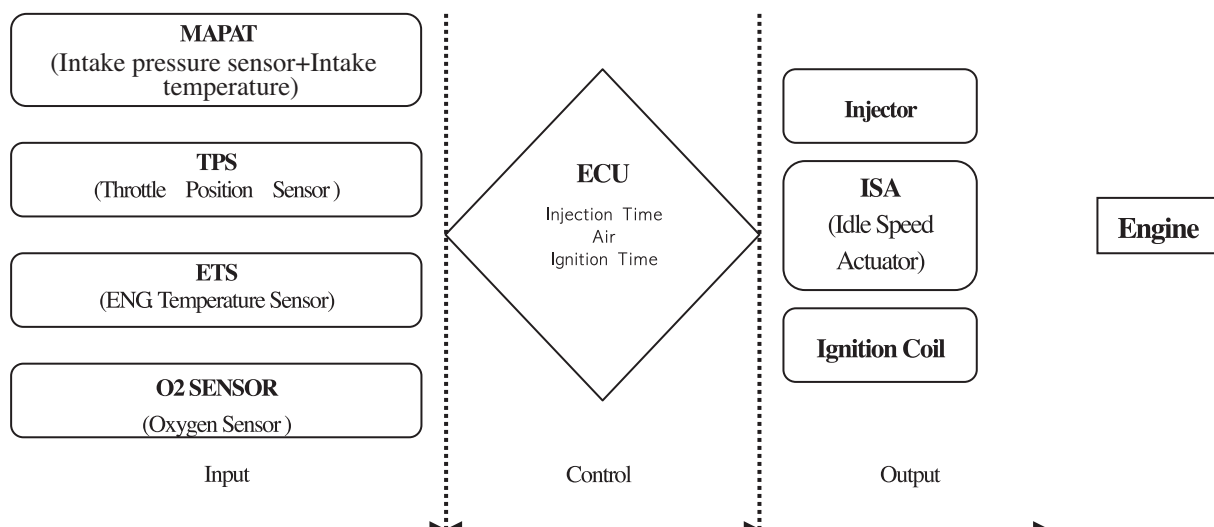
Injector sprays fuel into the intake system by injection signals of ECU.

3) IGNITION SYSTEM

The ignition system is composed of spark plug which makes ignition spark, a spark timing control part to control proper spark time in cylinder, high-voltage system, and so forth.

4) CONTROL SYSTEM

- ① Various sensors to move electric signals converted by checking the current engine status
- ② Input interface which works various processes like regulating voltage levels, removal of noise, A/D conversion, amplifying of inputted signals from above sensors.
- ③ Micro-computer which decides output value through various calculating, arithmetic and logic processing.
- ④ Output interface to amplify the above output signals.
- ⑤ Actuator being mechanically worked by receiving the amplified output signals.



3. TERMINAL ARRANGEMENT OF THE ECU

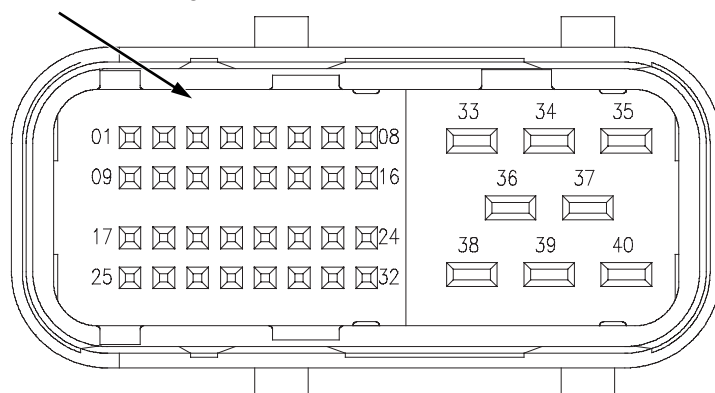
ECU PIN NO. and FUCTIONS			
PIN NO.	FUNCTION	PIN NO.	FUNCTION
01	ECU earth	21	Frame earth
02	Oxygen Sensor earth	22	Crank position signal B
03	Intake pressure sensor, Intake temperature sensor earth	23	Communication LOW
04	Throttle position sensor, Engine temperature sensor earth	24	Engine check lamp
05	Engine kill switch	25	Battery power
06	-	26	Supply of intake power sensor(5V)
07	-	27	Signal of intake power sensor
08	-	28	Signal of intake temperature sensor
09	ECU earth -	29	-
10	After main key turns on, battery power	30	Crank position signal A
11	-	31	Communication HIGH
12	Oxygen sensor signal	32	Engine speed signal
13	-	33	Idle Speed Actuator
14	-	34	Oxygen sensor heat
15	-	35	Ignition coil earth
16	-	36	-
17	Battery power	37	Ignition signal
18	Supply of power(5V) of Throttle positon sensor	38	Head lamp relay signal
19	Throttle position sensor signal	39	Fuel pump relay signal
20	Engine temperature sensor signal	40	Injector signal

※Remarks

ECU PIN NO. 6,7,8,11,13,14,15,16,29,36 NOT available

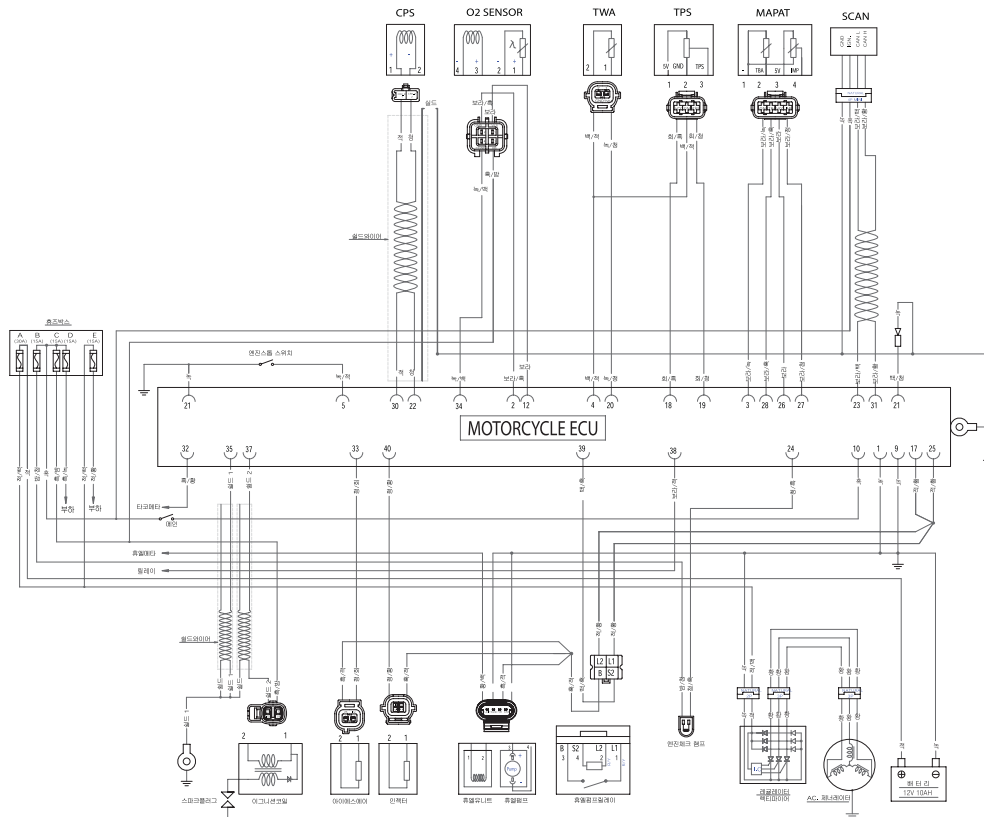
Terminal arrangement is based on the ECU.

ECU Terminal Arrangement



- Earth wire : 1,2,3,4,9,21,35
- Power supply : 10,17,18,25,26
- Input signal to ECU :
5,12,19,20,22,27,28,30
- Output signal from ECU :
24,32,33,34,37,38,39,40

ECU WIRE DIAGRAM



AN ERROR CHECKLIST FOR EACH TERMINAL OF ECU

PIN NO.	ERROR Checklist						PIN NO.	ERROR Checklist					
	Starting	Idle RPM Stability	Driving	Durability	SCAN tool communication	MIL		Starting	Idle RPM Stability	Driving	Durability	SCAN tool communication	MIL
ECU 1	O	O	O	X	O	X	ECU 23	O	O	O	O	X	X
ECU 2	O	X	O	X	O	O	ECU 24	-	-	-	-	O	X
ECU 3	O	X	O	X	O	O	ECU 25	X	-	X	-	X	X
ECU 4	O	X	O	X	O	O	ECU 26	O	X	O	X	O	O
ECU 5	X	-	X	-	O	X	ECU 27	O	X	O	X	O	O
6, 7, 8	-	-	-	-	-	-	ECU 28	O	X	O	X	O	O
ECU 9	O	O	O	X	O	X	ECU 29	-	-	-	-	-	-
ECU 10	X	-	X	-	X	X	ECU 30	X	-	X	-	O	X
ECU 11	-	-	-	-	-	-	ECU 31	O	O	O	O	X	X
ECU 12	O	X	O	X	O	O	ECU 32	O	O	O	O	O	O
ECU 13	-	-	-	-	-	-	ECU 33	O	X	O	O	O	O
14,15,16	-	-	-	-	-	-	ECU 34	O	X	O	X	O	O
ECU 17	X	-	X	-	X	X	ECU 35	X	-	X	-	O	X
ECU 18	O	X	O	X	O	O	ECU 36	-	-	-	-	-	-
ECU 19	O	X	O	X	O	O	ECU 37	X	-	X	-	O	X
ECU 20	O	X	O	X	O	O	ECU 38	O	O	O	O	O	O
ECU 21	O	O	O	O	O	X	ECU 39	X	-	X	-	O	O
ECU 22	X	-	X	-	O	X	ECU 40	X	-	X	-	O	O

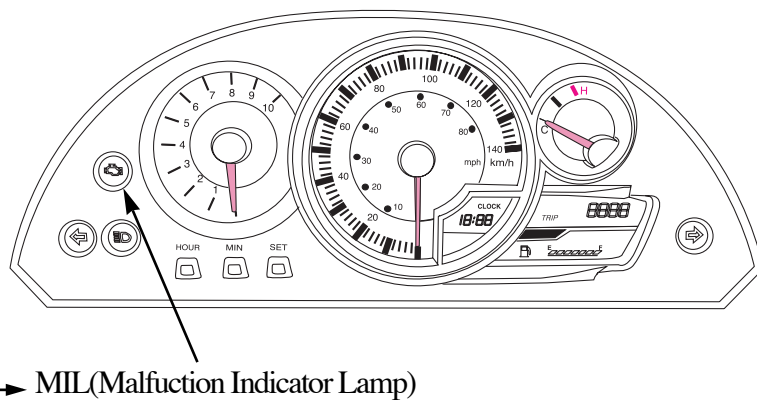
SELF-DIAGNOSTIC FUNCTION BY MIL(Malfunction Indicator Lamp)

SELF-DIAGNOSTIC FUNCTION

The EMS is equipped with self-diagnostic function in order to ensure that the engine control system is operation normally. If this function detects a malfunction in the system, it immediately operates and illuminates the MIL (malfunction indicator lamp). It gives the rider that malfunction has occurred in the system.

However, the ECU takes fail-safe function, it enables to drive only temporary when that happen.

Normally, the MIL illuminates for 3 seconds, when the main key is turned on.



※ when the ignition key ON.

MIL	Engine operation	Remarks
OFF	Able to engine start	
ON	Starting and driving are temporary	Refer to 1
	Unable to engine start	Refer to 2

* 시동키를 ON했을 경우임

Remarks 1

If the EMS has some problem and the MIL on and off, engine starting and driving are temporary by the EMS's fail safe function. But the EMS is not normal condition, so check the vehicle and repair soonest.

Remarks 2

It might not be able to starting and driving when following problems happen.

- Crankposition sensor
- Injector
- Fuel pump

※ The MIL on and blink(when this function detects a malfunction in the system)

MIL	Conditions
ON	MIL on continuously, when the engine operating
Blink	MIL blinks, when the main key is turn on (engine is stop)

FAIL-SAFE FUNCTION

If the ECU checks something wrong, the vehicle can be driven by its fail safe function.

However, if there are something wrong in fuel pump, injector, crank position sensor, the engine operation can be impossible.

FAILSAFE	SENSOR	ENGINE MIL
Starting possible	ENGINE TEMPERATURE SENSOR TPS INTAKE PRESSURE SENSOR INTAKE TEMPERATURE SENSOR	Ignition Key on : MIL on/off In engine operation : MIL on
Bad starting	CRANK POSITION SENSOR FUEL PUMP INJECTOR	

If there is something wrong in the EMS, it has fail safe function in order for engine to work and to cover a minimum driving of vehicle.

Contents	FAILSAFE	Starting	Driving
ENGINE TEMPERATURE SENSOR	In case that intake air temperature is below 20°C, that of engine will be fixed to 20°C In case that intake air temperature is over 20°C, that of engine will be fixed to 80°C.	Possible	Possible
TPS	Depending upon engine rpm, the opening degree of Throttle Valve has a temporary value.	Possible	Possible
INTAKE PRESSURE SENSOR	The value of intake pressure is fixed as the pressure just before when the intake pressure sensor is out of order.	Possible	Possible
INTAKE TEMPERATURE SENSOR	The value of intake temperature is fixed as a temperature just before when the intake pressure sensor is out of order.	Possible	Possible

⚠ CAUTION

If the MIL on and blink, starting and driving are temporary by fail safe function, but, because the conditions of engine operation are not perfect, this can be used in an urgent case. In this case, safe repairing of vehicle shall be required.

HOW TO CHECK THE FAULT CODE

There are two methods of checking the fault codes.

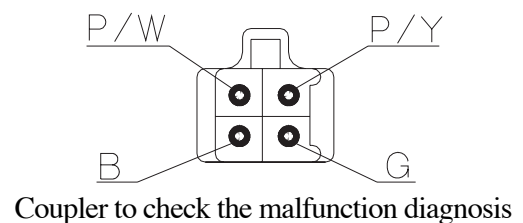
Use the MIL in the speedometer and the diagnostic tool.

First) Use the MIL in the Speedometer for checking.

- Turn off the ignition key
- The MIL blinks continuously
- Find the defects by checking the number of lighting, the fault code can be verified (refer to the fault code table)

Second) The diagnostic tool (refer to scan user's manual for checking.)

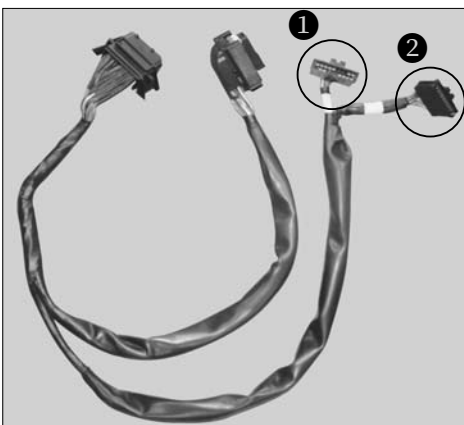
- Turn off the ignition key
- Assemble the coupler of diagnostic tool with the coupler to check the malfunction of vehicle.
- Turn on the ignition key
- Press the power button of diagnostic tool
- Checks according to diagnostic procedure of diagnostic tool.



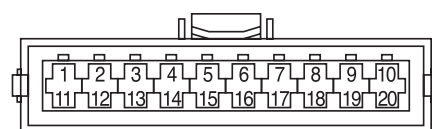
Wire color to check the malfunction diagnosis

-P/W : PINK/WHITE	: CAN_L
-P/Y : PINK/YELLOW	: CAN_H
-B : BLACK	: IGNITION KEY
-G : GREEN	: GROUND

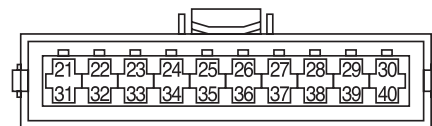
Third) Use the wireharness for checking



① Coupler for checking (ECU 1 - ECU 20 PIN)



② Coupler for checking (ECU 21 - ECU 40 PIN)



Measure the wire harness for checking by connecting the ECU with main wire harness to check the ECU.
It has two coupler to check the terminal.

The wireharness to check the ECU arrangement

① Coupler for checking : ECU PIN no. 1,2,3,4,5,9,10,12,17,18,19,20 were connected.
ECU PIN no. 6,7,8,11,13,14,15,16 is not connected.

② Coupler for checking : ECU PIN no. 21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,37,39,40 were connected.
ECU PIN no. 36 is not connected.

HOW TO SHOW THE FAULT CODE

There are two methods to show the Fault codes.

First) The methods to show in engine operation

In engine operation, when there is something wrong in each part of EMS, the MIL keeps light on without the light on/off function of MIL in order for driver to acknowledge defect. This time, so for checking the fault code, stop the vehicle and engine, and in the ignition key on, by checking the number of lighting, the fault code can be verified.(refer to the fault code table)

Second) The ways of indication only turn on the ignition key.

When only ignition key is on and if the defect of each part brings out, the MIL keeps showing the Fault code of defect part repeatedly in order to give defect information to driver.

CAUTION

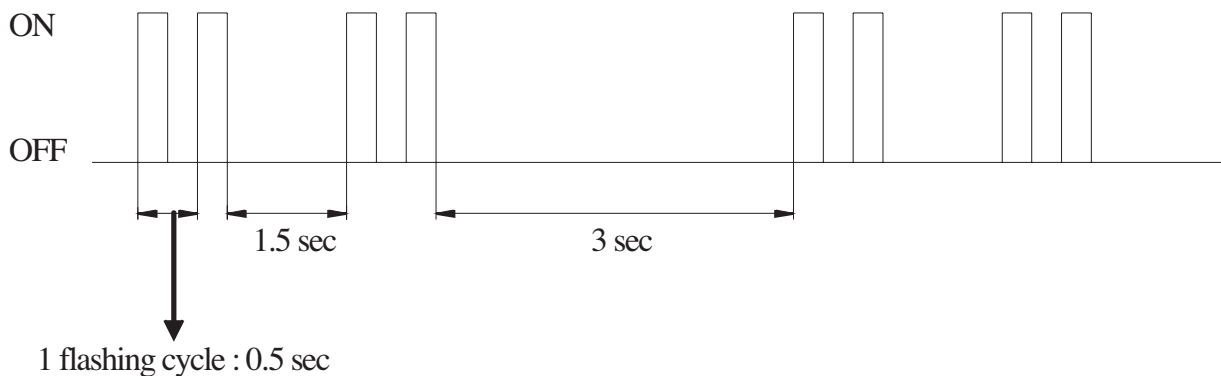
If the MIL on when engine is working, engine is able to be operated by fail safe. However, in the event that Injector, Fuel pump, Ignition coil has something wrong, vehicle may not be driven and engine not started.

HOW TO READ THE FAULT CODE

The fault codes are showed as 2 digits on the MIL of EMS.

Only one defect code is showed up to prior sequence of defects. This time, that fault code is repeatedly showed.

E.g.) The Fault code of ISA



If many problems will happened in the EMS parts at the same time, only one fault code is displayed by the priority, however, the ECU remembers all the fault codes.

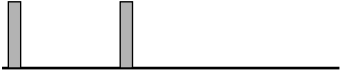
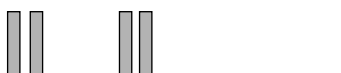
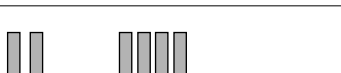
After revise the code, remove the memorized fault code by the method of warm up.(5-10)

(Refer to remove the fault codes)

When the vehicle is checked using the diagnosis tool.

- If the vehicle is check using the malfunction diagnosis tool, all fault code check is possible.

FAULT CODES TABLE

MIL INDICATION (The number of blinks)	Fault code no.	Priority order	Description
	0 0	—	No failure
	1 1	1	Crank position sensor failure(CKP)
	2 1	2	Injection valve failure(IV)
	2 2	3	Idle speed actuator failure (ISA)
	2 3	4	Electrical fuel pump failure (EFP)
	1 2	5	Intake Manifold absolute pressure signal failure (IMP)
	1 3	6	Throttle position signal failure (TPS)
	2 4	7	O2 sensor heater output failure (LSH)
	1 4	8	Lambda signal failure (VLS)
	1 5	9	Engine temperature signal failure (TENG)
	1 6	10	Breathing air temperature signal failure (TBA)
	2 5	11	Engine speed signal output failure (ESS)
	2 6	12	Headlamp relay failure
	2 8	13	Malfunction indicate lamp failure (MIL)

HOW TO REMOVE THE FAULT CODE

Remove the fault codes in two ways;

First) Full warm up

1. Starting the engine.
 - The MIL blinks continuously because the ECU memorized the fault code yet.
2. Full warm up the engine (keep idling five minutes)
3. Turn off the ignition key after full warm up the engine
4. Turn on the ignition key again, and check whether the fault code is disappeared or not.

After full warm up, it is possible to check the fault code is removed with the ignition key on/off.

If many problems happened in the EMS parts at the same time, only one defect code will be displayed by the priority order.

Even though repair a fault and remove the memorized fault code, another fault code blinks.

at this time, revise the fault and remove the memorized fault code by the warm up.

Second) Malfunction diagnosis tool
(refer to the scan user's manual)

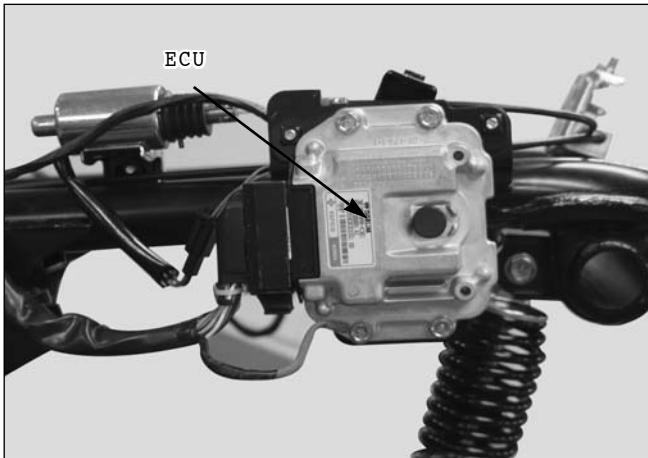


EMS TROUBLE SHOOTING

Inspection before diagnosis

Inspection the following before malfunction diagnosis.

- Engine oil capacity and leakage
- Condition of Spark plug
- Cylinder compressed pressure
- Fuel capacity and leakage
- Air cleaner clogging
- Condition of Battery
- Remaining length of Throttle cable
- Fuse cut or not
- MIL's blinking
- Coming out of emission gas
- Connection status of each coupler

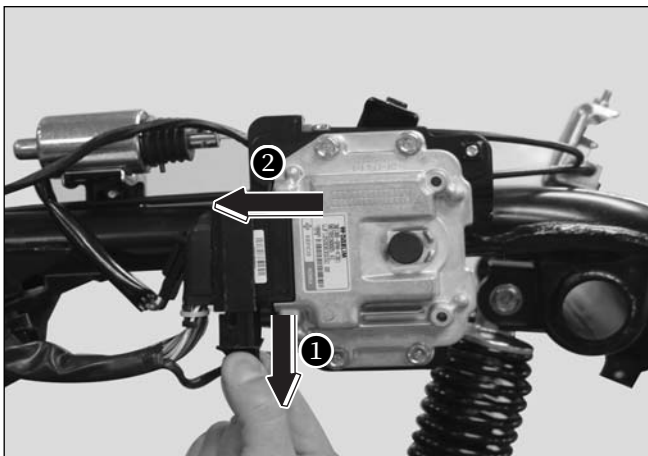


ECU

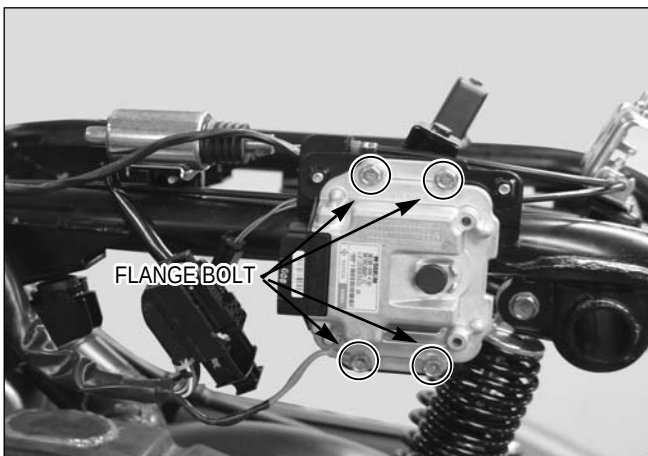
- Press seat button and open seat.
- Diassemble luggage box

CAUTION

- The key shall be OFF before disassembly

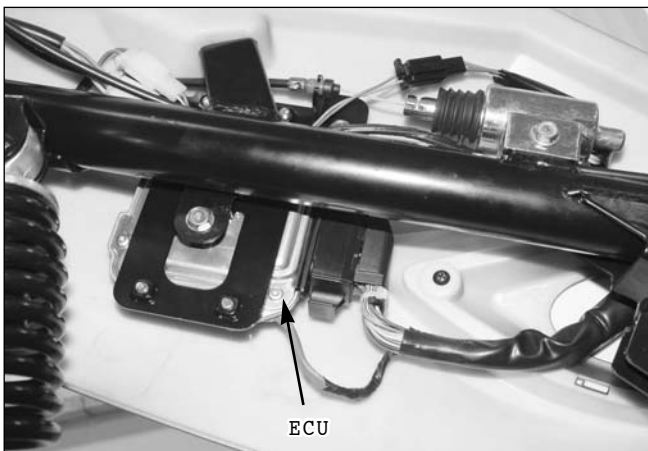


- Disassemble based on sequence because coupler can be broken if disassembling by force(1→2)



DISASSEMBLY

- Disassemble the coupler connected with ECU
- Untie 4 flange bolts installed at ECU

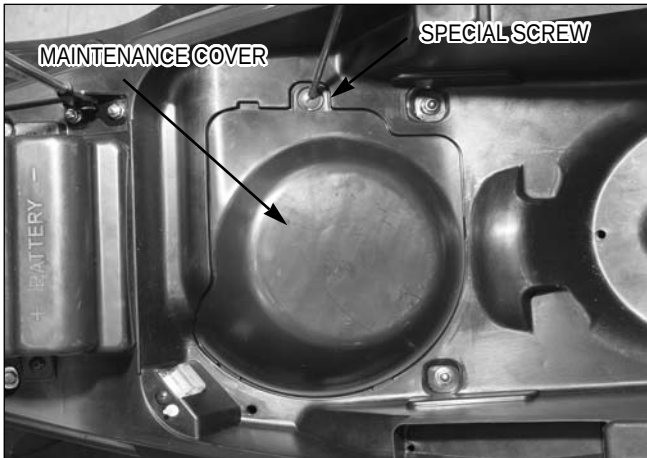


ASSEMBLY

- Assemble in the reverse order of disassembly

CAUTION

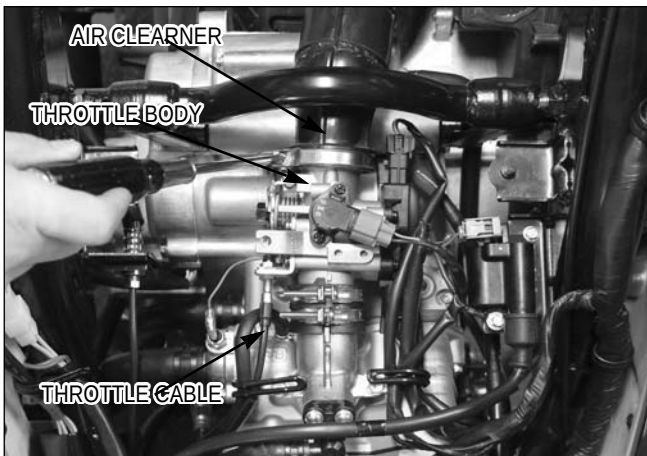
- At assembly, the ground wire(green colored) of ECU shall be connected.



THROTTLE BODY DISASSEMBLY

- Open seat
- Untie 1 screw and separate maintenance cover

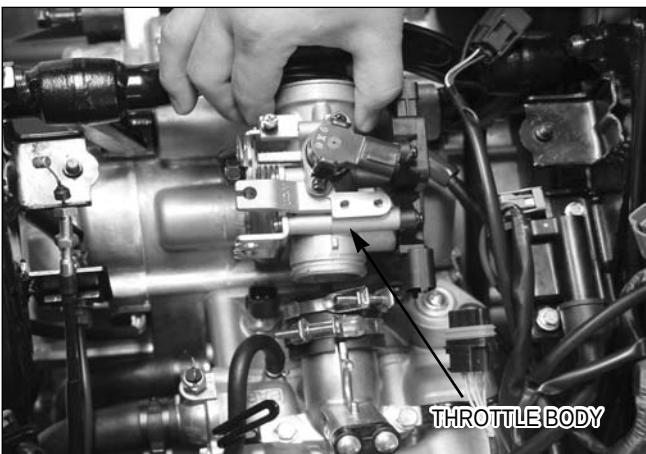
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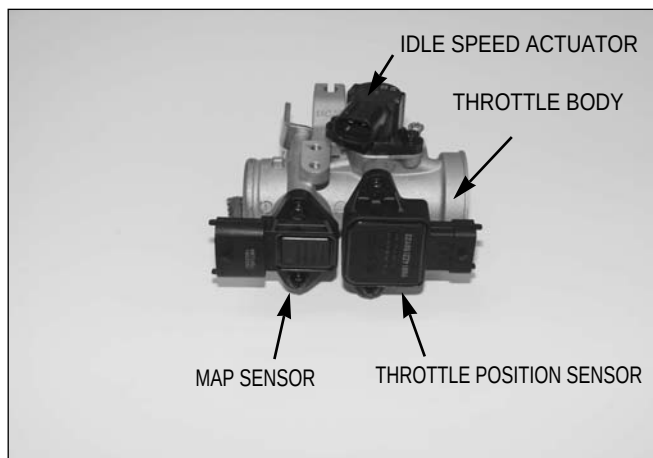
- Untie the screw installed at air cleaner connecting tube band
- Untie the screw installed at connecting tube



- Separate throttle cable
- Disassemble fuel tube connected to injector cap
- Disassemble TPS, ISA, Map sensor, injector coupler



- Disassemble throttle body ass'y

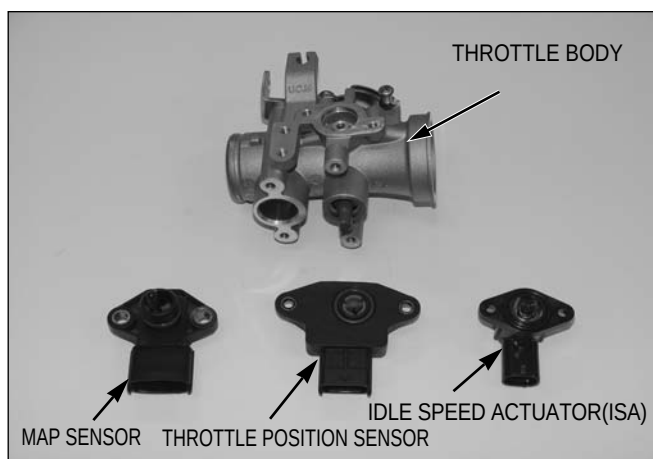


DISCONNECT THE THROTTLE BODY

- Remove the each component parts securing throttle body and check.

CAUTION

- Do not disconnect both the throttle adjust screw and adjust nut.

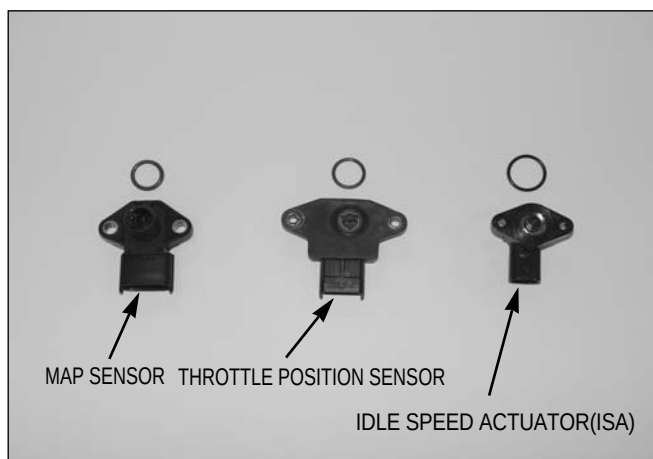


REMOVE

- Loosen the throttle body 2 bolts securing the insulator.
- Disconnect the TPS (Throttle position sensor).
- Disconnect the ISA (Idle speed actuator).
- Disconnect the MAPAT.

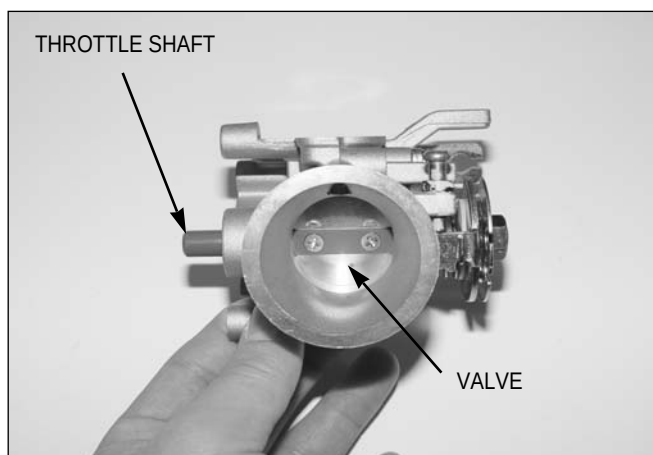
CAUTION

- Do not disconnect the throttle valve.



CHECKING THE THROTTLE BODY

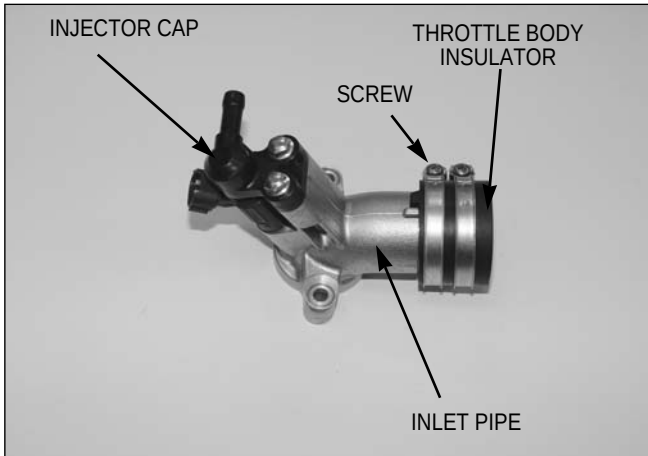
- Check map sensor
- Check ISA
- Check TPS
- Check o-ring
- If there is abrasion or damage to the vehicle



- Check throttle shaft
- Check throttle valve

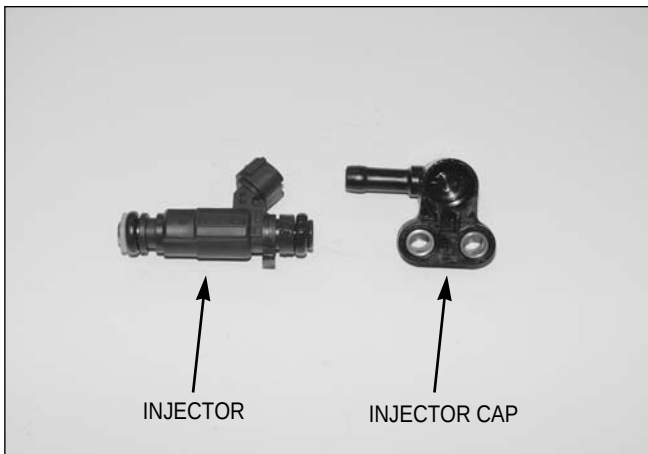
CAUTION

- Assemble in the reverse order of disassembly

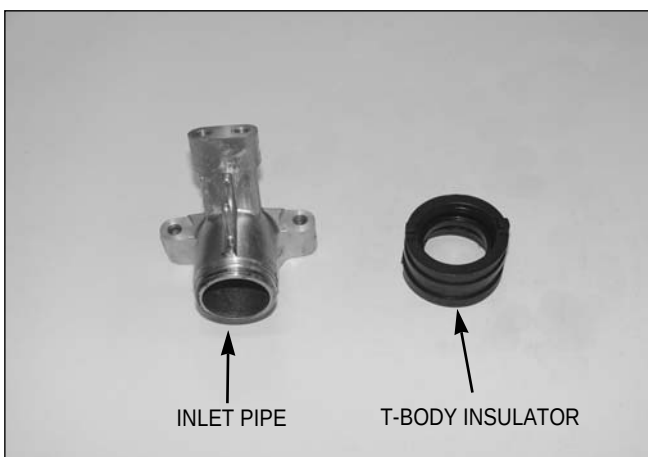


INLET PIPE DISASSEMBLY

- Untie 2 flange bolts installed at cylinder head, disassemble inlet pipe
- Untie throttle body insulator and screw installed at inlet pipe



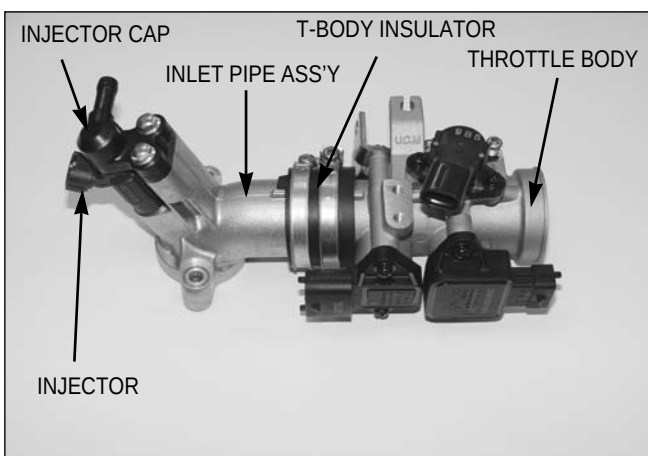
- Disassemble simultaneously injector and injector cap from inlet pipe.
- Disassemble injector and injector cap
- Check injector
- Check injector o-ring



- Check inlet pipe and throttle body insulator.
- Check inlet pipe o-ring
- Check about abrasion, damage of throttle body insulator
- Assembly of inlet pipe is in the reverse order of disassembly

CAUTION

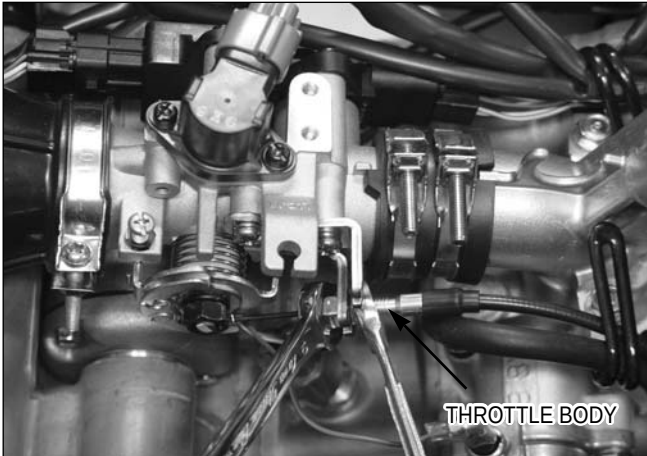
- At assembly, replace with the new o-ring



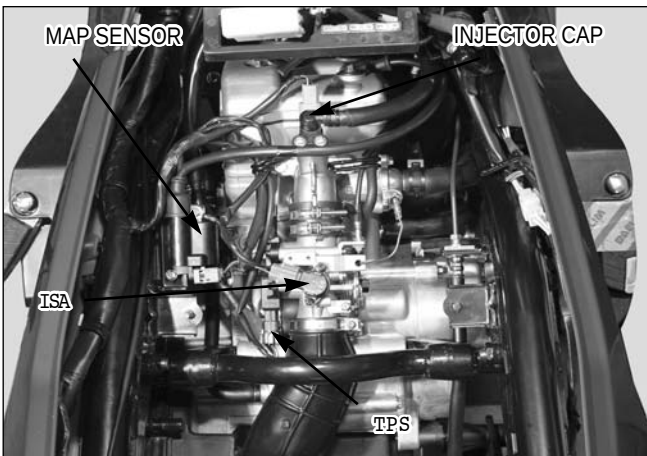
- Assemble inlet pipe and throttle body
Torque : 1.0kgf · m
- Assemble installed inlet pipe and throttle body to cylinder head.
- At assembly of inlet pipe, check o-ring
Torque : 1.2 kgf · m

CAUTION

- Replace with the new o-ring



- Assemble throttle body ass'y to air cleaner connecting tube.
- Assemble throttle cable
- Adjust the freeplay of throttle grip

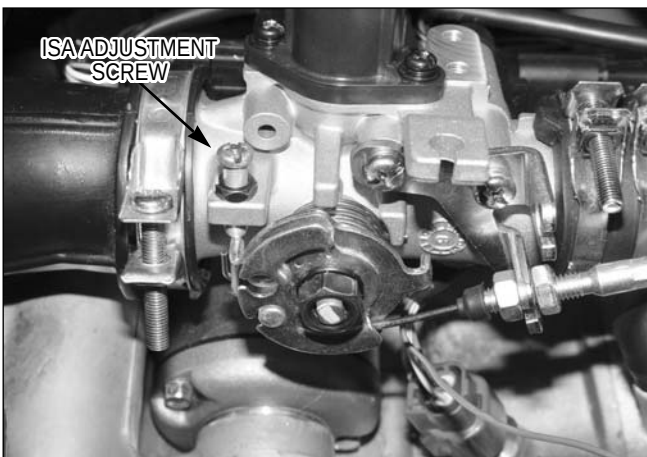


INSPECTION OF SENSORS AND ACTUATOR

- Connect each sensor and actuator coupler
- Assemble fuel hose and injector cap
- Connect scanner(the diagnosis equipment) and check whether each sensor works regularly or not.
- Check idle speed actuator(ISA)
- Check throttle position sensor(TPS)
- Check MAPAT sensor

CAUTION

- The checked value for TPS(throttle position sensor) after assembly shall be fit to the standard value.



ADJUSTMENT OF IDLE SPEED ACUTATOR(ISA)

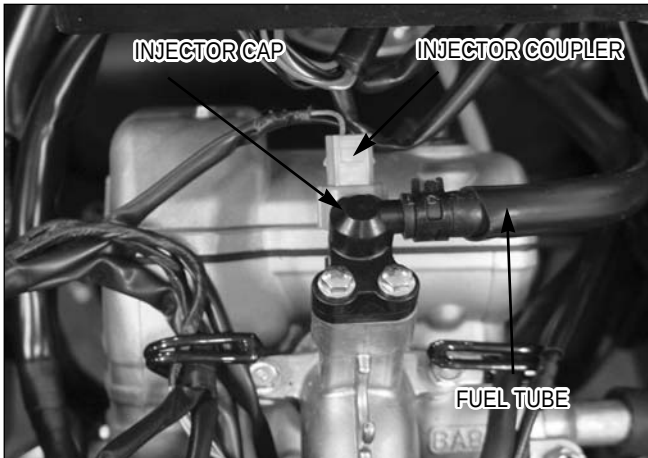
CAUTION

- The ECU shall be always initialized before engine starts.

- The vehicle is warmed up enough to adjust the idling speed.
- Connect scanner's coupler to the coupler for diagnosis of the vehicle.
- Check ISA value in the service data items by pressing power button of scanner.



- If ISA value does not fit around 20%, adjust it using the adjust screw to around 20% in 80~90°C of engine temperature.



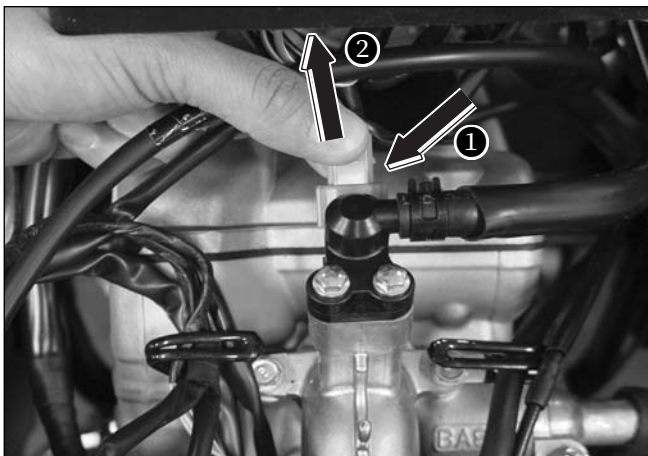
INJECTOR

DISASSEMBLY

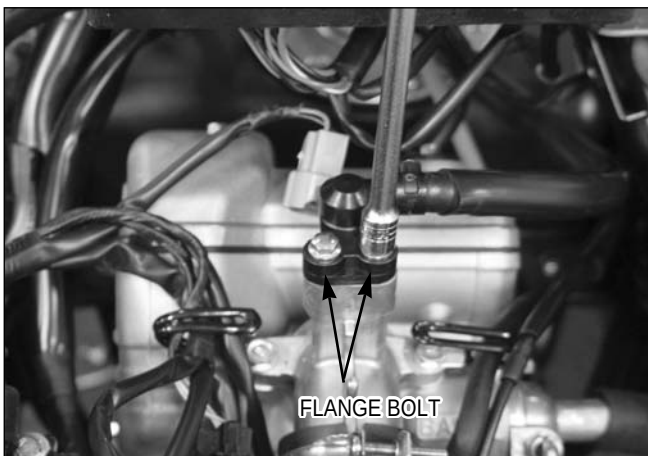
- Open seat and disassemble maintenance cover

CAUTION

- The key shall be OFF before disassembly.



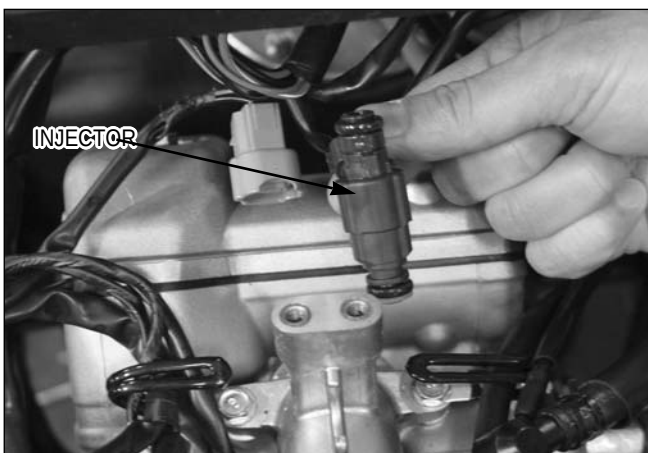
- After push injector coupler terminal and pull it up, injector will be disassembled.



- Disassemble fuel hose
- Untie injector cap bolt

CAUTION

- At disassembly, the engine shall be cooled.
 - Be sure to check the engine is cooled because even a little gasoline remains. If the engine is still hot, it could cause fire or burnt.
- If using the test of injector's fuel spray, be sure to disassemble the coupler of ignition coil.
 - If the spark plug sparks, it could cause fire.



- Disassemble injector
- Check whether the fuel spray hole of injector is cloggee or not.

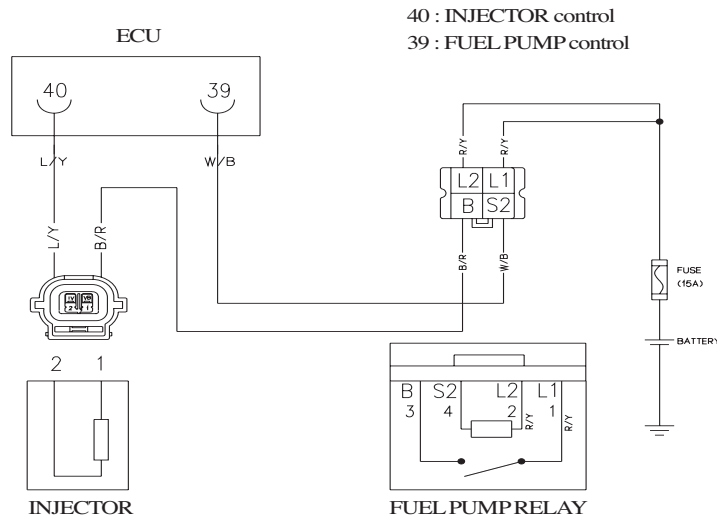
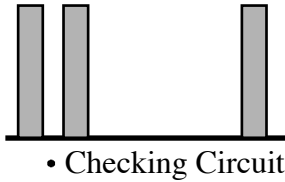
ASSEMBLY

- Assemble in the reverse order of disassembly.

CHECKING METHODS BY FAULT CODES

Checking of the Injector circuit

- The fault code is displayed by MIL



※Coupler terminal is based on wire harness.

CHECKING PROCEDURE

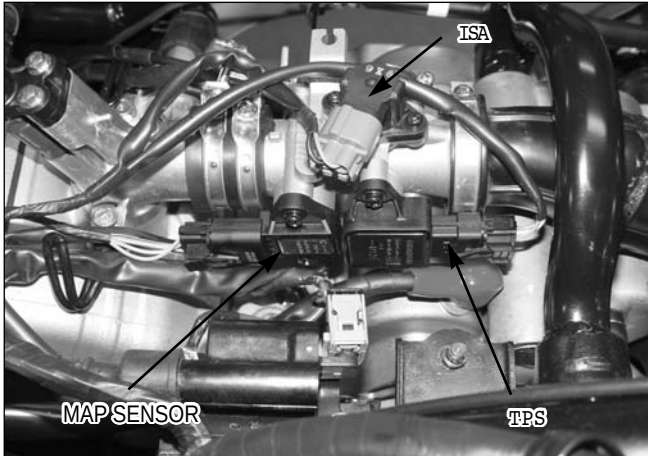
- 1) Turn off the ignition key.
- 2) Check to see if the injector coupler has come loose or the wire is peeling off.
If there is no problem, measured the resistance of injector.
- 3) Disassemble the injector coupler and measure the resistance between injector terminals.
The resistance of injector : $14.5 \pm 0.7 [\Omega]$, 20°C

※Remarks : measuring unit for resistance : resistance ' R ' [Ω]

- 4) If there is no problem, check the continuity between each terminal and ground.
The resistance between each terminal and ground : $\infty [\Omega]$
If resistance value is not normal, replace injector with the new one.
- 5) If the resistance is normal, turns on the ignition key
- If the fuel pump operated for 3 seconds, the power supply relay of injector is normal.
- 6) Measure between the voltage of coupler.
Measuring terminal : $\oplus$ BLACK/RED electric wire $\sim \ominus$ ground
Measuring voltage : battery voltage - 1.0[V]over

※Remarks : Measuring unit of voltage : voltage [V]

- 7) If the measured voltage is normal,
 - Check the 'Blue/Yellow' electric wire to see if they have been broken or have short-circuited or if the wire-harness coupler and the ECU coupler are a bad contact (ECU terminal No. 40)
 - If there is no problem in the electric wires, ECU is broken
 - Replace the ECU with new one, it rechecks
- 8) If the measured voltage is not normal,
 - Check the Black/Red electric wire to see if they have been broken or have short-circuited.
 - Check the fuel pump relay.
- 9) After fault repaired, to erase the memorized fault code in the ECU is refer to how to remove the fault code(5-11).



MAPAT(Manifold Air pressure sensor, Temperature sensor)

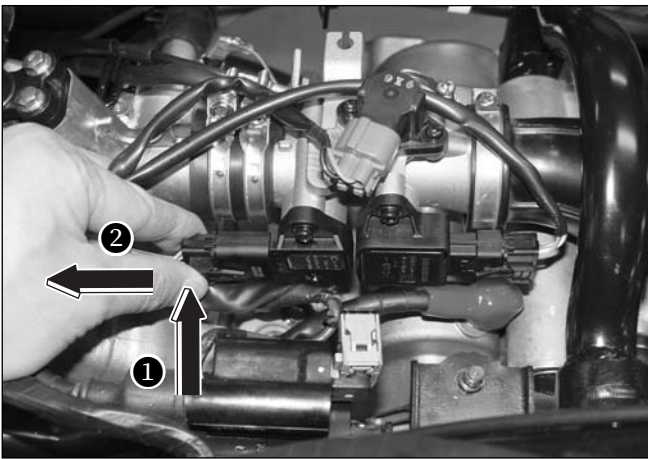
- MAPAT sensor is placed at the left side of throttle body.

DISASSEMBLY

- Disassemble MAPAT sensor coupler

CAUTION

- The key shall be 'OFF' before disassembly.



- Untie 2 MAPAT sensor screws.



- Disassemble MAPAT sensor
- Check MAPAT sensor

DISASSEMBLY

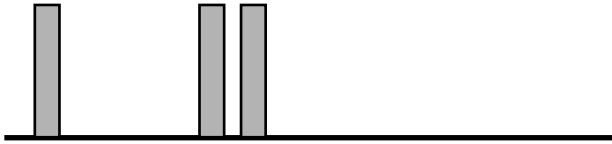
- Install in the reverse order of disassembly.



Check the MAPAT Circuit(Intake Pressure Sensor (IMP)+Intake Temperature Sensor(TBA))'s circuit

- Fault code number is displayed by MIL

The Fault code of intake pressure sensor

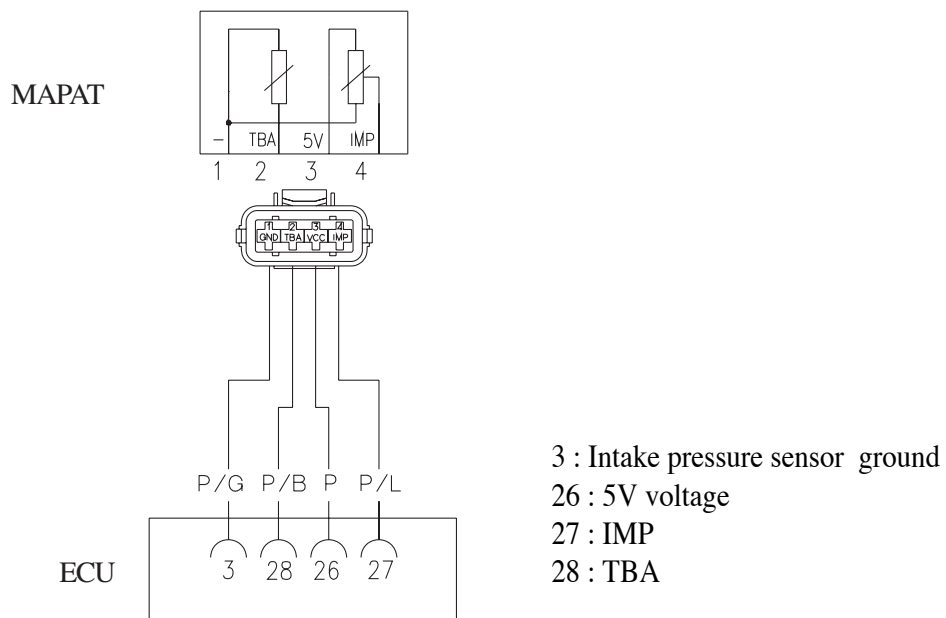


The Fault code of intake temperature sensor



5

Checking circuit



※Coupler terminal is based on the side of wire-harness

CHECKING PROCEDURE

- 1) Turn off the ignition key .
- 2) Check to see if the MAPAT coupler has come loose or the wire is peeling off.
If there is normal, measured the input 5 voltage of MAPAT's coupler.
- 3) Disassemble the coupler of MAPAT and turn on the ignition key
- 4) Measure the input voltage of MAPAT (intake pressure sensor + intake temperature sensor)'s coupler.
 - Input voltage : 4.5 ~ 5.5[V]
 - Measuring terminal : ⊕ MAPAT 3 terminal ~ ⊖ MAPAT 1 terminal

※Remarks : Measuring unit of voltage : voltage [V]

- 5) If voltage value is not normal,
 - Check to see if the ECU coupler is loose or if there is a bad contact.
 - Check the 'P' electric wire, 'P/G' electric wire, 'P/L' to see if they have been broken short-circuited

※Remark : refer to (5-16) if the intake pressure sensor is broken

refer to (5-16) if the intake temperature sensor is broken

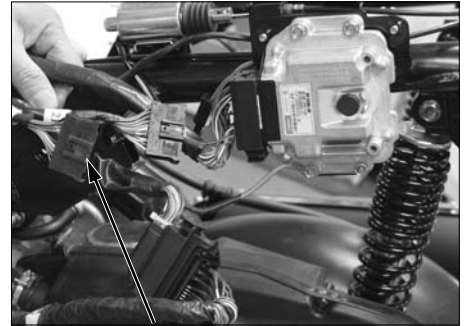
After fault repaired, To erase the memorized fault code in the ECU is refer to how to remove the fault code(5-11).

CHECKING OF THE INTAKE PRESSURE SENSOR

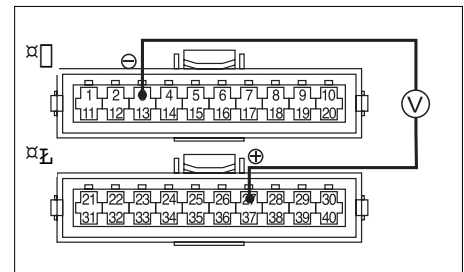
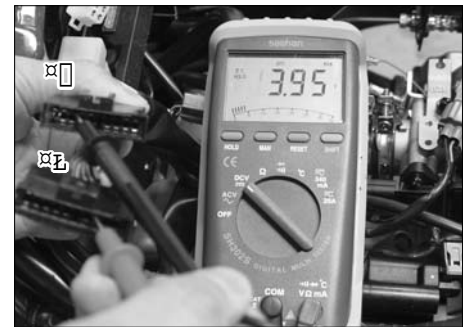
- 1) If voltage value is normal, turn off the ignition key.
Connect the MAPAT(intake pressure sensor + intake temperature sensor) coupler
- 2) The wire-harness to check the ECU is connected with the ECU with a wire-harness coupler.
Refer to how to assemble or disassemble the ECU (5-32)
- 3) Turn on the ignition key. Start engine and operate idle.
- 4) Measure the voltage of intake pressure sensor for ECU check.
 - Measuring the voltage of intake pressure sensor.
 - Measuring terminal : ⊕ECU No. 27(P/L:PINK/BLUE) ~ ⊖ECU No.3(P/G : PINK/GREEN)
 - Measuring voltage : 0.1[V] ~ 4.8[V]
- ※ Remarks : Measuring unit of voltage : Voltage [V]
 - The voltage of air pressure;
 - 20[kPa]: 0.719 ~ 0.859[V]
 - 107[kPa]: 4.154 ~ 4.294[V]
- 5) If the measured voltage is not normal,
 - Check the 'P' electric wire, 'P/G' electric wire, 'P /L' electric wire to see if they have been broken or have short- circuited.
 - Replace the MAPAT sensor with the new one and it rechecks.

If measuring voltage is normal,

- Check the 'P' electric wire, 'P/G' electric wire, 'P/L' electric wire to see if they have been broken or have short- circuited if there is a bad contact.
badness of terminal No. 3, No. 26, No.27 of ECU coupler.
 - If the electric wire is no problem, ECU is broken.
 - Replace the ECU with the new one, it rechecks.
- 6) After repaired, refer to the fault code removal method to erase the memorized fault code in the ECU.



Connect the wire harness to check



CHECKING OF INTAKE TEMPERATURE SENSOR

- 1) If voltage value is normal, turn off ignition key.
- 2) Disassemble the MAPAT coupler and measure the resistance of intake temperature sensor.

Resistance of intake pressure sensor : $2000 \pm 100[\Omega]$, $25 \pm 1^\circ\text{C}$

Measuring terminal : $\oplus$ ECU No. 28(P/B : PINK/BLUE) $\sim$ $\ominus$ ECU No. 3(P/G : PINK/GROUND)

※ Remarks : Measuring value for resistance : Resistance[Ω]

- The Voltage of air pressure;
- $24 \sim 26[^\circ\text{C}]$: $1800 \sim 2200[\Omega]$
- $99 \sim 101[^\circ\text{C}]$: $161 \sim 206[\Omega]$

- 3) If measuring resistance is not normal,
 - Replace the MAPAT sensor with new one and it rechecks.

If the measured voltage is normal,

- Check the 'P' electric wire, 'P/G' electric wire, 'P/L' electric wire to see if they have been broken or have short- circuited if there is a bad contact of terminal No. 3, No. 26, No. 27 of ECU coupler.
- If the electric wire is no problem, ECU is broken.
- Replace the ECU with the new one, it rechecks.

- 4) Turn on the ignition key. Start the engine and idling.
- 5) Measure the voltage of intake pressure sensor for ECU check.

- Measuring the voltage of intake pressure sensor
 - Measuring terminal: $\oplus$ ECU No.28(TBA)
 - $\sim$ $\ominus$ ECU No.3(IMP ground)
 - Measuring voltage: $0.1[\text{V}] \sim 4.9[\text{V}]$

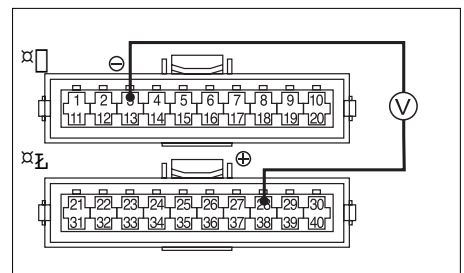
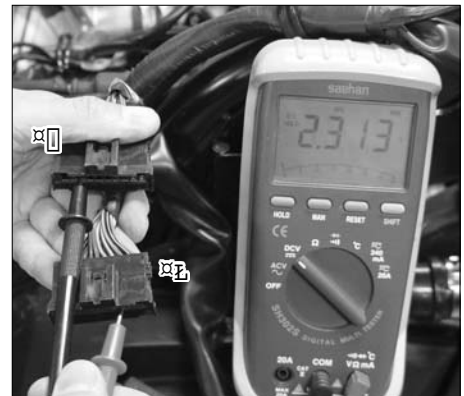
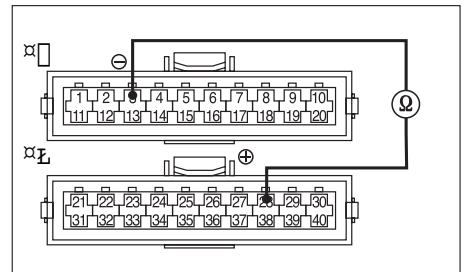
※ Remarks : Measuring unit of voltage : Voltage [V]

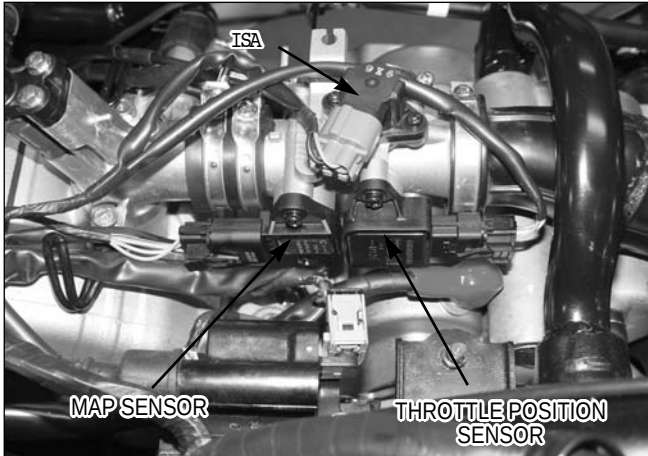
- 6) If the measured voltage is not normal,
 - Check the 'P' electric wire, 'P/G' electric wire, 'P /L' electric wire to see if they have been broken or have short- circuited.
 - Replace the MAPAT sensor with new one and it rechecks.

If the measured voltage is normal,

- Check the 'P' electric wire, 'P/G' electric wire, 'P/L' electric wire to see if they have been broken or have short- circuited if there is a bad contact of terminal No. 3, No. 26, No.28 of ECU coupler.
- If the electric wire is no problem, ECU is broken.
- Replace ECU with the new one, it rechecks.

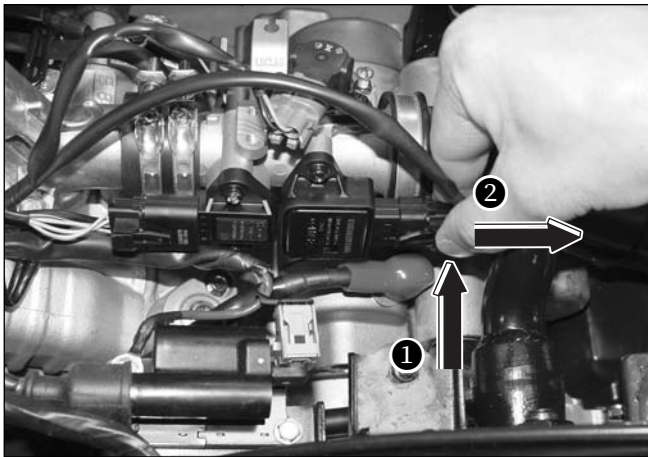
- 7) After fault repaired, To erase the memorized fault code in the ECU is refer to how to remove the fault code(5-11).





THROTTLE POSITION SENSOR(TPS)

- TPS is placed at the left side of inside engine.



DISASSEMBLY

- Push and pull TPS coupler, disassemble

CAUTION

- The key shall be 'OFF' before disassembly.



- Untie 2 TPS screws



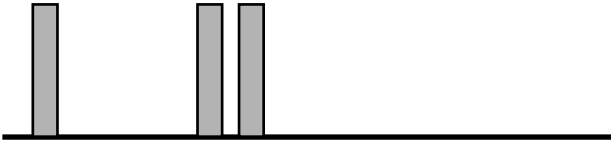
- Disassemble TPS
- Check TPS

ASSEMBLY

- Install in the reverse order of disassembly

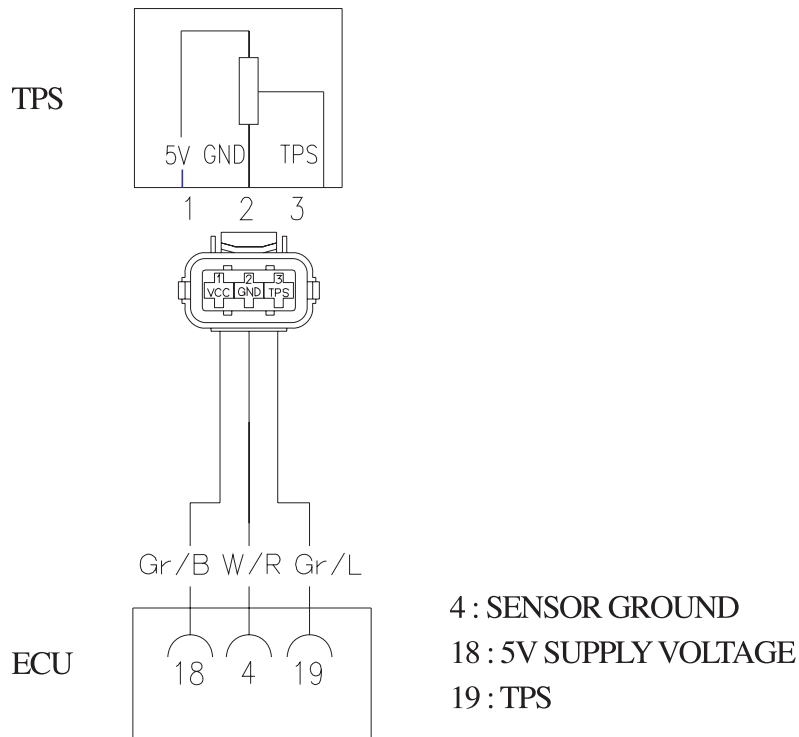
CHECKING THE TPS(Throttle Position Sensor) CIRCUIT DIAGRAM

- Fault code number is displayed by MIL



Checking circuit

5



※ The coupler terminal is based on the side of wire-harness

• Checking Procedure

- 1) Turn off ignition key .
- 2) Check the TPS(Throttle Position Sensor) coupler is loose, or bad.
If there is no defect, measure the input voltage of TPS.
- 3) Disassemble the TPS coupler
- 4) Turn on the ignition key.
 - Input voltage : 4.5 ~ 5.5[V]
 - Measuring terminal : $\oplus$ ECU NO.18(Gr/B : GRAY/BLACK) ~ $\ominus$ ECU NO.4 (W/R : WHITE/RED)

Measure the terminal voltage of TPS's coupler.

Measuring voltage : 4.5[V] ~ 5.5[V]

※Remarks : Measuring unit of voltage : Voltage [V]

If voltage value is not normal,

- Check to see if the ECU coupler is loose if there is bad contact.
- Check the 'GR/B' electric wire, 'W/R' electric wire, 'GR /L' electric wire to see if they have been broken or have short- circuited.

- 5) If the value of voltage is normal, turn off the ignition key.

