DAELIM

SERVICE MANUAL

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ROADWIN

DAELIM MOTOR

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SM48-0401-01E

HOW TO USE THIS MANUAL

This manual describes effective maintenance procedure for the VJ125 manufactured by DAELIM Motor Co., Ltd.
To ensure safety and optimal operating conditions of the vehicle, carry out regular inspections according to the maintenance schedule (Section 2).
Sections 1 through 2 provide information on overall vehicle; and section 3 describes maintenance procedure for the engine, frame and electrical systems.
To facilitate use of this manual, each page starts with disassembly and system diagrams, service information, and troubleshooting guide. If you cannot find the cause of trouble, refer to Section 21: Troubleshooting.

CONTENTS

1. GENERAL INFORMATION

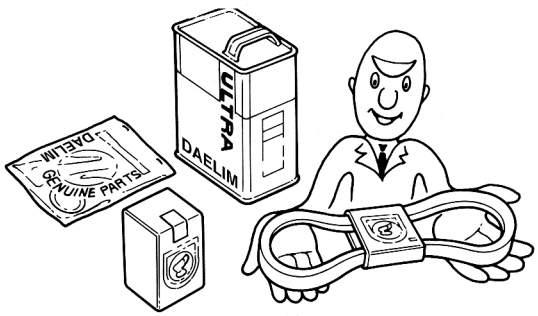
SERVICE INFORMATION

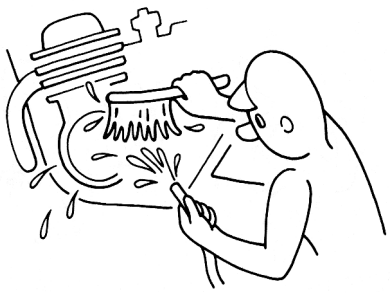
⚠ WARNING

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 be 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 be 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.

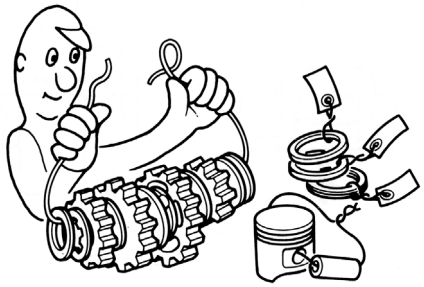
SERVICE RULES

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



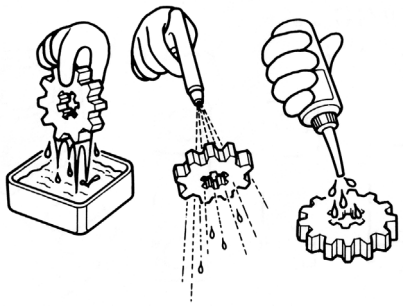


3. Store the parts of each system discriminatively to install each part in the right place.



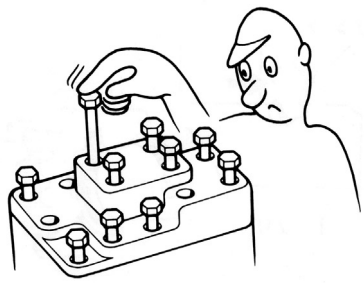
4. After removing gasket, O-ring, piston pin clip and cotter pin, always replace them with the new one. When removing the snap ring, it can be easily missed after transformation or installation.

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.

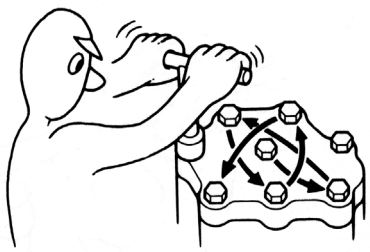


6. Check necessary place and measure necessary data during installation. When installing, return to the state before removing.

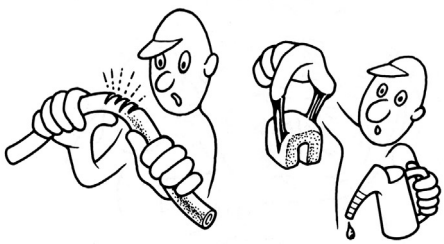
7. Align the bolts to uniform the tightening points before tightening them when you don't know the bolt length.



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.

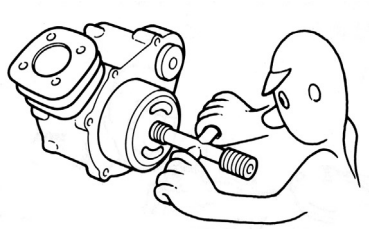


9. Check to see if the rubber part is worn out when removing it and replace it if necessary. Some rubber part is weak to gasoline and kerosene, so pay attention not to soak with gasoline or oils.

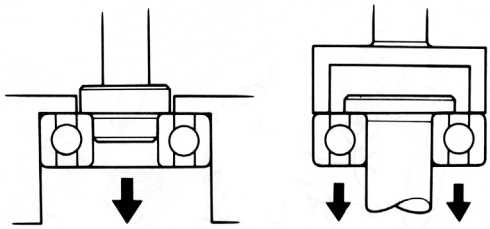


10. Recommended grease must be applied to or filled in the specified place.

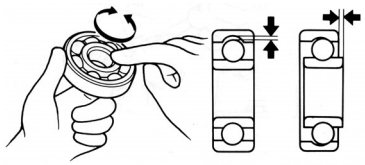
11. Maintenance needed to use the specialized tools must be performed with the right tool.



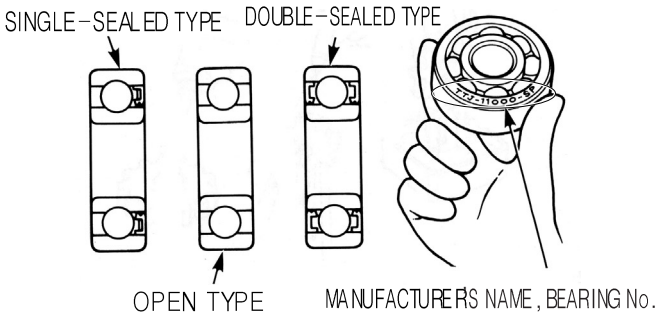
12. Never reuse the ball bearing removed with the ball applied pressure when removing press-fitted the bearing.



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.

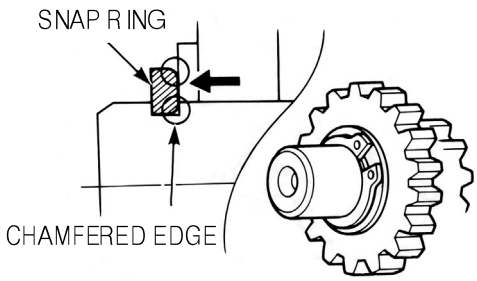


14. Pay attention to installation direction in case of the single-sided sealed ball bearing. Install the open-direction or double-sided sealed bearing in the way that the face marked with manufacturer and size should direct to the outer axle.

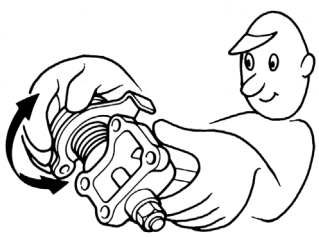


15. When blowing the ball bearing with compressed air after cleaning, keep the race from rotating. High speed rotation of the race may damage the bearing. Prior to installation, apply oil or grease to the bearing.

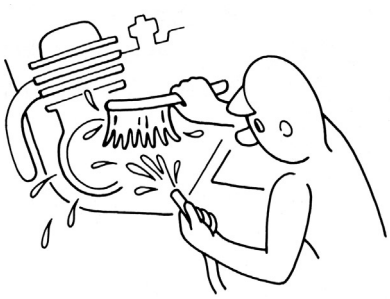
16. Install the snap ring so that chamfered side directs to the load-applied side. After installation, check the proper installation by rotating the snap ring.



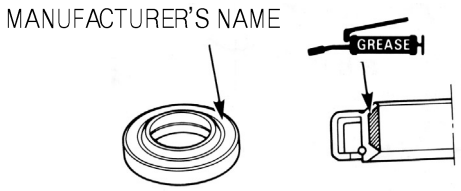
17. Check each part for proper tightening and operation after installation.



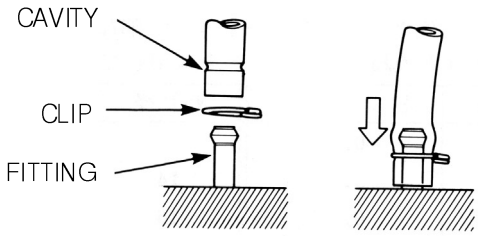
18. The brake fluid and coolant can damage the painted plastic or rubber parts. Keep these parts from contacting with them and wash these parts with water in case of contact.



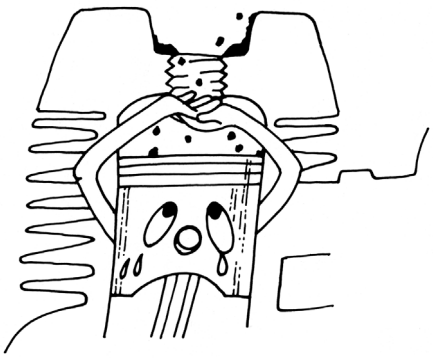
19. Install the oil seal so that the manufacturer marked surface directs outer surface.(direction not covered with oil)
    - Pay attention not to bend or damage the lip.
    - Apply the grease to the lip.



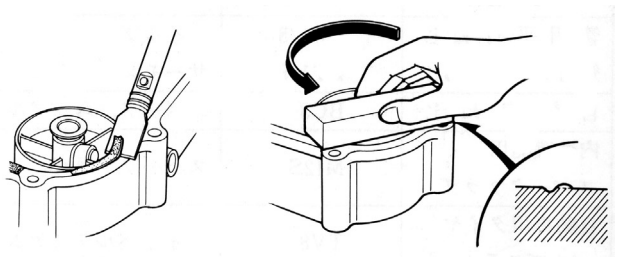
20. Connect the tube until the tube fully inserted in the joint. Install the clip if it is supplied. Replace the tube having slacked end.



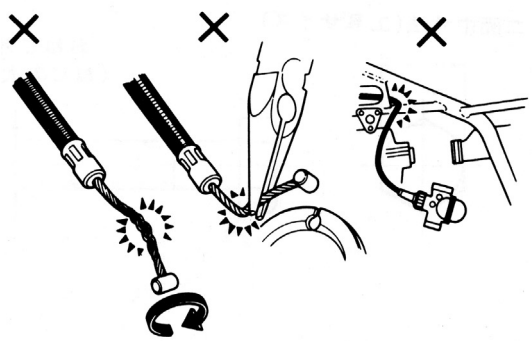
21. Keep the pneumatic system interior or the engine interior from the infiltration of dust.



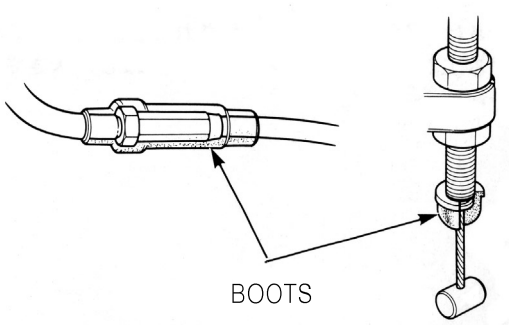
22. Install the gasket mounted in the contact surface of each case of the engine while removing gasket material completely. Remove damaged contact surface by wiping with the oil stone equally.



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

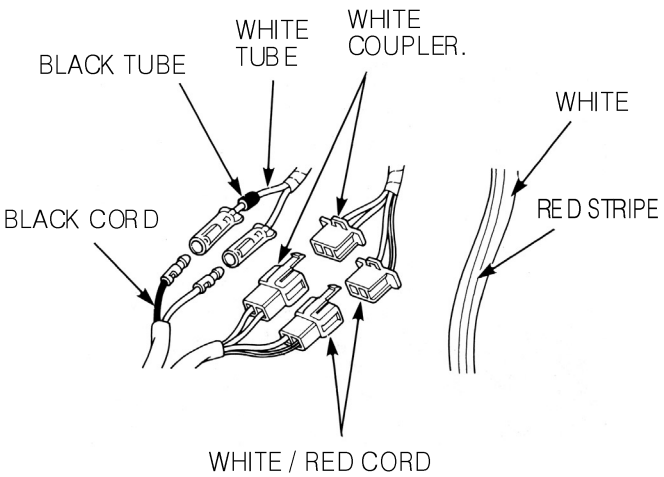


24. Install the boots with the installing groove by inserting the boots into the groove.

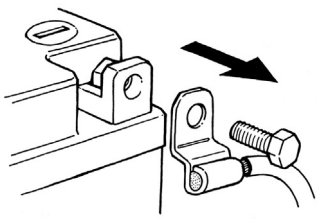


CAUTION WHEN WIRING

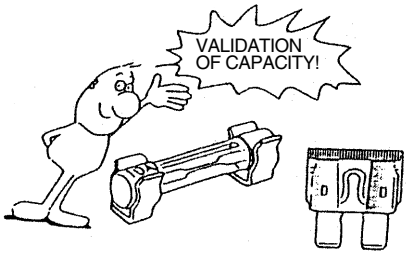
- Each cord must be connected depending on its color. When connecting different cord, attach color tube around the connector. Connect the coupler to the connector with same color and same pin number.
- Identify the two-colored cord by main color first and then spriped color .



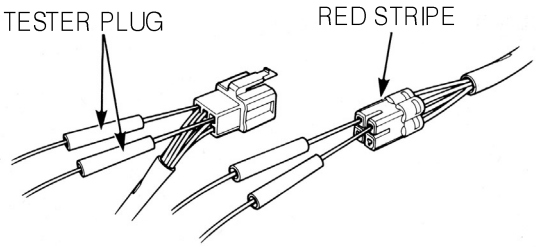
- When disconnecting the battery, the minus terminal must be disconnected first.
- Make sure that the tool such as spanner do not contact with the frame.



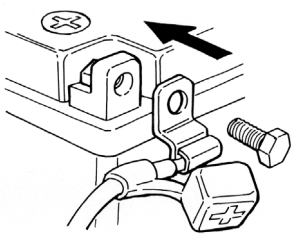
- If the fuse is short-circuited, find out the cause and repair. Replace with the fuse having the specified capacity.



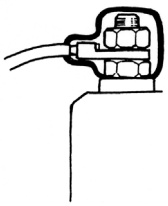
- When measuring voltage or resistance of the cord terminal using tester, contact the tester plug behind of the coupler. Pay attention not to open the cord terminal and contact the tester plug from the front of the coupler in case of water-proof coupler.



- 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.



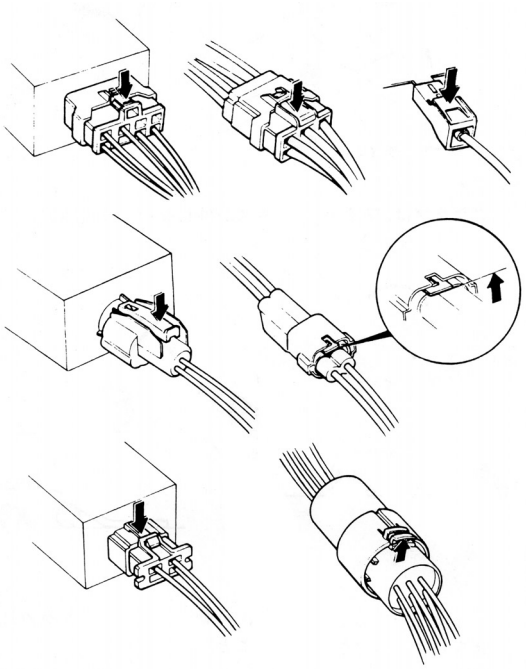
- Connect covers to the terminal after maintenance.



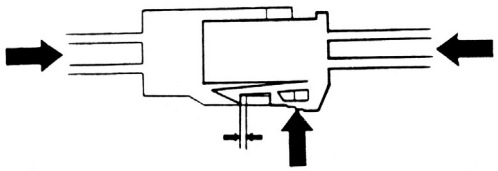
- If there is rust in the terminal, remove the rust with sand paper prior to connecting.

- 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.

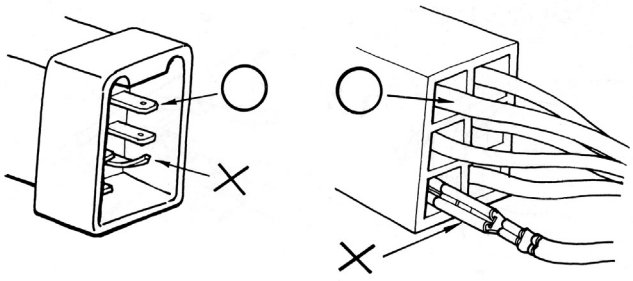
- Typical releasing method of the coupler is illustrated in the following.



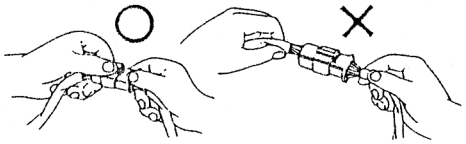
- Release the lock by inserting the coupler slightly and then narrowing connection to remove the coupler.



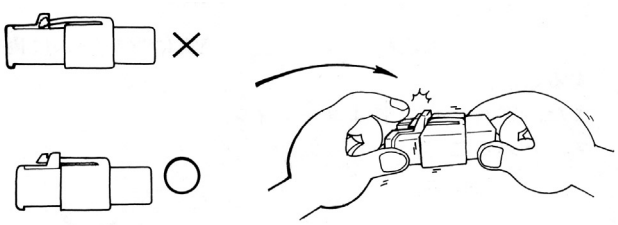
- Check to see if there is bended terminal and secure it to avoid disconnecting.



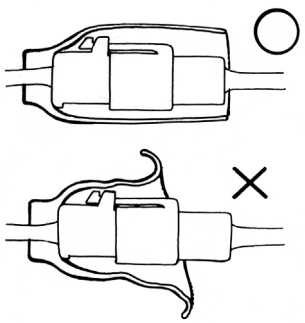
- When disconnecting the coupler, disconnect it while holding the coupler body. Pull while holding the wire harness cord and do not remove the coupler connection.



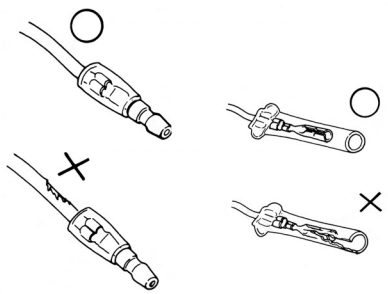
- Insert the lock of the coupler until the lock is fully secured.



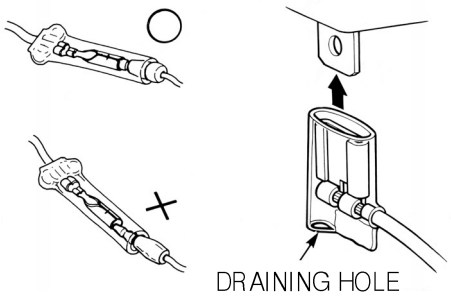
- Pay attention not to damage the vinyl cover of the coupler.



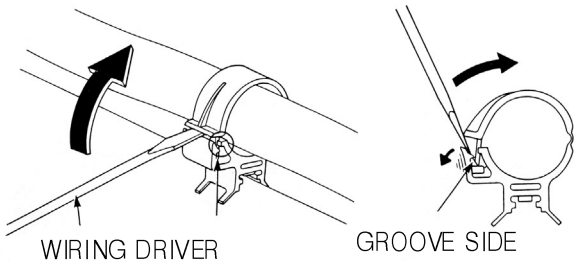
- If the wire harness coating is damaged, repair by winding vinyl tape or replace it.
- Prior to connecting the connector, make sure that the cover is not damaged and the mess terminal is not opened.



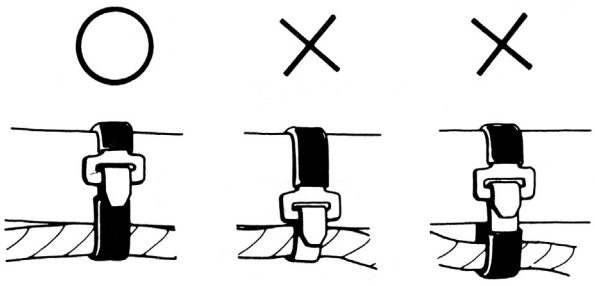
- Insert the connector until the vinyl cover is fully inserted into the terminal.
- The opening of the vinyl cover must face at the ground direction but in case of the plain connector, the draining opening must face at the sky direction.



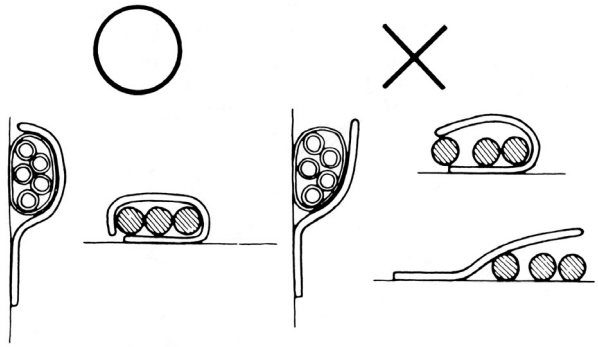
- When removing T-start, broaden the groove of T-start using the wiring driver and release the torque.
- Connect the harness and the hose to T-start and then insert until the groove is locked.
- When removing T-start from the frame, replace it with the new one.



- 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.

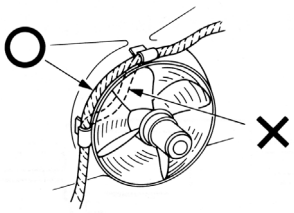


- Secure the wire harness firmly using the clamp.

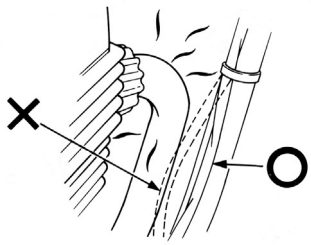


- In case of the weld clamp, do not clamp in the welded part.

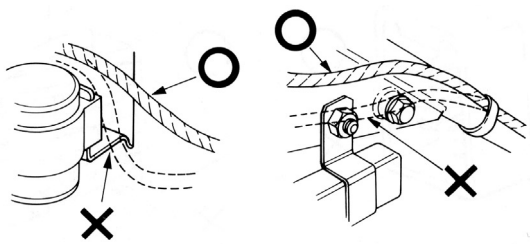
- When clamping the wire harness, make sure that the harness is not contacted with the shaft or rotating part.



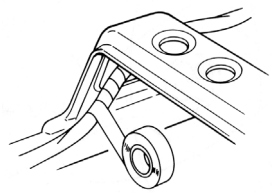
- When clamping the wire, pay attention not to contact with hot part.



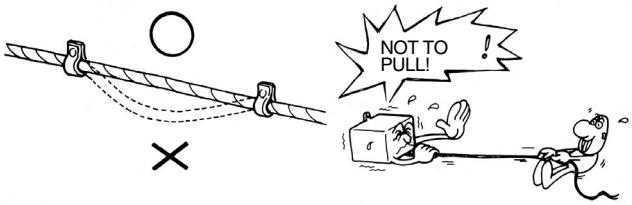
- The wire harness must be routed without contacting with the end of the lamp or any sharp edge.
- The wire harness must be routed without contacting with the end of the bolt or the piece.



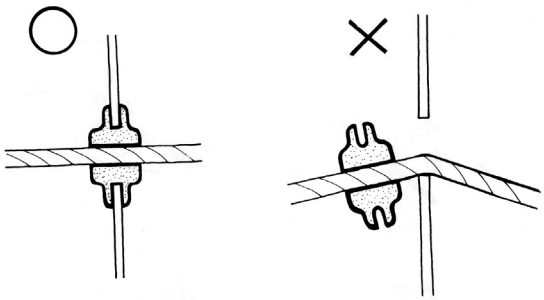
- In case that the wire harness is contacted with the end or the sharp edge, protect both parts with tube or tape.



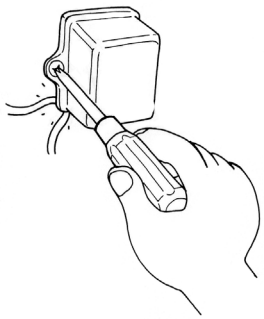
- The wire must not hang down or be pulled excessively.



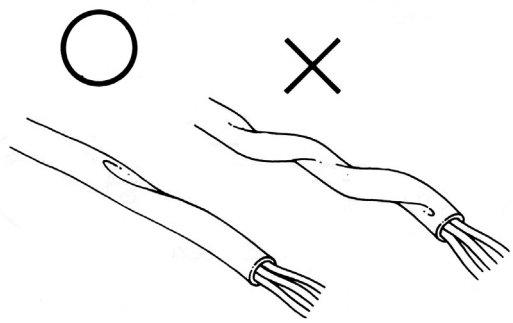
- If necessary, lock the wire harness properly.



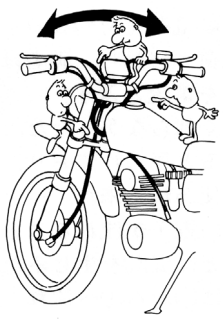
- When mounting parts, make sure that the wire harness is not pressed by the parts.



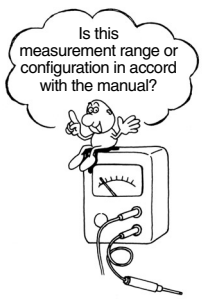
- Do not twist the wire harness.



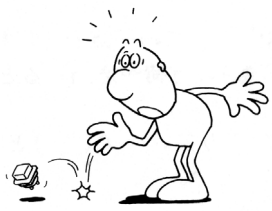
- Wire the wire harness not to be pulled or expanded when the handle is turned to the right or the left completely. Avoid excessive bending or chewing and interference with the engine.



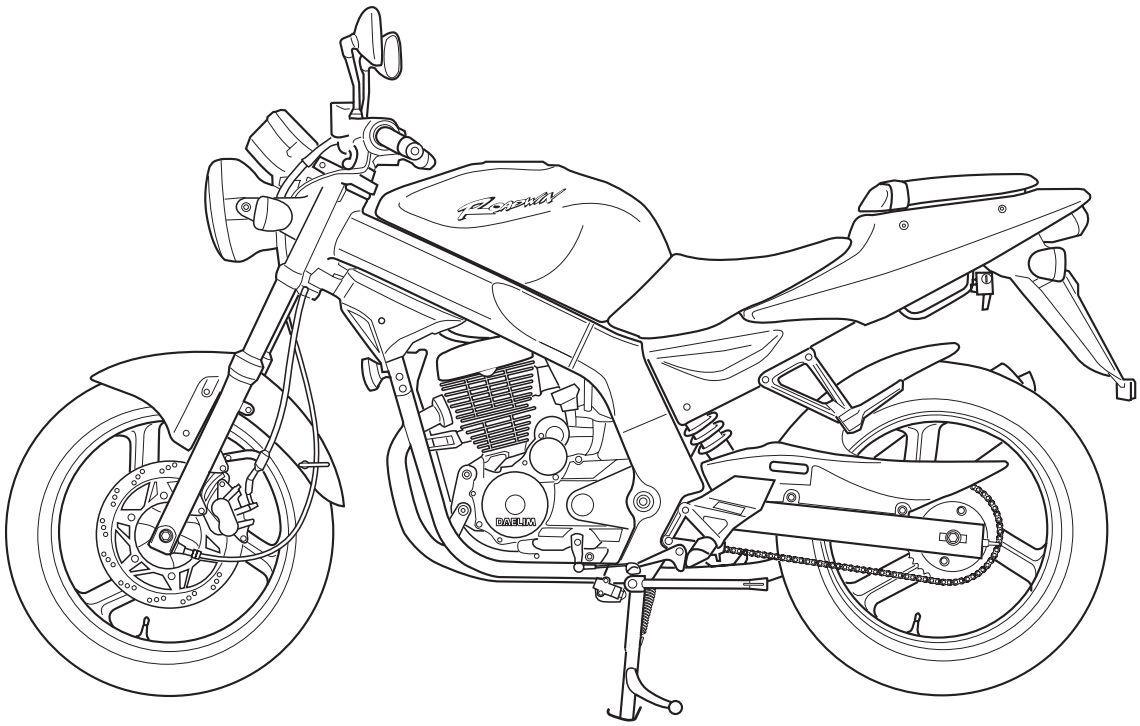
- Prior to using the tester, please read the manual carefully and understand the contents.
- When testing the resistance of the tester, the zero adjustment must be performed before testing.

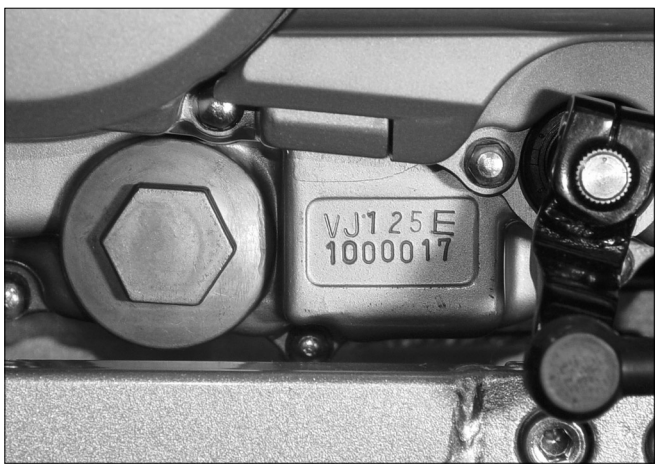


- Do not drop or throw the parts especially semiconductor contained parts because these parts may be damaged by the impact of the drop.



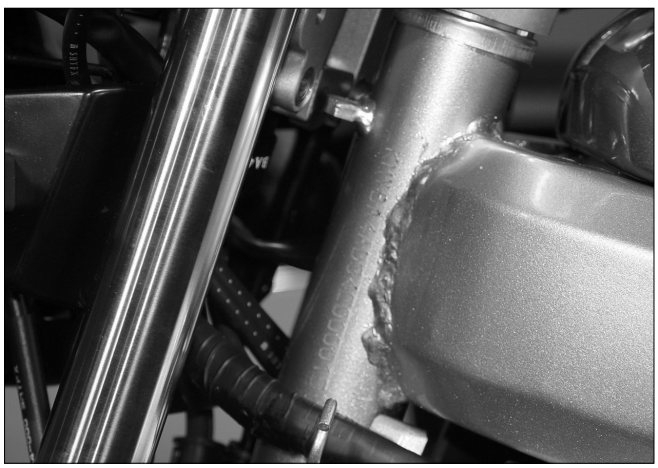
MODEL IDENTIFICATION





ENGINE SERIAL NUMBER LOCATION

• The engine serial number is stamped on left crankcase.



FRAME SERIAL NUMBER LOCATION

• The frame serial number is stamped on the left side of steering head.

SPECIFICATIONS

ITEM		SPECIFICATIONS
DIMENSIONS	OVERALL LENGTH	2,010mm
	OVERALL WIDTH	740mm
	OVERALL HEIGHT	1,040mm
	WHEEL BASE	1,380mm
	SEAT HEIGHT	780mm
	GROUND CLEARANCE	150mm
	DRY WEIGHT	130kgf
	CURB WEIGHT	147kgf
FRAME	TYPE	Double Cradle
	FRONT SUSPENSION / STROKE	Telescopic / 130mm
	REAR SUSPENSION / STROKE	Swingarm / 28mm
	FRONT TIRE SIZE (TYPE)	110/70-17 54P (Tubeless)
	REAR TIRE SIZE (TYPE)	140/60-17 69P (Tubeless)
	TIRE PRESSURE 1 PERSON FRONT	2.00kgf/cm^2(200kPa)
	REAR	2.00kgf/cm^2(200kPa)
	2 PERSON FRONT	2.00kgf/cm^2(200kPa)
	REAR	2.25kgf/cm^2(225kPa)
	FRONT BRAKE	Hydraulic Disk
	REAR BRAKE	Hydraulic Disk
	FUEL CAPACITY	16 ℓ
	FUEL RESERVE CAPACITY	1.1 ℓ
	CASTER ANGLE	25.2°
	TRAIL	93.5mm
	FRONT FORK OIL CAPACITY	265 $\pm$ 2.5cc
ENGINE	TYPE	Air Cooled 4-stroke SOHC
	CYLINDER NUMBER, ARRANGEMENT	1 Cylinder, 15° Inclined from vertical
	BORE AND STROKE	56.5 X 49.5mm
	DISPLACEMENT	124.1cm^3
	COMPRESSION RATIO	10.7:1
	VALVE TRAIN	SOHC Chain Drive
	OIL CAPACITY	1.1 ℓ After Disassembly
		1.05 ℓ After Draining and Oil Filter Change
		1.0 ℓ After Draining
	LUBRICATION SYSTEM	Wet Pressing and Spray
	AIR FILTRATION TYPE	Paper Filter
	CYLINDER COMPRESSION	13.0kgf/cm^2 (600rpm)
	INTAKE VALVE OPEN	6° BTDC
	CLOSED	22° ABDC (1.12mm Lift)
	EXHAUST VALVE OPEN	24° BBDC
	CLOSED	-4° ATDC (1.12mm Lift)
	VALVE CLEARANCE INTAKE	0.12 $\pm$ 0.02mm
	(A COOLING-OFF PERIOD) EXHAUST	0.12 $\pm$ 0.02mm
	ENGINE DRY WEIGHT	32.3kgf

ITEM		SPECIFICATIONS
CARBURETOR	TYPE	PD 24
	VENTURI BORE	24mm
	SETTING SERIES MARK	VJ 125 C
	MAIN JET	#100
	SLOW JET	#38
	PILOT SCREW INITIAL SETTING	2 1/8
	FLOAT LEVEL	12.5mm
	IDLE SPEED	1,600 ± 100(rpm)
DRIVE TRAIN	CLUTCH TYPE	Multiplate Wet Clutch
	TRANSMISSION TYPE	Constant Mesh Transmission
	GEAR RATIO 1st	3.083(37/12 T)
	2nd	1.882(32/17 T)
	3rd	1.380(29/21 T)
	4th	1.095(23/21 T)
	5th	0.923(24/26 T)
	GEARSHIFT PATTERN	Left foot operated return system 1-N-2-3-4-5
ELECTRICAL	IGNITION TYPE	DC-CDI Ignition
	IGNITION TIMING “F” MARK	8° BTDC / 1,600(rpm)
	FULL ADVANCE	28° BTDC / 4,000(rpm)
	AC GENERATOR	12V-11A/5,000(rpm)
	BATTERY CAPACITY	12V 10AH
	SPARK PLUG	CR8EH - 9
	SPARK PLUG GAP	0.8 - 0.9mm
	FUSE CAPACITY	15A
	STARTING SYSTEM	Starter Motor
	HEADLIGHT	35W/35W
	POSITION LAMP	3W
	WINKER LAMP	10W × 4
	STOP/TAIL LIGHTS	21W/5W
	SPEEDOMETER LAMP	3W
	FUEL RESERVE INDICATOR LAMP	2W
	NEUTRAL INDICATOR LAMP	3W
	HIGH BEAM INDICATOR LAMP	3W
	WINKER INDICATOR LAMP	3W × 2
	LICENCE PLATE LAMP	5W
	TACHOMETER LAMP	2W

TORQUE VALUES

ENGINE

ITEM	Q'TY	THREAD DIA (mm)	TORQUE kgf.m,(N.m)	REFERENCE
CAM SHAFT HOLDER NUT	4	M8 × 1.25	2.0 (20)	Apply Engine Oil
CYLINDER HEAD COVER BOLT	2	M6 × 1.0	1.0 (10)	
CAM CHAIN TENSIONER PIVOT BOLT	1	M8 × 1.25	1.0 (10)	
CAM CHAIN TENSIONER LIFTER BOLT	2	M6 × 1.0	1.2 (12)	
CAM CHAIN TENSIONER LIFTER SCREW	1	M6 × 1.0	0.4 (4)	
TAPPET VALVE ADJUST HOLE CAP	1	M36 × 1.5	1.5 (15)	
TAPPET ADJUST NUT	4	M5 × 0.5	1.1 (11)	
PRIMARY DRIVE GEAR NUT	1	M16 × 1.0	6.5 (65)	Apply Engine Oil
CLUTCH LOCK NUT	1	M16 × 1.0	6.5 (65)	Apply Engine Oil
FLYWHEEL BOLT	1	M10 × 1.25	5.5 (55)	Apply Engine Oil
STARTER CLUTCH SOCKET BOLT	3	M8 × 1.25	3.2 (32)	
BEARING SET PLATE BOLT	2	M6 × 1.0	1.2 (12)	
OIL FILTER COVER SOCKET BOLT	1	M10 × 1.25	1.2 (12)	
SHIFT DRUM STOPPER ARM BOLT	1	M6 × 1.0	1.2 (12)	
DRIVE SPROCKET BOLT	2	M6 × 1.0	1.2 (12)	
R. CRANKCASE COVER BOLT	11	M6 × 1.0	1.1 (11)	
OIL FILTER COVER BOLT	3	M6 × 1.0	1.1 (11)	
L. CRANKCASE COVER BOLT	7	M6 × 1.0	1.1 (11)	
A.C GENERATOR CAP	1	M14 × 1.5	0.6 (6)	
CRANKSHAFT HOLE CAP	1	M30 × 1.5	0.8 (8)	
CRANKCASE BOLT	10	M6 × 1.0	1.1 (11)	
SPARK PLUG	1	M10 × 1.25	1.1 (11)	
OIL PUMP MOUNT BOLT	2	M6 × 1.0	1.1 (11)	
START MOTOR NUT	1	M6 × 1.0	1.2 (12)	
OIL THROUGH BOLT(CYLINDER)	2	M12 × 1.25	3.2(32)	
OIL THROUGH BOLT(RADIATOR)	2	M12 × 1.25	3.2(32)	
AIR CLEANER CASE COVER SCREW	4	M5 × 12	0.4(4)	

FRAME

ITEM	Q'TY	THREAD DIA (mm)	TORQUE kgf.m,(N.m)	REFERENCE
ENGINE HANGER BOLT (REAR)	2	M10 × 1.25	4.9 (49)	
ENGINE HANGER BOLT (FRONT)	1	M10 × 1.25	4.9 (49)	
STEERING HANDLE PIPE BOLT	2	M8 × 1.25	2.6 (26)	
SIDE STAND PIVOT SCREW	1	M10 × 1.25	1.5 (15)	
SIDE STAND PIVOT NUT	1	M10 × 1.25	4.5 (45)	HEX NUT
SPEEDOMETER GEAR BOX SCREW	1	M 5 × 0.8	0.42 (4.2)	
REAR AXLE NUT	1	M14 × 1.5	8.8(88)	U- NUT
DRIVE SPROCKET NUT	4	M10 × 1.25	5.9(59)	U- NUT
REAR BRAKE OIL BOLT	2	M10 × 1.25	3.4(34)	

FRAME

ITEM	Q'TY	THREAD DIA (mm)	TORQUE kgf.m,(N,m)	REFERENCE
REAR CALIPER BRACKET BOLT	2	M8 × 1.25	3.0(30)	
REAR MASTER CYLINDER HOLDER SOCKET BOLT	2	M6 × 1.0	1.2(12)	
FRONT AXLE NUT	1	M14 × 1.5	5.9(59)	U- NUT
FRONT BRAKE DISK BOLT	6	M8 × 1.25	4.2(42)	
BRAKE OIL BOLT (FRONT/REAR)	4	M10 × 1.25	3.4(34)	
CALIPER BRACKET BOLT (FRONT/REAR)	4	M8 × 1.25	3.0(30)	
FRONT MASTER CYLINDER HOLDER BOLT	2	M6 × 1.0	1.2(12)	
STEERING STEM NUT	1	M22 × 1.0	7.4(74)	
STEERING TOP THREAD	1	M22 × 1.0	0.3(3)	
FORK TOP BRIDGE PINCH BOLT	2	M8 × 1.25	2.6(26)	
BOTTOM BRIDGE PINCH BOLT	2	M8 × 1.25	3.4(34)	
FORK HANDLE PIPE MOUNTING BOLT	2	M8 × 1.25	2.6(26)	
SWINGARM PIVOT NUT	1	M14 × 1.25	8.8(88)	U- NUT
REAR CUSHION UPPER/UNDER BOLT	2	M10 × 1.25	3.4(34)	
CHAIN SLIDER SCREW	2	6mm Tapping	0.6(6)	
L. DOWNTUBE COMP 'B'	4	M8 × 1.25	4.2(42)	SOCKET BOLT
HANDLE WEIGHT SOCKET BOLT	2	M8 × 1.25	2.0(20)	
REAR BRAKE DISK BOLT	3	M8 × 1.25	4.2(42)	

Torque specifications listed above are for important fastener. Other should be tighten to the standard torque values below.

TYPE	TORQUE		TYPE	TORQUE	
	kgf · m	N · m		kgf · m	N · m
5mm BOLT, NUT	0.5	5	5mm SCREW	0.4	4
6mm BOLT, NUT	1.0	10	6mm SCREW, FLANGE BOLT	0.9	9
8mm BOLT, NUT	2.1	21	6mm FLANGE BOLT, NUT	0.9	9
10mm BOLT, NUT	3.5	35	8mm FLANGE BOLT, NUT	2.7	27
12mm BOLT, NUT	5.5	55	10mm FLANGE BOLT, NUT	4.0	40

SYMBOLS / ABBREVIATIONS

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

SYMBOL	MEANING	SYMBOL	MEANING
⚠ WARNING	Indicates dangerous area. Serious accident may result if instructions are not followed.	⚠ CAUTION	Indicates important work. Minor injury or vehicle part damage may result if instruction are not followed.
		⚠ NOTE	Indicates general safety matters. Provides safety and appropriate handling procedures.

The following symbols indicate needed lubrication steps, the changing of parts, and required specialized tools, etc. when performing maintenance.

SYMBOL	CAUTION
	Use recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease with the ratio 1:1)
	Use multi-purpose grease (Lithium based multi-purpose grease NLG #2 or equivalent)
	Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent)
	Use molybdenum disulfide paste containing more than 40% molybdenum disulfide, NLGI #2 or equivalent)
	Use silicone grease
	Apply a locking agent. Use the agent of the middle strength, unless otherwise specified
	Apply sealant
	Replace the parts with new ones before assembly
	Use brake fluid, DOT3 or DOT4. Use the recommended brake fluid, unless otherwise specified
	Use Fork or Suspension Fluid
	Use special tool
	Use option tool. These tools are obtained as you order parts.
(⇨3-1)	Indicates reference page. (Example : Refer to page 3-1)

Special grease, etc. that do not correspond to the above are indicated without using symbols.

TOOLS

SPECIAL		COMMON	
DESCRIPTION	REF. SEC.	DESCRIPTION	REF. SEC.
CLUTCH CENTER HOLDER	7	WRENCH, 8 × 9mm	2
ACG ROTOR PULLER	8	ADJUSTING WRENCH, B	2
VALVE GUIDE DRIVER	9	FLOAT LEVEL GAUGE	4
VALVE GUIDE REAMER	9	LOCK NUT WRENCH, 20 × 24mm	7
UNIVERSAL BEARING PULLER	11	EXTENSION BAR	7, 13
BEARING REMOVER SET	11	FLY WHEEL HOLDER	7, 8
THREAD ADAPTER	11	VALVE SPRING COMPRESSOR	9
ASSEMBLY SHAFT	11	DRIVER	11, 13, 14
CRANK CASE ASSEMBLY COLOR	11	ATTACHMENT	11, 13, 14
BALL RACE DRIVER	13	PILOT	11, 13, 14
STEERING STEM DRIVER	13	FORK SEAL DRIVER BODY	13
FORK SEAL DRIVER	13	BEARING REMOVER HEAD	14
STEERING STEM SOCKET	13	BEARING REMOVER SHAFT	14
SNAP RING PLIERS	15		

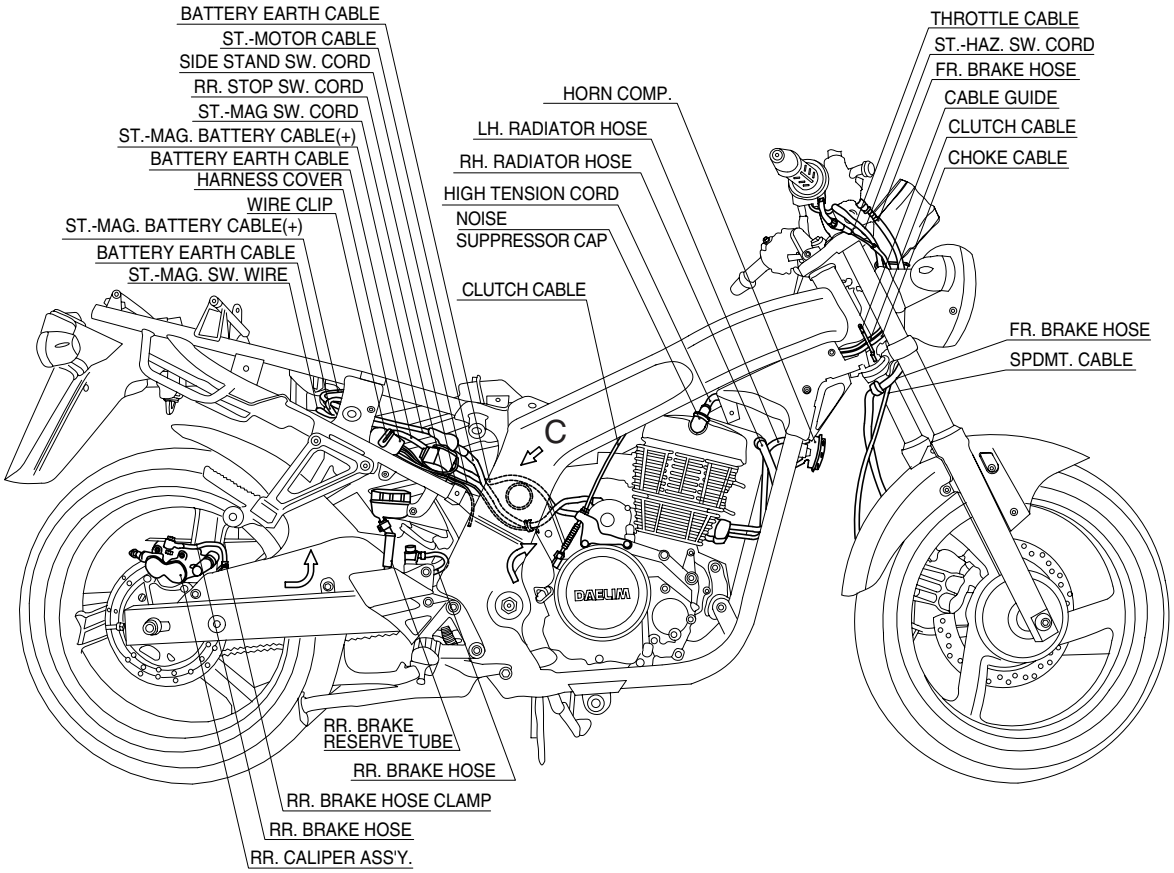
TESTER, GAUGE

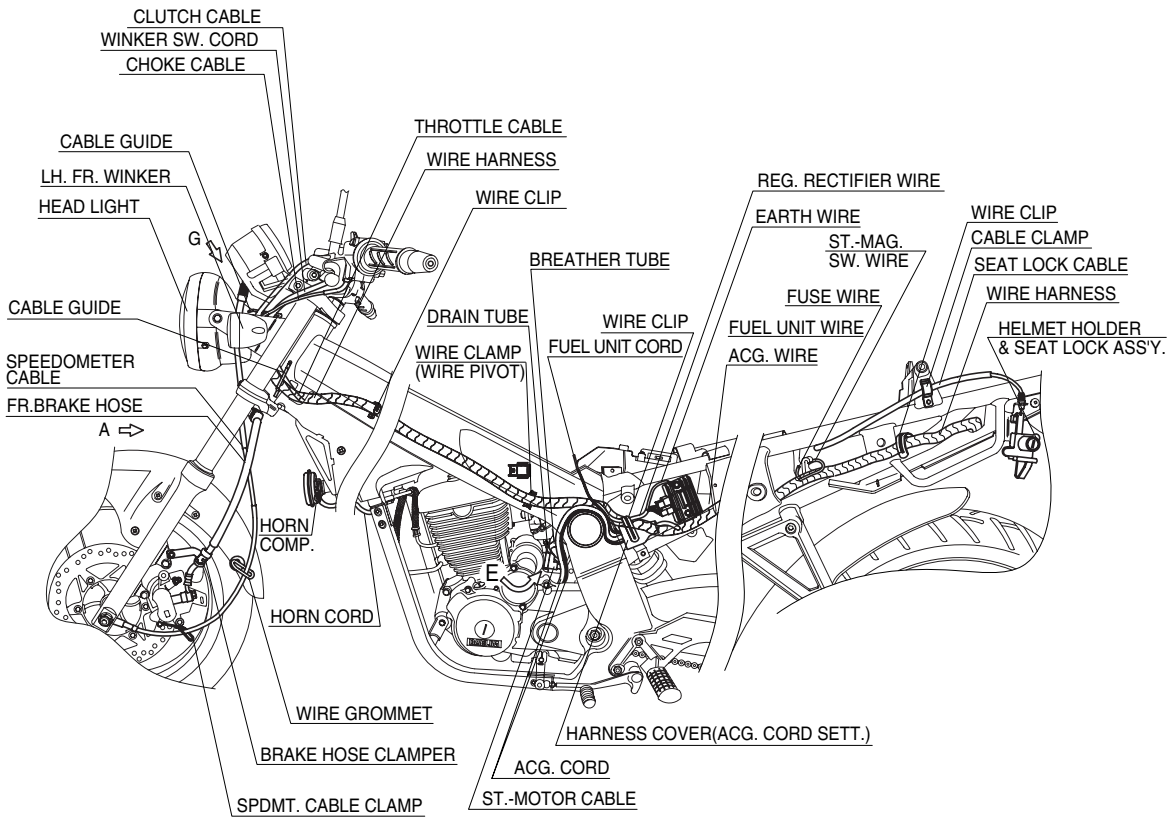
DESCRIPTION	REFERENCE SECTION	REMARK
COMPRESSION GAUGE	2	
DIGITAL MULTI TESTER	16, 17	
PVA TESTER	16, 17	
BATTERY TESTER	17	

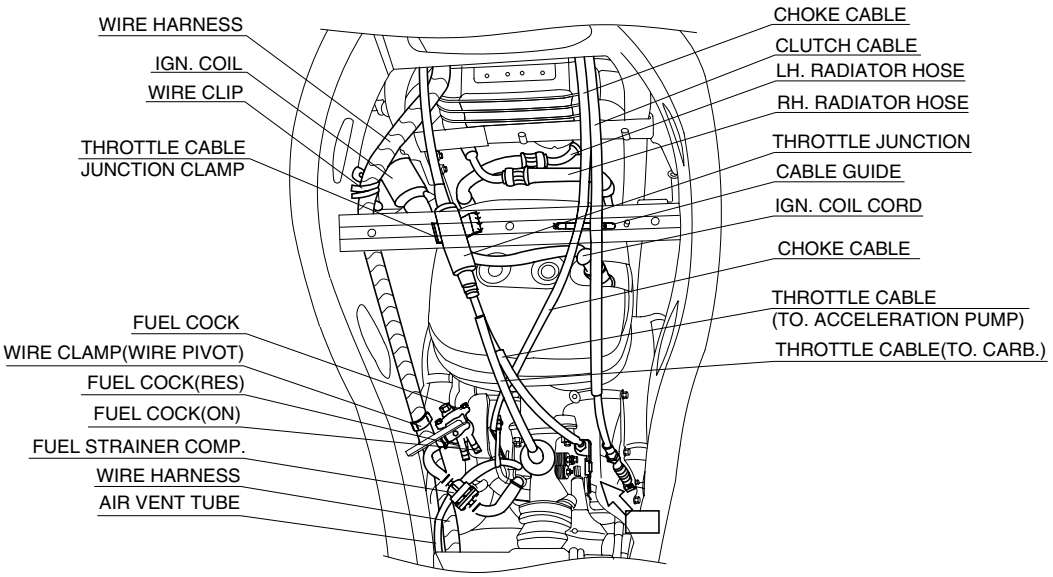
VALVE SEAT CUTTER

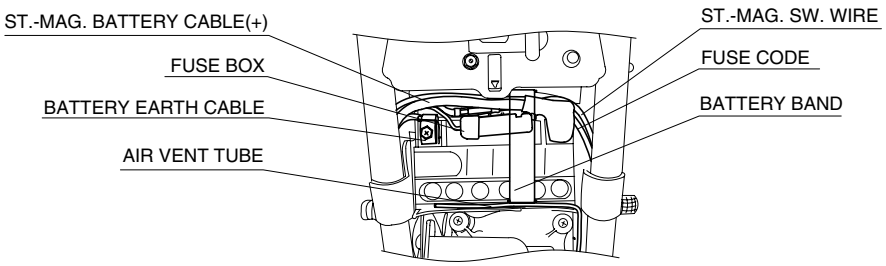
DESCRIPTION	REFERENCE SECTION	REMARK
VALVE SEAT CUTTER 45°	9	24.5mm IN, EX
VALVE SEAT CUTTER 35°	9	23mm IN
VALVE SEAT CUTTER 35°	9	20mm EX
VALVE SEAT CUTTER 60°	9	22mm IN, EX
CUTTER HOLDER 5mm	9	Use with Valve Seat

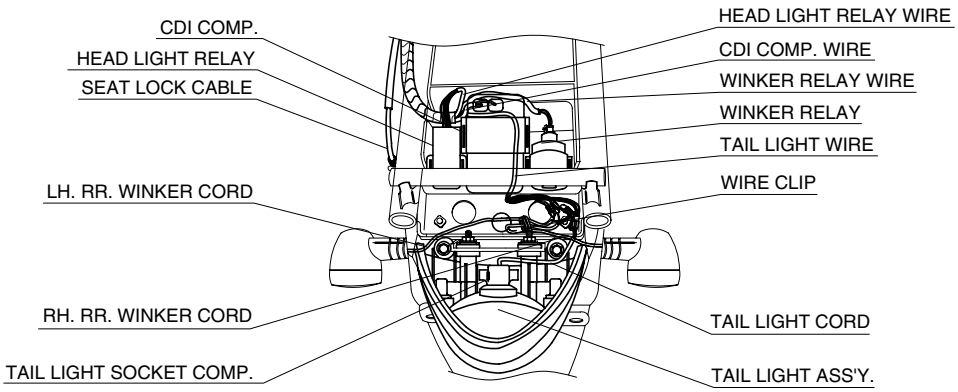
WIRING DIAGRAM

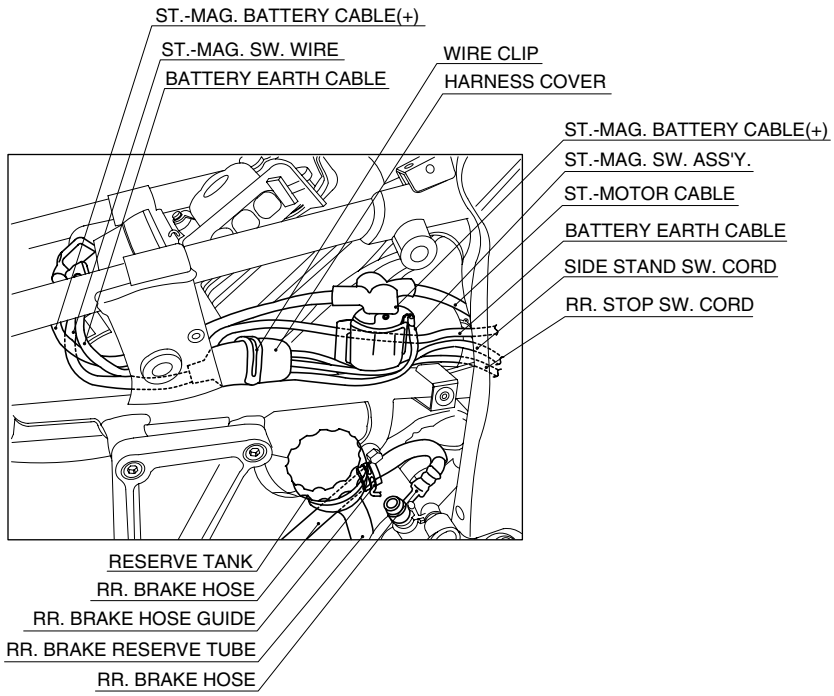




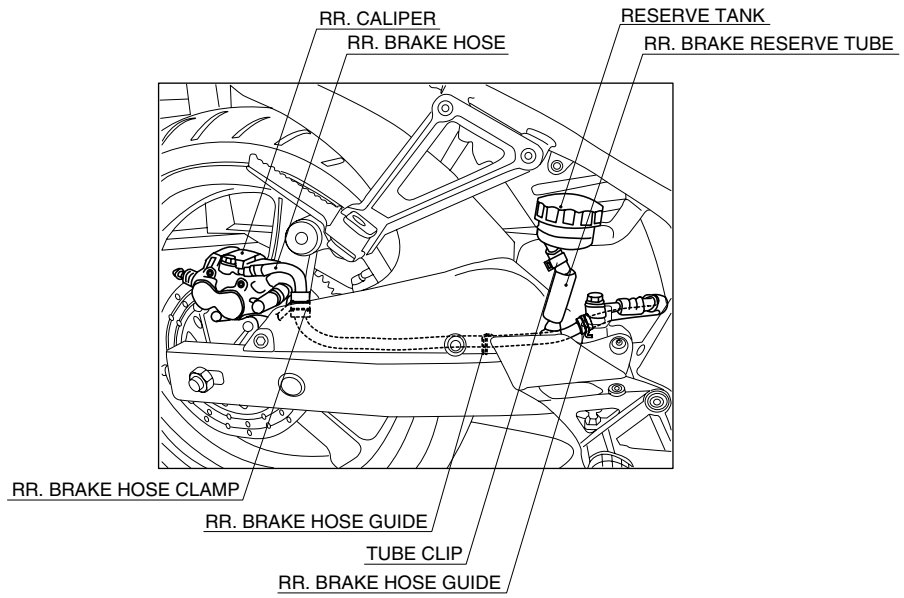

WIRE HARNESS
IGN. COIL
WIRE CLIP
THROTTLE CABLE
JUNCTION CLAMP
FUEL COCK
WIRE CLAMP(WIRE PIVOT)
FUEL COCK(RES)
FUEL COCK(ON)
FUEL STRAINER COMP.
WIRE HARNESS
AIR VENT TUBE
CHOKE CABLE
CLUTCH CABLE
LH. RADIATOR HOSE
RH. RADIATOR HOSE
THROTTLE JUNCTION
CABLE GUIDE
IGN. COIL CORD
CHOKE CABLE
THROTTLE CABLE
(TO. ACCELERATION PUMP)
THROTTLE CABLE(TO. CARB.)


ST.-MAG. BATTERY CABLE(+)
FUSE BOX
BATTERY EARTH CABLE
AIR VENT TUBE
ST.-MAG. SW. WIRE
FUSE CODE
BATTERY BAND

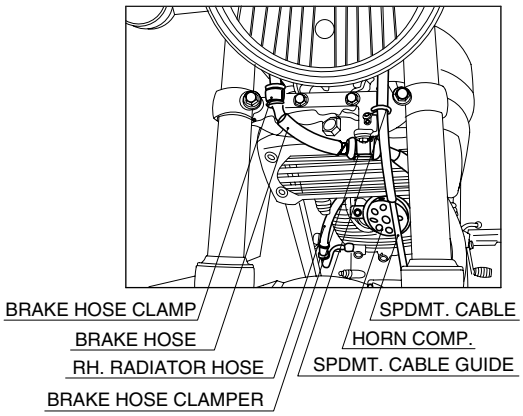

CDI COMP.
HEAD LIGHT RELAY
SEAT LOCK CABLE
LH. RR. WINKER CORD
RH. RR. WINKER CORD
TAIL LIGHT SOCKET COMP.
HEAD LIGHT RELAY WIRE
CDI COMP. WIRE
WINKER RELAY WIRE
WINKER RELAY
TAIL LIGHT WIRE
WIRE CLIP
TAIL LIGHT CORD
TAIL LIGHT ASS'Y.



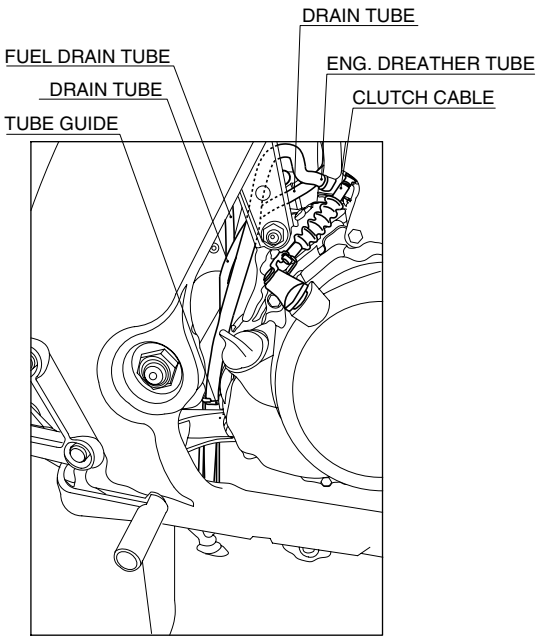
DETAIL OF VIEW C



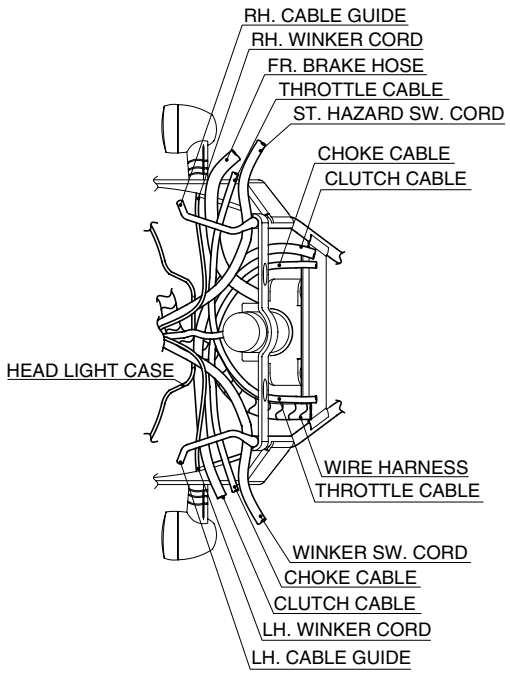
DETAIL OF VIEW B



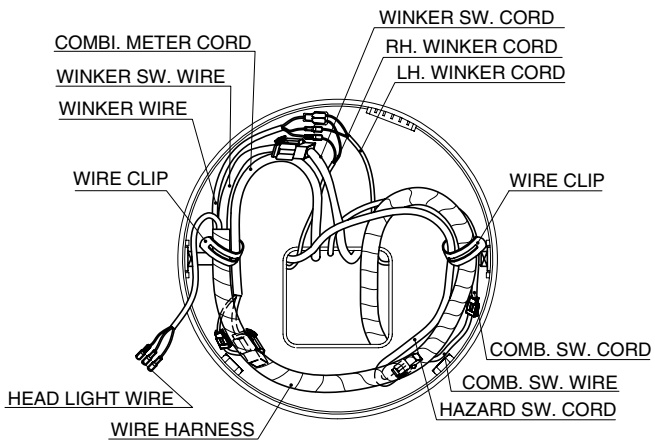
DETAIL OF VIEW A



DETAIL OF VIEW D



DETAIL OF VIEW G



DETAIL OF HEAD LIGHT CASE PART

MEMO

2. INSPECTIONS/ADJUSTMENTS

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.

⚠ NOTE

- For information on engine oil and oil filter, refer to sections 3-3 and 3-4.
- Stand the main stand prior to beginning work.

SPECIFICATIONS

THROTTLE GRIP PLAY		2~6mm
SPARK PLUG		CR8EH-9
SPARK PLUG GAP		0.8~0.9mm
VALVE CLEARANCE	IN.	0.12±0.02mm
	EX.	0.12±0.02mm
CARBURETOR IDLE SPEED		1,600±100rpm
CYLINDER COMPRESSION		13.0kgf/㎠ (600rpm)
DRIVE CHAIN SLACK		10~20mm
REAR BRAKE PEDAL FREE PLAY		10~20mm
CLUTCH LEVER FREE PLAY		10~20mm

TIRES

COLD TIRE PRESSURE	DRIVER ONLY	FRONT	200kPa (2.00kgf/㎠)
		REAR	200kPa (2.00kgf/㎠)
	DRIVER AND A PASSENGER	FRONT	200kPa (2.00kgf/㎠)
		REAR	225kPa (2.25kgf/㎠)
TIRE SIZE		FRONT	110/70-17 54P
		REAR	140/60-17 60P
TIRE 凹PART MINIMUM-DEPTH		FRONT	5.5mm
		REAR	7.0mm

TORQUE VALUES

SPARK PLUG	1.1 kgf-m(11N.m)
CYLINDER HEAD COVER BOLT	1.0 kgf-m(10N.m)
VALVE ADJUSTING NUT	1.1 kgf-m(11N.m)
AC GENERATOR CAP	0.6 kgf-m(6N.m)
CRANKSHAFT HOLE CAP	0.8 kgf-m(8N.m)
AIR CLEANER CASE COVER SCREW	0.43kgf-m(4.3N.m)
REAR AXLE NUT	8.8kgf-m(88N.m)
DRIVE SPROCKET BOLT	1.2kgf-m(12N.m)
DRIVEN SPROCKET NUT	5.9kgf-m(59N.m)

TOOLS

WRENCH, 8 × 9 mm
ADJUSTING WRENCH, B
COMPRESSION GAUGE

MAINTENANCE SCHEDULE

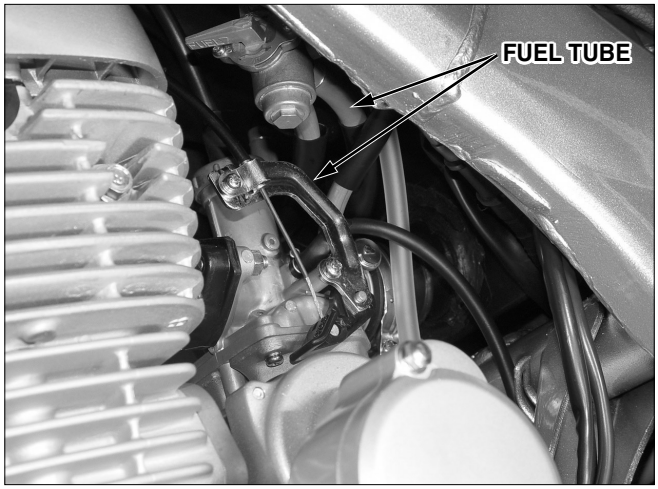
- Perform the Self Inspections Before Operation at each scheduled maintenance period.
  I : INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY.
  R : REPLACE L : LUBRICATE C : CLEAN
- These instructions are based on the assumption that the motorcycle will be used exclusively for its designed purpose. Sustained high speed operation, or operation in unusually wet or dusty conditions, will require more frequent service than specified in the following chart.

	ITEM \ FREQUENCY	ODOMETER READING(NOTE 1)						REMARK
		x 1000Km	1	4	8	12	REFER TO PAGE	
		MONTH		6	12	18		
*	FUEL LINE		I	I	I	I	2-4	
*	FUEL FILTER			R	R	R	2-4	
*	THROTTLE GRIP OPERATION			I	I	I	2-4	
*	CARBURETOR CHOKE			I	I	I	2-5	
	AIR CLEANER ELEMENT			R	R	R	2-5	NOTE (2)
	SPARK PLUG			I	R	I	2-6	
*	VALVE CLEARANCE		I	I	I	I	2-6	
*	CARBURETOR IDLE		I	I	I	I	2-7	
*	ENGINE OIL		R	R	R	R	3-3	
**	ENGINE OIL FILTER		R	R	R	R	3-4	
	DRIVE CHAIN		Every 1,000km : I and L				2-8	
*	DRIVE CHAIN SLIDER				I		2-10	
*	BRAKE FLUID			I	I	I	2-10	NOTE (3)
	BRAKE /PAD WEAR			I	I	I	2-10	
*	BRAKE SYSTEM		I	I	I	I	2-11	
*	BRAKE STOP SWITCH			I	I	I	2-12	
*	HEADLIGHT AIM			I	I	I	2-12	
	CLUTCH SYSTEM		I	I	I	I	2-12	
	SIDE STAND			I	I	I	2-13	
*	SUSPENSION			I	I	I	2-14	
**	BOLTS, NUTS, FASTENERS		I		I		2-14	
**	WHEELS/TIRES			I	I	I	2-15	
	STEERING HANDLE BEARING		I		I		2-15	

* If you do not have the appropriate tools or information to conduct maintenance, or if you feel you are not capable to perform maintenance on this vehicle, contact authorized dealers or repair shops for maintenance and repairs.

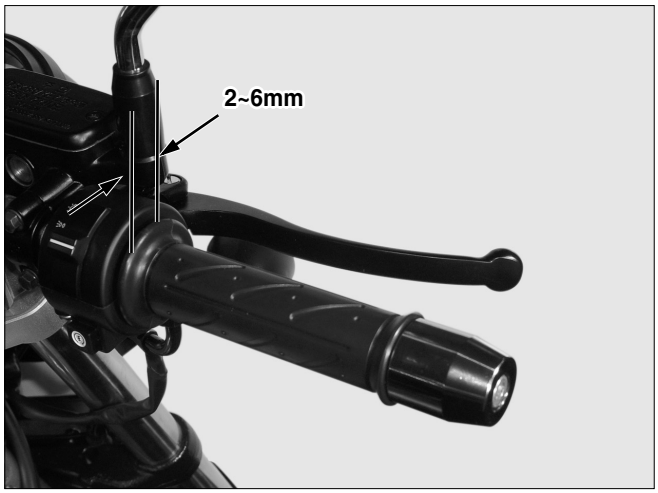
** To ensure safety, inspections and maintenance of these parts must be carried out by dealers, or repair centers.

NOTES : (1) At higher odometer readings, repeat at the frequency interval established here.
(2) Service more frequently when riding in unusually wet or dusty areas.
(3) Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.



FUEL LINE (FUEL TUBE)

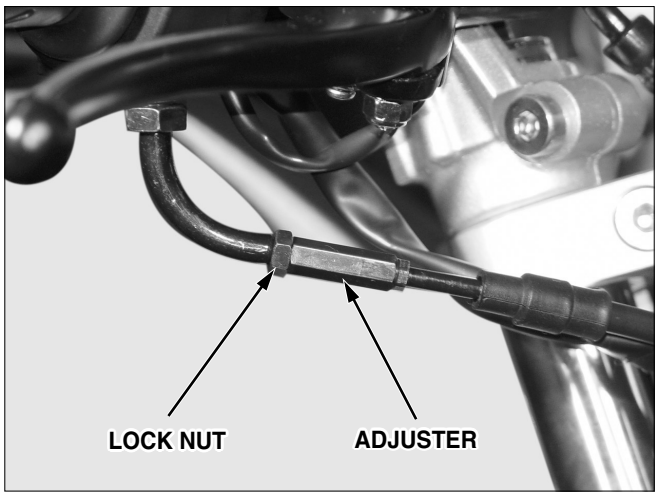
- Check the fuel tube for deterioration, damage or leakage. Replace it if necessary.