• Checking Procedure

- 6) Check continuity between the Sensor Ground Terminal of TPS and Earth.

The continuity TPS : $0 \sim 1.0 [\Omega]$, $20 \pm 1^\circ \text{C}$

Measuring Terminal : $\oplus$ ECU No. 4 (W/R : WHITE/RED)
 $\sim \ominus$ EARTH

※Remarks : Measuring unit for resistance : Resistance ' R ' [Ω]

- 7) If not problem, measure the resistance of TPS.

By turning round throttle Lever, measure the resistance.

The resistance of TPS

If the throttle is totally closed : $0.9 \sim 1.6 [\text{k}\Omega]$, $20 \pm 1^\circ \text{C}$

If the throttle is totally opened : $2.3 \sim 2.6 [\text{k}\Omega]$, $20 \pm 1^\circ \text{C}$

Measuring Terminal : $\oplus$ ECU No. 19 (Gr/L: GRAY/BLUE) ~

$\ominus$ ECU No.4 (W/R : WHITE/RED)

※Remarks : Measuring value of resistance : Resistance[k Ω]

- 8) If resistance and the continuity are not abnormal.

- Adjust correctly the position of TPS
- Replace the TPS with the new one and re-check.

- 9) If resistance and continuity are normal, connect the coupler of TPS.

- 10) Turn on the ignition key.

- 11) Measure the TPS voltage of the wire-harness to check the ECU.

- Rotate the throttle lever, measure the voltage

Measuring terminal: $\oplus$ ECU No. 19 (Gr/L: GRAY/BLUE) ~

$\ominus$ ECU No.4 (W/R : WHITE/RED)

Output voltage of TPS

-If the throttle is totally closed : $4.0 \sim 5.5 [\text{V}]$

-If the throttle is totally opened : $0.1 \sim 0.6 [\text{V}]$

※Remarks : Measuring unit for voltage : Voltage [V]

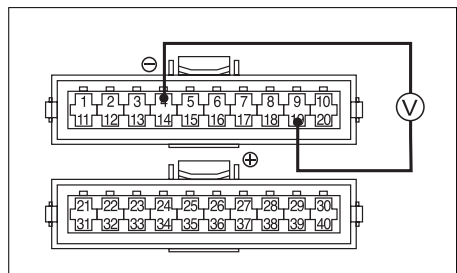
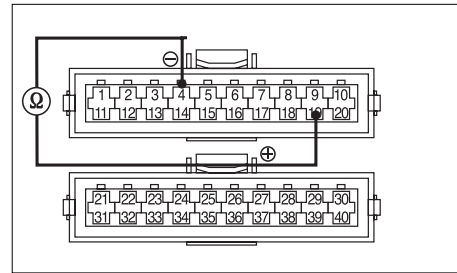
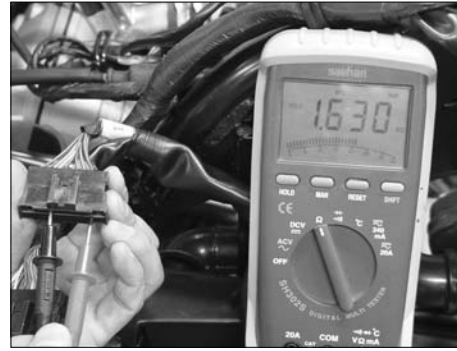
- 12) If the measured voltage is abnormal,

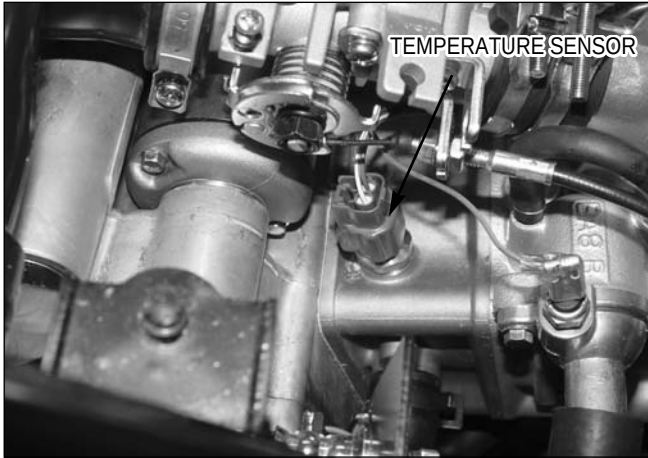
- Replace the TPS with the new one, and re-check.

If the measured voltage is normal,

- Check the 'GR/B' electric wire, 'GR/L' electric wire, 'W/R' electric wire to see if they have been broken or have short- circuited if there is a bad contact of terminal No. 4, No. 18, No. 19 of ECU coupler.
- If there is no problem in wires, ECU has broken down.
- Replace ECU with the new one, and recheck.

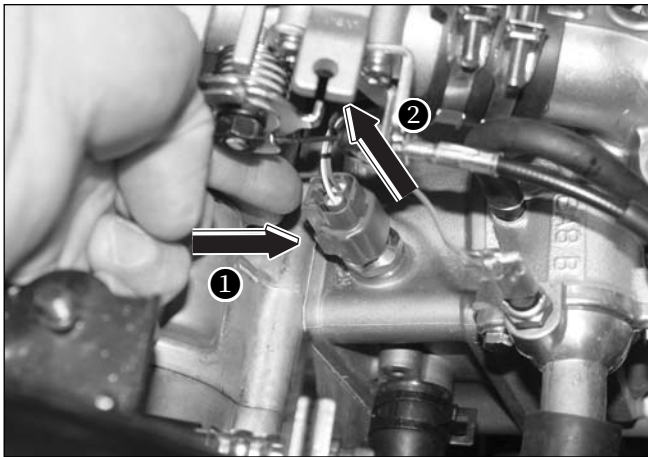
- 13) After fault repaired, To erase the memorized fault code in the ECU is refer to how to remove the fault code (5-11).





ENGINE TEMPERATURE SENSOR(ETS)

- Engine Temperature Sensor(ETS) is positioned at cylinder.

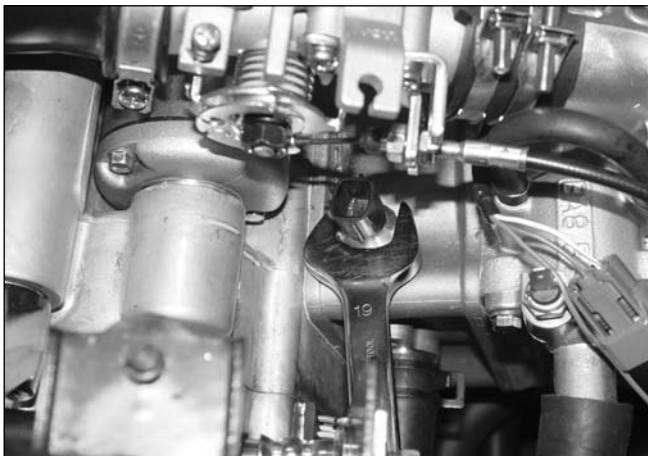


DISASSEMBLY

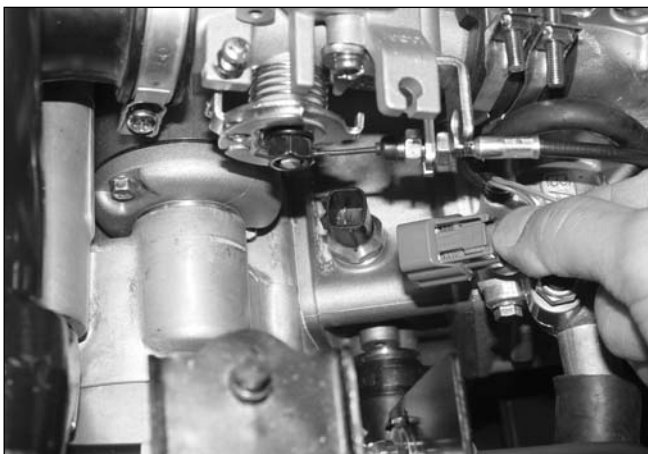
- Press the coupler of Engine Temperature Sensor(ETS) and pull it.

CAUTION

- Before disassembling, the ignition key shall be 'OFF'



- Disassemble ETS coupler
- Disassemble ETS
- Check ETS

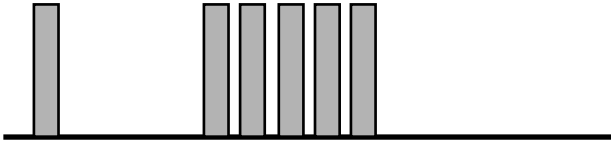


ASSEMBLY

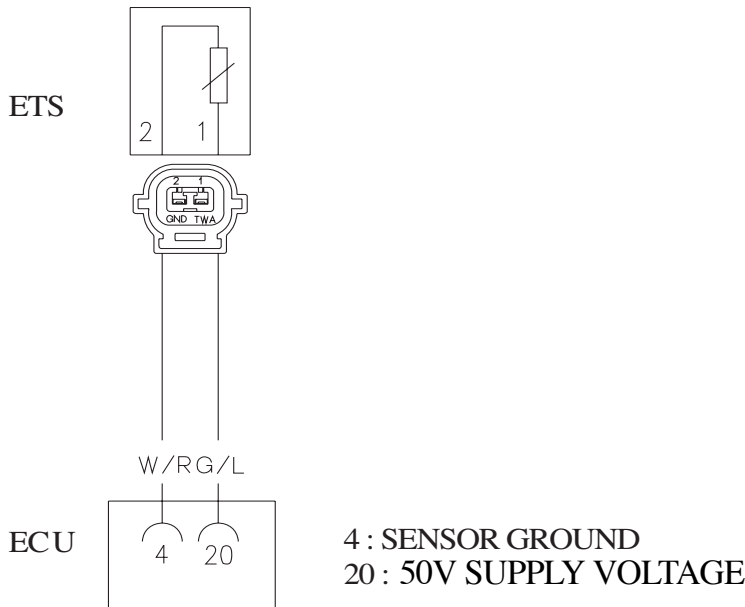
- Assemble in the reverse order of disassembly.

1)CHECKING THE CIRCUIT DIAGRAM OF ETS(Engine Temperature Sensor)

- Fault code number is displayed by MIL



CHECKING CIRCUIT



※ Coupler terminal is based on the side of wire-harness

• Checking Procedure

- 1) Turn off the ignition key .
- 2) Check to see if the ETS(Throttle Position Sensor) coupler is loose, or bad.
If there is no defect, measure the input voltage of ETS.
- 3) Disassemble the coupler of ETS
- 4) Turn on ignition key.
 - Measuring terminal : ⊕ECU No. 20 (Gr/L: GREEN/BLUE)
~ ⊖ECU No.4 (W/R : WHITE/RED)

Measure the terminal voltage of ETS's coupler.

Measuring voltage : 4.5[V] ~ 5.5[V]

※Remarks : Measuring unit for voltage : voltage [V]



If the voltage value is not normal,

- Check to see if the ECU coupler is loose, or bad contact.
- Check the 'G/L' electric wire, 'W/R' electric wire, 'W/R' electric wire to see if they have been broken or have short-circuited.

- 5) If the voltage value is normal, turn off the ignition key.

- 6) Disassemble the coupler of ETS, and measure the resistance of ETS.

Resistance of ETS : 1.6[kΩ] ~ 10.6[kΩ], 20°C ~ 80°C

Measuring terminal : Each terminal of ETS

※Remarks : Measuring unit for resistance : Resistance ' R ' [kΩ]

- 6-1) If the measured value is not normal,
- Replace the ETS with the new one, recheck.

If the measured value is normal,

- Check the G/L electric wire, W/R electric wire to see if they have been broken or have short-circuited or if the ECU coupler is a bad contact (No.4, No. 20.)
- If the electric wire is no problem, ECU is broken.
- Replace ECU with the new one, recheck.

6-2) After fault repaired, To erase the memorized fault code in the ECU is refer to how to remove the fault code (5-11).

5

• Checking Procedure-2

1) Disassembly

- Disassemble the ETS(Engine Temperature Sensor) : (Refer to 5-27)

2) Check the ETS(Engine Temperature Sensor)

- Connect two terminals of ETS to the probe of the tester and insert even its screw point of ETS into oil.
- Read the temperature of thermometer depending upon oil temperature's change and tester's value.

Characters of ETS

Temperature	Resistance value
20°C	10.6 kΩ ~ 14.4 kΩ
80°C	1.35 kΩ ~ 1.65 kΩ
110°C	0.57 kΩ ~ 0.69 kΩ

Measuring unit of resistance : Resistance ' R '[k Ω]

If the value of resistance is high or out of the standard value, replace the ETS with the new one.

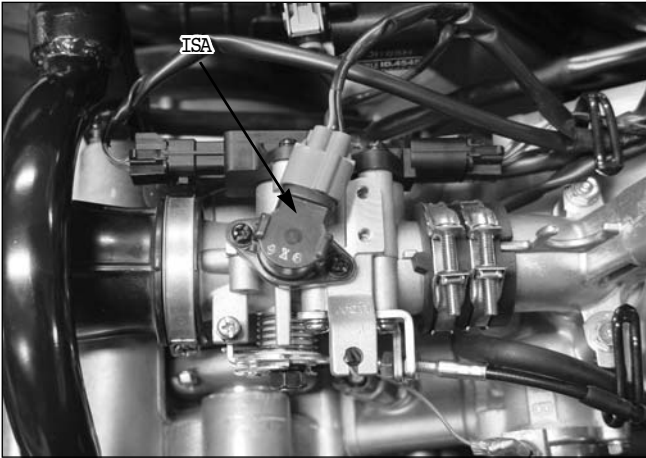
CAUTION

- 1) Be careful do not fell down the ETS, because its weakness.
- 2) Be careful the ETS and the Thermometer do not to touched to oil bowl.
- 3) Be careful oil temperature will not raised more than measurement temperature.

3) Install

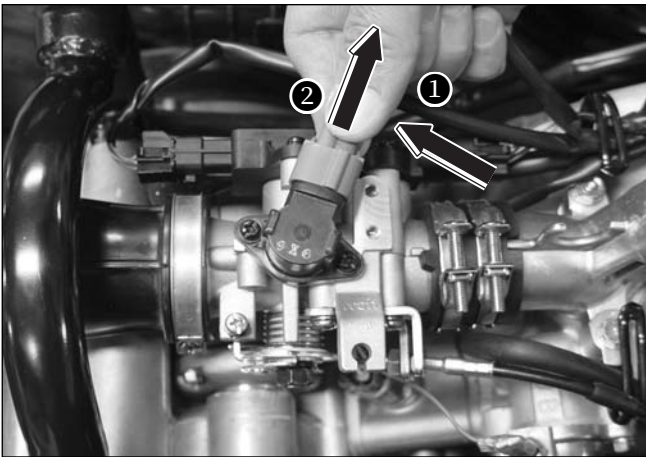
- Install in the reverse order of removal with standard torque.

ETS torque : 3.0[kgf • m]



ISA(IDLE SPEED ACTUATOR)

- ISA is located at the upper side of throttle body



DISASSEMBLY

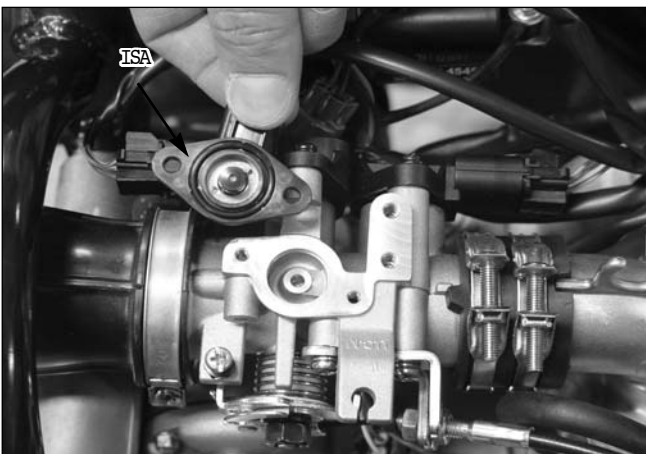
- Push ISA coupler and disassemble it.

CAUTION

- Before disassembly, the key shall be “OFF”.



- Untie 2 ISA screws



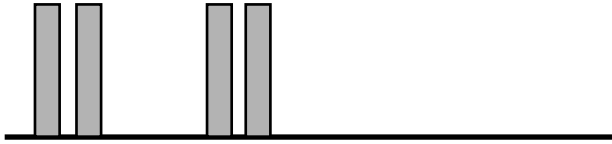
- Disassemble ISA
- Inspect ISA

ASSEMBLY

- Install in the reverse order of disassembly

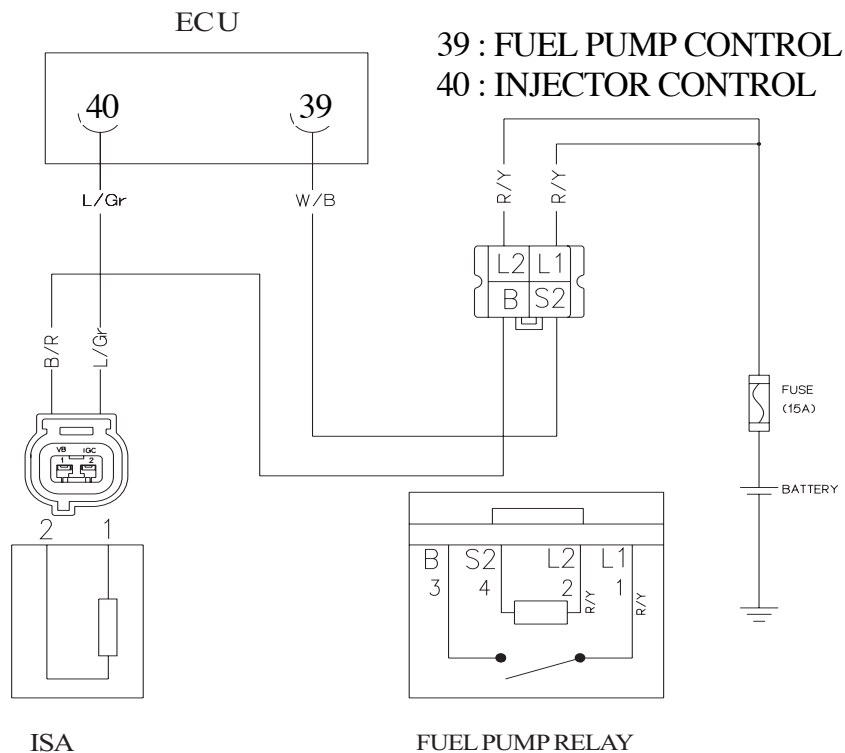
CHECK THE ISA(Idle Speed Actuator)

- Showing of defects codes by MIL



CHECKING CIRCUIT

5



※ Coupler terminal is based on the side of the wire-harness

• CHECK PROCEDURE

- 1) Turn off ignition key .
- 2) Check to see if the ISA(Throttle Position Sensor) coupler is loose, or bad.If there is no defect, measure the input voltage of ISA
- 3) Disassemble the coupler of ISA, measure the resistance between ISA terminals.

ISA resistance : 31.5~ 38.5[Ω], 20 °C

※remarks : Measuring unit of resistance : Resistance 'R'[Ω]

- 4) If there is no problem, check about the level of electricity flow between each terminal, and between each ground.

Resistance between each terminal , and between each ground : ∞ [Ω]

If measure resistance value is not normal, replace with the new one
Disassembly and Assembly : refer to (5-29)

※remarks : Measuring unit for resistance : Resistance 'R'[Ω]

- 5) If the measured resistance and continuity are abnormal,
* Replace with new ISA and recheck.
- 6) If the resistance and continuity are normal, connect ISA coupler.



- 7) Turn on ignition key
- 8) Measure ISA voltage of wire-harness to check ECU.
- Measuring terminal : $\oplus$ B/R electric wire $\sim \ominus$ EARTH
 - Output voltage of ISA : BATTERY VOLTAGE[V]

※Remarks : Voltage measuring unit : Voltage [V]

If the measured voltage is normal,

- Check the 'B/R' electric wire, 'L/G' electric wire, 'W/R' electric wire to see if they have been broken or have short- circuited if there is a bad contact of terminal No. 33, No. 39 of ECU coupler.
- If there is no problem in wires, ECU has broken down.
- Replace ECU with the new one, recheck.

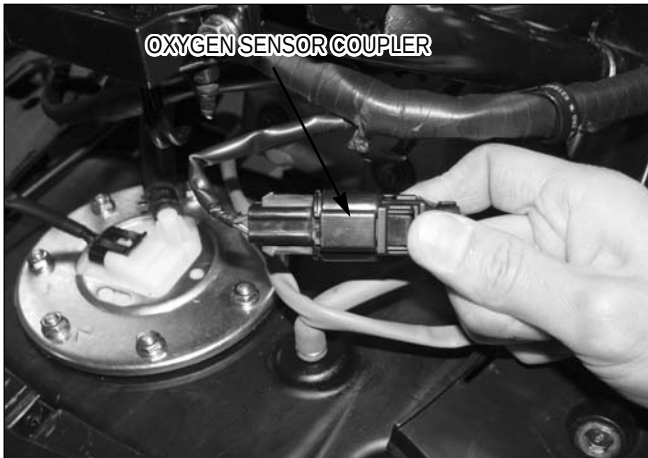
If the measured voltage is abnormal,

- Check the 'B/R' electric wire, 'L/G' electric wire, 'W/B' electric wire to see if they have been broken or have short- circuited.

- 9) After fault repaired, To erase the memorized fault code in the ECU is refer to how to remove the fault code(5-11)



※Remove the faulty code of scanner



O2(Oxygen) SENSOR

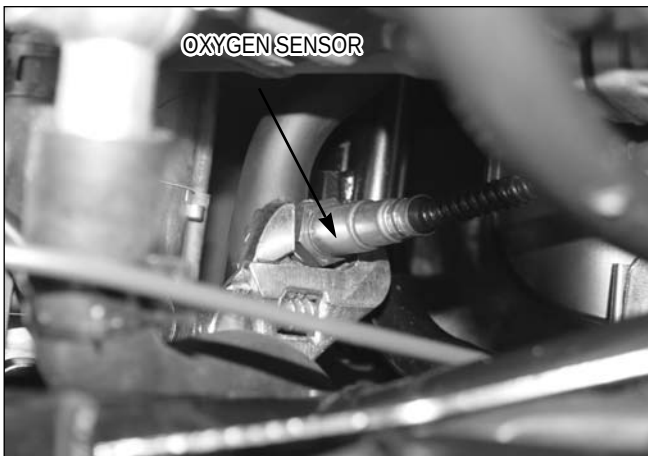
- Disassemble center cover
- Assemble O2 Sensor to the muffler exhaust pipe.
- The coupler is located at the upper side of fuel tank.

DISASSEMBLY

- Disassemble O2 sensor coupler.

CAUTION

- The key shall be 'OFF' before disassembly.



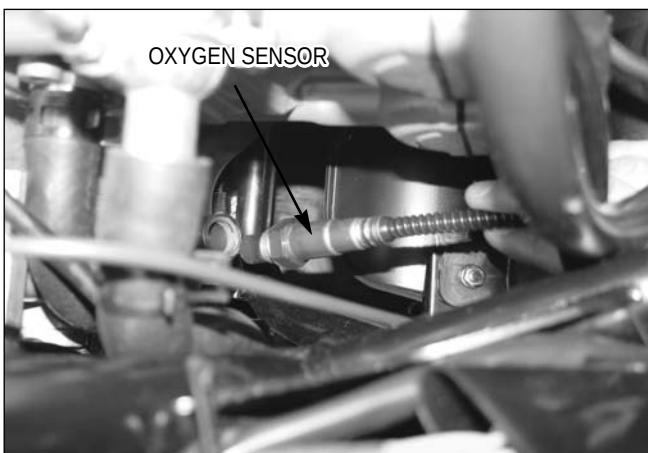
- Disassemble O2 sensor installed at the muffler exhaust pipe.



- Check O2 sensor

CAUTION

- Handle with care because O2 sensor is fragile.

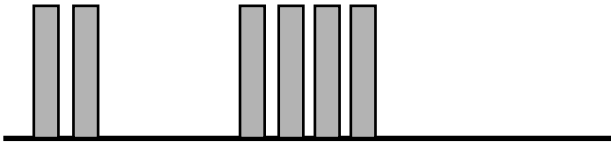


ASSEMBLY

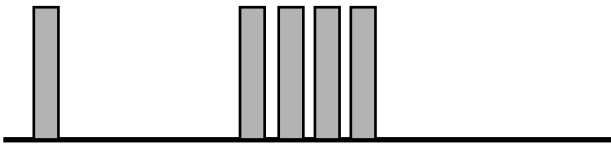
- Install in the reverse order of disassembly.

1) CHECKING OF OXYGEN(O₂) SENSOR CIRCUIT

- Fault code number is displayed by MIL

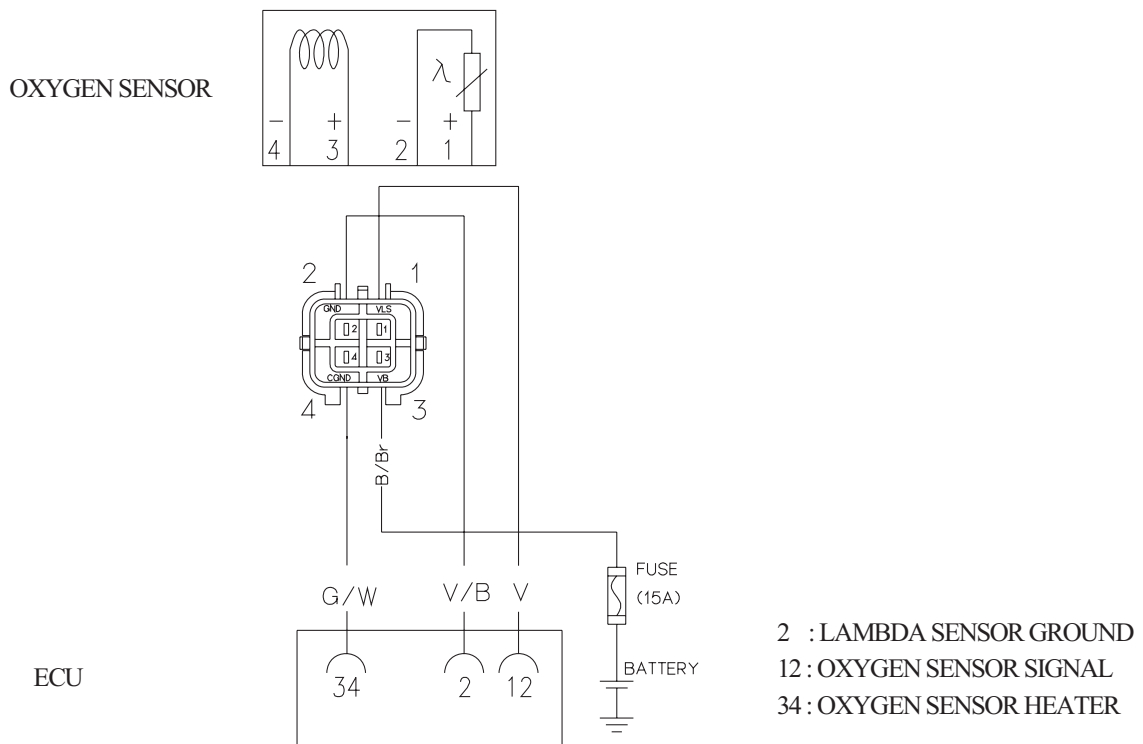


- Fault code number is displayed by MIL of the oxygen(O₂)sensor lambda signal.



5

CHECKING CIRCUIT



※ Coupler terminal is based on the side of Wire-Harness.

CHECKING FOR A FAULT CODE BY OXYGEN(O₂)SENSOR HEATER

- Turn off the ignition key.
- Check the O₂(oxygen) coupler is loose, or bad.
If there is no defect, measure the input voltage of O₂(oxygen)
- Disassemble the coupler of oxygen(O₂)sensor and turn on ignition key
- Measure input voltage of oxygen(O₂)sensor coupler
 - Input voltage : Battery voltage[V]
 - Measuring terminal (side of Wire-harness) : ⊕oxygen(O₂)3 terminal of sensor coupler (B/BR : BLACK/BROWN) ~ ⊖EARTH

※Remarks : Measuring unit of voltage : Voltage[V]

CHECKING FOR A FAULT CODE BY OXYGEN(O₂)SENSOR HEATER

If the voltage value is abnormal,

- Check to see if the ECU coupler is loose or if there is bad contact.
- Check the 'B/B' electric wire, 'G/W' electric wire to see if they have been broken or have short- circuited.

5) If the voltage value is normal, turn off the ignition key.

- Measure the Resistance of oxygen (O₂) Sensor heater : about 9[Ω], about 22℃
- Measuring terminal (side of wire-harness) : ⊕ oxygen(O₂)3 terminal of sensor coupler (B/BR : BLACK/BROWN) ~ ⊖ ECU No.4(G/W :GREEN/WHITE)

※Remarks : Measuring unit of Resistance : Resistance 'R'[Ω]

6) If the measured resistance is abnormal,

- Replace the oxygen(O₂)sensor with new one and recheck it.

If the measured resistance is normal,

- Check the 'B/B' electric wire, 'G/W' electric wire to see if they have been broken or have short- circuited.
- If the electric wire is no problem, the ECU is broken.
- Replace the ECU with new one, and recheck it.



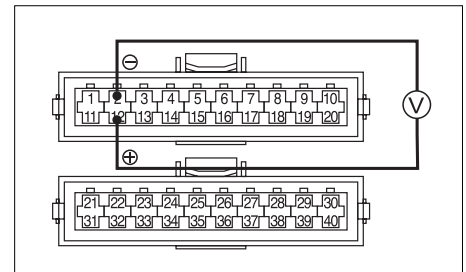
CHECKING FOR A FAULT CODE BY OXYGEN(O₂)SENSOR LAMBDA SIGNAL

1) Turn off the ignition key

2) Check the O₂(oxygen) coupler is loose, or bad.

If there is no defect, measure the input voltage of O₂(oxygen)

3) The wire-harness to check the ECU is connected to the ECU with a coupler. refer to the ECU assembly/disassembly.



4) Turn on the ignition key

5) Measure the oxygen(O₂)sensor voltage of wire harness to check ECU.

- Measuring terminal: ⊕ ECU No.12(V :VIOLET)
~ ⊖ ECU No.2(V/B:VIOLET/BLACK)
- Output voltage of oxygen(O₂) sensor : 0.1~0.8[V]

※ Remark : Measuring unit of voltage : Voltage[V]

Assembly of oxygen(O₂)sensor : 4.08 ~ 6.12[kgf • m]

If the measured voltage is normal,

- Check the 'B/R' electric wire, 'V' electric wire, 'V/B' electric wire to see if they have been broken or have short- circuited if there is a bad contact of terminal No. 2, No. 12 of ECU coupler.
- If there is no problem in wires, ECU is broken.
- Replace the ECU with new one, and recheck it.

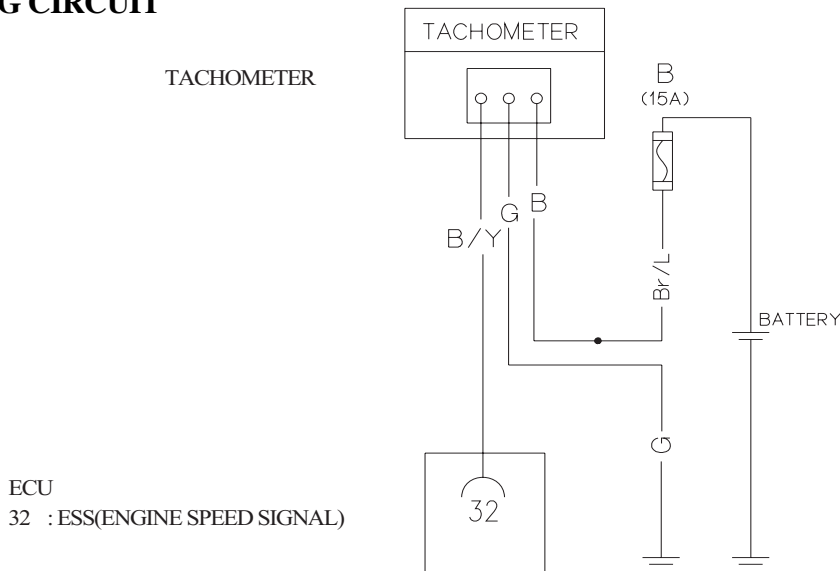
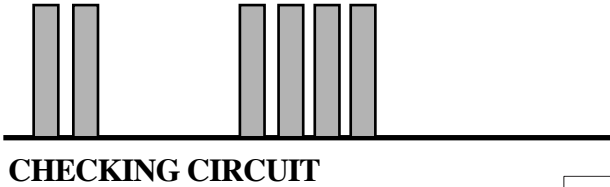
If the measured voltage is abnormal,

- Check the 'V' electric wire, 'V/B' electric wire, 'W/B' electric wire to see if they have been broken or have short- circuited.

6) After fault repaired, To erase the memorized fault code in the ECU is refer to how to remove the fault code(5-11)

CHECKING OF ENGINE SPEED SIGNAL(ESS)CIRCUIT

- Fault code number is displayed by MIL



• CHECK PROCEDURE

- 1) Turn off the ignition key
- 2) Check the ESS coupler is loose or bad.
If there is no problem, check the resistance of tachometer
- 3) If the resistance and continuity is normal, connect the tachometer coupler.
- 4) Turn on the ignition key
- 5) Measure the voltage of tachometer of wireharness for checking ECU.

- Measuring terminal: $\oplus$ B electric wire $\sim$ $\ominus$ G electric wire $\Rightarrow$ Output Voltage: battery voltage
- Measuring terminal: ECU No. 32(B/Y: BLACK/YELLOW) $\sim$ $\ominus$ G electric wire $\Rightarrow$ Output voltage: 9[V]~15[V]
- Measuring terminal: ECU No. 32(B/Y: BLACK/YELLOW) $\sim$ $\ominus$ G
Measuring the output voltage of electric wire, using the PVA(peak voltage adapter) multi-tester tool.

※Remark : Measuring unit of voltage : Voltage[V]



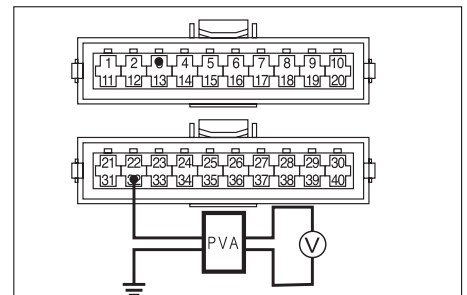
If the measured voltage is normal,

- Check the 'B/Y' electric wire, 'B' electric wire, 'G' electric wire to see if they have been broken or have short- circuited if there is a bad contact of terminal No. 32 of ECU coupler.
- If there is no problem in wires, ECU has is broken.
- Replace the ECU with new one, and recheck it.

If the measured voltage is abnormal,

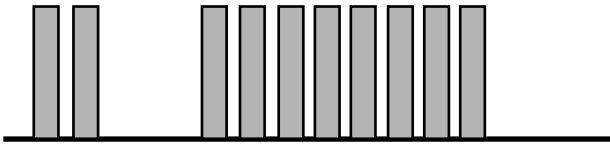
- Check the 'B/Y' electric wire, 'B' electric wire, 'G' electric wire to see if they have been broken or have short- circuited.

- 6) After repairing fault, to erase the memorized fault code in the ECU, refer to how to remove the fault codes(5-11)

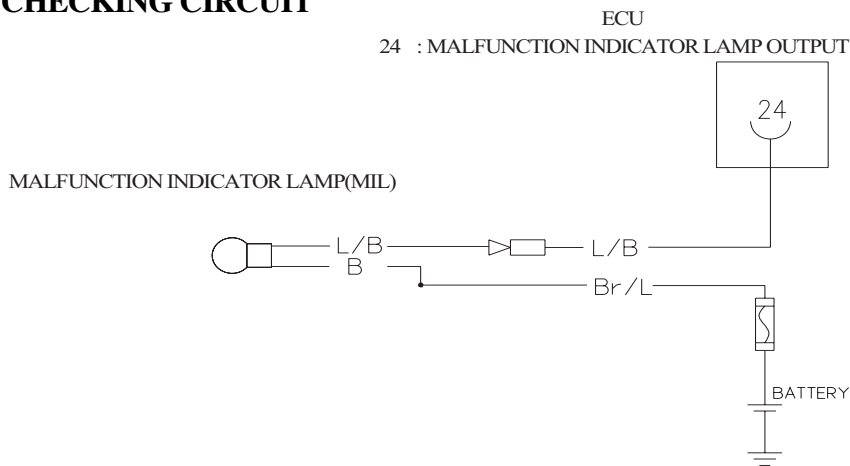


CHECKING OF MIL(MALFUNCTION INDICATOR LAMP)CIRCUIT

- Fault code number is displayed by MIL



CHECKING CIRCUIT



• CHECK PROCEDURE

- 1) Turn off ignition key.
- 2) Check the ESS coupler is loose, or bad.
If there is no problem.
- 3) Turn on the ignition key.
- 4) Check the MIL on for 3 seconds when turn on the ignition key at the same time.
 - If there is no lighting, check the Lamp.
 - But If the Lamp is working for 3 second,
- 5) Measure the MIL voltage of wire harness to check ECU.
 - Measuring terminal : $\oplus$ B electric wire $\sim \ominus$ EARTH $\Rightarrow$ Output Voltage: battery voltage
 - Measuring terminal : $\oplus$ ECU No.24(L/B :BLUE /BLACK) $\sim \ominus$ EARTH $\Rightarrow$ Output voltage: battery voltage

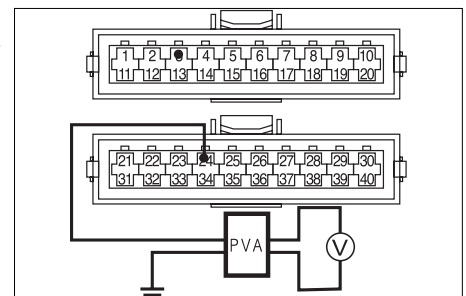
※Remarks : Measuring unit of voltage : Voltage[V]

If the measured voltage is normal,

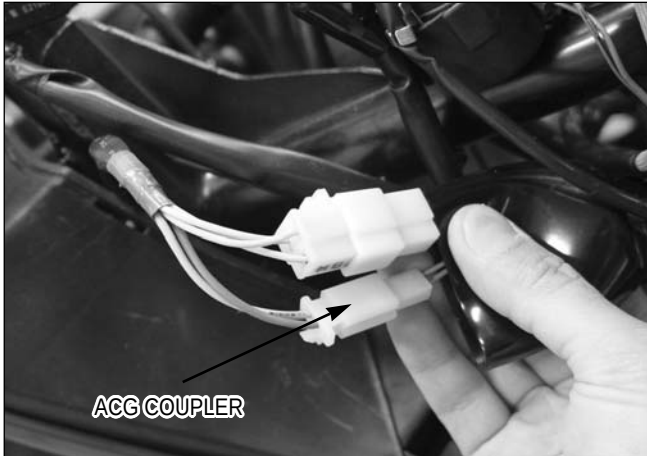
- Check the 'L/B' electric wire, 'B' electric wire, 'Br/L' electric wire to see if they have been broken or have short-circuited if there is a bad contact of terminal No. 24 of ECU coupler.
- If there is no problem in wires, ECU has is broken.
- Replace the ECU with new one, and rechecks it.

If the measured voltage is abnormal,

- Check the 'L/B' electric wire, 'B' electric wire, 'Br/L' electric wire to see if they have been broken or have short-circuited.



- 6) After fault repaired, To erase the memorized fault code in the ECU is refer to how to remove the fault code(5-11)



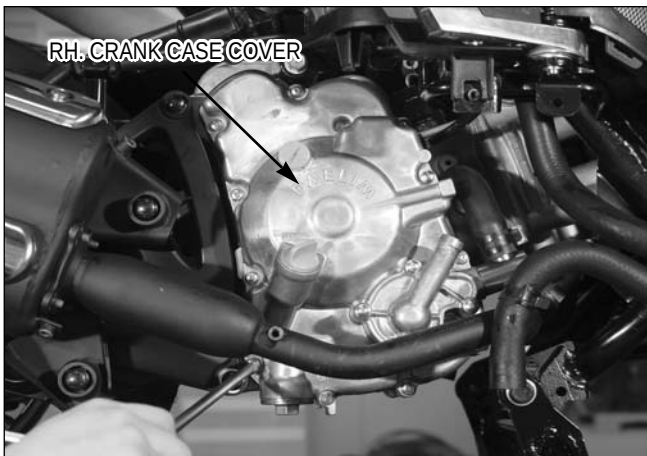
CKP(CRANK POSITION SENSOR)

- Remove the luggage box
- Remove ACG(crank position sensor) coupler

CAUTION

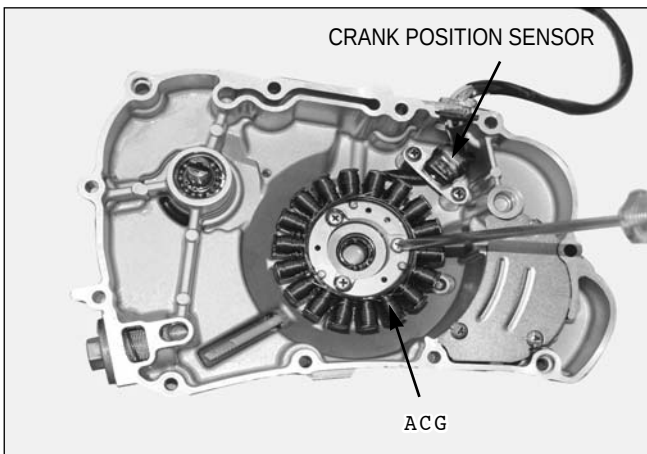
- The ignition key shall be 'OFF' before disassembly

5

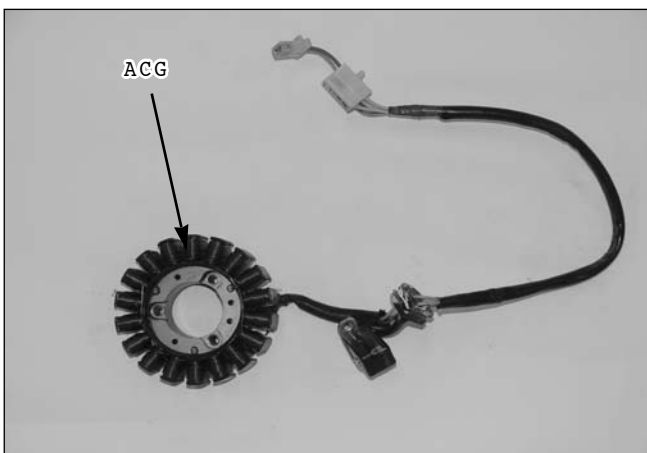


DISASSEMBLY

- Drain the cooling water and engine oil
- Disassemble RH. Crank case cover



- Untie 3 stator screws
- Untie 2 CKP(Crank position sensor) screws



- Check ACG stator and crank position sesnsor

CAUTION

- Take precaution not to use the stator comp(18 terminals) like the carburetor type stator.



- Check the fly wheel.
- Fly wheel for the EMS system have 10 spots on the fly wheel protrusion. It is different with carburetor type.
- Check the mark or contamination on the protrusion.

CAUTION

- When replace the fly wheel, check the 10 spots of protrusion part.



ASSEMBLY

- Assembly is the reverse order of removal.



MEASUREMENT RESISTANCE

- Disassemble AC. Generator coupler
- Measure the resistance between G and L.
STANDARD : 80~150Ω(20°C)

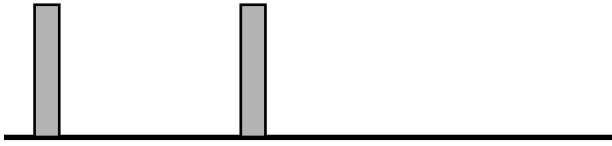


MEASUREMENT PVA

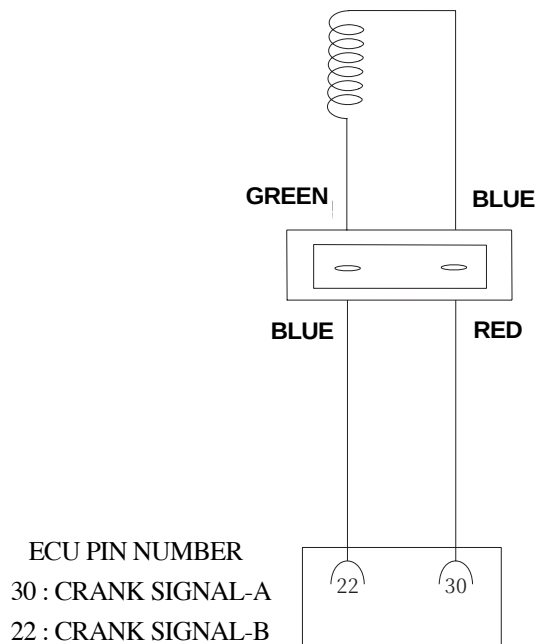
- Disconnect the ACG (L/G) connector.
- Connect the (+)cord of PVA tester to the green terminal or ground wire.
- Connect the (-)cord of PVA tester to the blue terminal.
- Crank the engine with the starter motor and measure the peak voltage of crank position sensor coil.
- HIGHEST VOLTAGE : 1.5V Over.
TOOL : PVA Multy tester.
- Assembly is the reverse order of removal.

CHECK THE CIRCUIT OF CKP

- Fault code number is displayed by MIL



CHECKING CIRCUIT



• CHECK PROCEDURE

- 1) Turn ON ignition key.
- 2) Check to see if the ENGINE SINK ON is ON or OFF with diagnosis tool.
 - When start up the ENGINE SINK ON change “OFF” to “ON”, it’s okay.
 - Check if ENGINE SINK ON is OFF while start up.
 - Remove the A.C. generator.
 - If there are over 10 spots on the flywheel protrusion, replace it.
 - Check the CKP is working or NOT (metal residue)
- 3) Turn OFF ignition key, check the breaking of A.C GEN CKP.
 - Check the A.C. GEN CKP resistance.
 - measuring resistance : 80 ~ 150[Ω]

Before starting

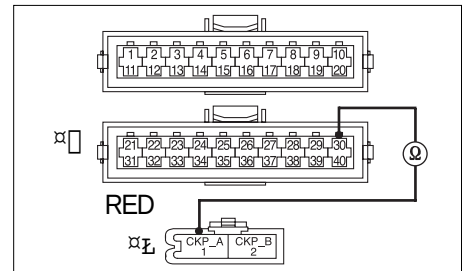
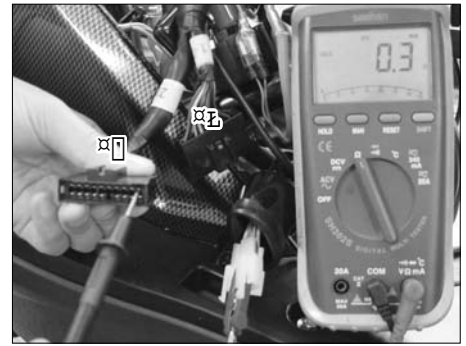
1.2 서비스 데이터 14/25	
엔진싱크ON	OFF
스로틀포지션단힘	ON
연료공급차단	OFF
산소센서활성화	OFF
연료분사시간	0.0 mS
연료분사시기	-150. °
점화각	7.5 °
드웰타임	6.0 mS
고정	전체 라인 도움

After starting

1.2 서비스 데이터 14/25	
엔진싱크ON	ON
스로틀포지션단힘	ON
연료공급차단	OFF
산소센서활성화	OFF
연료분사시간	3.4 mS
연료분사시기	322.5°
점화각	12.2 °
드웰타임	2.4 mS
고정	전체 라인 도움

4) Check if crank signal A,B wires is breaks or not.

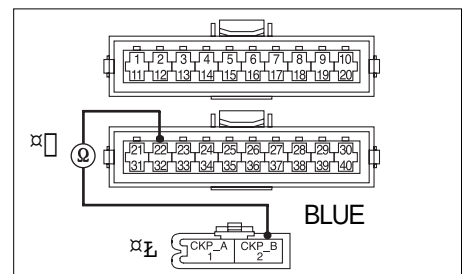
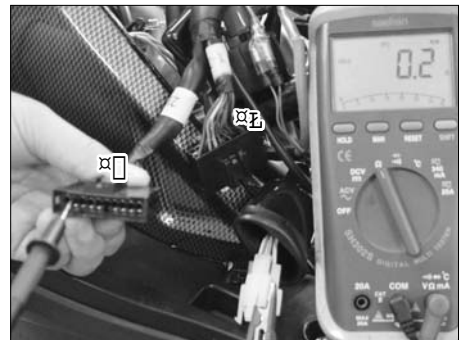
- Remove the ECU, connect wire harness for inspection to wire harness of vehicle.
- Check the wiring of crank signal A
 - Measure terminal : No. 30 pin of wire harness for inspection - Red wire of coupler of CKP.
 - Measuring resistance : $0 \sim 1[\Omega]$

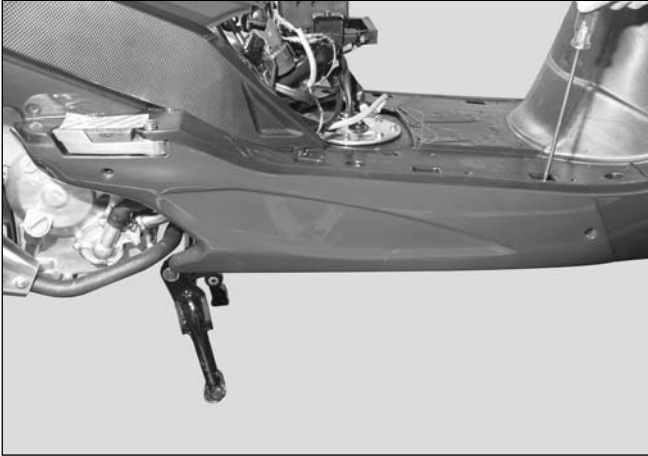


• Check the wiring of crank signal B

- Measure terminal : No. 22 pin of wire harness for inspection - Blue wire of coupler of CKP.
- Measuring resistance : $0 \sim 1[\Omega]$

5) After fault repaired, to erase the memorized fault code in the ECU is refer to how to remove the fault code.(5-11)





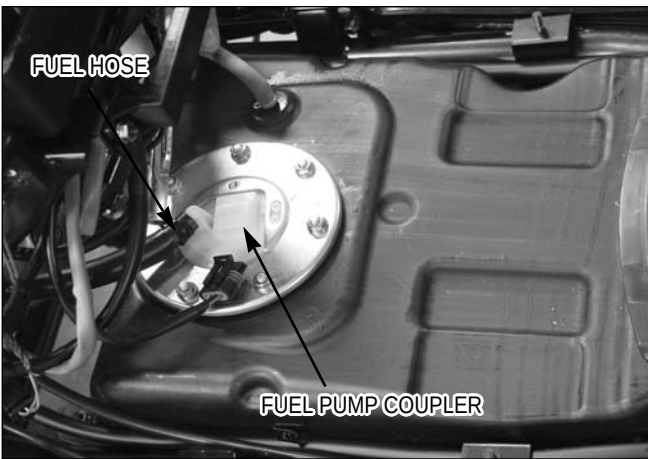
FUEL PUMP

- The fuel pump is located inside fuel tank
- Disassemble center cover

CAUTION

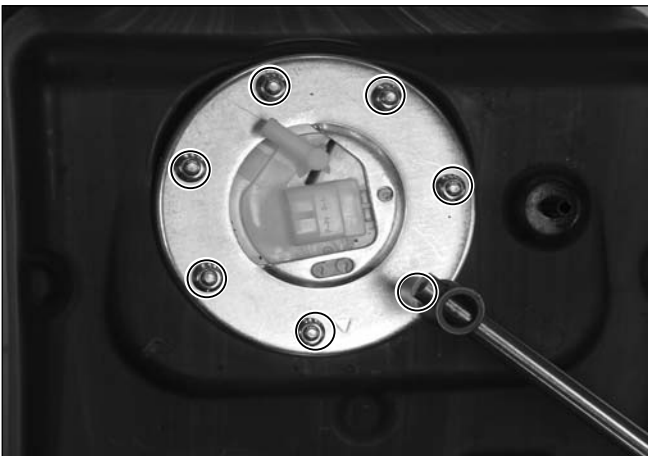
- The ignition key shall be 'OFF' before disassembly.

5

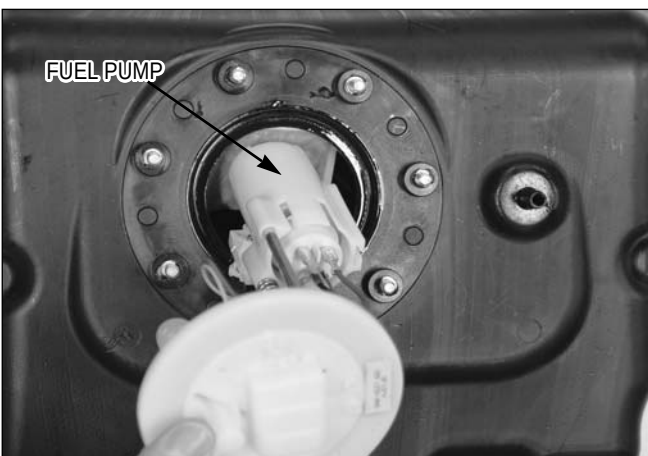


DISASSEMBLY

- Disassemble fuel tube
- Disassemble fuel pump coupler



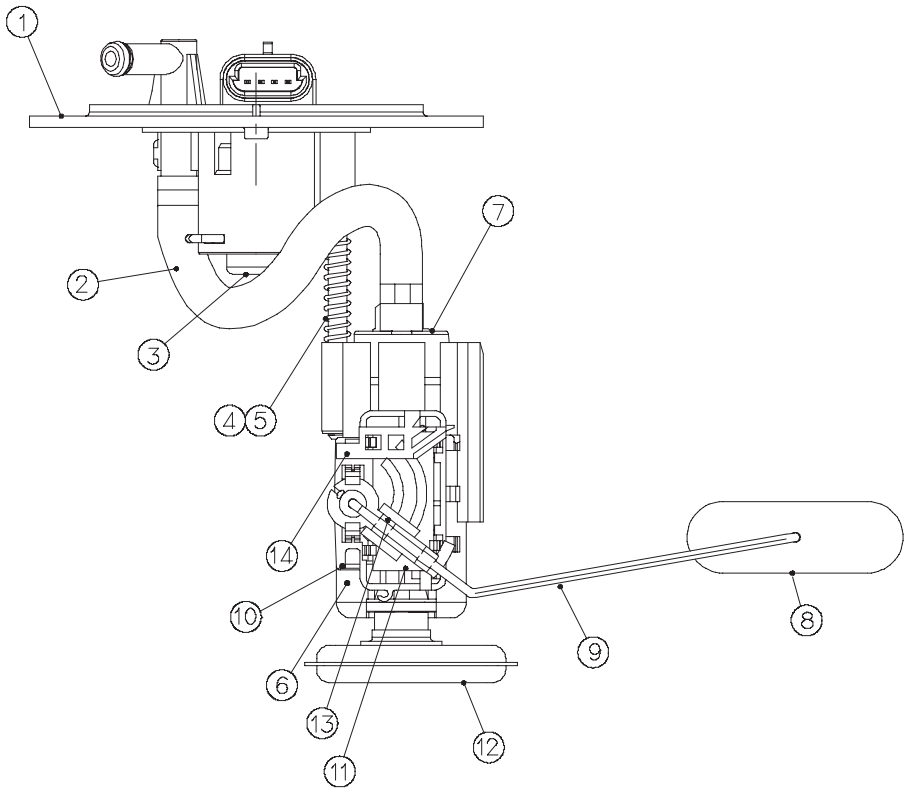
- Untie 7 flange nuts and disassemble fuel pump



- Disassemble fuel pump
- Check fuel pump

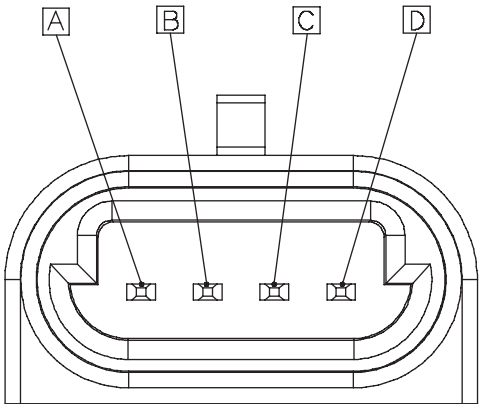
CHECK FUEL PUMP

5



NO	PARTS NAME	NO	PARTS NAME
1	FLANGE ASS' Y	8	FLOAT
2	CONVOLUTED HOSE	9	FLOAT WIRE
3	PRESSURE REGULATOR	10	RESISTOR CARD BODY
4	SUPPORT BA	11	RESISTER CARD
5	SPRING BOTTOM REF.	12	PRIMARY STRAINER
6	PUMP RETAINER	13	CONTACT PLATE
7	FUEL PUMP	14	STOPPER

- The terminal arrangement of the fuel pump
(The following color chart is the internal color of the fuel pump)



CONNECTOR WIRING		
LOCATION	FUNCTION	COLOR
A	LEVEL SENDER (UNIT 1)	YELLOW
B	LEVEL SENDER (UNIT 2)	BLUE
C	PUMP (+)	RED
D	GROUND	BLACK

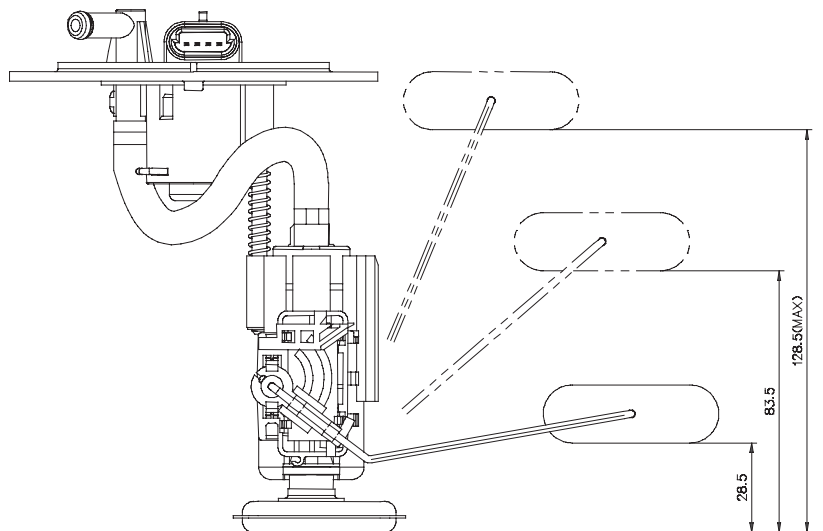
- Measure the resistance between terminals.

Float position	Resistance between terminals [Ω]
F : 128.5[mm]	$40 \pm 5[\Omega]$
1/2 : 83.5[mm]	$220 \pm 5[\Omega]$
E : 28.5[mm]	$400 \pm 3[\Omega]$

- The float position is based on tank bottom plate.
- Measure the resistance between Y/W (YELLOW/WHITE) wire and G(GROUND) wire of fuel unit terminal

※ Remark : measuring unit of resistance : resistance[Ω]

- If the measured resistance value is out of standard at float position, replace the fuel unit.



CHECK THE BLOW PRESSURE OF FUEL PUMP

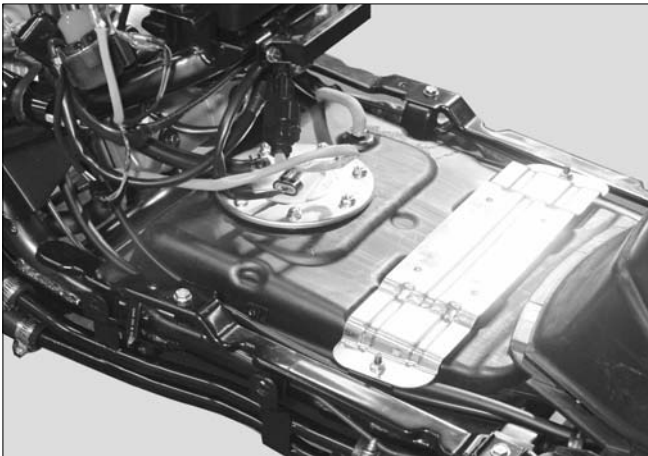
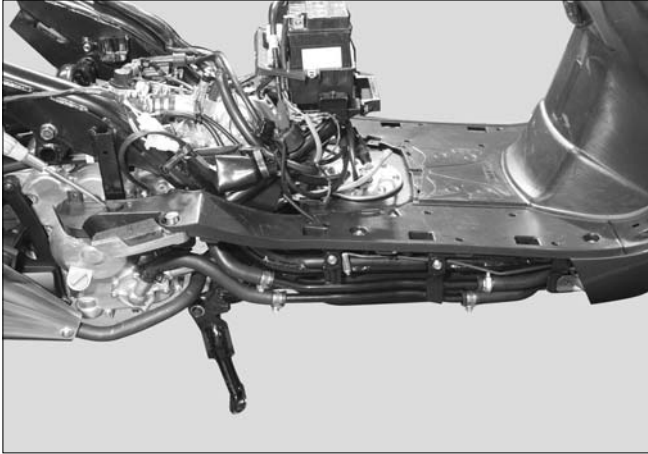
- Blow pressure : 3.8 Bar
- After remove fuel tube from the injector, turn the ignition key ON/OFF 3 times, when the fuel come out about 130cc over, it's Okay.

If under 130cc, check the fuel pump. Replace it if necessary.

(Be sure to the resistance of battery is over 12.6V)

ASSEMBLY

- Assembly is the reverse order of removal.



FUEL TANK

DISASSEMBLY

CAUTION

- Gasoline is very volatile, then during repairing, caution inflammables or use of fire strictly prohibited. Also, evaporated gasoline may cause explosion then repairing shall be recommendable in the place having good air circulation.

- Disassemble the following parts
 - luggage box
 - body cover
 - floor panel
 - inner box
- Untie 4 flange nuts installed at fuel tank
- Disassemble the fuel pump coupler
- Disassemble fuel hose and breather tube.

- Disassemble fuel tank
- Disassemble tube clip in fuel supply tube and separate it from fuel tank
- Check fuel tank. If it damaged, replace with the new one.

Capacity of fuel tank : 11.5 L

Reserve capacity(capacity of caution lamp) : 1.9 L

ASSEMBLY

- Assemble in the reverse order of disassembly
- After assembly, check whether gasoline leaks out or not.

MEMO

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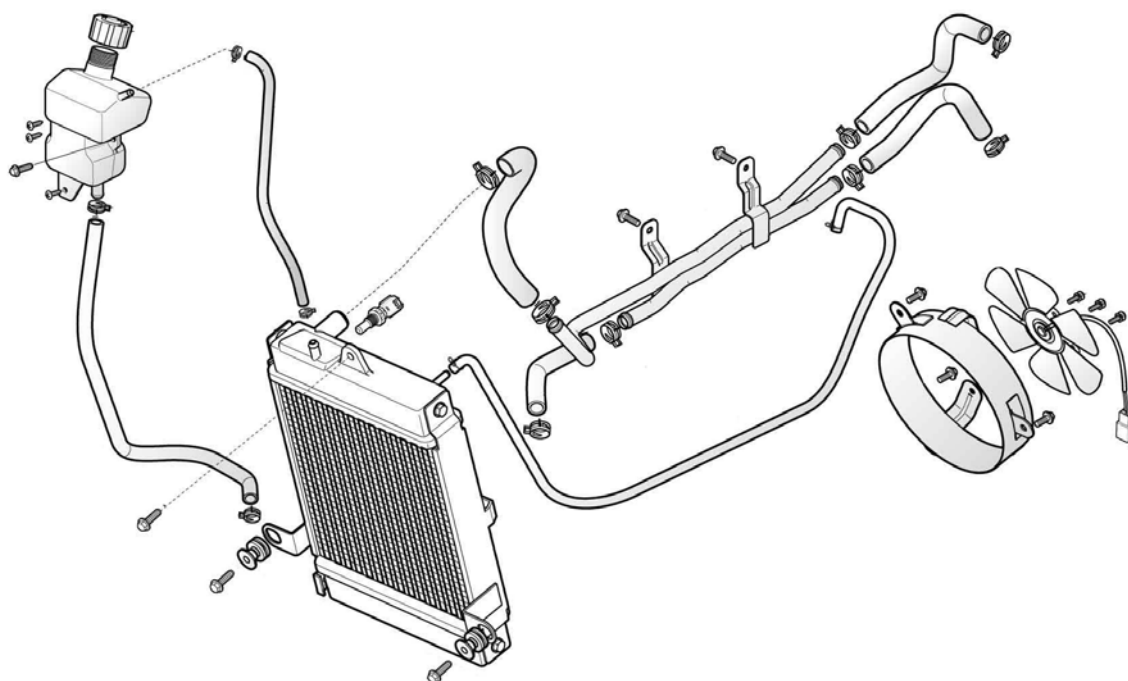
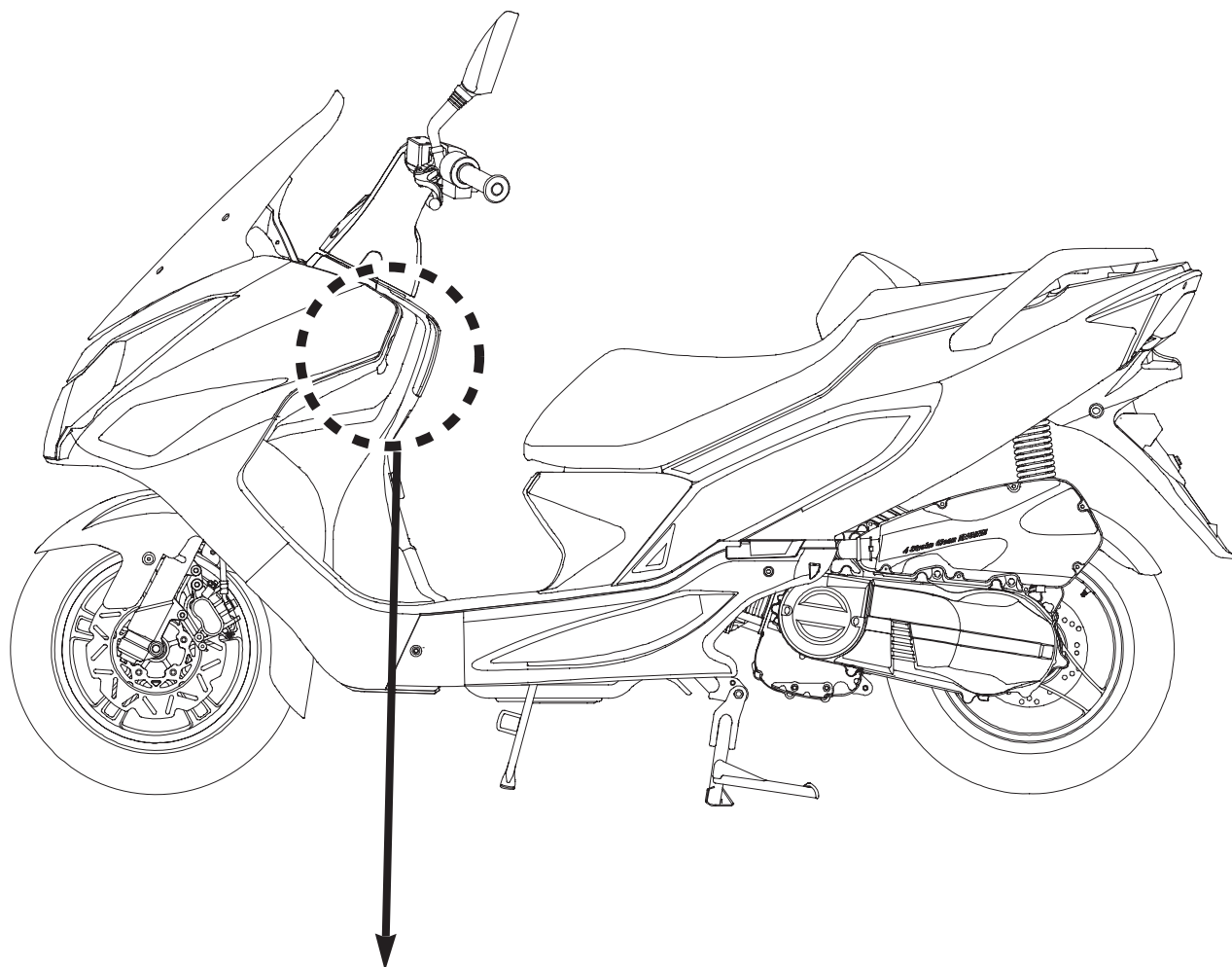
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6



6. COOLING SYSTEM

SERVICE INFORMATION . . . 6-1	WATER PUMP 6-7
TROUBLE SHOOTING . . . 6-2	WATER DAMPER GAUGE . . 6-11
COOLANT 6-3	THERMOSTAT ASS'Y . . . 6-12
RADIATOR 6-4	

SERVICE INFORMATION

CAUTION

- Do not remove radiator cap if the temperature of coolant may over 100°C, it is very dangerous removing the cap while the engine is hot and the coolant is under pressure may cause serious scalding. Then if the temperature decrease, open with care by wrapping it with piece of cloth.
- The repairing of cooling system shall be done at cooling time.
- Cooling liquid is toxic, keep it away from skin, eyes and cloths.
 - If any coolant gets on your skins or cloths, rinse thoroughly with soap and water.
 - If any coolant gets in your eyes, rinse them with water and consults a doctor immediately
 - If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
 - Especially pay attention to reserve the coolant. Keep out of reach of children.

- Do not remove the radiator cap, except to refill or drain the cooling system after servicing the cooling system.
- Avoid spilling coolant on painted surfaces, if contaminated, do wash in water immediately.
- After disassembling or servicing the cooling system, check for leaks with a radiator cap tester(sale at a market)

SPECIFICATIONS

ITEM		STANDARD VALUES	REMARKS
RADIATOR CAP RELIEF PRESSURE		0.9±0.15kg/cm ²	
THERMOSTAT TEMPERATURE	BEGIN TO OPEN	80±2°C	
	FULLY OPENED	90±3°C	
	VALVE LIFT	3.5~4.5mm	
COOLANT CAPACITY		Full : 1,500cc	

TORQUE

WATER PUMP IMPELLER : 1.0~1.4 kgf · m

WATER PUMP COVER BOLT : 1.0~1.2kgf · m

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature gauge or thermo sensor
- Air in cooling system
- Faulty thermostat stuck (Thermostat stuck closed)
- Passages blocked in radiator, hoses or water jacket
- Faulty fan motor switch
- Faulty water pump

6

Engine temperature too low or unstable

- Faulty temperature gauge or thermo sensor
- Faulty thermostat stuck (Thermostat stuck open)
- Faulty fan motor switch

Coolant leaks

- Faulty water pump mechanical seal
- Damaged or deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated gasket
- Loose hose connection or clamp

COOLANT

COOLANT INSPECTION

- Radiator coolant mixes the distilled water.
- Standard consistently : 30~50%

NOTE

- Coolant mixes the light water and radiator liquid about 5°C of tolerance in respect to the minimum temperature.

WARNING

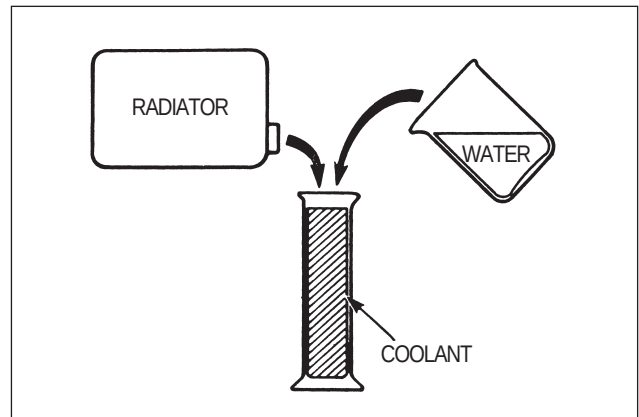
- Radiator coolant is toxic. Keep it away from skin, eyes and clothes.
 - If any coolant gets on your skin or clothes, rinse thoroughly with soap and water.
 - If any coolant gets in your eyes, rinse them with water and consults a doctor immediately.
 - If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
 - Especially pay attention to reserve the coolant. Keep out of reach of children.

COOLING SYSTEM INSPECTION

SPECIFIC GRAVITY TEST OF COOLANT

NOTE

- Follow the hydrometer manufacturer's instructions.
- Check the coolant specific gravity using a hydrometer.
- Check the contamination of the coolant.

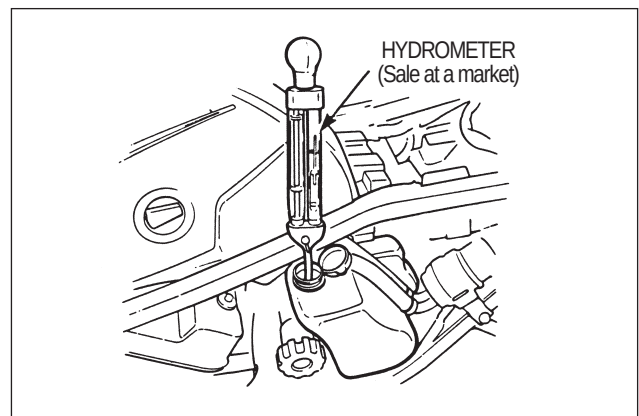


RADIATOR COOLANT MIXTURE CHART (ANTICORROSIVE AND ANTIFREEZE)

When the whole capacity of coolant is 2000cc

(Unit:cc)

Minimum temperature	Mixture	Ratio	Distilled water
-9°C	20%	400	1,600
-16°C	30%	600	1,400
-25°C	40%	800	1,200
-37°C	50%	1,000	1,000
-44.5°C	60%	1,100	900



COOLANT GRAVITY CHART

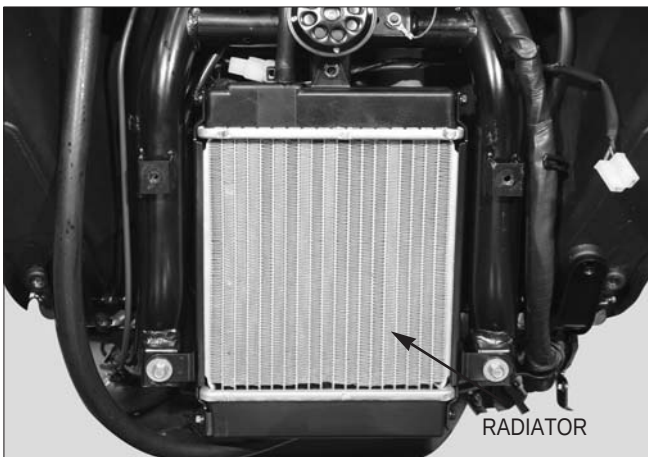
COOLANT TEMPERA- COOLANT RATIO%	0	5	10	15	20	25	30	35	40	45	50
5	1.009	1.009	1.008	1.009	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30	1.053	1.052	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071



RADIATOR

CHECKING RADIATOR

- Disassemble front under cover A
- Disassemble front under cover B



- Check leakage from the depths and welding points of radiator.

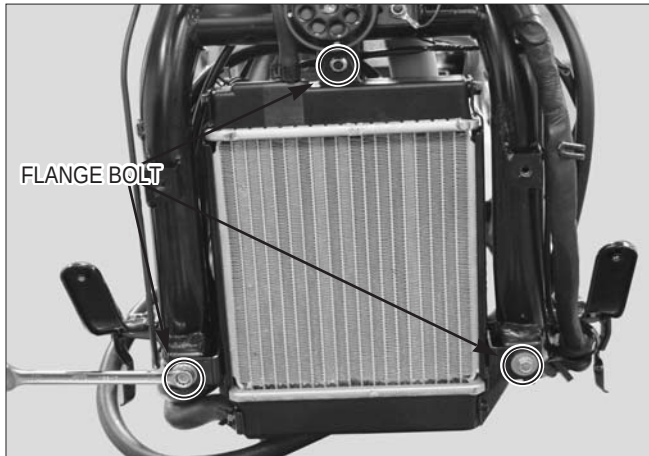


DISASSEMBLY

- Drain cooling water



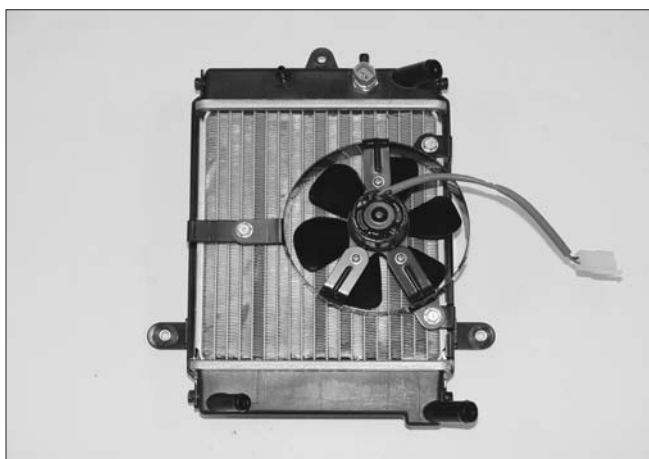
- Disassemble reserve tank cap



- Untie 3 flange bolts installed at radiator



- Disassemble inner box
- Disassemble fan motor coupler
- Disassemble radiator fan thermo switch coupler
- Disassemble water hose B,C
- Disassemble water path tube ass'y and water path tube B



- Disassemble radiator comp

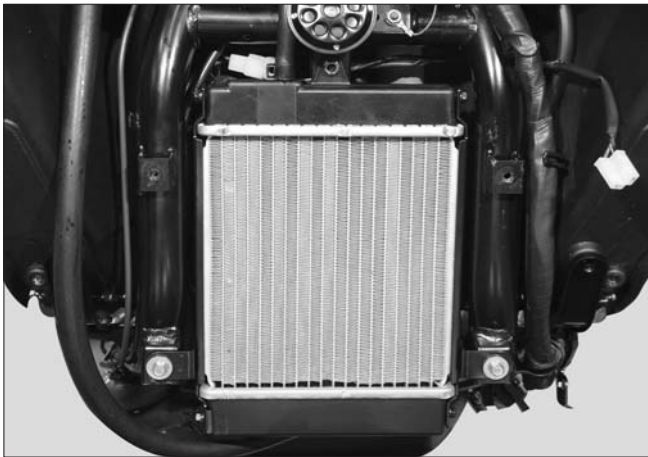


- Disassemble fan motor
- Check whether fan motor rotates or not by connecting with battery



CHECK RADIATOR FAN THERMO SWITCH

- Check radiator fan thermo switch.
- If the temperature of cooling water is over 87°C, Resistance value : 0~1 Ω (open)



ASSEMBLY OF RADIATOR

- Assemble 3 flange bolts



- Assemble radiator B,C
- Assemble radiator fan thermo switch and fan motor coupler
- Assemble water path tube



- Put into cooling water

CAUTION

- Replenish fully cooling water to the entrance of inlet.

- Do snapping 3~4 times by idling the engine for a few minutes and pull out air in cooling system
- By checking the capacity of cooling water in reserve tank, if insufficient, replenish cooling water to the upper limit.



- Disassemble inner box
- Assemble front under cover A,B



WATER PUMP

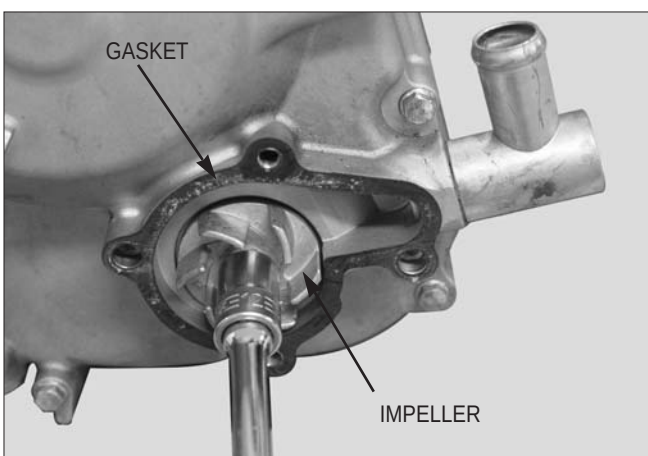
CHECK WATER SEAL

- Check at checking hole whether cooling water leaks or not from mechanical seal
- If cooling water leaks from mechanical seal, disassemble water pump body and check mechanical seal, replace.



WATER PUMP / IMPELLER DISASSEMBLE

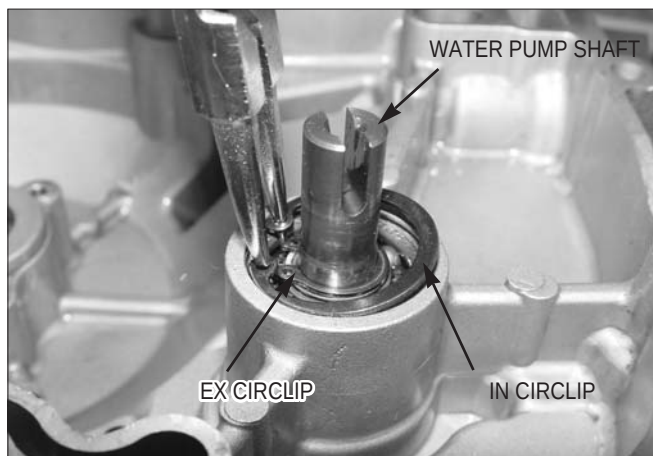
- Pull out cooling water
- Untie 3 flange bolts installed at water pump cover
- Disassemble radiator hose



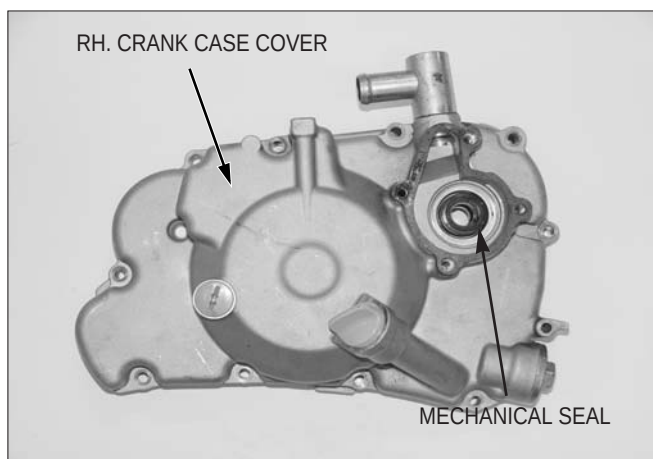
- Disassemble water pump impeller

CAUTION

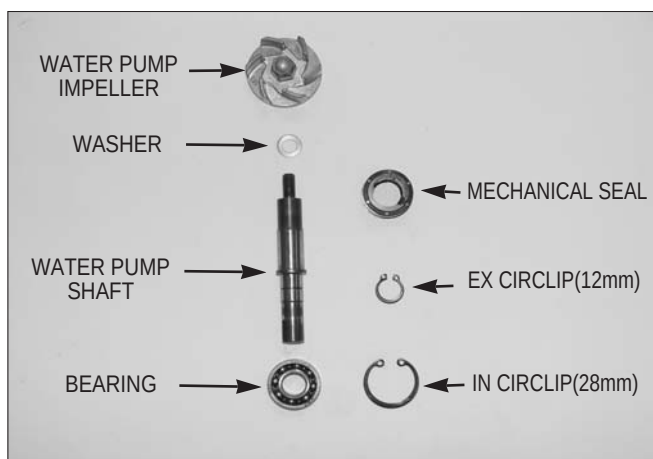
- Because impeller is left-handed screw, untie to the reverse way of clockwise rotation



- Disassemble IN, EX cir clips
- Disassemble water pump shaft



- Disassemble mechanical seal



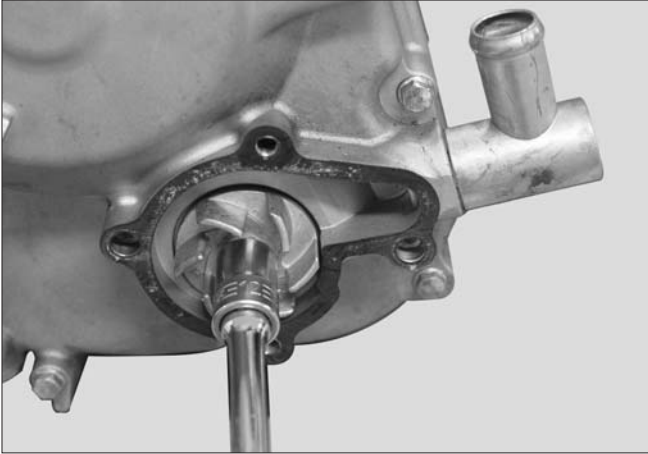
- Check about the abrasion and damage of mechanical seal
- Inspect shaft, bearing

CAUTION

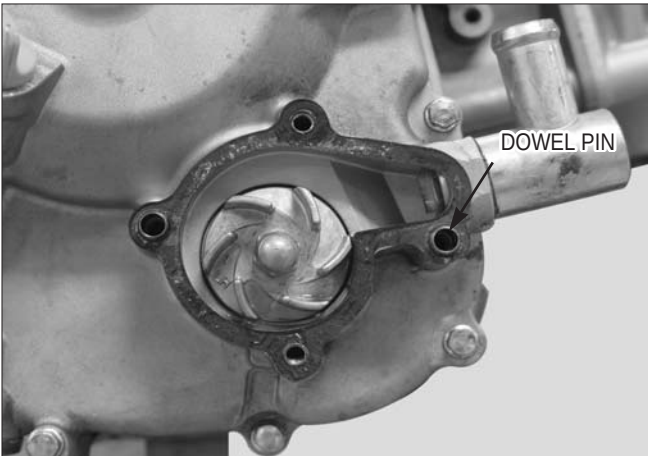
- Assemble mechanical seal
- Assemble bearing and shaft and IN, EX circlips



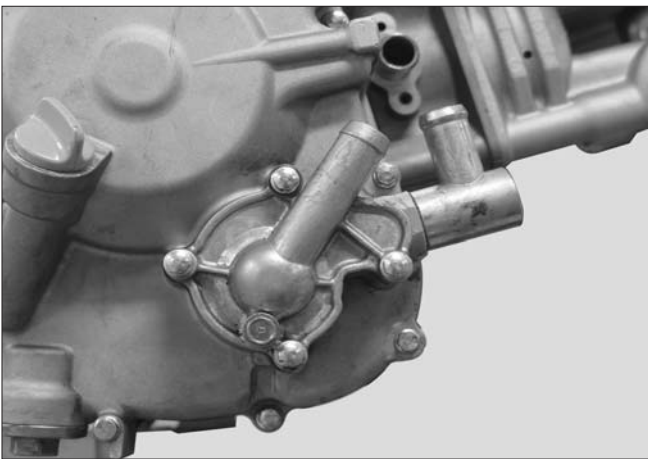
- Assemble mechanical seal
- Assemble bearing and shaft and IN, EX circlips



- Assemble impeller



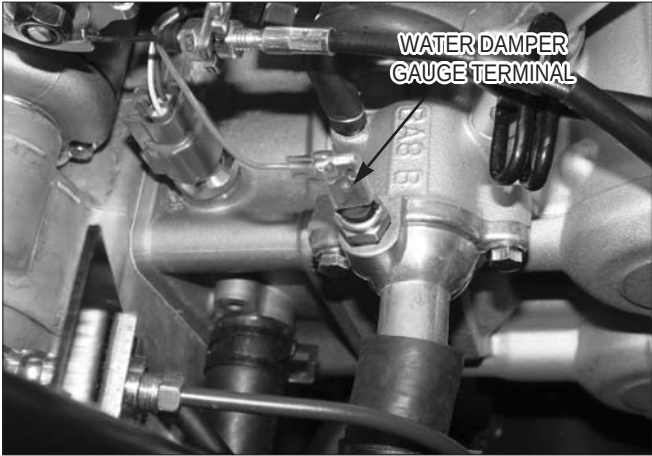
- Assemble new gasket and dowel pins



- Assemble water pump cover
- Replenish cooling water



- Check whether cooling water leaks or not

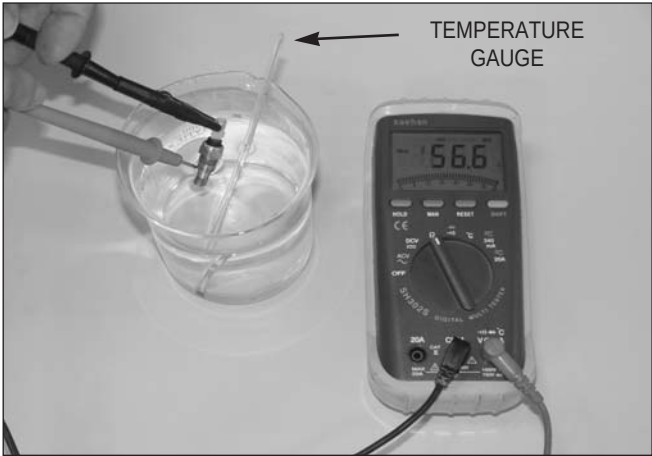


WATER TEMPERATURE GAUGE

- Disassemble terminal of water temperature gauge



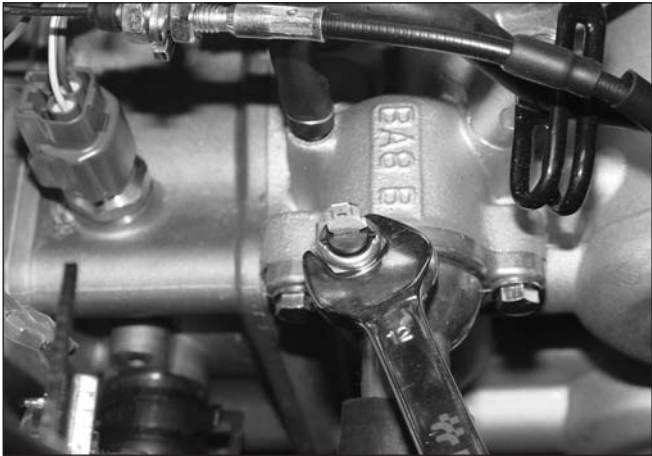
- Disassemble water temperature gauge



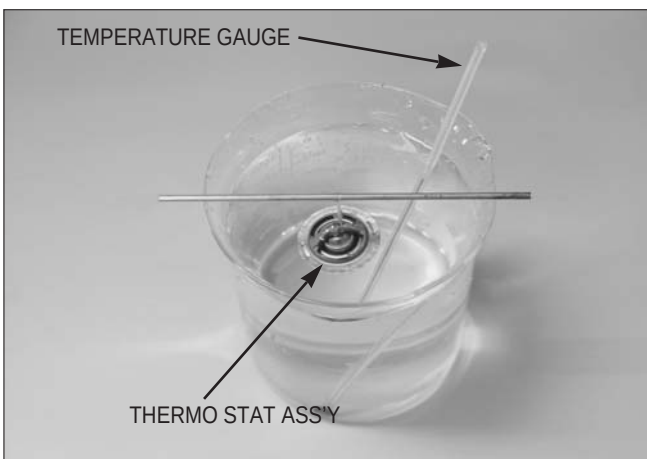
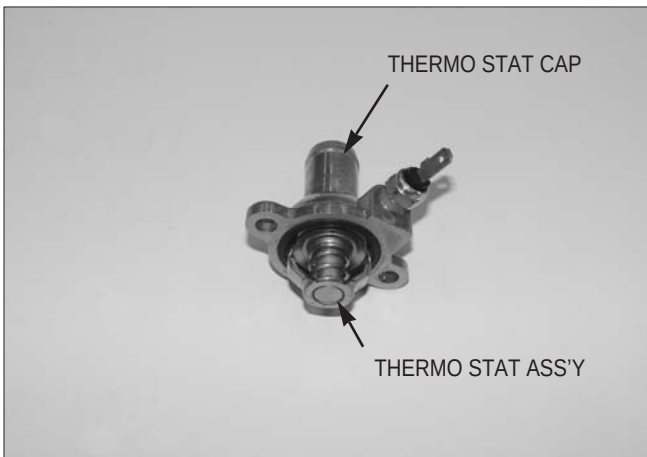
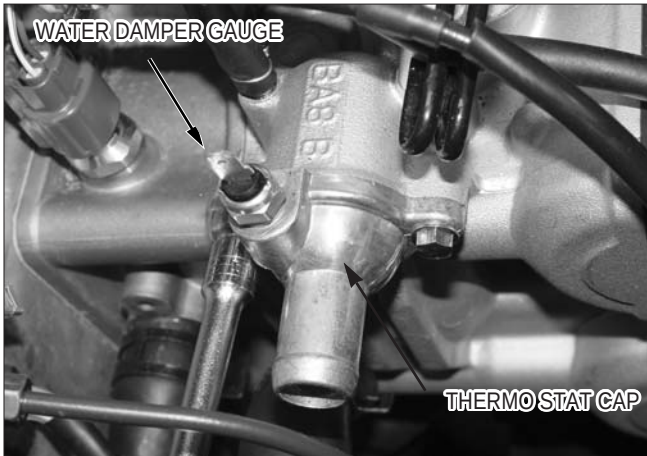
CHECK WATER TEMPERATURE GAUGE

- Pull water temperature gauge into water, heat water and measure the resistance

TEMPERATURE(°C)	50	80	100	120
RESISTANCE(Ω)	154	52	27	16



- Apply waterproof agent and assemble water temperature gauge.
- Connect the terminal of water temperature gauge



THERMO STAT

DISASSEMBLY OF THERMO STAT

- Disassemble thermo stat and water hose
- Untie 2 bolts and disassemble thermo stat cap

- Disassemble thermostat from thermostat cap

CHECK THERMOSTAT

- Put thermostat into water of test vessel and increase water temperature, check the temperature at the time of opening of thermostat.

OPEN(TO BEGIN)	$80 \pm 2^{\circ}\text{C}$
FULLY OPENED	$90 \pm 3^{\circ}\text{C}$
VALVE LIFT	3.5~4.5mm

CAUTION

- Replace thermostat when it opens even a little at high temperature
- Because the size of thermostat is small then its opening may take late, check changing lift by obtaining 5 minutes before or after at opening temperature
- Be careful the thermostat, temperature gauge not to be touched to the bottom of vessel

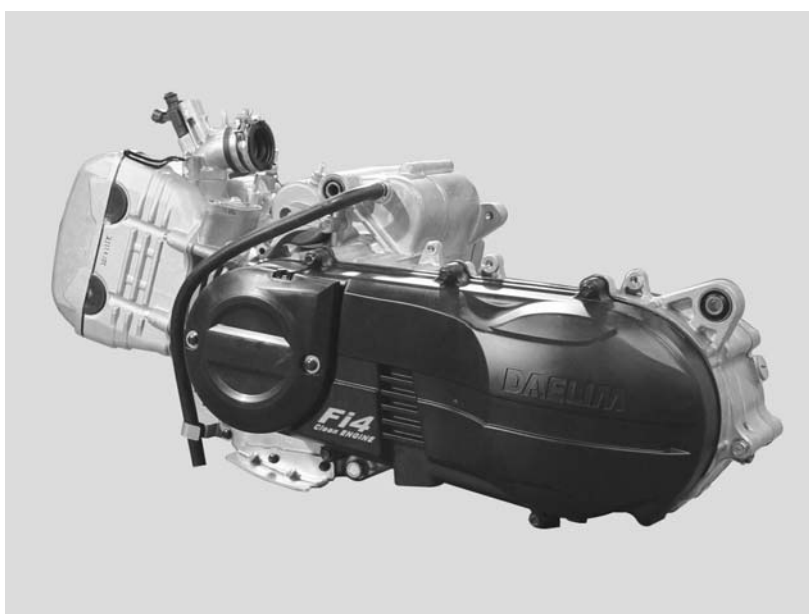
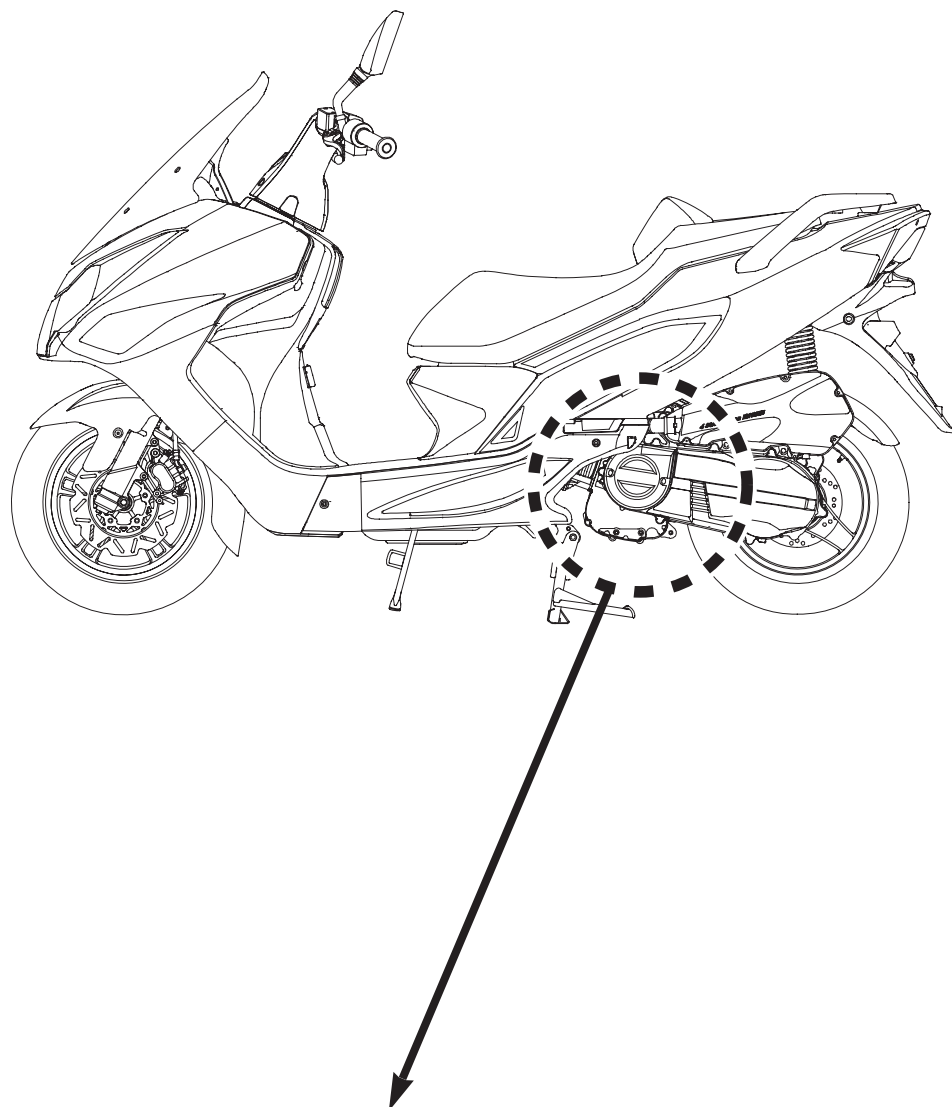
ASSEMBLY OF THERMOSTAT

- Assemble in the reverse order of disassembly

CAUTION

- At assembly, assemble for hole position of airvent is upward.

7



7. ENGINE DISASSEMBLY / ASSEMBLY

SERVICE INFORMATION 7-1

ENGINE ASSEMBLY 7-3

ENGINE DISASSEMBLY 7-2

SERVICE INFORMATION

CAUTION

7

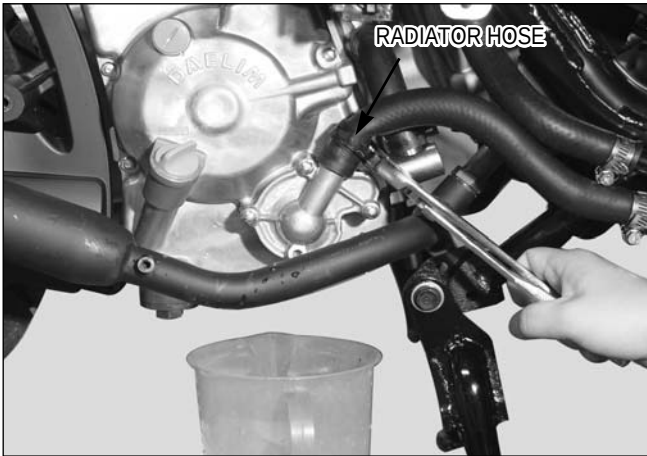
- Use a jack to remove or install the engine. Support the scooter with a jack firmly, taking precautions not to damage the frame, engine, cable or harness.
- Attach the tape to the frame to protect it during the engine removal or installation.
- The following works can be done without disassembly of the engine.
 - TRANSMISSION(⇒ chapter 12)
 - OIL PUMP(⇒ chapter 4)
 - AC. GENERATOR(⇒ chapter 9)
 - CVT(⇒chapter 8)
 - CYLINDER HEAD, CYLINDER, PISTON(⇒ chapter 10,11)
 - EX. MUFFLER(⇒ chapter 3)
 - THROTTLE BODY(⇒ chapter 5)
 - REAR SWING ARM(⇒ chapter 13)
- The following works is done after disassembly of the engine.
 - CRANKSHAFT, CRANKSHAFT BEARING, CRANK CASE BEARING
- The capacity of engine oil : 1.3L(at disassembly)

TORQUE VALUES :

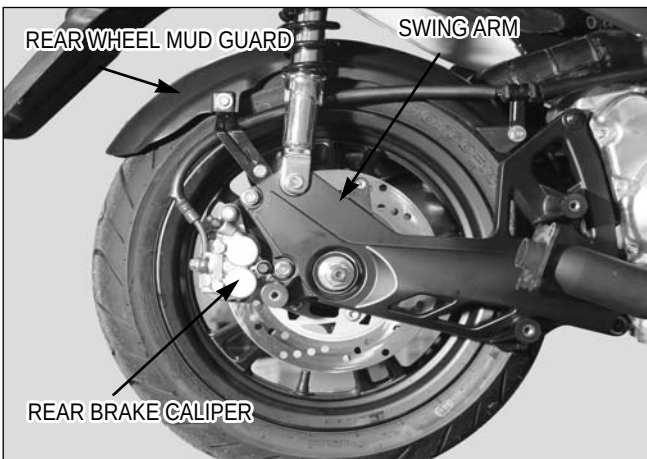
TORQUE(upper)	5.0~5.5kgf · m
(lower)	4.0~5.0kgf · m

ENGINE DIASSEMBLY

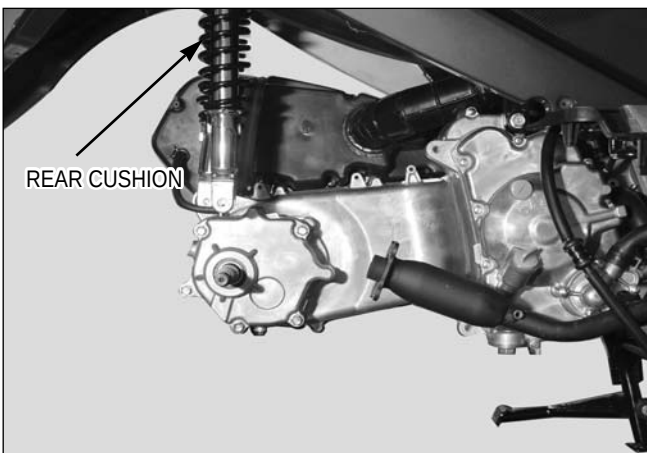
- Pull out the cooling water
- Disassemble the following parts
 - LUGGAGE BOX(⇒ 3-3)
 - CENTER COVER(⇒ 3-4)
- Disassemble the coupler connected to the wire harness of AC generator and the cable of starter motor.



- Disassemble the muffler(⇒ 3-10)



- Disassemble rear brake caliper(⇒ 15-8)
- Untie the under bolt installed at RH. Rear cushion.



- Disassemble rear swing arm
- Disassemble rear wheel mud guard.



- Disassemble TPS, ISA, Map sensor coupler
- Disassemble throttle body



- Disassemble air cleaner



- Untie LH. Rear cushion under bolt.
- Lift up slightly the rear part of frame, then pull out the flange bolt after assembling the engine hanger, disassemble the frame and engine.



ASSEMBLY OF ENGINE

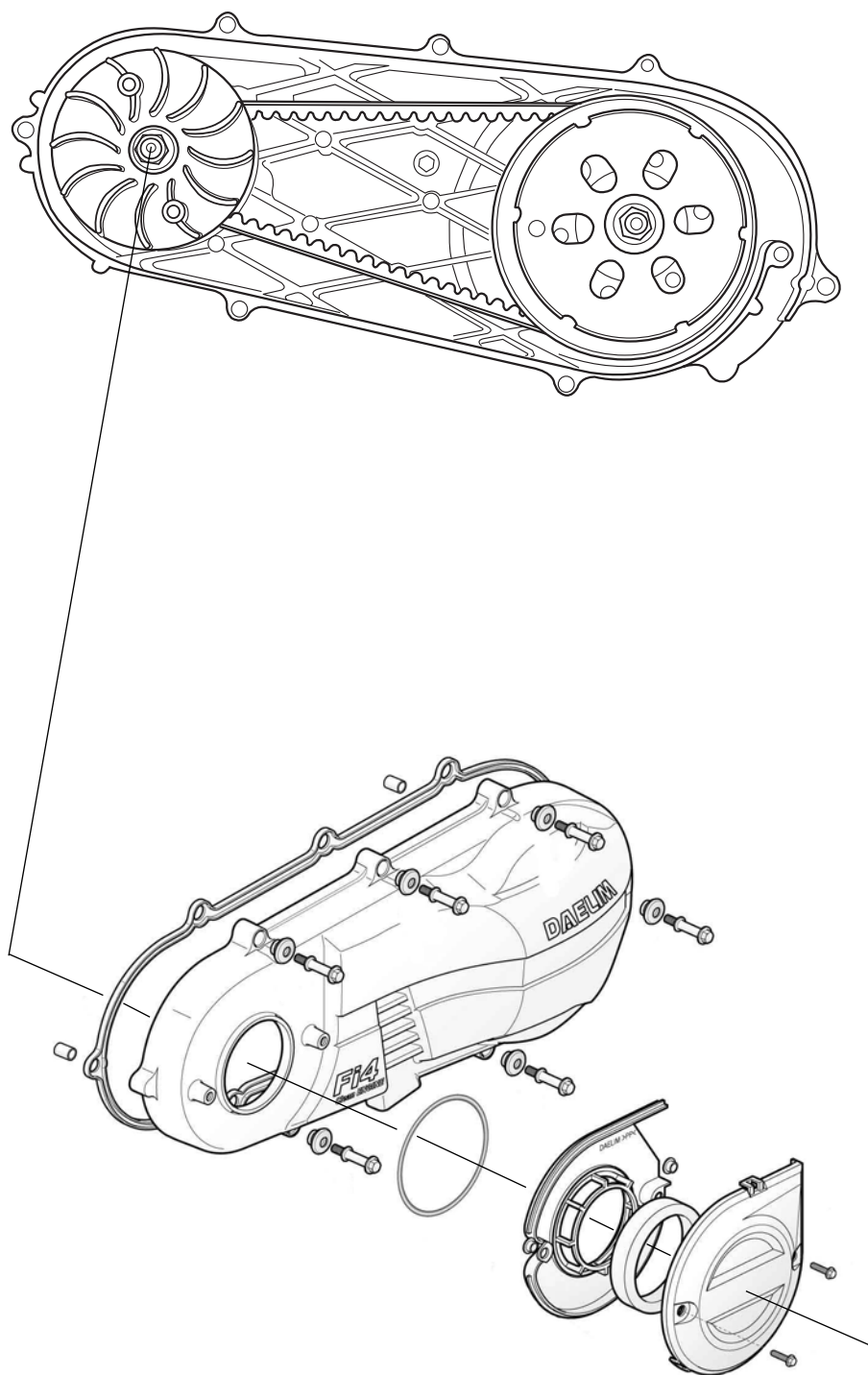
- Assemble in the reverse order of disassembly

CAUTION

- Be careful for wires, cables not to be damaged.
- Be careful for the screws or bolts not to be damaged
- Cables, tube and wires shall be placed at right positions.

TORQUE : Engine hanger bolt : 4.5 N·m

- Check the followings after assembly of engine
 - ENGINE OIL, COOLING WATER
 - Checking the electrical parts



8. LH. CRANK CASE COVER /BELT TYPE CONTINUOUSLY TRANSMISSION

SERVICE INFORMATION . . . 8-1	DRIVE BELT 8-2
TROUBLE SHOOTING 8-1	DRIVEN PULLEY ASS'Y 8-4
LH. CRANK CASE COVER . . . 8-2	MOVABLE DRIVE FACE 8-9

SERVICE INFORMATION

CAUTION

- Take precautions not to apply grease or oil to drive belt or the surface of pulley.
- Take precautions not to apply oil to the movable drive face, weight roller.

8

SPECIFICATIONS

UNIT : mm

ITEM	STANDARDS	SERVICE LIMIT
MOVABLE DRIVE FACE BUSHING INNER DIAMETER	24.000 - 24.013mm	24.05mm
DRIVE FACE BOSS OUTER DIAMETER	23.980 - 23.993mm	23.960mm
DRIVE BELT WIDTH	22mm	20.5mm
WEIGHT ROLLER OUTER DIAMETER	19.95 - 20.02mm	19.5mm
CLUTCH OUTER INNER DIAMETER	120.0 - 120.2mm	120.5mm
DRIVEN FACE SPRING FREE PLAY	97.85mm	90.00mm
DRIVEN FACE OUTER DIAMETER	37.965 - 37.985mm	37.94mm
MOVABLE DRIVEN FACE INNER DIAMETER	38.0 - 38.025mm	38.060mm

TROUBLE SHOOTING

Engine starts but scooter does not work

- Drive belt worn
- Ramp plate damaged
- Clutch weight shoe worn or damaged
- Driven face spring cut

Engine stops or the vehicle suddenly runs after starting

- Clutch weight shoe spring cut

Vehicle unable to run at the maximum speed or lack of output power

- Drive belt worn
- Defect of driven face spring
- Weight roller worn
- Contamination of the face of pulley.



LH. CRANK CASE COVER

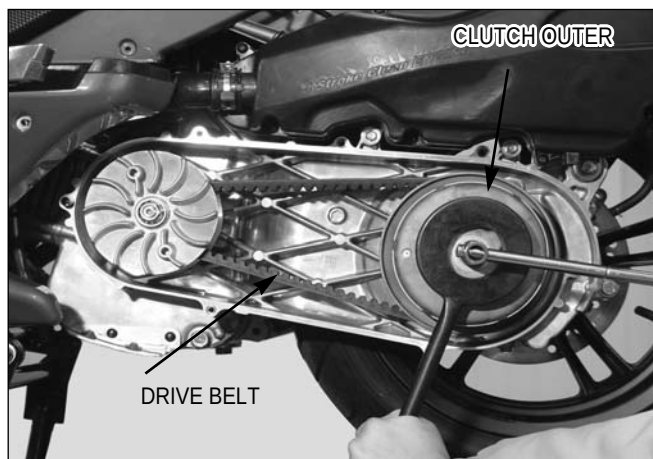
- Untie flange bolt installed at LH. Crank case cover



- Disassemble LH. Crank case cover
- Assemble in the reverse order of disassembly

CAUTION

- Fasten alternately and obliquely at assembling bolts.

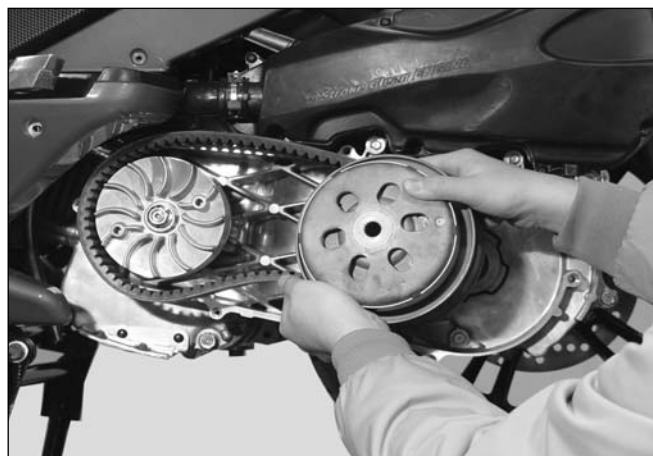


DRIVE BELT

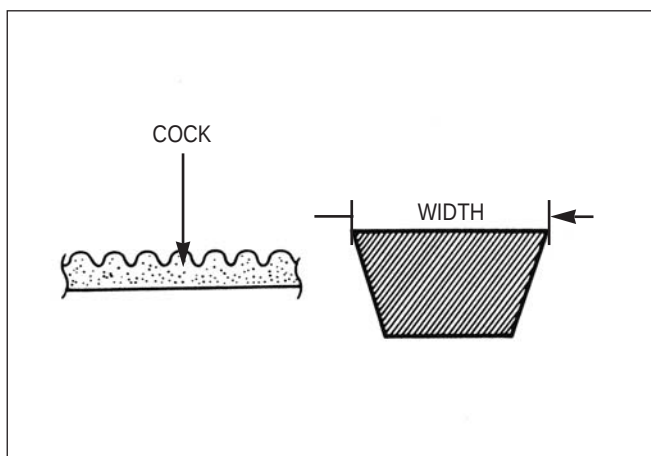
DISASSEMBLY

- Disassemble LH. Crank case cover
- Untie driven pulley flange nut by using of universal holder

TOOL : Universal holder



- Like the left photo, hang drive belt and disassemble belt from drive face.
- Disassemble belt from driven pulley.

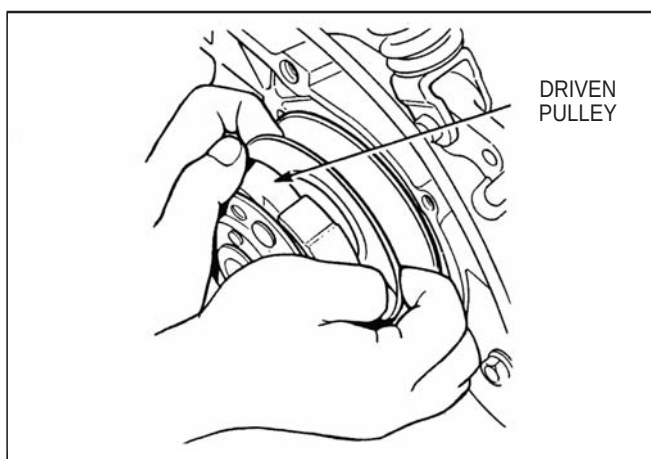


INSPECTION

- Check crack, aging, abnormal abrasion of drive belt, and if necessary, replace it.
- Measure the width of drive belt
SERVICE LIMIT : 20.5mm

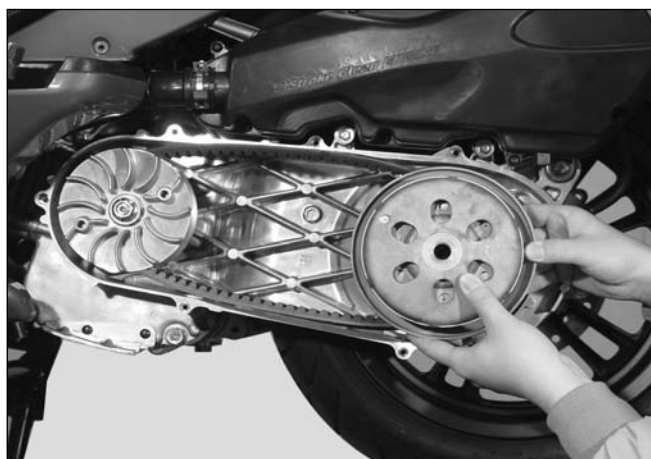
CAUTION

- At replacing, use the genuine parts.
- Take precautions not to apply greases on the contact position of pulley of belt.

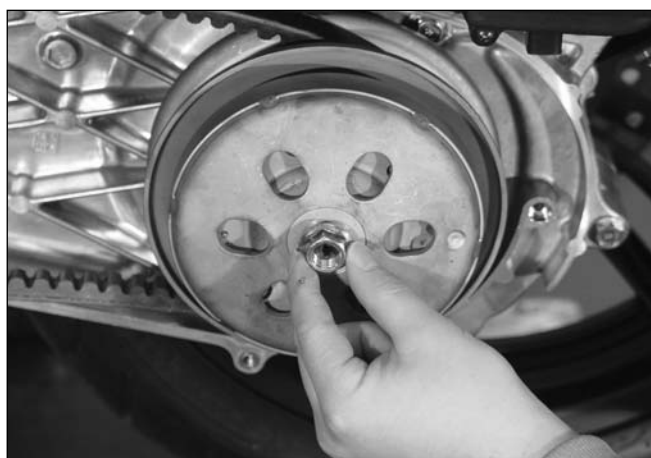


ASSEMBLY

- Like left photo, rotate the driven pulley sub ass'y to the right way, widen inside touching place and assemble drive belt to driven pulley sub ass'y.



- Assemble driven belt to the assemble area of movable drive face.
- Assemble driven pulley ass'y to drive shaft.

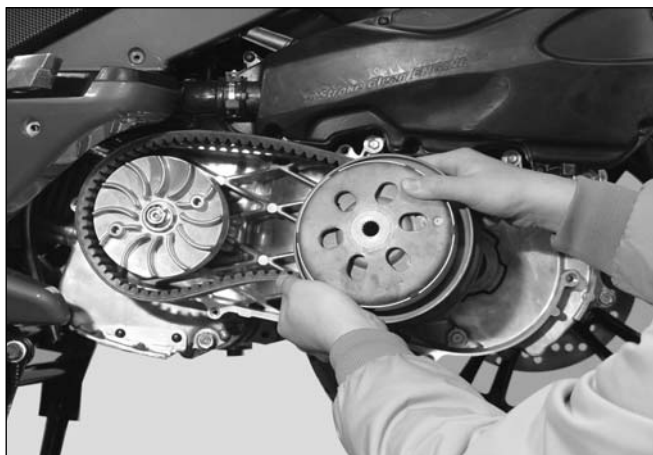


- Assemble temporarily flange nut to driven pulley.
- Fix the universal holder to clutch outer hole and assemble flange nut by designated torque.

TORQUE : 5.0~6.0 kgf·m

CAUTION

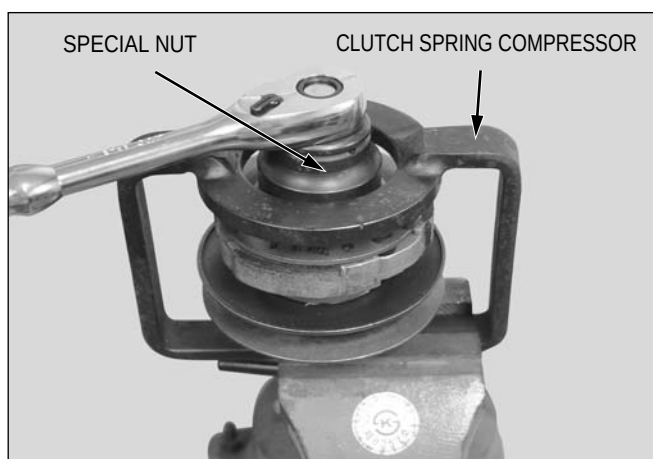
- Take precaution for the movable drive face not to be rotated by original position until driven pulley sub ass'y is assembled completely to drive shaft.



DRIVEN PULLEY ASS'Y

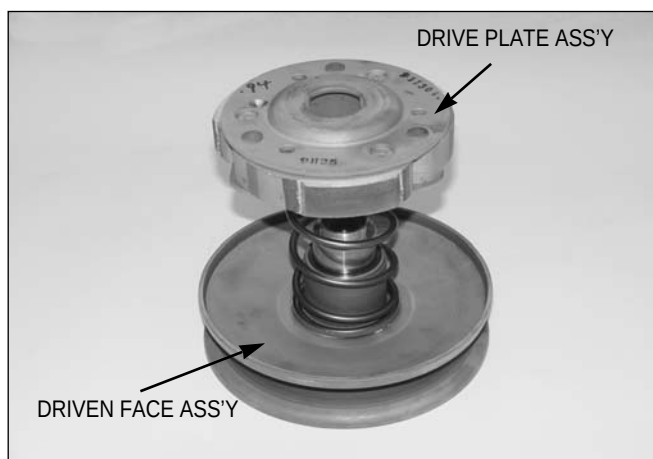
DIASSEMBLY

- Disassemble LH. Crank case cover
- Disassemble driven pulley ass'y
- Disassemble drive belt

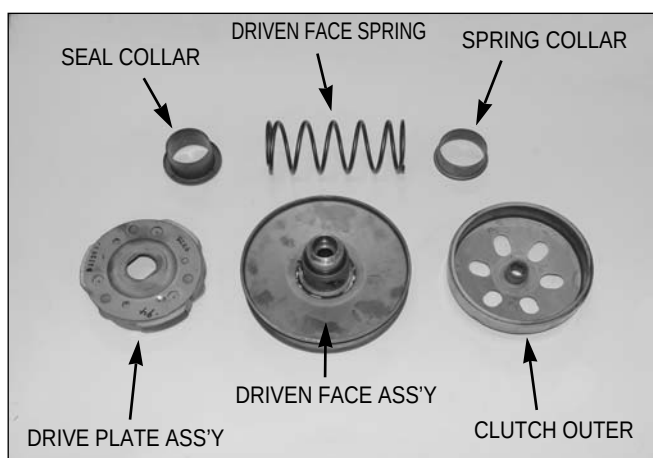


DISASSEMBLY

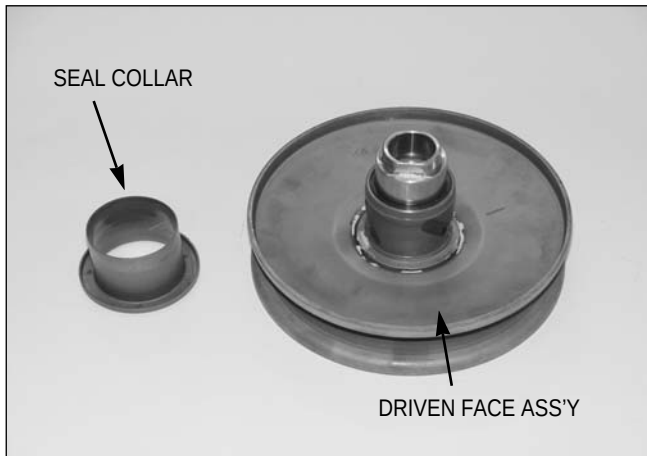
- Untie 26mm special nut
TOOL : CLUTCH SPRING COMPRESSOR
LOCK NUT WRENCH



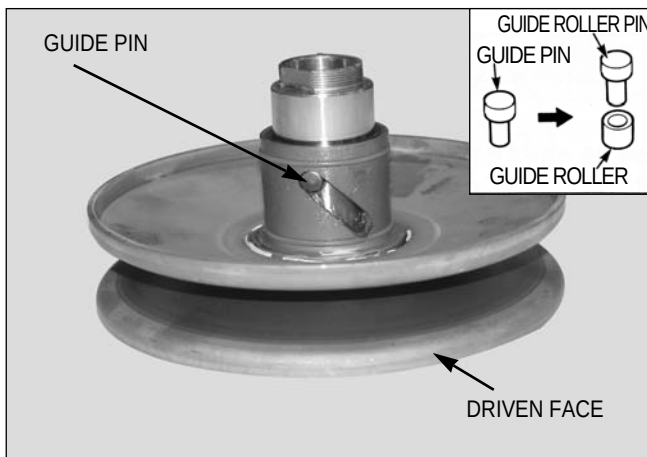
- Disassemble drive plate ass'y



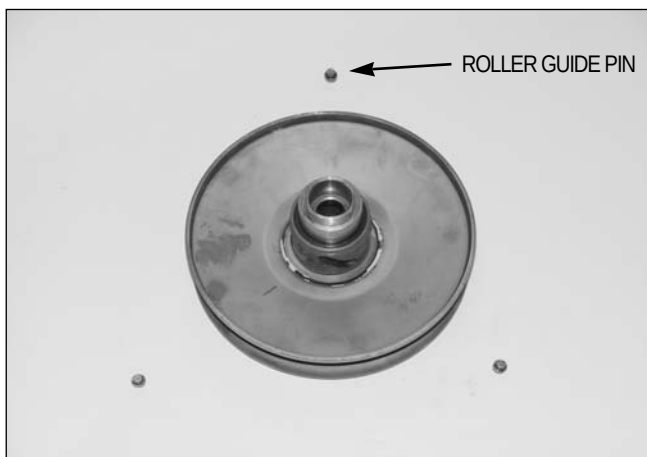
- Disassemble driven face spring
- Disassemble spring collar



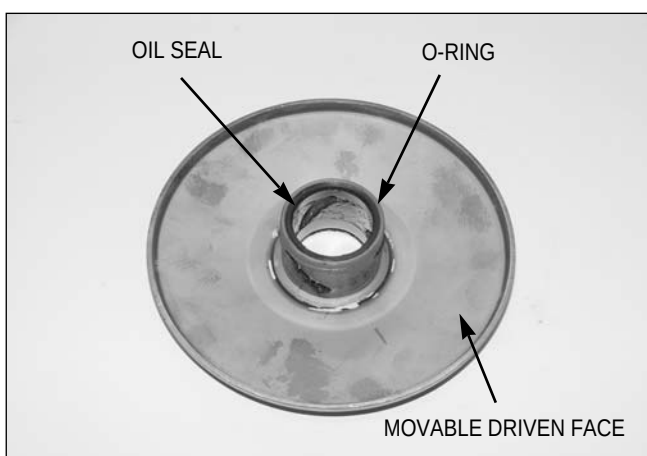
- Disassemble seal collar.



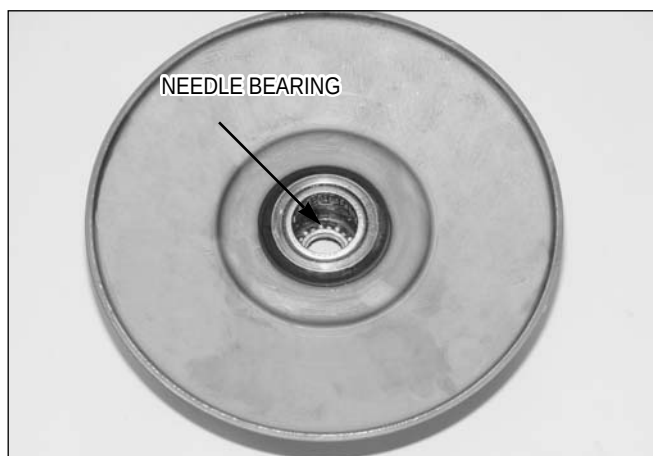
- Disassemble roller guide pin



- Disassemble movable driven face

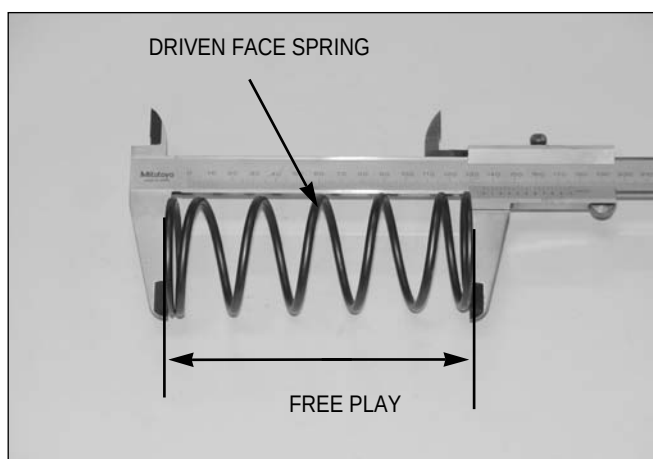


- Disassemble O-ring from movable driven face.
- Disassemble oil seal from movable driven face.

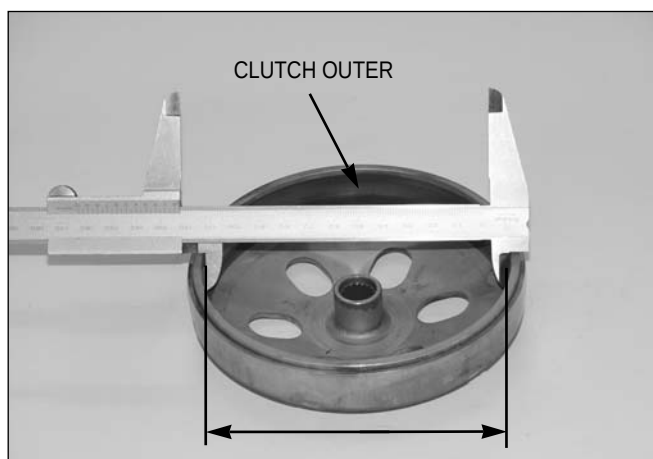


CHECKING DRIVEN FACE

- Check whether there is clattering or damage in needle bearing. Also, check whether there is abnormal sound or clattering between outer race and shaft, by turning the inner race of ball bearing(outer side with hand.



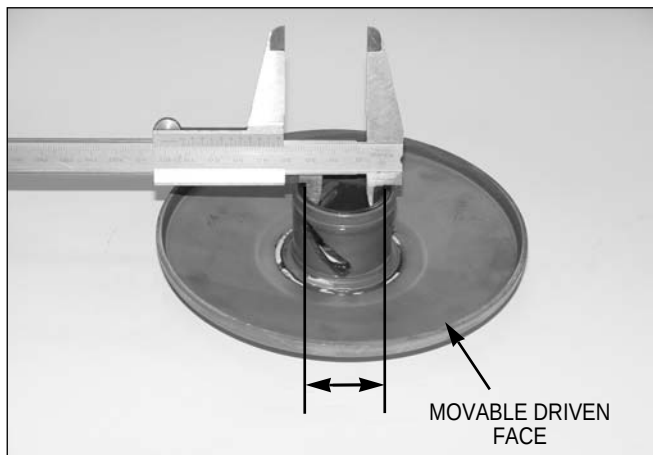
- Check free elasticity of driven face spring
SERVICE LIMIT : 131.1mm
TOOL : VERNIER CAPLIERS



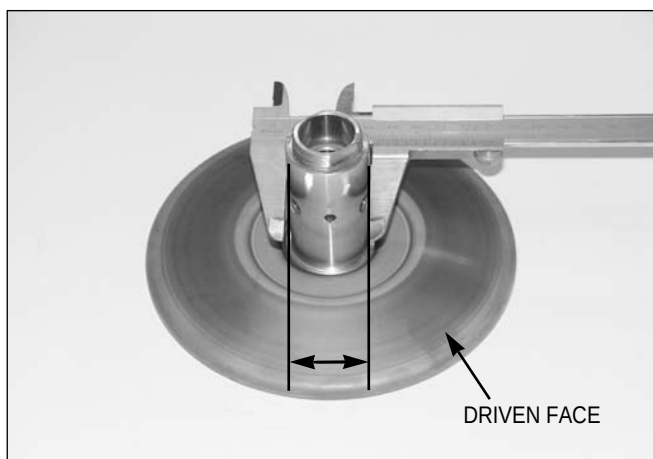
- Check whether there is damage or abrasion of clutch outer.
- Measure the inside diameter of outer clutch.
SERVICE LIMIT : 120.5mm



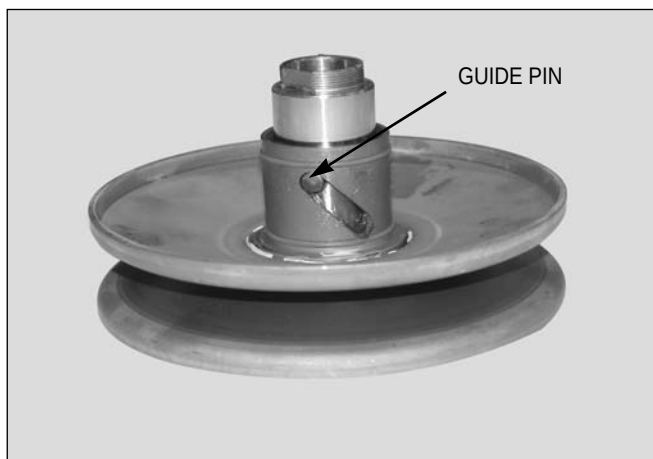
- Check on the damage or abrasion of clutch shoe.
- Measure the thickness of each shoe.
SERVICE LIMIT : 2.0mm



- Check damage or abrasion of movable driven face
- Check on abrasion of the end-plate of guide home of movable driven face.
- Measure inside diameter of movable driven face.
SERVICE LIMIT : 34.06mm



- Check on damage or abrasion of driven face.
- Measure outer diameter of driven face
SERVICE LIMIT : 33.94mm



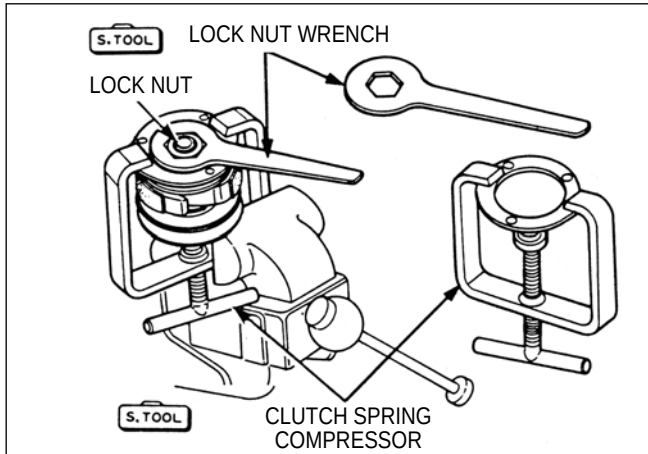
ASSEMBLY

- Assemble oil seal, O-ring to movable driven face
- Assemble movable driven face to driven face
- Assemble guide roller and roller pin
- Assemble seal collar



ASSEMBLY OF DRIVEN PULLEY SUB ASS'Y

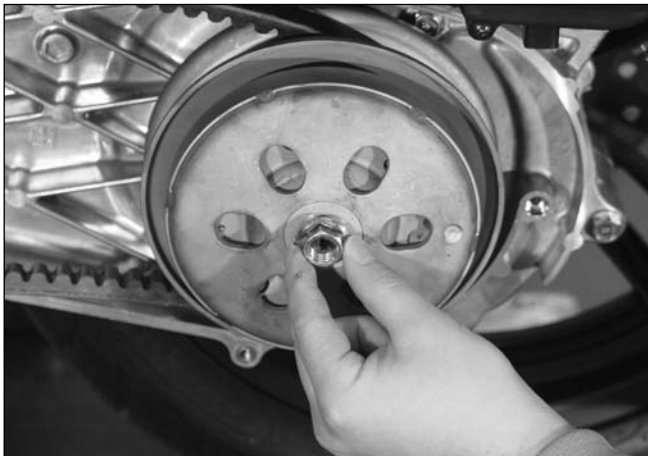
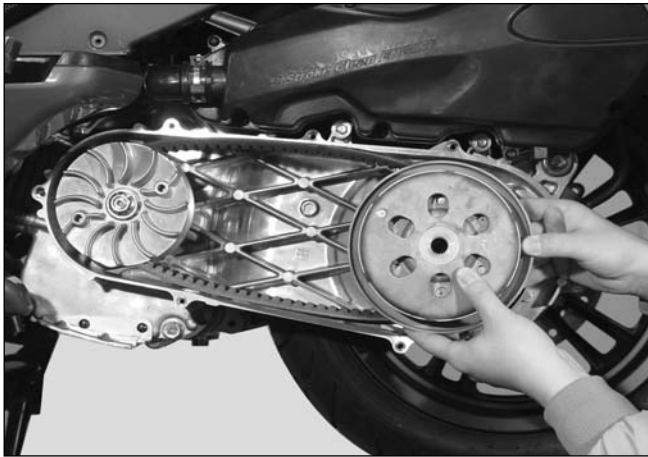
- Assemble spring guide and driven face, drive plate ass'y.



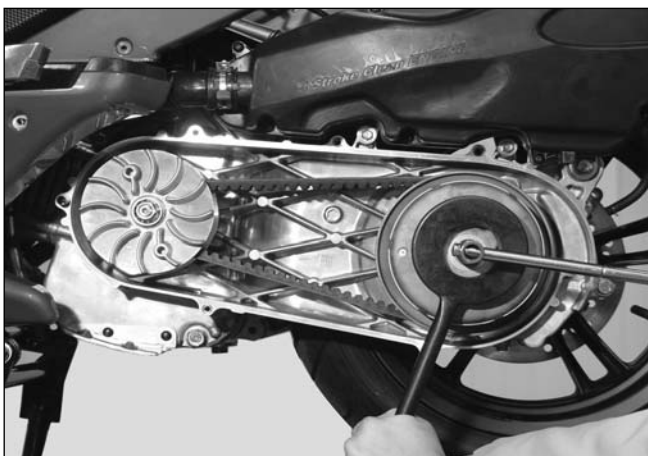
- Compress the length of special nut to 28mm by clutch spring compressor.
- Fix the clutch spring compressor by vice like the left picture, assemble lock nut as the designated torque by using lock nut wrench.
- Remove spring compressor
TORQUE : 5.0~6.0kgf · m
TOOL : LOCK NUT WRENCH, CLUTCH SPRING COMPRESSOR.