THROTTLE GRIP OPERATION

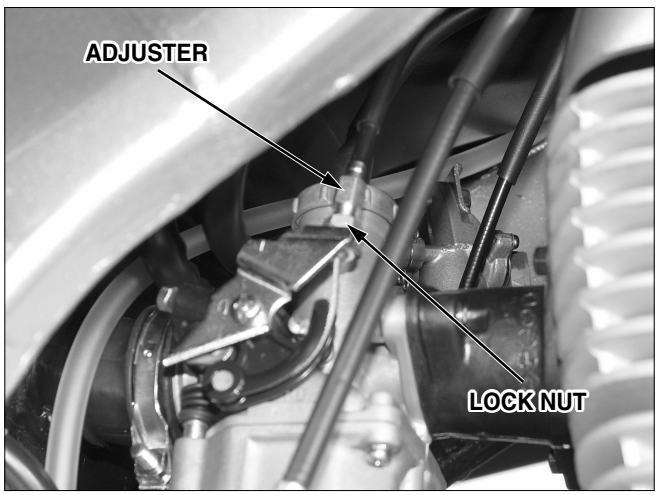
- Check if the throttle grip operates smoothly in all steering positions.
- If not operating smoothly, check the deterioration, damage and kink of the throttle cable.
- Measure the free play at the throttle grip.

FREE PLAY : 2~6mm

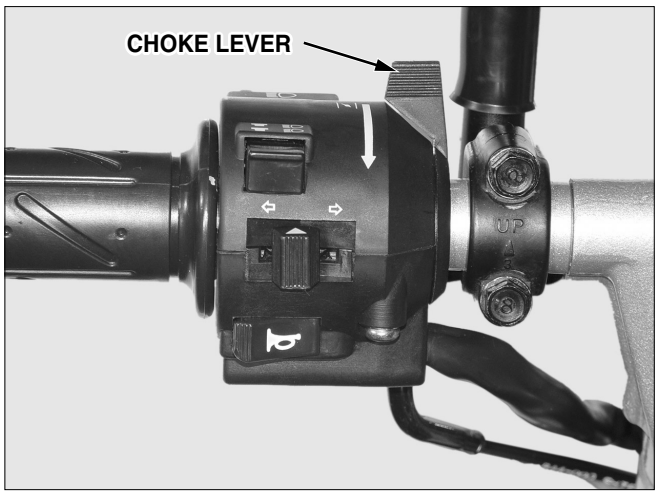


- Throttle grip free play can be adjusted at either end of the throttle cable.

- Minor adjustment are made with the upper adjuster.
- Adjust the free play by loosening the lock nut and turning the adjuster.

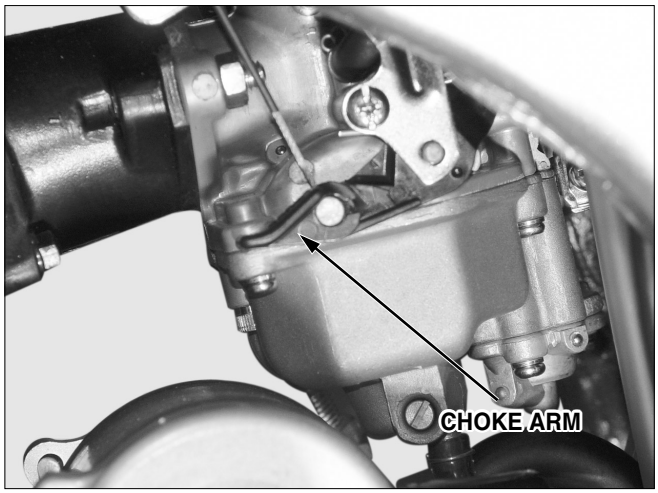


- Major adjustments are made with the lower adjuster.
- Adjust the free play by loosening the lock nut and turning the adjuster.
- After adjustment, tighten the lock nut securely.
- Recheck the throttle operation.
- Replace any damaged parts, if necessary.



CARBURETOR CHOKE

- Check the deterioration, damage and kink of the choke cable. Check if the choke lever operates smoothly in any position.
- Pull the choke lever to the left, and close it perfectly.



- Check if the choke valve is closed perfectly by moving the carburetor choke arm.
- When adjustment is necessary, loosen the choke cable clamp in order that choke valve can be opened, and then adjust by moving the choke cable cover.

AIR CLEANER

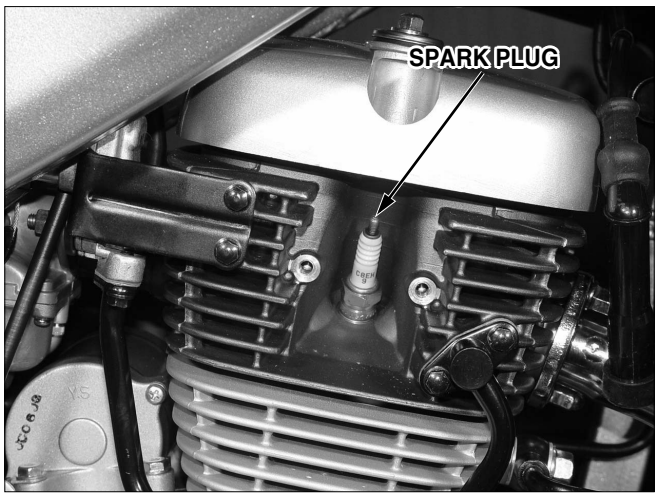
- Remove the seat. (⇨12-2)
- Loosen the 4 screws, remove the air cleaner housing cover.

- Remove and discard the air cleaner element in accordance with the maintenance schedule. (⇨2-3)
- Also replace the air cleaner element any time it is excessively dirty or damage.

- Install the removed parts in the reverse order of removal.

⚠ NOTE

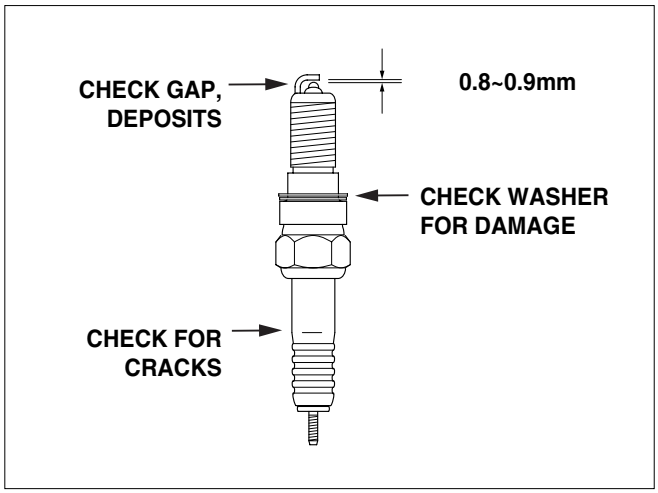
• The element is a viscous type which contains oil. Therefore do not use compressed air to clean the air cleaner element.



SPARK PLUG

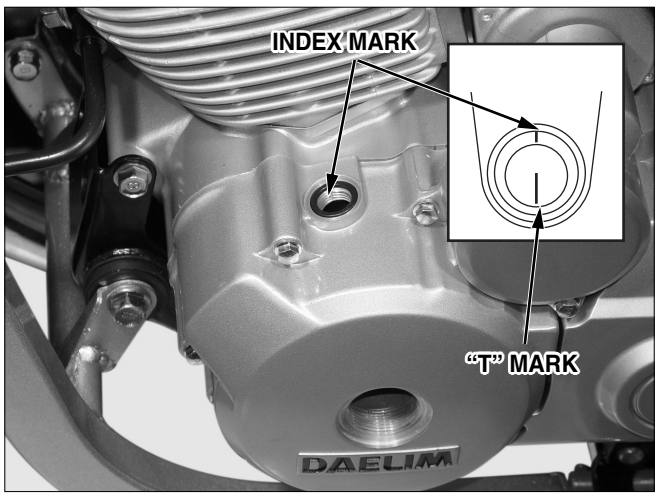
- Remove the spark plug cap and disassemble the plug.
- Check the plug for damage, contamination or deposits.
- If the spark plug is severely contaminated or damaged, raplace with a new one. If the plug can be reused after removing only the carbon, use plug cleaner and wire brush to clean the plug.
- Always use a feeler gauge to check the gap.

GENUINE PLUG : CR8EH-9
SPARK PLUG GAP : 0.8~0.9mm
TORQUE : 1.1kgf · m (11N · m)



⚠ CAUTION

- Make sure there is no dirt or debris on the seat of the spark plug hole before inserting the spark plug.
- To prevent damage to the cylinder head, handtighten the spark plug before using a wrench to tighten to the specified torque.
- Do not overtighten the spark plug.



VALVE CLEARANCE

⚠ NOTE

- Inspect and adjust valve clearance while the engine is cold. (below 35° C/95°F)

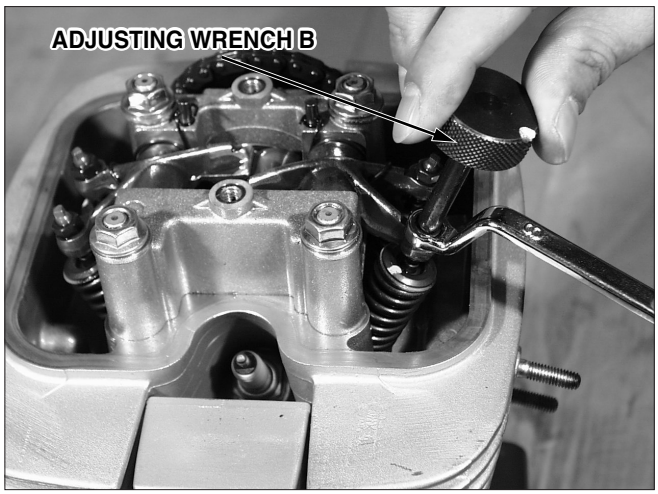
- Remove the cylinder head cover.
- Remove the A.C generator cap and crankcase hole cap.
- Rotate the flywheel counterclockwise to align the "T" mark with the index mark on the left crankcase cover.
- Make sure the piston is at TDC(Top Dead Center) on the compression stroke.

- Measure the valve clearance with a feeler gauge.

VALVE CLEARANCE : INTAKE : 0.12±0.02mm
EXHAUST : 0.12±0.02mm

- Loosen the lock nut with a vlave wrench, and set valve clearance to a prescribed level by turning the adjusting screw with a valve adjusting wrench.
- After setting clearance to the prescribed level, hold the adjuster screw with a valve adjusting wrench, and tighten the lock nut.

TORQUE : 1.1kgf · m (11N · m)
TOOLS : WRENCH 8x9mm
ADJUSTING WRENCH B
FEELER GAUGE

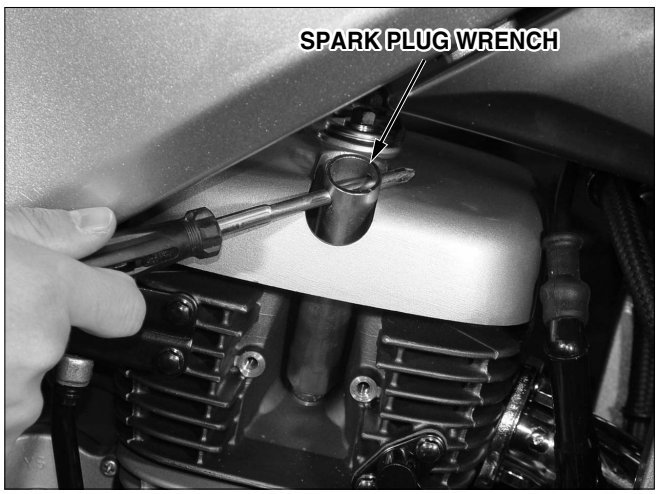


- Measure the vlave clearance again.
- Install the cylinder head cover and tighten the bolts.

TORQUE : 1.0kgf · m (10N · m)

- Install the A.C generator cap and crankcase hole cap.

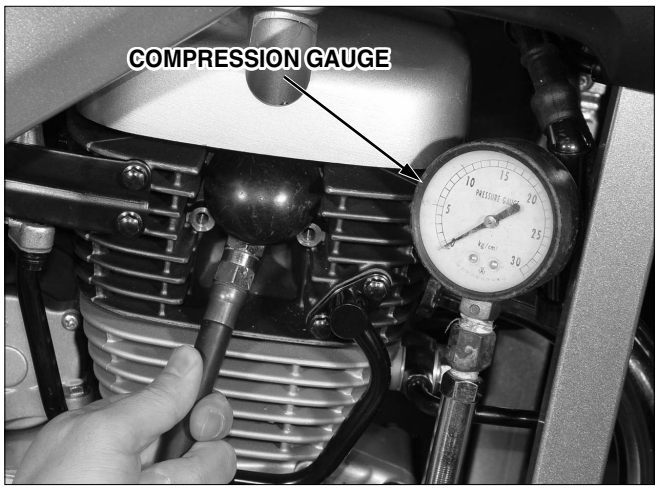
TORQUE :
A.C GENERATOR CAP : 0.6kgf · m(6N · m)
CRANK CASE HOLE CAP : 0.8kgf · m(8N · m)



CYLINDER COMPRESSION PRESSURE

- Warm up the engine.
- Stop the engine, and remove the spark plug cap and spark plug. Install the compression gauge.
- Open the throttle completely and crank the engine with the starter motor until the gauge reading stops rising.

TOOL : COMPRESSION GAUGE

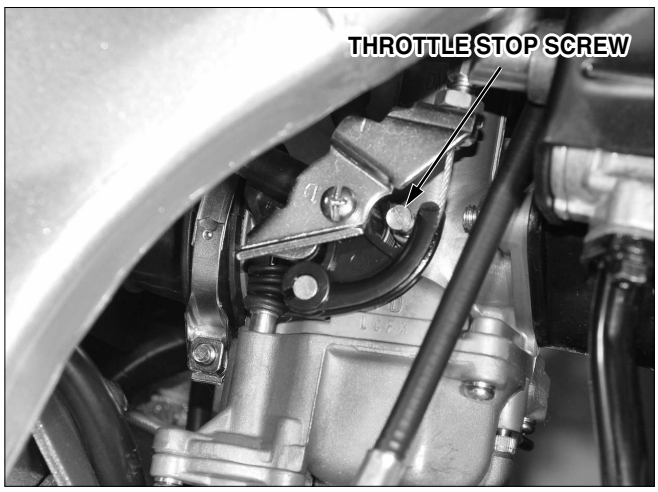


⚠ NOTE

- The maximum reading is usually reached within 4~7 seconds

COMPRESSION PRESSURE : 13.0kgf/cm²(600rpm)

- If compression is low, check the following:
  - Incorrect valve clearance adjustment
  - Valve leakage
  - Leakage from the cylinder head gasket.
  - Worn piston/cylinder
- If compression is high, check the following:
  - Carbon deposits on the piston head, and cylinder head.



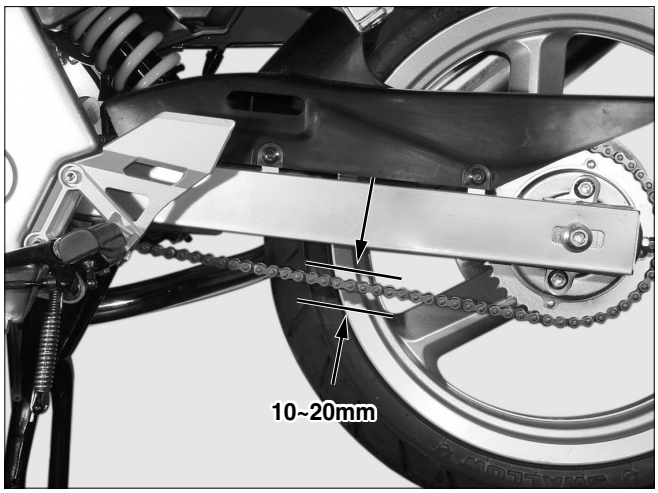
CARBURETOR IDLE SPEED

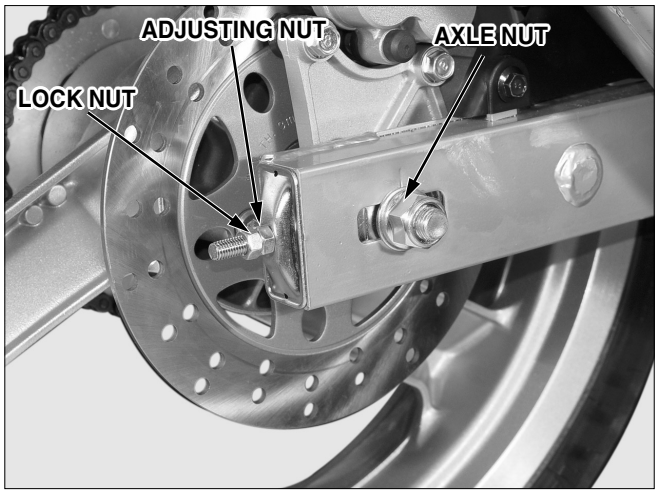
⚠ NOTE

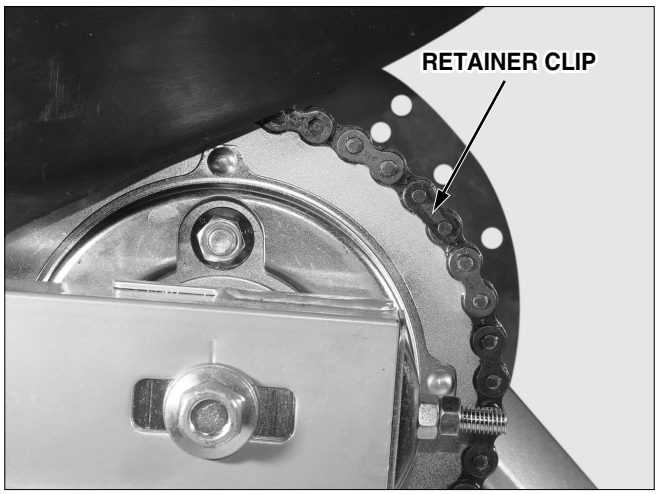
- Inspect all other engine adjustments are within specifications and adjust idle speed.
- The engine must be warm for accurate adjustment. Support the motorcycle on a level surface and shift the transmission into neutral.

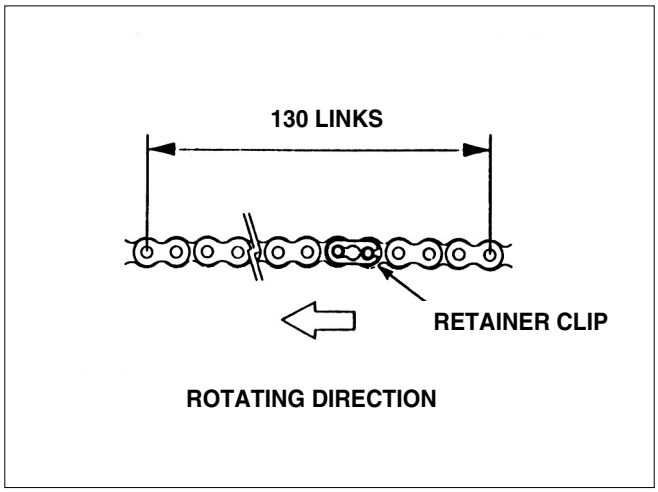
- Warm up the engine for about ten minutes.
- Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED : 1,600±100rpm









DRIVE CHAIN

⚠ WARNING

- Because there is a danger which fingers get jammed in the drive chain, never inspect or adjust it while the engine is running.

DRIVE CHAIN SLACK ADJUSTMENT

- Turn off the ignition switch, support the motorcycle on its main stand, and shift the transmission into neutral.
- Check slack in the lower chain with a hand midway between the sprockets.

CHAIN SLACK : 10~20mm

- Adjust the slack of drive chain if necessary.
- Adjust it by loosening the axle nut, loosening both lock nuts of adjust, and turning the adjusting nut.

⚠ NOTE

- Make sure that the chain adjuster scale are aligned with the correspondidng scale graduations on both sides of the swing arm.

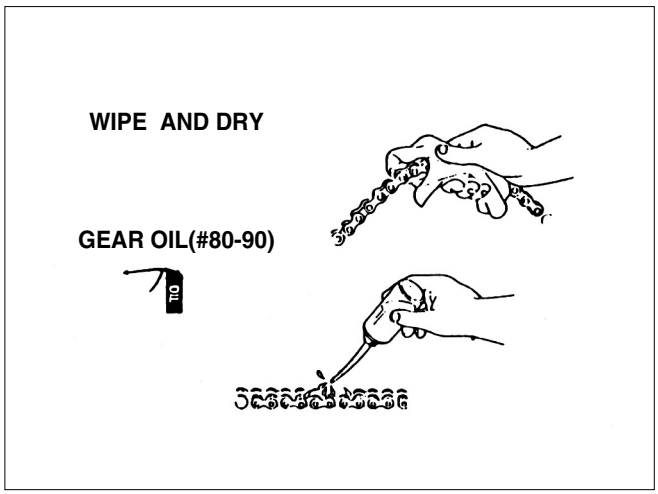
- Tighten the axle nut with the specified torque.

TORQUE : 8.8kgf · m(88N · m)

REMOVAL

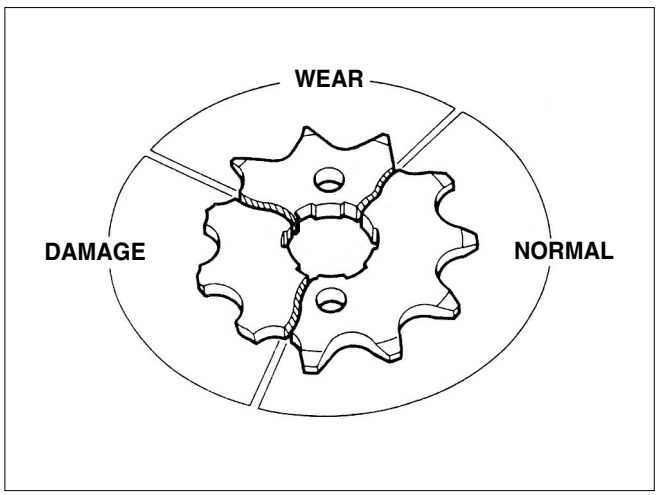
- In case that the drive chain becomes extremely dirty, it should be cleaned before lubrication.
- Remove the drive sprocket cover. Remove the retainer clip.
- Remove the master link, drive chain.

- Check the drive chain for adherence and damaging.
- Measure the length between the chain's pins and replace the chain if the prescribed limits are exceeded.
- Drive chain length (130 links).



DRIVE CHAIN INSPECTION

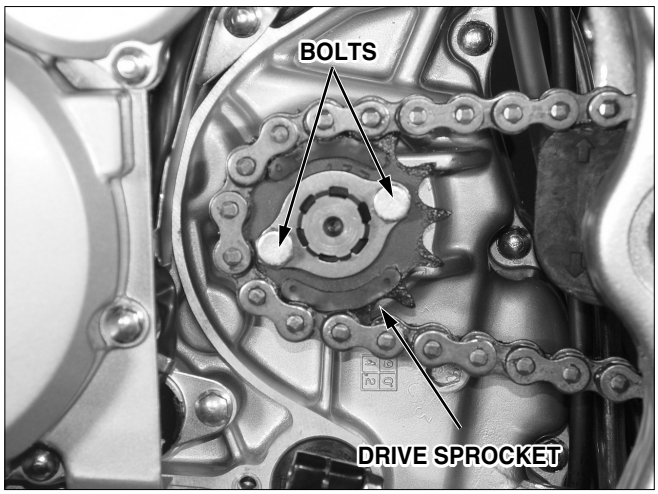
- Lubricate with #80-90 gear oil after removing the contamination of chain with a cleaner, and drying fully.
- Because an extremely lubricated oil splash while the chain moves round, clean it with a piece of cloth.
- After checking a wear and damage of the drive chain, replace it if necessary.



- After inspecting an excessive wear and damage of the drive sprocket, replace it if necessary.

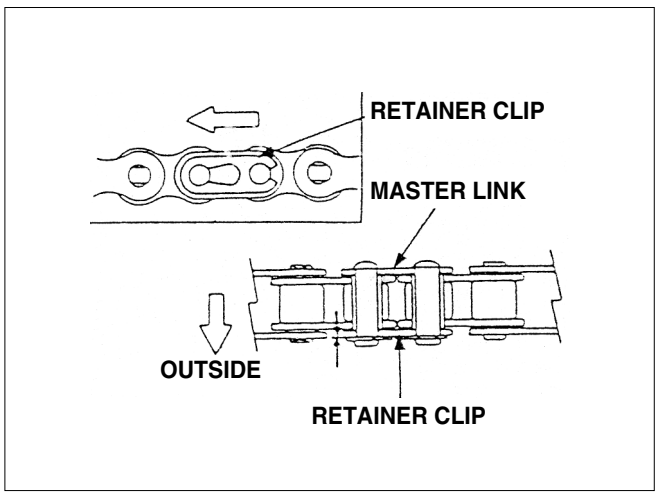
⚠ NOTE

• Always replace the chain and sprocket as a set.



- Check the attaching bolts and nuts on the drive and driven sprockets.
  If any are loose, torque them.

TORQUE :
DRIVE SPROCKET BOLT : 1.2kgf · m(12N · m)
DRIVE SPROCKET NUT : 5.9kgf · m(59N · m)

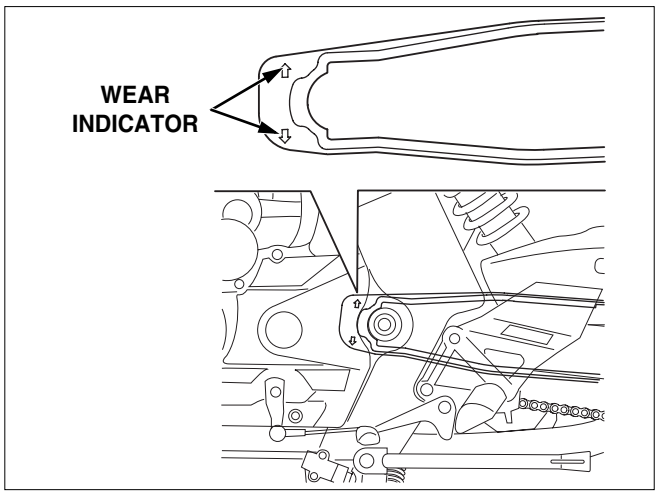


DRIVE CHAIN INSTALLATION

- Install the drive chain.
- Install the master link and retainer clip.

⚠ NOTE

• When installing the drive chain, it should be installed in order that the choked part of the clip can direct to a progressing derection of the chain.



DRIVE CHAIN SLIDER

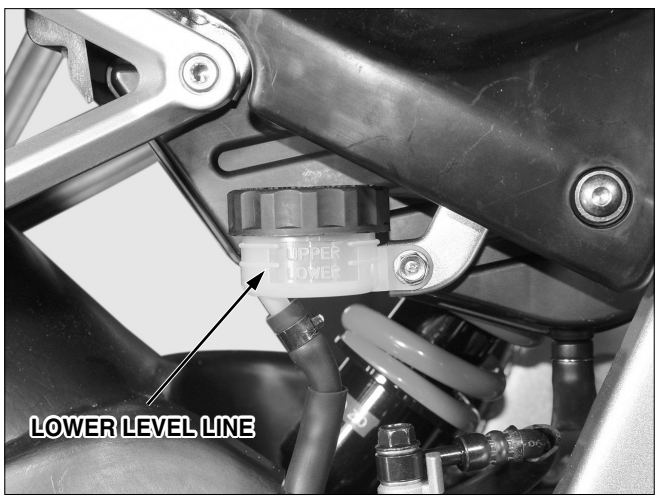
- Inspect the drive chain slider for excessive wear or damage.
- If it is worn to the wear indicator, replace the drive chain slider.

BRAKE FLUID

⚠ CAUTION

- Do not mix a dust or different types of fluid when filling the brake fluid.
- Mind that the reservoir is level in checking and filling it.
- Avoid spilling the fluid on painted, plastic, or rubber parts.

- When the fluid level is low, check the brake pads for wear. If the brake pads are not worn and the fluid level is low, check entire system for leaks. (⇨2-11)



FRONT BRAKE

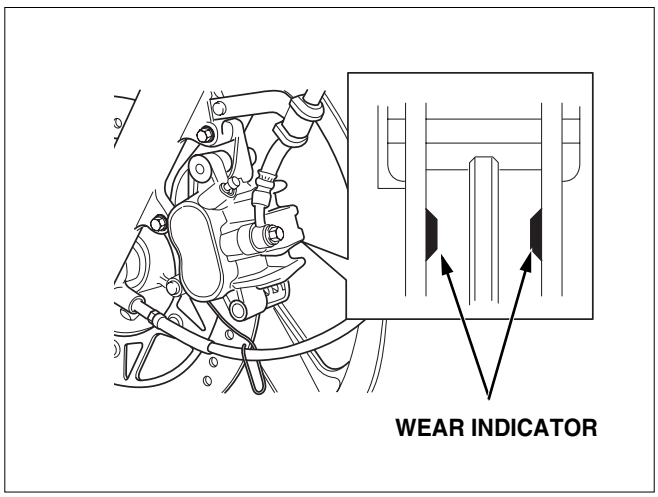
- Turn the handlebar so that the reservoir is level and check the front brake fluid reservoir level.
- If the level is near the lower level line, check the brake pad wear.

REAR BRAKE

- Place the motorcycle on a level surface, and support it upright position.
- Check the rear brake fluid reservoir level.
- If the level is near the lower level line, check the brake pad wear.

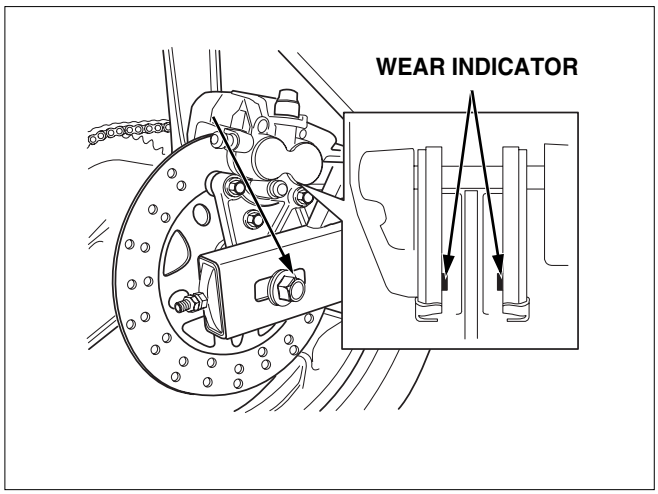
BRAKE PAD WEAR

FRONT BRAKE PADS



- Check the brake pads for wear.
- Replace the brake pads if either pad is worn to the bottom of wear limit groove.

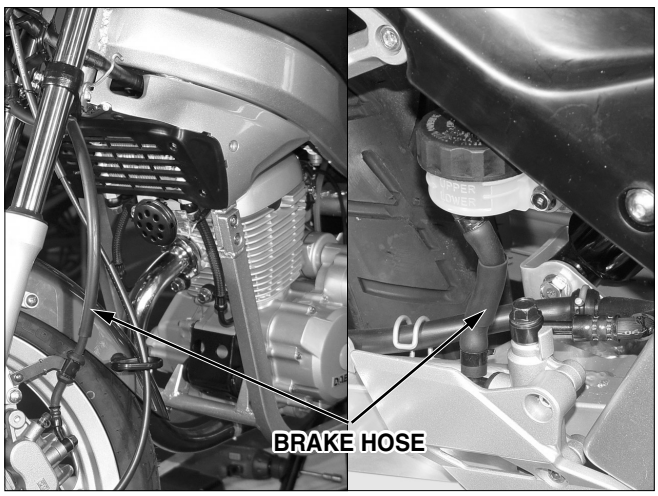
- Refer to page 15-6 for brake pad replacement.



REAR BRAKE PADS

- Check the brake pads for wear.
- Replace the brake pads if either pad is worn to the bottom of wear limit groove.

- Refer to page 15-6 for brake pad replacement.



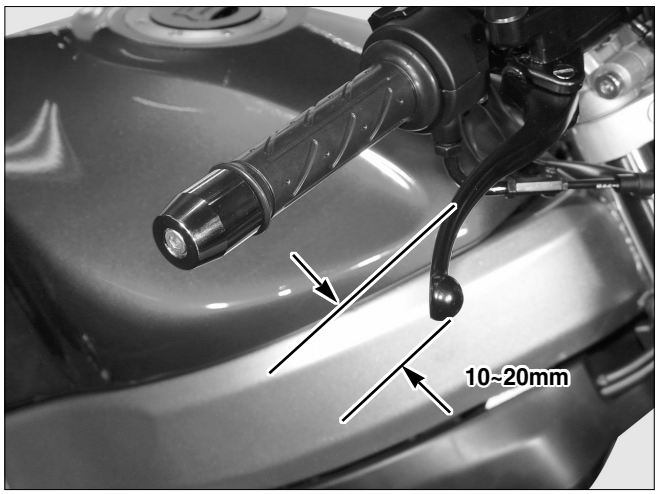
BRAKE SYSTEM

INSPECTION

- Firmly apply the brake lever or pedal, and check that no air has entered the system.
  If the lever or pedal feels soft or spongy when operated, bleed the air from the system.

- Inspect the brake hose and fittings for deterioration, cracks and sighs of leakage.
- Tighten any loose fittings.
- Replace hoses and fittings as required.

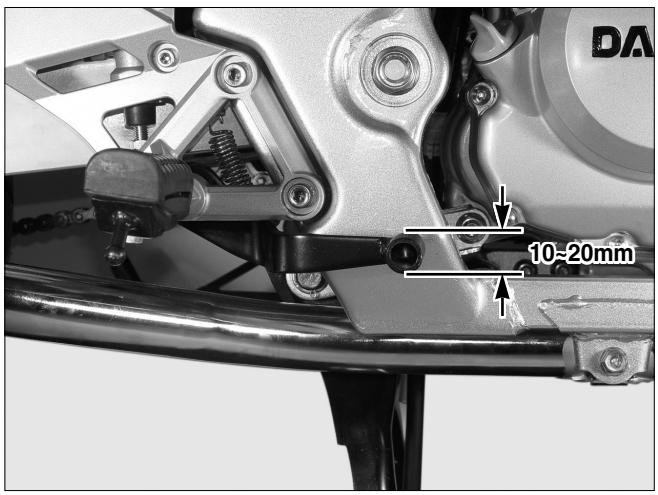
- Refer to page 15-4 for brake bleeding procedures.



FRONT BRAKE LEVER FREE PLAY

- Check the free play after pulling the lever.

BRAKE LEVER FREE PLAY : 10~20mm



REAR BRAKE PEDAL FREE PLAY

- Adjust the brake pedal free play at the end part of pedal.

BRAKE PEDAL FREE PLAY : 10~20mm

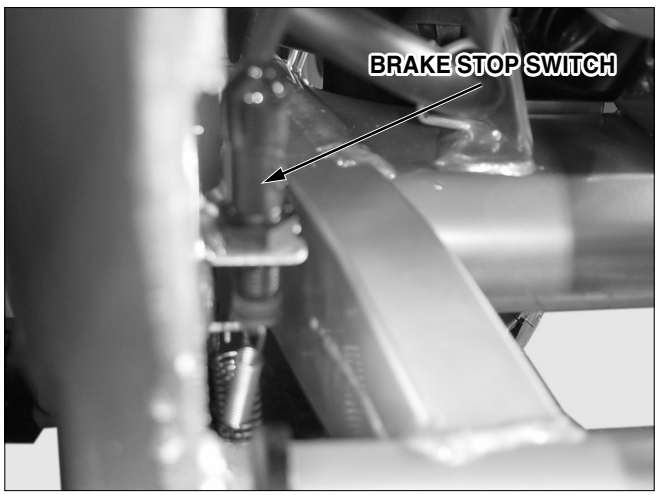
BRAKE PEDAL HEIGHT ADJUSTMENT

- Loosen the lock nut and turn the stopper bolt until the correct pedal height is obtained.
- After adjustment, tighten the lock nut securely.

⚠ CAUTION

• The adjustment faulty of height may caused that the brake runs in state of operation.

- After adjusting the brake pedal height, inspect the operation of rear brake light switch and brake pedal, and adjust them if necessary.



BRAKE STOP SWITCH

- Adjust the brake stop switch by turning the adjust nut, pressing the switch so that the brake light will come on just before the brake pedal is depressed and brake engagement begins.