ASSEMBLY OF DRIVEN PULLEY ASS'Y

- Assemble driven pulley to drive shaft



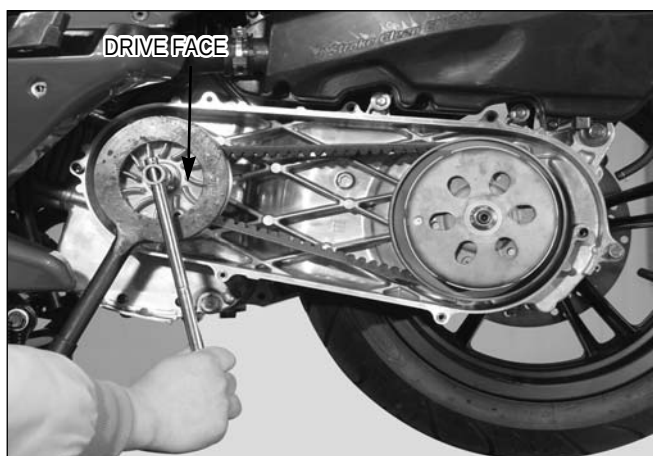
- Assemble temporarily flange nut.



- Assemble temporarily flange nut to driven pulley
- Fix to clutch outer hole by universal holder, assemble flange nut as designated torque.
TORQUE : 5.0~6.0kgf · m
- Assemble LH. Crank case cover.

CAUTION

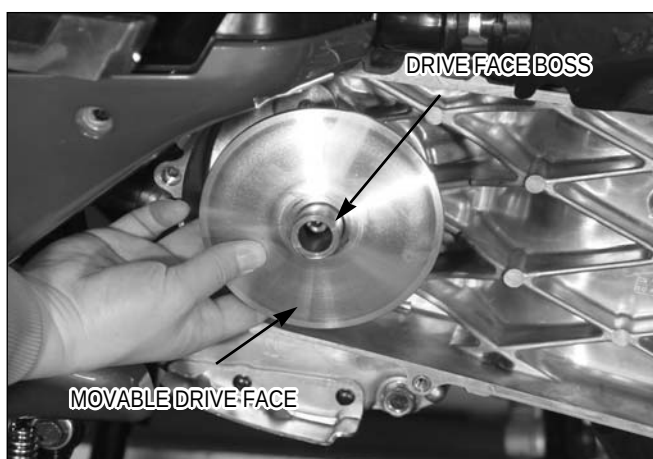
- Take precaution for drive face not to return to its original position by the time that driven pulley sub ass'y will be assemble completely to drive shaft.



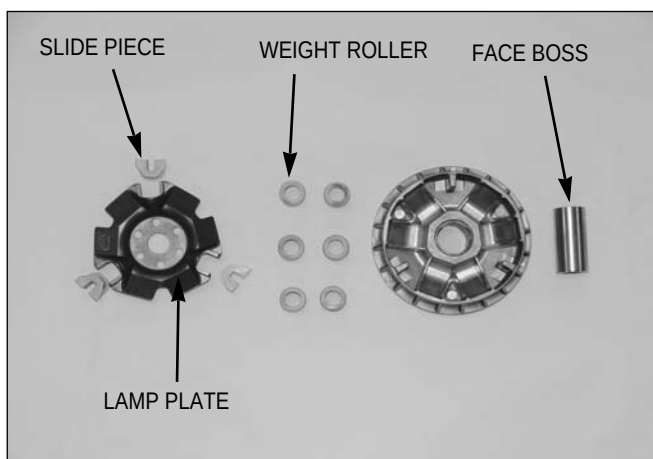
MOVABLE DRIVE FACE

DIASSEMBLY

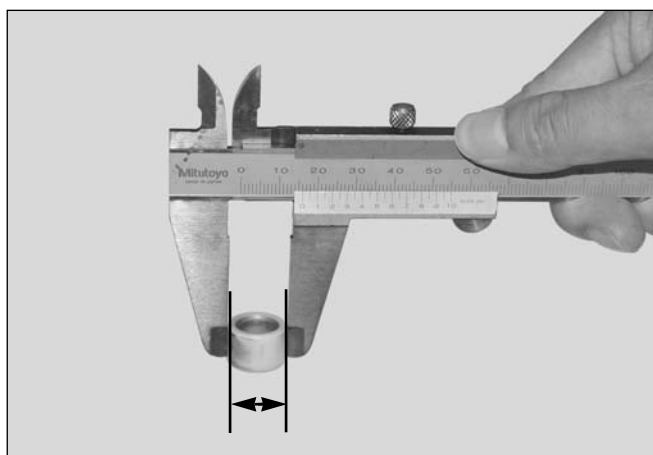
- Disassemble LH. Crank case cover(⇒8-2)
- Fix drive face holder to drive face.
TOOL : DRIVE FACE HOLDER



- Disassemble drive face nut, rear axle collar, drive face
- Disassemble movable drive face from drive face boss.

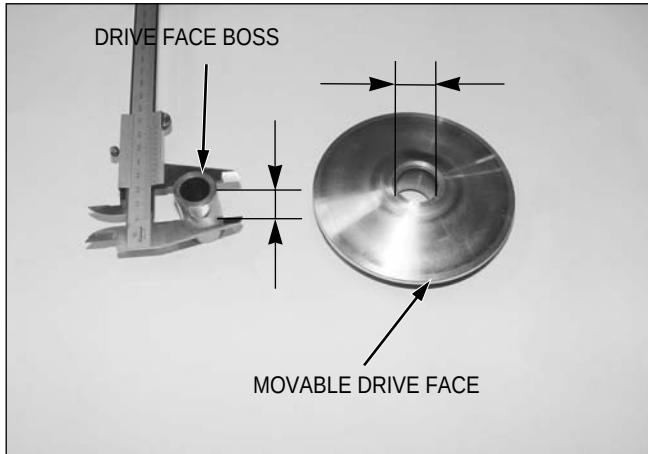


- Disassemble lamp plate, weight roller, oil seals from movable drive face.



INSPECT

- Check abrasion and damage of weight roller.
- Measure outer diameter of weight roller.
SERVICE LIMIT : 19.5mm
- Measure side worn.
SERVICE LIMIT : within 2mm



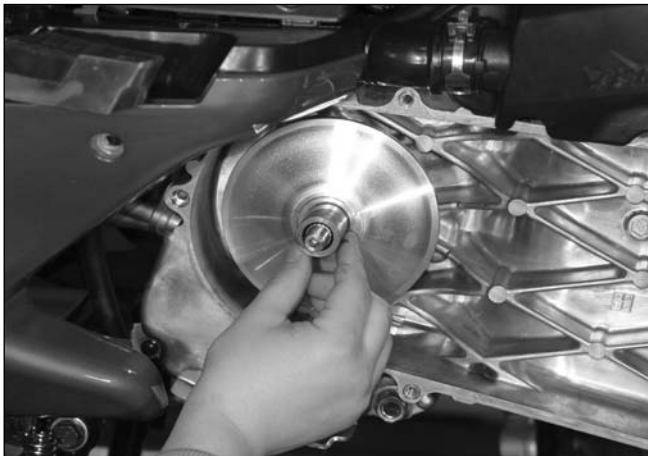
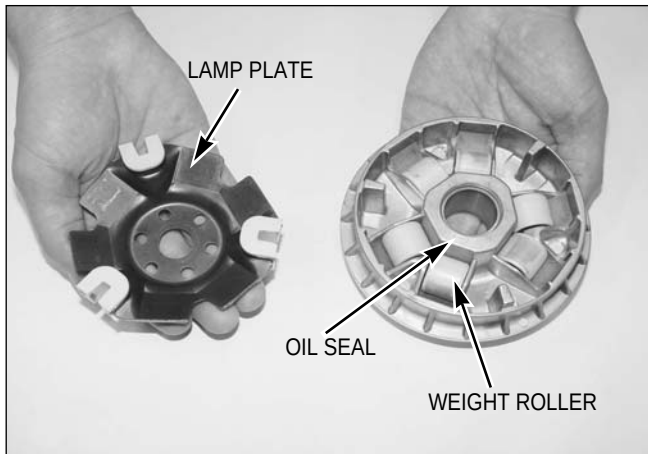
- Check damage and worn oil seal of movable drive face boss.
- Measure the outer diameter of movable drive face boss.
SERVICE LIMIT : 23.960mm
- Measure the inner diameter of movable drive face bushing.
SERVICE LIMIT : 24.025mm

ASSEMBLY

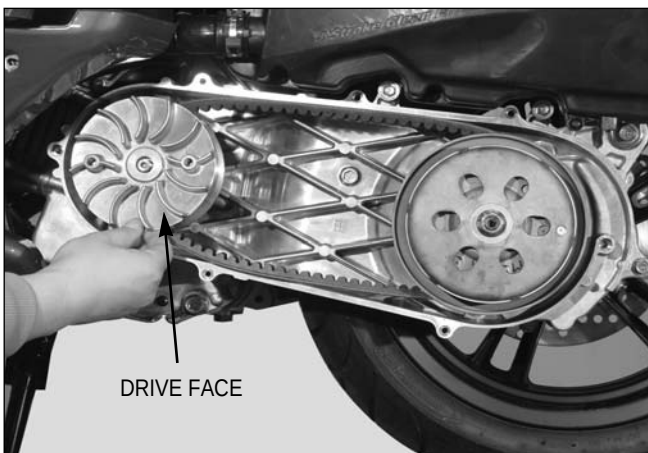
- Assemble weight roller to movable drive face.
- Assemble movable drive face boss.

CAUTION

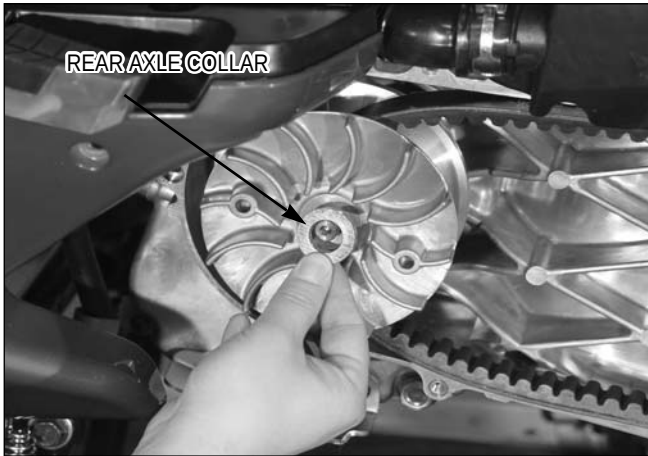
- Do not apply grease to the pulley side of movable drive face.
- Remove grease if applying.



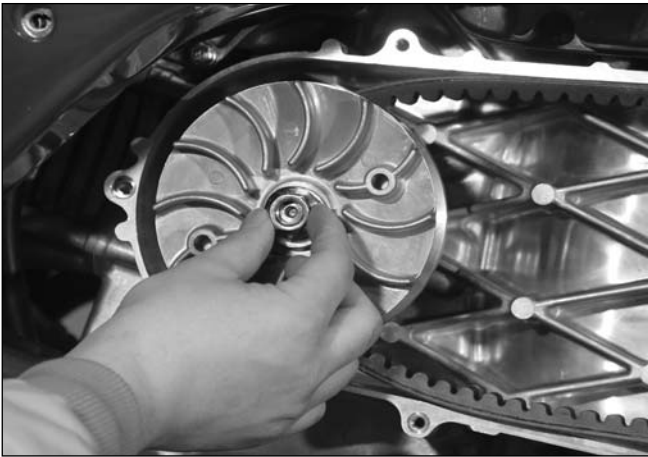
- Assemble movable drive face boss and movable drive face to LH. Crank case shaft.



- Assemble drive face to LH. Crank shaft.



- Assemble rear axle collar



- Assemble temporarily flange nut to drive face.



- Fasten it as the designated torque by using drive face holder.

TORQUE : 5.0~6.0kgf · m

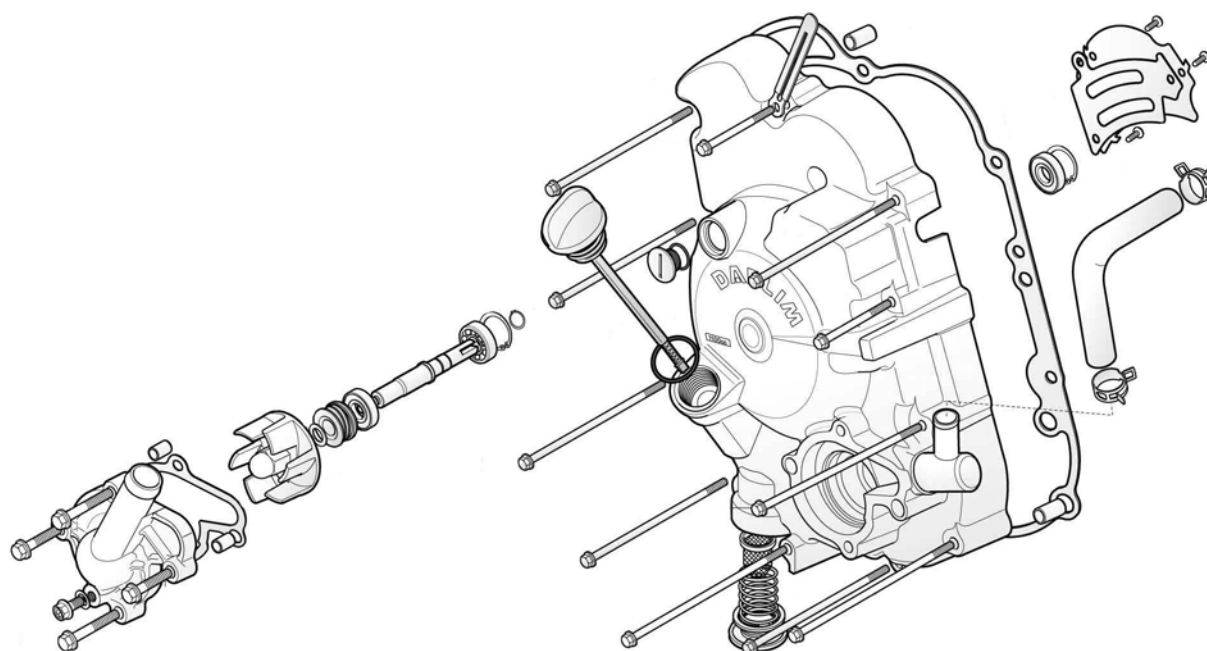
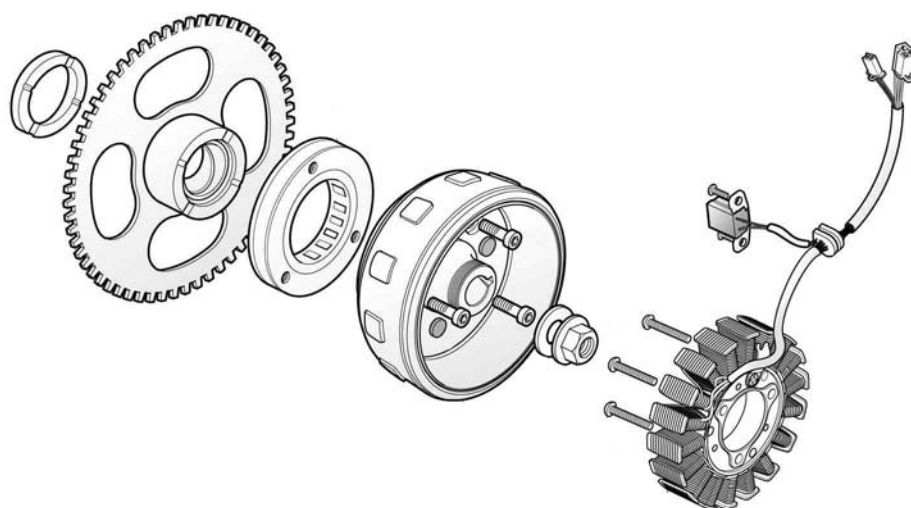
TOOL : Drive face holder



CAUTION

- Assemble by the designated torque

- Assemble LH. Crank case cover(⇒8-2)



9. AC. GENERATOR /FLY WHEEL

SERVICE INFORMATION . . . 9-1	AC. GENERATOR 9-2
SERVICE STANDARDS . . . 9-1	FLY WHEEL 9-3

SERVICE INFORMATION

- This section describes the removal and assembling of the A.C. generator
- For the information of A.C. generator inspection, refer to the section 16.
- The charging systme can be maintained without removing the engine.

SERVICE STANDARDS

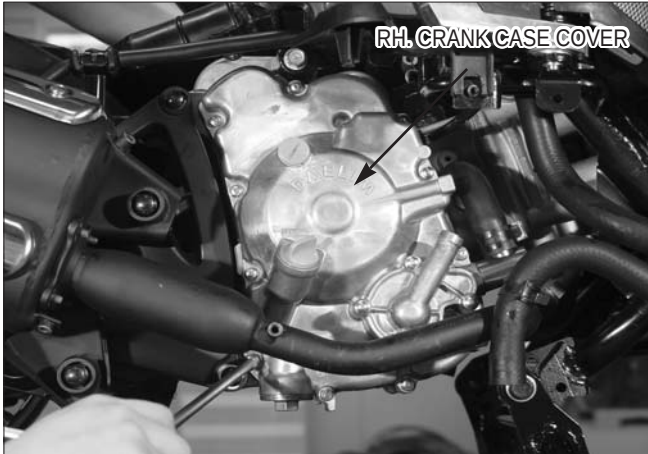
ITEM		STANDARDS	USAGE LIMIT
STARTER DRIVEN GEAR	OUTER DIAMETER	39.622 ~ 39.635	39.607
	INNER DIAMETER	22.010 ~ 22.022	22.100
REDUCTION GEAR	INNER DIAMETER	10.013 ~ 10.045	10.100
REDUCTION GEAR SHAFT	OUTER DIAMETER	9.991 ~ 10.000	9.97

TORQUE

FLY WHEEL NUT	6.0~6.7kgf · m
RH. CRANK CASE COVER BOLT	1.0~1.2kgf · m

TOOL

A.C.G. ROTOR PULLER



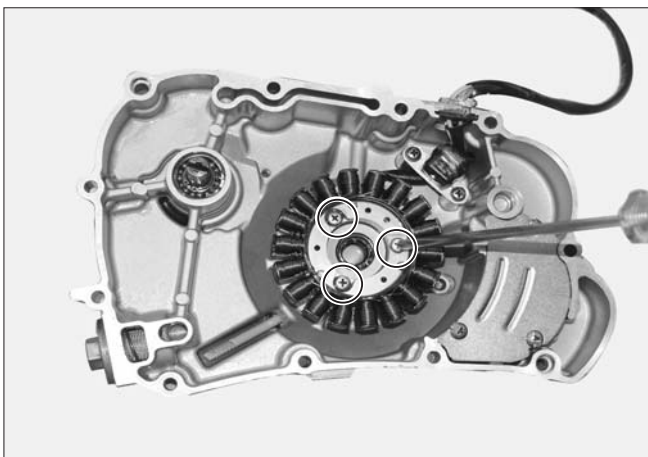
AC. GENERATOR

DISASSEMBLY

- Disassemble EX. Pipe cover
- Untie flange bolt installed at RH. Crank case cover.
- Drain engine oil and cooling water



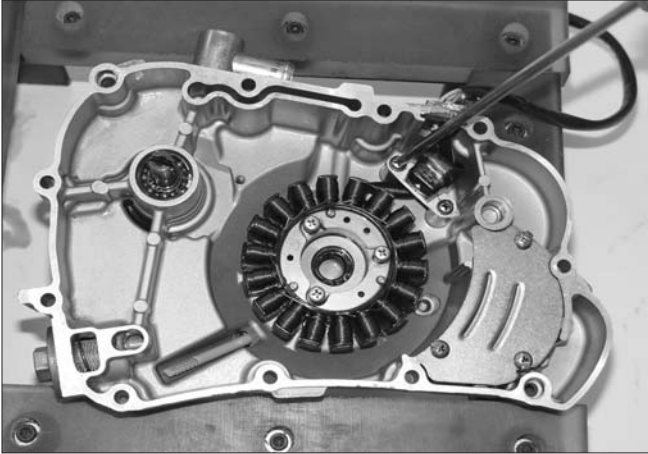
- Disassemble the connection of AC. Generator coupler and RH. Crank case cover.



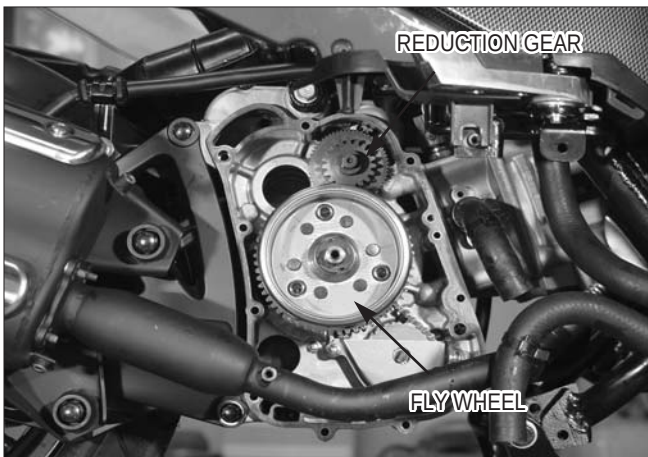
- Untie the screw installed at ACG. Stator.
- Disassemble ACG. Stator comp



- Check the damage or broken of wires by checking ACG. stator.

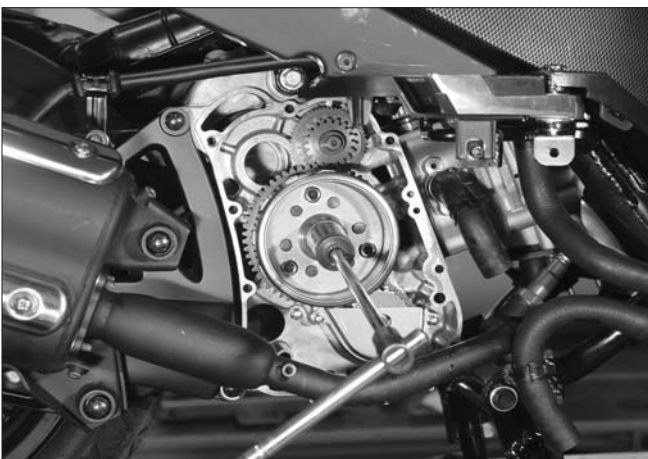


- Assemble stator
- Assemble in the reverse order of disassembly



FLY WHEEL

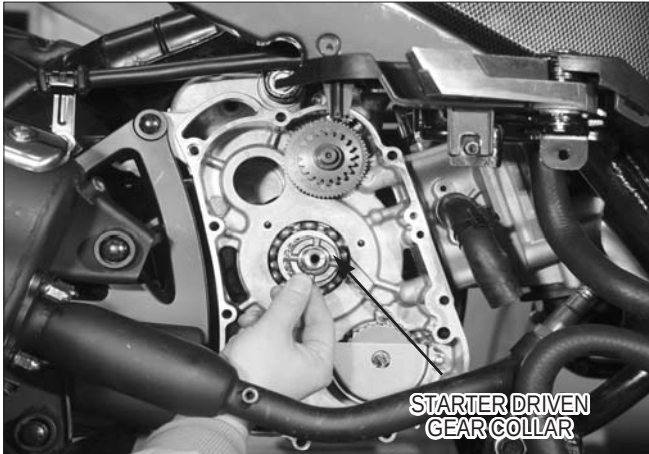
- Disassemble RH. Crank case
- Disassemble dowel pin and gasket



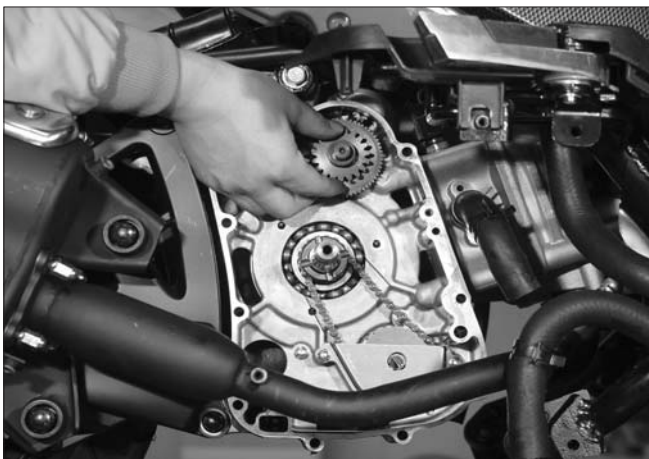
- Disassemble fly wheel lock nut



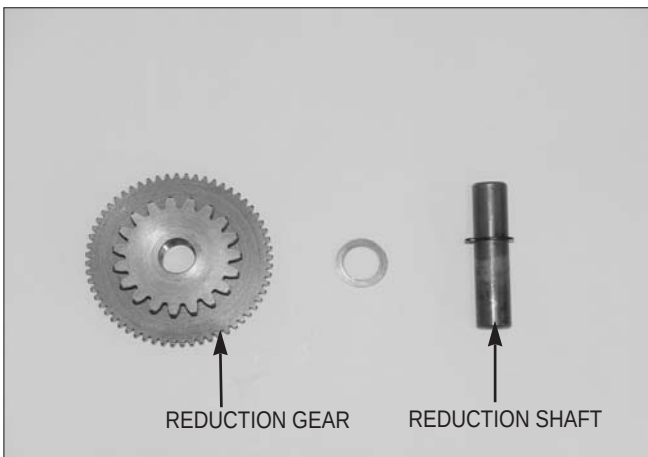
- Disassemble fly wheel from crank shaft by using of ACG. Rotor puller.
TOOL : ACG. ROTOR PULLER



- Disassemble fly wheel and starter driven gear collar

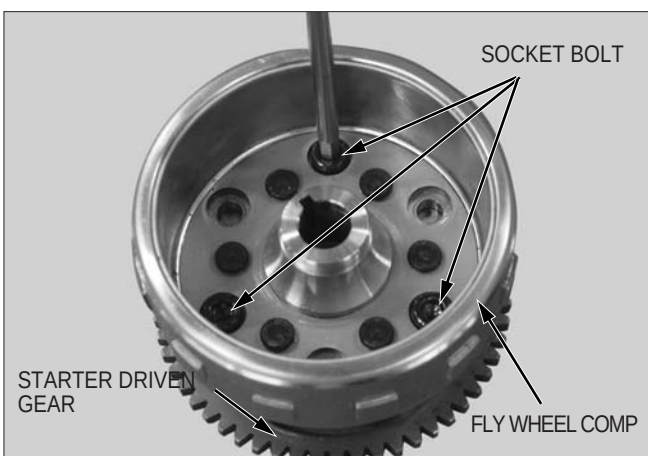


- Disassemble reduction gear and shaft



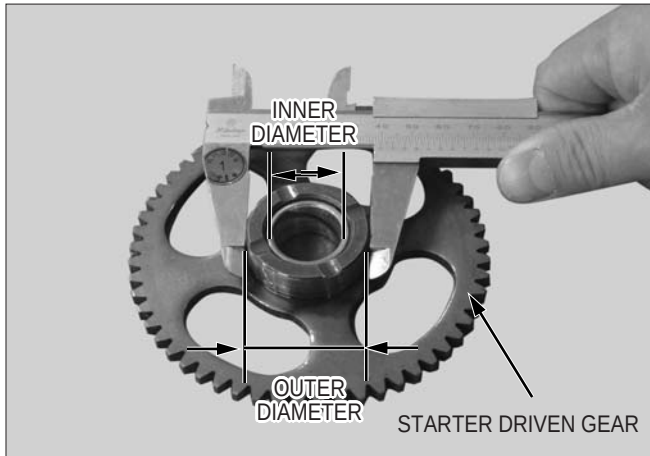
CHECKING REDUCTION GEAR

- Check on abrasion and damage of reduction gear
- Measure inner diameter of reduction gear
SERVICE LIMIT : 10.100mm
- Measure the outer diameter of reduction gear shaft
SERVICE LIMIT : 9.97mm

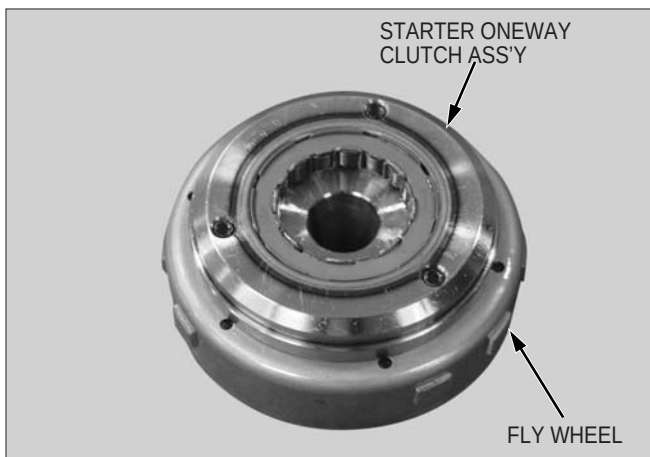


DISASSEMBLY

- Disassemble fly wheel
- Untie 3 socket bolts and disassemble starter clutch(one way clutch) from fly wheel.



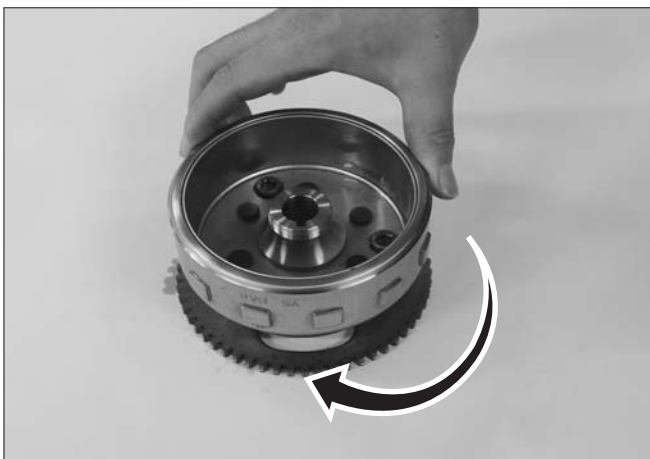
- Measure on damage and abrasion of starter driven gear
 - Measure inner and outer diameters of driven gear
- SERVICE LIMIT**
Outer diameter : 39.607 mm
Inner diameter : 22.100 mm



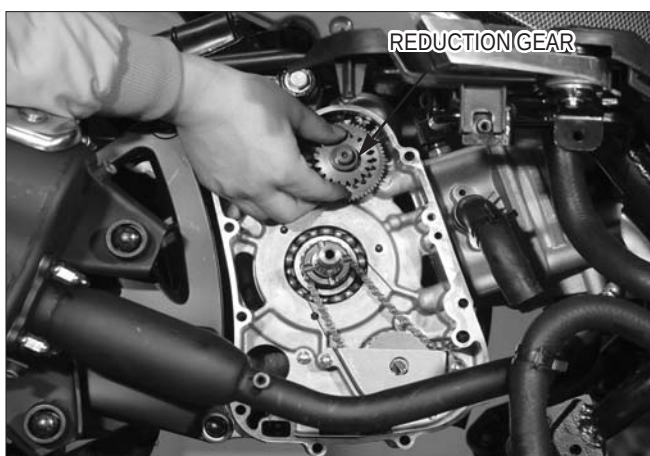
ASSEMBLY

- Check on abrasion and damage of one way clutch
 - Assmble one-way clutch to fit to fly wheel
 - Apply screw locking adhesive to starter clutch socket bolt.
 - Assemble starter driven gear
- TORQUE : 3.2kgf · m**

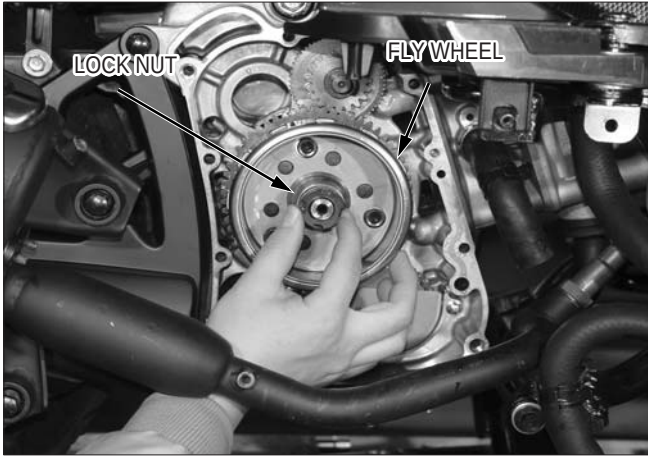
9



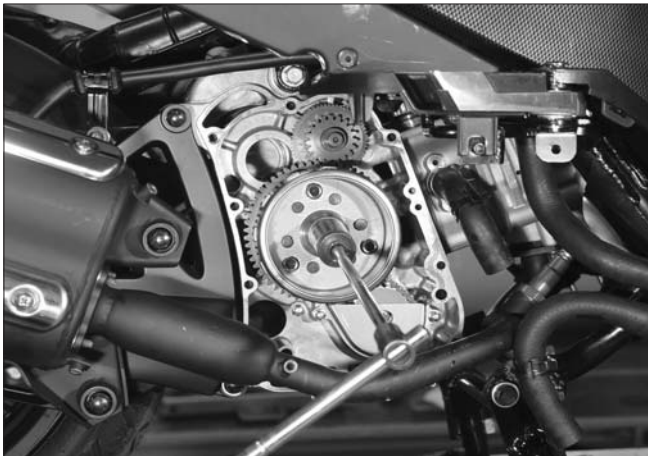
- Grasp fly wheel and rotate starter driven gear so that it rotates well like the left picture.



- Assemble reduction gear



- Assemble fly wheel
- Assemble temporarily lock nut



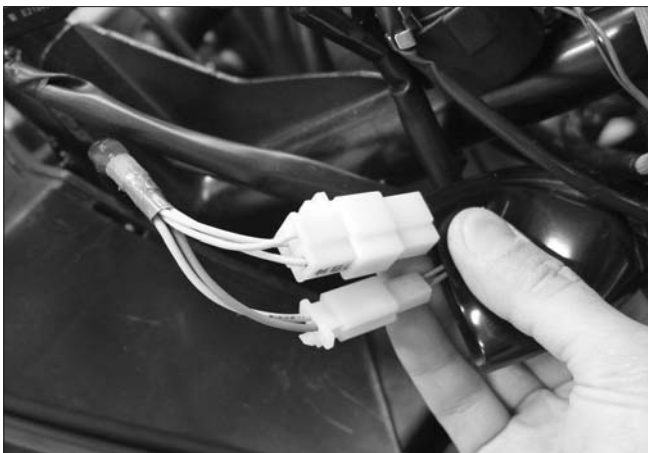
- Assemble lock nut
TORQUE : 6.0~6.7kgf · m



- Assemble RH. Crank case

CAUTION

- Fix completely to the home position of grommet



- Assemble ACG. Coupler
- Put into engine oil and cooling water.

MEMO

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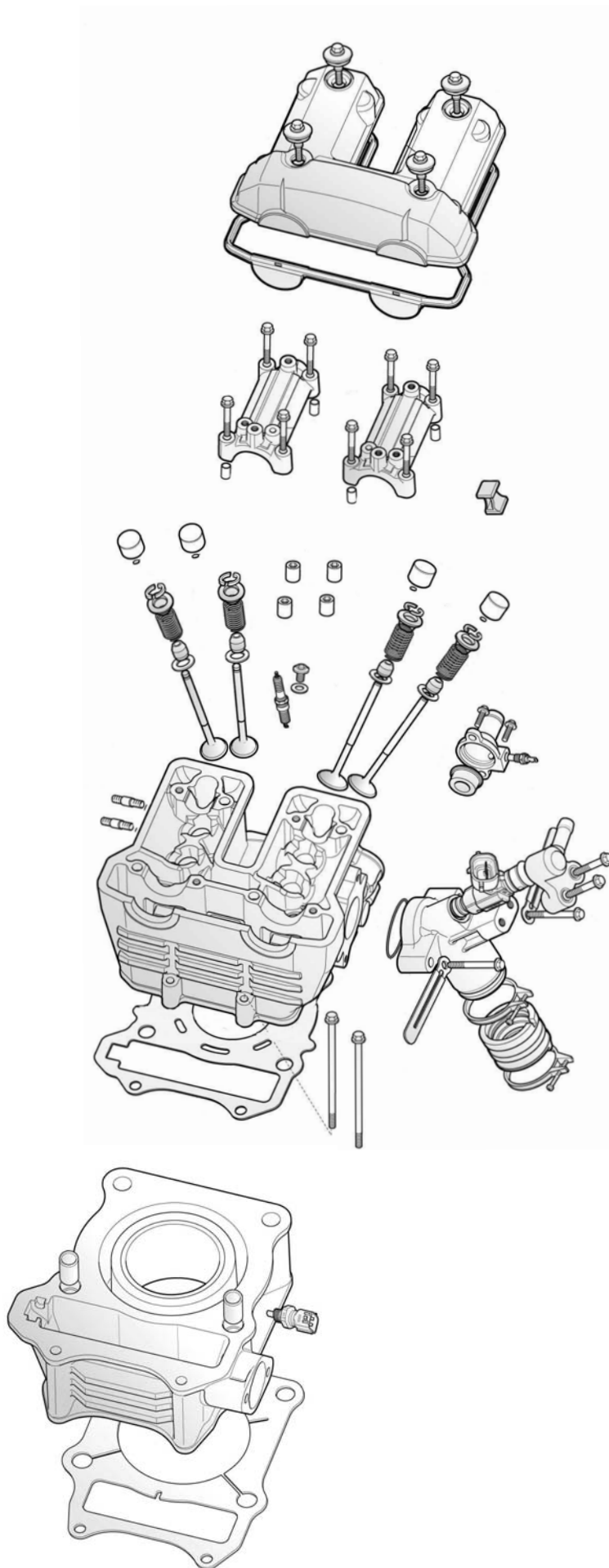
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10. CYLINDER HEAD / VALVES

SERVICE INFORMATION	10-1	DISASSEMBLY OF CYLINDER HEAD .	10-5
SERVICE STANDARDS	10-1	REPLACEMENT OF VALVE GUIDE .	10-6
TROUBLE SHOOTING	10-2	CHECK AND ADJUSTMENT OF VALVE SEAT .	10-7
DISASSEMBLY OF CAM SHAFT .	10-3	ASSEMBLY OF CYLINDER HEAD .	10-8
DISASSEMBLY OF CYLINDER HEAD .	10-4	INSTALLATION OF CYLINDER HEAD .	10-9

SERVICE INFORMATION

CAUTION

- The rocker arm and the camshaft can be served without removing the engine. If cylinder head was repaired already, the engine shall be taken out from the frame.
- The oil of camshaft oil is supplied through the cylinder head oil hole. Then, clean th oil hole prior to assembling the cylinder head.

10

SPECIFICATIONS

UNIT: mm

ITEM			STANDARD VALUE	SERVICE LIMIT
CAM SHAFT	CAM HEIGHT	IN.	31.6±0.08 (32.02~32.18)	31.40
		EX.	31.8±0.08 (31.72~31.88)	31.60
VALVE VALVE GUIDE	VALVE SPRING FREE LENGTH	IN., EX.	41.4	40.0
	VALVE STEM OUTER DIAMETER	IN.	4.975~4.990	4.925
		EX.	4.955~4.970	4.905
	VALVE GUIDE INNER DIAMETER	IN., EX.	5.000~5.012	5.03
	CLEARANCE BETWEEN STEM AND GUIDE	IN.	0.010~0.037	0.08
		EX.	0.030~0.057	0.10
VALVE SEAT WIDTH			0.7~0.9	1.3

TIGHTENING TORQUE

SPARK PLUG	1.6 kgf-m
CYLINDER HEAD SPECIAL SOCKET NUT	4.0 kgf-m
CAM CHAIN TENSIONER PIVOT BOLT	1.0 kgf-m
CAM CHAIN TENSIONER LIFTER BOLT	1.2 kgf-m
CAM CHAIN TENSIONER LIFTER SCREW	0.4 kgf-m
CYLINDER HEAD COVER BOLT	1.1 kgf-m
AC GENERATOR CAP	0.6 kgf-m

TOOL

SPECIAL TOOL

- VALVE GUIDE REAMER
- VALVE GUIDE DRIVER

COMMON TOOL

- VALVE SPRING COMPRESSOR
- VALVE SEAT CUTTER

TROUBLE SHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression or leak down test or by tracing noises to the top-end with a sounding rod or stethoscope.

Low compression

- Valves
 - Incorrect valve gap adjustment
 - Valve spring damaged
 - Incorrect valve timing
 - Uneven valve seating

Excessive white smoke

- Worn valve guide or valve stem
- Damaged valve stem seal
- Worn or damaged piston ring

Rough idle

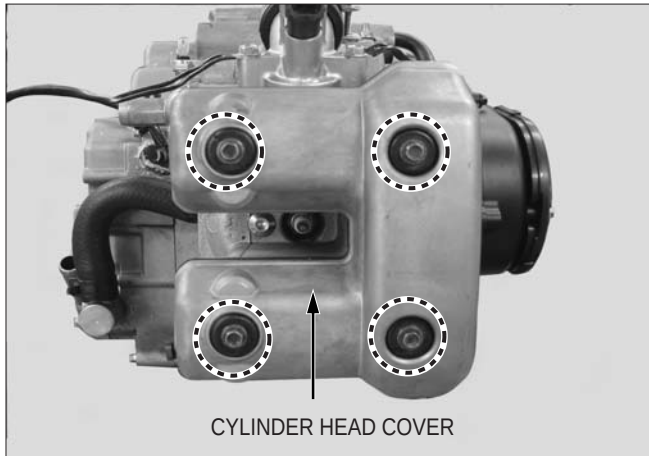
- Low cylinder compression
- Bad fuel system(chapter 5)

Compression too high

- Excessive carbon build-up on piston or combustion chamber

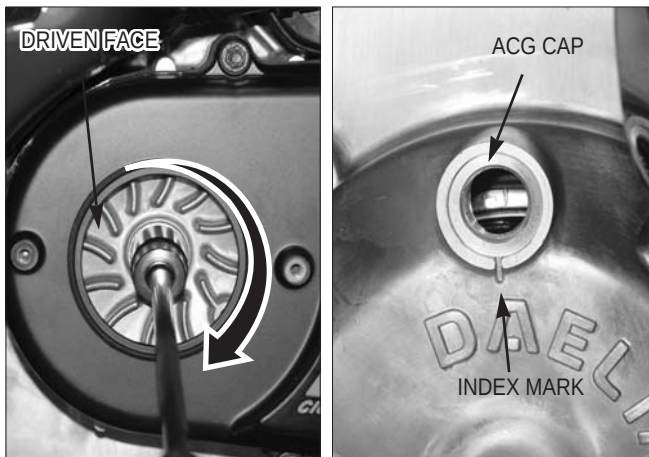
Excessive noise

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Loose or worn cam chain
- Worn or damaged cam chain tensioner

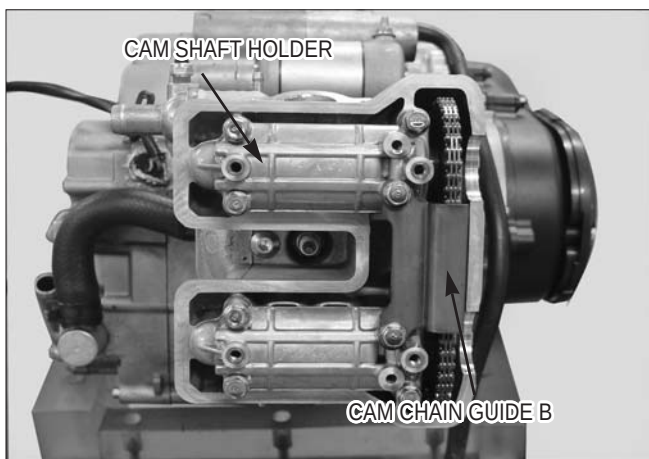


DIASSEMBLY OF CAM SHAFT

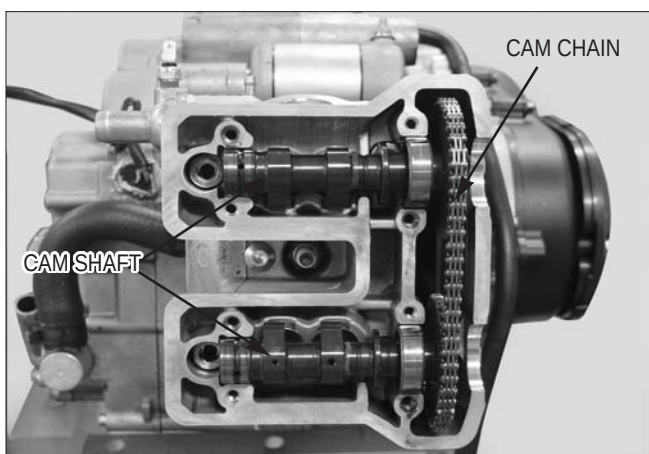
- Untie 4 cylinder head cover special bolts and disassemble cover.
- Untie cam chain tensioner screw, tensioner flange bolt and disassemble tensioner



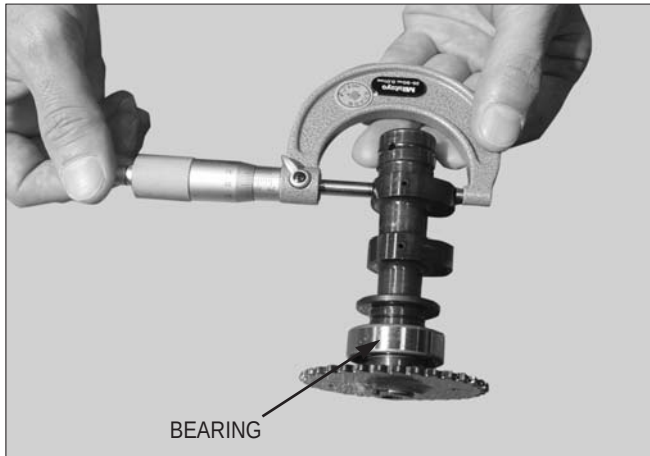
- Disassemble ACG cap from RH. Crank case cover.
- Disassemble CVT dust cover of LH. Crank case cover.
- Rotate crank shaft and square "T" mark of fly wheel with the index mark of RH. Crank case cover.
- Check whether piston is positioned in the compressed upper line.
- If the teeth of cam is not toward outside, rotate crank shaft and fit it with "T" mark.



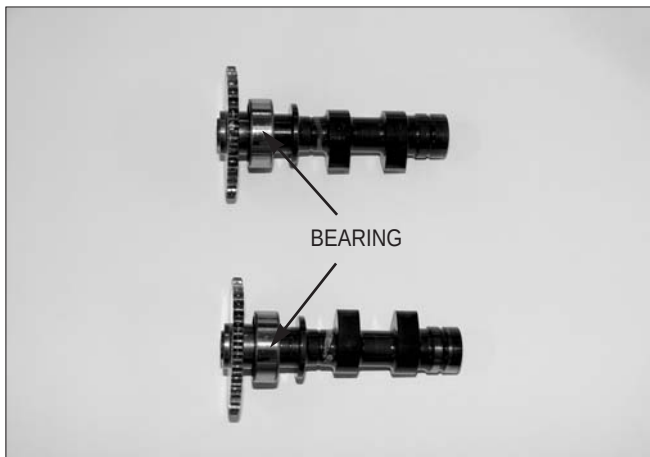
- Disassemble cam chain guide B.
- Untie 8 flange bolts of cam shaft holder, disassemble cam shaft holder from cylinder head.



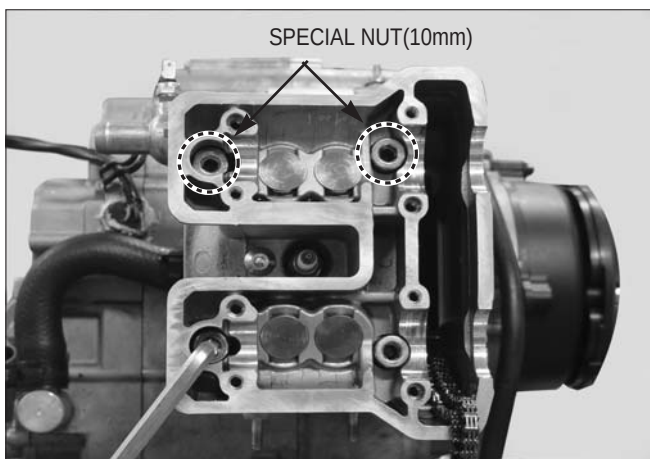
- Take out cam chain from cam shaft
- In order for cam chain not to be taken off from crank case, tie it with thread or string.
- Disassemble cam shaft.



- Check on abnormal abrasion or damage of cam 類 of cam shaft.
- Measure the height of cam 類.
SERVICE LIMIT IN : 31.4mm
EX : 31.6mm

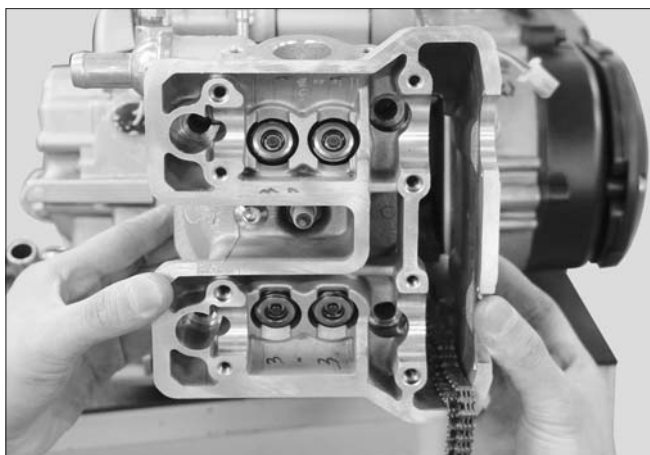


- Rotate with hand the outer race of cam shaft bearing, check whether it rotates well or not. Then check on damage of bearing.

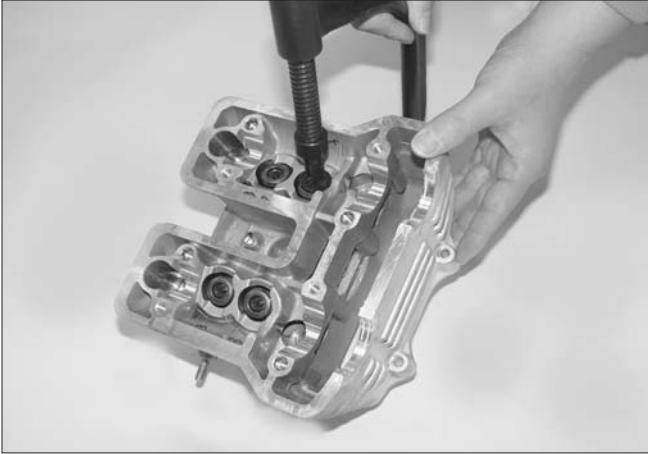


DISASSEMBLY OF CYLINDER HEAD

- Disassemble inlet pipe
- Disassemble cylinder head cover
- Disassemble cam shaft
- Untie cylinder head special nut(10mm)
- Disassemble after marking the position of valve.



- Diassemble cylinder head from cylinder
- Disassemble cylinder head gasket, dowel pin and cam chain guide.



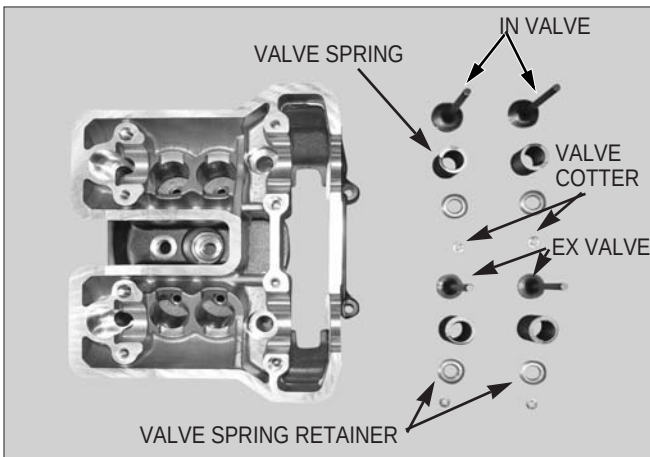
DISASSEMBLY OF CYLINDER HEAD

- By using valve spring compressor, disassemble valve spring cotter, retainer, spring and valve.

TOOL : VALVE SPRING COMPRESSOR

CAUTION

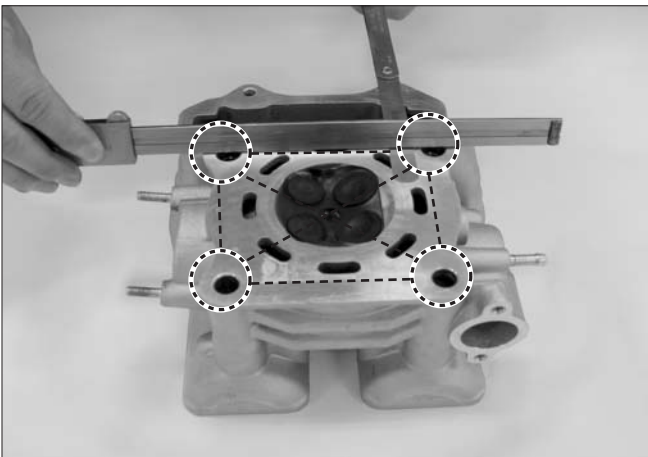
- Do not compress valve spring more than necessary to prevent the damage of spring tension



CAUTION

- Mark in order for disassemble parts to be able to be assembled in their original positions.

- Disassemble valve spring seat and valve stem seal. Remove the carbons in cylinder.



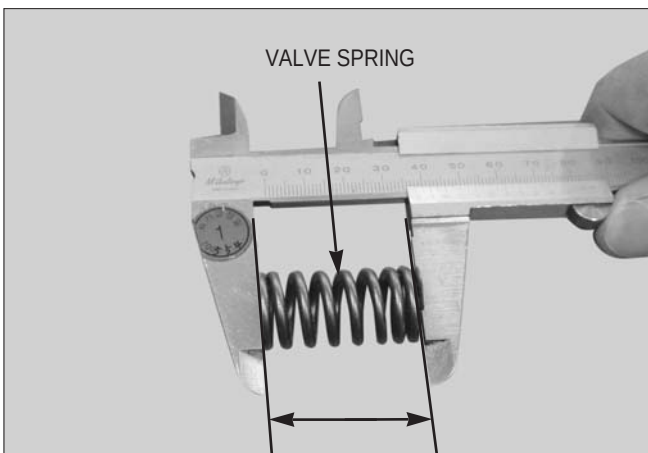
CHECKING CYLINDER HEAD

- Remove the trace of gasket on the gasket side of cylinder head.
- Check on crack in the nearby valve seat and hole of spark plug.

SERVICE LIMIT : 0.1mm

CAUTION

- Take precaution for the gasket side of cylinder head to be damaged.



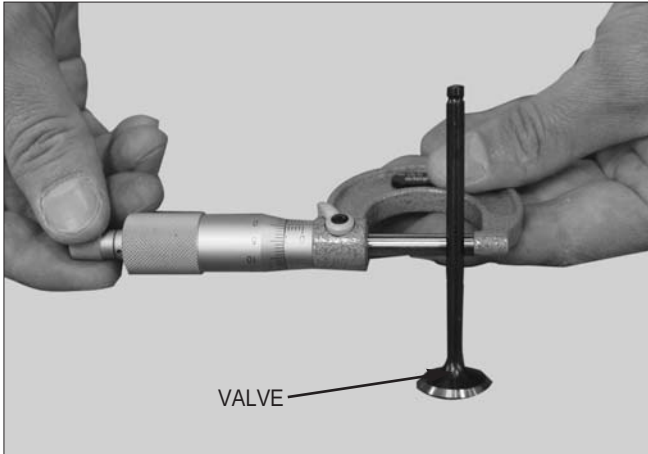
VALVE SPRING

- Measure the free length of valve spring.

SERVICE LIMIT : 40.0mm

CAUTION

- If even one unit of valve spring is shorter than SERVICE LIMIT, replace them with the set.



GAP BETWEEN VALVE STEM AND GUIDE

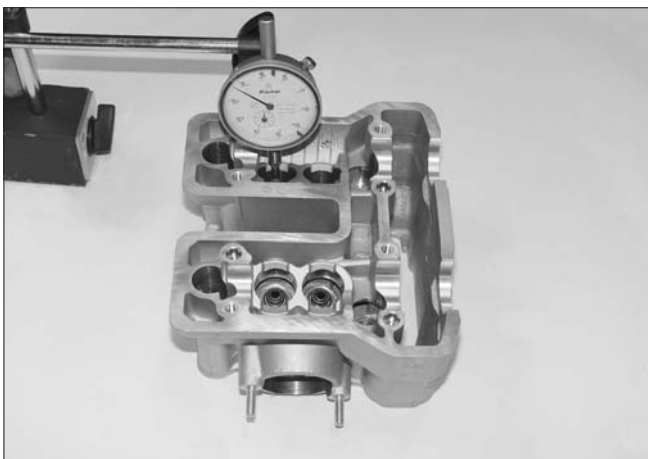
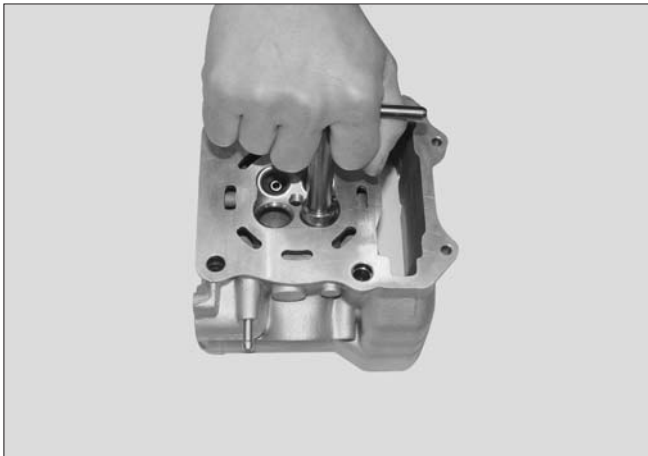
- Check on abnormal abrasion of stem, twist, stick, damage of valve.
- Check on operation of valve by putting it into valve guide.
- Record by measuring outer diameter of valve stem.
SERVICE LIMIT IN : 4.925mm
EX : 4.905mm

- Insert valve guide reamer and remove carbon deposit.

CAUTION

- The entering of reamer shall be done by rotating it to the right way as always. If rotating to the left or not rotating then entering reamer, the inside of guide can be damaged.

TOOL : VALVE GUIDE REAMER.



- Record by measuring inner diameter of valve guide.
SERVICE LIMIT : 5.03mm

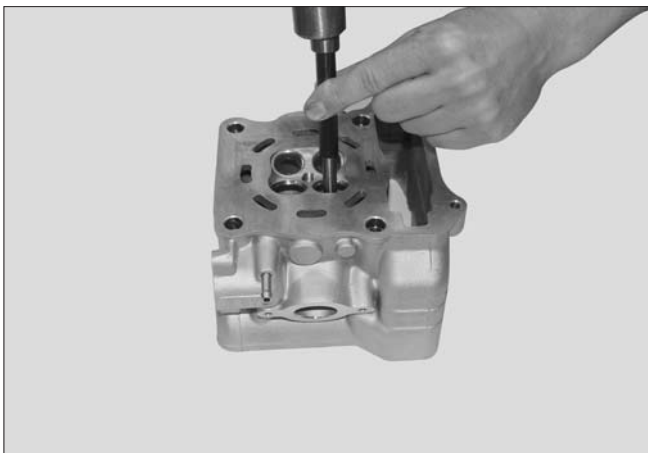
- Calculate the gap between valve stem and guide.
SERVICE LIMIT : IN : 0.08mm
EX : 0.10mm

- Measure inner diameter of new valve guide, then replace
Valve too not to be in the service limit.

REPLACEMENT OF VALVE GUIDE

CAUTION

- If replacing valve guide, the valve seat shall be corrected.
- Get warm cylinder head totally at 130~140°C and be careful the temperature not to be over 150°C.
- Because of getting burnt, unskillful working shall not be done.
- When cylinder head gets warm, do not heat it sectionally by using like gas burner that may cause twist of cylinder head.



- Pull out the valve guide from cylinder, supporting cylinder head.

TOOL : VALVE GUIDE DRIVER.



CAUTION

- Take precaution that cylinder head is not damaged.

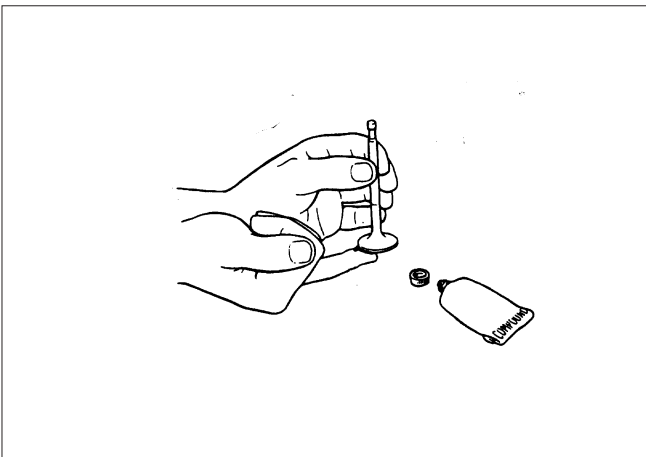
- Insert valve guide to the upper side of cylinder head.
- Assemble new O-ring to the new valve guide.

TOOL : VALVE GUIDE DRIVER



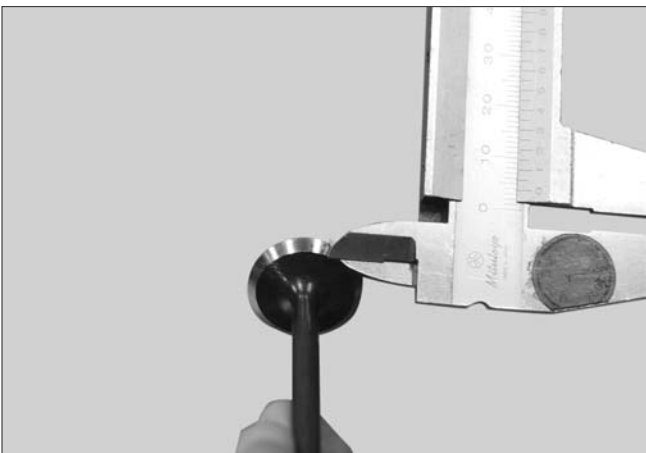
- After inserting valve guide, insert valve guide reamer to the cylinder and make valve guide finished by inserting valve guide reamer.

TOOL : VALVE GUIDE REAMER



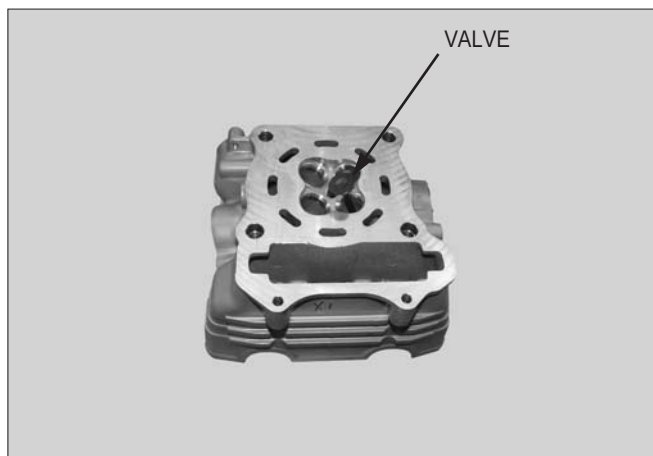
CAUTION

- Make reamer finished for it not to be leaned.
- If cutting on condition that reamer leaned, the hole of valve guide leans that makes stem seal leaked and widen the surrounding of valve seat, then fixation and adjustment seat can not be done.
- Going in and out of reamer shall be done by rotating it to the right. If it rotates to the left or does not rotate, flaw can occur inside guide.



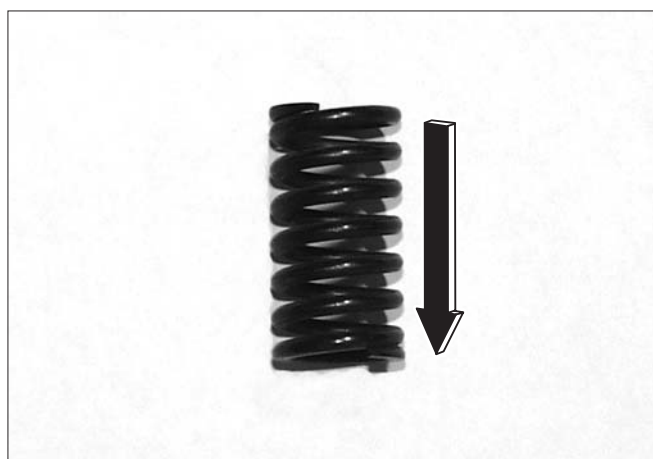
CHECKING AND ADJUSTMENT OF VALVE SEAT

- Remove carbon deposit of valve
- Apply slightly and equally red lead to the valve seat of cylinder head.
- Do not rotate valve by using valve guide reamer, knock slightly for fixation to be correctly placed.
- If there is any flaw on valve seat, adjust valve seat. If valve leans, check the gap between valve guide and stem. If not normal gap, replace valve guide.

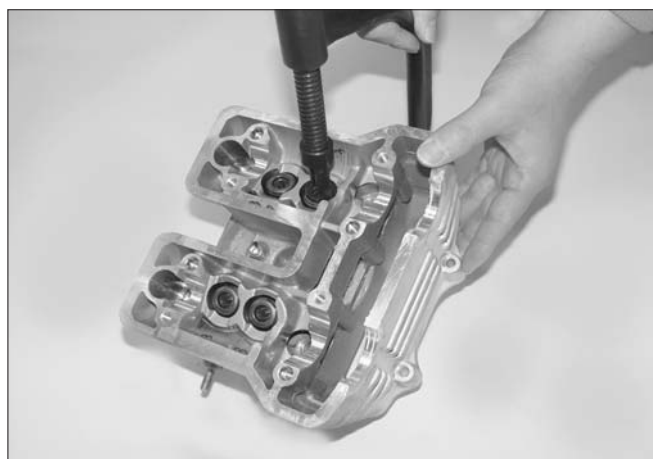


ASSEMBLY OF CYLINDER HEAD

- Assemble valve spring seat and new stem seal.
- Apply molybdenum to valve stem. In order not to damage stem seal, rotate slowly valve and assemble it to guide.
- Check whether valve moves smoothly up and down.



- Assemble so that narrow pitch of valve spring is toward cylinder head.



- Assemble spring retainer.
- Assemble valve cotter by compressing valve spring.
TOOL : VALVE SPRING COMPRESSOR

CAUTION

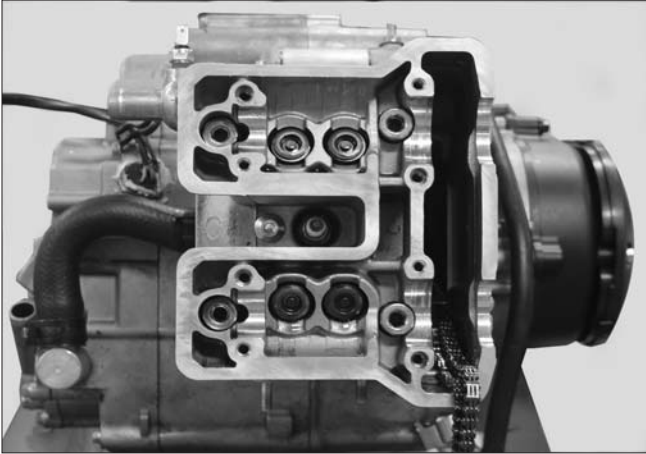
- Do not compress valve spring more than necessary



- Knock 2~3 times slightly the end of valve stem so that valve and cotter are placed safely.

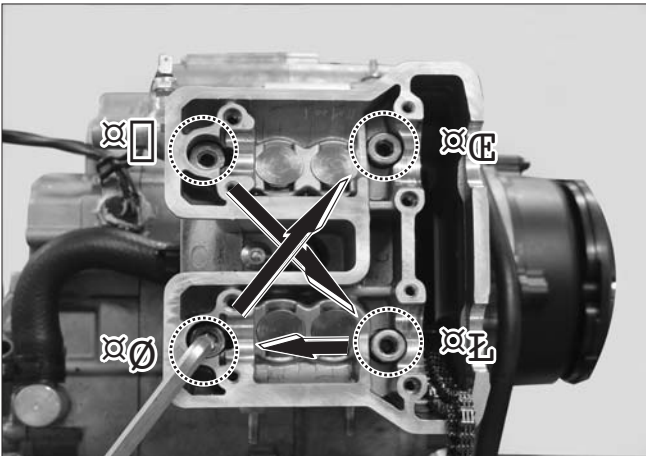
CAUTION

- Take precaution for valve not to be damaged.



INSTALLATION OF CYLINDER HEA

- Assemble cam chain guide to cylinder
- Assemble dowel pin and new cylinder head gasket
- Assemble cylinder head

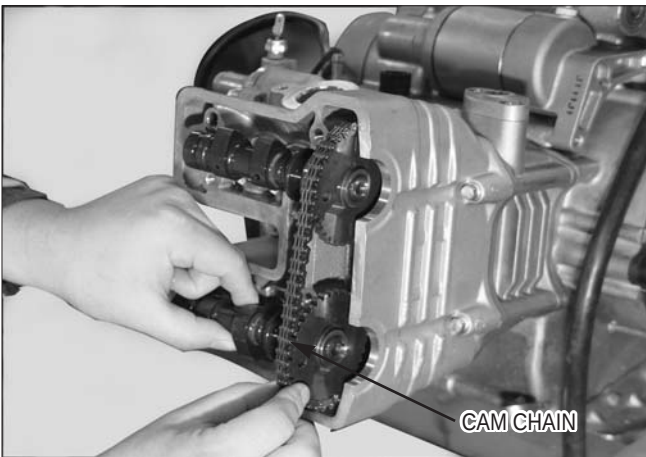


- Assemble special nut
- ※CAUTION : cylinder head special socket nut(M8 X 1.25)
At assembly, assemble as following picture sequence by dividing two times.

Half assembling → 2) assemble by correct torque → 3) assemble by correct torque → 4) assemble by correct torque → 1) assemble by correct torque

TORQUE : 4.0kgf-m

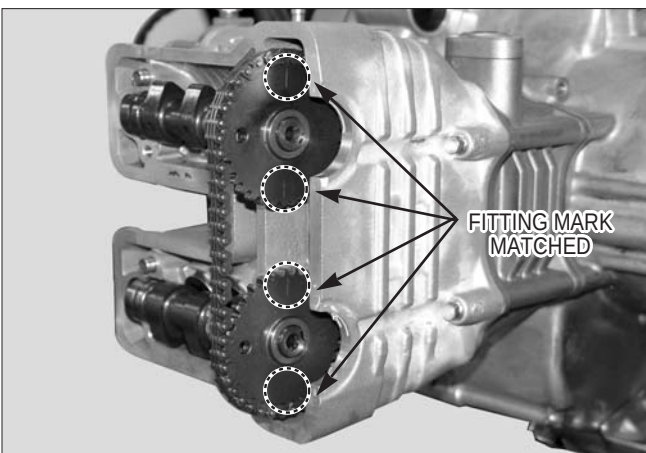
- Assemble the valve lead diassembled to fit to its position.



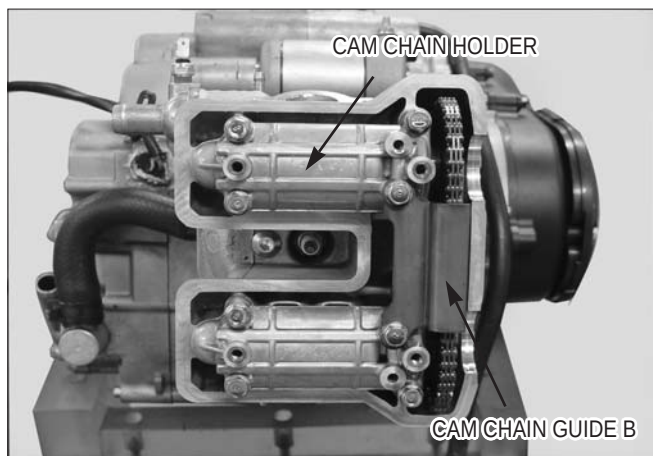
- After checking on something wrong of cam shaft comp, assemble it to the back of cylinder head.
- Rotate slowly crank shaft and fit the T mark of fly wheel to RH. Crank case cover.

CAUTION

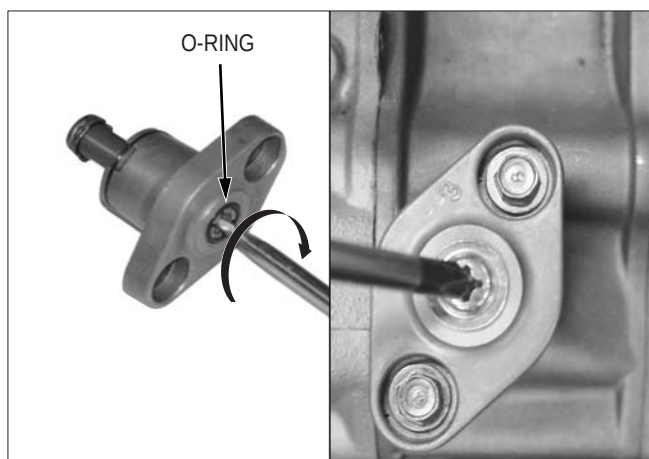
- When rotating crank shaft, take precautions so that cam chain does not come from timing gear of crank shaft.



- Hang cam shaft sprocket to cam chain and assemble it to cylinder head.
- By squaring timing mark of cam sprocket to the upper side of cylinder head, fit to the upper level.
- Apply engine oil to cam shaft.



- Assemble dowel pin to cylinder head.
- Assemble cam shaft holder, then install flange bolt.
- Assemble cam chain guide B.

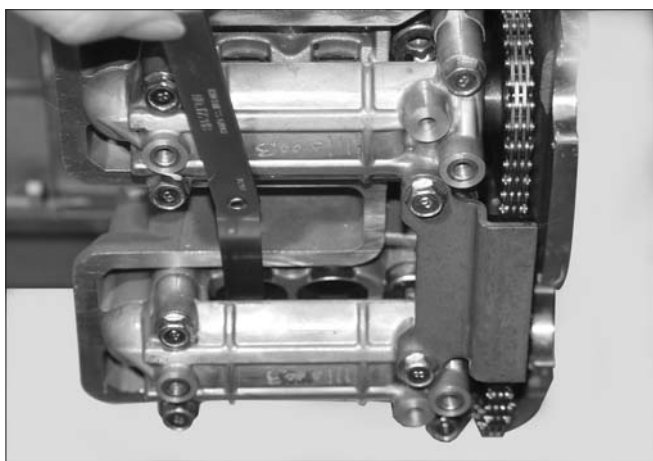


- Rotating tensioner shaft by small driver to the right, fix shaft by putting it completely into lifter body.

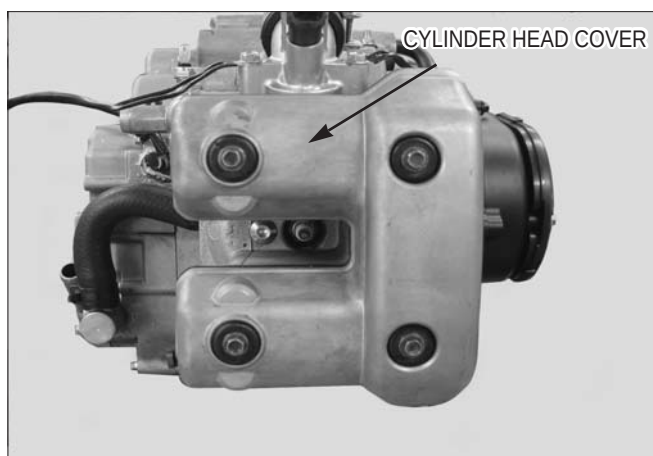
- Assemble new gasket to the cylinder.
- Assemble tensioner lifter bolt
TORQUE : 1.2 kgf · m
- Insert O-ring to the home of lifter body and install screw.
TORQUE : 0.4kgf · m

CAUTION

- If falling tensioner shaft, the shaft goes forward due to spring power.



- Check valve gap
- If valve gap does not fit, adjust valve lead.
IN VALVE GAP : 0.15mm
EX VALVE GAP : 0.25mm



- After removing oil in 顔, assemble correctly the gasket of cylinder head cover to cover.
- Assemble cylinder head cover
- Install cylinder head cover.
TORQUE : 1.0kgf · m

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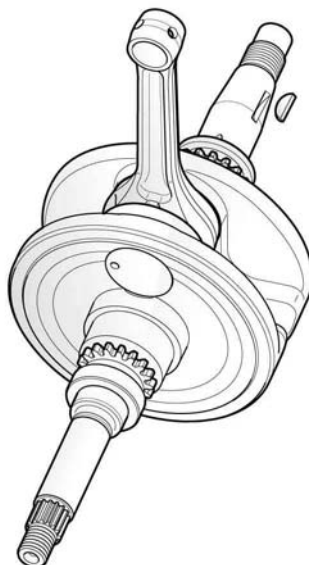
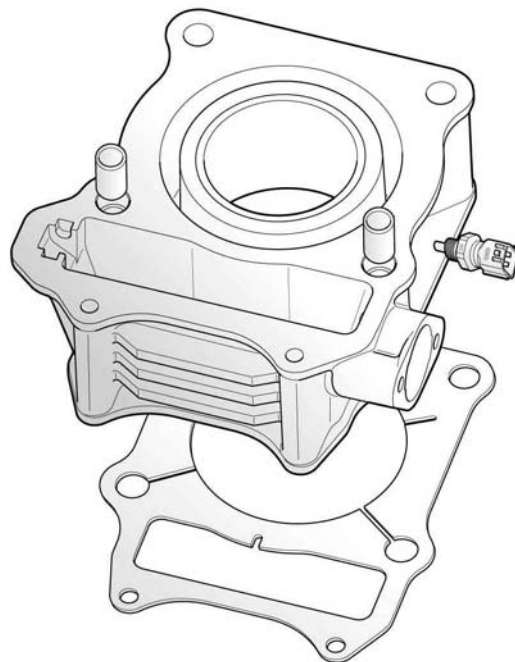
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11. CYLINDER / PISTON

SERVICE INFORMATION . . . 11-1	CYLINDER 11-2
SERVICE STANDARDS . . . 11-1	PISTON 11-3
TROUBLE SHOOTING . . . 11-1	PISTON / ASSEMBLY OF CYLINDER 11-5

SERVICE INFORMATION

GENERAL SAFETY

- Be careful not to damage the mating surfaces by using a screwdriver when disassembling the cylinder. Do not strike the cylinder too hard during disassembly, even with a rubber or plastic mallet, to prevent the possibility of damage to the cylinder pins.
- Take precautions not to damage the cylinder wall and piston

SPECIFICATIONS

unit : mm

ITEM			STANDARDS	SERVICE LIMIT
CYLINDER	INNER DIAMETER		56.505 ~ 56.565	56.6
	TAPER		-	0.1
	OUT-OF-ROUND		-	0.05
	HEAD CONTACT WARPAGE		-	0.1
PISTON, PISTON PIN, PISTON RINGS	PISTON SKIRT OUTER DIAMETER		56.450 ~ 56.470	56.35
	PISTON PIN HOLE INNER DIAMETER		15.002 ~ 15.008	15.04
	PISTON PIN OUTER DIAMETER		14.994 ~ 15.000	14.96
	PISTON-TO-PISTON PIN CLEARANCE		0.002~0.014	0.02
	PISTON RING TO GROOVE CLEARANCE	TOP	0.015~0.050	0.09
		SECOND	0.015~0.045	0.09
	PISTON RING JOINT GAP	TOP/SECOND	0.35~0.45	0.5
		OIL(SIDE RAIL)	0.2~0.7	1.1
CYLINDER-TO-PISTON CLEARANCE			0.035 ~ 0.065	0.30
CONNECTING ROD SMALL END INNER DIAMETER			15.010~15.028	15.06
GAP BETWEEN CONNECTING ROD SMALL END AND PISTON PIN			0.010~0.034	0.04

TROUBLE SHOOTING

Compression pressure too low

- Piston worn
- Piston ring worn or damaged
- Cylinder worn

Emission of white gas from muffler

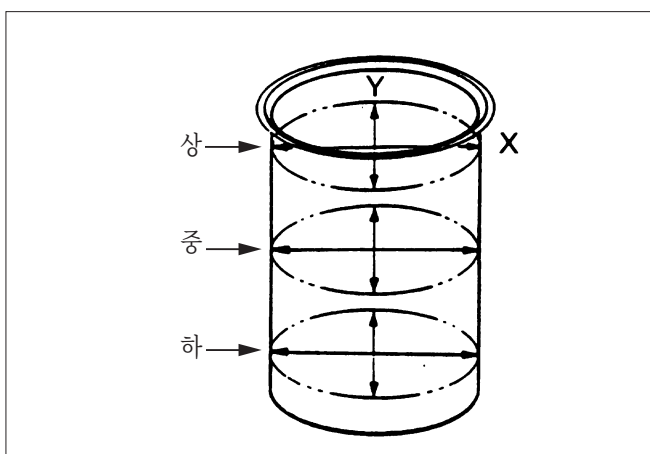
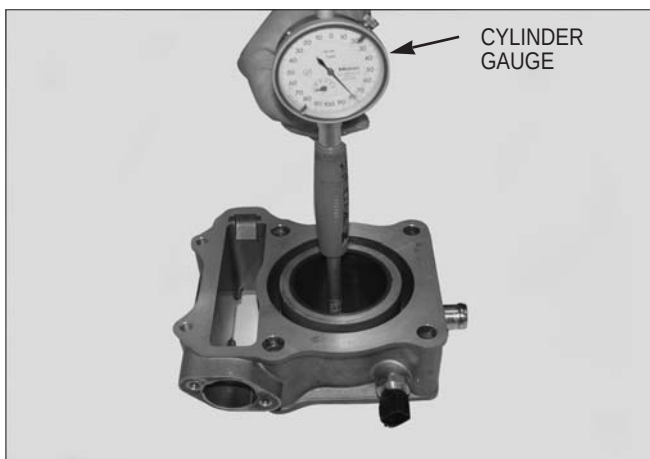
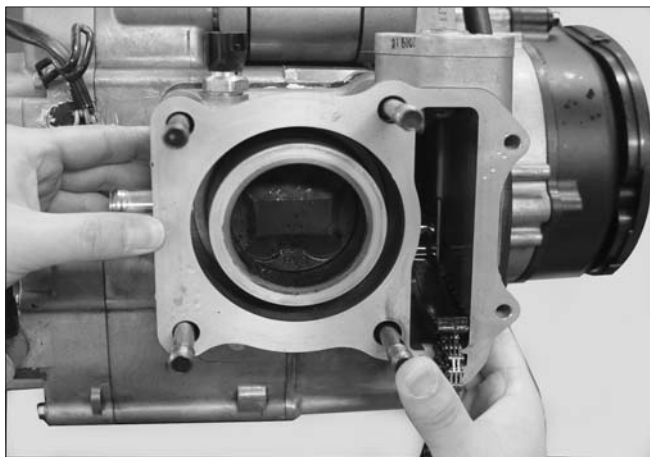
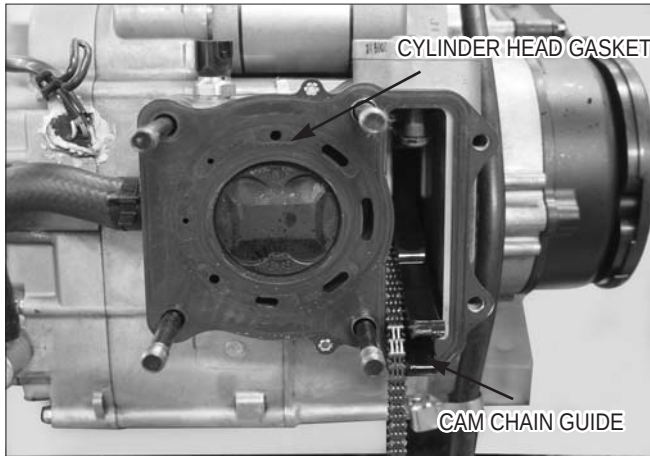
- Cylinder, piston, piston rings worn
- Bad adjustment of piston rings
- Piston, cylinder worn

Over heated

- Excessive carbon built up on top of piston

Abnormal engine noise

- Cylinder, piston worn
- Worn connecting rod small end bearing or piston pins
- Damaged piston rings
- Excessive carbon built up on top of piston



CYLINDER

DISASSEMBLY

- Disassemble cylinder head(부10-4)
- Disassemble cylinder head gasket
- Disassemble cam chain guide from cylinder

- Disassemble cylinder
- Remove gasket from cylinder

CAUTION

- Take precaution for touched area of gasket of cylinder not to be damaged.

INSPECTION

- Measure the inner diameter of cylinder from 6 position of top, middle, bottom by the direction of piston pin and by the rectangular direction(X-Y direction).
- Be the maximum measured value to that of inner diameter of cylinder.

SERVICE LIMIT : 56.60mm

- Measure the outer diameter of piston.
- Minusing the value of outer diameter of piston from that of inner diameter of cylinder, measure the gap between cylinder and piston.
- By each measured values, calculate the out-of-roundness(X and Y direction) and cylindricity(the value of inner diameter of top, middle, bottom by the direction of X or Y).

- By choosing the maximum values among the values, they are out-of-roundness and cylindricity.

SERVICE LIMIT : OUT-OF-ROUNDNESS : 0.05mm

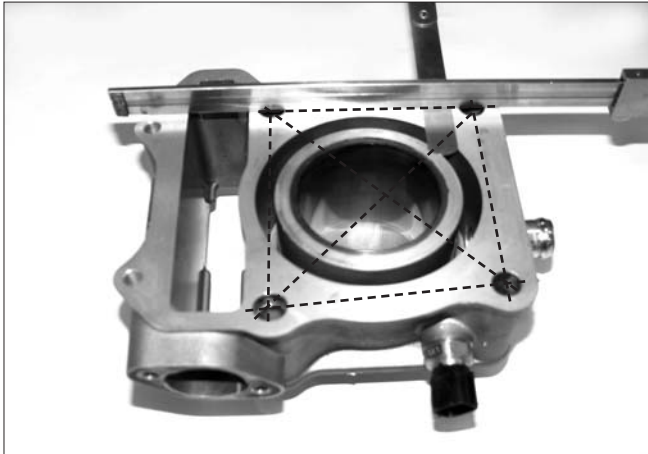
CYLINDRICITY : 0.1mm

- Boring processing of cylinder shall be done till the gap between cylinder and piston will be standard value by measuring the outer diameter of over-sized piston.

OVER SIZE : 0.25mm, 0.50mm

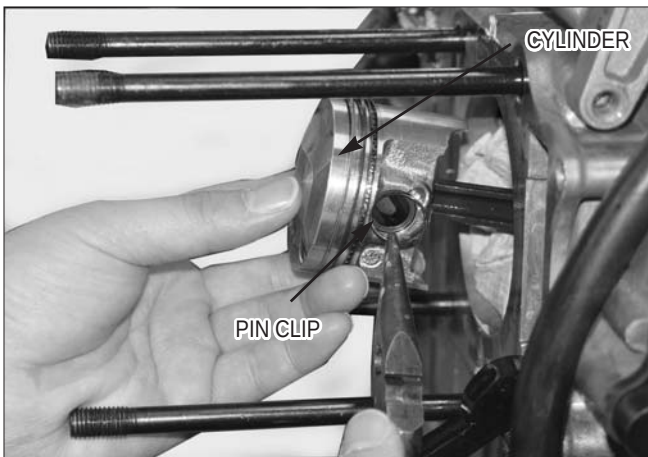
0.75mm, 1.00mm

STANDARD GAP : 0.020~0.050mm



- Check the twistness of the touched area of cylinder head gasket.

SERVICE LIMIT : 0.1mm



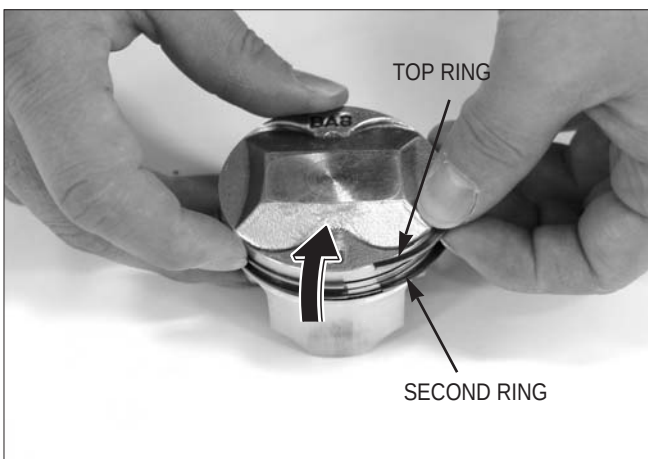
PISTON

DISASSEMBLY

- Pull out piston pin clip.

CAUTION

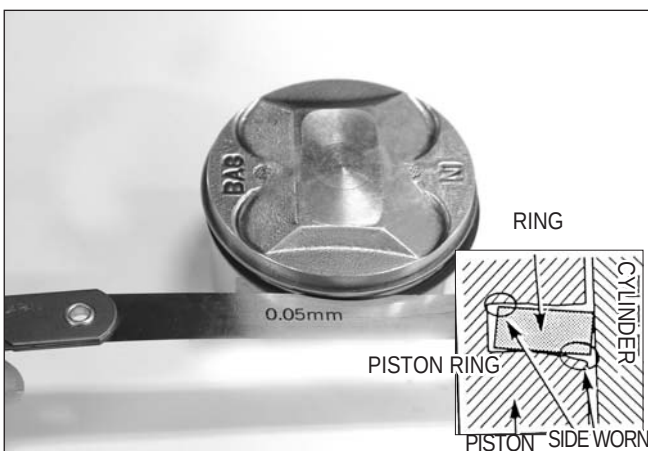
- Be careful for the piston pin clip in crank case not to be fall down.
- Disassemble piston by pulling out piston pins.



- Disassemble piston top ring
- Disassemble piston second ring

CAUTION

- At disassembly, do not hurt the piston by piston ring

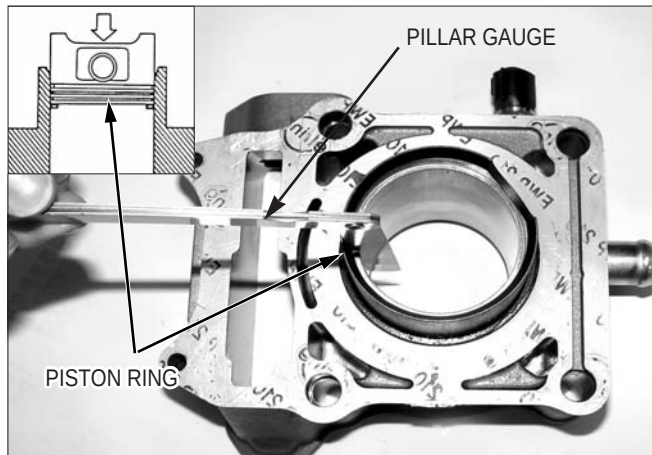


- Measure the gap between piston ring and home

SERVICE LIMIT : TOP/SECOND : 0.09mm

O-RING : 0.09mm

- Measure the abrasion and damage of piston.



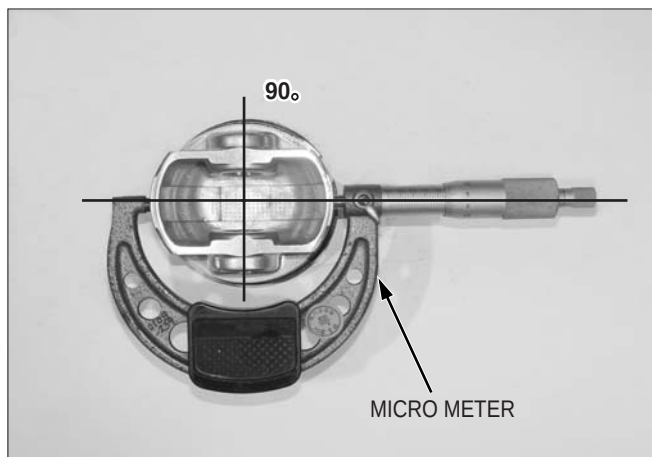
- Check the gap of piston ring by inserting it to the inside of cylinder.

SERVICE : TOP/SECOND : 0.5mm

OIL : 1.1mm

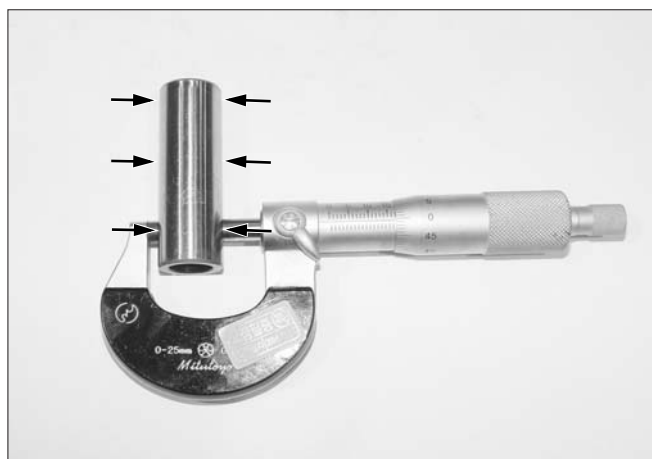
CAUTION

- Insert piston ring by using piston head so that the piston ring will be flat.



- Measure the outer diameter of piston at 10mm from the bottom side of piston to the 90° direction against piston pin.

SERVICE LIMIT : 56.35mm



- Measure the inner diameter of the hole of piston pin.

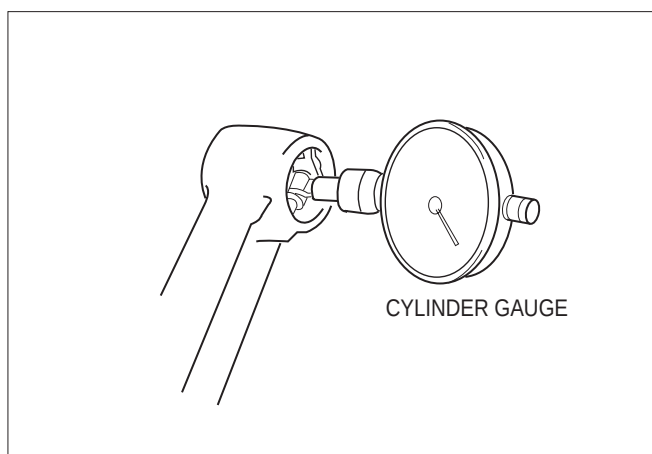
SERVICE LIMIT : 15.04mm

- Measure the outer diameter of piston pin.

SERVICE LIMIT : 14.96mm

- Measure the gap between piston and piston pin

SERVICE LIMIT : 0.02mm

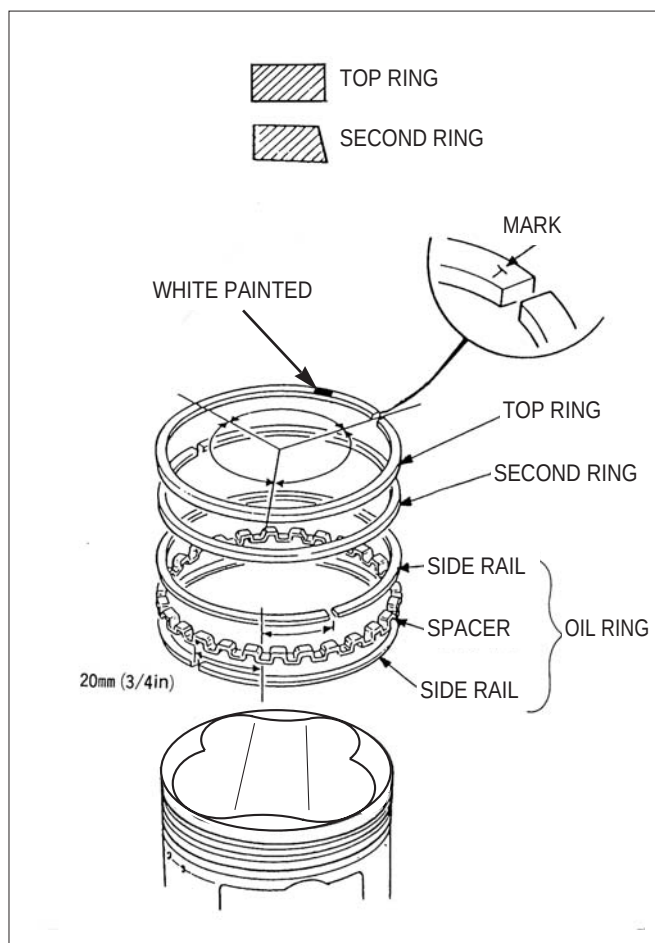


- Measure the inner diameter of small side of connecting rod.

SERVICE LIMIT : 15.06 mm

- Measure the gap between small side of connecting rod and piston pin.

SERVICE LIMIT : 0.04mm



ASSEMBLY OF PISTON / CYLINDER

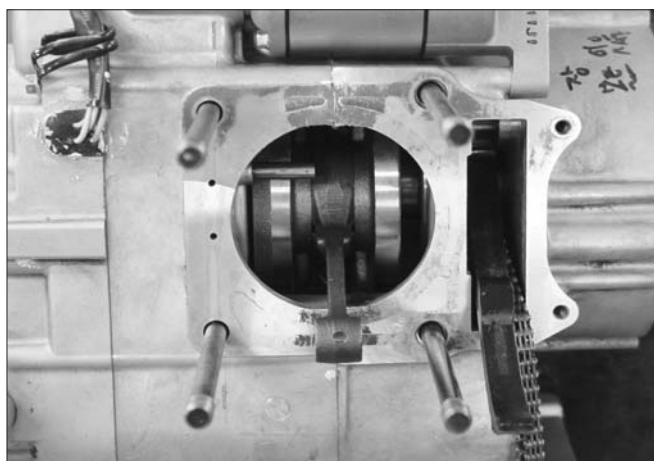
ASSEMBLY OF PISTON RING

- Clean 顔 of piston ring by oil and fit piston ring into piston.

CAUTION

- Because ring can be easily cut, then take precaution that it is not cut and for piston not to be damaged during assembling.
- Assemble so that the mark side of ring shall be upward
- Be careful not to be confused in distinguishing top ring and second ring.
- Be sure for the end gap of each ring to be 120°.

- Check about smooth operation of ring after assembling.

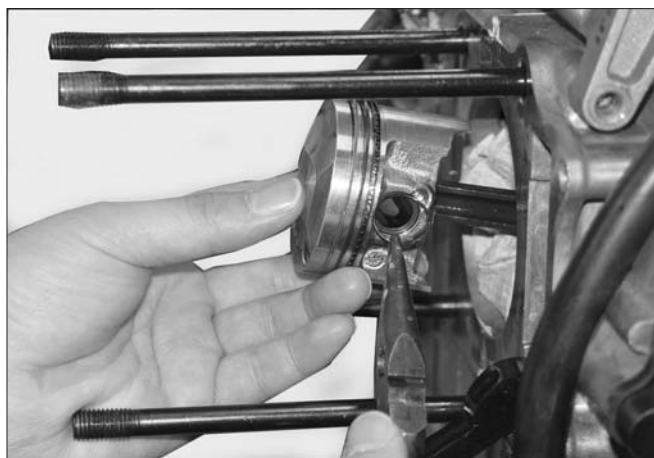


ASSEMBLY OF PISTON AND CYLINDER

- Clean completely gasket attached to the surface of crank case and replace with new gasket.

CAUTION

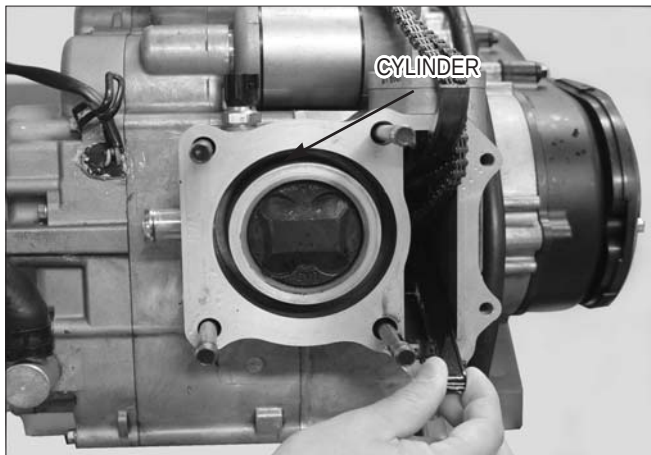
- Take precaution for contact side of gasket not to be damaged.
- By using cloth, protect for alien material like piece of gasket not to fall into crank case.



- Insert piston, piston ring to cone rod.
- Assemble with the new piston pin clip.

CAUTION

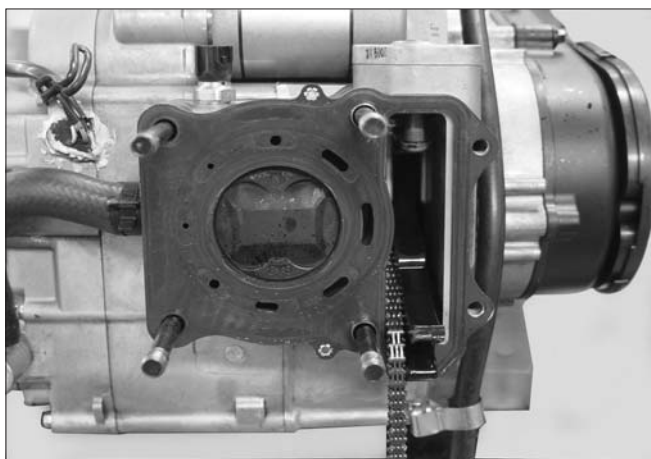
- The "IN" mark shall be toward to the in valve.
- By using of cloth, protect for piston pin clip not to fall into crank case.
- Be sure that piston pin clip and piston home are not fit each other.



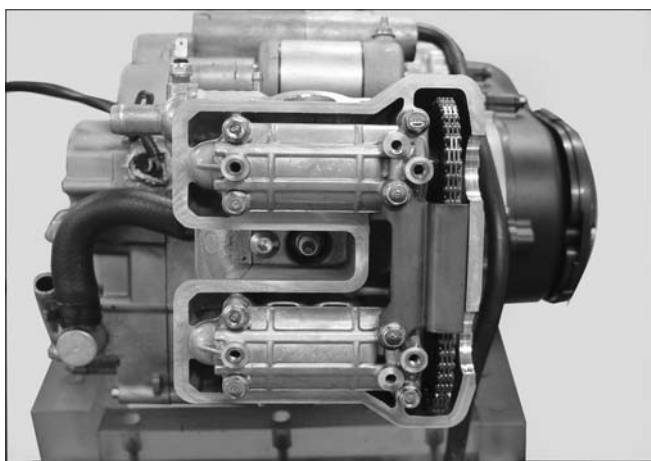
- Apply the engine oil to the inside of cylinder and piston ring, assemble piston to cylinder.
- Combine cam chain guide.
 - Insert the bottom side to 顔 of crank case and assemble the upper swelling of guide to 顔 of cylinder.

CAUTION

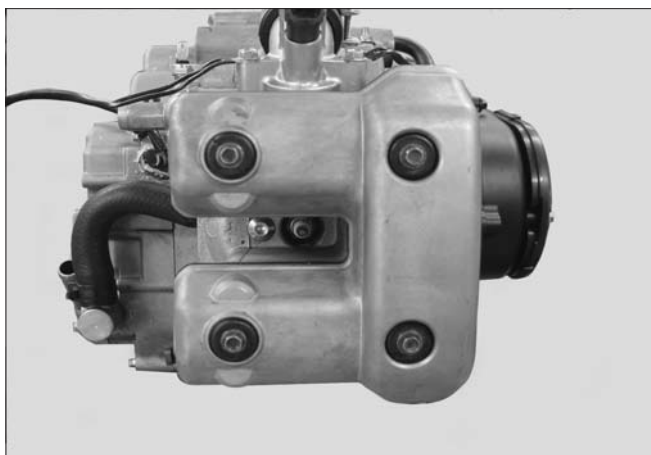
- Take precautions for piston ring not to be damaged.
- Take precautions for cam chain not to fall into crank case.



- Assemble with the new cylinder head gasket.



- Assemble cylinder head(⇒10-9)



- Assemble in the reverse order of disassembly.

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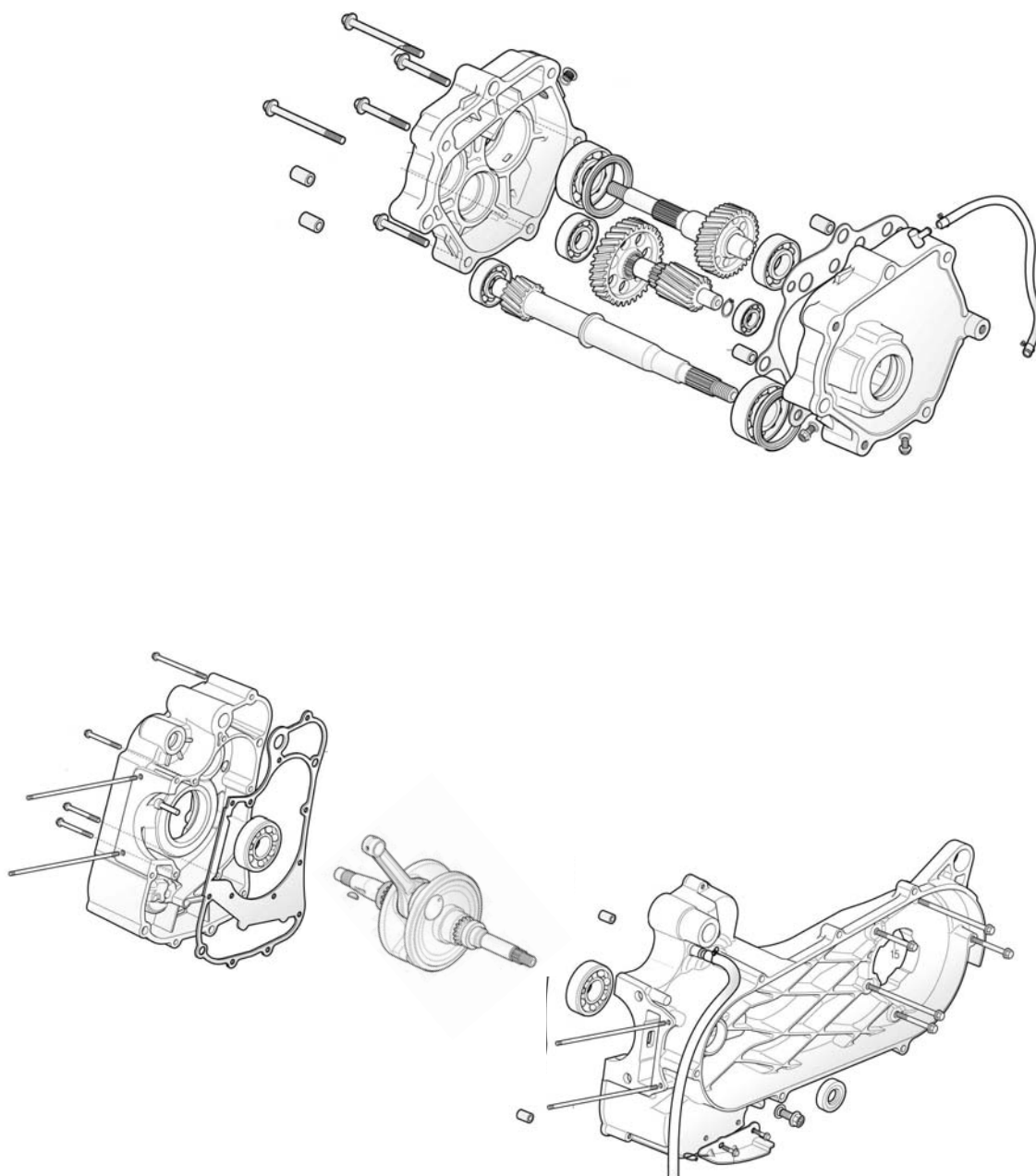
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12. TRANSMISSION / CRANKSHAFT / CRANKCASE

SERVICE INFORMATION . . . 12-1

TROUBLE SHOOTING 12-2

TRANSMISSION 12-3

CRANK CASE REMOVAL . . . 12-7

CRANK SHAFT REMOVAL . . . 12-7

TRANSMISSION BEARING . . 12-8

CRANK SHAFT ASSEMBLY . . 12-9

CRANK CASE ASSEMBLY . . . 12-10

SERVICE INFORMATION

GENERAL SAFETY

- This section describes how to remove the crank case and to maintain the transmission and the crankshaft.
- Service transmission without removing the engine from the vehicle. However, to prevent damage to the LH. Crank case, remove the engine and disassemble the rear brake prior to changing the LH. Crank case bearing
- Always use special tools to change the drive shaft. Fix the bearing inner race, and install the shaft
- The following parts must be removed prior to removing the crank case. Follow the removal procedure specified in each section.
 - Disassembly of oil pump(⇒ chapter 4)
 - Disassembly of engine(⇒chapter 7)
 - Disassembly of cylinder head, cylinder, piston(⇒chapter 10,11)
 - Disassembly of AC. Generator(⇒ chapter 9)
 - Disassembly of driven pulley(⇒ chapter 8)
- When replacing the LH crank case, follow the below procedure specified in each section.
 - Disassemble the transmission(⇒ chapter 12)

SPECIFICATIONS

UNIT : mm

ITEM		STANDARD VALUE	SERVICE LIMIT
CRANK SHAFT	CONNECTING ROD	0.15~0.60	0.6
	GAP OF BIG END SIDE	0.1~0.35	
	CONNECTING ROD BIG END	0 - 0.008	0.05
	CRANKSHAFT	RIGHT	0.1
	SHAKING	LEFT	0.1

SPECIFICATIONS

OIL CAPACITY	0.15L(Full capacity) 0.14L(After oil change)
RECOMMENDED OIL	DAELIM genuine mission oil or SAE 80W/90

TORQUE

CRANK CASE BOLT 1.0kgf · m

TOOL

- UNIVERSAL BEARING PULLER
- BEARING REMOVER SET
- REMOVER ASS'Y
- REMOVER SHAFT
- REMOVER HEAD
- SLIDING WEIGHT
- ASSEMBLY SHAFT

TROUBLE SHOOTING

Engine Noise

- Connecting rod big and small ends loose
- Crank pin bearing loose free play

Engine started but unable to move out

- Transmission damage
- Transmission seized

Noise during operation

- Gear worn, overheated, cracked
- Bearing worn

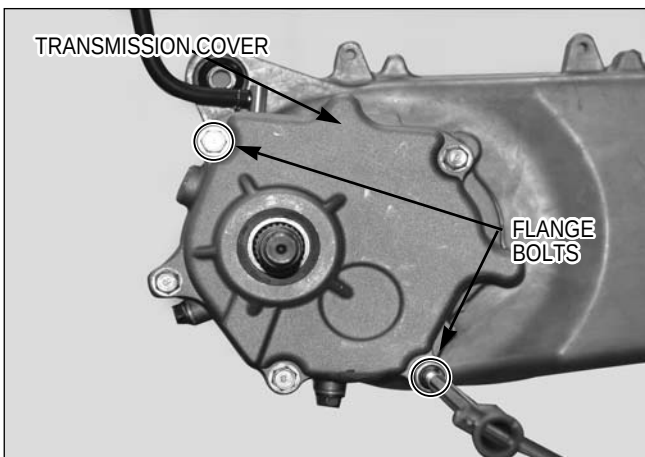
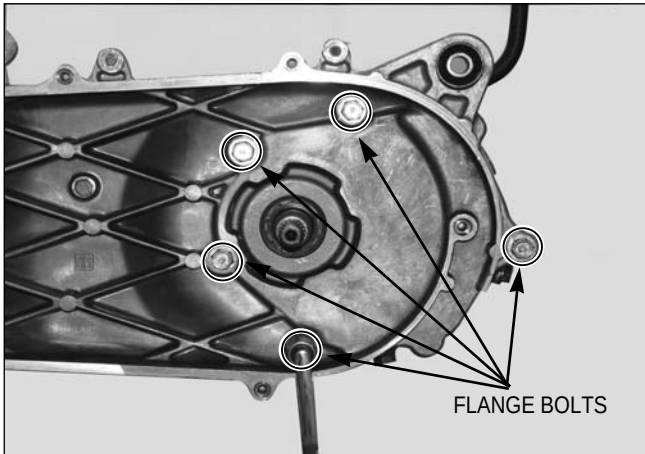
Oil leaks

- Excessive oil level
- Oil seal worn, damaged

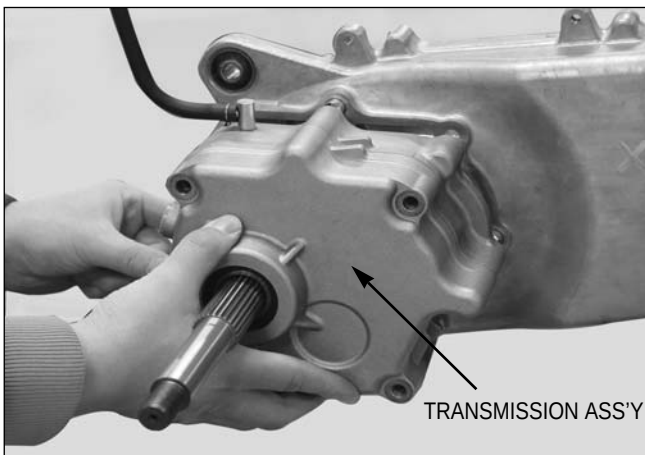
TRANSMISSION

DIASSEMBY

- Loosen the drain bolt, drain the mission oil.
- Disassemble the LH. crankcase cover.
- Disassemble the driven pulley, drive belt.
- Disassemble 5 flange bolts installed at LH. Crank case.



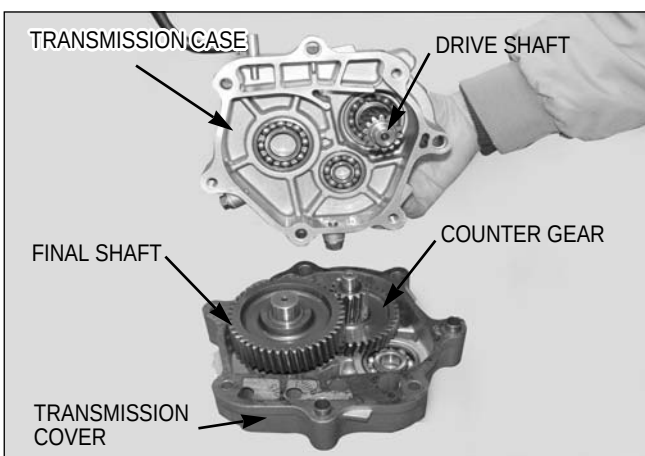
- Disassemble EX. Muffler.
- Disassemble rear cushion
- Disassemble rear swing arm
- Disassemble rear brake caliper
- Disassemble rear wheel
- Untie 2 flange bolts(85mm) installed at mission cover ass'y.



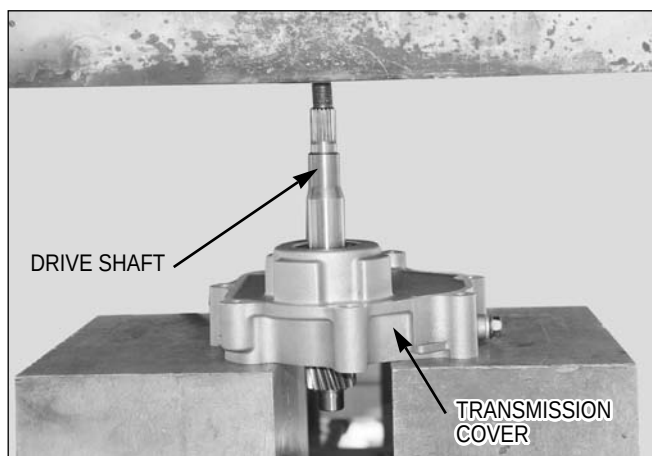
- Disassemble transmission ass'y

CAUTION

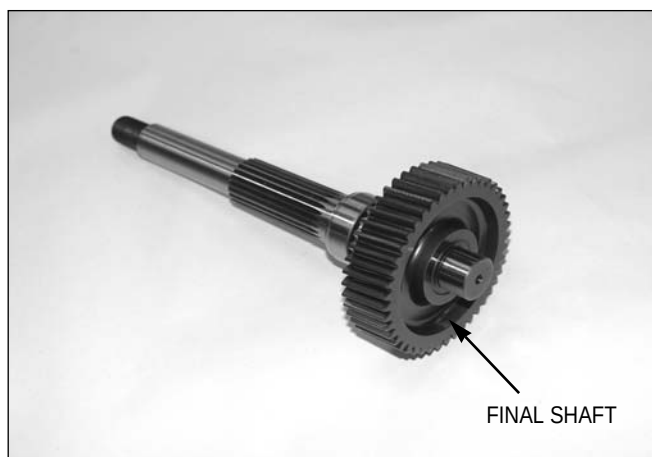
- Take precautions for the assemble position of cover not to be damaged.



- Untie 3 flange bolts installed at transmission ass'y.
- Disassemble transmission cover and case comp
- Disassemble final shaft, counter gear, counter shaft.

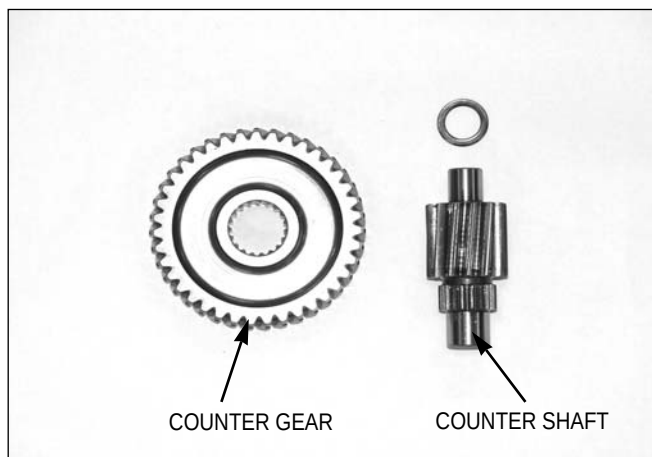


- Disassemble drive shaft pressed to the transmission cover by the press.

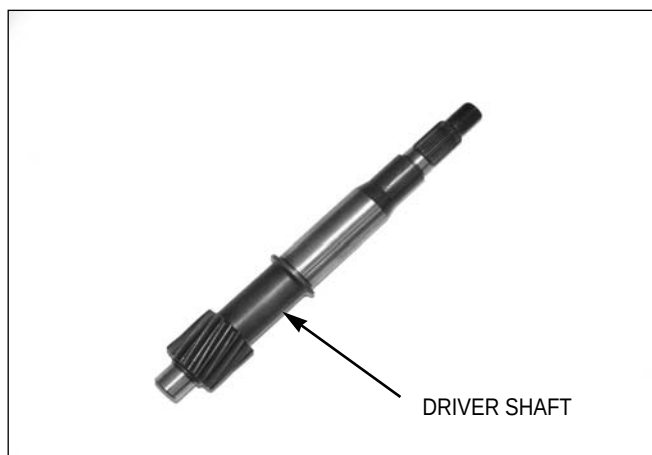


CHECK

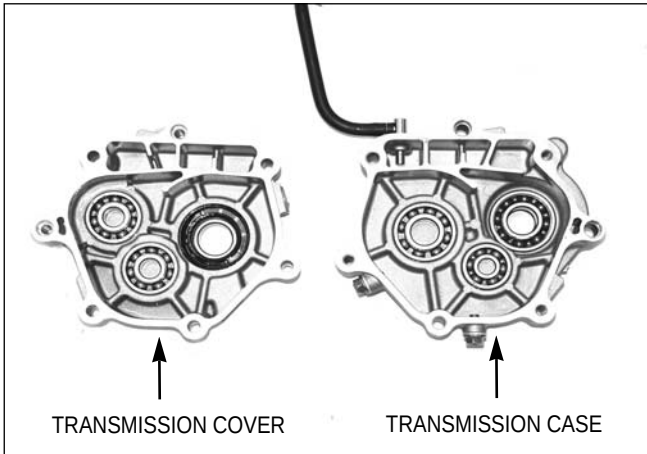
- Check the final shaft



- Check the counter shaft and gear



- Check the driver shaft



CHECKING BEARING

- Check whether the inner race of bearing pressed to mission cover and case rotates smoothly or not by turning fingers.
- Check whether the outer race assembled pressed correctly to the case.
- Replace the bearing if necessary

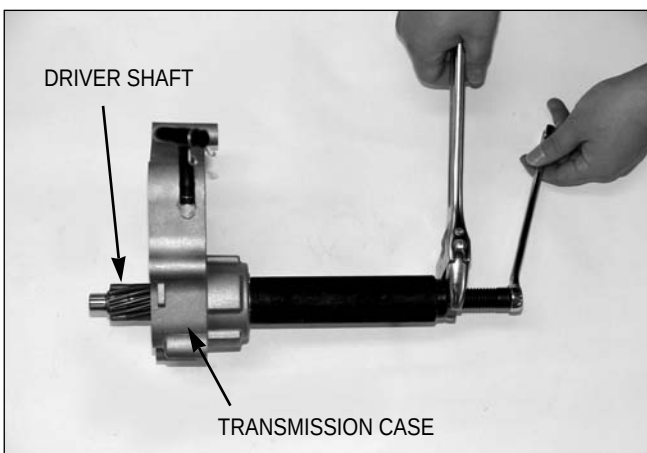


- Disassemble bearing by using of special tool



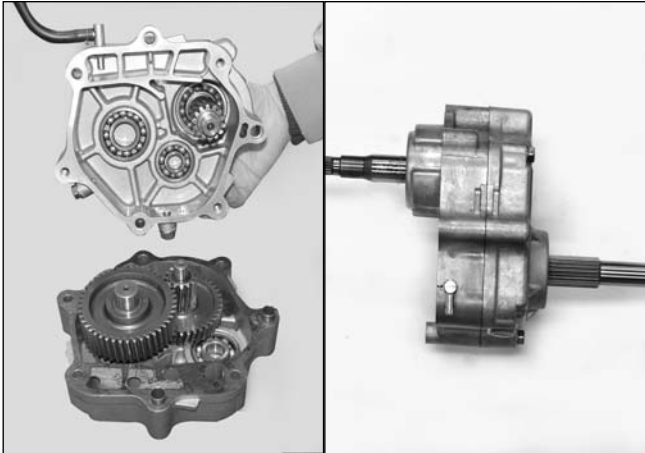
- Press the bearing into case by using of special tool
TOOL : DRIVER HANDLE A
OUTER DRIVER
DRIVER PILOT

12

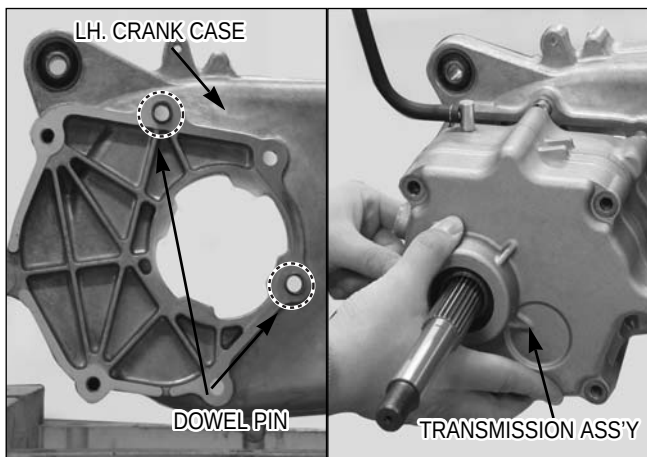


ASSEMBLY

- Assemble the drive shaft to transmission case
- Assemble the new drive shaft oil seal.
TOOL : CRANK ASSEMBLY SHAFT
CRANK ASSEMBLY COLLAR

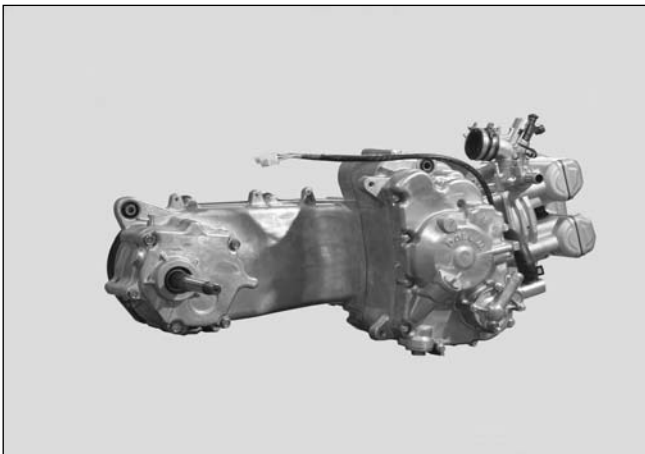


- Assemble the new gasket and dowel pin
- Assemble the final shaft, counter shaft.
- Assemble bolts after doing mission cover and cover



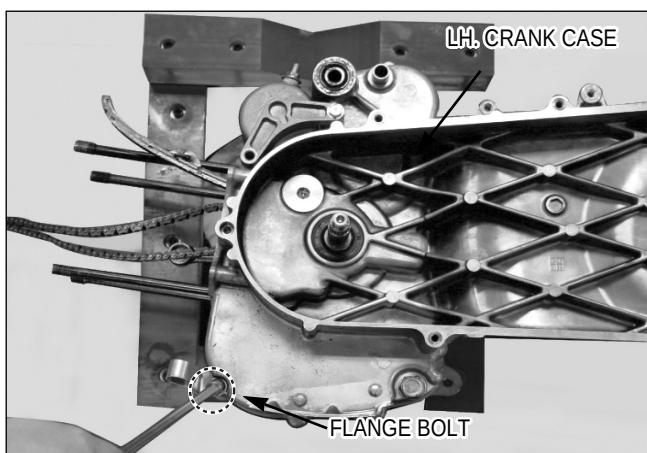
- Assemble transmission ass'y to LH. Crank case, then install bolts.
- Assemble the following parts
 - rear wheel assembly(⇒14-4)
 - rear swing arm assembly(⇒14-5)
 - rear brake caliper assembly(⇒16-8)
 - assembly belt typed continuously variable transmission(⇒8)
- Assemble rear cushion upper bolt
- By disassembling AC Generator cap, inject the mission oil(⇒4-8)

12

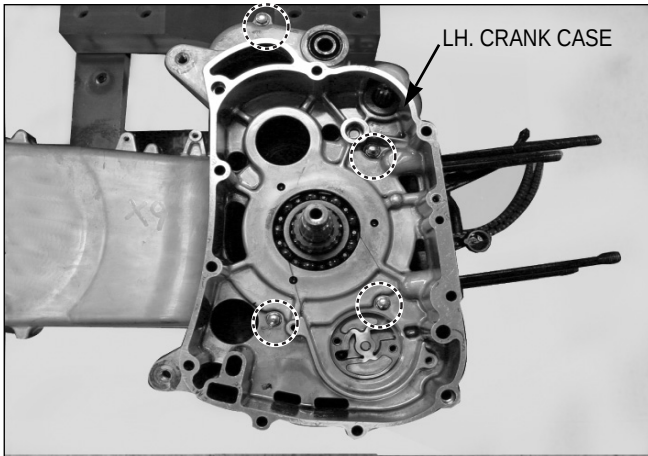


DIASSEMBLY OF CRANK CASE

- Unload the engine from frame(⇒7-2)
- Disassemble RH/LH Crank case cover(⇒8-2,9-2)
- Disassemble transmission cover(⇒12-3)
- Disassemble the parts to be necessary for disassembling of crank case



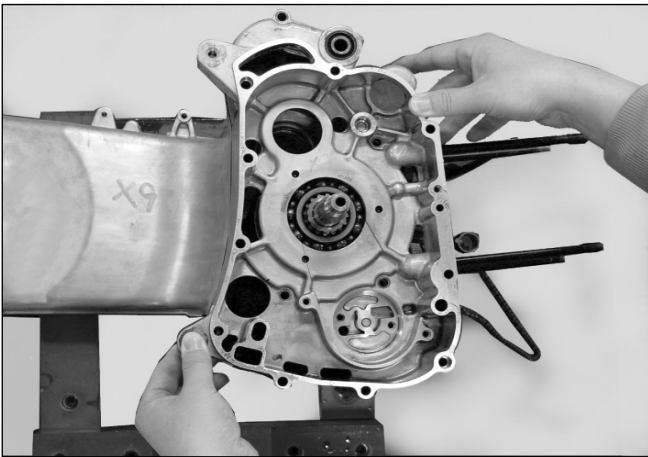
- Untie 1 flange bolt installed at LH. Crank case



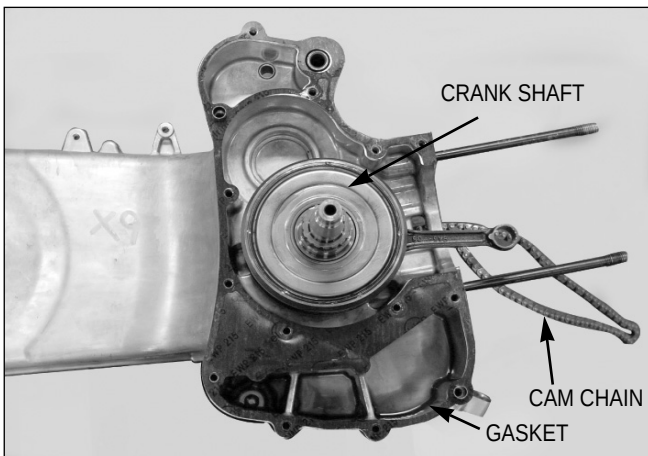
- Untie 4 flange bolts installed at RH. Crank case.

CAUTION

- Do not disassemble twistedly the fixing positin of crank case.

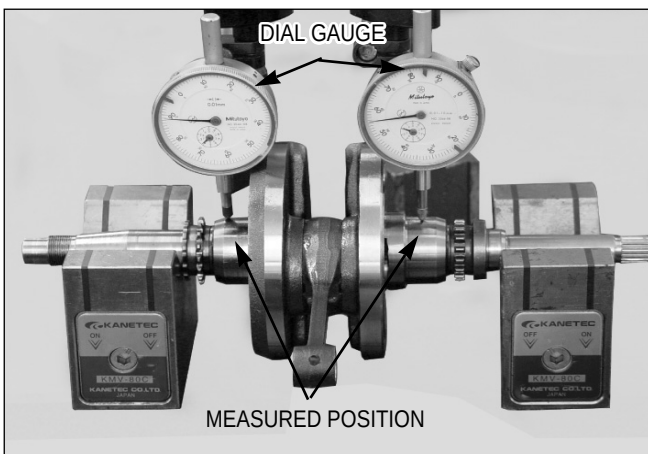


- Beat slightly by plastic hammer the LH. Crank case downward and disassemble RH. Crank case from LH. Crank case.



DISASSEMBLY OF CRANK SHAFT

- Because crank shaft is installed to RH/LH Crank case, lift up crank chast slightly upward and diassemble it.



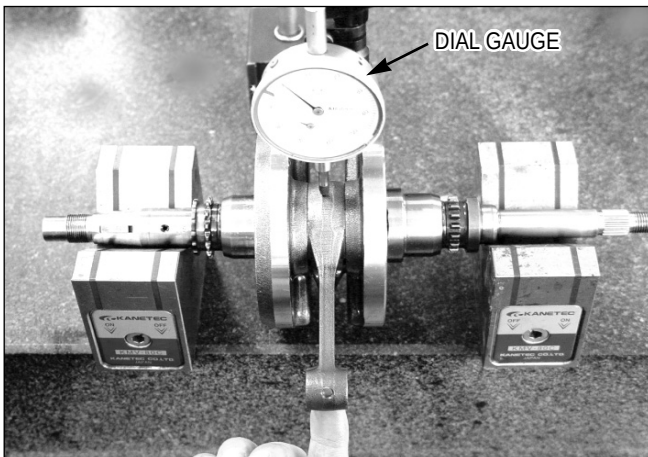
CHECK

- Install crank shaft to the stand or V block, measure and vibratioon of the journal position.

**SERVICE LIMIT : RIGHT 0.1mm
LEFT 0.1mm**

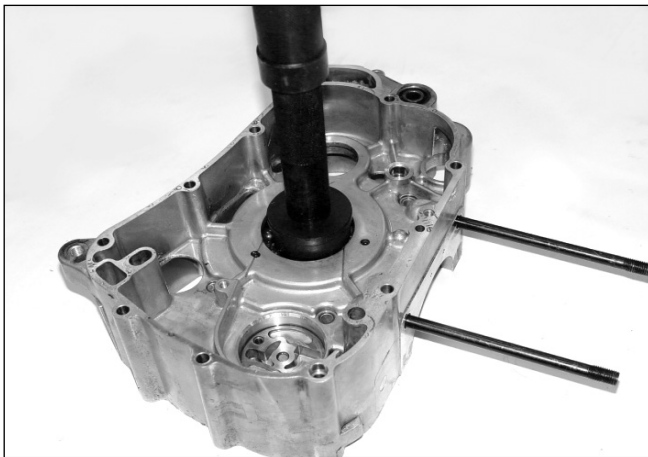


- Measure the gap between the big end of connecting rod and crank weight.
TOOL : PILLAR GAUGE



- Measure on movement of axle vertical way of the big end of connecting rod by X and Y directions.
SERVICE LIMIT : 0.05mm

12



CRANK CASE BEARING CHECKING

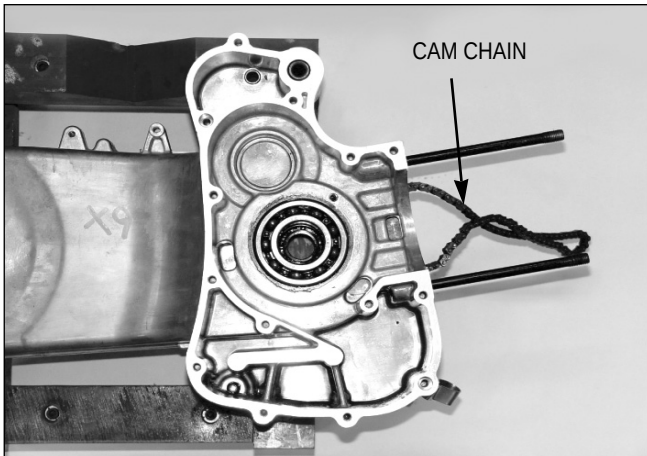
- Check by rotating the inner race of bearing with fingers on whether bearing rotates smoothly.,
- Also, check whether the outer race correctly pressed into the case or not.
- If the free play is big and the status of case pressing is loose, disassemble and replace.



DISASSEMBLY

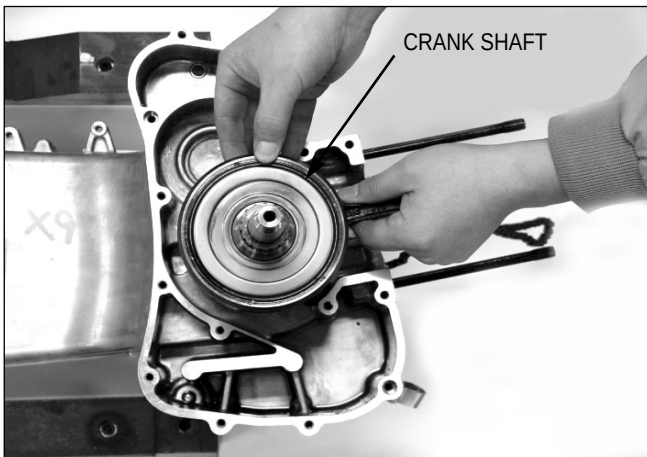
- Disassemble bearing by using of special tool.
- Apply clean engine oil to the new RH. Crank shaft bearing and press to RH. Crank case.

**TOOL : DRIVER HANDLE A
DRIVER PILOT
OUTER DRIVER**



ASSEMBLY OF CRANK CASE

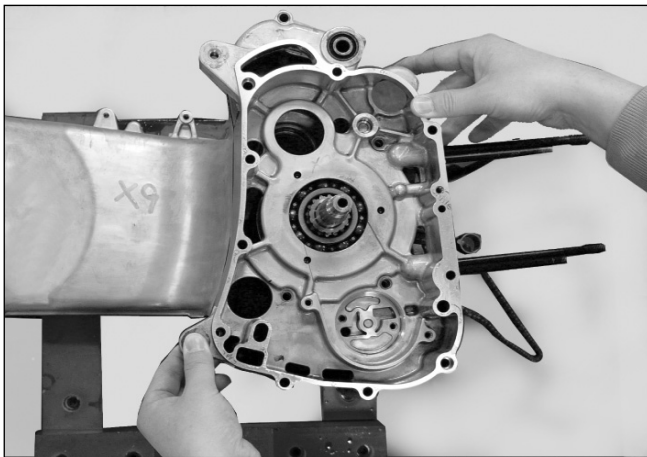
- Assemble cam chain to LH. Crank case.