HEADLIGHT AIM

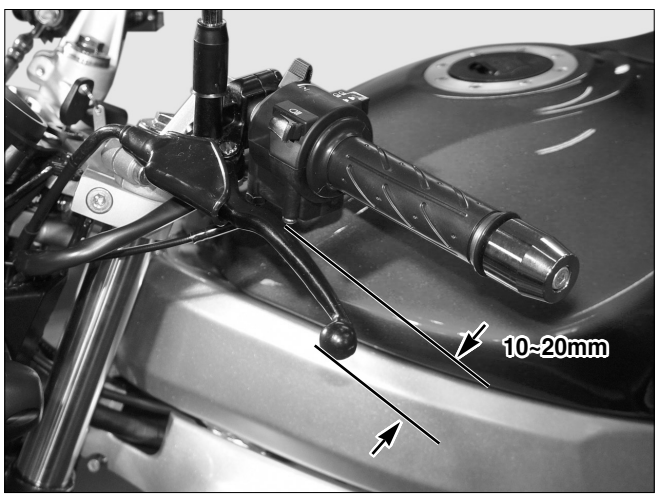
- Adjust the headlight beam vertically by turning the headlight case adjustment bolts.

⚠ NOTE

• Adjust the headlight beam as specified by local laws and regulations.

⚠ CAUTION

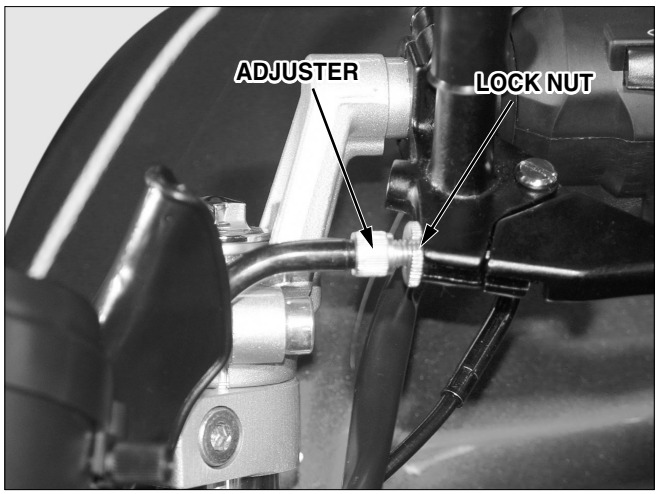
• An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.



CLUTCH SYSTEM

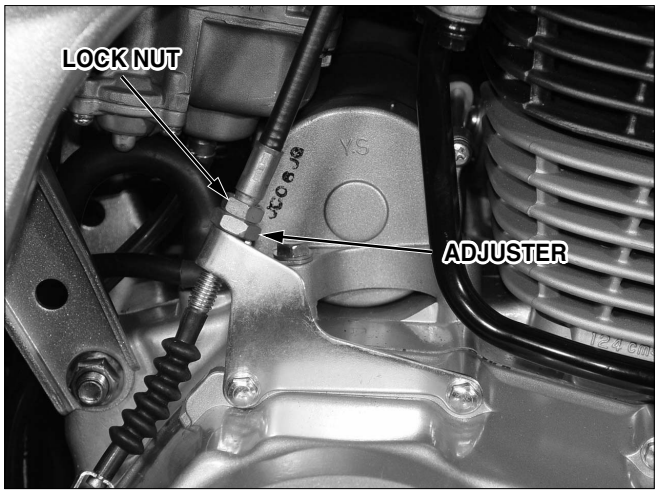
- Measure the clutch lever free play at the end of the clutch lever.

FREE PLAY : 10~20mm



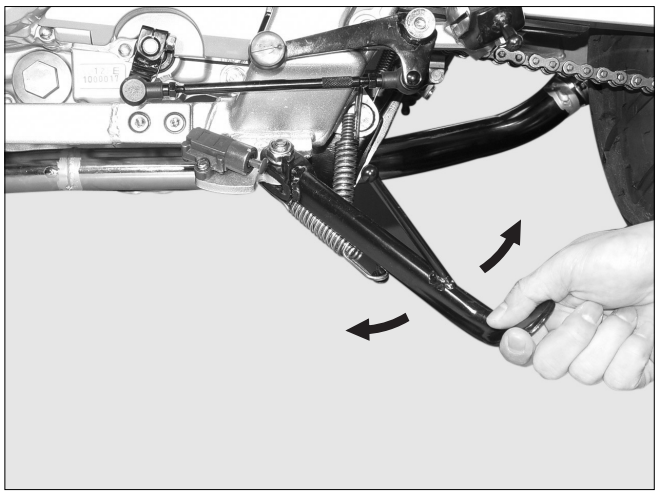
- Minor adjustments are made using the upper adjuster at the clutch lever.
- Loosen the lock nut and turn the adjuster.

- If the adjuster is threaded out near its limit and the correct free play cannot be obtained, turn the adjuster all the way in and back out one turn.
  Tighten the lock nut and make a major adjustments as described as follow.



- Major adjustments are performed at the clutch arm.
- Loosen the lock nut and turn the adjuster nut to adjust free play.
- Hold the adjuster nut securely while tightening the lock nut.

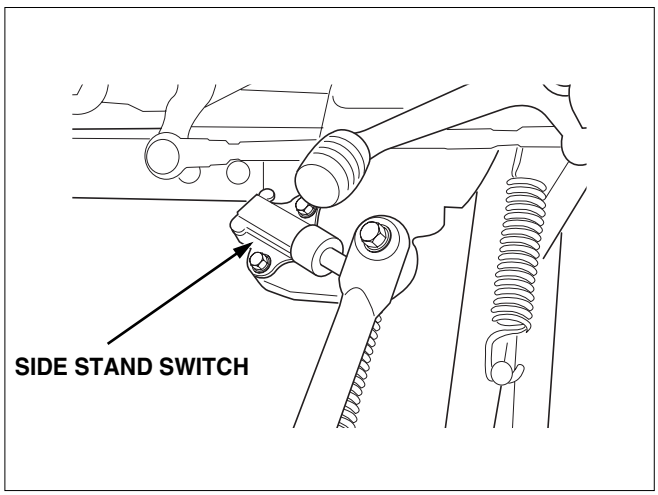
- If proper free play cannot be obtained, or the clutch slips during test ride, disassemble and inspect the clutch. (see section 7)



SIDE STAND

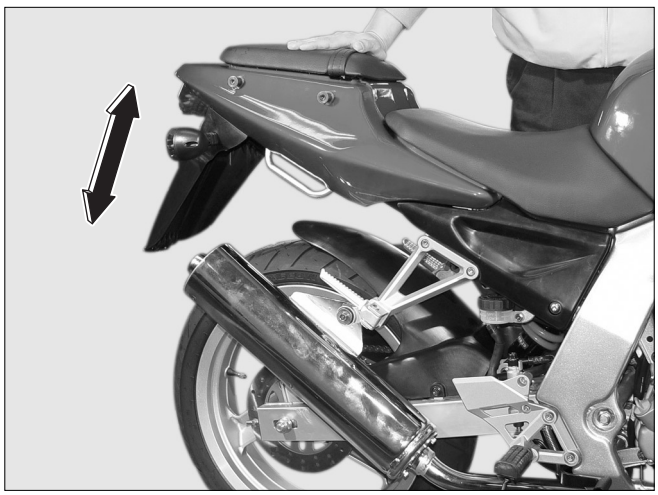
- Support the motorcycle on a level surface.

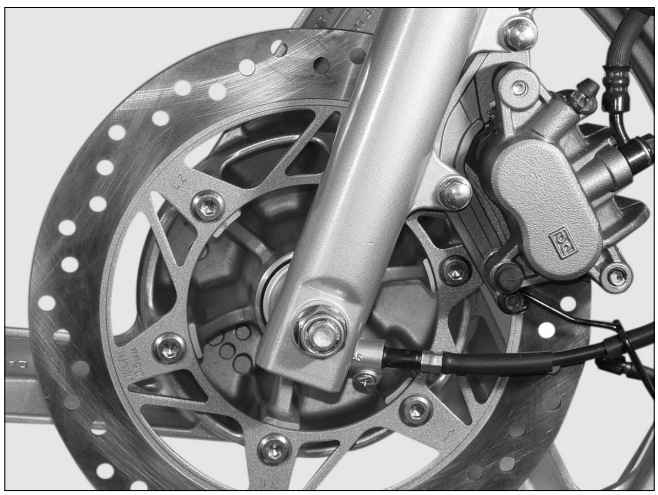
- Pull the lower end of the side stand, and see if it moves freely.
- If the side stand does not move smoothly, apply grease to the pivot area.
- If the side stand moves too freely, check the side stand spring.
- Check the axial movement of the side stand.



- Check the side stand switch:
  - Sit astride the motorcycle and raise the side stand.
  - Start the engine with the transmission in neutral.
  - Lower the side stand.
  → The engine should not accelerate as the throttle grip is operated.

- If there is a problem with the system, check the side stand switch. (section 17)





SUSPENSION

⚠ NOTE

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

FRONT SUSPENSION INSPECTION

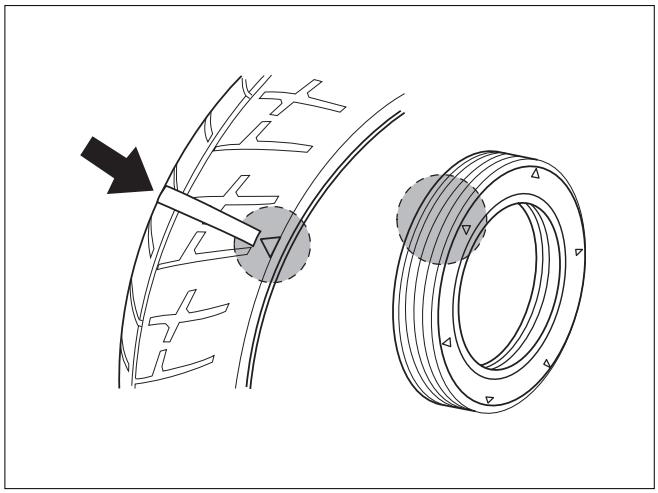
- Hold the brake lever, and compress the front cushion up and down several times to check the operating conditions.
- Check the front fork for oil leakage, parts damage or looseness.

REAR SUSPENSION INSPECTION

- Compress the near cushion up and down several times to check the operating conditions.
- Check the rear cushion for oil leakage, parts damage or looseness.
- Support the motorcycle with the main stand.
- Check a wear of the rear fork bush by moving the rear wheel aside. If there is a free play, replace the rear fork bush.
- Tighten all nuts and bolts of the rear suspension.

BOLTS, NUTS, FASTENERS

- Check that all frame nuts and bolts are tightened to their correct torque values. (⇨1-12)
- Check that all safety clips, hose clamps and cable stays are in place and properly secured.



WHEELS/TIRES

⚠ NOTE

• Check the tire pressure when the tires have been cooled off. Check the tread (the part making contact with the road surface) and side for wear, cracks or damage. Replace damaged tires.

STANDARD PRESSURE

kgf/cm² (kpa)

ITEM	FRONT WHEEL	REAR WHEEL
DRIVER ONLY	2.00(200)	2.00(200)
DRIVER AND A PASSENGER	2.00(200)	2.25(225)

- Check the tread depth at the tire center.
- If the tread depth has reached the service limit, replace the tires.

SERVICE LIMIT : FRONT : 5.5mm
REAR : 7.0mm

STEERING HEAD BEARINGS

⚠ NOTE

• Check that the cables do not interfere with handlebar rotation.

- Support the motorcycle securely and raise the front wheel off the ground.
- Check that the handlebar moves freely from side to side to side.
- If the handlebar moves unevenly, binds or has vertical movement, inspect the steering head bearings. (section 13)

MEMO

3. LUBRICATION

SERVICE INFORMATION

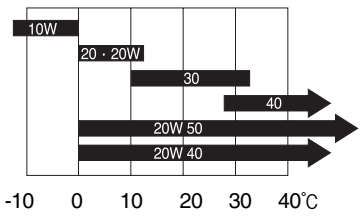
GENERAL SAFETY

⚠ WARNING

1. The exhaust gas contains poisonous substance. Do not keep engine idling in a closed or poorly ventilated place for a long period of time.
2. 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 oil frequently; however, wash your hands thoroughly with soap and water immediately after handling the used oil.
3. The oil pump can be serviced without removing the engine from the frame.

ENGINE OIL

OIL CAPACITY	1.1 ℓ (After disassembly) 1.05 ℓ (After Oil filter change) 1.0 ℓ (After Oil change)
RECOMMENDED OIL	API service classification : SE, SF, SH grade Viscosity : SAE10W-30 (Use appropriate type of oil with viscosity satisfying the atmospheric temperature in your riding area based on the table shown on the right side.)



OIL PUMP

Unit : mm

ITEM	STANDARD VALUE	SERVICE LIMIT
PUMP BODY CLEARANCE	0.15~0.20	0.25
ROTOR END CLEARANCE	0.15	0.20
PUMP SIDE CLEARANCE	0.05~0.09	0.12

TORQUE VALUES

TAPPET ADJUST HOLE CAP	1.5kgf · m (15N · m)
OIL FILTER SOCKET BOLT	1.2kgf · m (12N · m)
OIL FILTER COVER BOLT	1.1kgf · m (11N · m)
OIL PUMP MOUNTING BOLT	1.1kgf · m (11N · m)

TROUBLESHOOTING

Engine oil level too low

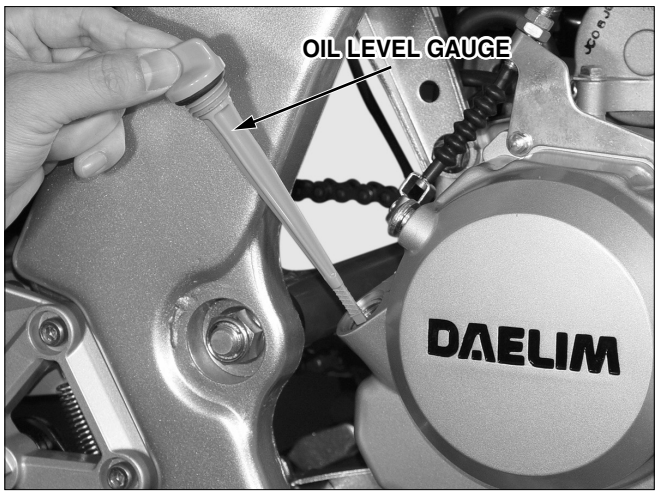
- Oil consumption.
- External oil leaks.
- Worn piston ring or incorrect piston ring installation.
- Worn valve guide or seal.

Oil contamination

- Oil or filter not changed often enough.
- Faulty head gasket.
- Worn piston rings.

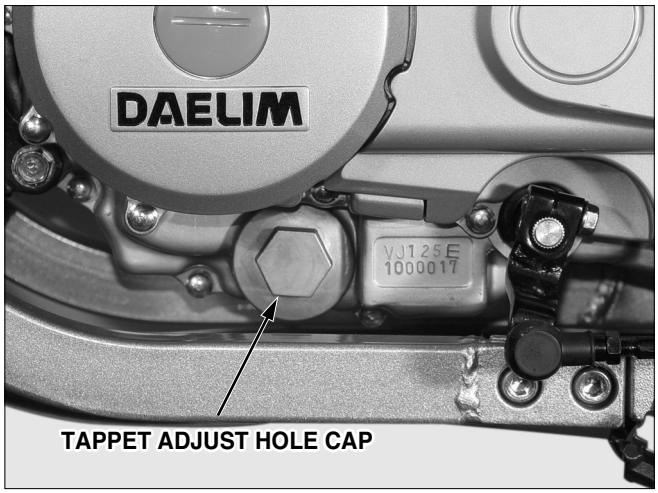
Low or no oil pressure

- Clogged oil orifice.
- Incorrect oil being used.



ENGINE OIL LEVEL INSPECTION

- Support the motorcycle by main stand.
- Start the engine and let it be warm fully.
- Stop the engine, remove the oil level gauge and wipe it clean.
- Check the oil level with the level gauge by inserting it in engine screwing level gauge.
  It is good if the oil surface is between the lower level mark and upper that of the level gauge. If the oil level is near the lower level mark on the dipstick or below that, full to the upper level mark with the recommended oil.

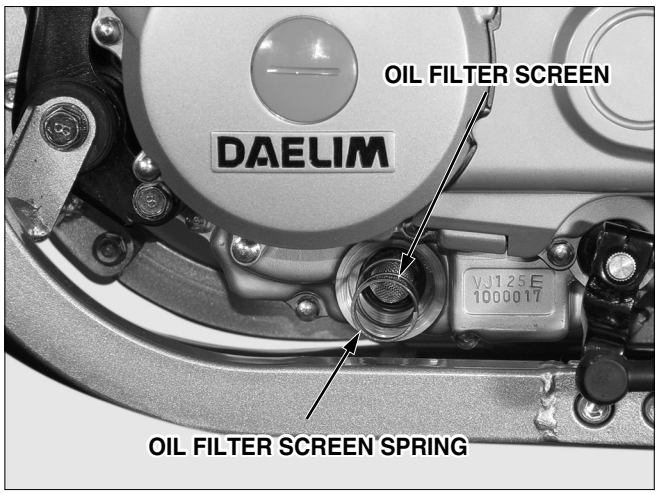


ENGINE OIL CHANGE

⚠ NOTE

• Make the engine warm and support the motorcycle with its side stand in order to assure complete and rapid draining.

- Remove the tappet adjust hole cap.
- Extract the spring and screen.
- Start the kick starter arm for several times to drain any oil which may be left in the engine.



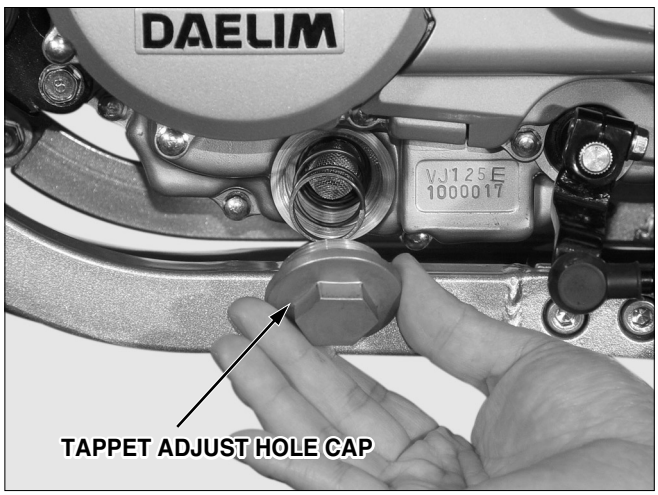
- Clean filter screen with a clean wash. Check if the oil filter screen and O-ring of the screen cap are in good condition.
- Install the filter screen and spring.
- Install and tighten the tappet adjust hole cap.

TORQUE : 1.5 kgf · m(15N.m)

- Fill the crankcase with recommened engine oil.

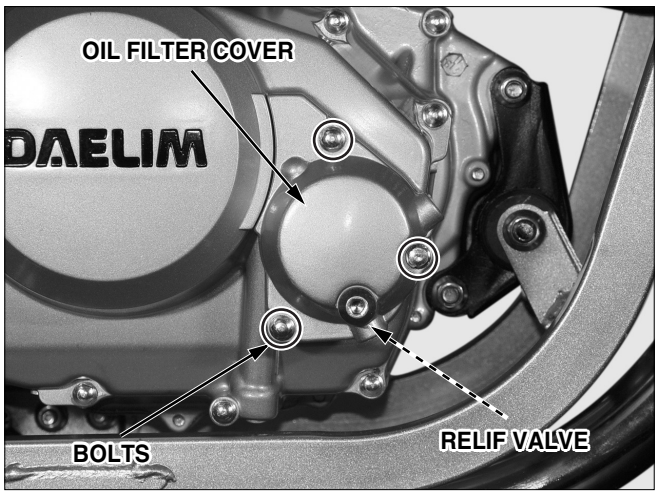
OIL CAPACITY: 1.1 ℓ (After disassembly)
1.05 ℓ (After oil filter change)
1.0 ℓ (After oil change)

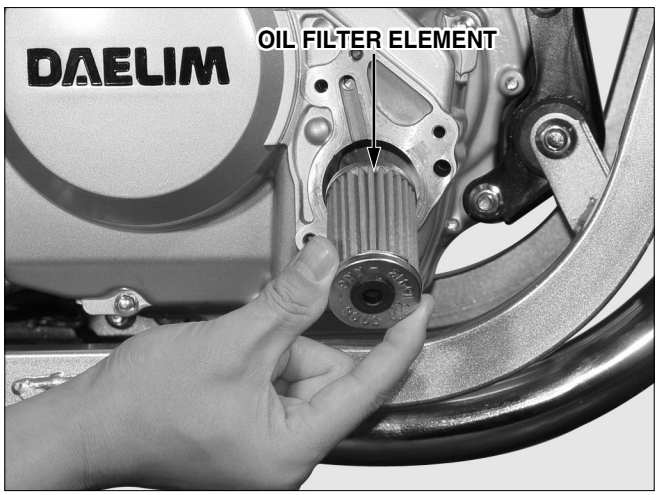
RECOMMENDED ENGINE OIL :
Genuine oil
API classification : SE or SH
viscosity : 10W-30



- Install the oil level gauge.
- Start the engine and let it idle for a few minutes.
  Stop the engine and recheck the oil level.
  If insufficient, supply the recommended oil.

- Make sure that there are no oil leaks.





OIL FILTER ELEMENT CHANGE

- Drain the engine oil. (⇨3-3)
- Loosen the 3 flange bolts securing the oil filter cover, remove the oil filter cover.
- Remove the oil filter element and oil filter spring.
- Change the oil filter element with a new one.

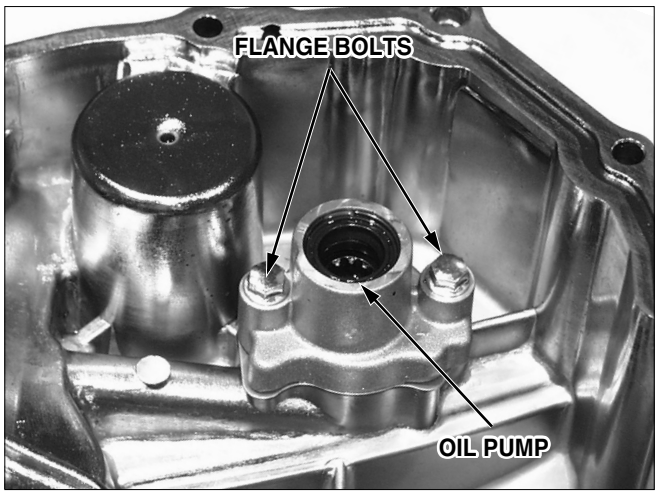
- Check the operation of the relief valve.
  If the relief valve is fully opened when released, it is in good condition.
- Check if the oil filter seal is in good condition.

- Install the filter element, spring and oil filter cover and tighten the bolts to the specified torque.

TORQUE : 1.1 kgf · m (11 N · m)

⚠ NOTE

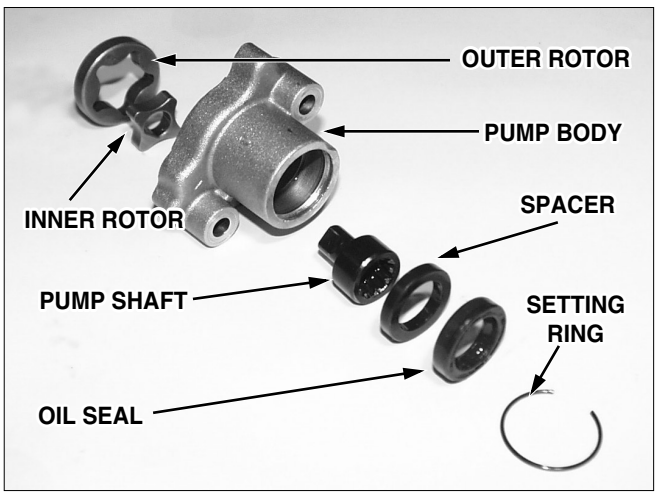
- Always use a genuine oil filter element.
- Be sure to replace the oil filter seal when removing oil filter element.
- Be careful not to lose the oil filter spring when assembling the oil filter element.



OIL PUMP

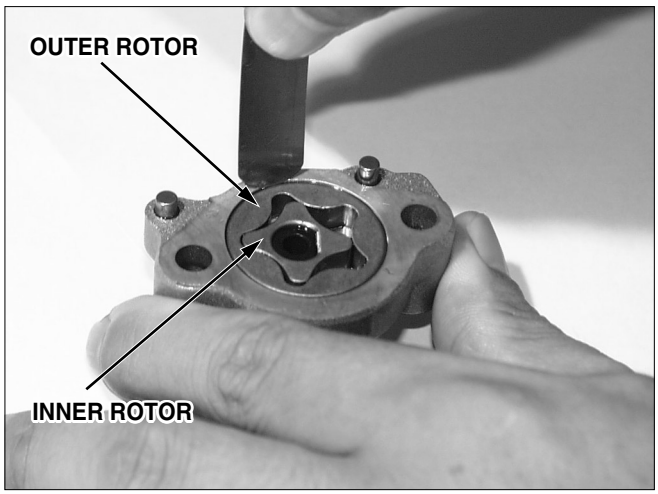
REMOVAL

- Drain the engine oil. (⇨3-3)
- Remove the right crankcase cover. (⇨7-3)
- Loosen the 2 flange bolts securing the oil pump, remove the oil pump.



DISASSEMBLY

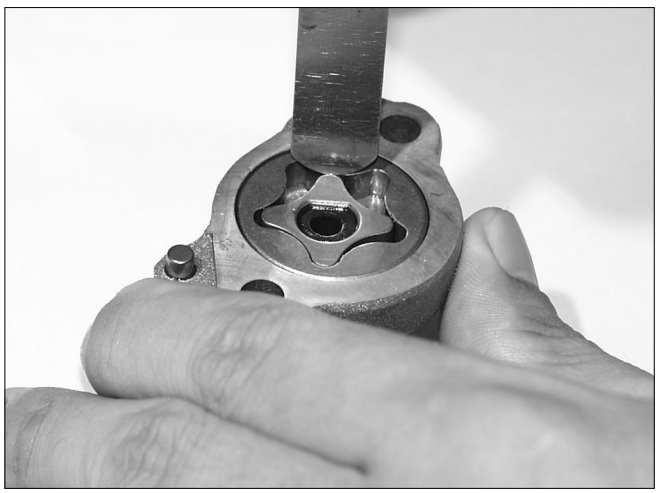
- Remove the oil pump body, the oil pump plate, and lock pin.
- Clean the oil pump body, inner and outer rotors with fresh cleaning oil.



INSPECTION

- Install the inner and outer rotors into the oil pump body.
- Measure the pump body clearance.

SERVICE LIMIT : 0.25mm

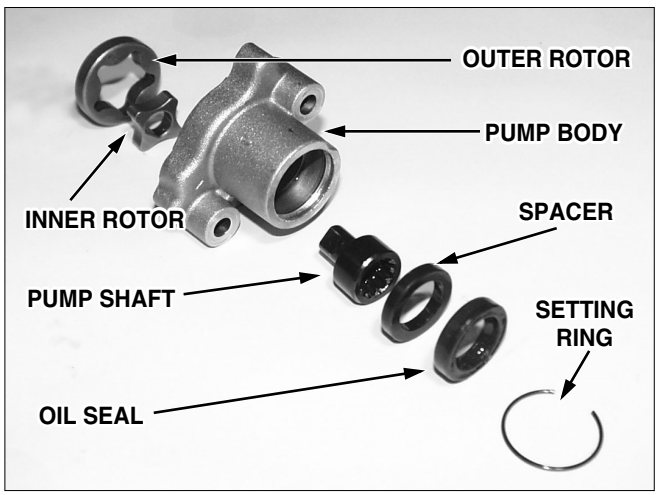


- Measure the rotor end clearance.

SERVICE LIMIT : 0.20mm

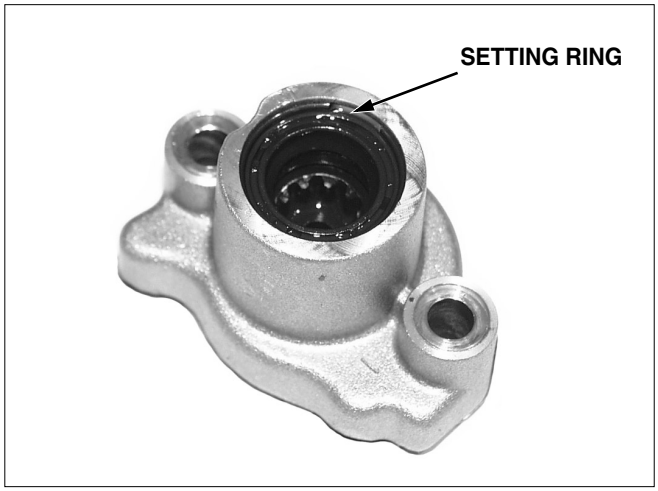
- Measure the pump side clearance.

SERVICE LIMIT : 0.12mm

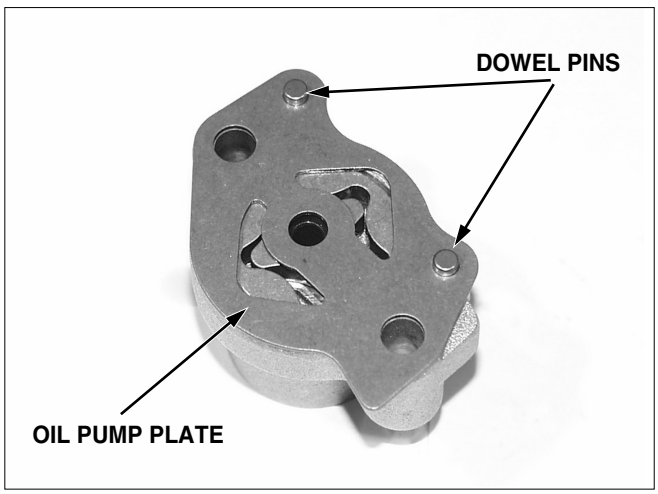


ASSEMBLY

- Clean all parts with fresh cleaning oil.



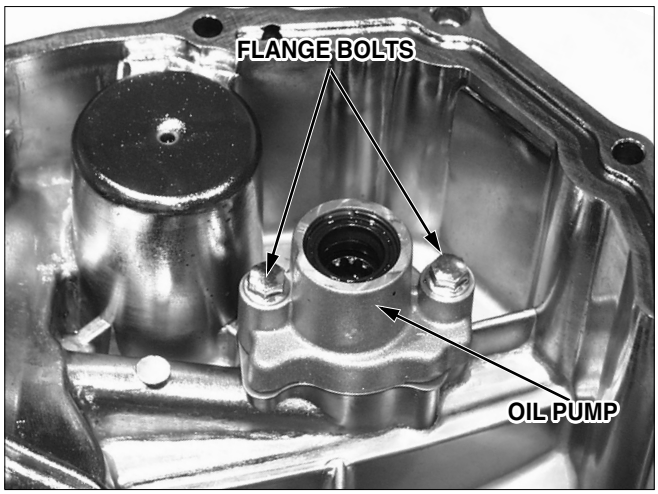
● Install the pump shaft, oil seal and spacer, then assemble into the setting ring.



● Install the inner and outer rotors to the pump body.
● Install the dowel pins and oil pump plate into the pump body.

⚠ NOTE

• After installing, check the oil pump to operate smoothly.



INSTALLATION

● Install the oil pump into the right crankcase cover and tighten the bolts with the specified torque.

TORQUE : 1.1 kgf · m (11 N · m)

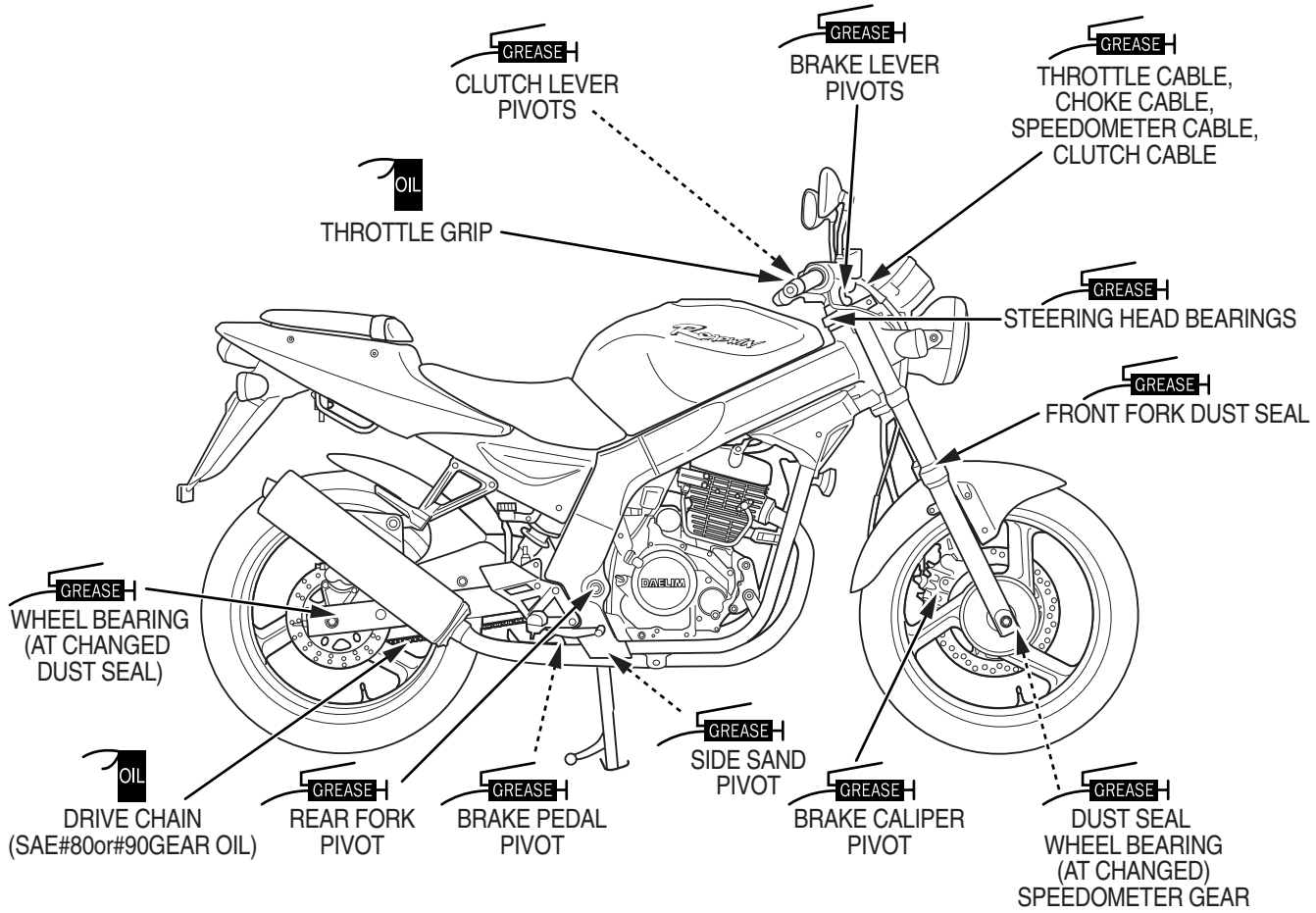
● Install the right crankcase cover. (⇨7-12)
● Fill the crankcase with the recommended oil and check that there is no oil leaks.

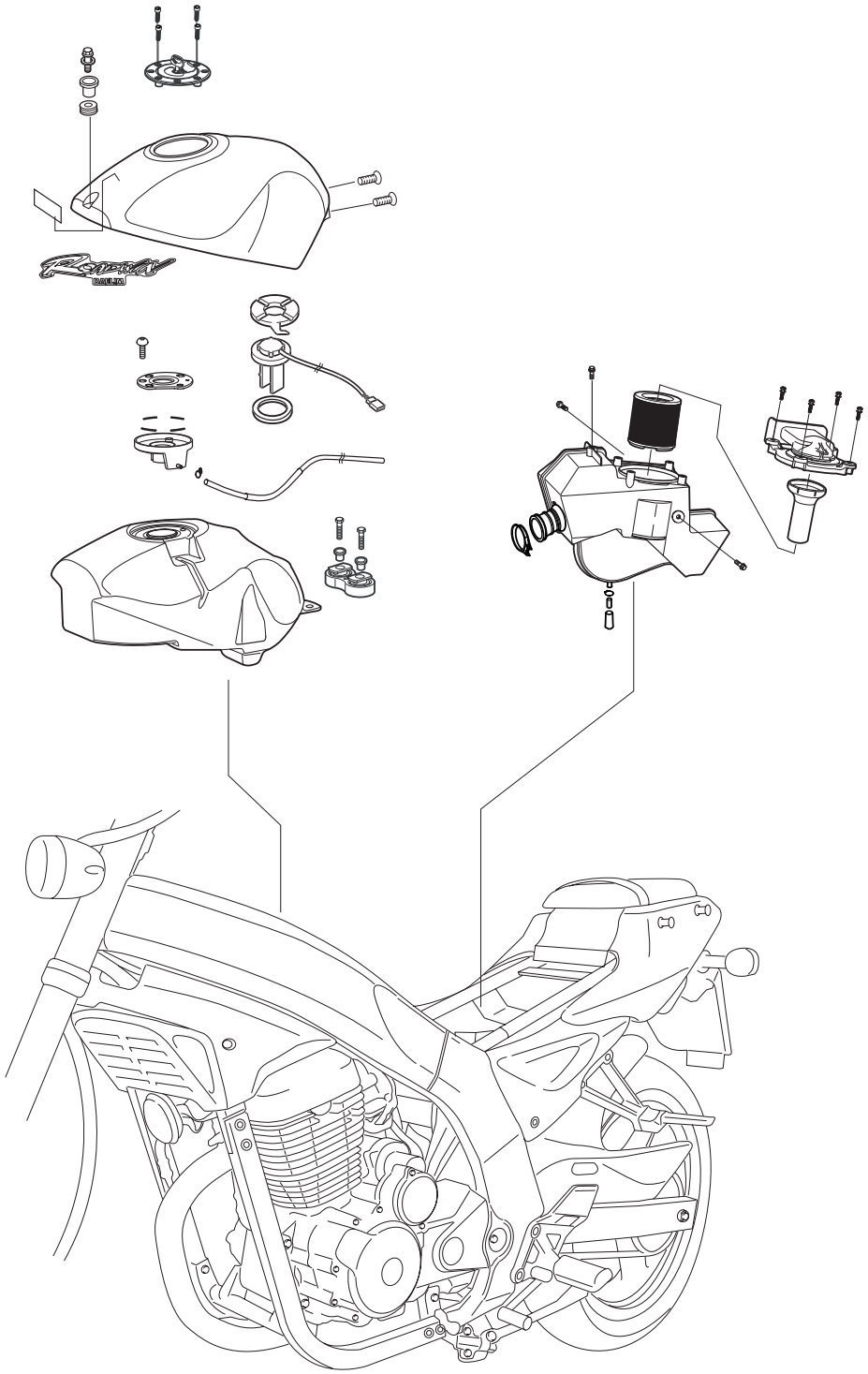
LUBRICATION POINTS

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

CONTROL CABLE LUBRICATION

Periodically disconnect the upper end of the throttle cable and that of clutch cable, then apply oil after cleaning. Change it when the cable lengthened.





4. FUEL SYSTEM

SERVICE INFORMATION

GENERAL SAFETY

⚠ WARNING

- Gasoline is extremely flammable. Avoid fire in the work place, also paying particular attention to sparks. Furthermore, the evaporated (gasified) gasoline is highly explosive. Work in a well-ventilated areas.
- Exhaust gas contains poisonous substance. Do not keep engine running for a long period of time in a closed, or poorly ventilated area.

⚠ CAUTION

- Do not excessively bend or twist cable. Distorted or damaged cable may lead to mechanical malfunctions.
- Pay particular attention to the position of O-ring. Replace with new ones when disassembled.
- Loosen the drain bolt of the float chamber before disassembly, drain residual gasoline, and then, put in a vessel.
- If it is desired to store a vehicle for a period longer than 1 month, drain gasoline out of the carburetor float chamber. Gasoline left in the float chamber will be deteriorated causing the slow jet to be clogged with deposits, and idling may become unstable.

SPECIFICATIONS

FUEL TANK CAPACITY : 16 *l*
RESERVE FUEL CAPACITY: 1.1 *l*

CARBURETOR

ITEM	SPECIFICATIONS
VENTURI BORE	24mm
SETTING SERIES MARK	VJ125 C
MAIN JET	#100
SLOW JET	#38
JET NEEDLE CLIP POSITION	2th Level
FLOAT LEVEL	12.5mm
PILOT SCREW INITIAL OPENING	2 1/8
IDLE SPEED	1,600±100(rpm)
THROTTLE GRIP FREE PLAY	2~6mm

TORQUE VALUE

AIR CLEANER CASE COVER SCREW 0.43kgf · m (4.3N · m)

TOOL

FLOAT LEVEL GAUGE

TROUBLESHOOTING

Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
- Cylinder flooded with fuel
- Clogged air cleaner
- No spark at plug

Rough idle, incorrect idle speed

- Faulty idle adjustment
- Excessively lean or rich mixture
- Clogged fuel system
- Intake air leak
- Clogged fuel system

Lean mixture

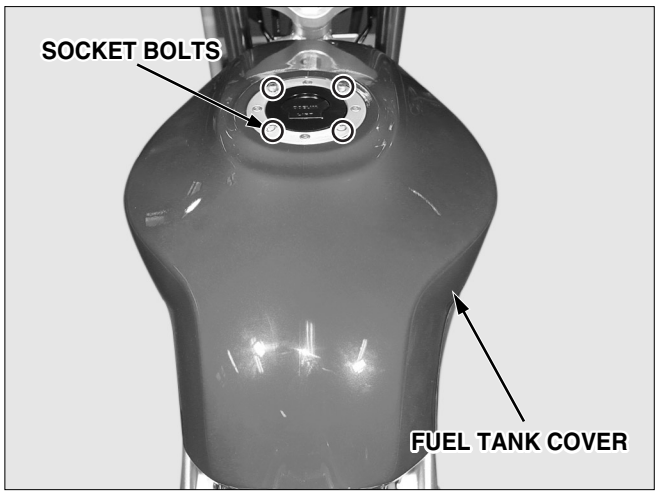
- Clogged carburetor jets
- Clogged fuel tank breather
- Clogged fuel strainer screen
- Twisted, pressed and clogged fuel tube
- Faulty float valve
- Float level too low

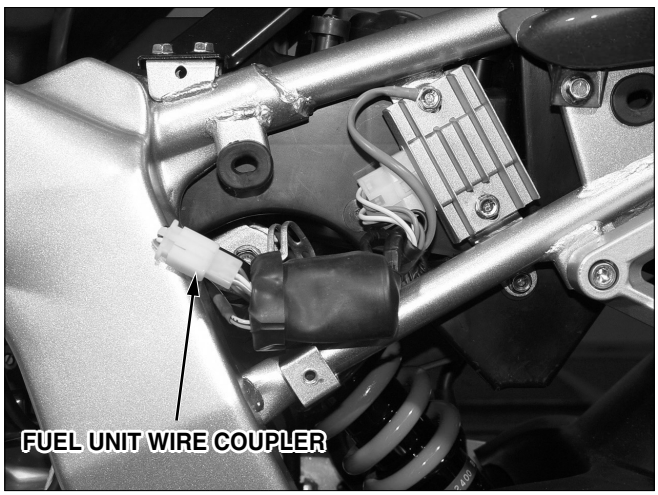
Rich mixture

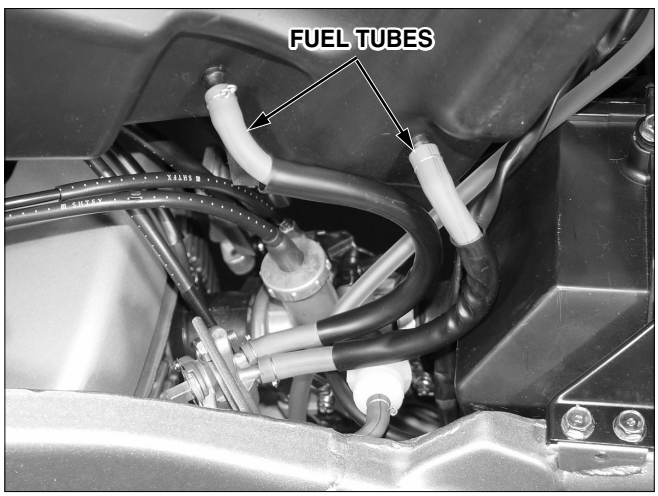
- Closed choke valve
- Faulty float vlave
- Float level too high
- Clogged air jets

Load during acceleration

- Faulty accelerating pump







FULE TANK

REMOVAL

⚠ WARNING

- Do not smoke or allow flames or sparks in the work area because gasoline is extremely flammable. Immediately wipe off a leaked gasoline.

- Remove the seat. (⇨12-2)
- Remove the fuel filler cap by looseing the 4 socket bolts.
- Remove the fuel tank cover by looseing the 2 special screws and washer bolt.

- Remove the LH. side cover. (⇨12-2)
- Disconnect the fuel unit wire coupler.

- Place the fuel tank upside down.
- Disconnect the fuel tubes from the fuel tank.

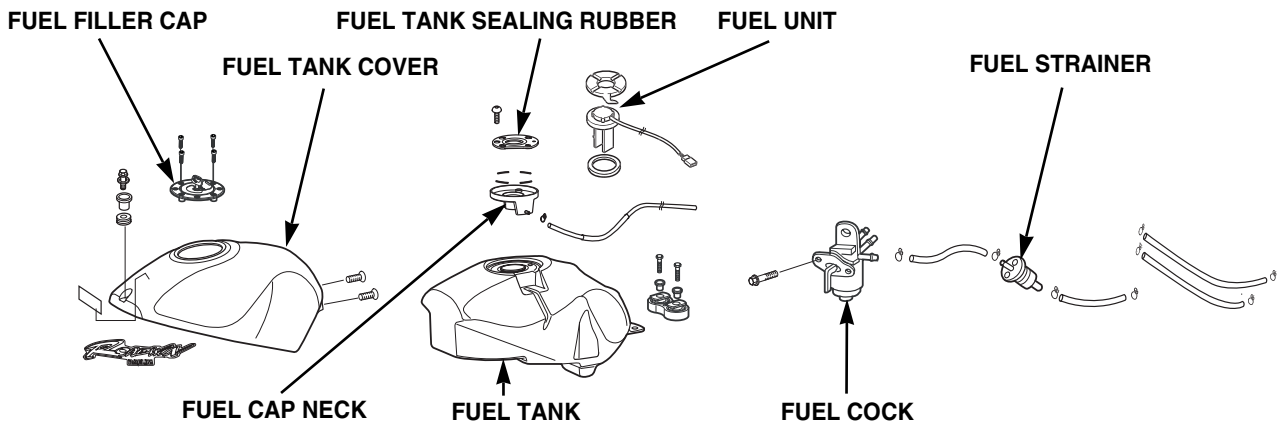
⚠ NOTE

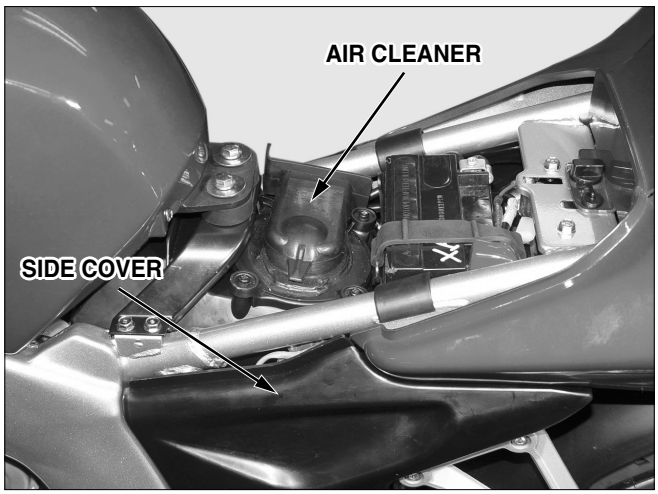
- Be careful not to damage the fuel tank.

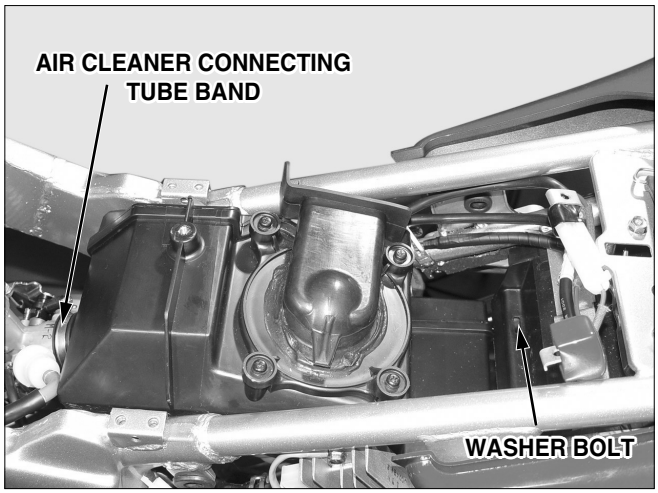
- If fuel is in short supply at the fuel cock, remove the gasoline in the tank, and clean the strainer screen by loosening the fuel cock.

INSTALLATION

- Install the fuel tank in the reverse order of removal.
- After installation, check if there is a gasoline leak.







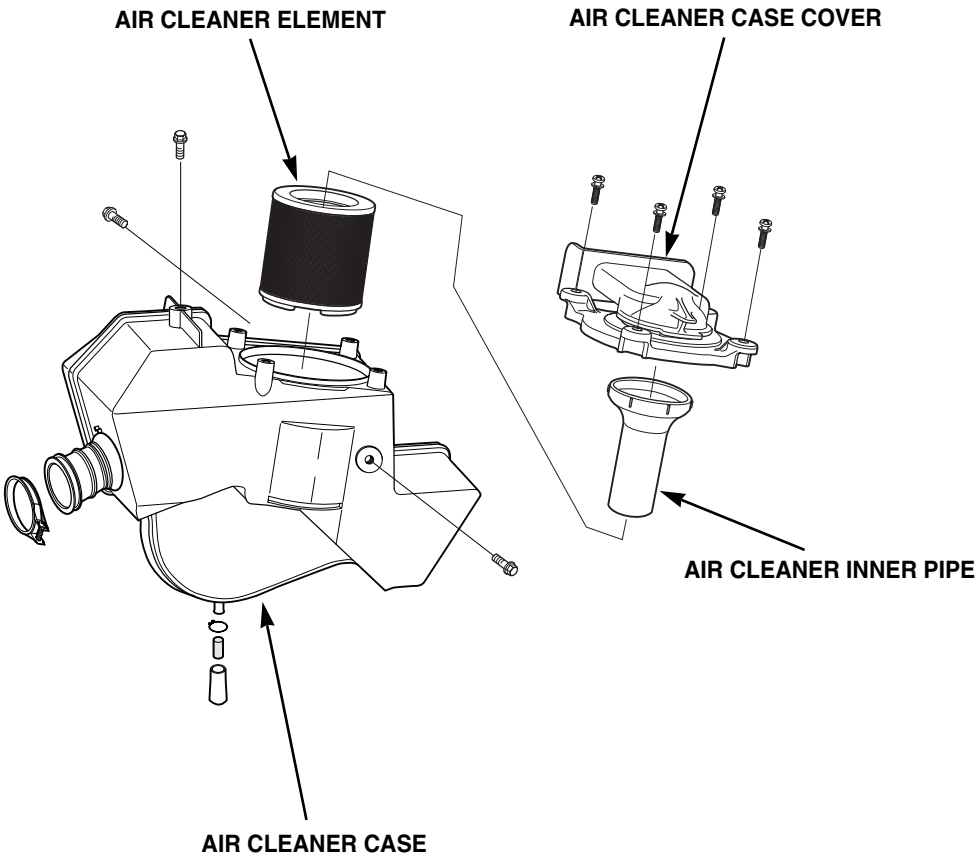
AIR CLEANER CASE

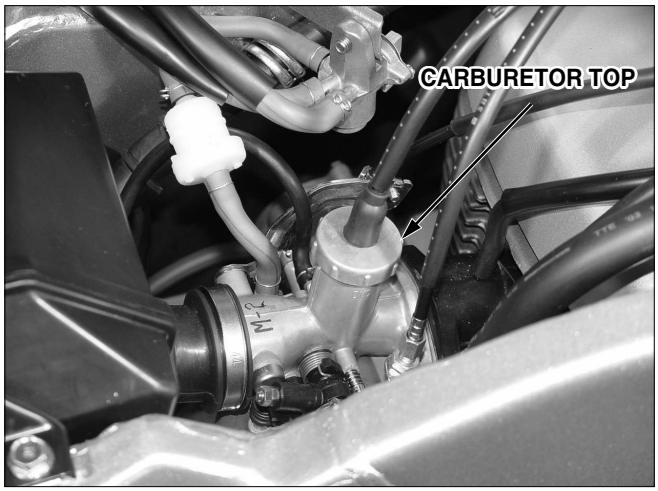
REMOVAL

- Remove the fuel tank. (⇨4-3)
- Remove the RH. LH. side covers.
- Remove the battery. (⇨16-3)
- Remove the battery box by loosening the washer bolt.
- Remove the air cleaner connecting tube band.
- Remove the air cleaner case mounting bolts, then remove the air cleaner case.

INSTALLATION

- Install in the reverse order of removal.

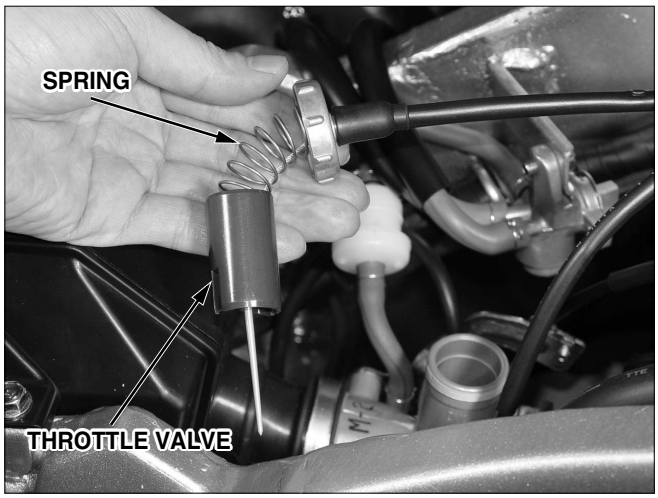




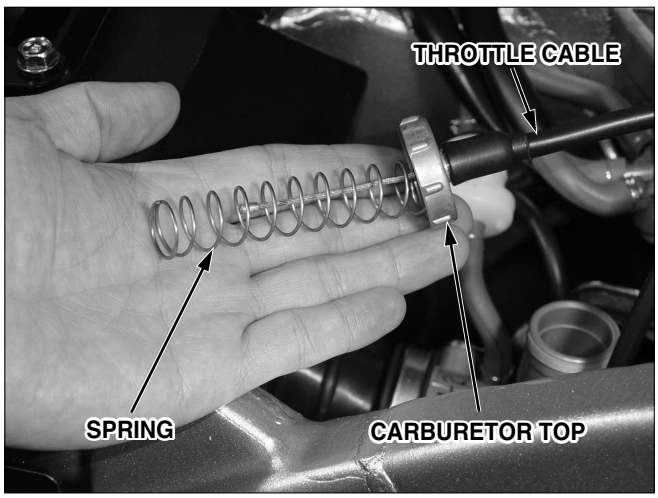
THROTTLE VALVE

REMOVAL

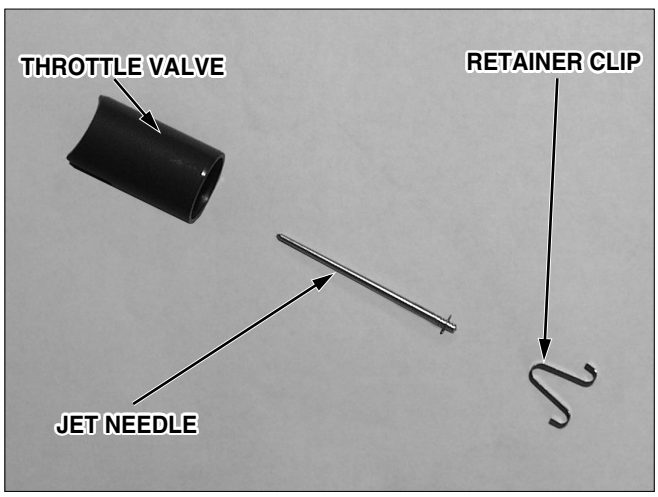
- Remove the fuel tank. (⇨4-3)
- Loosen the carburetor top slowly, and remove the throttle valve.



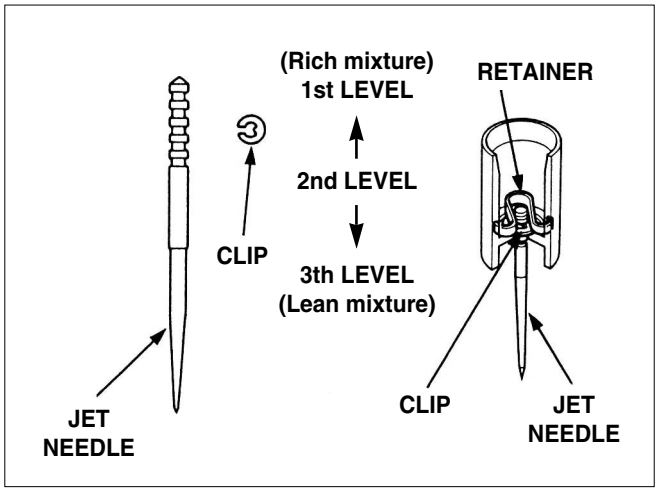
- Disconnect the throttle cable from the throttle valve, and remove the throttle valve.



- Remove the throttle valve spring and carburetor top from the throttle cable.



- Pull out the retainer clip, and remove the jet needle.
- Inspect the jet needle, throttle valve for damage and wear.

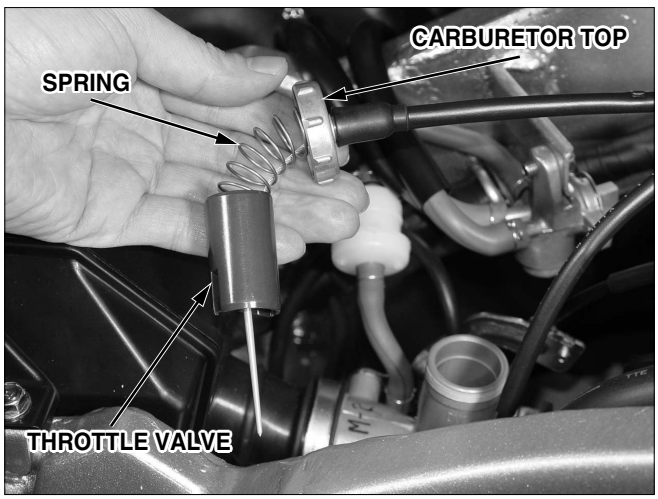


INSTALLATION

- Install the clip on the jet needle.

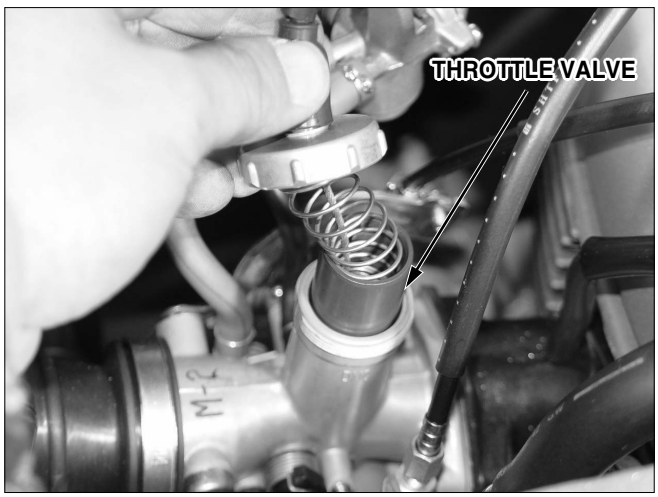
  STANDARD CLIP POSITION : 2nd LEVEL

- Install the jet needle into the throttle valve and secure with the retainer.
- Install the carburetor top into the throttle cable.



- Route the throttle cable through the spring and compress the spring fully.
- Attach the throttle cable end to the bottom of the throttle valve and thread the throttle cable through the slot in the valve.
- Align the cutout in the throttle valve with the throttle stop screw on the carburetor and install the valve on the carburetor.

- Inspect the following items.
  - Throttle grip free play : 2~6mm
  - Idling speed :1,600 ± 100 rpm



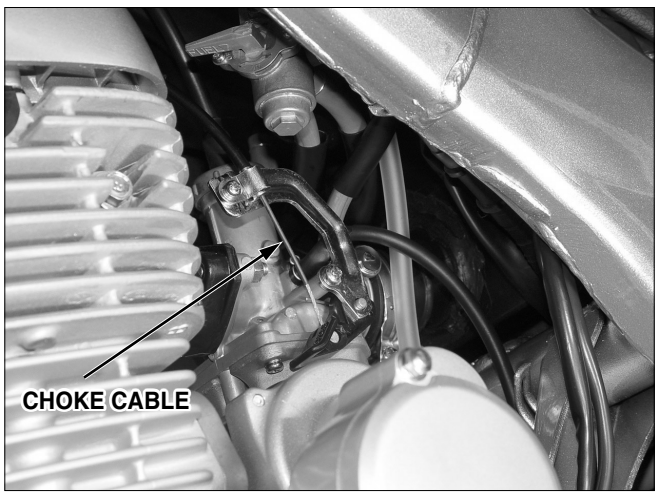
CARBURETOR

REMOVAL

- Remove the fuel tank. (⇨ 4-3)
- Remove the carburetor top. (⇨ 4-5)
- Remove the carburetor drain screw and drain gasoline from the carburetor.

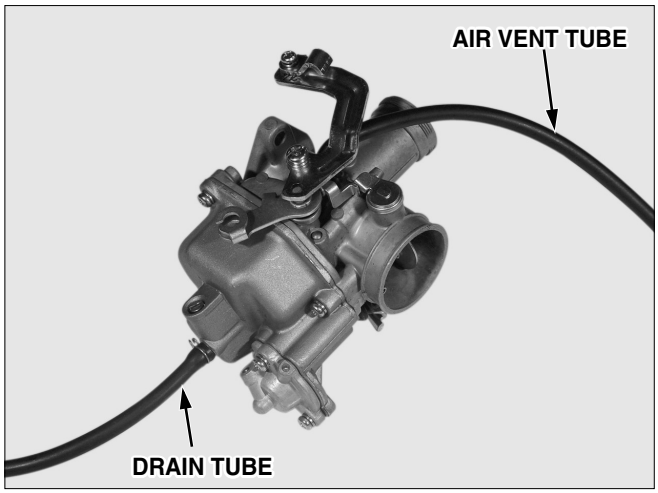
⚠ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area where gasoline is drained or stored and where the fuel tank is refuelled.



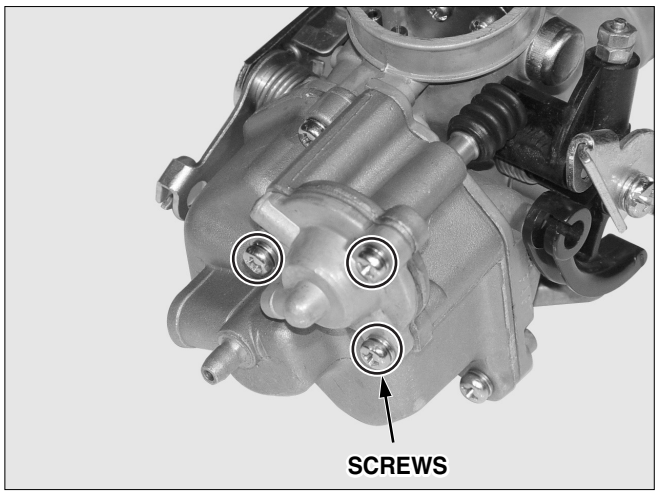
- Remove the choke cable.
- Loosen the air cleaner connecting tube band.

- Remove the throttle cable.
- Loosen the carburetor mounting nut, and remove the carburetor.



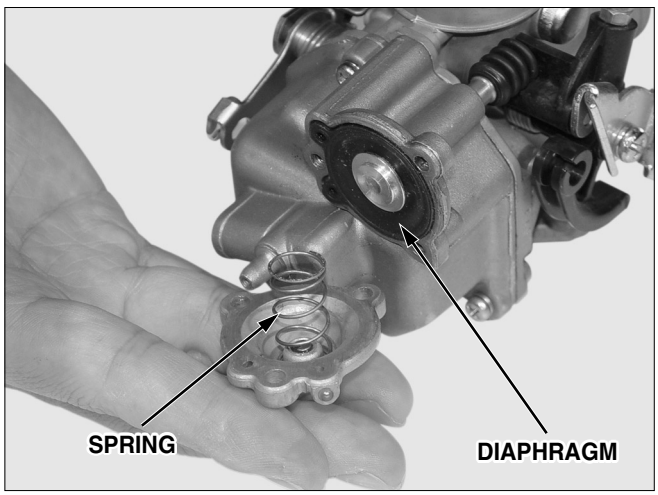
DISASSEMBLY

- Remove the air vent tube and drain tube.

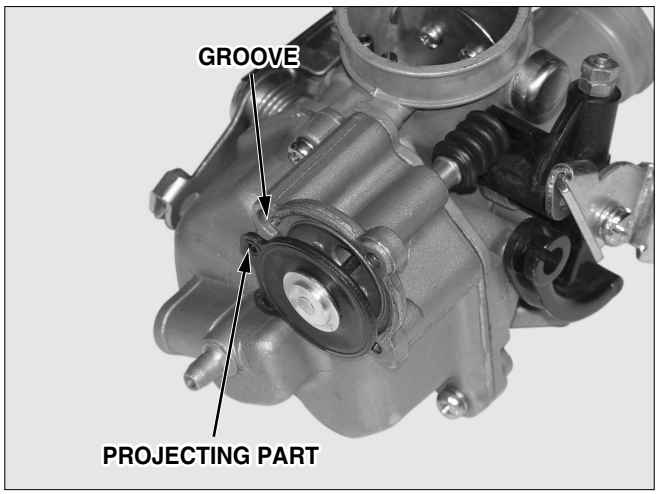


Accelerator Pump

- Take of the 3 screws, and remove the pump cover.

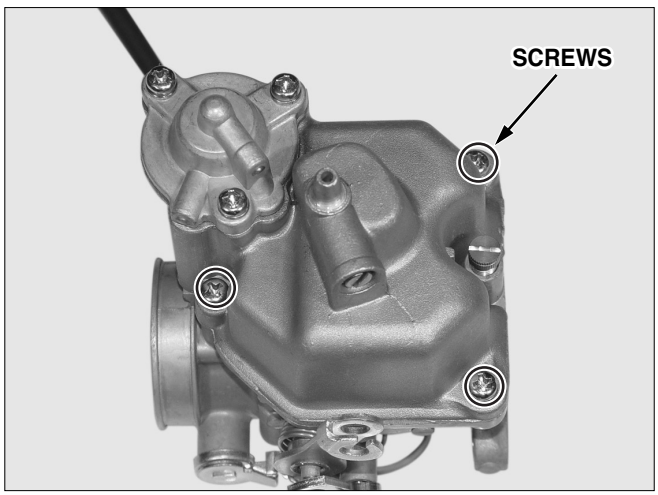


- Remove the spring.
- Inspect the damage of accelerator pump rod and diaphragm. Blow the fuel pathway of diaphragm with air lightly and clean the clogged place.

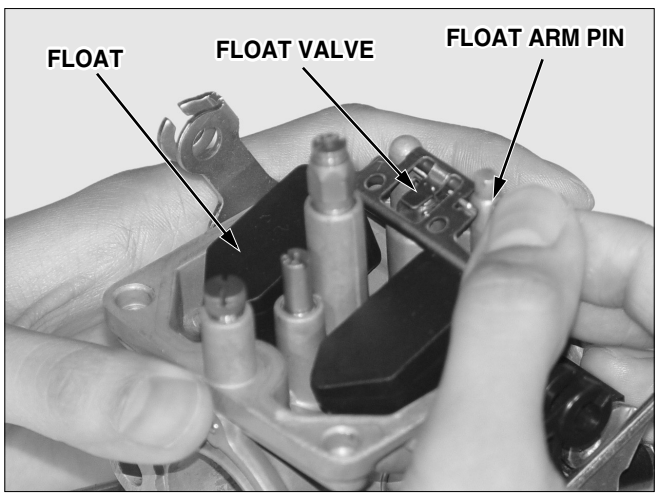


- Align the diaphragm projecting part with float chamber groove. Install the spring to diaphragm cover, and install the cover to the float chamber preventing the diaphragm form damaging.
- Adjust the accelerator pump.

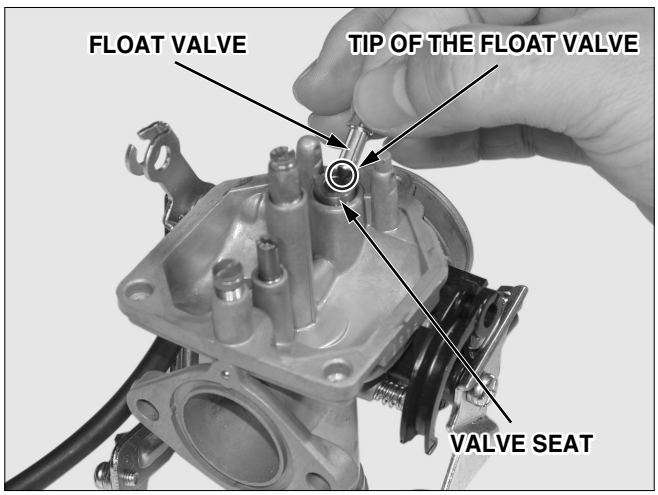
Float, Float Valve



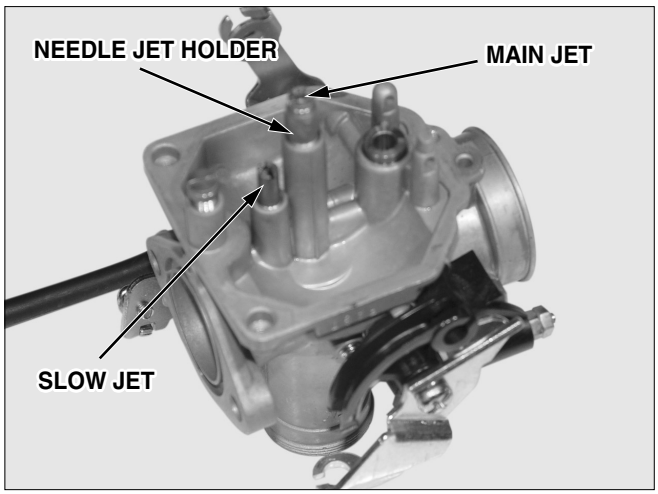
- Take off the 3 screws and remove the float chamber.

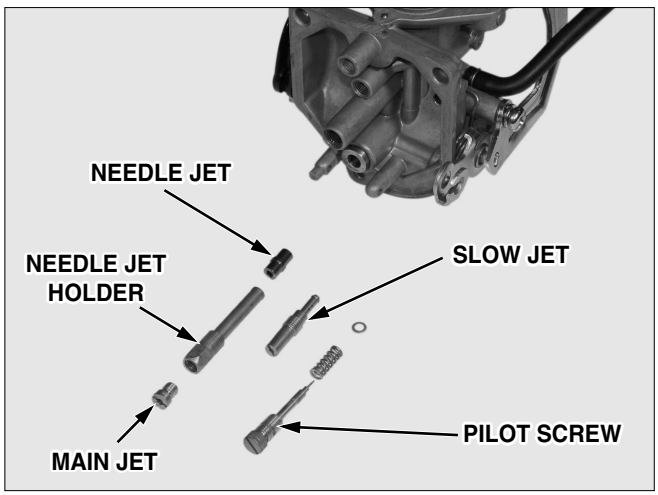


- Take off the float arm pin, and remove the float and float valve.