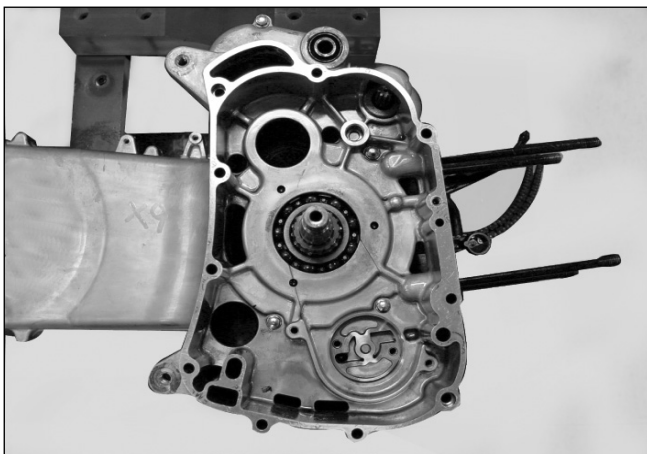
- Assemble crankshaft to the inside of cam chain assembled at LH. Crank case.
- Check whether cam chain assembled exactly to crank shaft
- Assemble dowel pin and new gasket

CAUTION

- Check whether the gasket completely attached without any gap.

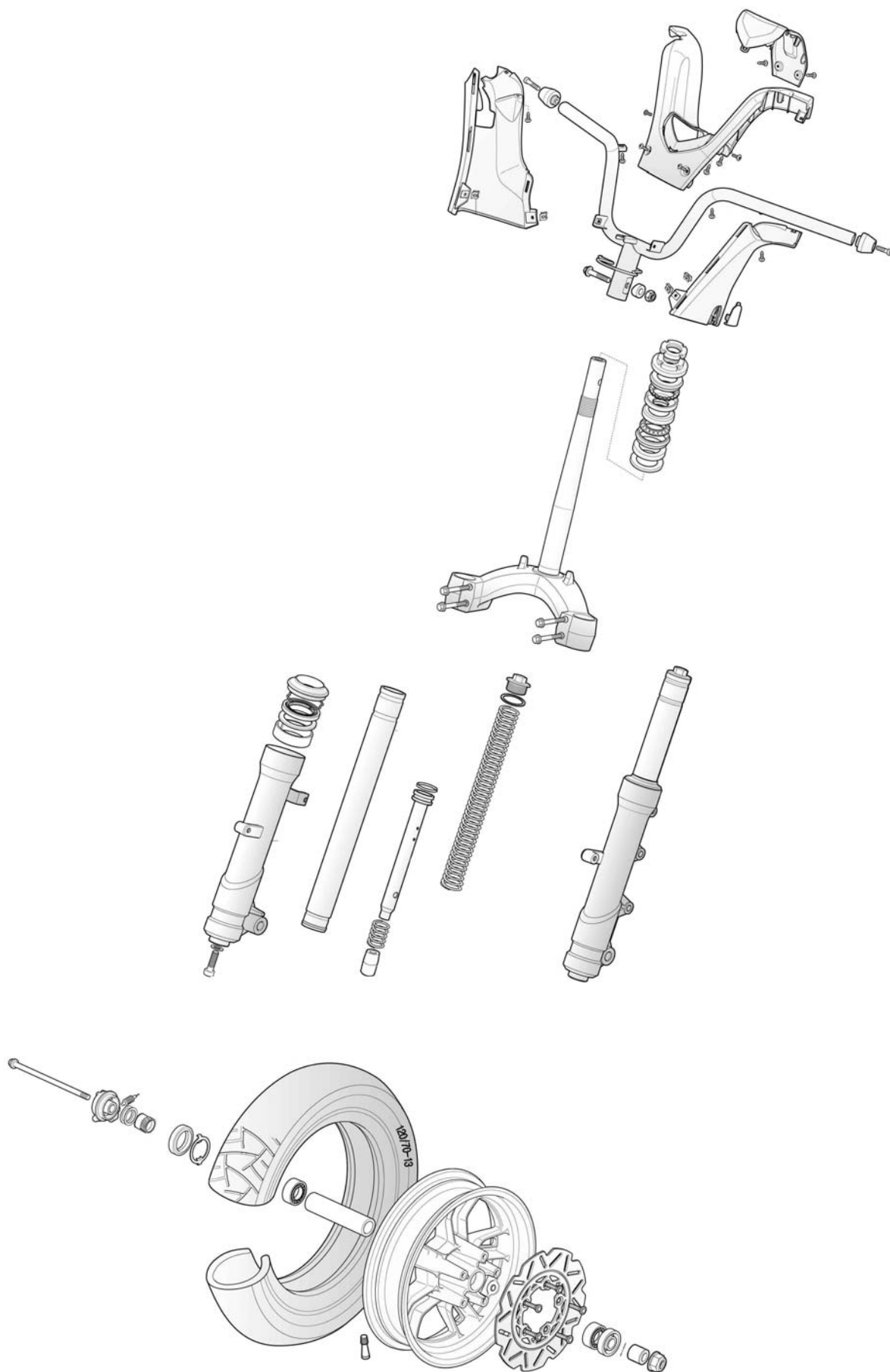


- Assemble RH. Crank case to LH. Crank case.



- Assemble flange bolt to RH. Crank case.
- Assemble required parts for assembling the engine.
- Assemble the engine to the frame(⇒7-3)

FRONT WHEEL / FRONT FORK / STEERING STEM



13. FRONT WHEEL / FRONT FORK / STEERING STEM

SERVICE INFORMATION . . 13-1

TROUBLE SHOOTING . . . 13-2

STEERING HANDLE 13-3

FRONT WHEEL 13-4

FRONT WHEEL BEARING . 13-5

SPEEDOMETER GEAR BOX 13-6

FRONT WHEEL ASSEMBLY 13-7

FRONT FORK 13-7

STEERING STEM 13-11

SERVICE INFORMATION

CAUTION

- Use special tire levers and rim protectors to remove or assemble tires to protect the rim from being damaged
- Place a jack underneath the engine to support the 2-wheeled vehicle

SPECIFICATIONS

UNIT : mm

ITEM		STANDARD VALUE(mm)	SERVICE LIMIT(mm)
AXLE SHAFT RUN OUT		-	0.2
FRONT WHEEL RIM RUN OUT	RADICAL	-	2.0
	AXIAL	-	2.0
FRONT CUSHION SPRING FREE LENGTH		281	

TORQUE VALUES

STEERING STEM LOCK NUT 6.0~8.0kgf · m

STEERING TOP CON RACE 0.2~0.3kgf · m

FRONT CUSHION BOLT 1.5~3.0kgf · m

FRONT AXLE NUT 5.0~7.0kgf · m

BRAKE CALIPER BOLT 2.8~3.4kgf · m

TROUBLE SHOOTING

Hard steering

- Steering top cone race excessively tightened
- Steering stem steel ball damaged
- Steering ball race, cone race damaged
- Insufficient tire pressure
- Tire worn

Steer to one side or does not track straight

- Bent fork
- Bent front axle
- Bent frame
- Worn or deformed tire
- Worn wheel bearing

Front wheel wobbling

- Rim deformed
- Bad wheel bearing

Wheel turning heavy

- Bad wheel bearing

Weak Front suspension

- Weak spring

Front cushion noise

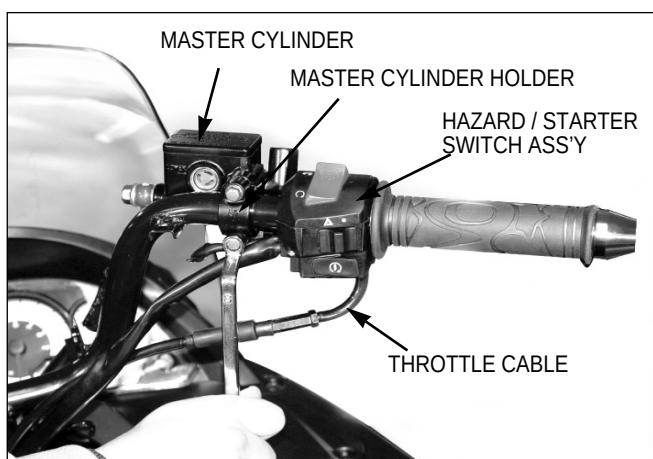
- Looseness of front cushion assembled position



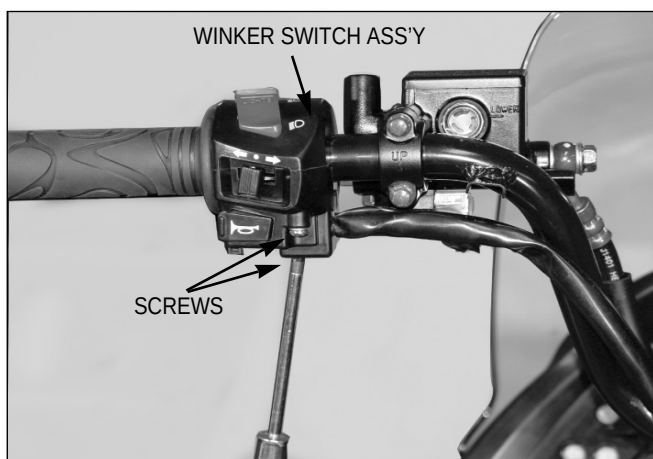
STEERING HANDLE

DISASSEMBLY

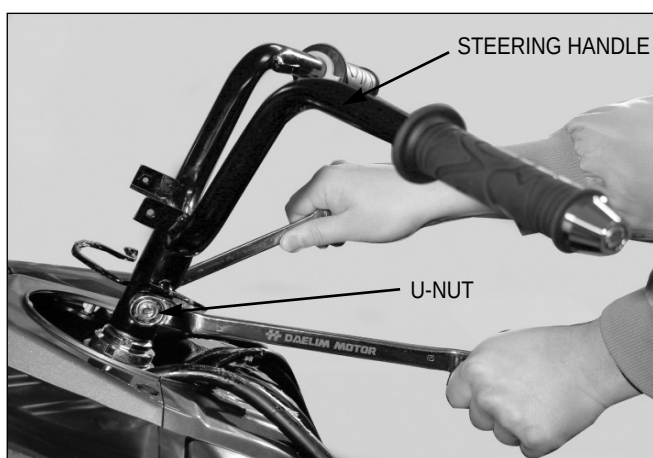
- Disassemble upper handle cover and under handle cover.



- Untie front, rear brake master cylinder holder bolts.



- Disassemble hazard starter switch ass' y.
- Disassemble throttle cable
- Disassemble winker switch ass' y



- Untie steering handle U nut and disassemble steering handle.

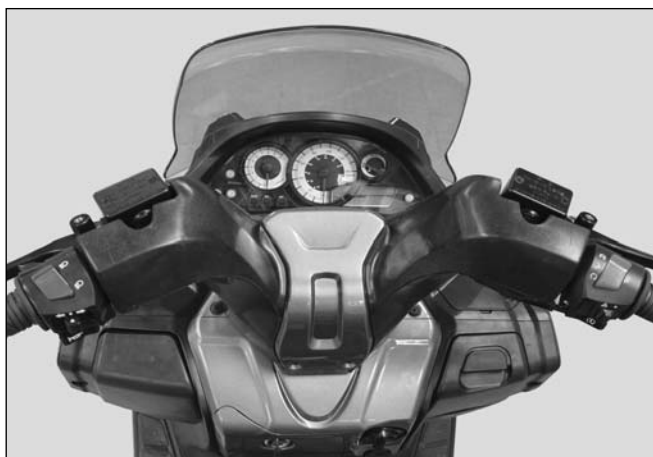


ASSEMBLY

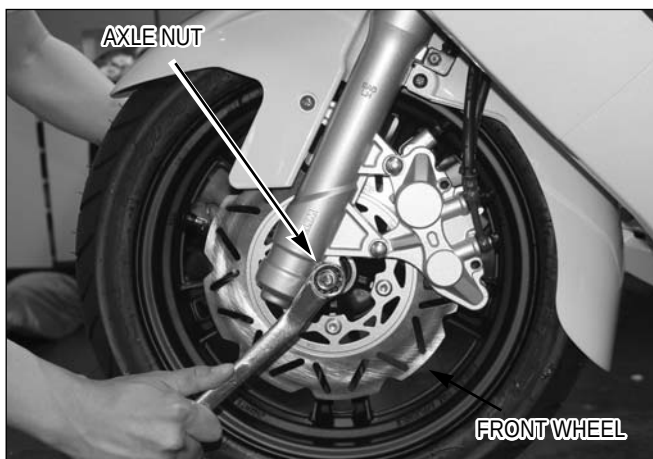
- Assemble steering handle to steering stem.
 - Fit the flange bolt and assemble lock nut.
- TORQUE : 5.8~6.5kgf · m**

CAUTION

- Adjust the free play of throttle grip to 2~6mm



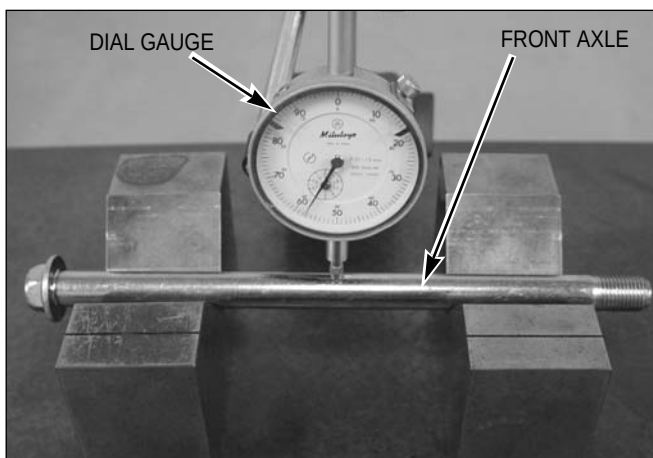
- Assemble in the reverse order of disassembly



FRONT WHEEL

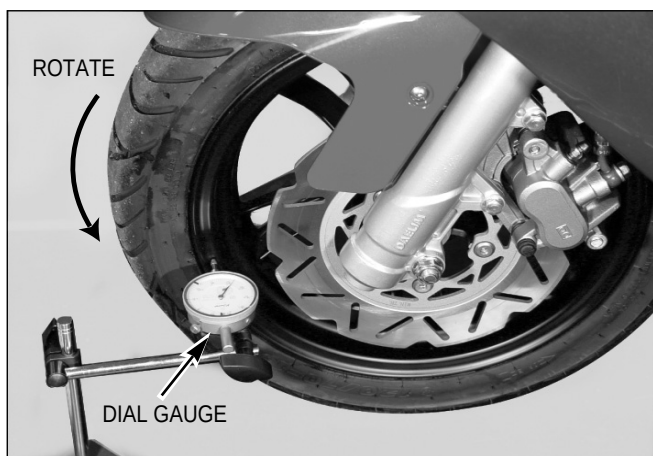
DISASSEMBLY

- Fix the front wheel not to be taken out from the ground by bridging.
- Untie axle nut and speedometer cable fixing screw, disassemble the wheel.



CHECK

- Check on bent of front axle. Install the front axle on the V block and measure it by dial gauge.
- SERVICE LIMIT : 0.2mm**

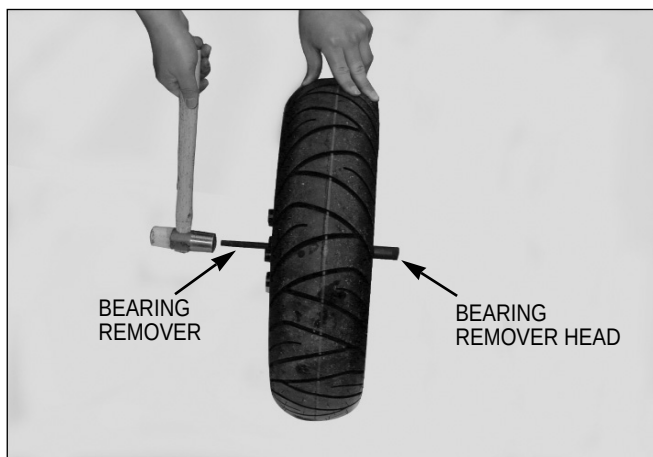


- Install the front wheel to stand. Turn slowly the wheel and check on the rim trembling by dial gauge.
**SERVICE LIMIT : longitudinal 2.0 mm
Lateral 2.0 mm**



FRONT WHEEL BEARING CHECK

- Turn the inner race of bearing by fingers, replace it if it makes noise or is worn.
- Check whether the outer race of bearing assembled exactly to the wheel hub and if it is worn, replace it.



REPLACEMENT

- Install bearing remover head, remover shaft to wheel and disassemble bearing and distance collar.

**TOOL : BEARING REMOVER HEAD
BEARING REMOVER**



- Apply grease enough to bearing
- Press to assemble seal position of bearing from the right.
- Assemble distance collar and press to install bearing on condition that its seal position is external side.

**TOOL : DRIVER HANDLE A
DRIVER PILOT
OUTER DRIVER**

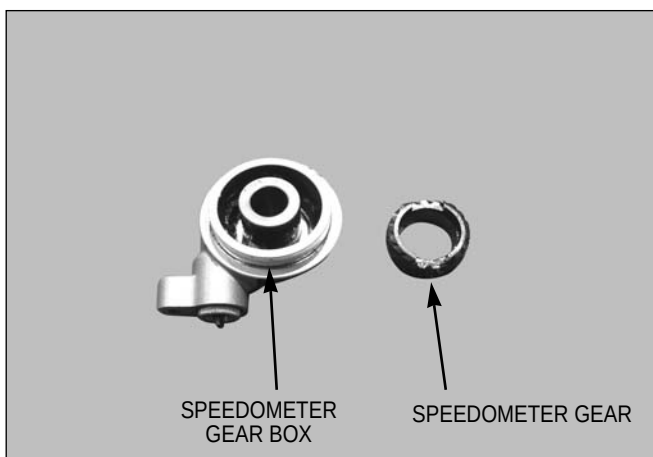
CAUTION

- At assembly of bearing, assemble correctly for it not to be inserted obliquely.



SPEEDOMETER GEAR BOX

- Disassemble the speedometer gear from speedometer gear box.



CHECK

- Check the speedometer gear.
- Check the speedometer gear box

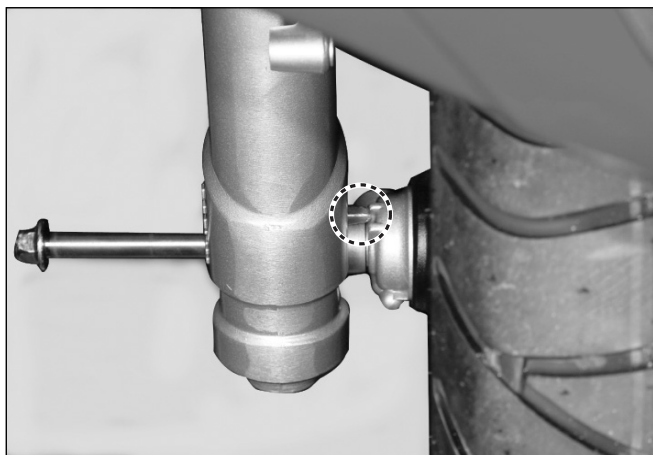


ASSEMBLY

- Apply grease the rim position of LH. Side dust seal.
- Assemble retainer
- Assemble LH. Side dust seal
- Attach dust seal and combine speedometer gear box by fitting the prominent area of speedometer gear box retainer to the home of gear.



- Assemble side collar to front wheel.



ASSEMBLY OF FRONT WHEEL

- Insert front wheel between front forks.
- Combine wheel for pads not to be damaged by inserting disc.
- Fit the concaved area of speedometer gear box to the prominent area of RH. Fork slider.
- Insert the front axle to speedometer gear box and wheel hub.



- Assemble axle nuts.



- Assemble speedometer cable and fix screw exactly.
- Place front wheel to its original position and assemble it with axle nut by designated torque.

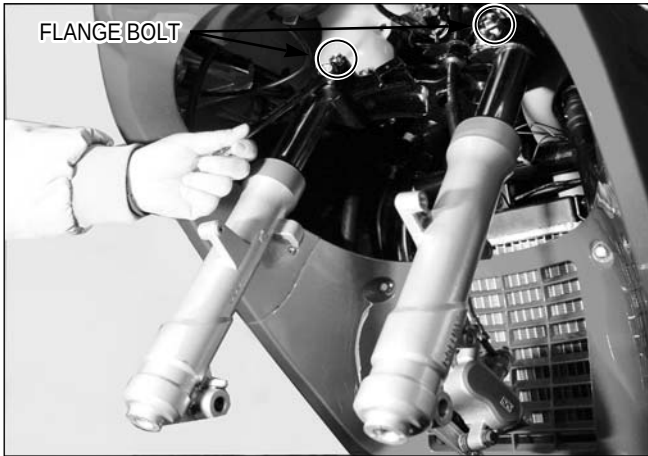
TORQUE : 5.0~7.0 kgf · m

13



FRONT FORK

- Disassemble front caliper
- Disassemble front fender
- Disassemble front wheel
- Untie brake hose and bolts installed at clamp.

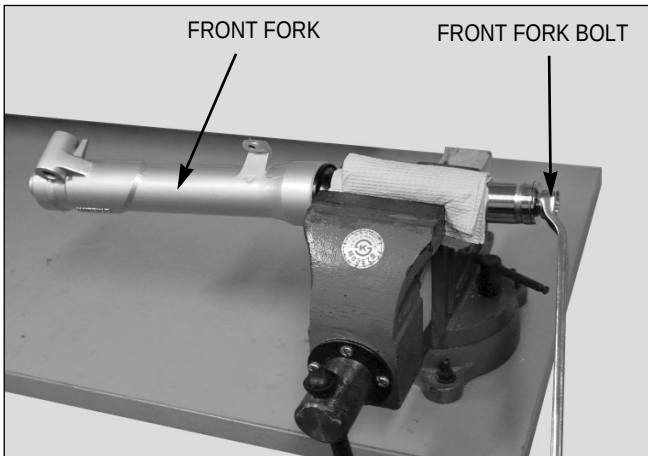


- Untie slightly flange bolt installed at steering stem comp when diassembling front fork.

CAUTION

- Support the engine not to be overturned by jack.
- Untie loosely fork back not to be disassembled.

- Grasp front fork by hands and disassemble front fork.

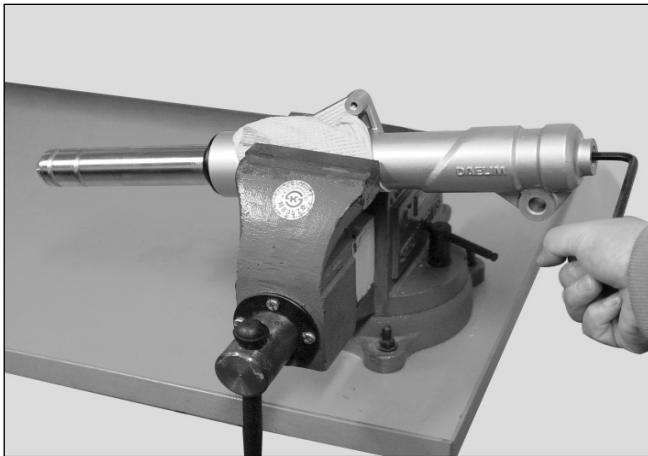


DISASSEMBLY

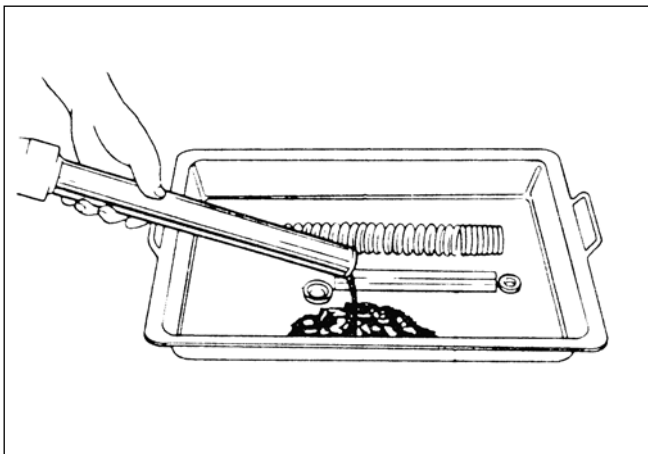
- Disassemble front fork bolts.

CAUTION

- If screws are untied completely, be careful about coming out bolts because of spring may occur.
- Disassemble fork spring and pull out fork oil by stretching several times.



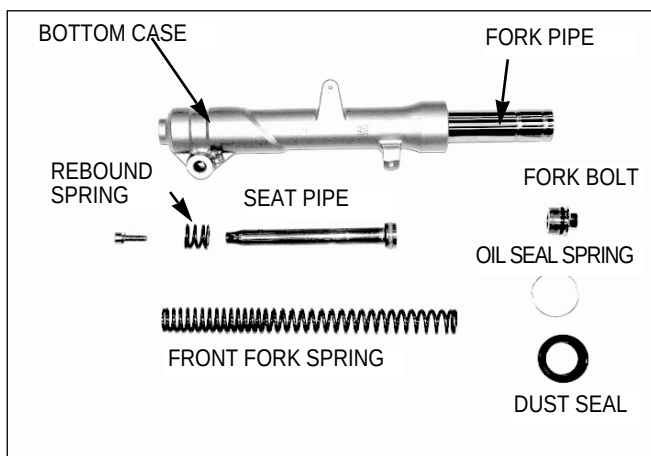
- Wrap bottom case by cloth and diassemble socket bolts.



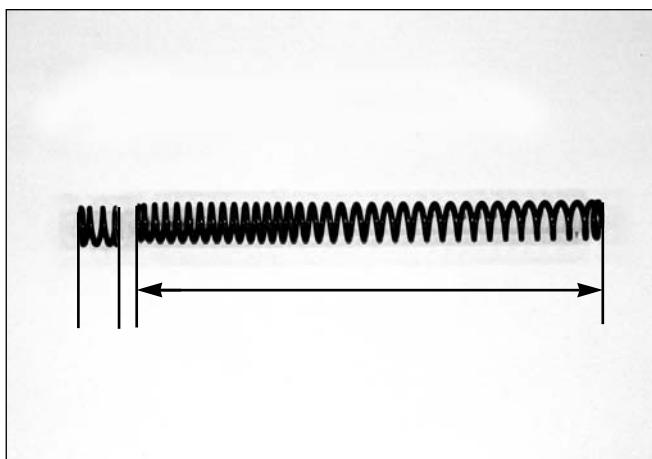
- Drain fork oil

CAUTION

- If socket bolts idles and are not pulled out, assemble temporarily spring and fork pipe cap bolts.
- Support strongly bottom case by vice so that it is not deformed or broken.



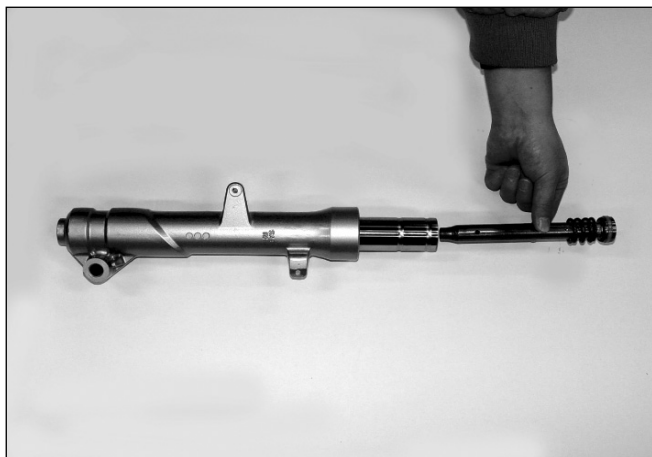
- Disassemble piston, rebound spring, seat pipe, fork spring from fork pipe.
- Check the parts of front fork.



CHECK

- Measure the free length of fork spring on condition that it places on flat area.
- Replace it if it is below the value of service limit.
- Check whether component parts damaged or abnormally worn, if yes, replace with the new ones.

STANDARD SPECIFICATION : 281mm



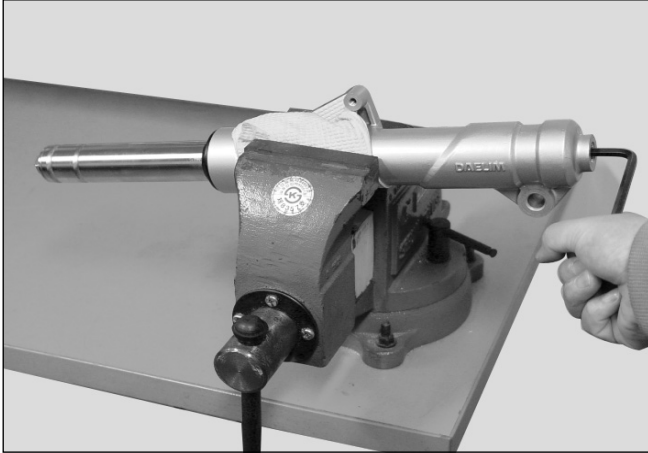
ASSEMBLY

- Clean completely each part by cleaned oil before assembling them,
- Assemble rebound spring and pipe to fork pipe.

CAUTION

- Take precautions for the inside and outside diameters of bottom case not to be damaged.





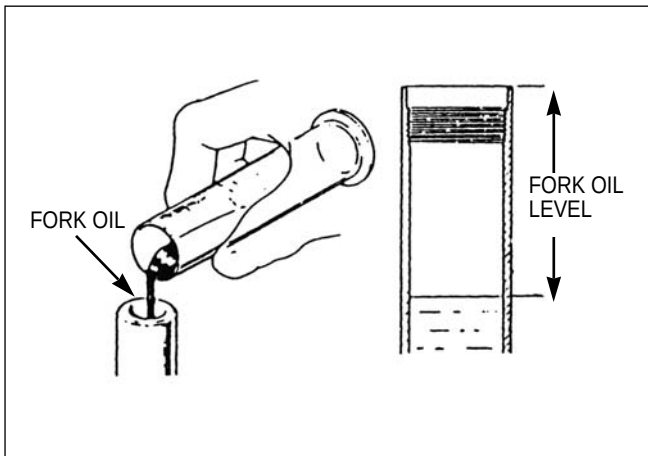
- Fix the bottom case to vice wrapping by cloth.
 - Apply screw lock agent to the screw area of socket bolts and assemble to fork piston.
- TORQUE : 2.0 kgf · m**

CAUTION

- When fixing the bottom case to vice, do not insert directly to case. Surely insert to the bracket position.



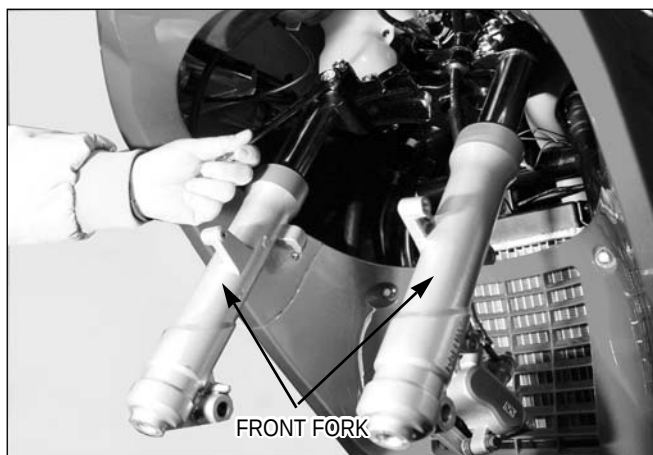
- Apply fork oil



- Inject the specified capacity of ATF(automatic transmission fluid) to fork pipe.
- CAPACITY : 130 cm³**
- Deflate air by pressing 2 or 3 times fork tube.



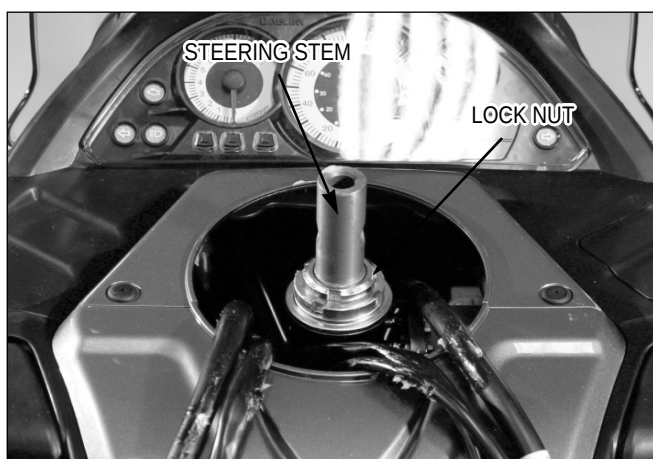
- Assemble fork pipe bolts to fork pipe.



ASSEMBLY

- Fit the home area to installation area of setting bolts.
- Assemble front fork setting bolts.
TORQUE : 1.5~2.5 kgf · m

- Assemble in the reverse order of disassembly.



STEERING STEM

DISASSEMBLY

- Disassemble following parts
 - HANDLE COVER
 - STEERING HANDLE
 - FRONT WHEEL
 - FRONT FORK



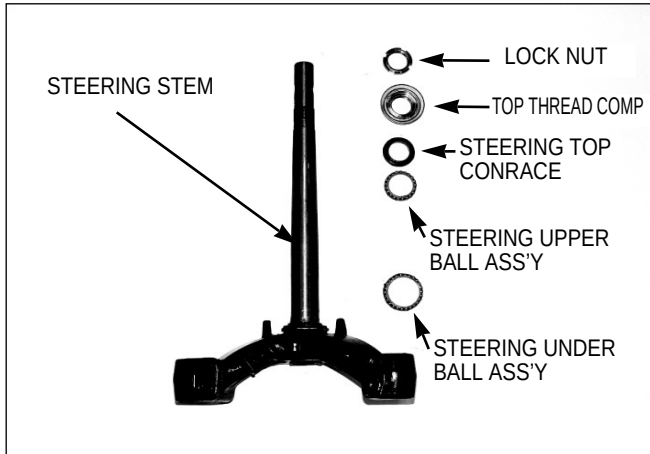
CAUTION

- Be careful about the vehicle over turn.

- Disassemble steering lock nuts by using steering nut socket.



- By using steering stem socket, disassemble top thread comp.



- Disassemble top cone race
- Check on the abrasion or damage of ball ass'y, cone race and ball race.
- If ball race worn, damaged or its race area gets pressure, replace it with new one.



ASSEMBLY

- Assemble under ball ass'y to steering stem.
- Assemble steering upper ball and top cone race to head pipe.
- Assemble steering stem to head pipe.



- Assemble top cone race and top thread comp to steering stem.
- Fasten completely top thread and untie it 1/8 turn.
TORQUE : 0.2~0.3kgf · m
- Check whether it moves smoothly up, down and left, right.



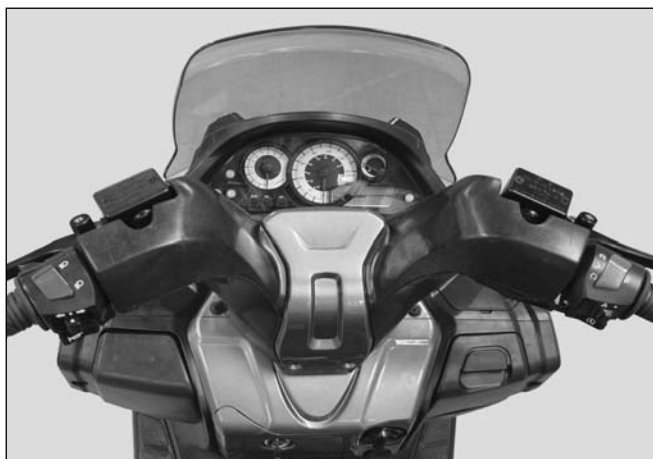
- Assemble temporarily lock nut.



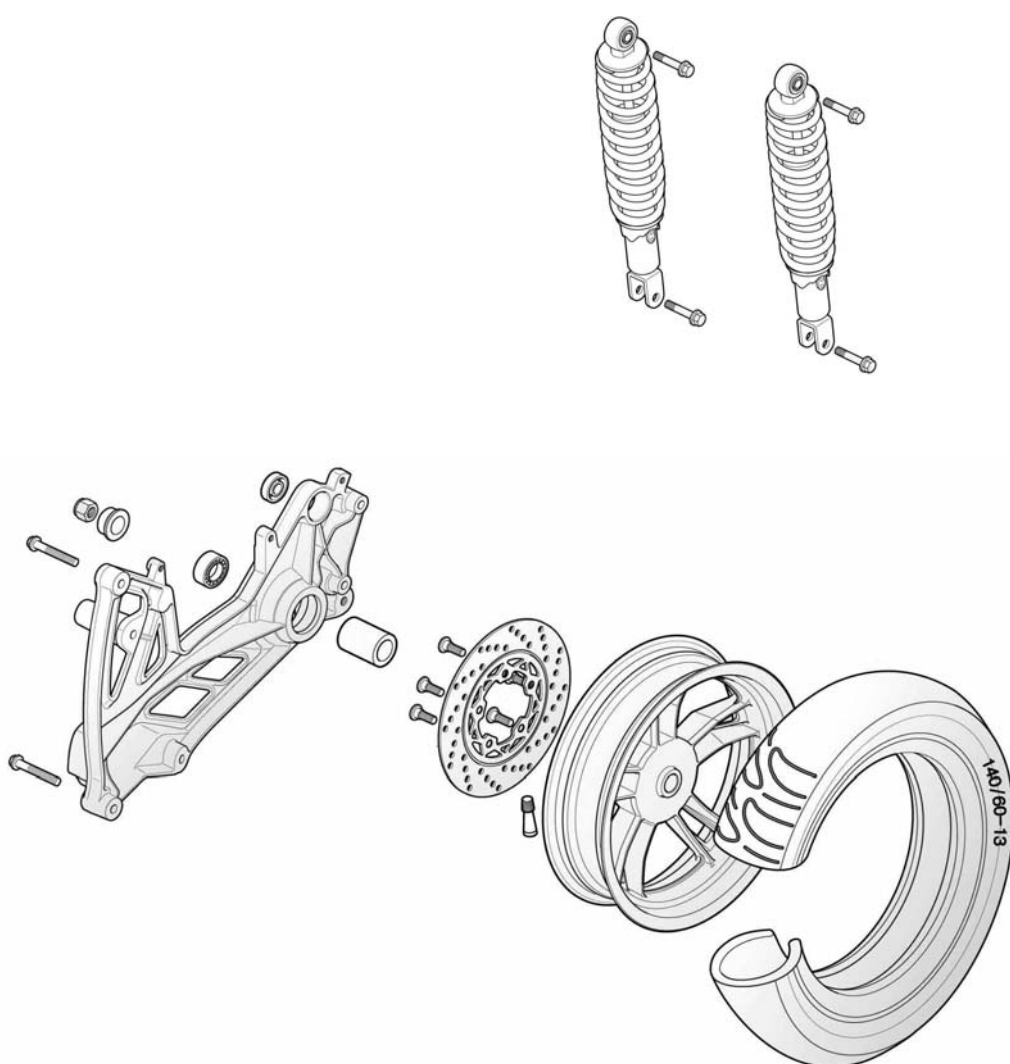
- Install lock nut by using steering stem lock nut socket.

TORQUE : 7.0 kgf · m

**TOOL : STEERING STEM LOCK NUT SOCKET
STEERING STEM SOCKET**



- Assemble following parts
 - FRONT FORK
 - HANDLE STEERING
 - HANDLE COVER
 - FRONT WHEEL
- Assemble in the reverse order of disassembly.



14. REAR WHEEL / REAR SWING ARM / REAR CUSHION

SERVICE INFORMATION . . . 14-1

TROUBLE SHOOTING . . . 14-2

REAR WHEEL 14-3

REAR SWING ARM 14-5

REAR CUSHION 14-6

SERVICE INFORMATION

GENERAL SAFETY

- When disassembling or assembling tire from rim, use the exclusively used tire lever and rim protector in order for rim not to be damaged.

SPECIFICATIONS

ITEM	STANDARD VALUE	SERVICE LIMIT
REAR WHEEL RIM RUN OUT	-	2.0
REAR CUSHION SPRING FREE LENGTH	247	242

TORQUE VALUES

REAR CUSHION UPPER BOLT	3.5~4.5kgf · m
REAR CUSHION UNDER BOLT	3.5~4.5kgf · m
REAR CUSHION ROD LOCK NUT	3.0~4.0kgf · m
REAR AXLE NUT	12~13kgf · m

13.2 TROUBLE SHOOTING

Rear wheel wobbling or vibration

- Deformed wheel, rim
- Bad tire
- Axle bad fastening
- Bad tire air pressure
- Improper wheel balancing

Soft rear suspension

- Bad spring
- Bad rear damper, oil leakage

Hard suspension

- Twisted damper rod
- Bad tire air pressure

Rear cushion noise

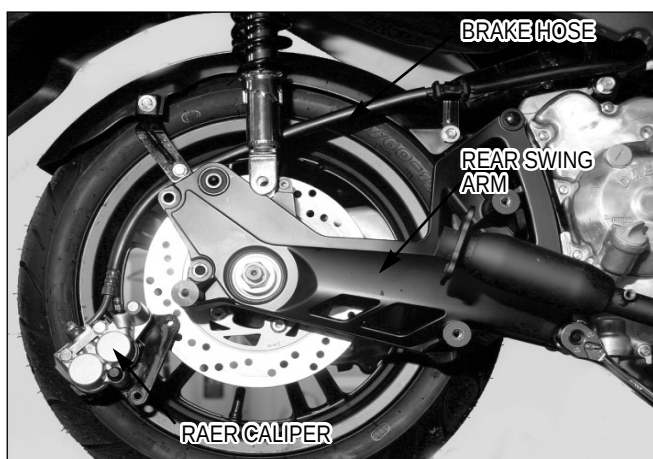
- Looseness of fastening and assembled points



REAR WHEEL

REMOVAL

- Erect the motorcycle on the main stand.
- Remove the muffler.
- Disassemble rear cushion.



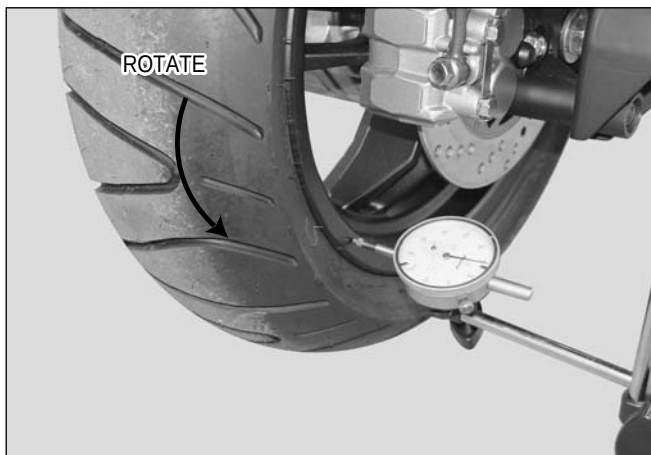
- Disassemble rear brake caliper ass'y from rear swing arm on condition that rear brake caliper ass'y assembled with brake hose.



- Untie rear axle nut.
- Disassemble rear wheel inside collar
- Disassemble rear swing arm



- Disassemble rear wheel outside collar
- Disassemble rear wheel



CHECK

- Rotate wheel and check on its shaking
**SERVICE LIMIT : longitudinal 2.0 mm
lateral 2.0mm**
TOOL : Dial gauge



ASSEMBLY

- Assemble rear wheel to final shaft
- Assemble rear wheel inside collar



- Assemble rear swing arm
- Assemble rear wheel outside collar
- Assemble rear axle U nut.
TORQUE : 12~13kgf · m



- Assemble rear swing arm on condition that rear brake caliper ass'y and brake hose assembled together.
- Assemble EX. Muffler.



REAR SWING ARM

- Disassemble muffler
- Disassemble rear brake caliper



DISASSEMBLY

- Untie rear axle U nut.



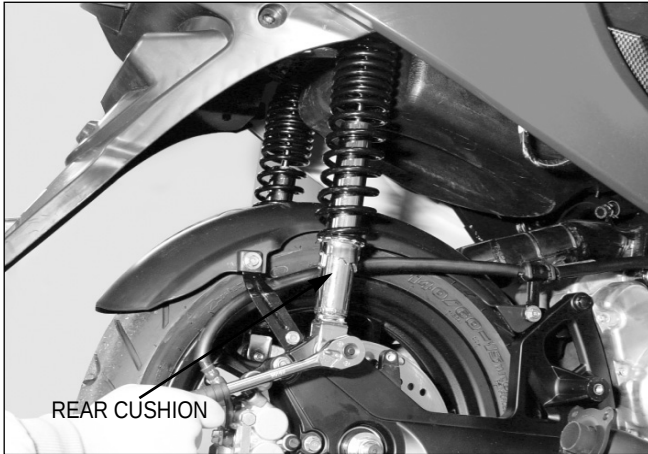
- Disassemble rear swing arm
- Disassemble rear wheel outside collar from rear swing arm.
- Disassemble radial ball bearing(6302UU).
- Replace rear swing arm bearing if it has something wrong.

14



ASSEMBLY

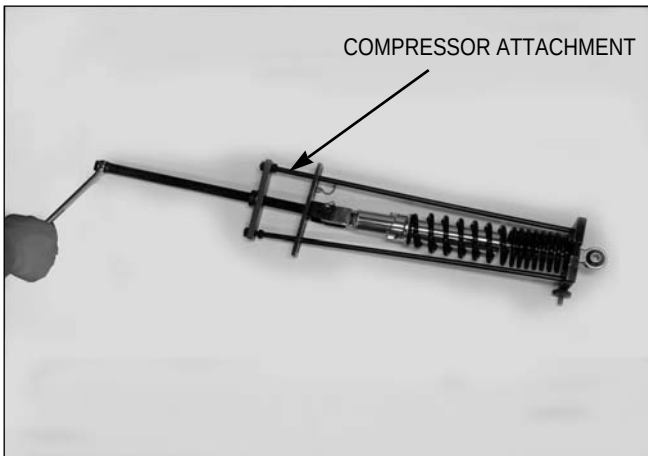
- Assemble in the reverse order of disassembly.



REAR CUSHION

DIASSEMBLY

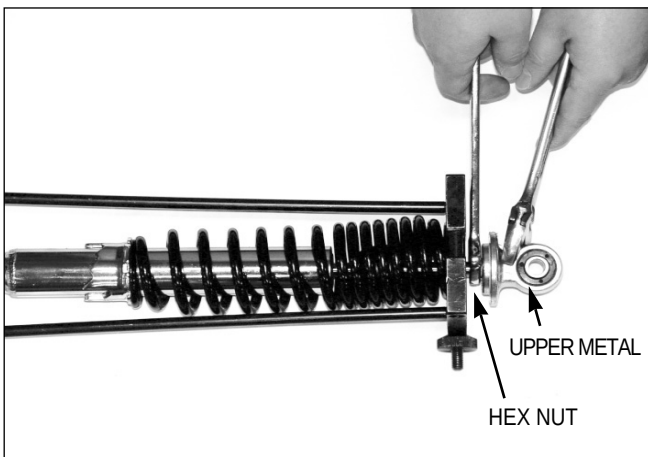
- Diassemble air cleaner
- Untie upper, lower bolts of LH. Rear cushion and diassemble rear cushion.
- Diassemble muffler
- Untie upper, lower bolts of RH. Rear cushion and diassemble rear cushion.



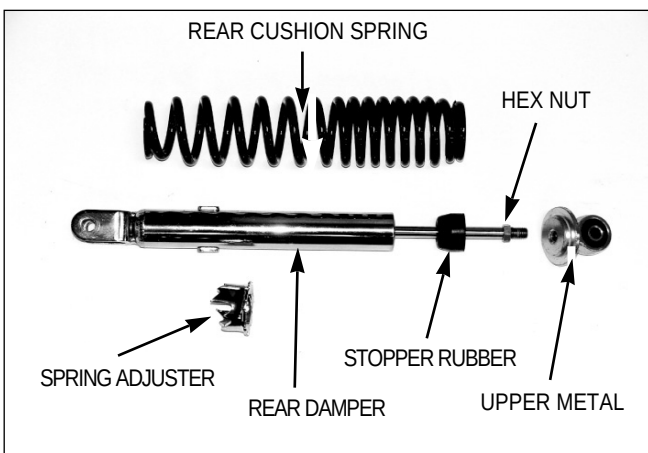
DISASSEMBLY

- Install compressor attachment as the photo.
- Install cushion compressor to cushion and compress spring.

**TOOL : REAR CUSHION COMPRESSOR ATTACHMENT
REAR CUSHION COMPRESSOR**

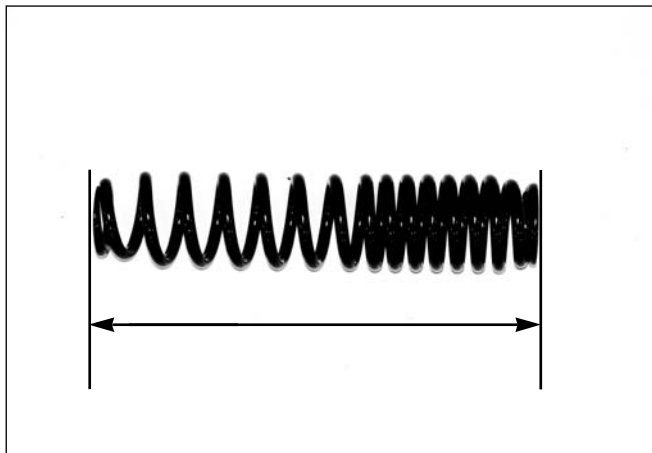


- Fix upper metal and untie hex nut.
- Diassemble upper metal
- Diassemble hex nut, upper metal, stopper rubber, spring from rear damper comp.

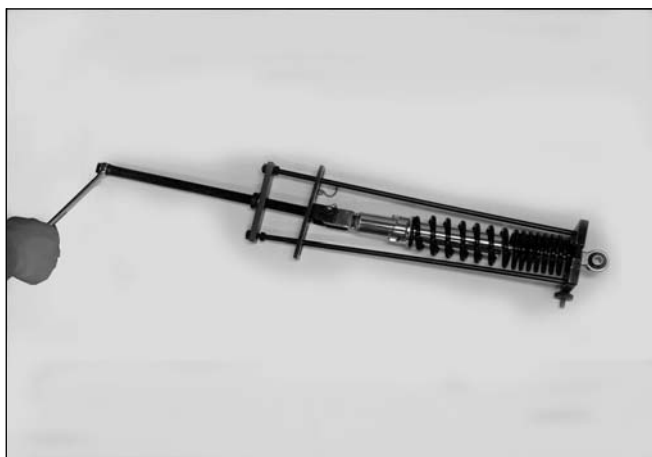


CHECK

- Check on bent or damaged of damper rod.



- Measure the free play length of rear cushion spring
SERVICE LIMIT : 247mm



ASSEMBLY

- Assemble spring, stopper rubber to damper comp.

CAUTION

- At assembly of spring, do it so that its lean pitch side goes up.

- Apply screw lock detergent and install rear cushion compressor attachment to damper rod.

- Fix upper metal and fasten hex nut.

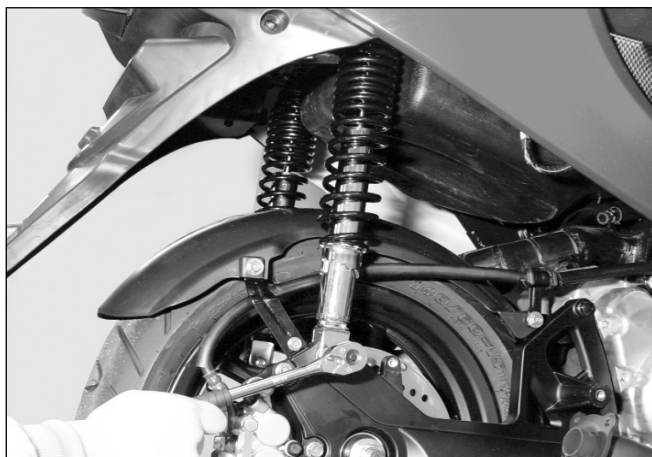
TORQUE : 3.0~4.0kgf·m

**TOOL : REAR CUSHION COMPRESSOR
REAR CUSHION COMPRESSOR
ATTACHMENT**

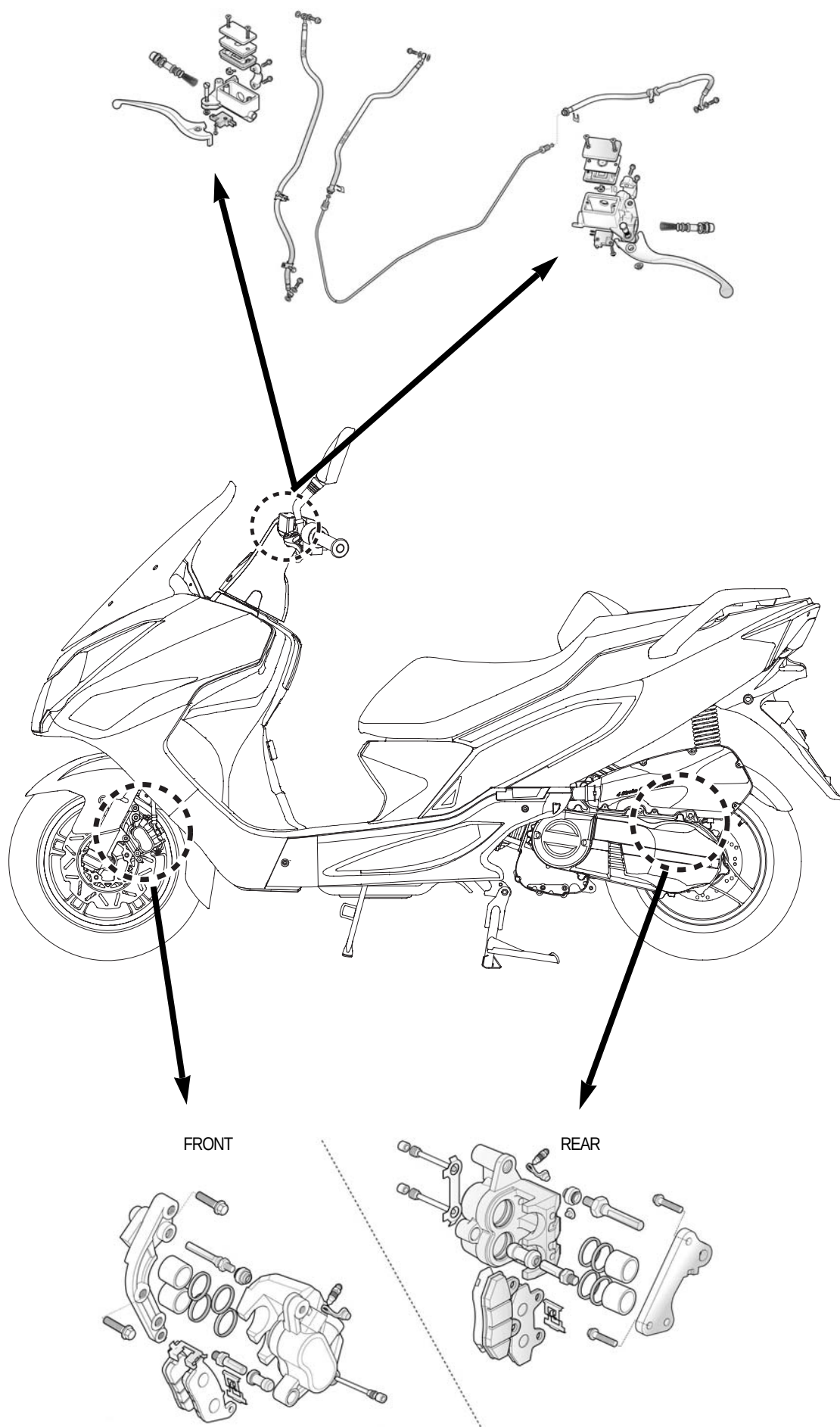
- Combine LH/RH. Rear cushion.

- Install LH/RH. Rear cushion with upper, lower under bolts.

**TORQUE : upper 3.5~4.5kgf · m
Under 3.5~4.5kgf · m**



BRAKES



15. BRAKES

SERVICE INFORMATION . . .	15-1	FRONT BRAKE CALIPER . .	15-6
TROUBLE SHOOTING . . .	15-2	REAR BRAKE CALIPER . .	15-8
BRAKE FLUID REPLACEMENT	15-3	MASTER CYLINDER . . .	15-11
FRONT BRAKE PAD . . .	15-5	BRAKE DISK	15-13
REAR BRAKE PAD . . .	15-6		

SERVICE INFORMATION

CAUTION

- Take precautions not to mix alien material or water with brake fluid at replacing brake fluid.
- Do not use different brake fluid to prevent certain chemical change.
- Do not use again contaminated brake fluid.
- Because brake fluid gives damage to painting, parts, plastics, rubbers, then take precautions that brake fluids does not touch with these materials.
- Do not use again sealing washer.
- Clean disassembled parts with brake fluid and check whether these parts[°]Ø holes are not clogged.
- Deflate air at separating brake hose.
- Take precautions so that oils or brakes fluids are not stained with brake disk or pad.
- This may get the braking power lower, then if these parts contaminated, replace with the new pad and clean disk completely.

SPECIFICATIONS

UNIT : mm

	ITEMS	STANDARDS	SERVICE LIMIT
FRONT	DESIGNATED BRAKE FLUID	DOT3 or DOT4	-
	BRAKE DISK THICKNESS	4.0	3.5
	BRAKE DISK WOBBLING	0.1	0.3
	INNER DIAMETER OF MASTER CYLINDER	12.700~12.743	12.755
	OUTER DIAMETER OF PISTON	12.657~12.684	12.645
	INNER DIAMETER OF CALIPER CYLINDER	24.440~25.410	25.420
	OUTER DIAMETER OF CALIPER PISTON	24.278~24.328	24.270
REAR	DESIGNATED BRAKE FLUID	DOT3 or DOT4	-
	THICKNESS OF BRAKE DISK	4.0	3.0
	BRAKE DISK WOBBLING	0.1	0.3
	INNER DIAMETER OF MASTER CYLINDER	14.000~14.043	14.055
	OUTER DIAMETER OF PISTON	113.878~13.905	13.866
	INNER DIAMETER OF CALIPER CYLINDER	25.278~25.328	25.270
	OUTER DIAMETER OF CALIPER PISTON	24.914~24.935	24.870

TROUBLE SHOOTING

BAD BRAKING POWER

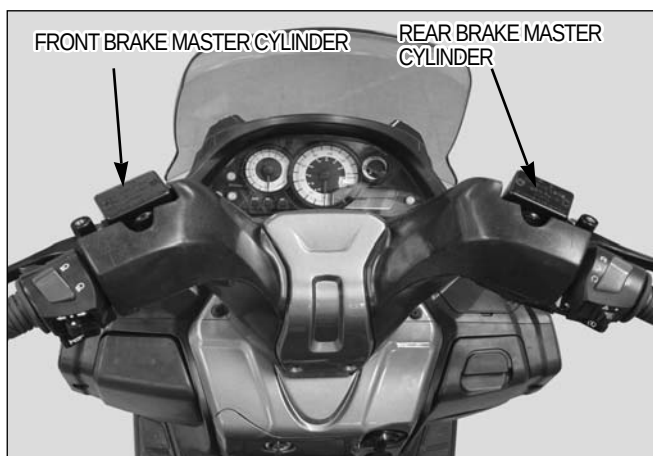
- Air mixed in brake system
- Brake fluid spoils because of water mixing.
- Contamination of brake pad, disk
- Abrasion of caliper piston seal
- Abrasion of master cylinder piston seal
- Abrasion of brake pad
- Internal contamination of caliper
- Bad operation of caliper slide
- Side abrasion of brake pad, disk
- Insufficient capacity of brake fluid
- Cogging of the brake fluid path
- Twist or deformation of disk
- Hardening or abrasion of caliper piston
- Hardening or abrasion of master cylinder piston
- Abrasion of disk
- Internal contamination of master cylinder
- Brake lever bent

HARD OPERATION AND BAD RETURNING OF BRAKE LEVER

- Cogging of brake system
- Hardening or abrasion of caliper piston
- Bad operation of caliper slide
- Cogging of brake fluid path
- Abrasion of caliper piston seal
- Hardening or abrasion of master cylinder piston
- Brake lever bent

BRAKE DRAGGING

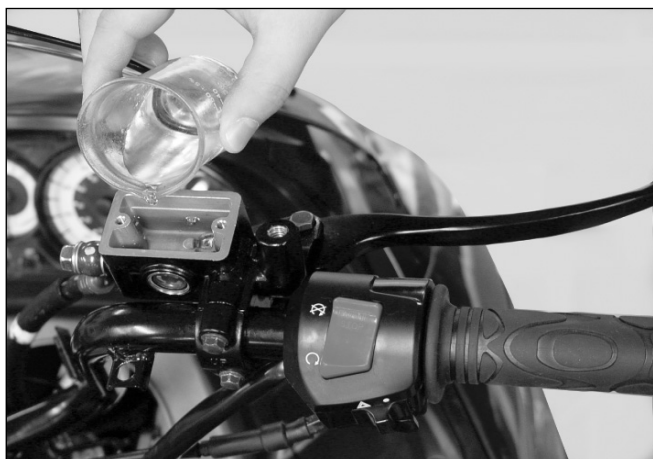
- Contamination of brake pad, disk
- Assembled at the status of wrong wheel array
- Side abrasion of brake pad, disk
- Disk bent, deformed
- Bad operation of caliper slide
- Contamination in oil pressure system because of dust



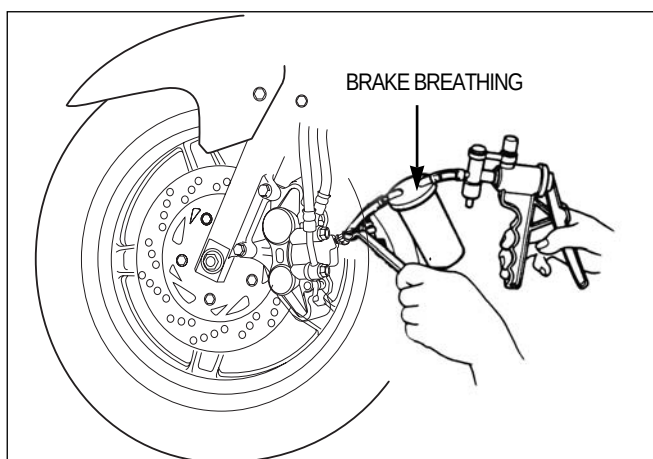
BRAKE FLUID REPLACEMENT

CAUTION

- Oils not to be stained with disk, pad because braking performance loses.
- If stained, replace pad and clean completely contaminated materials in disk.
- Being careful about capacity of brake fluid in reserve, replace with new brake fluid and keep working. Brake fluids not to be stained with painting, plastic, rubbers like these kinds of parts.



- Disassemble oil cap cup, diaphragm plate, diaphragm from master cylinder.
- Replenish brake fluids, DOTS or DOT4 into master cylinder.
- Connect breather valve to breather hose.
- Disassemble breather valve, repeat grasping and releasing brake lever
- If the stream of brake fluid stops, stop brake lever operation.



AIR SUBTRACTION

<IN CASE OF USING BREATHER HOSE>

CAUTION

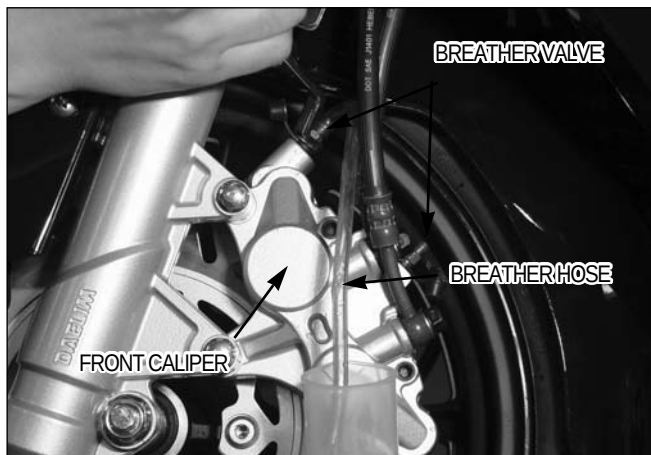
- To prevent chemical change, do not use different brake fluid.

- Assemble brake breather to breather valve
- Repeat grasping and releasing brake lever, then loosen breather valve
- Repeat this work enough by the time that brake fluid comes out brake breather.
- Replenish brake fluid



CAUTION

- Check brake fluid capacity often, and if it reduces under lower line, replenish.
- In case of disassembling brake breather, read manual carefully and use correctly.
- In order for air not to be mixed around breather valve, protect it with tape.



<When the brake bleeder is not available>

- Fill the brake fluid up to the upper limit line.
- Connect the transparent bleeder hose to the bleeder valve and place the other end of the hose in a container.

- ① Squeeze the brake lever, then open the bleeder valve 1/2 turn, and close the valve.

NOTE

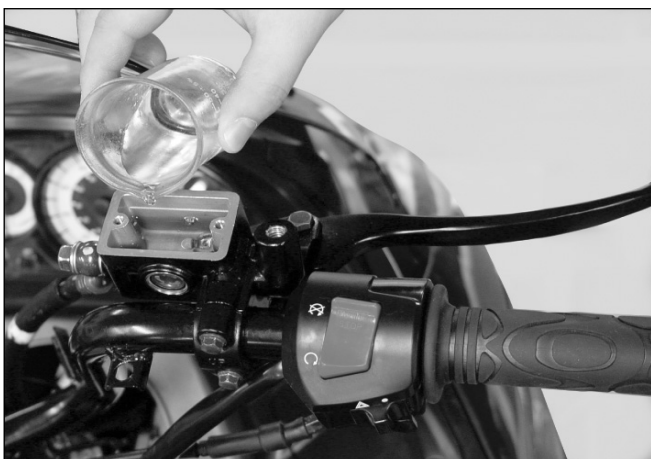
- Do not release the brake lever until the bleeder valve has been closed.



- ② Release the brake lever slowly and wait several seconds after it reaches the end of its travel.
- ③ Repeat the above steps ① and ② until bubbles cease to appear in the fluid at the end of the hose.

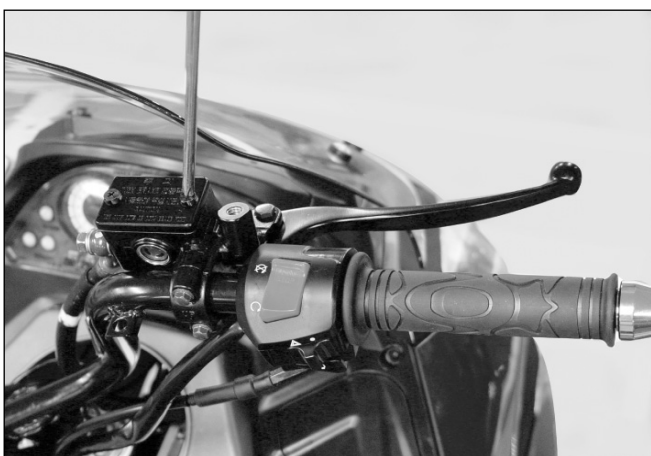
- Check the fluid level often, and add fluid if the fluid level is near the lower level.
- If no air leaks out of the bleeder hose, operate the brake lever to check the presence of air.
- Tighten the bleeder valve.

TORQUE VALUE : 0.4~0.7 kgf · m



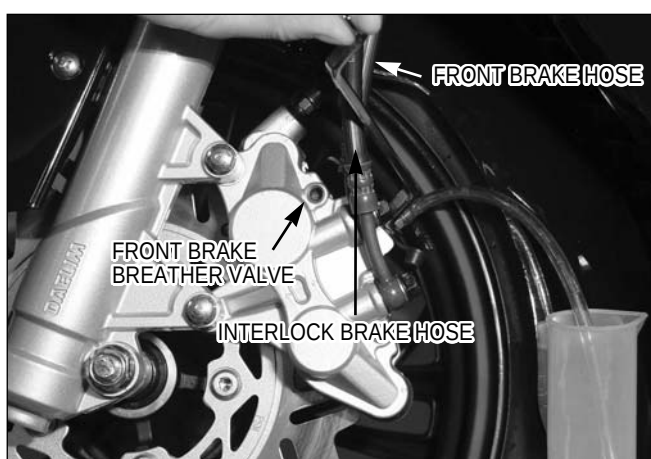
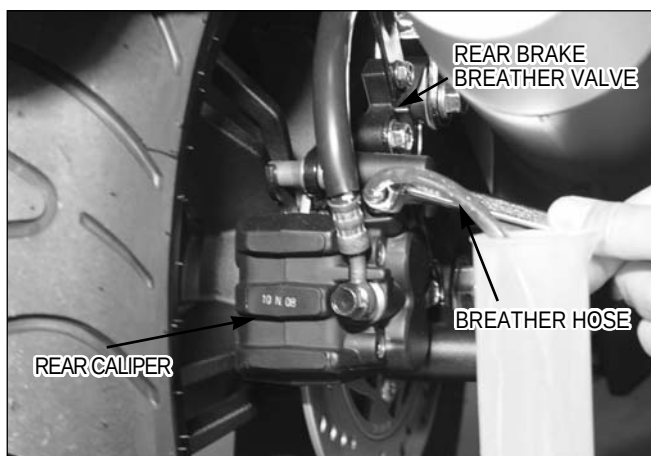
- Check the brake fluid capacity often and if it reduces under the lower line, replenish it.
- If air does not come out of breather hose, operate lever and check on air mixing.
- Assemble breather valve

TORQUE : 0.4~0.7kgf · m



- Replenish brake fluid to the upper level. Assemble diaphragm, diaphragm plate, oil cup cap.