- Check the float valve and valve seat for scores, scratches, clogging and damage. Replace if necessary.
- Check the tip of the float valve, where it contacts the valve seat, for stepped wear or contamination. Replace the float valve if its tip is worn or contaminated.
- A worn or contaminated valve does not seat properly and will eventually flood the carburetor.





Jet

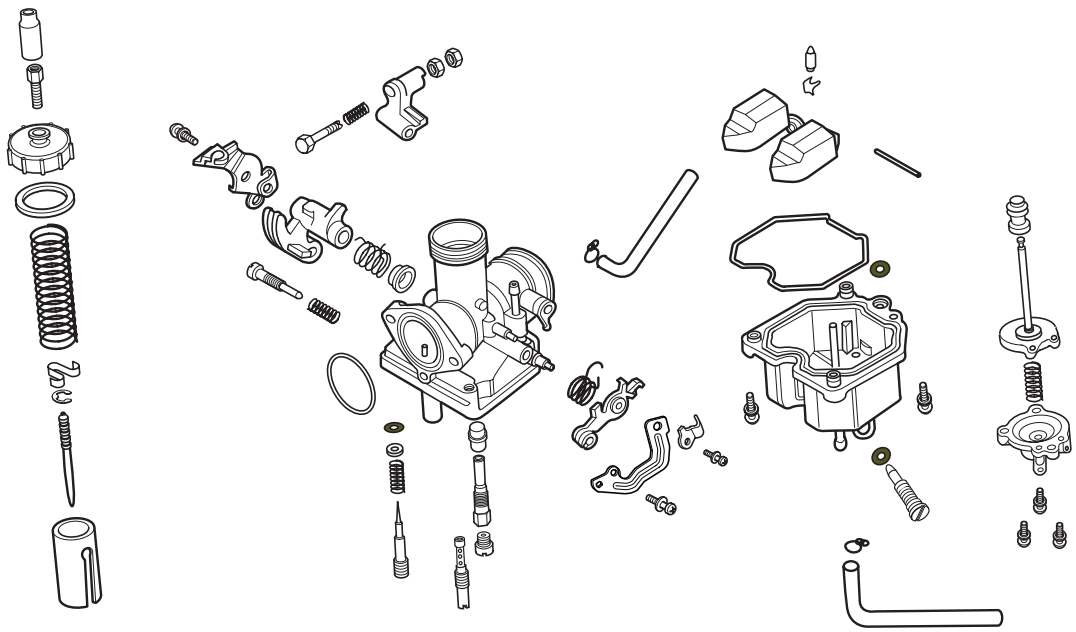
- Remove the main jet, needle jet holder, and needle jet.
- Remove the slow jet.
- Remove the pilot screw after recording the number of turns until the pilot screw is tightened to clockwise completely.

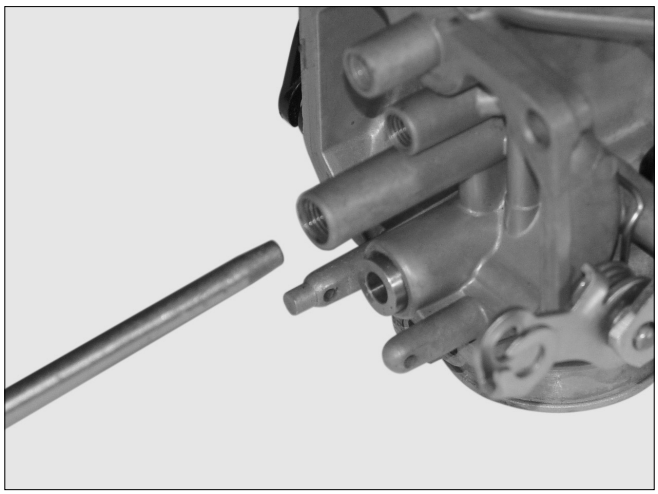
⚠ CAUTION

• Do not tighten up the pilot screw by force.
It can cause the damaging of the seat part.

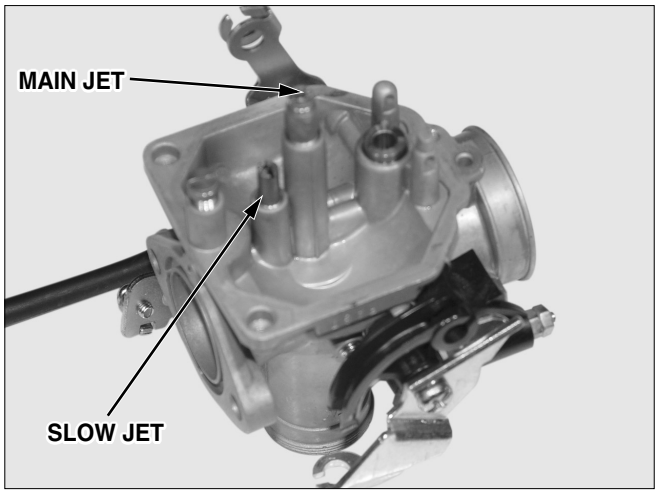
- Remove the throttle stop screw.
- Clean the jet with cleaning solvent.
- Inspect the pilot screw and jets and change the wear and tear parts with new ones.

ASSEMBLY





- Blow open air and fuel passages in the carburetor body with compressed air.

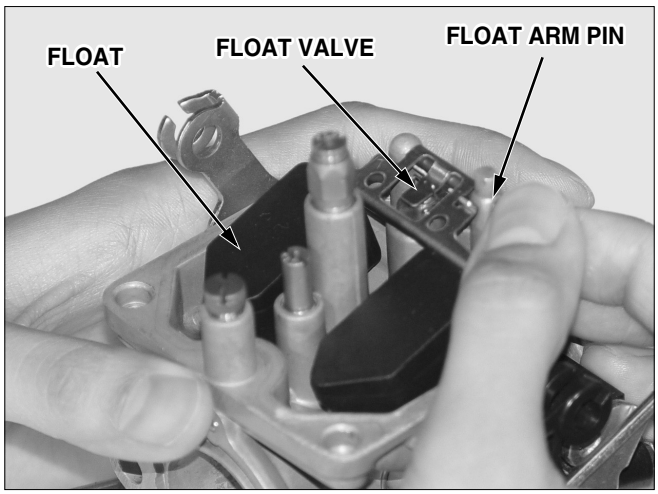


- Install the needle jet, needle jet holder, main jet and slow jet.
- Install the throttle stop screw and pilot screw.

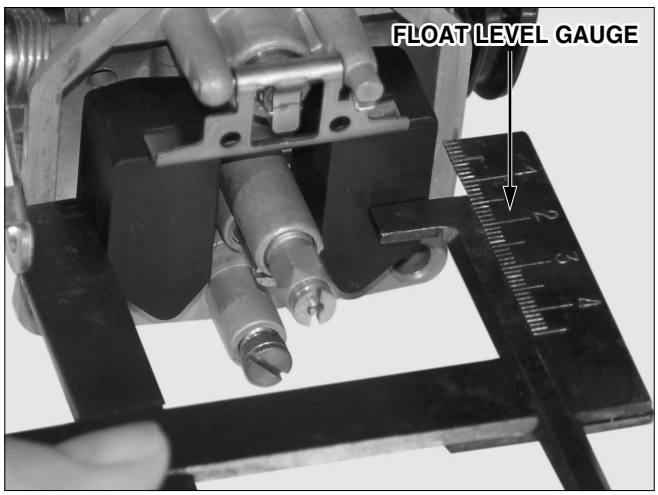
⚠ CAUTION

• After tighten the pilot screw completely, back it out according to the recorded turns when removing.

- If installing the new pilot screw, adjust the pilot screw.



- Install the float valve, float and float arm pin.

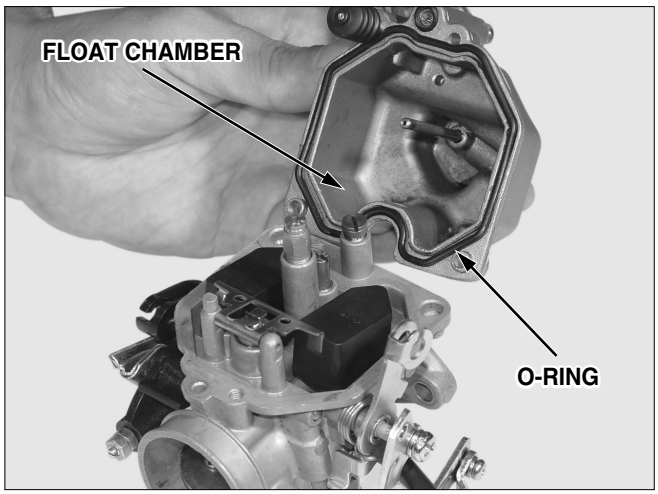


Float Level Adjustment

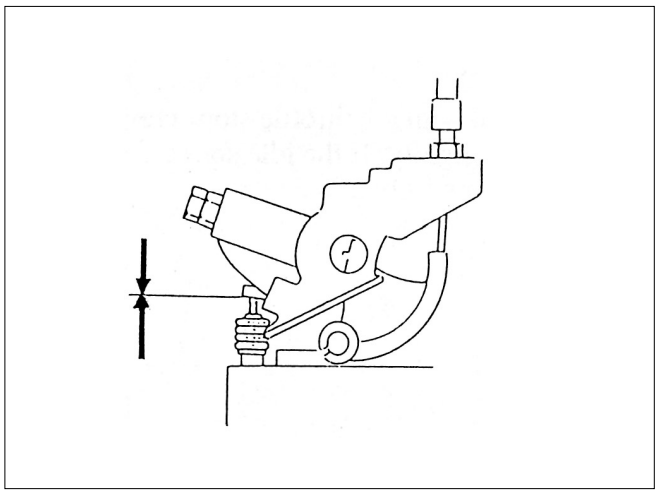
- Measure the float level in the state of contacting with float valve and float arm by inclining the carburetor.

STANDARD LEVEL : 12.5mm
TOOL : FLOAT LEVEL GAUGE

- Check the smooth operation of float.



- Install the new o-ring to the float chamber groove.
- Install the float chamber and screws.



Accelerator Adjustment

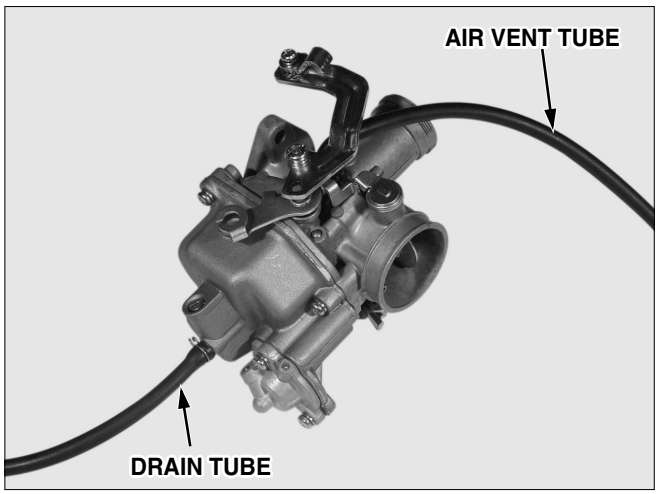
⚠ CAUTION

• Do not adjust unless replacing the adjuster screws.

- Adjust the idling. (⇨ 2-7)
- Adjust the operation of throttle grip. (⇨ 2-4)
- Loosen the lock nut, turn the adjuster screws to contact with accelerator pump cap, and then adjust the accelerator pump rod clearance.

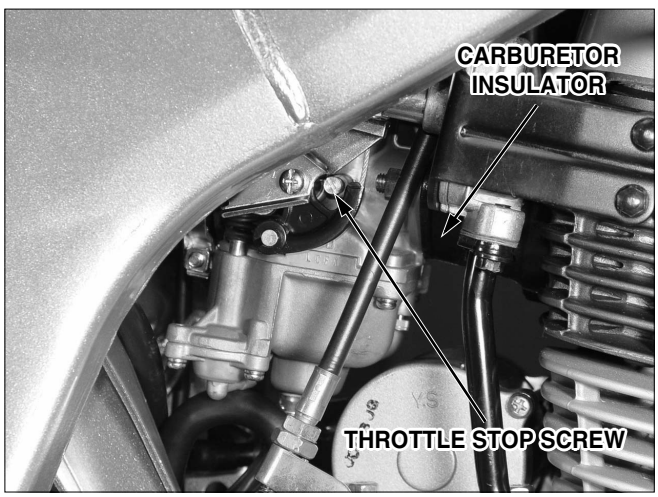
CLEARANCE : 0mm

- Tighten the lock nut.



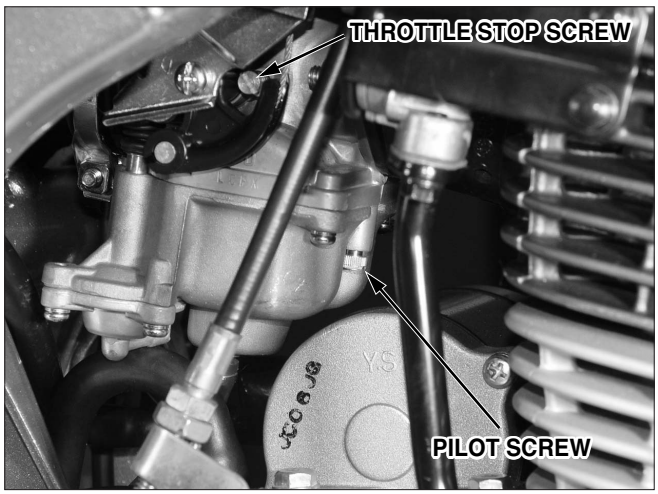
INSTALLATION

- Install the air vent tube and drain tube.



- Install the new o-ring into carburetor intake flange.
- Install the carburetor between carburetor insulator and connecting tube. Install the carburetor assembly nut and tighten the connecting tube bend screw.
- Connect the choke cable and throttle cable.

- Adjust the chock cable. (⇨ 2-5)
- Install the throttle valve. (⇨ 4-5)
- Adjust the throttle grip free play. (⇨ 2-4)



PILOT SCREW ADJUSTMENT

⚠ NOTE

- Adjust the pilot screw after all other engine adjustments are within specifications.
- The pilot screw is factory pre-set. Adjustment is not necessary unless the carburetor is overhauled or a new pilot screw is installed.

⚠ CAUTION

- Tightening the pilot screw against its seat will damage the seat.

1. Turn the pilot screw clockwise until it seats lightly, then back it out to the specification given.

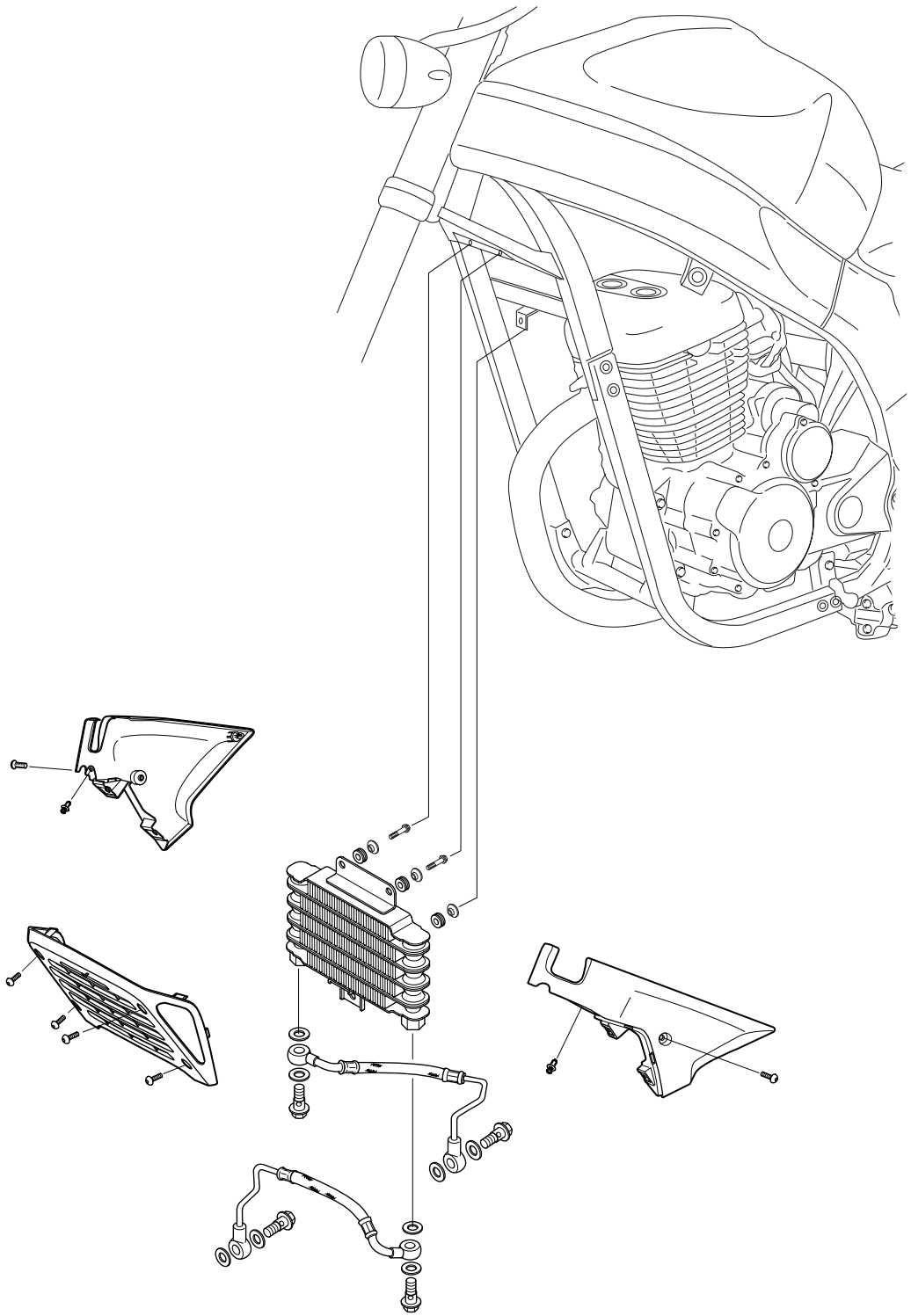
   INITIAL OPENING : 2⅛

2. Warm up the engine to operating temperature.
   Ten minutes of stop and go driving is sufficient.
3. Stop the engine and connect a tachometer.
4. Start the engine and adjust the idle speed with the throttle stop screw.

   IDLE SPEED : 1,600±100rpm

5. Turn the pilot screw in or out slowly to obtain the highest engine speed.
6. Readjust the idle speed to the specified value with the throttle stop screw.
7. Make sure that the engine does not miss or run erratically. Repeat steps 5 and 6 until engine speed increases smoothly.
8. Readjust the idle speed with the throttle stop screw.

MEMO



5. COOLING SYSTEM

SERVICE INFORMATION

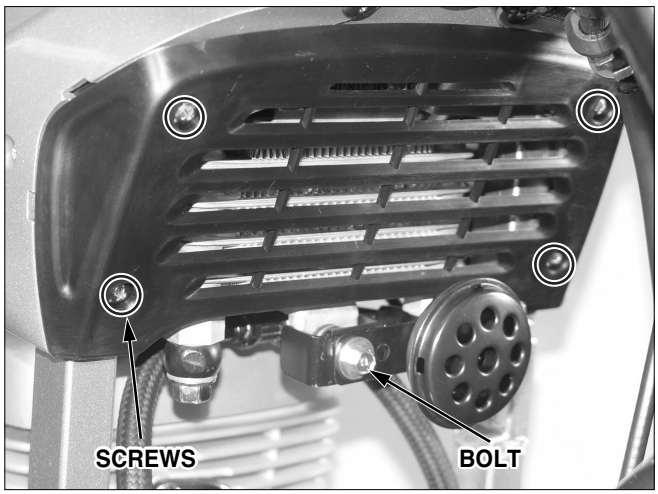
GENERAL SAFETY

⚠ WARNING

- Wait until the engine is cool before servicing the cooling system.

TORQUE VALUE

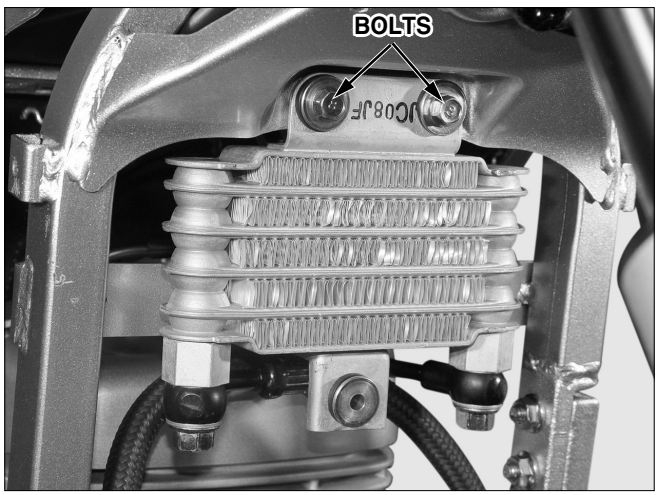
OIL THROUGH BOLT 3.2kgf · m (32N · m)



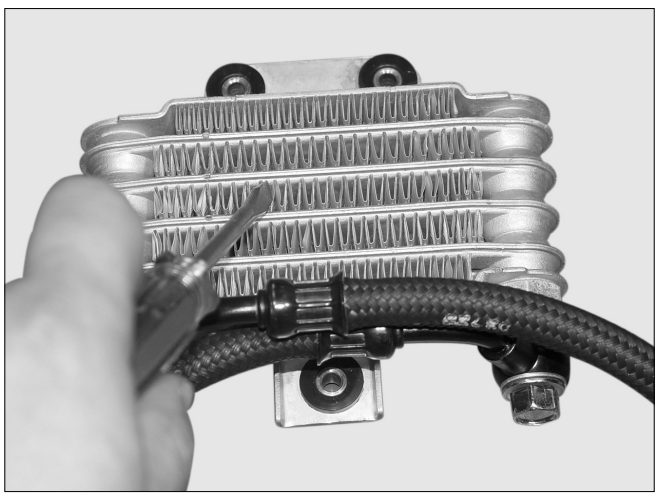
RADIATOR

REMOVAL

- Loosen the horn mounting bolt and remove the horn.
- Loosen the 4 radiator cover mounting screws and remove the radiator cover.



- Loosen the 2 flange bolts and remove the radiator from the frame.
- Remove the oil through bolts from the cylinder and RH. LH. radiator hose.



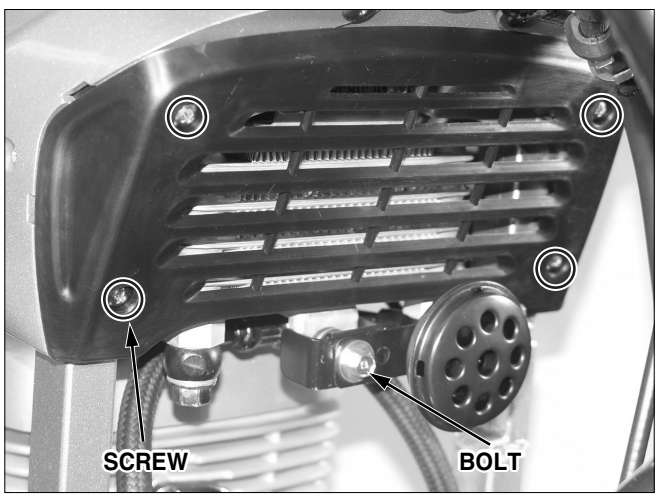
RADIATOR HOSE INSPECTION

- Check the radiator core for clog or damage.
- Check the pin for deformation; adjust it if necessary.

⚠ NOTE

• Replace the radiator when the choked area of radiator core is over 20% of radiant heat area.

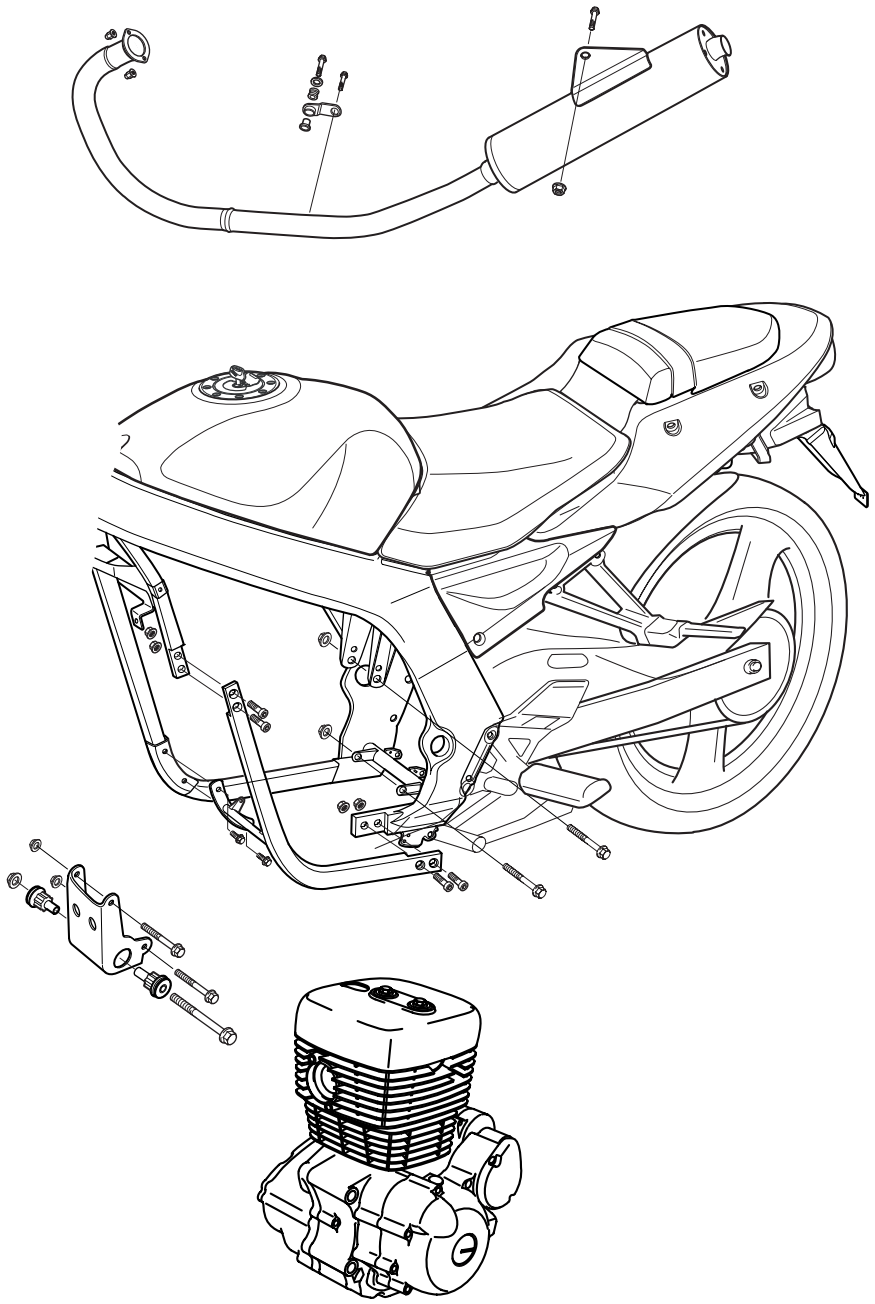
- Check the hose or clamp for damage or deterioration.



INSTALLATION

- Install the removed parts in the reverse order of removal.

MEMO



6. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

GENERAL SAFETY

⚠ NOTE

- Use a jack to remove or install the engine. Support the motorcycle with a jack firmly, taking precautions not to damage the frame, engine, cable or harness.
- Attach tape to the frame to protect it during the engine removal or installation.

● The following works can be serviced with the engine installed in the frame.
- Oil pump (section 3)
- Carburetor (section 4)
- Radiator (section 5)
- Clutch (section 7)
- Geashift (section 7)
- A.C. Generator (section 8)
- Starter clutch (section 8)

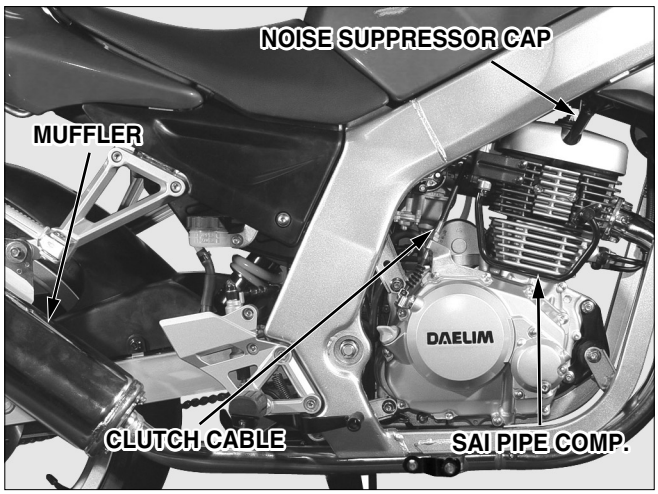
● The following works require engine removal for service.
- Cylinder head/valve（section 9）
- Cylinder/piston（section 10）
- Transmission（section 11）
- Crank shaft（section 11）

SPECIFICATION

ITEM	SPECIFICATIONS
ENGINE DRY WEIGHT	32.3kg
ENGINE OIL CAPACITY(AT DISASSEMBLY)	1.1 *l*

TORQUE VALUES :

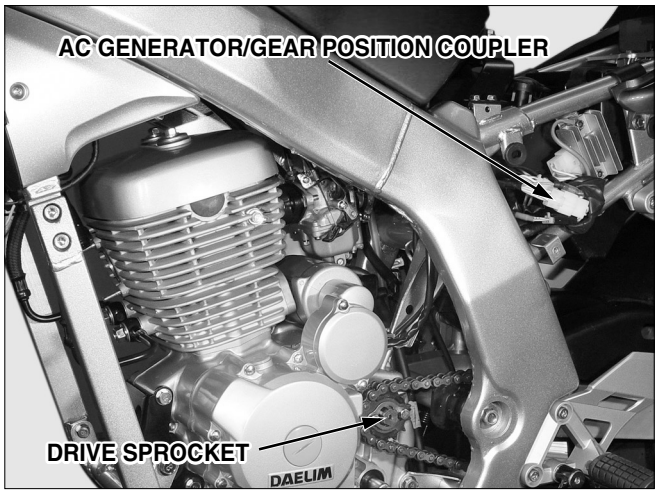
ENGINE HANGER BOLT (FRONT) :	4.9kgf · m (49N · m)
(REAR) :	4.9kgf · m (49N · m)
GEAR CHANGE ARM BOLT :	1.2kgf · m (12N · m)
DRIVE SPROCKET BOLT :	1.2kgf · m (12N · m)
LH. DOWNTUBE MOUNTING BOLT (SPECIAL BOLT) :	4.2kgf · m (42N · m)
LH. DOWNTUBE BRACKET MOUNTING BOLT :	2.2kgf · m (22N · m)



ENGINE REMOVAL

- Drain the engine oil. (⇨3-3)

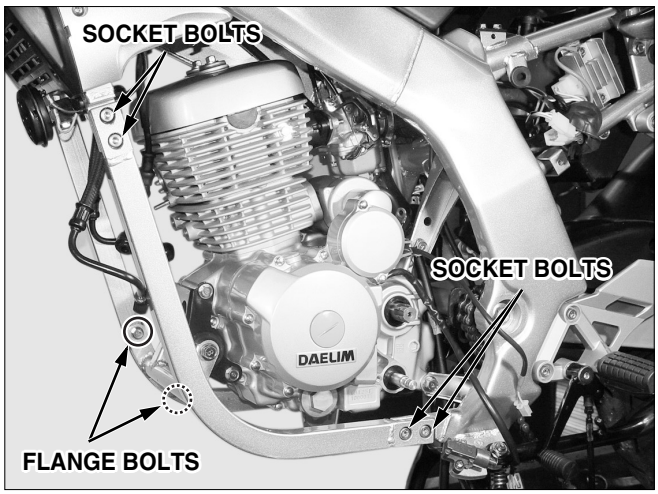
- Remove the muffler. (⇨12-4)
- Remove the noise suppressor cap.
- Remove the battery ground cable and clutch cable.
- Remove the SAI pipe complete and SAI reed valve assembly from the cylinder head.
- Remove the carburetor insulator from the carburetor.



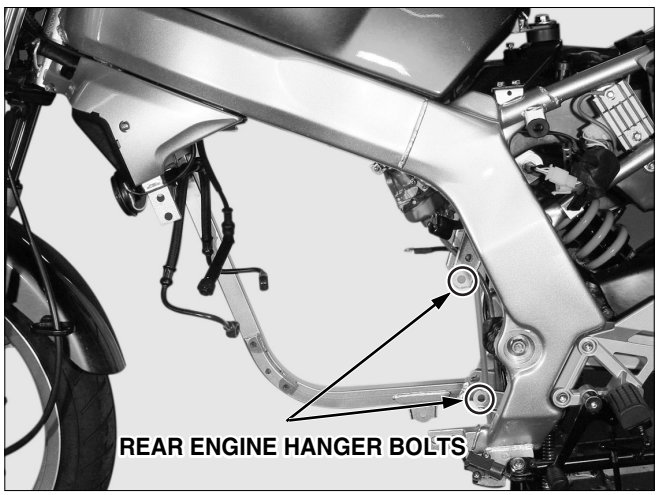
- Remove the LH. side cover. (⇨12-2)
- Disconnect the AC generator wire coupler and gear position switch wire coupler.
- Disconnect the starter motor cable.

- Remove the gear change arm.
- Remove the LH. rear cover.
- Loosen the rear axle nut and drive chain adjuster, then remove the drive sprocket after pushing the rear wheel forward.

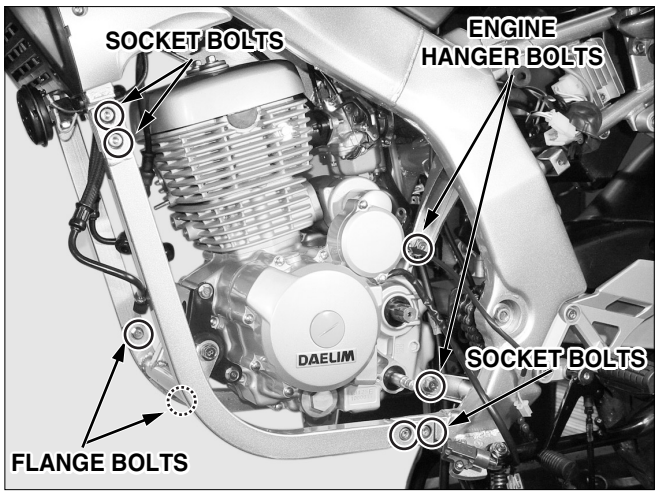
- Remove the 2 oil through bolts from the cylinder, then remove the radiator hose from the engine.

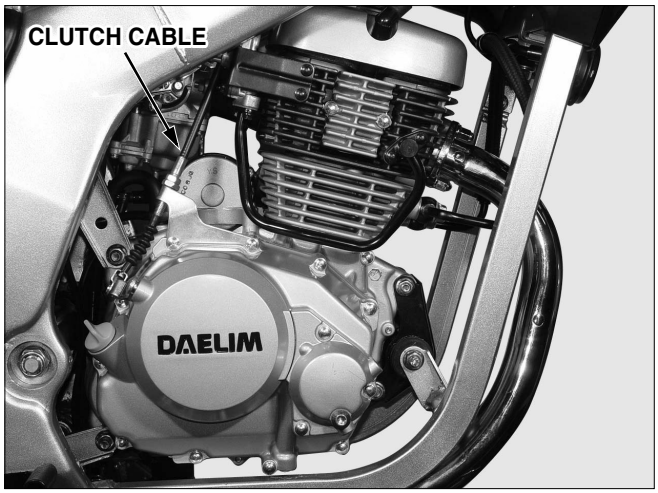


- Remove the LH. downtube comp. B mounting bolts and socket bolts.



- Remove the 2 rear engine hanger bolts, then remove the LH. downtube comp. B and engine.





ENGINE INSTALLATION

Engine installation is essentially the reverse order of removal.

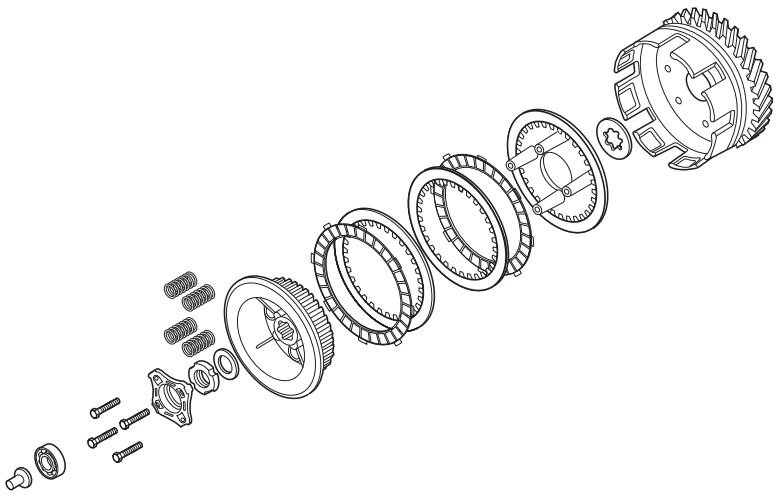
⚠ NOTE

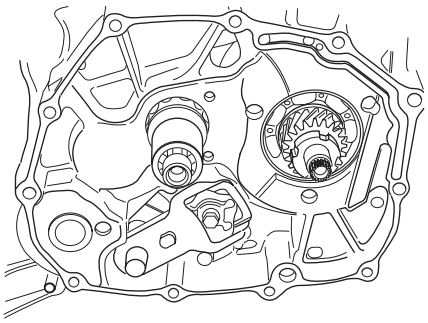
- Carefully align mounting points with the jack to prevent damage from mounting bolt threads and wire harness and cables.
- Be careful not to damage any part of the frame and bolt nuts.
- Be sure to install the cables, tubes, and wires to their correct positions(⇨ 1-10~12).

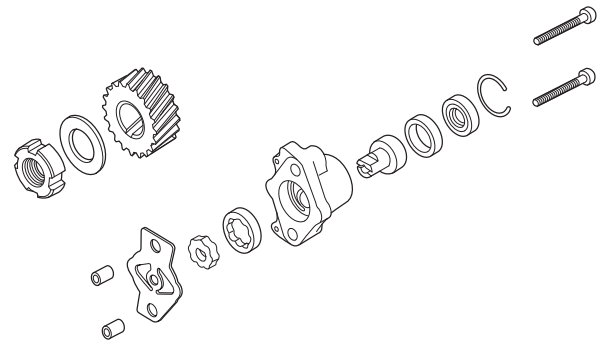
TORQUE :

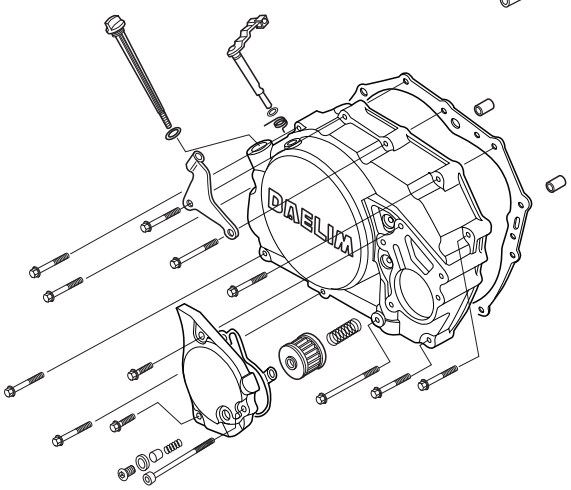
ENGINE HANGER BOLTS :	
(FRONT)	**4.9kgf · m(49N · m)**
(REAR)	**4.9kgf · m(49N · m)**
GEAR CHANGE ARM BOLT	**1.2kgf · m(12N · m)**
DRIVE SPROCKET BOLT	**1.2kgf · m(12N · m)**

● Inspect the following after installing the engine.
- Engine oil level
- Throttle glip operation
- Clutch lever operation
- Drive chain slack








DAELIM

7. CLUTCH / GEARSHIFT

SERVICE INFORMATION

GENERAL SAFETY

- The clutch, gearshift spindle can be serviced with the engine in the frame.
- If the shift fork, drum and transmission require service, remove the engine and separate the crankcase.
- The quality and level of fluid affect clutch operation. If the clutch slips, check the fluid level before servicing the clutch system.

SPECIFICATIONS

Unit : mm

ITEM	STANDARD VALUE	SERVICE LIMIT
CLUTCH LEVER FREE PLAY	10~20	——
CLUTCH SPRING FREE LENGTH	35.5	34.2
CLUTCH DISK THICKNESS	2.9~3.0	2.6
CLUTCH PLATE WARPAGE	——	0.2
CLUTCH OUTER I.D	28.000~28.013	28.030
CLUTCH OUTER GUIDE O.D.	27.967~27.980	27.950

TORQUE VALUES

CLUTCH LOCK NUT	6.5kgf · m(65N · m) - Apply engine oil
DRUM STOPPER ARM BOLT	1.2kgf · m(12N · m)
PRIMARY DRIVE GEAR NUT	6.5kgf · m(65N · m) - Apply engine oil
RH. CRANKCASE COVER BOLT	1.1kgf · m(11N · m)
GEAR SHIFT PEDAL BOLT	1.2kgf · m(12N · m)

TOOLS

CLUTCH CENTER HOLDER
LOCK NUT WRENCH
EXTENSION BAR
FLYWHEEL HOLDER

TROUBLESHOOTING

Clutch operation problem can be corrected by adjusting a cable free play.

Clutch lever pull too hard

- Damaged, clogged or sticking clutch cable
- Damaged lifter mechanism
- Damaged clutch lifter plate bearing
- Incorrect wiring of clutch cable

Clutch slips

- Too big clutch lever free play
- Clutch plate warpage
- Clutch lock nut loose
- High fluid level or high fluid weight

Clutch disengages

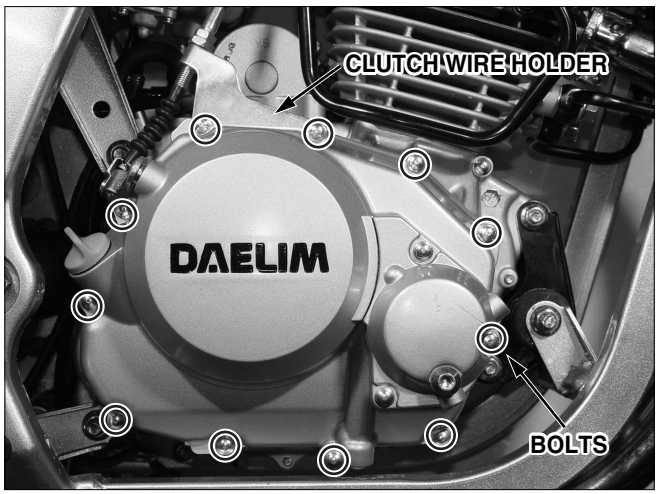
- Sticking lifter hydraulic system
- Worn disks
- Weak spring
- Too small clutch lever free play

Difficult to thrust the gear level

- Incorrect clutch adjustment(too big free play)
- Bent shift fork
- Bent shift fork shaft
- Damaged gear shift spindle
- Damaged shift drum guide groove
- Damaged shift drum guide pin

Gear jumps out

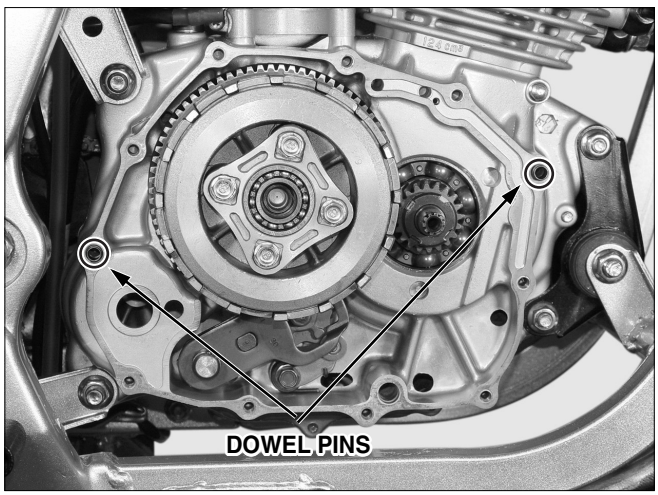
- Worn gear dog
- Bent shift fork shaft
- Damaged shift drum stopper
- Worn shift drum guide groove
- Worn gear shift fork groove



R. CRANKCASE COVER

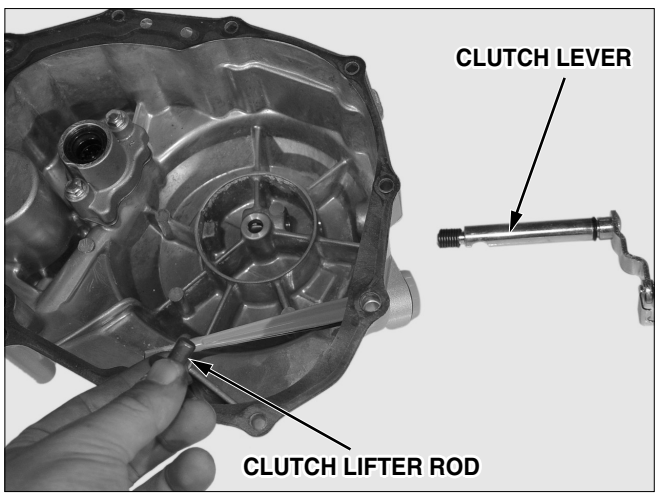
REMOVAL

- Drain the engine oil. (⇨ 2-3)
- Remove the bolts and clutch wire holder, then disconnect the clutch cable end from the clutch lever.
- Remove the right crankcase cover bolts and remove the right crankcase cover.

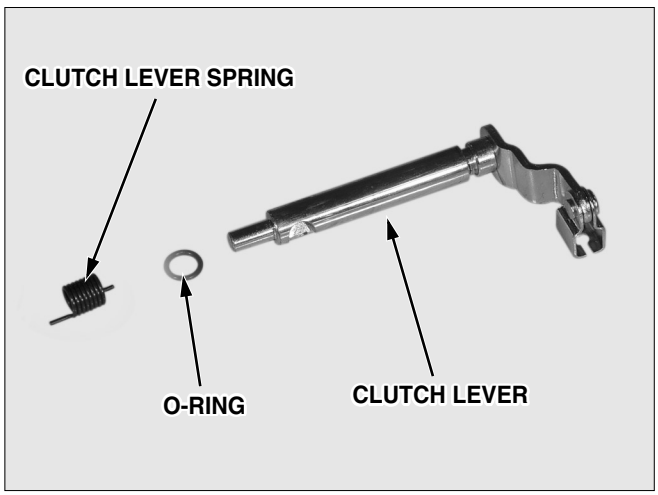


- Remove the two dowel pins and gasket.

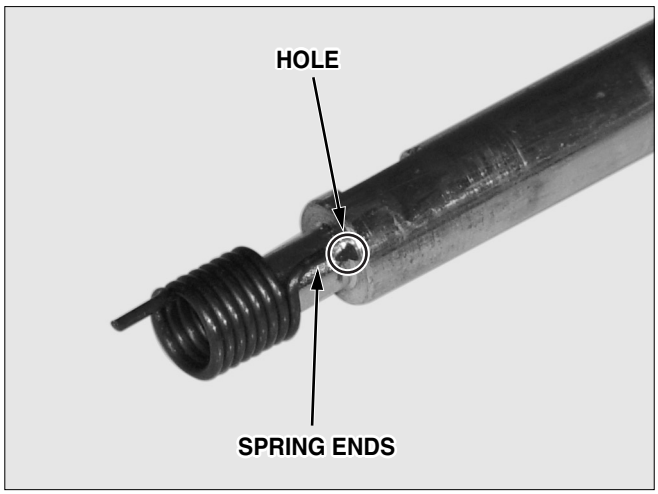
CLUTCH LEVER/LIFTER ROD



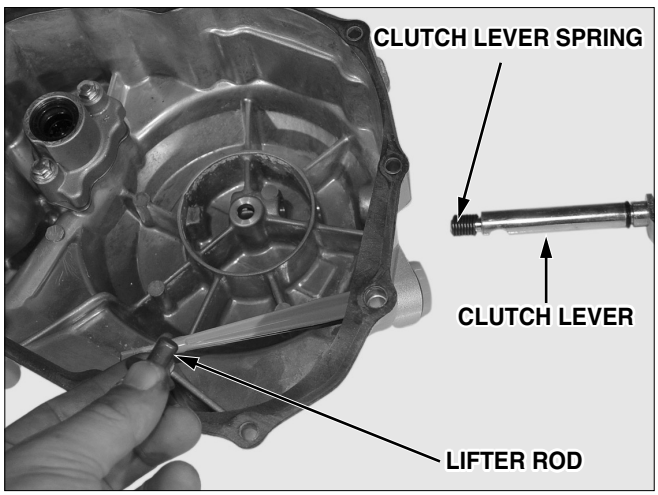
- Remove the clutch lever and spring from the R. crankcase cover.
- Remove the clutch lifter rod.



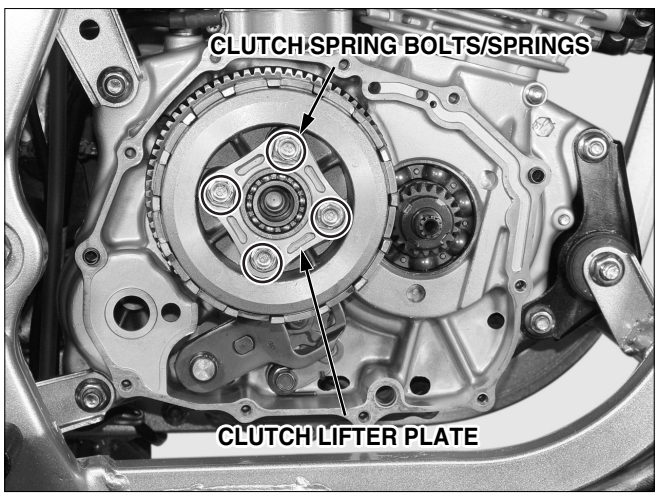
- Remove the clutch lever spring and O-ring from the clutch lever.
- Check the wear and damage of the lifter rod and clutch lever.
- Check the fatigue or damage of the clutch lever spring.



- Coat the new o-ring with grease, and install it to the clutch lever.
- Install the clutch lever spring to the clutch lever.
- Install the spring ends into the hole of the clutch lever.



- After installing the clutch lever into the R. crankcase cover, turn the clutch lever to the clockwise and install the lifter rod aligning the clutch lever with the R. crankcase cover hole.



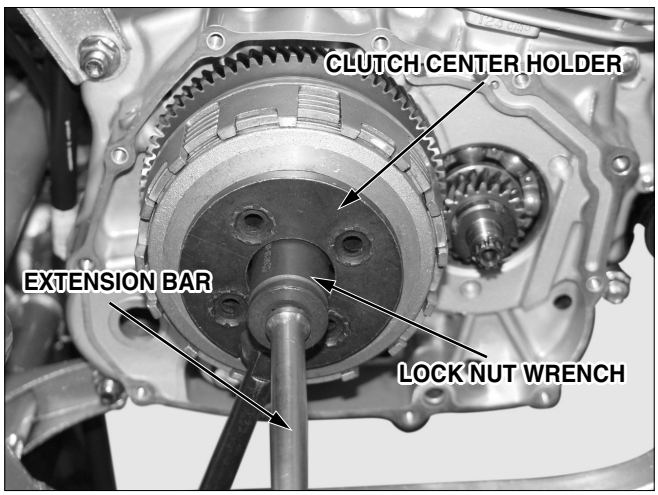
CLUTCH

REMOVAL

- Remove the following.
  - Clutch spring bolts
  - Clutch lifter plate
  - Clutch spring

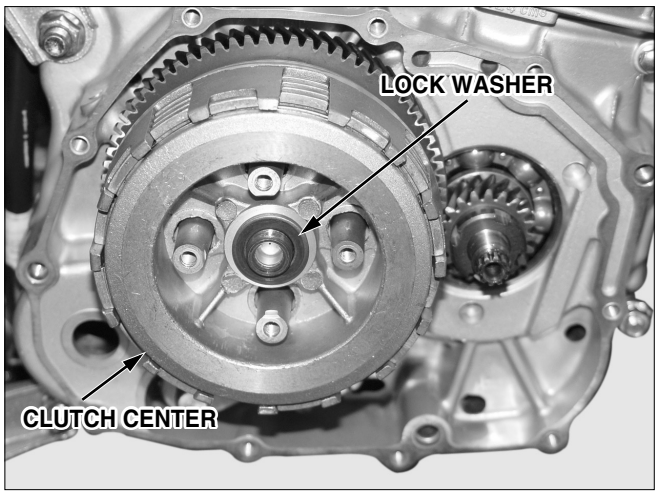
⚠ NOTE

• Loosen the clutch spring bolt in a crisscross pattern in two or three steps and remove the bolts.

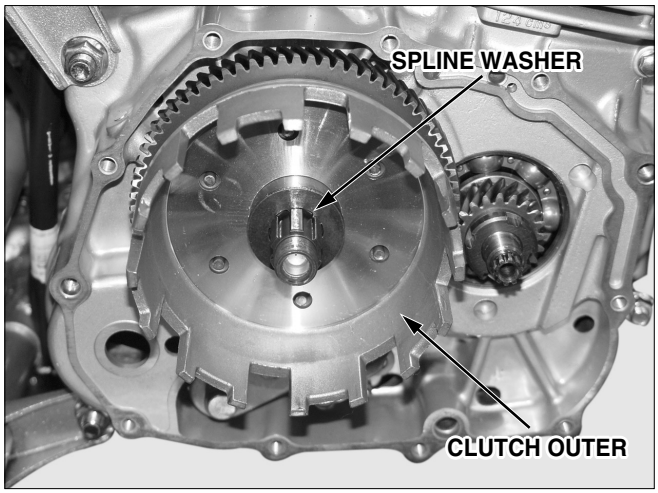


- Press the clutch center using the clutch center holder and remove the clutch lock nut.

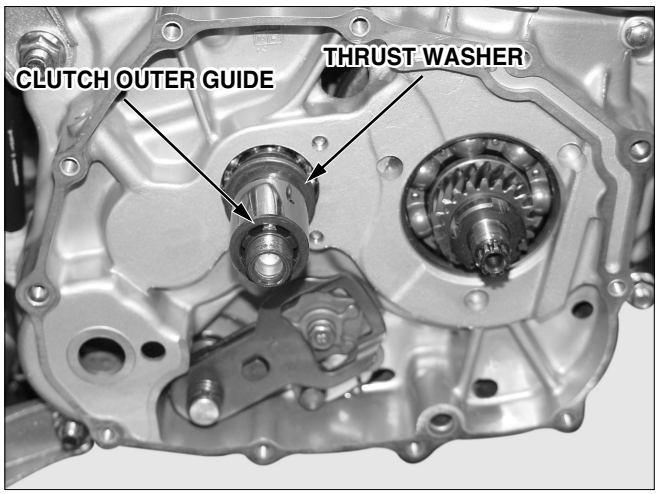
TOOLS:
CLUTCH CENTER HOLDER
LOCK NUT WRENCH, 20 × 24mm
EXTENSION BAR



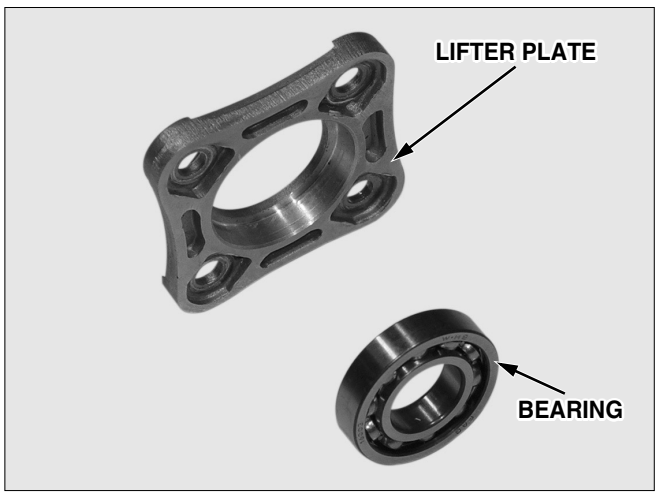
- Remove the lock washer.
- Remove the clutch center, disk, plate and pressure plate.



- Remove the spline washer and clutch outer.

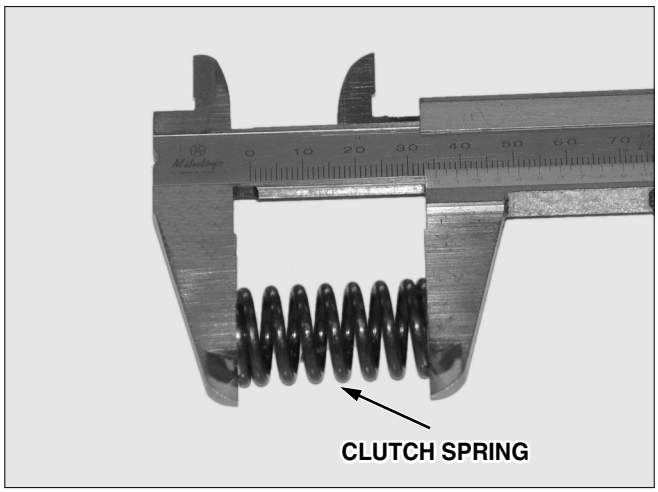


- Remove the clutch outer guide and thrust washer.



INSPECTION

- Inspect the lifter plate bearing for scoring and other damage.
- Inspect the lifter plate for damage.
- If necessary, replace them.

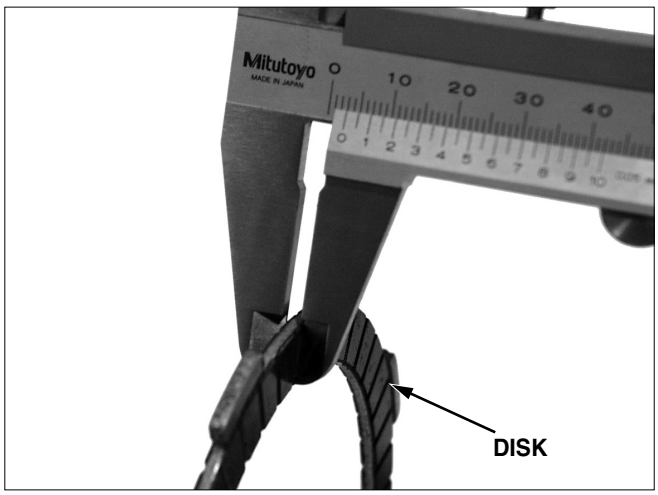


- Measure the clutch spring free length; replace the springs if the measurement is not within the service limit.

SERVICE LIMIT : 34.2mm

⚠ NOTE

- If the motorcycle has been used for a long time, the clutch springs free lingth will be shorten, because the clutch springs are compressed while the clutch is disengaged.
- Replace the clutch springs as a set so that the disks contact evenly with the clutch plates.

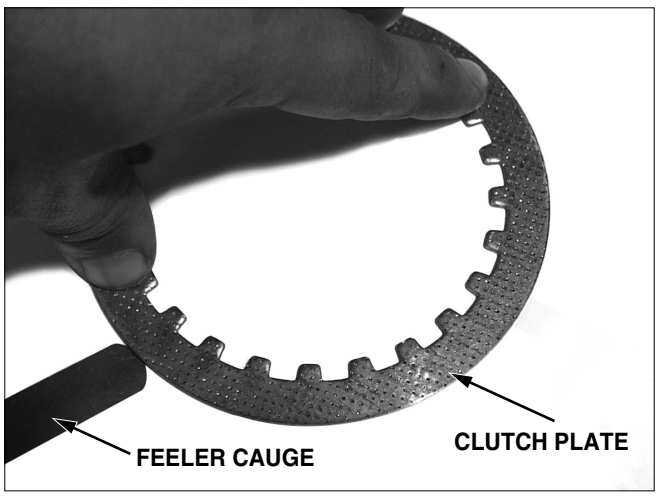


- Check the clutch disk for scoring or discoloration; replace as necessary.
- Measure the disk thickness and replace the disks if the service limit is exceeded.

SERVICE LIMIT : 2.6mm

⚠ NOTE

- Replace the clutch disks and plates as a set.

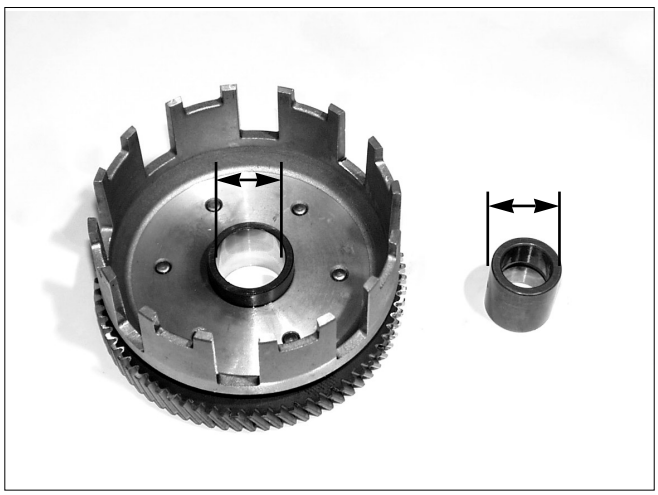


- Check the clutch plates for warpage or discoloration; replace as necessary.
- Check for plate warpage on a surface plate using a feeler gauge; replace if the service limit is exceeded.

SERVICE LIMIT : 0.2mm

⚠ NOTE

- Warped clutch plates prevent the clutch from disengaging properly.

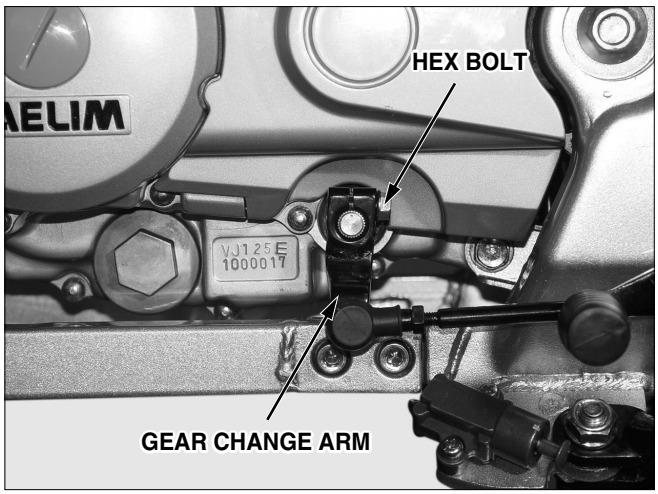


- Check the slots ⊔ in the clutch outer for nicks or indentations made by the clutch discs. If necessary replace them.
- Measure the clutch outer inside diameter.

SERVICE LIMIT : 28.030mm

- Measure the clutch outer guide outsider diameter.

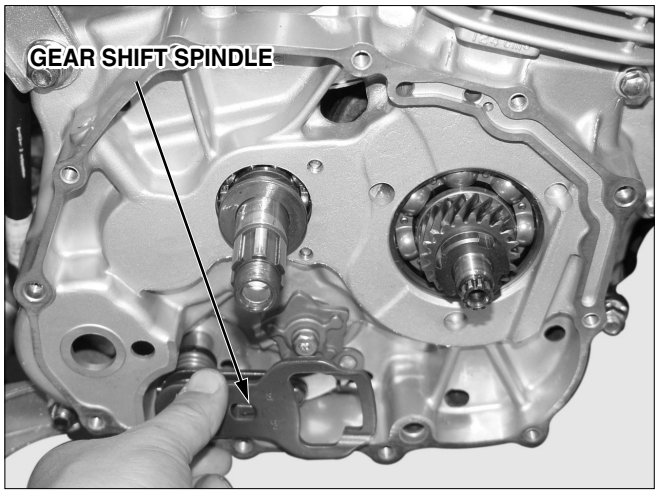
SERVICE LIMIT : 27.950mm



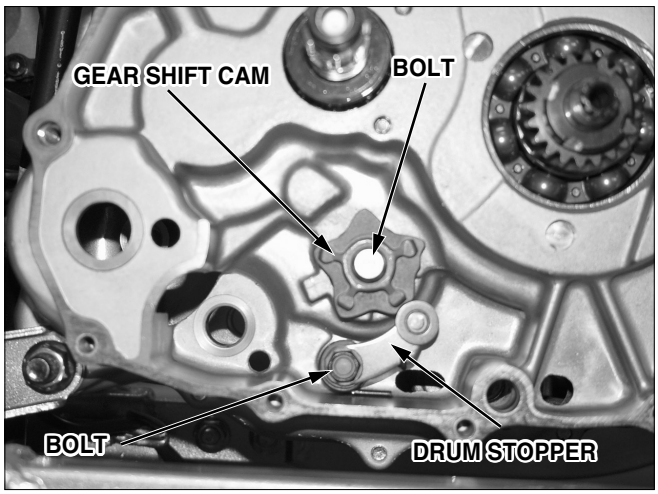
GEAR SHIFT SPINDLE

REMOVAL

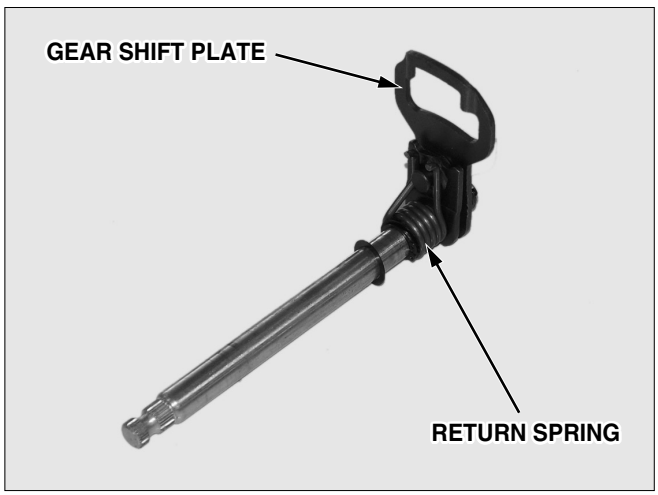
- Loosen the hex bolt and remove the gear change arm.
- Remove the RH. crankcase cover. (⇨7-3)
- Remove chutch assembly. (⇨7-4)



- Remove the gear shift spindle and thrust washer.

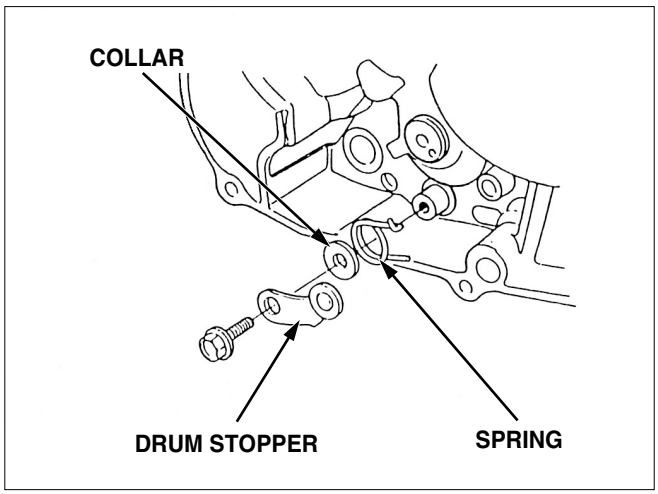


- Remove the gear shift cam bolt, cam and roller.
- Remove the drum stopper bolt, drum stopper, collar and spring.



INSPECTION

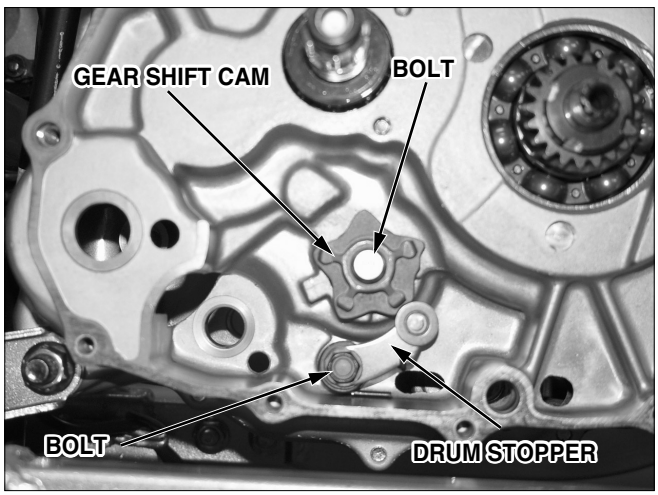
- Check the gear shift spindle for wear or damage.
- Inspect the gear shift plate for deformation, wear, or other damage.
- Check the return spring and gear shift plate spring for wear or damage.



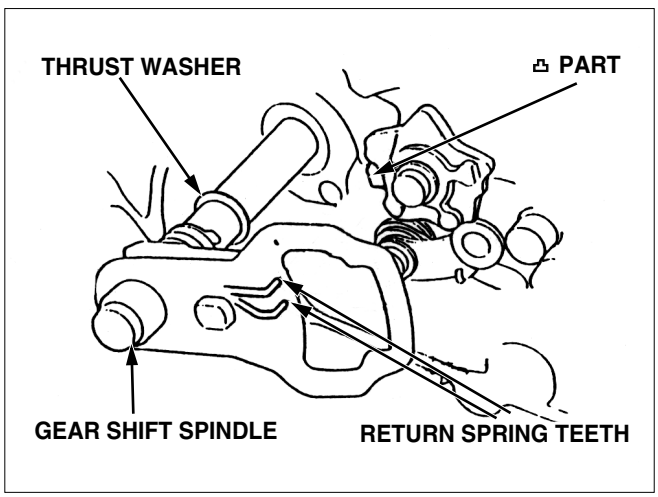
INSTALLATION

- Install the collar, spring, drum stopper and bolt.
- Tighten the bolt.

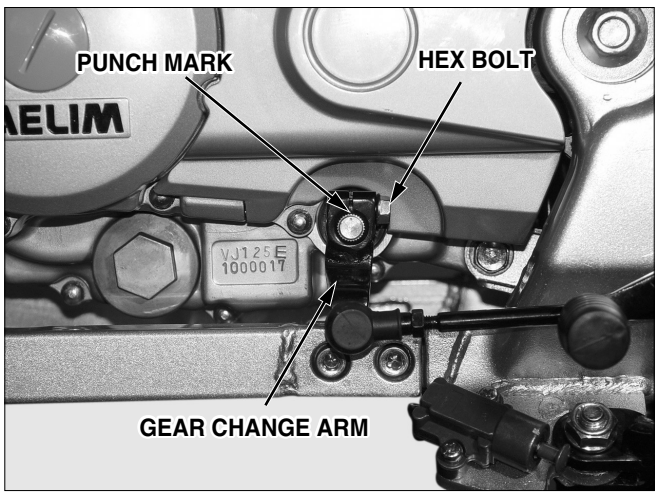
TORQUE : 1.2kgf · m(12N · m)



- Press the drum stopper, and install the gear shift cam, aligning the roller with the gear shift cam hole.