TORQUE : 1.0kgf · m



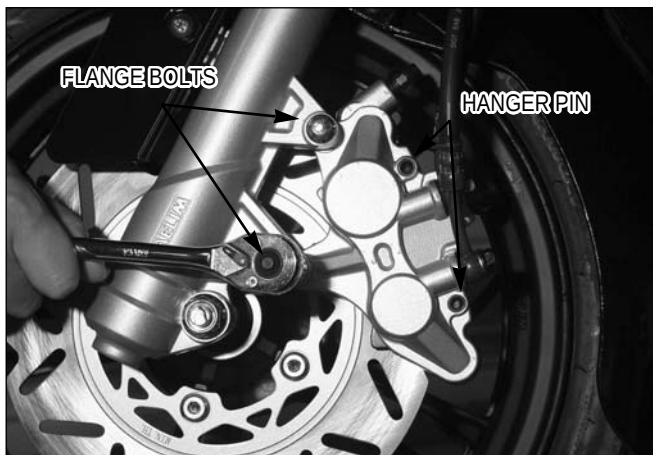
REAR BRAKE BLEEDLING (INTERLOCK)

- The rear brake is apply to interlocking system, when squeezing the right side brake lever, the front and rear brake works at once.

- ① Fill the brake fluid up to the upper limit line.
- ② Connect the breeder hose to the breeder valve on the rear caliper and bleed air.

- ③ If no air leaks out of the breeder hose after operate the brake lever, stop pumping it.

- ④ Connect the breeder hose to the breeder valve on the front caliper and bleed air.
- ⑤ Fill the brake fluid up to the upper limit line and install the diaphragm, plate and oil cup cap.
- ⑥ Install the fluid maintenance lid.



FRONT BRAKE PAD REPLACEMENT

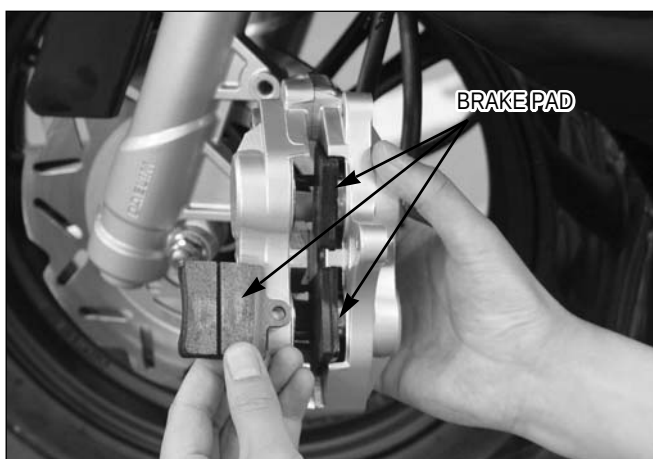
- Disassemble loosely the hanger pin of front caliper.
- Untie flange bolt

CAUTION

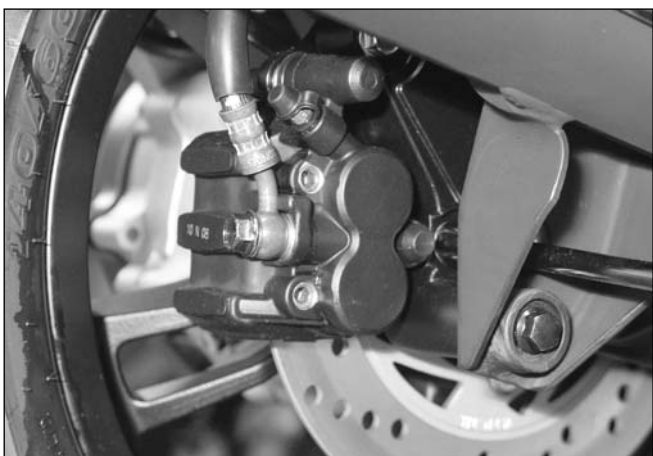
- Be sure to replace brake pads as the set.
- When replacing pad, do not disassemble brake hose.



- Disassemble brake pad from front fork.
- Check on abrasion of brake pad



- Assemble hanger pin to new brake pad.
- Install hanger pin and assemble brake caliper to front fork.



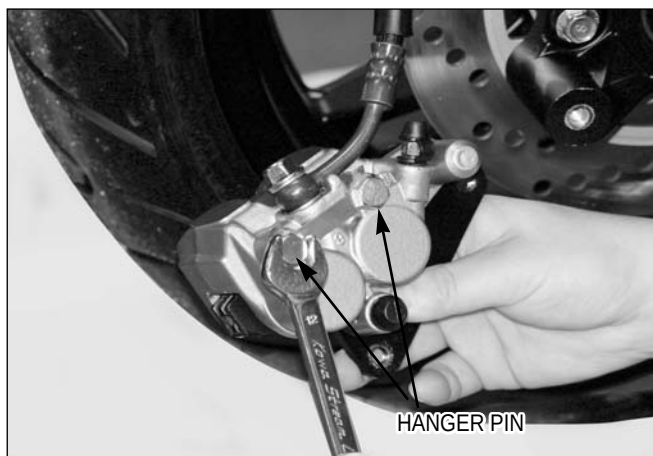
REAR BRAKE PAD REPLACEMENT

- Replace muffler
- Unfold the prominent position of lock plate and untie loosely.

CAUTION

- Be sure to replace brake pads as the set.
- When replacing brake pads, do not disassemble brake hose.

- Untie rear brake installing bolt and disassemble brake caliper.



- Disassemble brake pad, lock plate, hanger pin
- Check on abrasion of brake pad



- Assemble hanger pin to new brake pad
- Assemble in the reverse order of disassembly.



FRONT BRAKE CALIPER DISASSEMBLY

- Untie brake tube bolt.
- Untie 2 bolts installing caliper.

CAUTION

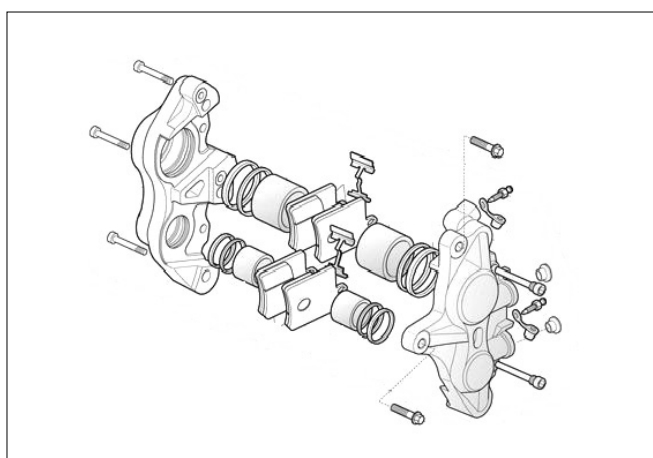
- Take precaution so that brake fluid is stained with painting, plastic, rubbers.

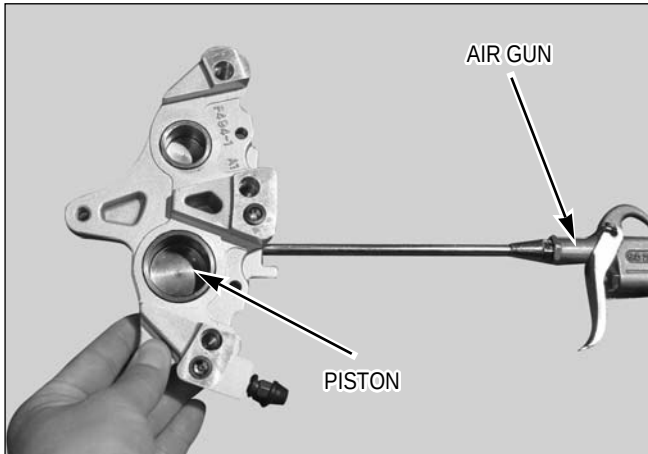
15

DISASSEMBLY

CAUTION

- Because oils may lose braking performance, take precaution so that brake fluid is not stained with disk, pad
If stained, replace with new pad and clean disk.



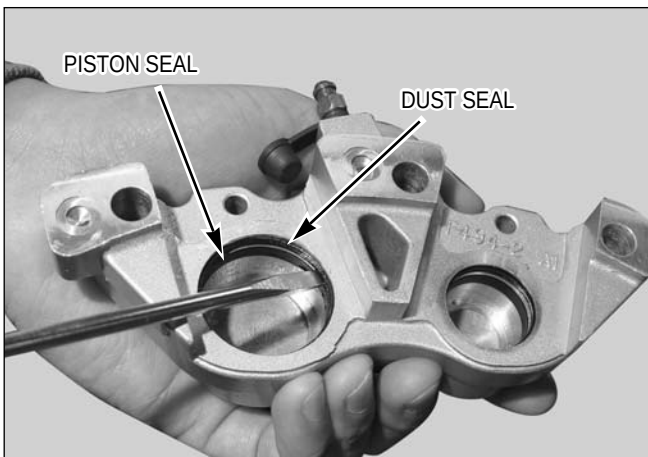


DISASSEMBLY

- Remove the pad spring, pad comp, caliper bracket, boot from the caliper body.
- Wrap the caliper with a piece of cloth to avoid piston and brake fluid leakage and facing the piston downward.
- Remove the piston from the caliper while blowing the low-pressure air in the opening of the brake hose.

CAUTION

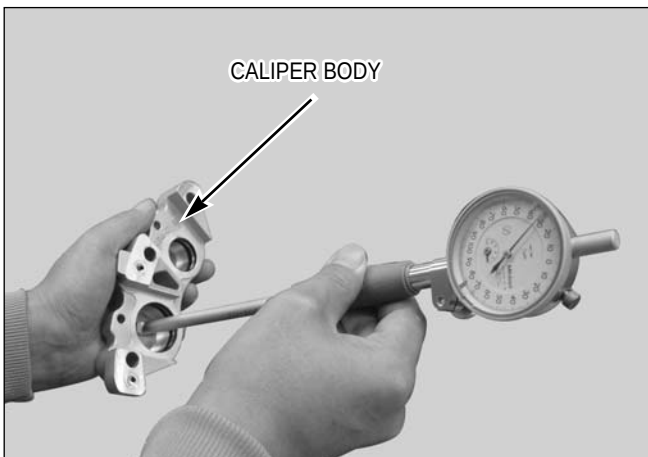
- Never use the high-pressure air or bring the air gun too close.
- Never touch the inside of the caliper.



- Disassemble the piston seal and the dust seal.

NOTE

- Pay attention not to damage the inner surface of the caliper.

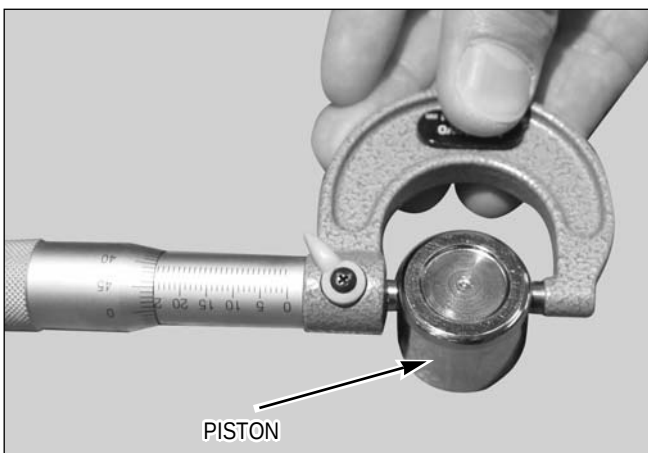


- Clean the piston and inside of the caliper with the brake fluid.

INSPECTION

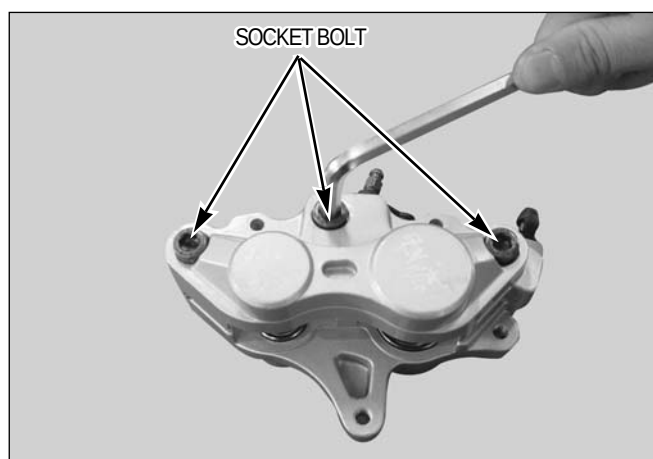
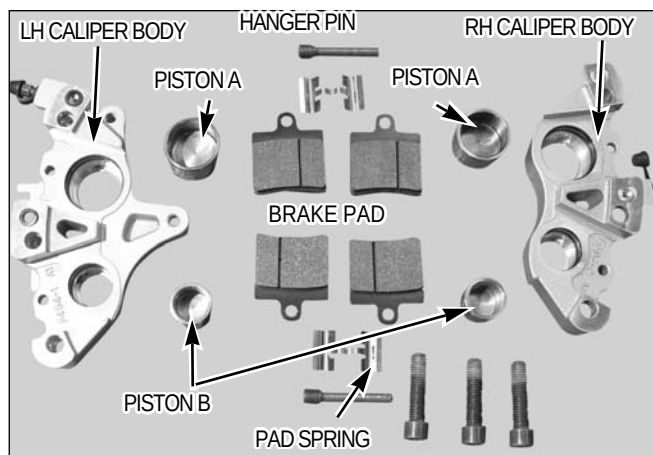
- Check the caliper cylinder bore for scoring, scratches, or other damage.
- Measure the caliper cylinder I.D.

SERVICE LIMIT : CYLINDER I.D.A : 34.01mm
CYLINDER I.D.B : 25.46mm



- Check the caliper piston outer diameter part for scratches or other damage.
- Measure the piston outer diameter.

SERVICE LIMIT : PISTON O.D.A : 33.848MM
PISTON I.D.B : 25.30MM



ASSEMBLY

- Clean the piston seal and the dust seal with the brake fluid and install them in the caliper.
- Install the piston in the caliper with the groove side of the piston facing the pad.

- Install the RH./LH. caliper body.
- Install the socket bolt.
- Install pad spring to the caliper.
- Install caliper hanger pin bolt to the pad comp and caliper bracket to the caliper body.
- Install the brake pad to the caliper.

INSTALLATION

- Install the brake caliper to the from fork, and front axle.
- Install the caliper to the specified torque.

TORQUE VALUE : 3.0 kgf · m

- Install the brake hose to the caliper body with the new 2 oil bolts washer and oil bolts.
- Install the oil bolt to the specified torque.

TORQUE VALUE : 3.4 kgf · m

- Fill the brake fluid, and bleed air.

REAR BRAKE CALIPER

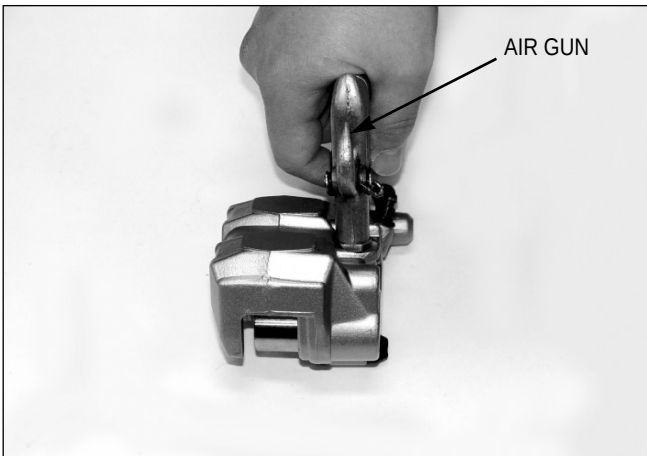
DISASSEMBLY

- Disassemble muffler
- Untie rear brake tube and separate brake tube
- Untie 2 bolts and disassemble rear brake caliper.



DISASSEMBLY

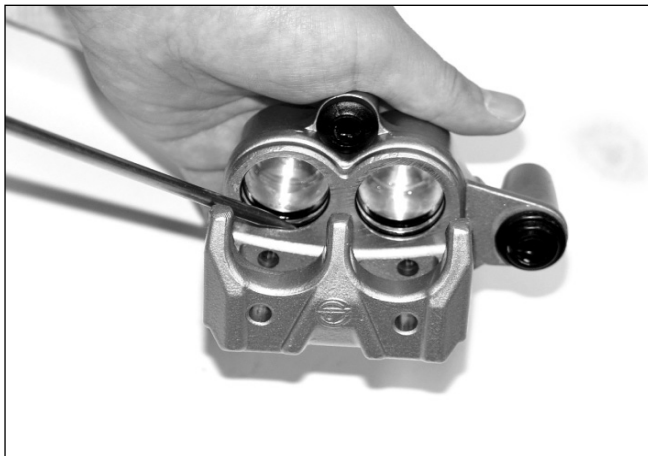
- Disassemble rear brake caliper



- Disassemble pad spring, slide pin, caliper bracket, boot from caliper body.
- Wrap caliper with cloth, and face it down.
- Blow slowly low pressed air to the assembled place of brake hose and separate piston from caliper.

CAUTION

- Do not use high pressed air or do not close air gun.
- Do not hand insert to the inside of caliper

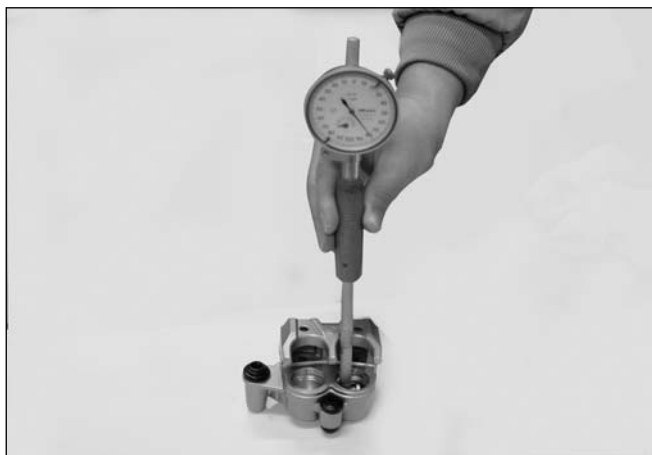


- Disassemble piston seal, dust seal

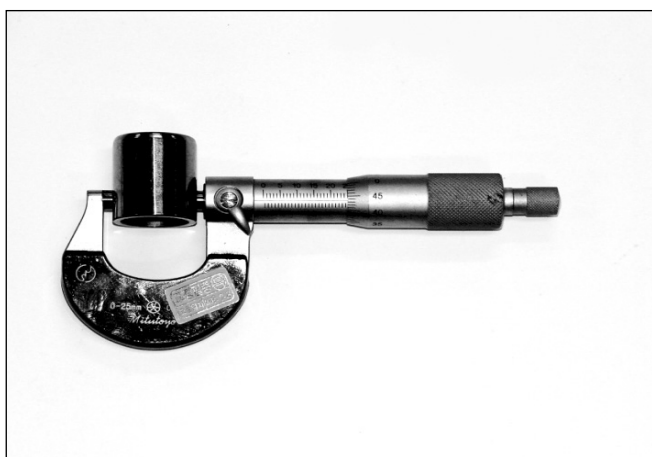


CHECK

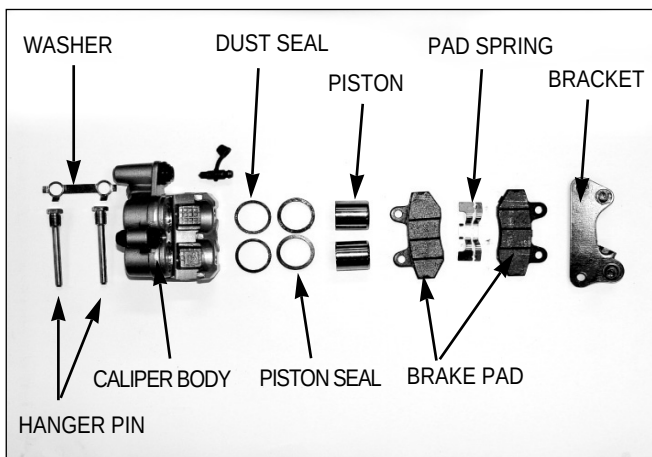
- Clean the inside of caliper and piston with brake fluid
- Check whether there is flaw and damaged in the contact place of caliper.



- Measure inner diameter of caliper cylinder
SERVICE LIMIT : 25.27mm
- Check whether there is flaw or scratch in outer side of piston.



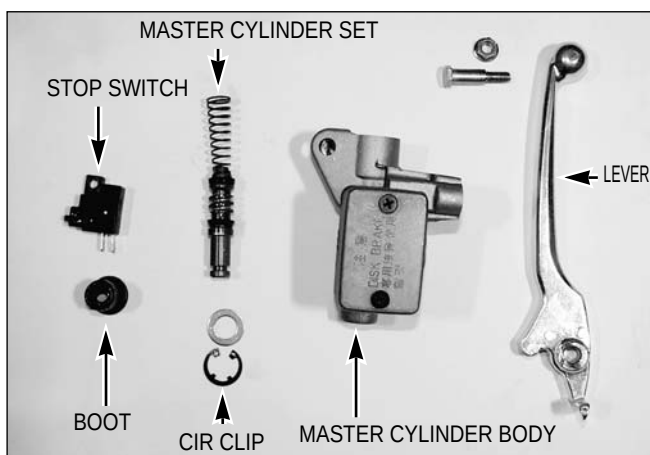
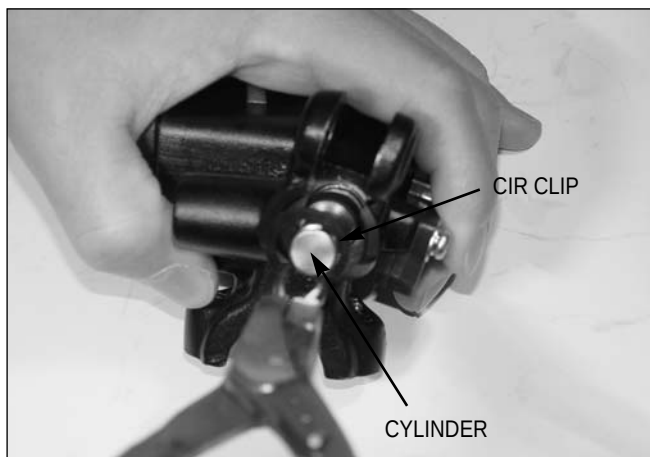
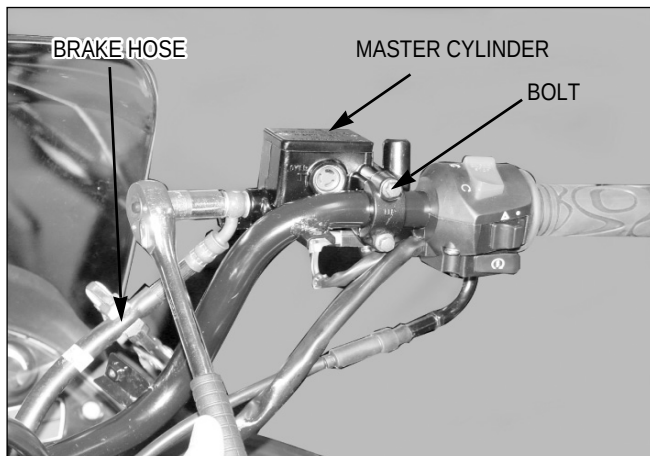
- Measure the outer diameter of piston
SERVICE LIMIT : 24.87mm



- Assemble caliper



- Assemble in the reverse order of disassembly



MASTER CYLINDER

DISASSEMBLY

- Disassemble upper handle cover and under handle cover.
- Drain, front and rear brake fluid.
- Disassemble rear stop switch coupler.

- Untie brake tube bolt.
- Untie master cylinder holder bolt.
- Disassemble master cylinder.

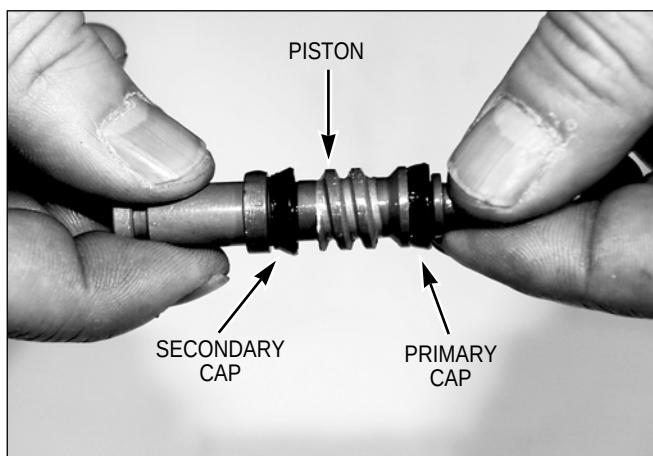
CAUTION

- Be careful for brake fluid not to be stained with painting, plastic, rubbers. If brake fluid stained, clean it by cloth or wash with water. For preventing leakage of brake fluid, cover the hose connecting area.
- After disassembly, wash parts with brake fluid and check about air ventilation in each hole.
- Put disassembled parts in order not to be stained with dirty material or dust.

DISASSEMBLY

- Disassemble boot, cir clip from master cylinder.
- TOOL : SNAP RING PLIER.**

- Disassemble washer, piston, spring from master cylinder.
- Wash inside master cylinder, reserve, master piston with brake fluid.



CHECK

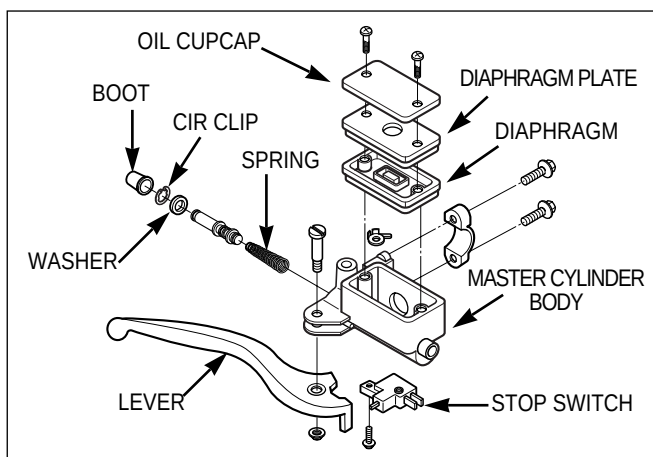
- Check whether there is flaw or scratch in outer place of piston.
- Check on abrasion or damage of primary cup, secondary cup.



CAUTION

- If fluid leaks out at assembly of new piston, it means side abrasion of cylinder. In this case, replacement of master cylinder body is necessary as well.

- Check whether there is flaw or abrasion of slide selective place of master cylinder.

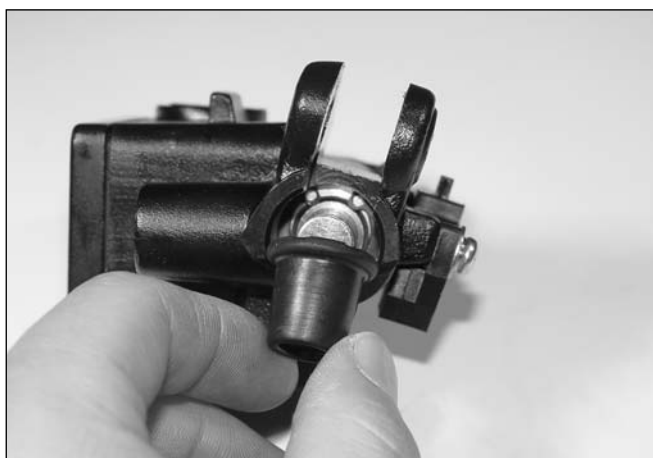


ASSEMBLY

CAUTION

- Replace surely based on set when disassembling of piston, spring, cup, snap ring.
- Check whether dust or alien material is attached to each part.
- Use the designated brake fluid surely at cleaning with brake fluid.

- Apply the designated and recommended clean brake fluid to cup, piston, inner place of cylinder and assemble piston.



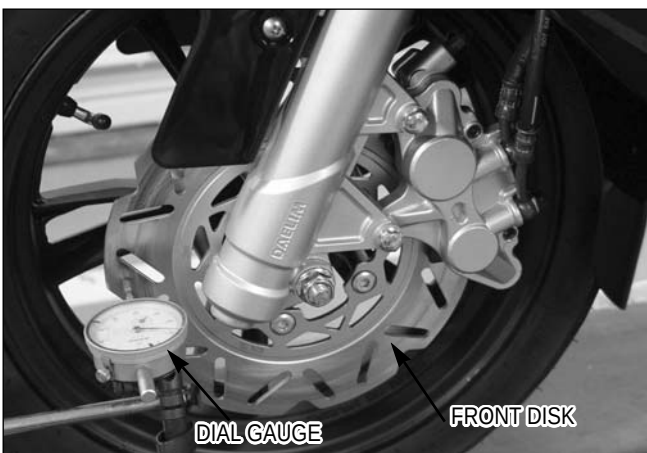
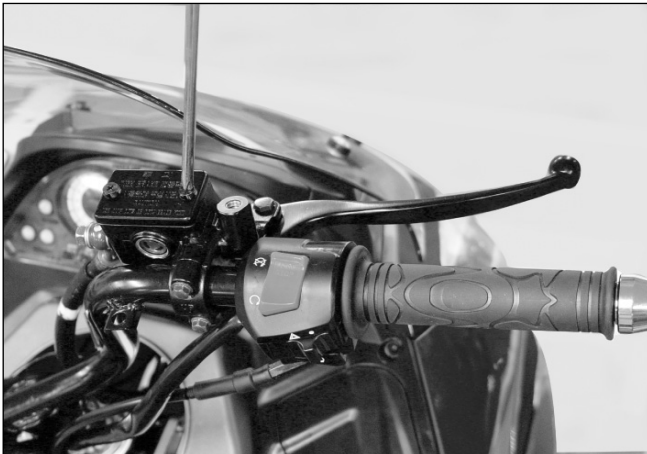
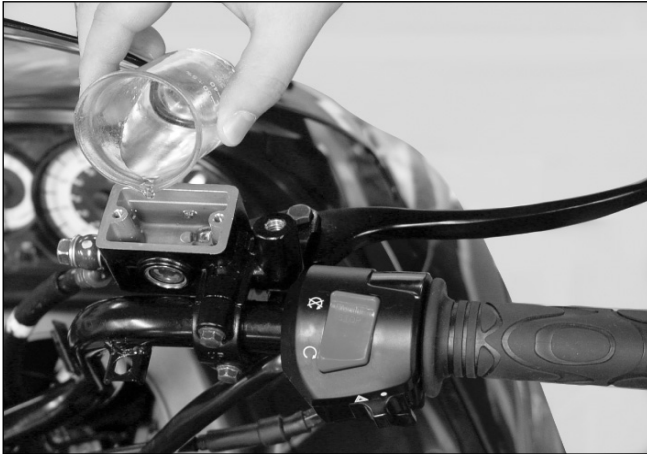
CAUTION

- When assembling cup, be careful for the end of cup not to be clogged.
- Assemble spring so that the end of its small coil goes forward to piston.
- Attach the primary cup to the way of spring.

- Assemble circlip to the home of master cylinder correctly.

TOOL : SNAPPING PLIER

- Assemble boot to master cylinder.



INSTALLATION

- Assemble front/rear master cylinder to the handle.

CAUTION

- Face the UP mark of holder up and fit the contact place to the punch mark of handle.
- Assemble the upper bolt of holder first

- Assemble brake hose with 2 new sealing washer to master cylinder

TORQUE : 2.5~3.5kgf · m

- Untie flat screw and disassemble oil cup cap, diaphragm plate, diaphragm.
- Apply brake fluid and pull out the mixed air(⇒16-2)

- Assemble oil cup cap, diaphragm plate, diaphragm

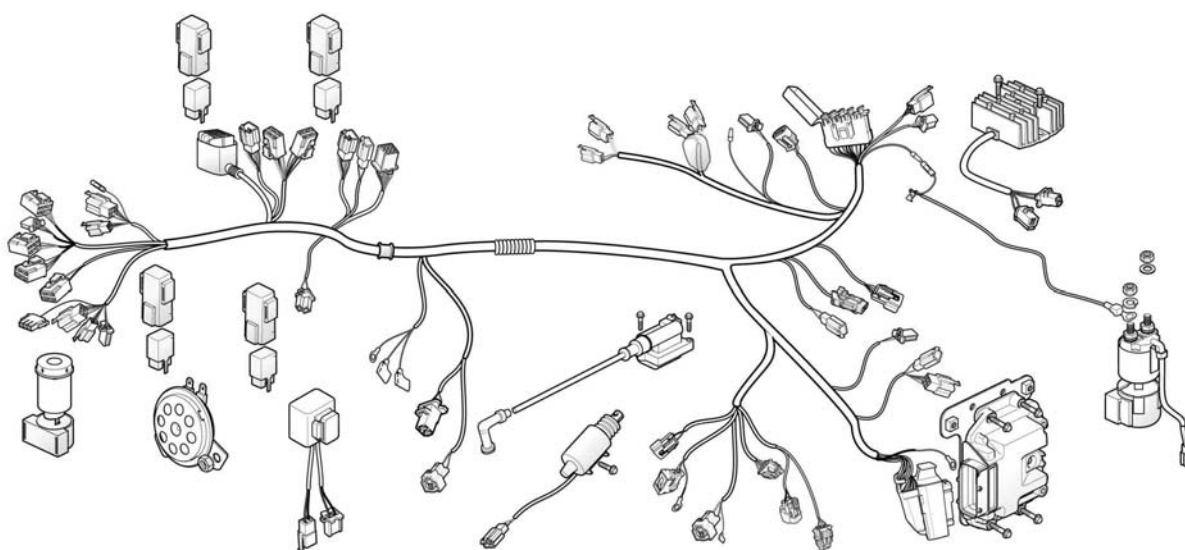
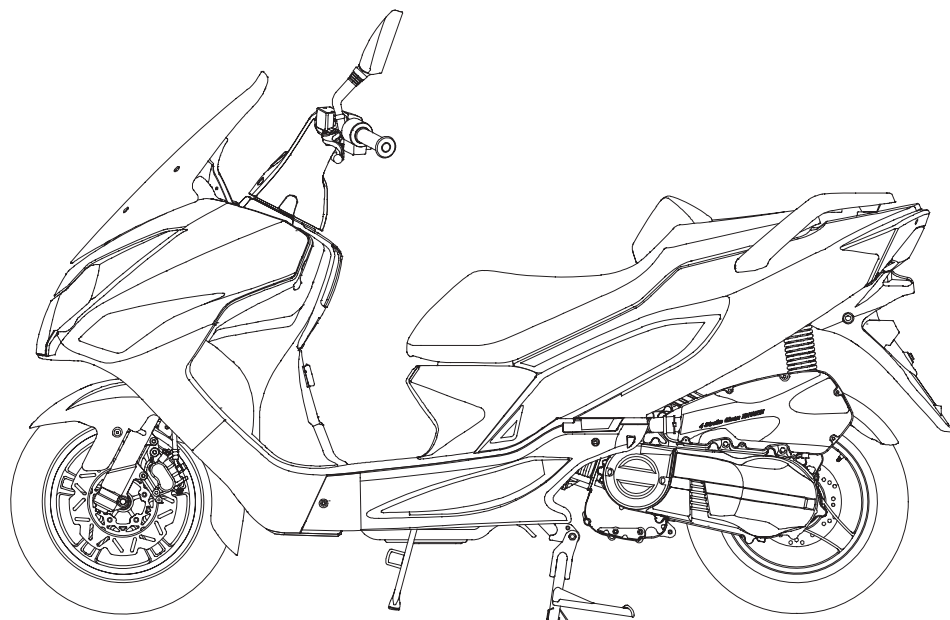
BRAKE DISK

CHECK

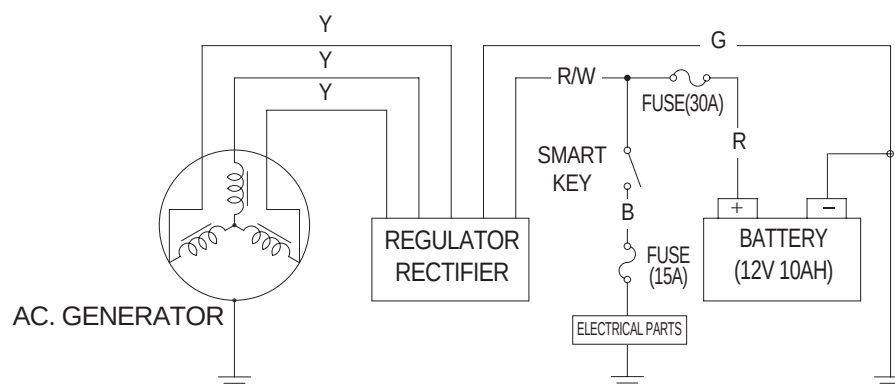
- Measure the thickness of brake disk
SERVICE LIMIT ; 3.0mm

- Check on wobbling of brake disk
SERVICE LIMIT
TOOL : DIAL GAUGE

MEMO



CHARGING SYSTEM



16. CHARGING SYSTEM

SERVICE INFORMATION	16-1
SERVICE STANDARDS	16-1
TROUBLE SHOOTINGS	16-2
BATTERY	16-3

INSPECTION OF CHARGING SYSTEM .	16-4
INSPECTION OF REGULATOR RECTIFIER .	16-5
INSPECTION OF AC. GENERATOR CHARGING COIL .	16-6

SERVICE INFORMATION

WARNING

- Do not place flammable materials near battery when charging. This can be a fire hazard as hydrogen gas is created during charging battery
- Do not allow battery acid to come into contact with clothes, skin or eyes. Battery acid contact can cause burns or loss of eye sight. If contact occurs, thoroughly clean with water, and if acid enters eyes, flush with water and see a doctor.
- If battery acid gets on clothing, as it can seep through or make a hole through the clothing and make its way to the skin, make sure to change clothing that has come into contact with battery acid and wash the battery acid from the clothes.

CAUTION

- This vehicle has a maintenance-free(MF) battery. Because MF batteries use different charging equipment, take special care when performing maintenance and especially when replacing parts. Not all regular battery equipment is compatible with MF batteries.
- When charging the battery, remove the battery from the frame and do not open stopper.
- There is the possibility of damaging the regulator/rectifier, etc. if the terminal or coupler is separated / connected when electricity is over flowing through the electrical devices. Make sure to turn the main switch OFF when performing maintenance to the charging equipment.

- If the battery is allowed to repeatedly lose all its charge, is repeatedly over-charged, or if it is left in an un-charged state, the battery can be damaged, its life can be reduced, or it can lose some of its strength. It is important to note here that the battery will naturally last 2-3 years of normal use, and although it will re-charge, its load is reduced, leading to a loss in battery strength.
- It is possible for the battery to become overcharged from battery body load. If a battery cell becomes short-circuited and if a state develops where voltage is not created between the terminals, the regulator will not operate and excessive voltage will develop where voltage is not created between the terminals, the regulator will not operate and excessive voltage will develop in the battery and normal cell electrolytes will decrease.
- If the vehicle is not used for a long period, make sure to change the battery every three months. If not so, the battery ability to store electricity is reduced.
- For information on generator disassembly, refer to section 8.

SPECIFICATIONS

UNIT :mm

ITEM		STANDARD VALUES
BATTERY	Capacity	12V - 10AH(MF)
	Terminal to terminal voltage (When fully charged)	13.0 - 13.2V (at the time in 'OFF' for 30 minutes)
A.C. GENERATOR	Charging coil resistance value(20°C)	0.1~1.5Ω(20°C)
	Rpm at charging start	1,350rpm
REGULATOR / RECTIFIER	Type	Thyristor
	Regulator voltage	14.5±1.0V / 5,000(rpm)

TOOL

MULTI TESTER, SCANNER, BATTERY TESTER, PVA(Pick Voltage Adapter)

16-2 TROUBLE SHOOTING

No power(key turned on)

- Dead battery
 - Low fluid level
 - Complete discharged
- Disconnected battery cable
- Main fuse cut or bad contacted(between fuse and holder)
- Faulty main switch lever
- Wire harness cut or bad contacted

Low power(key turned on)

- Battery undercharged
 - Low fluid level
 - Battery discharged
- Charging system failure
- Loose battery connection

Low power(engine running)

- Battery undercharged
- Battery is failing
- Charging system failure

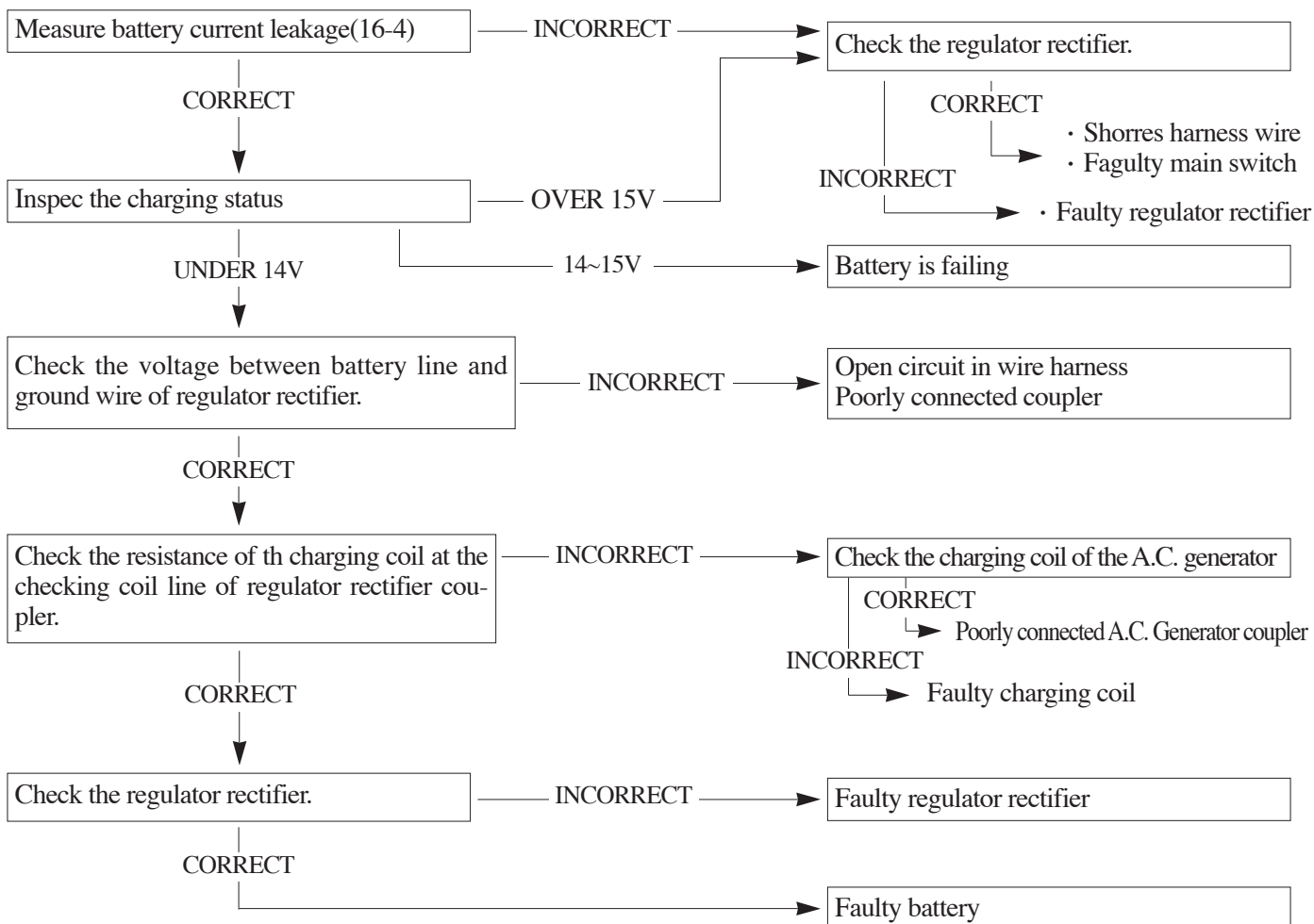
Intermittent power

- Loose battery connection
- Loose charging system connection
- Loose starting systme connection
- Loose connection or short circuit in ignition system
- Loose connection or short circuit in lighting system

Charging system failure

- Loose, broken or shorted wire or connection
- Faulty regulator rectifier
- Faulty A.C. Generator

CHARGING SYSTEM

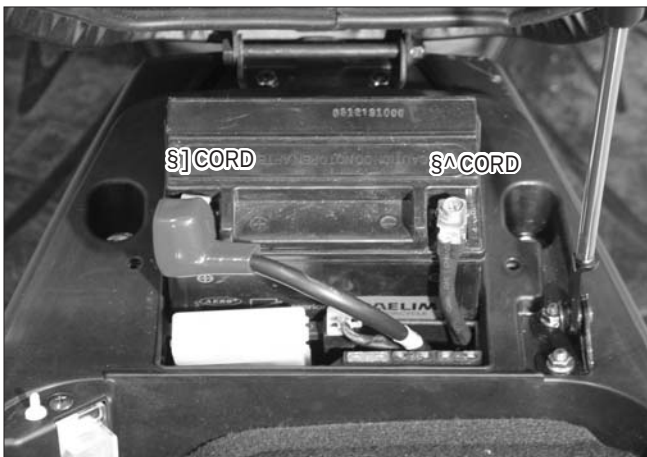




BATTERY

DISASSEMBLY / INSTALLMENT

- Open seat
- Disassemble battery cover



- Untie battery(-) cord, disassemble (+) cord and battery
- Assemble in the reverse order of disassembly.

CAUTION

- At assembling of battery, in order to prevent short circuit, first connect + terminal then - cord.



VOLTAGE INSPECTION

- Use multi tester and measure the voltage of battery.
VOLTAGE : Full charging : 13.0~13.2V
Insufficient charging : under 12.3V
TOOL : Multi tester

NOTE

- Use a voltmeter that will accurately indicate 0.1V difference.
- When measuring the battery voltage after charging, leave it for at least 30 minutes, or the accurate results cannot be obtained because the battery voltage fluctuates just after charging.

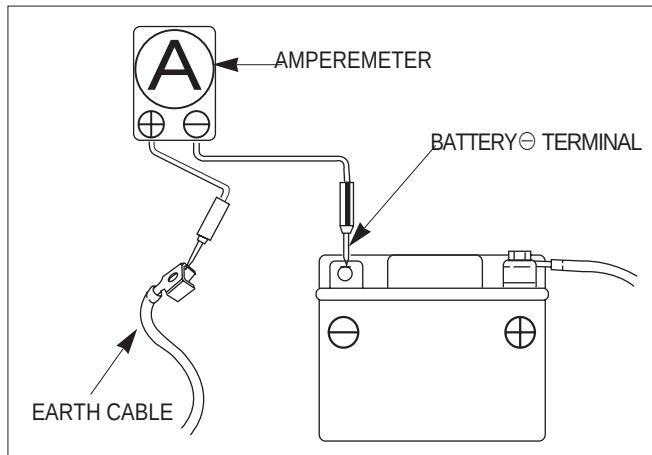
BATTERY CHARGING

- Remove the battery.
- Connect the charging + cable and battery + terminal.
- Connect the charging - cable and battery - terminal.

NOTE

- Be sure to the battery charging is not allow to exceed the specified charging time and current.
- To avoid the rapid charging could be possible to reduce the battery life and cause of damage.





CHARGING SYSTEM INSPECTION

LEAK TEST

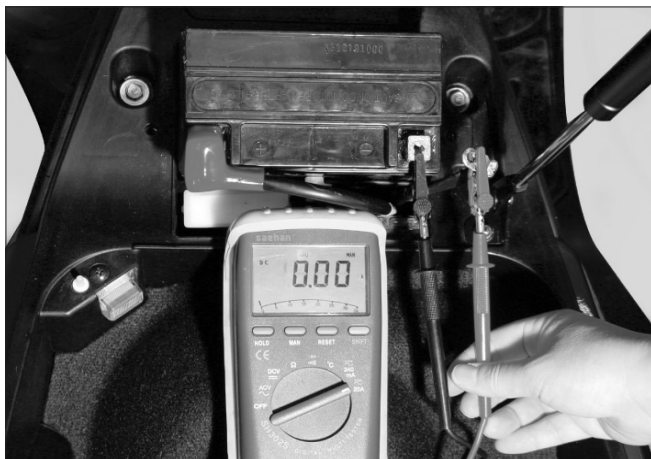
- Turn off the ignition switch, and disconnect the ground (-) cable from the battery.
- Connect an ampere meter between negative (-) terminal and ground cable.
- With the ignition switch off, measure the leakage current.

Leak current : 0.1A(below)

TOOL : MULTI TESTER or AMPEREMETER

CAUTION

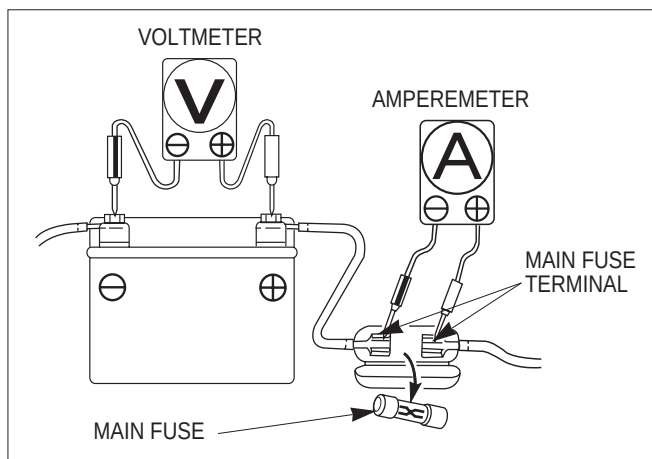
- Current flow larger than the range selected may blow out the fuse in the tester.
 - While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.
- LEAK CURRENT.**



CHARGING VOLTAGE INSPECTION

CAUTION

- Be sure that the battery is fully charged before performing this test. The amount of current flow may change abruptly if not sufficiently charged. Use a battery whose voltage between its terminals is 13.0~13.2V
- When engine is started using the starter motor, a large amount of current may flow from the battery temporarily. Use the kick starter to start the engine.
- If the probes are connected in reverse order, the registered current flow direction when charging and discharging the battery will be reversed as well.



- Perform heating engine operation and assemble fullt charged battery.
- Connect tester between battery terminals
- Disassemble main fuse and connect amperemeter between terminals.
- Operate engine and increase engine rpm slowly, measure charging voltage.

CHARGING CURRENT : OVER 0.5A / 5,000rpm

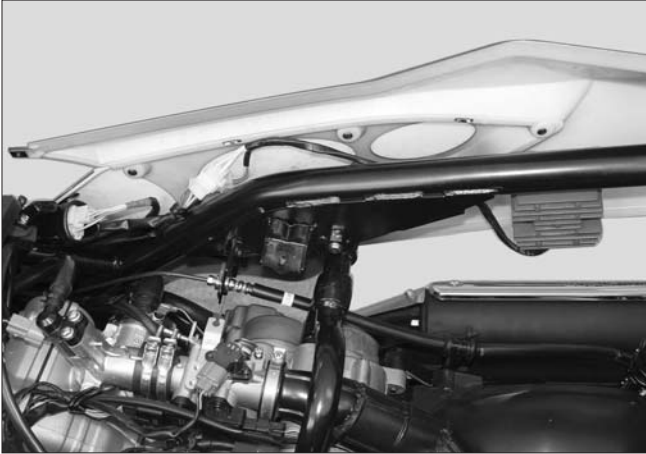
CONTROLLING VOLTAGE : 14.5±1.0V/5,000rpm

TOOL : SCANNER, MULTI TESTER

CAUTION

- Take precaution not to control the tester or wiring when flowing the current.
- It can cause the damage for the other parts by overflowing the current.





INSPECTION OF REGULATOR RECTIFIER.

- Open seat
- Disassemble luggage box
- Check wire diagram from terminal of main harness.

ITEM	MEASUREMENT	CRITERIA
BATTERY WIRE(RED)	Voltage between red(+) and green(-)	Shall be battery Voltage
GROUND WIRE(GREEN)	Current flow between green and earth wire	Flow shall be done
CHARGING COIL(YELLOW)	※Standard resistance value between each yellow wire	0.1~1.5 Ω
	Whether flow between each yellow and earth wire	Flow not to be done

※ Check at the time when 10 mins is over after engine stop.



- Check charging voltage
 - Connect multi tester to battery
 - After connecting scanner, accelerate engine rpm at 5,000 rpm to check the voltage.
- Charging voltage : over 13.5V(headlight 'ON')**

- Check harness and if everthing is OK, measure the resistance between regulator rectifier and terminals.



CAUTION

- During checking, if finger touches with metal area of tester, the resistance of human body shows. The be careful about this.
- Check by using designated tester. If using other tester except designated one, measure by fitting correctly measuring range.

- If the resistance between terminals is different, replace with new regulator rectifier.

TOOL : MULTI TESTER

- “∞” : If more than [MΩ], it shows

REPLACEMENT

- Disassemble the coupler of regulator rectifier.
- By untieing 2 bolts of regulator rectifier, disassemble.
- Assemble in the reverse order of disassembly.





CHECKING OF AC. GENERATOR CHARGING COIL

- Disassemble seat
- Disassemble connected coupler of AC. Generator cord.



- Measure the resistance between each yellow lead wire.
STANDARD RESISTANCE VALUE : 0.1~1.5 Ω (20°C) between yellow and yellow.
- If there is flow between terminal and earth terminal or if the resistance value is big, replace with the new stator.
- Assemble in the reverse order of disassembly.

CAUTION

- This test shall be done on condition that the engine installed to the vehicle.

MEMO

MEMO

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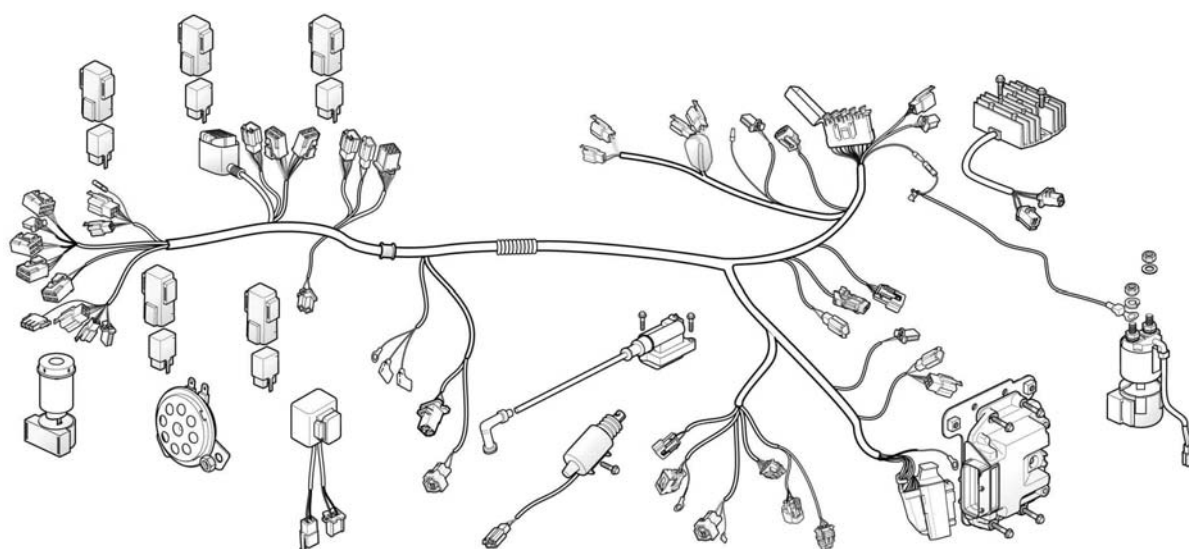
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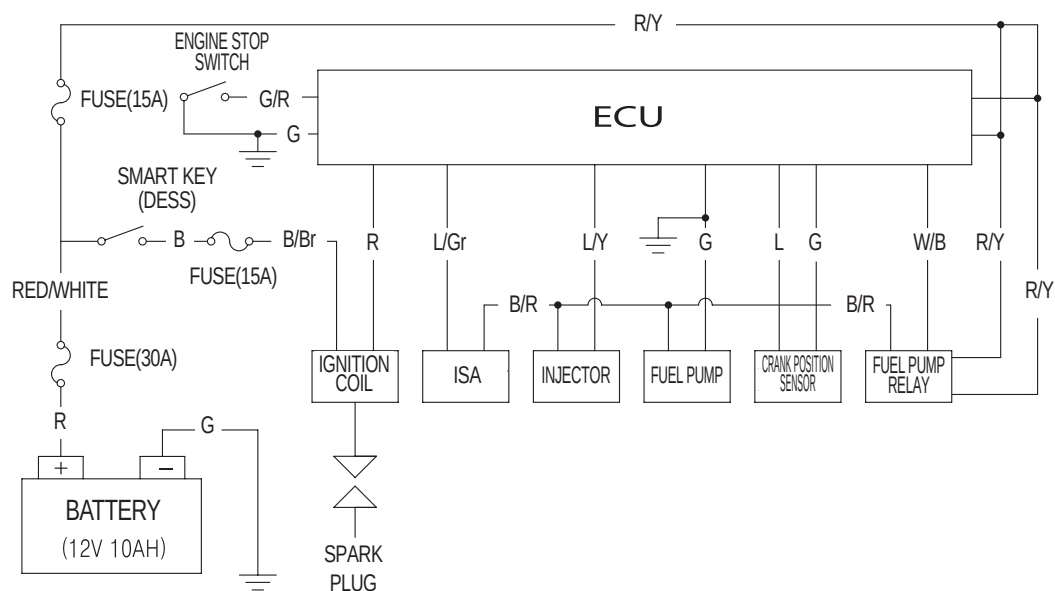
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IGNITION SYSTEM



17. IGNITION SYSTEM

SERVICE INFORMATION 17-1	CHECKING OF CRANK
SERVICE STANDARDS 17-1	POSITION SENSOR 17-3
TROUBLE SHOOTINGS 17-2	CHECKING OF IGNITION COIL . 17-4

SERVICE INFORMATION

GENERAL SAFETY

- Follow the steps described in the troubleshooting flow chart when servicing the ignition system
- If ECU falls down or gets strong out force, it may cause out of order. Then, take precaution because falling down may cause out of order.
- If the connector is disconnected when the current is flowing, the excessive voltahe may damage the unit.
Always turn off the ignition switch before servicing.
- ECU is controlling equipment in ignition system, then temporary adjustment is impossible because adjusting.
- Use spark plug of the correct heat range. Using spark plug iwith an incorrect heat range can damage the engine.
- Connect the same color cords. Pay particular attention to colors prior to removing wiring. Connect the same color couplers.
- A faulty ignition system is often related to poorly connected connectors. Check those connections before proceeding
- This manual gives explanations on inspections to receive peak voltage. As inspections for coil resistance values are also included, it may be difficult to make a correct determination
- Conduct inspection on the main switch by referring to the wiring system continuity chart(⇒ 21)

SPECIFICATIONS

ITEM			STANDARD VALUE
IGNITION COIL RESISTANCE VALUE 20°C	PRIMARY COIL		0.73 ± 0.08Ω, 23°C± 5°C
	SECONDARY COIL	WITH PLUG CAP WITHOUT PLUG CAP	(15 KΩ)
CRANK POSITION SENSOR RESISTANCE VALUE			80Ω~150Ω,20°C
IGNITION TIMING	IDLE(1,600±100rpm)		BTDC 0 °(Cold water temperature : 70 °C)

TOOL

MULTI TESTER

PVA MULTI-TESTER

TROUBLE SHOOTING

No spark at spark plug : Surely check peak voltage tester.

UNUSUAL CONDITION		PROBABLE CAUSE(CHECK IN NUMERICAL ORDER)
Ignition coil primary voltage	Low peak voltage	1. Cranking speed is too slow - Battery is undercharged(or operating force of kick starter is weak) 2. Effect of test sampling(After several times testing, if the voltage is over standard value, it means normal) 3. The wires of ignition system are taken off. 4. Faulty ignition coil 5. Faulty ECU(in case when above No. 1~5 spark plug does not work-not lighting)
	No the maximum voltage or almost not.	1. Incorrect peak voltage adaptor connections 2. Faulty ignition switch 3. Loose or poorly connected ECU coupler 4. ECU earth wire cut or bad contact 5. Faulty ECU(in case when above 1~5 are normal, but not flame in spark plug)
	Peak voltage is normal, nut no spark jump at plug	1. Faulty spark plug or leaking ignition coil secondary current ampere 2. Faulty ignition coil
Crank position sensor	Low peak voltage	1. Cranking speed is too slow - Battery is undercharged(or operating force of the kick starter is weak) 2. Effect of test sampling time(after several times test, if voltage is over standards, it means normal) 3. Faulty crank position senso(if normal in 1~3)
PULSE GENERATOR	No peak voltage or almost not	1. Faulty peak voltage adopter 2. Faulty crank position sensor

CHECKING POINTS

No spark at spark plug : Surely check peak voltage tester.

UNUSUAL CONDITION	PROBABLE CAUSE(CHECK IN NUMERICAL ORDER)
IGNITION KEY	When starting, measure the battery voltage between ignition key's black and green wire.
CRANK POSITION SENSOR	Measure the resistance between blue and green wire of coil. (80~150 Ω , 20°C)
IGNITION COIL PRIMARY	Measure the resistance between black/yellow and green wire of coil (0.73° ±0.08 Ω , 23°C° ±5°C)
GROUND WIRE	Check the electricity flow between ground wire and frame body.

● If the measure value is over designated range or spark plug does not make flame, check ignition coil by using tester.



CHECKING OF CRANK POSITION SENSOR

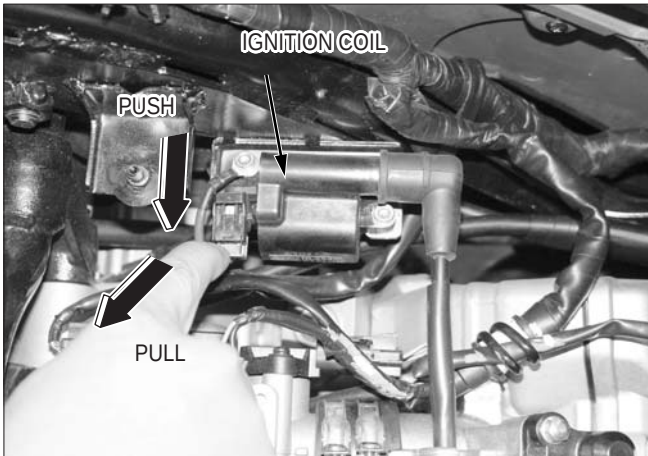
MEASURING RESISTANCE

- Open the seat
- Disassemble luggage box
- Disassemble the coupler of AC. Generator
- Measure the resistance between blue and green wire.
Standard value : 80~150 Ω (20°C)



MEASURING THE MAXIMUM VOLT-AGE

- Disassemble the coupler of AC. Generator
- Connect the + code of PVA tester to blue terminal
- Connect - code of PVA tester to green terminal
- Crack by starter motor and measure the maximum voltage of pulse generator coil
The maximum voltage : over 1.5V
Tool : PVA, Multi-tester
- Assemble in the reverse order of disassembly.



CHECKING OF IGNITION COIL

- Pull backward the fixing pin of ignition coil, press the coupler and disassemble it.

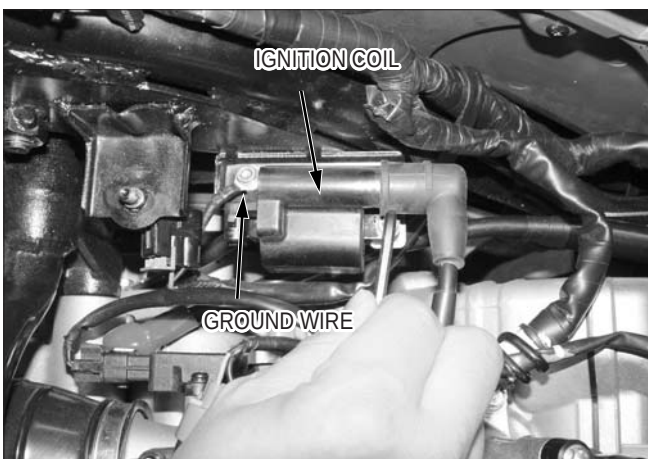
CAUTION

- Because the resistance value of primary coil is low, then it is difficult to decide whether it is out of order or not.



PRIMARY COIL

- Measure the resistance value of primary from ignition coil terminal.
- If its value is within the designated range, it is OK.
STANDARDS : (Resistance) $0.73 \pm 0.08 \Omega$, $23^{\circ}\text{C}^{\circ}$ $\pm 0.5^{\circ}\text{C}$ (voltage) over 100V.



REPLACEMENT

- Disassemble high tension cord from plug and plug cap.
- Disassemble wires from ignition coil cord terminal.
- Untie 2 ignition coil flange bolts assembled at frame and disassemble ignition coil.
- Assemble in the reverse order disassembly.

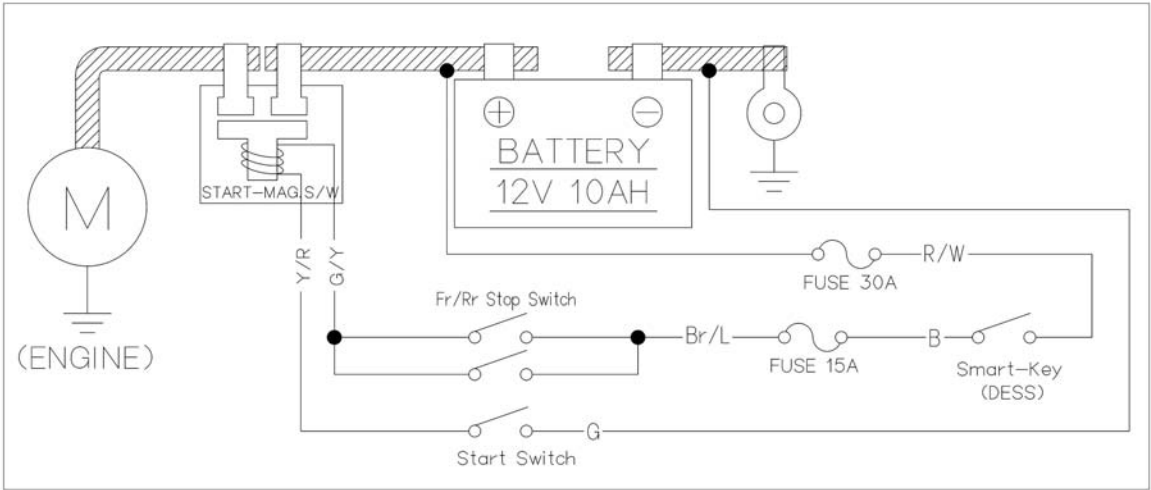
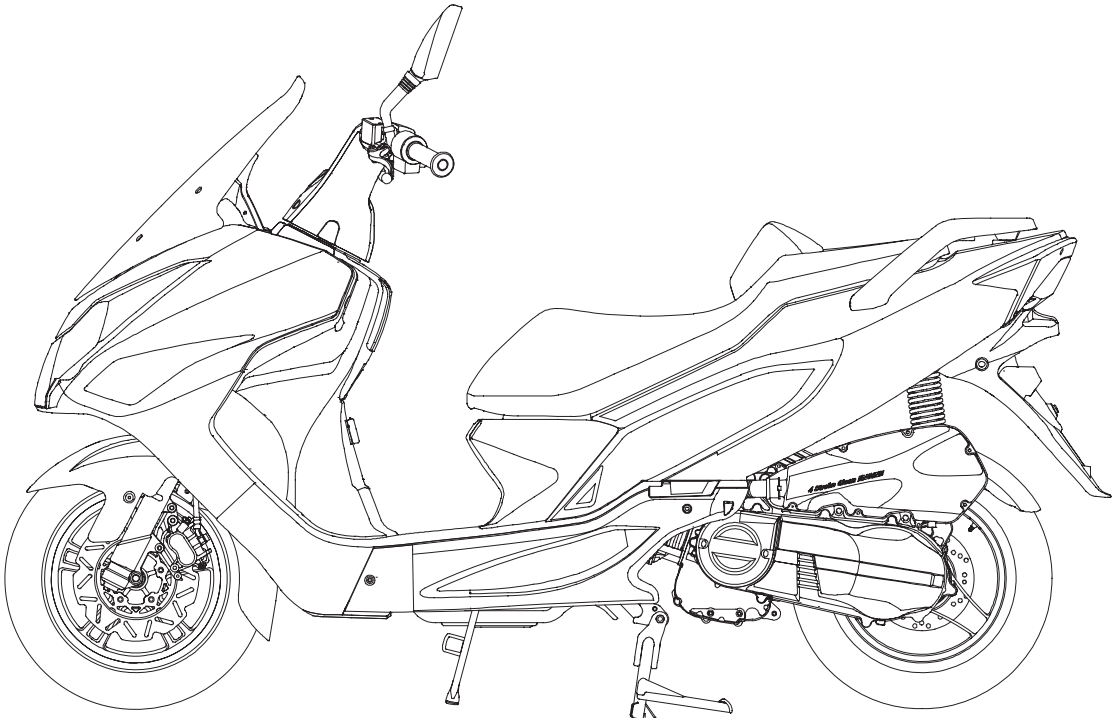
CAUTION

- At assembly, be sure to connect the ground wire(earth wire).

MEMO

Handwriting practice area with 15 horizontal dotted lines.

Large empty rectangular box for drawing or additional notes.



18. STARTER SYSTEM

SERVICE INFORMATION 18-1

TROUBLE SHOOTING 18-2

STARTER MOTOR 18-3

STARTER MAGNETIC SWITCH . 18-6

SERVICE INFORMATION

GENERAL SAFETY

- The starter motor can be maintained without removing the engine from the vehicle
- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- A weak battery may be unable to turn the starter motor quickly enough, or, supply adequate ignition current
- The starter motor may be damaged if current is allowed to flow to it when the engine cannot turn over
- The engine may not be turned over if the stop switch is faulty

SPECIFICATIONS

UNIT : mm

ITEM	STANDARD VALUE	SERVICE LIMIT
STARTER MOTOR BRUSH LENGTH	10.2mm	5mm

TOOL

MULTI-TESTER

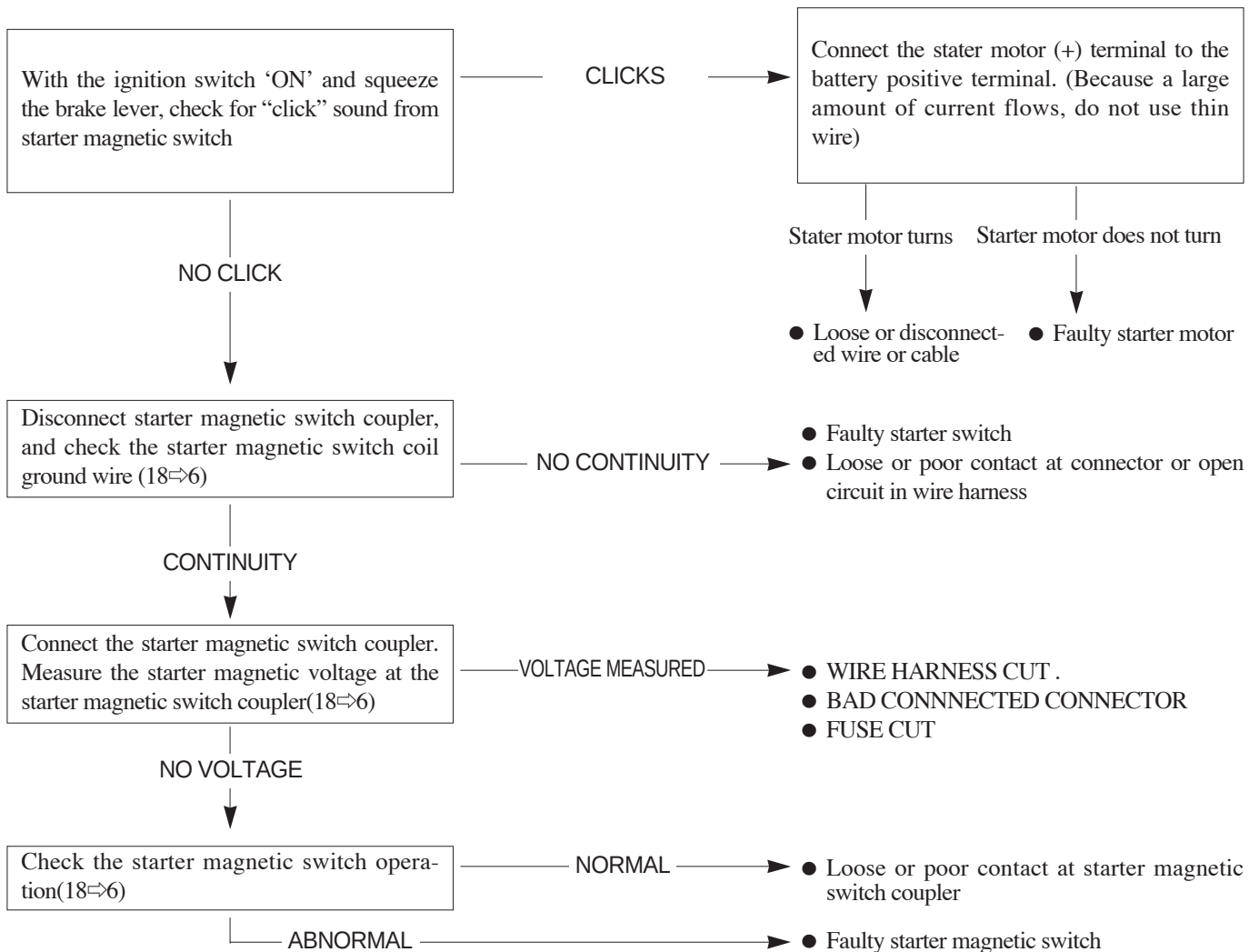
VERNIER CALIPERS

SCANNER

TROUBLE SHOOTING

STARTER MOTOR DOES NOT TURN

- Check for a blown main fuse before servicing



Starter motor turns, but crankshaft does not

- Faulty starting clutch
- Faulty starter gear
- Slided starter clutch

Idling starter

- Reverse rolling of motor
- Reversely assembled brush
- Reversely assembled motor cable
- Motor terminal reversely assembled

The rolling power of starter motor is weak

- Battery discharged
- Poorly connected battery terminal cord
- Poorly connected starter motor cord
- Poorly connected ground cable
- Worn or damaged brush

Starter motor, crankshaft turn, but engine does not start

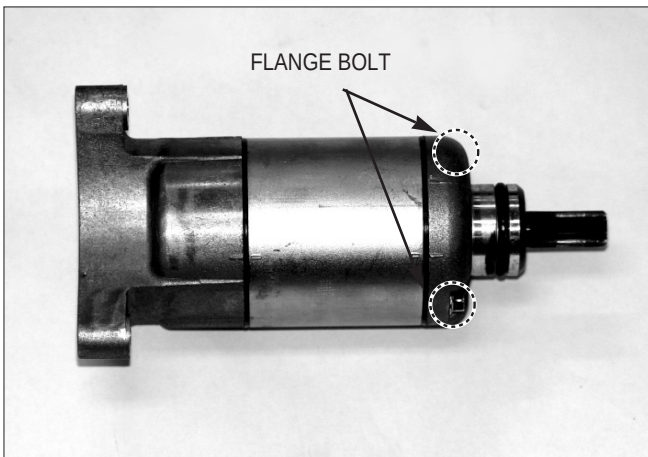
- Faulty ignition system
- Engine problems



STARTER MOTOR

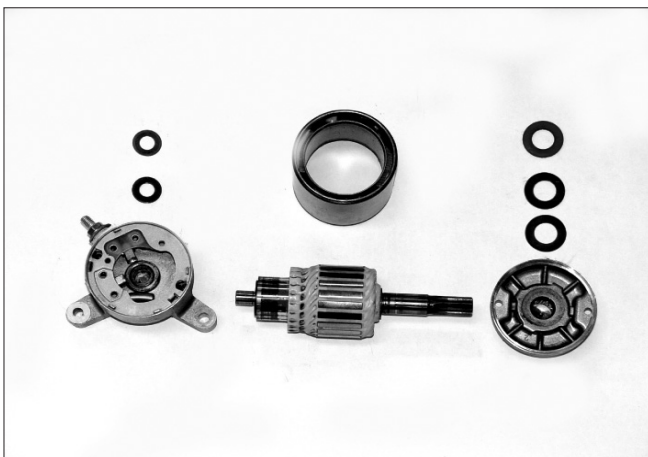
DISASSEMBLY

- Turn the main switch “OFF”, disassemble battery(-) cable before maintaining starter motor.
- Take off rubber cap and untie nut, disassemble starter motor cable from starter motor.
- Untie 2 starter motor flange bolts and separate earth cable and starter motor from case.



DISASSEMBLY

- Untie 2 installation bolts and disassemble the following parts
 - O-RING
 - STARTER MOTOR CASE BOLT/ SPRING WASHER
 - FRONT COVER
 - SEAL RING
 - LOCK WASHER
 - WASHER
 - CIR CLIP
 - REAR COVER ASS'Y
 - SEAL RING
 - 2 WASHERS
 - AMATEUR



CAUTION

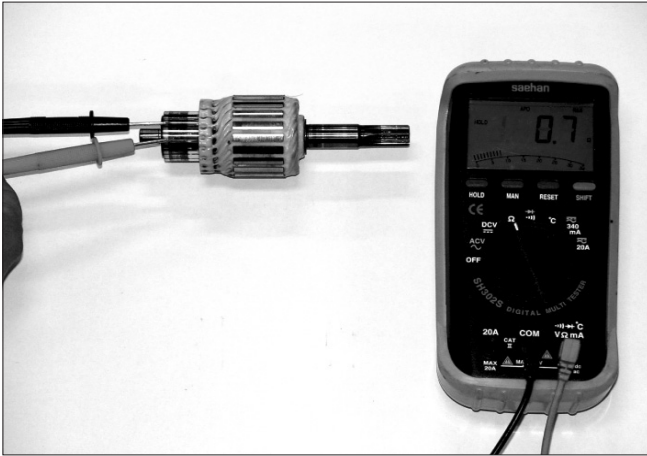
- Be sure to turn the main switch off when repairing starter motor. If the power connected, starter motor may exceptionally operate then cause to be damaged.

INSPECTION

- Check whether the inner bushing in rear cover are damaged or worn.
- Check whether the inner bushin of front cover and oil seal are damaged or worn.
- Check on discolor of amateur commutator.
- Replace if each segment is seriously discolored meaning abnormal.



STARTER SYSTEM



- Check on continuity of each segment of commutator.
 - If continuity, normal.



- Check on continuity between amateur shaft and each segment of commutator.
 - If not continuity, means normal.



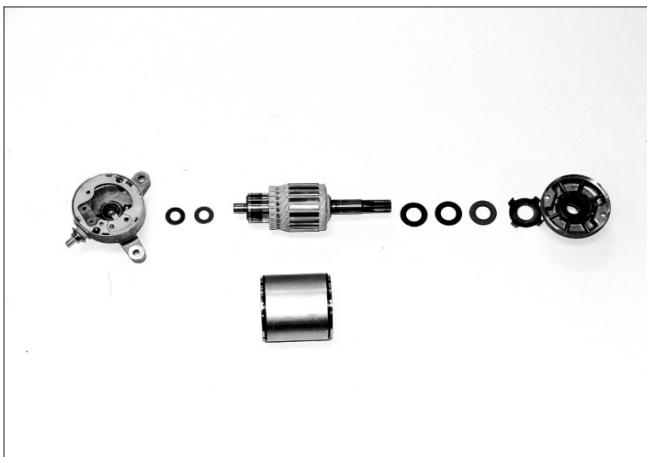
- Check on continuity between + brush and cable terminal.
 - If continuity, means normal.



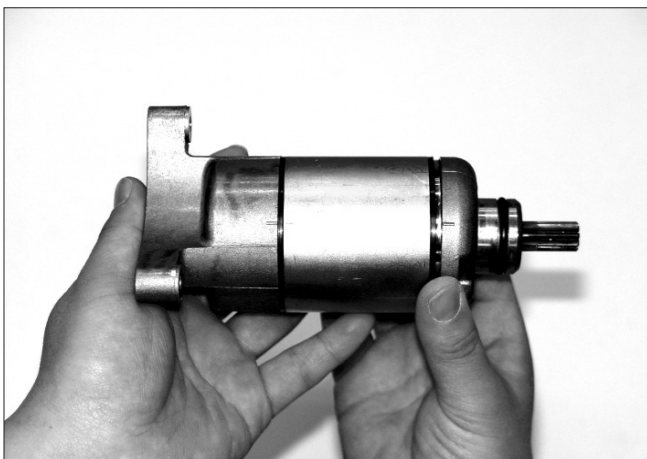
- Check on continuity between cable terminal and case.
 - If not continuity, means normal.



- Check abrasion of brush and measure the length of brush.
SERVICE LIMIT : 5mm



- Insert 2 washers.
- Assemble the new seal ring to motor case.
- Apply slightly grease to the end position of amateur shaft.
- Assemble brush to terminal.



- Fit brush into brush holder and assemble amateur to motor case.
- Combine rear cover to the mark of motor case.

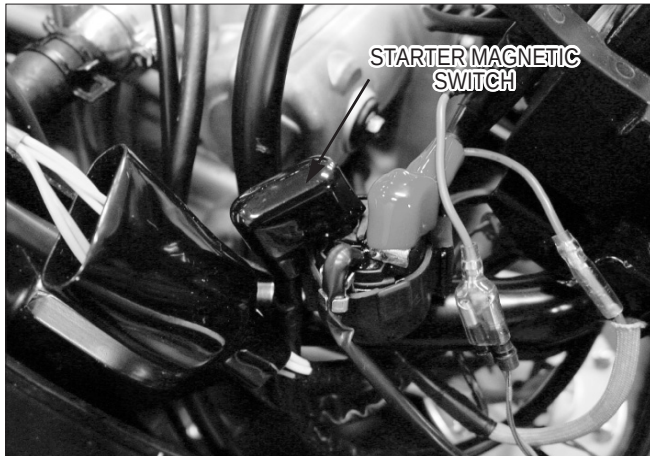
CAUTION

- Take precautions that there is not any flaw in contact side of amateur and brush. When case is assembled to amateur, both parts may be crashed each other because magnet may be pulled out. If strongly crashed then coil may be damaged, be sure to pull it by hand and fit into.



ASSEMBLY

- Apply oil to the new O-ring and assemble starter motor home.
- Insert starter motor to LH. Crank case.
- Assemble 2 starter motor assembly bolts.
- Assemble starter motor cable.
- Wrap up correctly rubber cap to terminal.



STARTER MAGNETIC SWITCH

DISASSEMBLY

- Open seat
- Disassemble luggage box
- Disassemble battery + wire assembled at starter magnetic switch terminal(When disassembling, take precautions not to short circuit and grounding.
- Disassemble sarter motor cable assembled at starter magnetic switch terminal.
- Disassemble wire harness and assembled yellow/red connector and green/yellow connector.
- Disassemble starter magnetic switch from the fixed bracket of frame.

INSPECTION

- Turn the main switch “ON”, when pushing starter switch button, check whether it sounds precisely connected.
 - It sounds
 - ⇒ Bad contacting between battery terminal and motor terminal(Check operation of starter magnetic switch).
 - It does not sound
 - ⇒ Do not input the voltage to starter magnetic switch.
 - ⇒ Bad starter magnetic switch

STARTER MAGNETIC SWITCH VOLTAGE

- Measure the voltage between starter magnetic switch yellow/red wire(+) and frame earth(-).
- When the main switch turned ON and pushing starter switch, if there is battery voltage, it is normal

STARTER MAGNETIC SWITCH EARTH WIRE DIAGRAM

- Disassemble connection of starter magnetic switch green/yellow wire connector, if there is continuity between the terminal of harness and frame earth.

CHECKING OF OPERATION.

- When connecting the battery (+) to yellow/red wire disassembled connecting of magnetic switch wire connector and battery (-) to green/yellow wire, if there is continuity between terminals by connecting multi tester like the photo, the switch operates well.
- Assemble in the reverse order of disassembly.

MEMO

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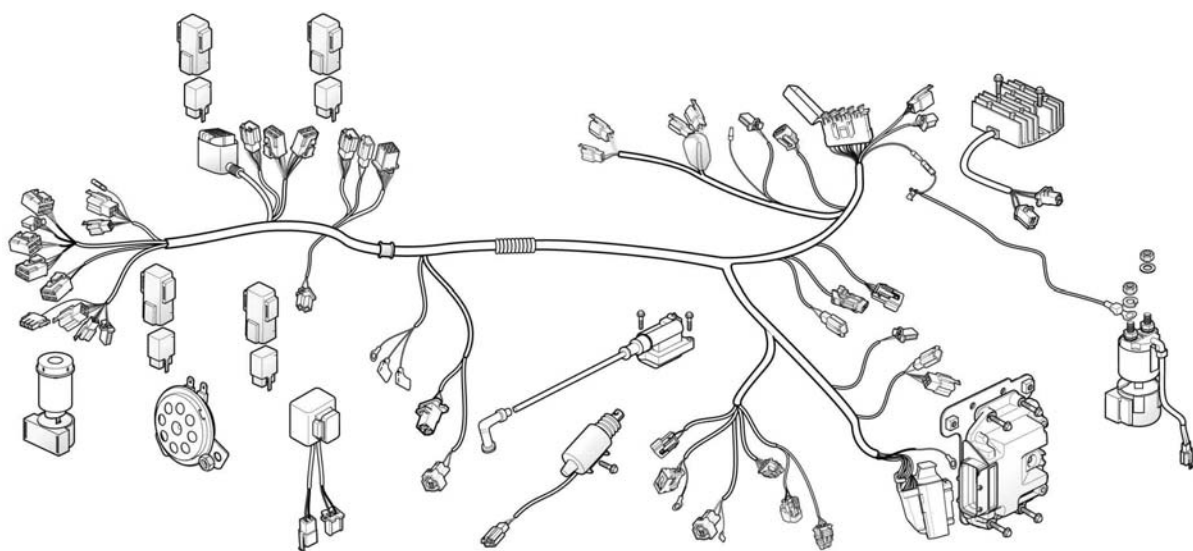
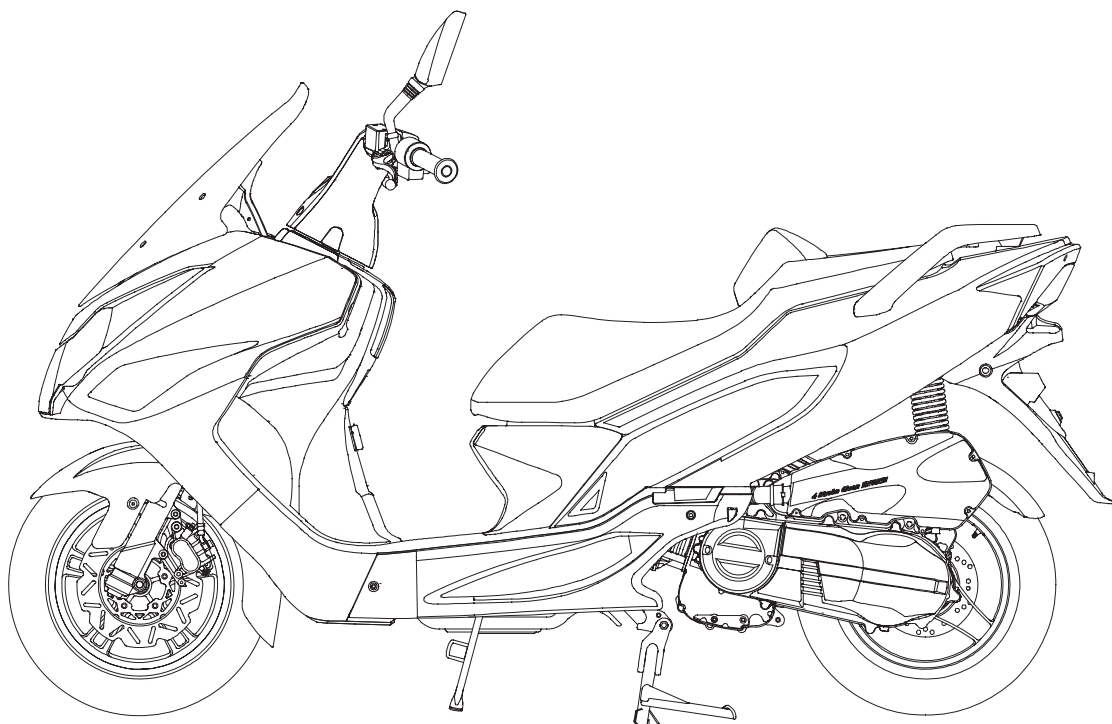
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19. LIGHTS// SWITCHES / HORN

SERVICE INFORMATION	19-1	MAIN SWITCH	19-5
TROUBLE SHOOTINGS	19-1	HANDLE BAR SWITCH	19-5
HEAD LIGHT	19-2	HORN SWITCH	19-6
FRONT WINKER	19-3	FRONT/ REAR STOP SWITCH . .	19-6
REAR COMBINATION LIGHT . .	19-3	SEAT SWITCH	19-7
REAR WINKER	19-3	SMART KEY SET(DESS)	19-7
SPEEDOMETER	19-4		

SERVICE INFORMATION

GENERAL SAFETY

- Connect the same color wires together. Connect couplers carrying the same color and the same number of pins together.
- All couplers are equipped with tabs which can be locked. Remove these locks prior to disassembling ; and insert these tabs all the way until locked when assembling
- Carry out continuity test on circuits or parts to diagnose electric systems. The continuity test on normal parts can be carried out without removing the parts from the vehicle. Simply disconnect the wires and connect a continuity tester or an ohmmeter to the coupler terminal or connectors.
- The continuity test is conducted to check if electric power is connected between 2 terminals. If there is coil resistance within circuits, or to check the large resistance resulting from the connector corrosion, an ohmmeter is required to check the circuit resistance value.

TROUBLE SHOOTING

Light not turned on when the main switch is ON.

- Faulty light bulb
- Wire cut or faulty wires
- Faulty or disconnected wiring
- Fuse cut
- Battery discharged

Dim headlight

- Battery discharged
- Wiring and switch resistance high

Headlight Hi-low beam can not be changed

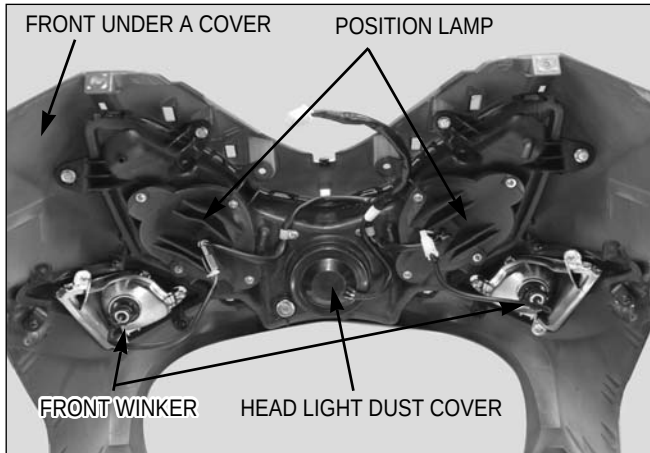
- Faulty light bulb
- Faulty dimmer switch

Fuel meter indicator malfunctioning

- Coupler separated
- Harness disconnected
- Float operation malfunction
- Fuel unit damaged

Fuel meter needle unstable

- Coupler loose
- Fuel unit damaged
- Meter damaged



HEAD LIGHT

DISASSEMBLY

- Disassemble front under A cover.
- Disassemble headlight wires
- Untie 6 flange bolts
- Disassemble head light ass'y
- Assemble in the reverse order of disassembly

REPLACEMENT OF HEAD LIGHT BULB

- Disassemble head light dust cover from under the front under A cover.
- Disassemble head light socket
- Replace with new head light bul
- Assemble in the reverse order of disassembly

CAUTION

- When replacing bulb, if touching the glass surface of bulb by hand or contaminated gloves, oil contents may be stained causing heating. Then it may cause heat deformation of glass surface and break. At replacing bulb, refer to the followings.
- When light turns on, do not replace. Turn main switch OFF surely then bulb gets cold and do the following works.
 - When replacing bulb, wear clean gloves to be careful for oil content not to be stained in glass.
 - If oil content stained in bulb, clean it completely by clean gloves stained with alcohol or gasoline like thinner and next clean once more by clean gloves.
 - After replacing bulb, assembled rear cover completely.

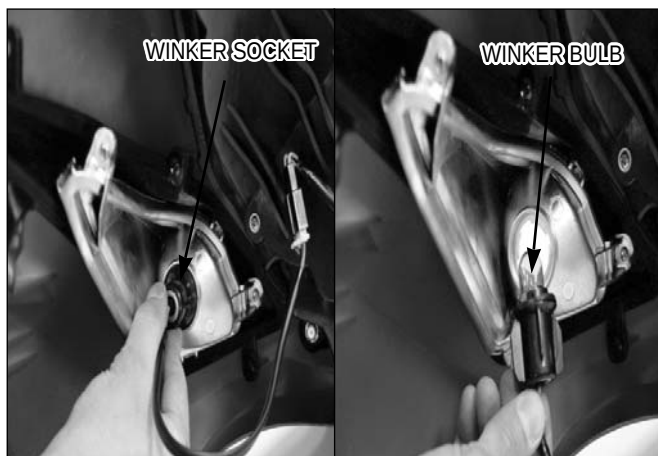


POSITION LAMP

- Disassemble front under A cover
- Untie 4 screws and disassemble position dust cover.



- Disassemble the position lamp wires
- Untie 2 screws and disassemble position lamp
- Disassemble RH/LH position lamp ass'y
- Assemble in the reverse order of disassembly



FRONT WINKER

REPLACEMENT OF WINKER BULB

- By rotating winker socket from front under cover A clockwise, disassemble it.
- Disassemble bulb from winker bulb socket next replace.

CAUTION

- When disassembling lens, do not press unnecessary force.

- Assemble in the reverse order of disassembly



REAR COMBINATION LIGHT

REPLACEMENT OF BULB

- Disassemble body cover
- Disassemble luggage box
- Disassemble rear combination light ass'y
- Replace with the new rear combination light ass'y
- Assemble in the reverse order of disassembly

CAUTION

- At disassembling, be careful for lens not to be broken and do not press unnecessary force.
- Check on whether lens seal assembled correctly at assembling tail light lens.



REAR WINKER

REPLACEMENT OF BULB

- Untie 4 tail light lens fixing tapping screws of rear combination light.
- Pulling backward the left and right of tail light slightly and breaking away from home, disassemble.



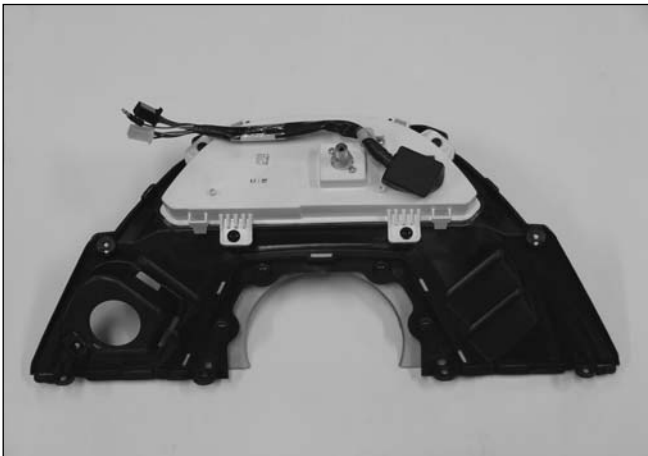
- By disassembling bulb from winker bulb socket, and replace it.
- Assemble in the reverse order of disassembly.



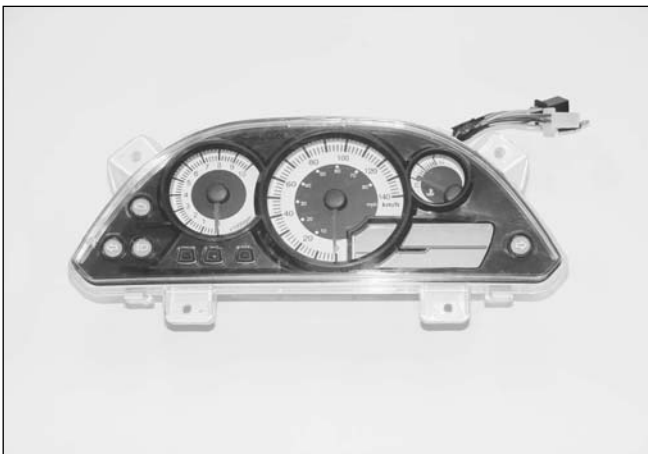
SPEEDOMETER

DISASSEMBLY

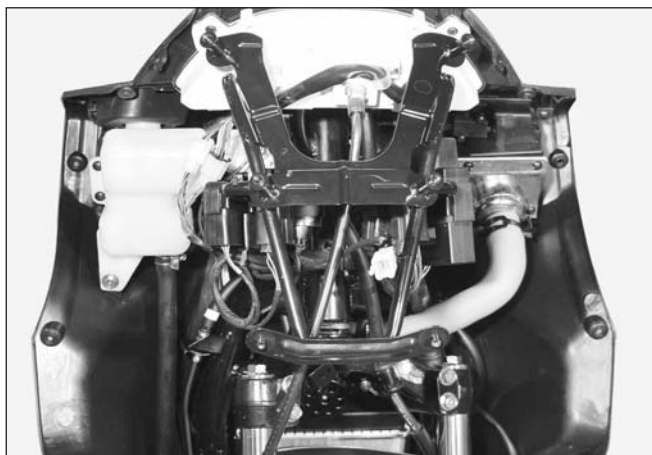
- Disassemble front under, upper handle cover
- Disassemble front cover
- Disassemble speedometer(in the meter side) cable.



- Disassemble meter cover



- Disassemble speedometer ass'y
- Assemble in the reverse order of disassembly.



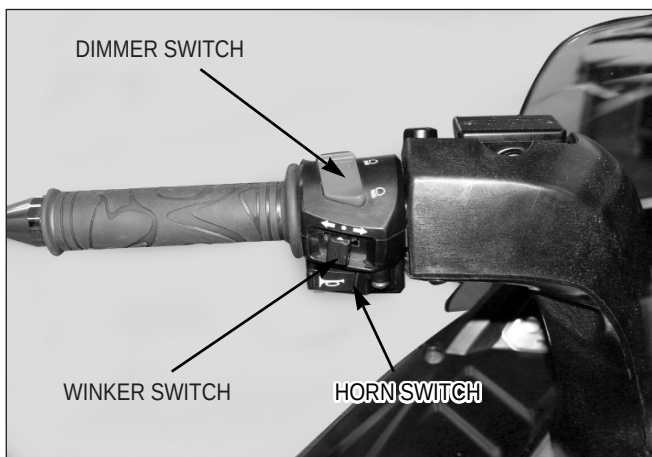
MAIN SWITCH

- Disassemble front under cover A



- Disassemble main switch coupler
- Test the continuity between each terminal

	RED	BLACK
OFF		
ON	○	○



HANDLE BAR SWITCH

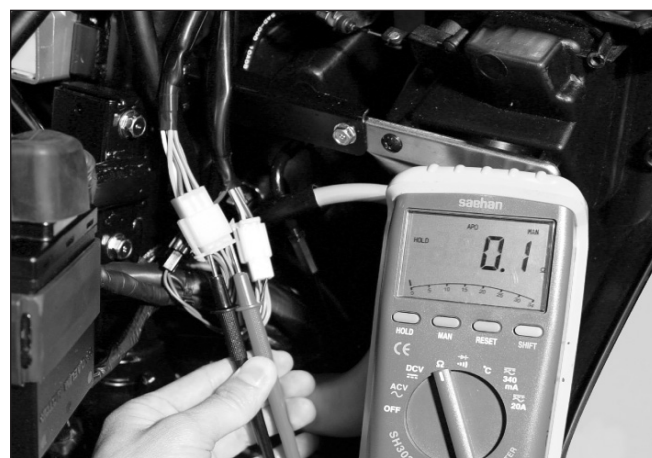
- Disassemble front cover
- Disassemble connecting of handle bar switch connector.
- Check the continuity between each terminal of handle bar switch.

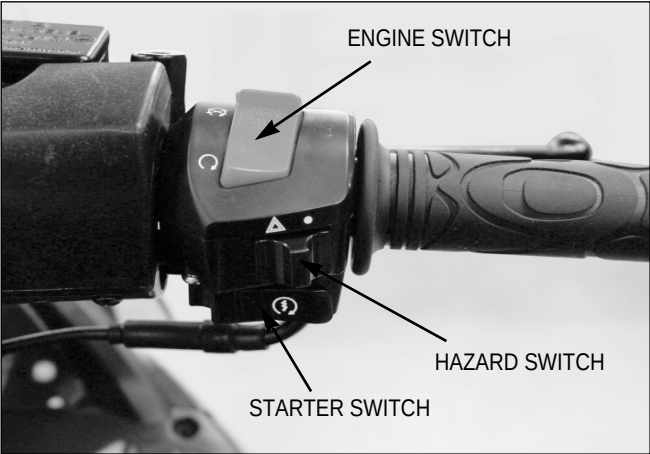
WINKER SWITCH

	W	R	L
R	○	○	
N			
L	○		○
COLOR	GRAY	SKY BLUE	ORANGE

DIMMER SWITCH

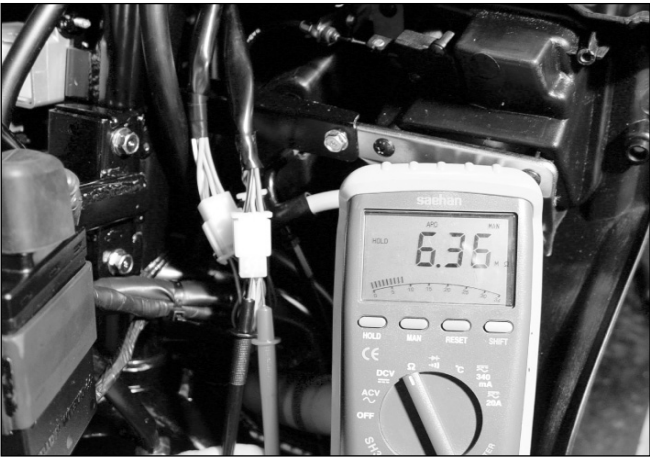
	BAT4	HI	LO
HI	○	○	
(N)	○	○	○
LO	○		○
COLOR	BROWN/WHITE	BLUE	WHITE





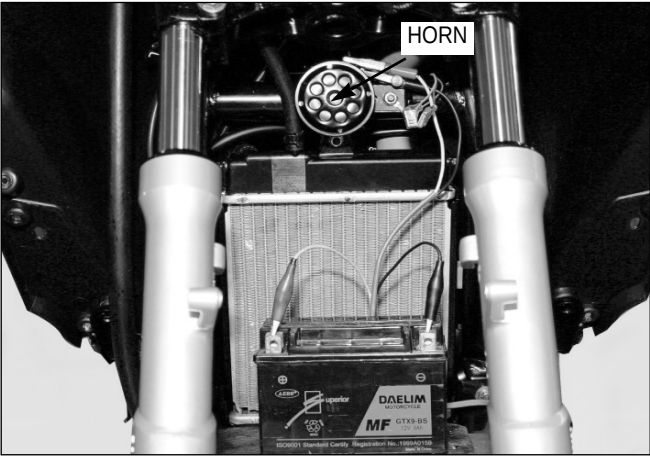
STARTER SWITCH

	ST	E
FREE		
PUSH	○	○
COLOR	GREEN/RED	GREEN



HAZARD SWITCH

	HAZARD		
	W	R	L
OFF			
HAZARD	○	○	○
COLOR	GRAY	SKY BLUE	ORANGE



HORN

- Remove the wire connector from the horn.
- Connect the horn terminal with 12V battery.
- Normal if it sounds.

HORN SWITCH

	HO	BAT2
FREE		
PUSH	○	○
COLOR	LIGHT GREEN	BLACK

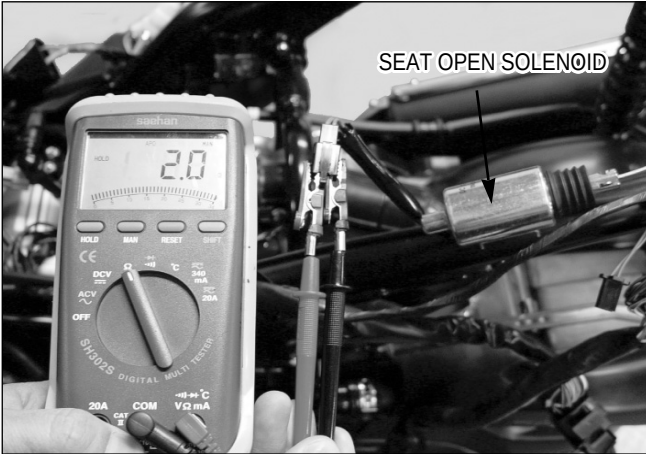


FRONT / REAR STOP SWITCH

INSPECTION

- Remove the front handle cover.
- Check the continuity between the black wire of under the key and the terminal of green/yellow wire.
At pulling brake lever - continuity
At releasing brake lever - no continuity
- Assemble in the reverse order of disassembly

SEAT SWITCH



- Check the resistance of seat open solenoid material
RESISTANCE VALUE : about 2 Ω
- If it is over the designated resistance value range or ∞ , it means faulty part then replace.



- After connecting tester to orange/blue(+) cord and green cord(-) of seat open solenoid, push the seat button and check the voltage.
STANDARD VOLTAGE : Battery voltage



SMART KEY SET(DESS)

- When push the main switch lever and LED of smart key lights, check whether blue LED at key lights or not.



- Check the resistance of green and white/yellow of main switch lever.
- Check the continuity when pushing the main switch lever.



- Check the resistance after connecting tester to the red/white and black/blue of solenoid.
RESISTANCE VALUE : about 30 Ω
- If it is over the designated resistance value or ∞ , it means faulty part then replace.



- Check the continuity between key set terminals after main switch lever ON.



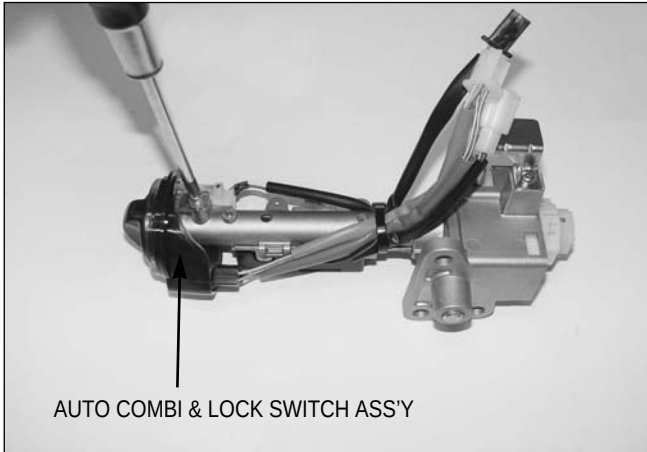
SMART KEY RECEIVER

- Check the voltage between red/white and green of smart key receiver.
STANDARD VOLTAGE : Battery voltage
- Check the continuity and wire status of each part of receiver.



KEY SET DISASSEMBLY

- Disassemble 3 flange bolts
- Disassemble coupler and auto combi. & lock switch ass'y.



- Disassemble auto combi. & lock switch ass'y lever cover.



- Disassemble LED bulb.
- Assemble in the reverse order of LED bulb.



ANTENNA

- Disassemble center cover
- Check on damage or flaw off outer antenna and connection of coupler and wires.

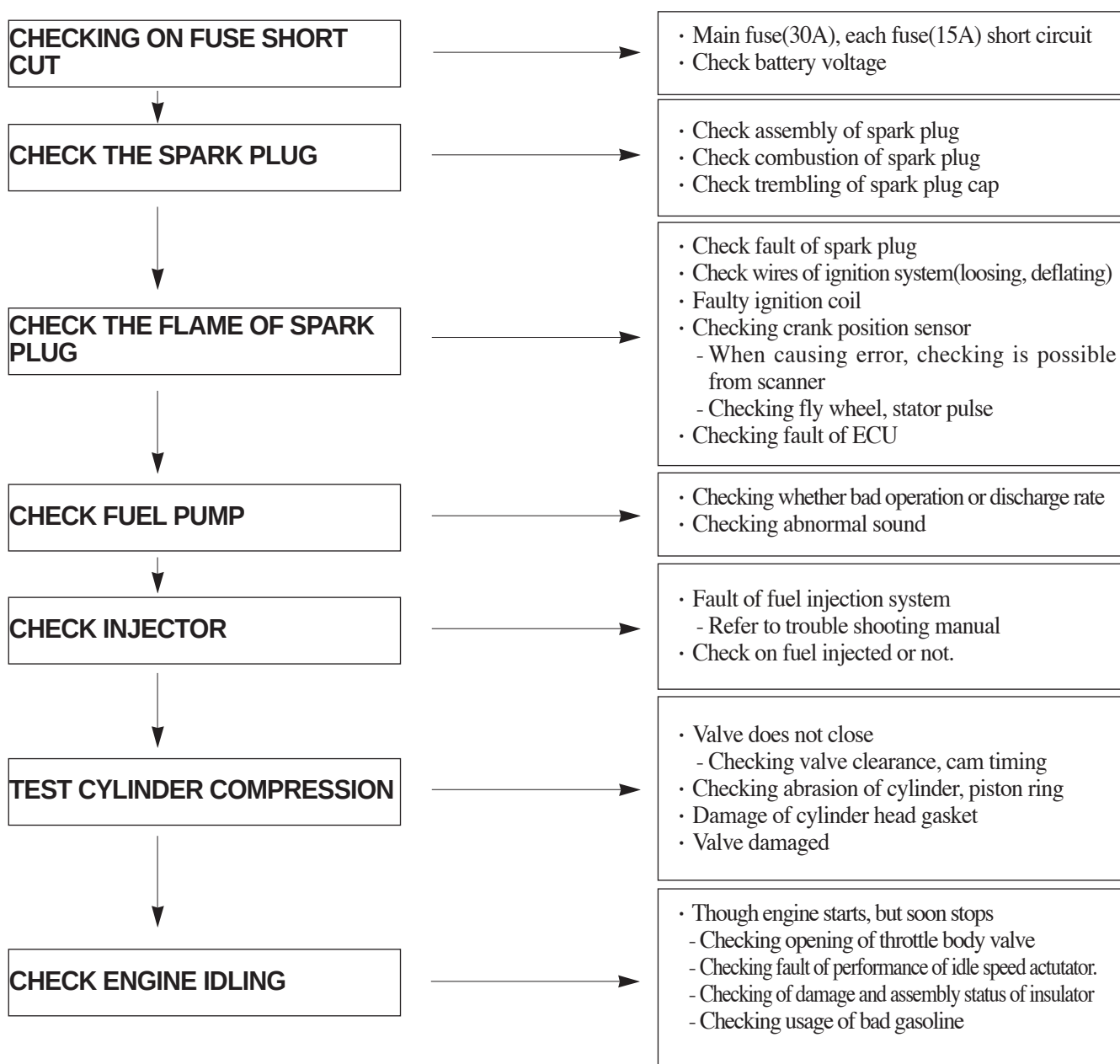
MEMO

20. TROUBLE SHOOTING

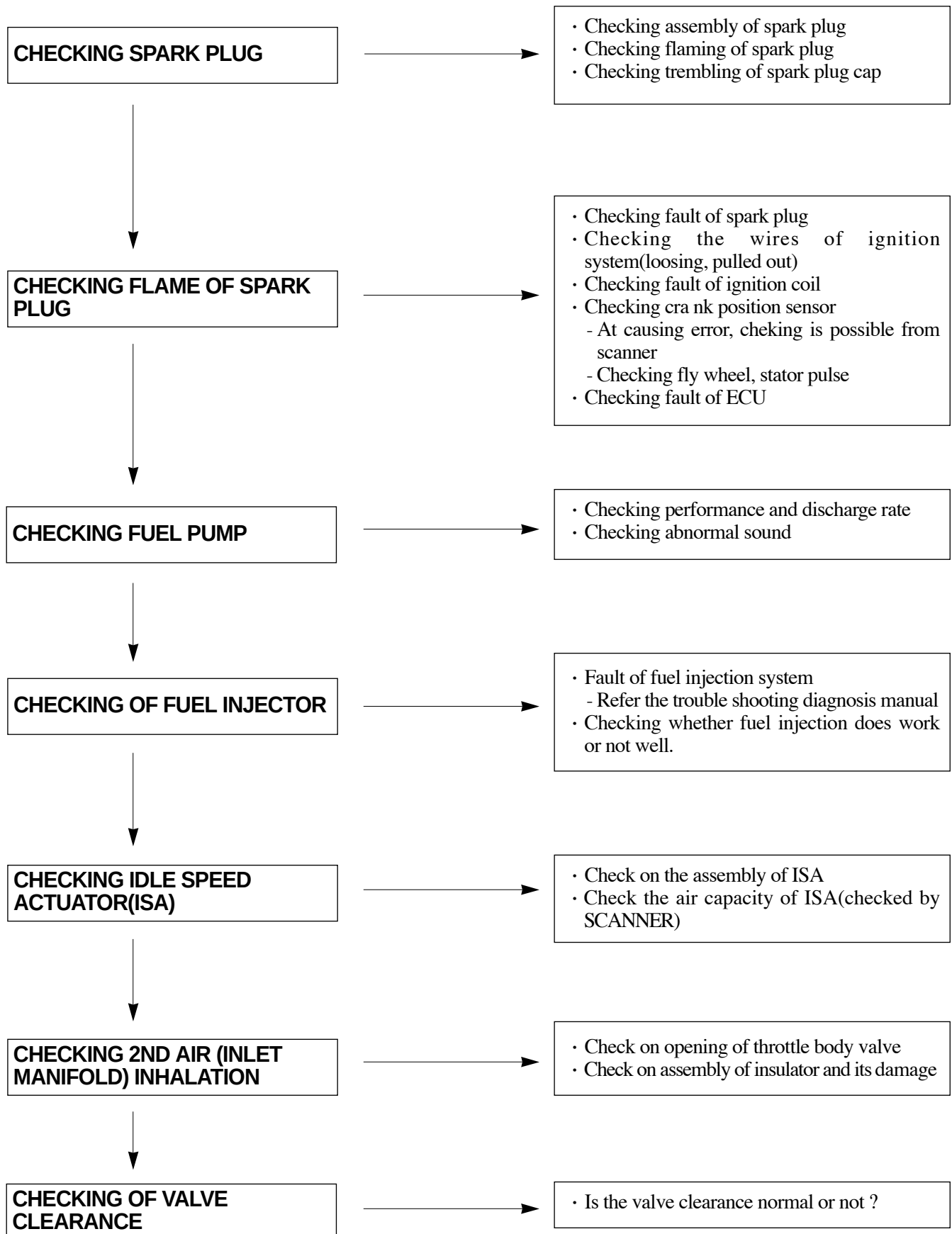
ENGINE WON'T STARTING OR IS HARD TO START . . . 20-1	POOR STARTING 20-5
IDLEING, POOR LOW SPEED AFTER STARTING . . . 20-2	UNSTABLE PRM OR STOP AT ENGINE STARTING . . . 20-6
POOR ENGINE SPEEDING AT MIDDLE OR HIGH SPEED . . . 20-3	IDLE RPM INCREASES OVER 2,000 RPM 20-6
POOR PERFORMANCE AT HIGH SPEED 20-3	FAULTY OPERATION 20-7

* This section explains about diagnosis of principal trouble shooting in engine. Except this section, refer to each section's trouble shooting.

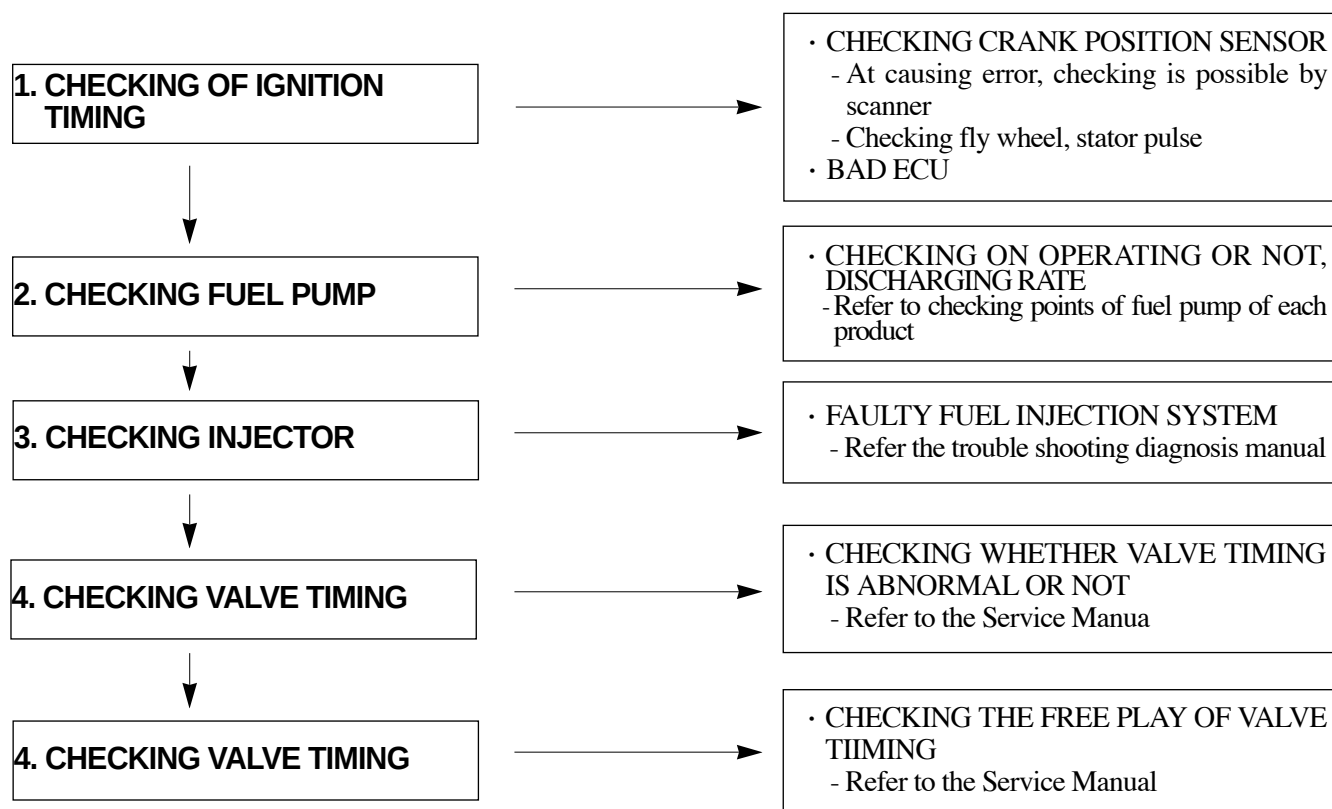
BAD ENGINE STARTING



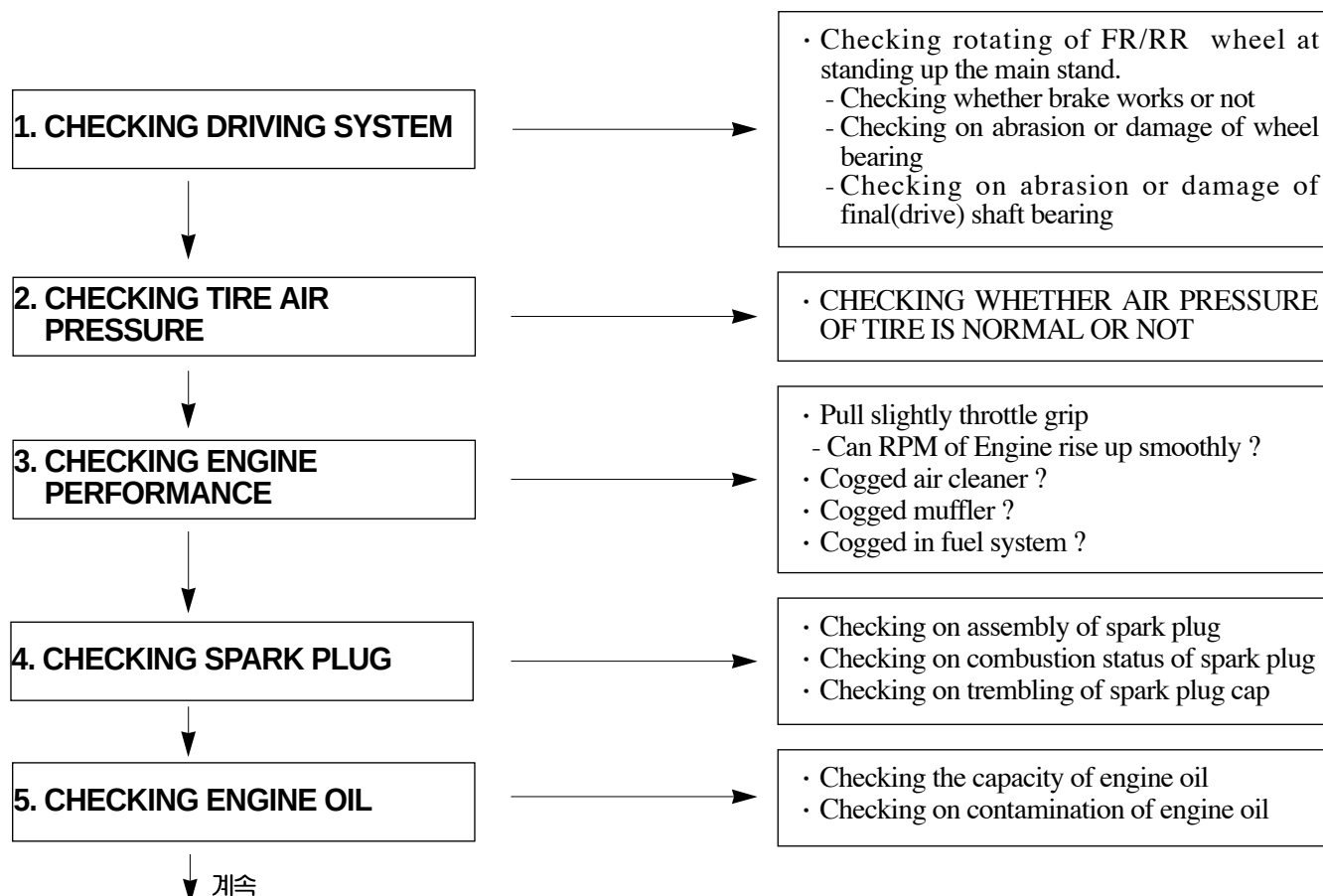
IDLING AFTER STARTING, BAD LOW SPEED



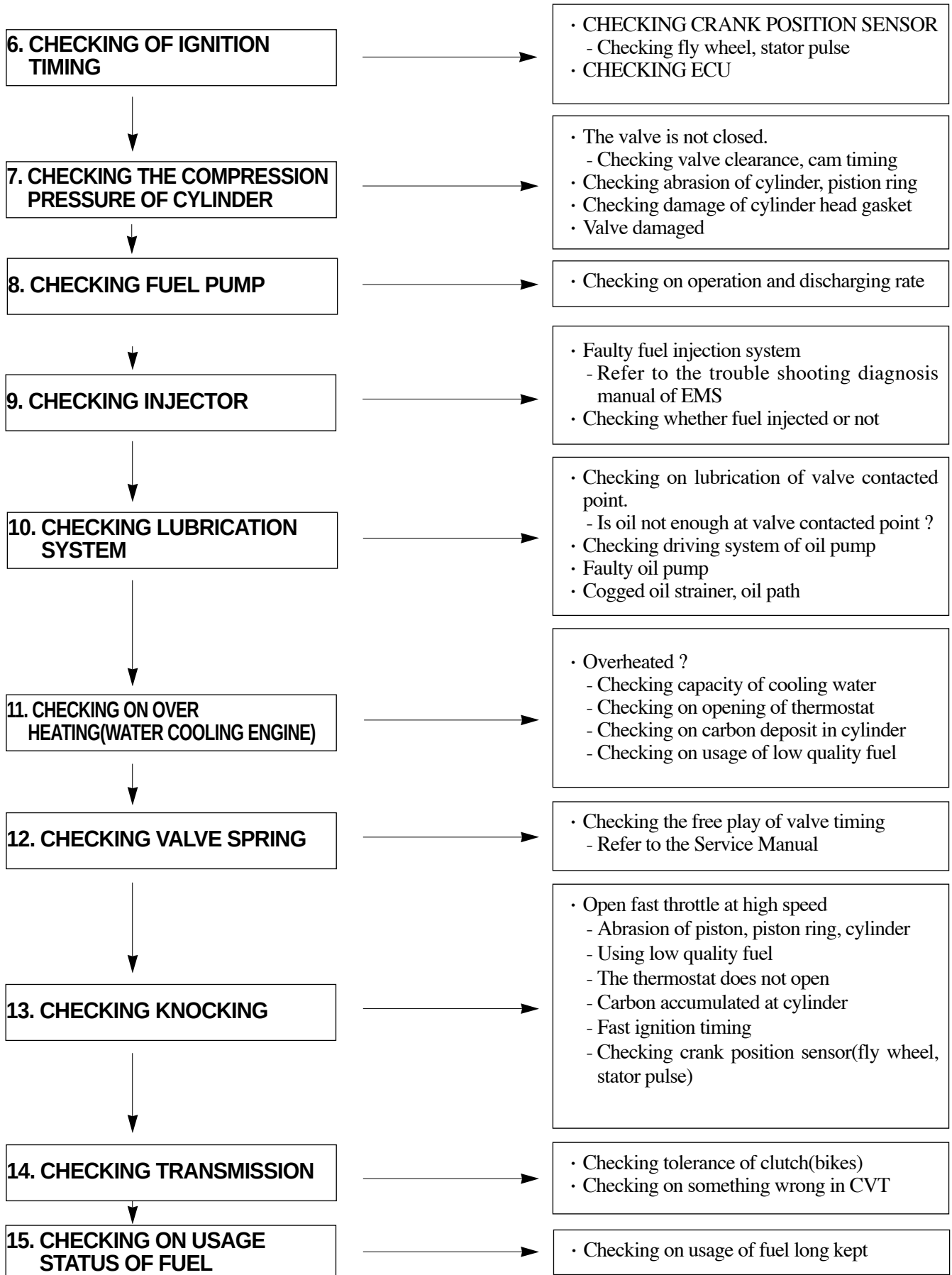
POOR ENGINE SPEEDING AT MIDDLE, HIGH SPEED



POOR PERFORMANCE AT HIGH SPEED



POOR PERFORMANCE AT HIGH SPEED



BAD STARTING

WHEN ENGINE CAUTION(CHECK) LAMP LIGHTS

ERROR OF CRANK POSITION SENSOR	→	• Checking faulty points of scanner • Checking on damage like being stabbed at signal position of fly wheel • Checking whether abnormal voltage is generated within the range where A, B pulse signals of AC.
BAD PERFORMANCE OF FUEL PUMP RELAY	→	• Generator are not generated. • Checking on operation of fuel pump relay component parts by scanner • Checking on being cut of ECU 39 by checking wire harness. • Refer to EMS trouble shooting diagnosis manual about detail checking methods of each number of ECU.
INJECTOR	→	• Checking faulty points by scanner • Checking on operation of injector component parts by scanner • Checking on being cut of ECU 40 by checking wire harness • Refer to EMS trouble shooting diagnosis manual about detail checking methods of each number of ECU.

WHEN ENGINE CAUTION(CHECK) LAMP DOES NOT LIGHT

CHECKING ON BEING CUT OF ECU POWER CORD	→	• At connecting with scanner, communication error occurs. (There is no operation sound of fuel pump) • Checking whether battery voltage at ECU 10,17,25 is or not by checking wire harness(in case of separate cut in 10, in case of simultaneous cut in 17 and 25, it makes problem) • As for detail checking methods of each number of ECU, refer to the EMS trouble shooting diagnosis manual)
CHECKING ON BEING CUT OF CRANK A,B SIGNAL CORDS	→	• Checking whether engine think is ON or not by scanner. • If not being ON, check on being cut of ECU 22, 30 by checking wire harness. • As for detail checking methods about being cut, refer to the EMS trouble shooting diagnosis.
CHECKING SIDE STAND SWITCH	→	• Connect with scanner then check whether switch turns ON, OFF. • Check on being cut in ECU 5(scooter), ECU13(bikes) with checking wire harness. In case of bikes, the signall of neutral gear of ECU 29 occurs. • Regarding detail checking methods about each number of ECU, refer to the EMS trouble shooting diagnosis manual.
CHECKING IGNITION COIL	→	• Checking on abnormal or not of ignition coil externally • Checking on being cut of ECU 35,37 by checking wire harness. • As for detail checking methods of each number of ECU, refer to the EMS trouble shooting diagnosis manual.
CHECKING FUEL PUMP	→	• VJF125/250, VS : 3.8 bar Checking discharge rate of fuel pump VL,VJ,SQ,SLU,SN : 3.0 bar • Checkig discharge rate of fuel pump. When the min key operates three times, in case of VJF, VS, its value shall be over 130cc, Except above, those of VL,VJ,SQ,SLY,SN shall be over 100cc (But, the battery voltage shall be over 12.6V and the capacity fuel in fuel tank shall enough
CHECKING ENGINE KILL SWITCH	→	• Check on ON/OFF of engine kill switch(scanner) • Checking on being short circuit of ECU No. 5(bike) • Refer to the EMS trouble shooting diagnosis manual for detail checking methods of each number of ECU.

AFTER ENGINE STARTING, IT STOPS SOON AND ITS RPM IS UNSTABLE.

CHECKING OF IGNITION COIL

- Checking on something wrong of ignition coil
- Checkiing the flame of spark plug
(Reference) Fuel value of spark plug - bike : CR9EH-9,
scooter : CR8EH-9

CRANK POSITION SENSOR ERROR

- Checking trouble shooting contents by scanner
- Checking on being stabbed of the signal position of fly wheel
- Checking whether abnormal voltage occurs or not in the range where A,B pulse signals of AC. Generator does not occur.

IDLE SPEED ACTUATOR

- Checking the value of idle speed actuator by scanner
(designated value : over 100°ΔC in engine temperature, the value of ISA : about 20%)
- Checking on operation of ISA component parts by scanner

CHECKING OF FUEL PUMP

- Checking the discharge rate of fuel pump
- VJF125/250, VS : 3.8 bar VL,VJ,SQ,SLU,SN : 3.0 bar
- Checking the discharge rate of fuel pump - At operation of main key three times, in case of VJF,VS, it shall be over 130°CC Except other models(VL, VJ, SQ, SLU, SN), it shall be over 100°CC
(But, the fuel capacity in fuel tank and over 12.6V of battery voltage are required)

IF THE ELECTRIC WIRE OF OXYGEN SENSOR IS CUT

- Checking on trouble shooting points by scanner
- Checking the voltage of oxygen sensor by scanner
- Checking on being cut of ECU 2,12,34 by checking wire harness.
- Refer to the EMS trouble shooting diagnosis manual for detail checking of each number of ECU.

THE RPM OF IDLE INCREASES OVER 2,000 RPM

CHECKING THROTTLE POSITION SENSOR

- Checking the value of throttle position sensor by scanner(the designated value : 0~1.2)
- Initialize ECU by scanner
- Checking on being cut of ECU 4,18,19 by cheking wire harness
- Refer to the EMS trouble shooting diagnosis manual for detail checking methods of each number of ECU.

BAD OPERATION

MOVABLE DROVE FACE ASS'Y

TROUBLE SHOOTING REASONS

ENGINE IS OPERATED, BUT,
DOES NOT START

- DRIVE BELT WORN OR BROKEN
- LAMP PLATE BROKEN
- BAD WEIGHT ROLLER OPERATION
- MOVABLE DRIVE FACE OPERATION
- BAD DRIVEN PULLEY WEIGHT SHOE SPRING
- BAD TRANSMISSION
- CLOGGED TRANSMISSION

THE SCOOTER SLOWLY
MOVES AND ENGINE STARTS,
BUT STOPS.

- DRIVEN PULLEY WEIGHT SPRING
- CLUTCH OUTER AND WEIGHT CLOGGED

AT STARTING, LOW ENGINE
POWER

- DRIVE BELT ABRASION AND SLIPPERY
- WEIGHT ROLLER ABRASION
- DRIVEN FACE BEARING CLOGGED
- WEAK DRIVEN SPRING
- MOVABLE DRIVEN FACE BAD OPERATION

AT HIGH SPEED, LOW ENGINE
POWER

- DRIVE BELT ABRASION AND SLIPPERY
- WEIGHT ROLLER ABRASION
- DRIVEN PULLEY BEARING ABRASION

ABNORMAL SOUND OR
SMELLING

- OIL OR GREASE STAINED IN DRIVE BELT AND PULLEY
- DRIVE BELT ABRASION
- BAD DRIVEN FACE WEIGHT SPRING
- DRIVE PULLEY BEARING ABRASION AND CLOGGED

HANDLE/ WHEEL

HEAVY HANDLING OPERATION

- EXCESSIVELY FASTENING OF STEERING TOLP THREAD
- INSUFFICIENT TIRE AIR PRESSURE
- STEERING BEARING BROKEN
- BALL RACE BROKEN
- VIOLENT PULLING CABLE

HANDLE TREMBLES

- INSUFFICIENT TIRE AIR PRESSURE
- TIRE ABRASION AND BAD TIRE
- BAD WHEEL BALANCE
- DEFORMED RIM
- WHEEL BEARING ABRASION AND BROKEN
- AXLE SHAFT LOOSED

HANDLE LEANS TO THE ONE
WAY

- NOT MATCHED THE CENTER BETWEEN FRONT AND REAR WHEEL
- FRONT CUSHION POWER
- REAR CUSHION POWER
- BAD ENGINE HANGER
- NOT SMOOTH OPERATION OF STEERING

HEAVY WHEEL ROTATING

- BAD WHEEL ALIGNMENT
- BAD WHEEL BEARING
- BENT AXLE SHAFT
- BENT BRAKE DISK
- CALIPER PISTON BAD OPERATION

MEMO

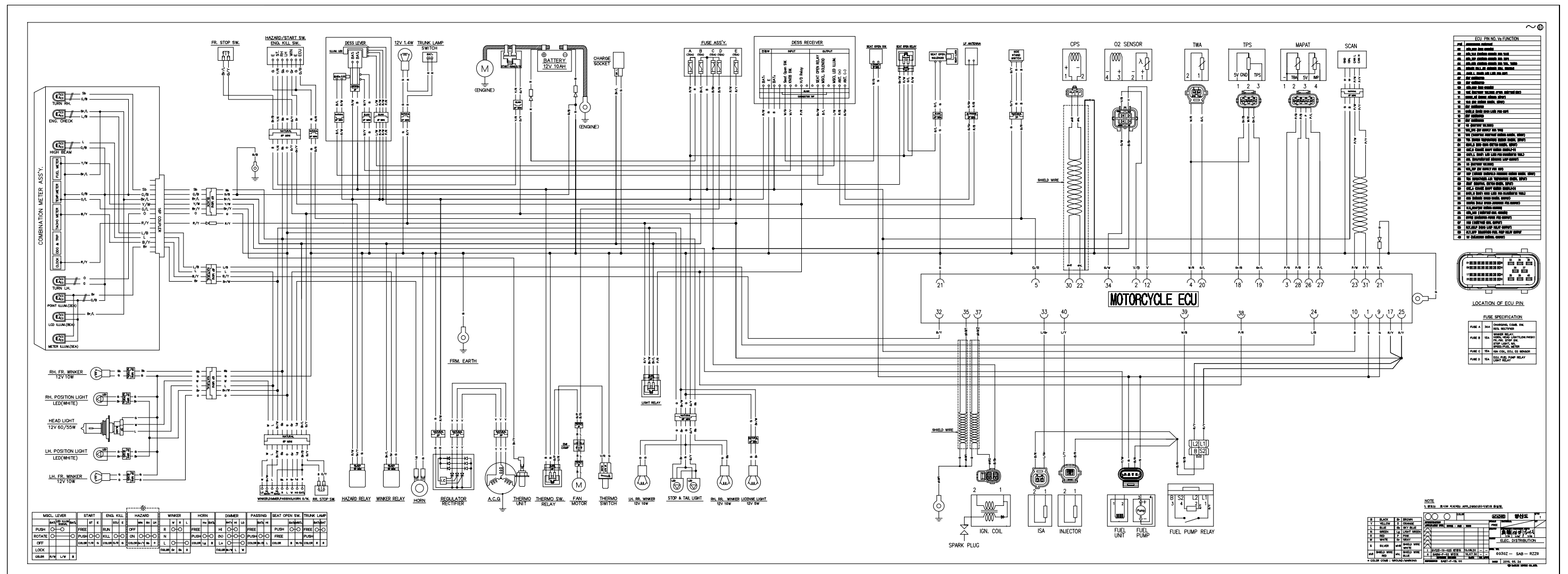
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21. WIRING DIAGRAM





SERVICE MANUAL

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 **DAELIM MOTOR**