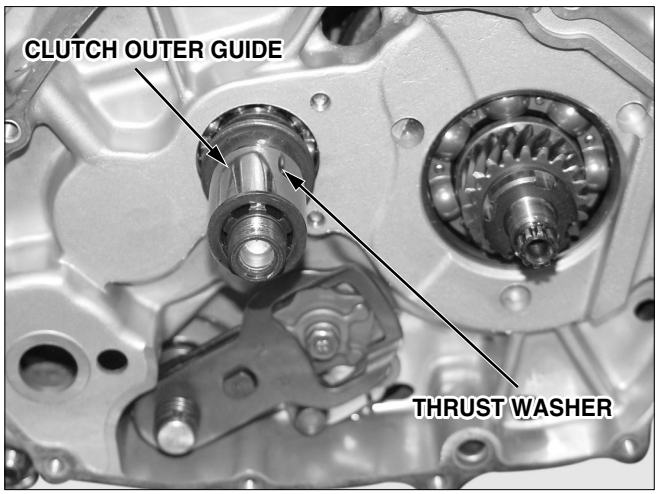


- Install the thrust washer into the gear shift spindle.
- Install the gear shift spindle into the crank case, aligning the teeth of the return spring with the tappet of the right crank case as shown.

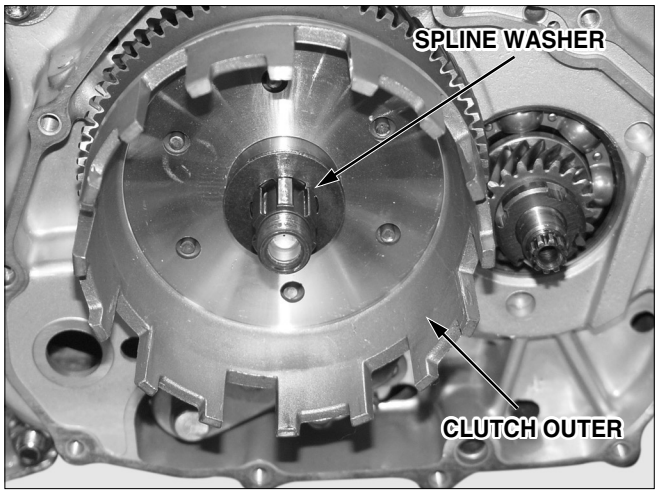


- Install the following:
  - Clutch assembly.
  - R. crank case cover
- Install the gear shift arm aligning its slit with the punch mark on the gear shift spindle.
- Install and tighten the pinch bolt to the specified torque.

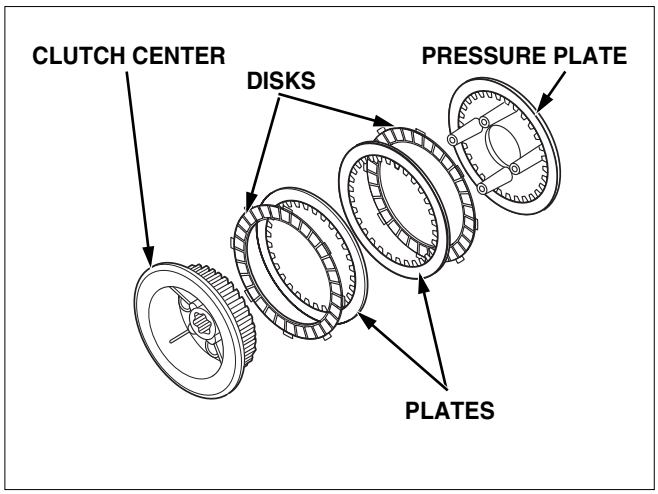
CLUTCH INSTALLATION



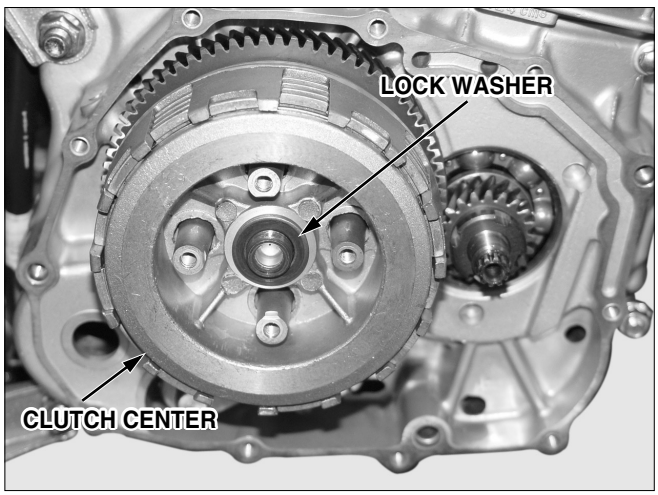
- Coat the clutch outer guide with clean engine oil.
- Install the trust washer and outer guide into the main shaft.



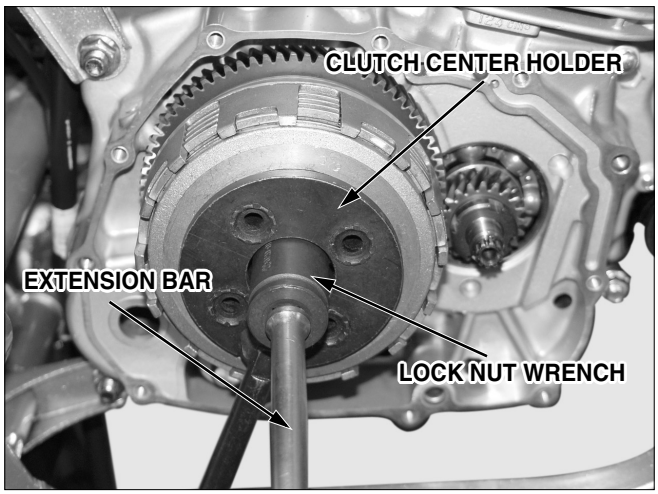
- Install the clutch outer and spline washer.

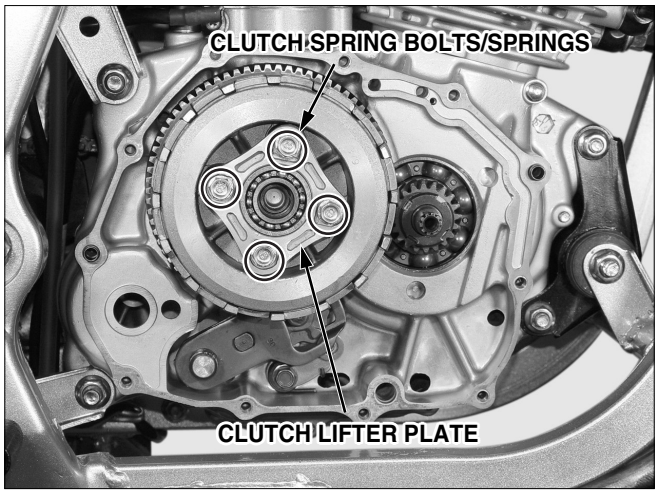


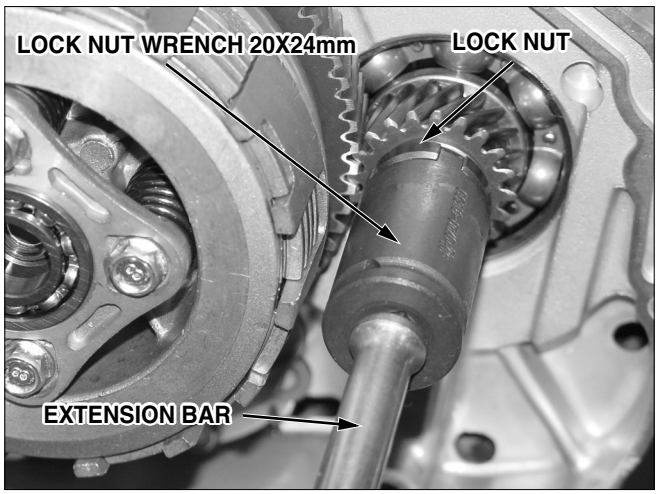
- Coat the clutch and plate disk. With clean engine oil.
- Install the 6 disks. and 5 plates to the clutch center by turns.

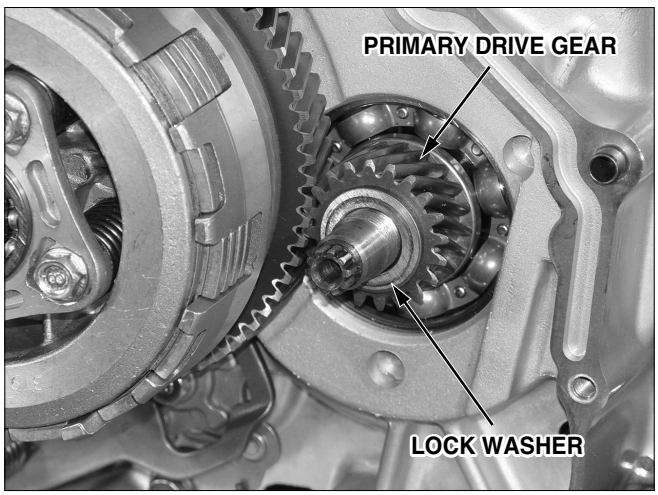


- Install the pressure plate, disk, plate and clutch center into the clutch outer.
- Coat the nut parts with clean engine oil, and tighten the lock nut.









- Install the lock nut by pressing clutch center into the clutch center holder.

  TORQUE : 6.5kgf · m (65N · m)
  TOOLS :
  CLUTCH CENTER HOLDER
  LOCK NUT WRENCH, 20 × 24mm
  EXTENSION BAR

- Install the clutch spring, lifter plate and clutch spring bolt diagonally several times.

NOTE

• Check if the pressure plate press the disk, and plate exactly.

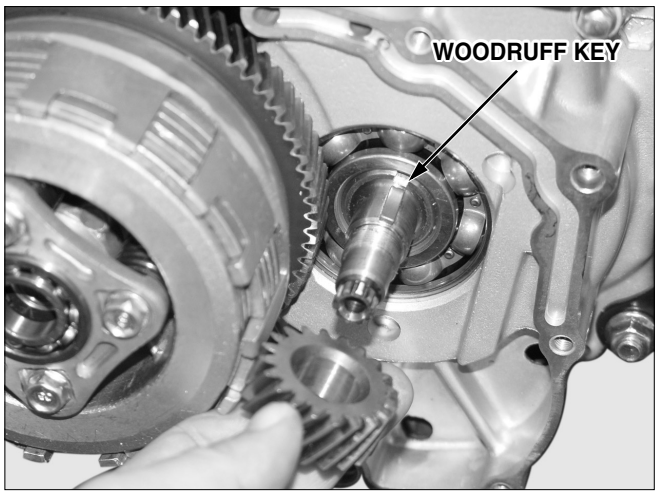
PRIMARY DRIVE GEAR

REMOVAL

- Remove the R. crankcase cover.
- Hold the flywheel using a flywheel holder, and remove the primary drive gear lock nut.

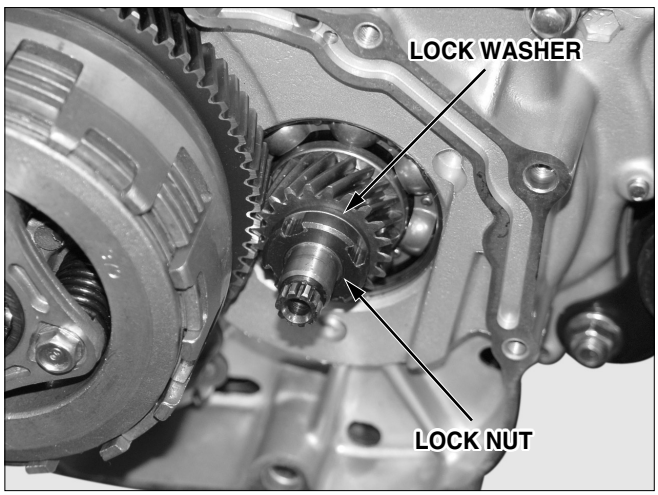
  TOOLS:
  FLYWHEEL HOLDER
  LOCK NUT WRENCH, 20 × 24mm
  EXTENSION BAR

- Remove the lock washer, primary drive gear and woodruff key.

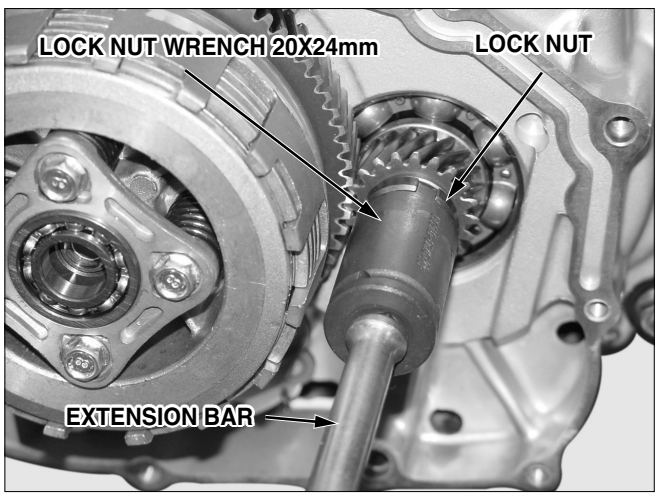


INSTALLATION

- Install the woodruff key into the key groove of the crankshaft.
- Align the primary drive gear key groove with the crankshaft key and install the gear.

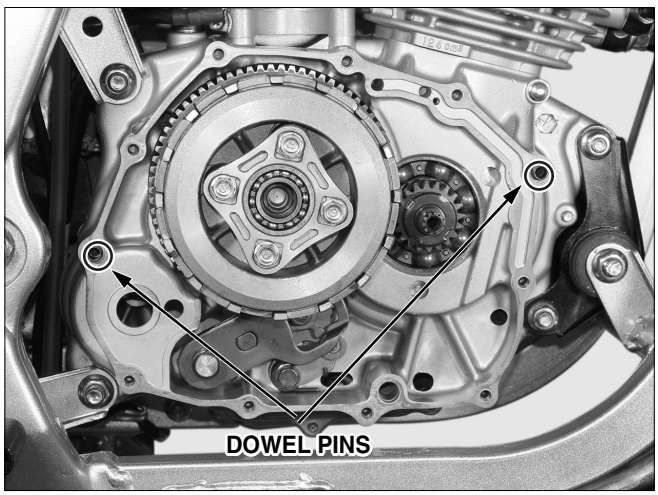


- Install the lock washer.
- Coat the nut with clean engine oil, and temporarily tighten the lock nut.



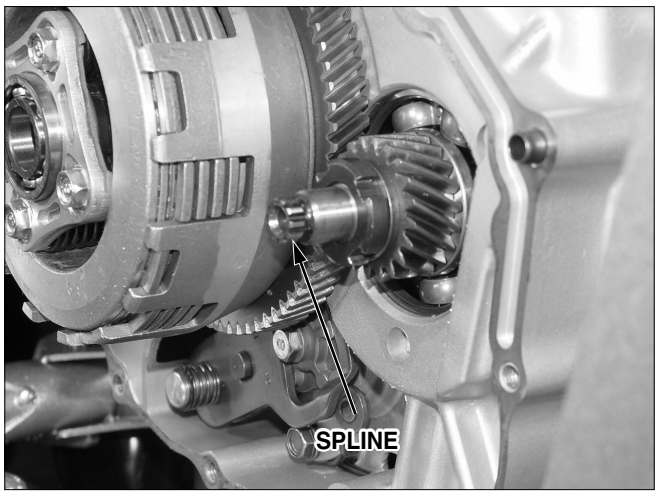
- Hold the flywheel with a flywheel holder, and tighten the primary drive gear lock nut with the specified torque.

TORQUE : 6.5kgf · m(65N · m)
TOOLS : FLYWHEEL HOLDER
LOCK NUT WRENCH, 20 × 24mm
EXTENSION BAR



R. CRANKCASE COVER INSTALLATION

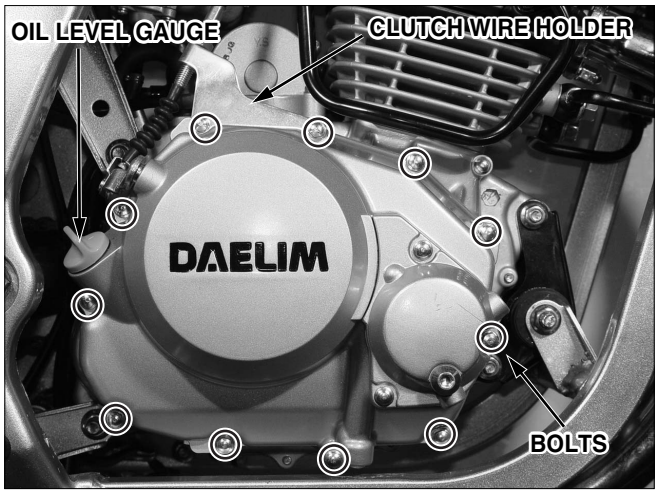
- Remove the gasket from the crankcase surface.
- Install the two dowel pins and a new gasket.



- Install the right crankcase cover, aligning the spline of the crank shaft and with the spline of the oil pump shaft.

⚠ NOTE

• If any difficulty is encountered in joining the crank shaft spline to the oil pump shaft spline, remove the crankshaft hole cap, then install the right crank case cover while turning the crankshaft to the right slowly.

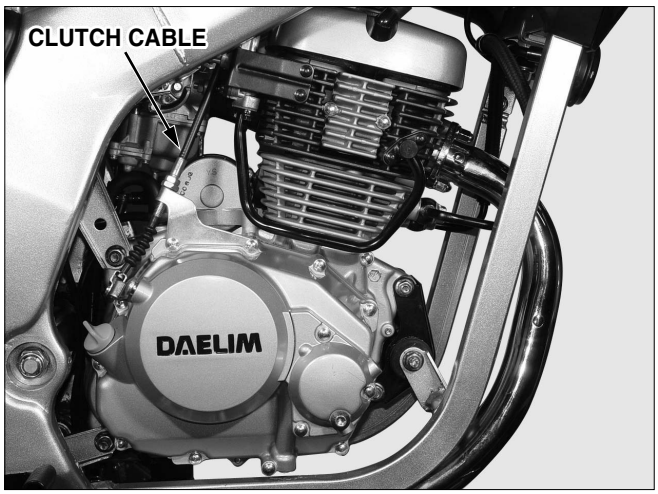


- Install the right crankcase cover bolts.
- Tighten the bolts crisscross pattern in 2-3 steps securely.

TORQUE : 1.1kgf · m(11N · m)

- Connect the clutch cable end to the clutch lever, then install the clutch wire holder with the two bolts.
- Tighten the bolts securely.

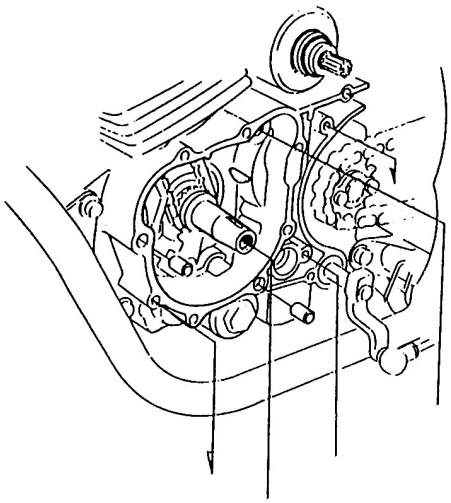
TORQUE : 1.1kgf · m(11N · m)

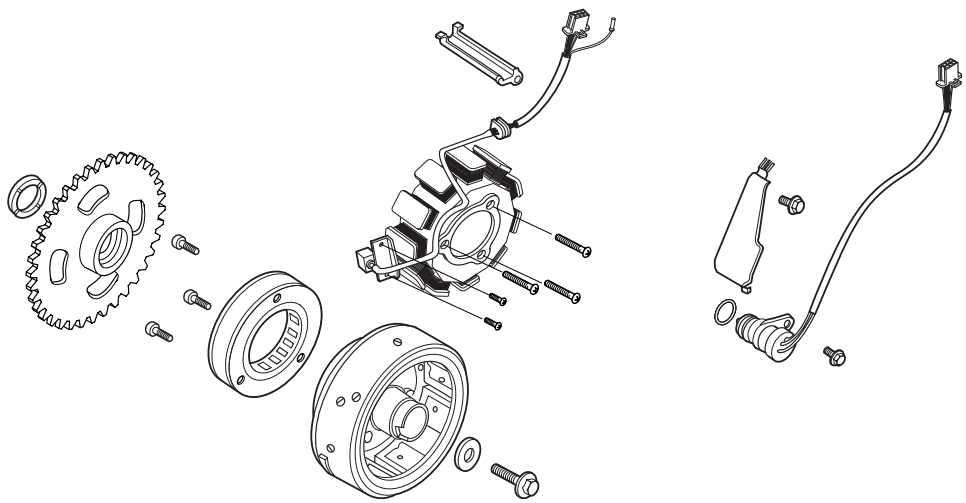


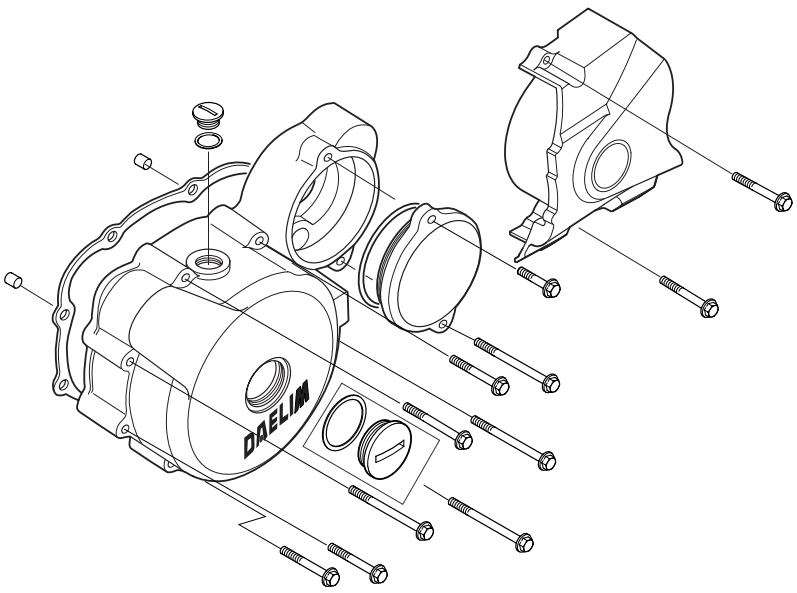
- Check the clutch lever free play. (⇨ 2-12)

- Remove the oil level gauge, then fill the crankcase with the recommended oil.(⇨ 3-3)

MEMO






DAELIM

8. A.C GENERATOR / STARTER CLUTCH

SERVICE INFORMATION

GENERAL SAFETY

- This section covers removal and installation of the A.C. generator.
- Refer to section 16 for inspection of the A.C. generator.
- The A.C. generator/starter clutch service can be done with the engine installed in the frame.

SPECIFICATIONS

Unit:mm

ITEM		STANDARD VALUE	SERVICE LIMIT
STARTER DRIVEN GEAR	O.D.	39.622~39.635	39.607
	I.D	22.010~22.022	22.100
STARTER IDLE GEAR	I.D	10.013~10.045	10.100
STARTER IDLE GEAR SHAFT	O.D	9.991~10.000	9.970
REDUCTION GEAR	I.D	10.013~10.045	10.100
REDUCTION GEAR SHAFT	O.D	9.991~10.000	9.970

TORQUE VALUES

FLYWHEEL BOLT	5.5kgf · m(55N · m)
STARTER CLUTCH SOCKET BOLT	3.2kgf · m(32N · m)
LEFT CRANK CASE COVER BOLT	1.1kgf · m(11N · m)

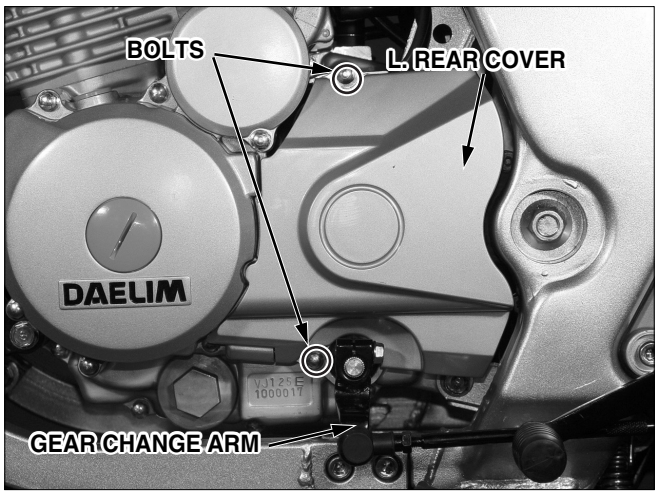
TOOLS

ACG ROTOR PULLER
FLYWHEEL HOLDER

TROUBLESHOOTING

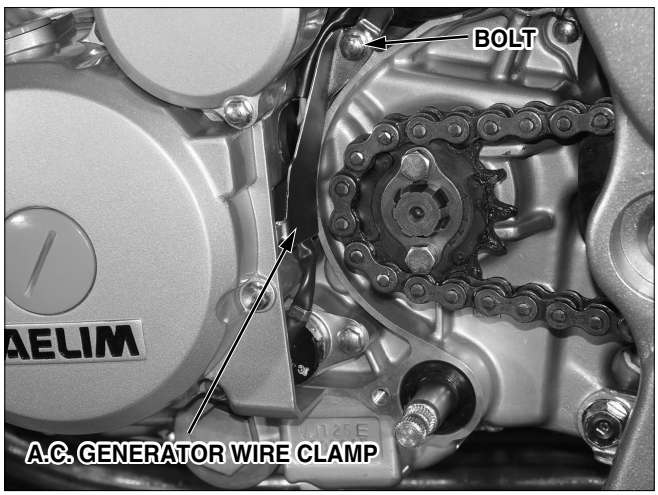
Engine does not turn

- Faulty starter clutch
- Damaged idle gear/shaft

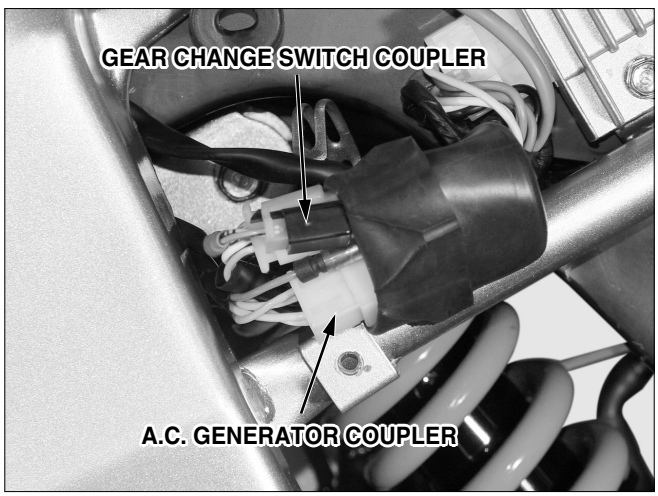


A.C GENERATOR REMOVAL

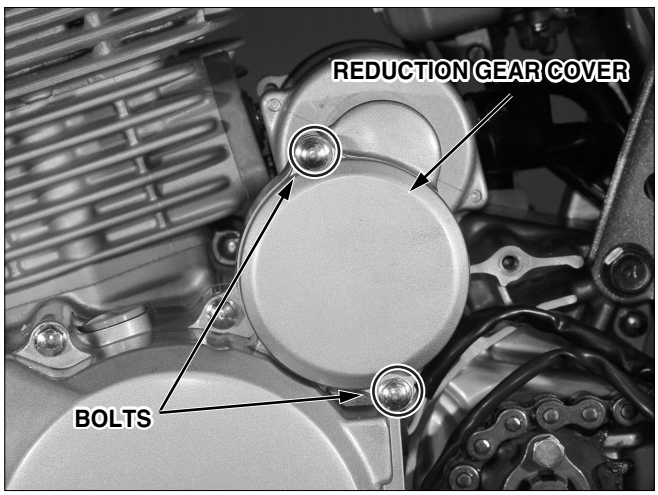
- Remove the gear change arm.
- Remove the L. rear cover.



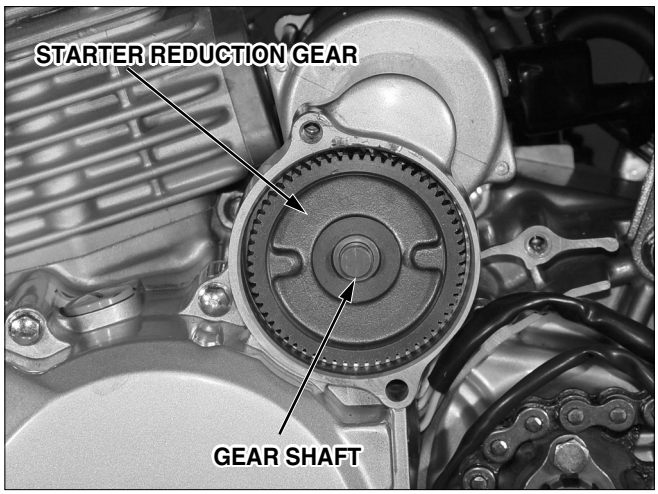
- Remove the A.C. generator wire clamp bolt and A.C. generator wire clamp.



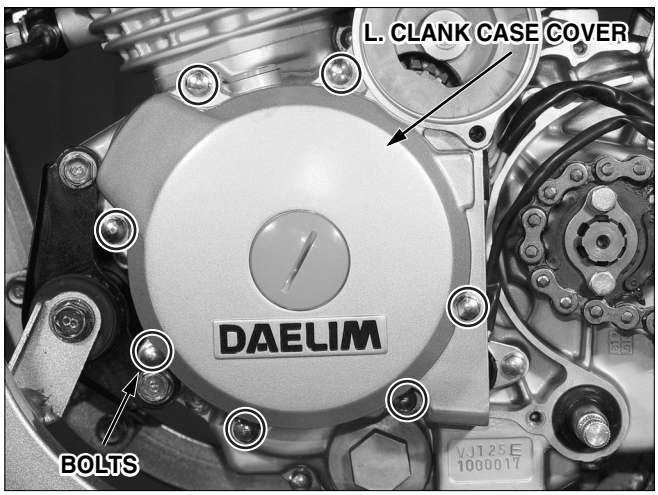
- Disconnect the A.C. generator wire coupler and gear change switch wire coupler.



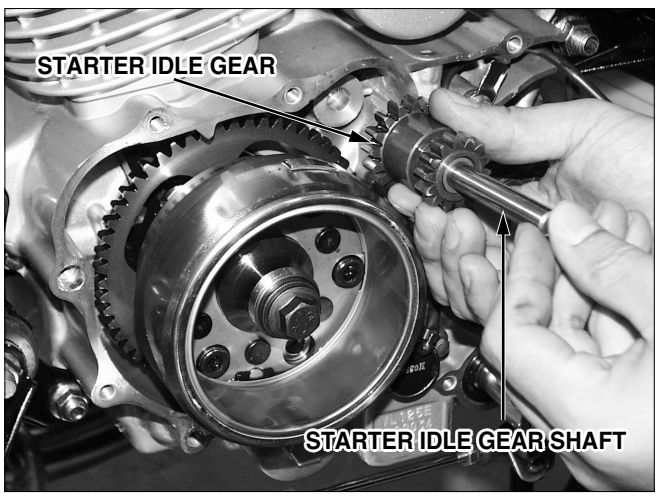
- Remove the reduction gear cover bolts and starter reduction gear cover.



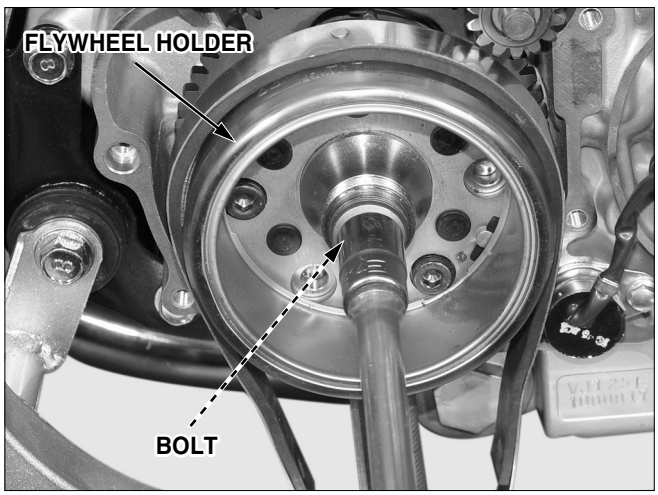
- Remove the starter reduction gear shaft and starter reduction gear.



- Remove the left crankcase cover bolts and left crankcase cover.
- Remove the gasket and the dowel pins.

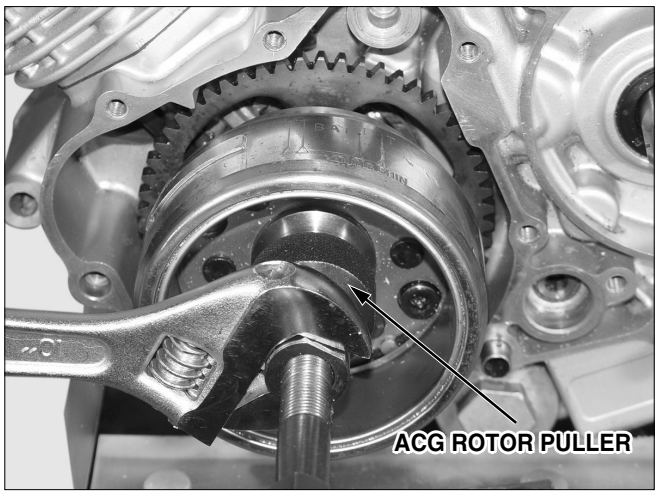


- Remove the starter idle gear shaft and starter idle gear.



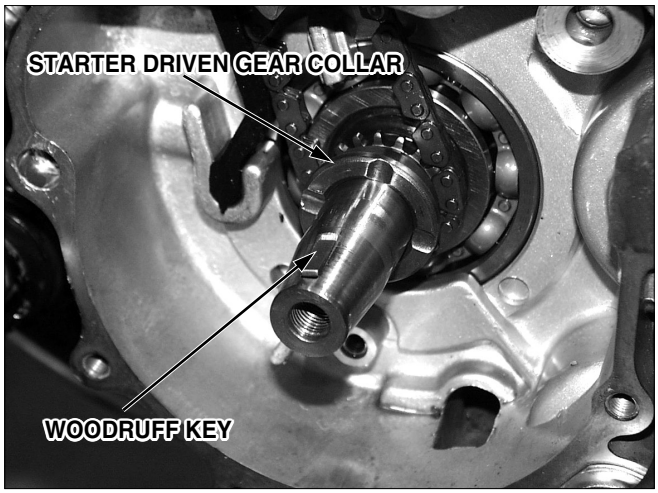
- Hold the flywheel rotor with a flywheel holder, and remove the rotor bolt.

TOOL : FLYWHEEL HOLDER



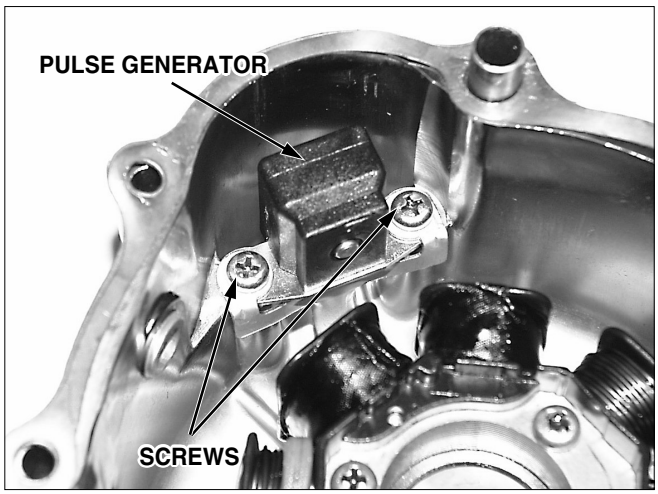
- After installing the ACG rotor puller on the rotor, remove the rotor.

TOOL : ACG ROTOR PULLER

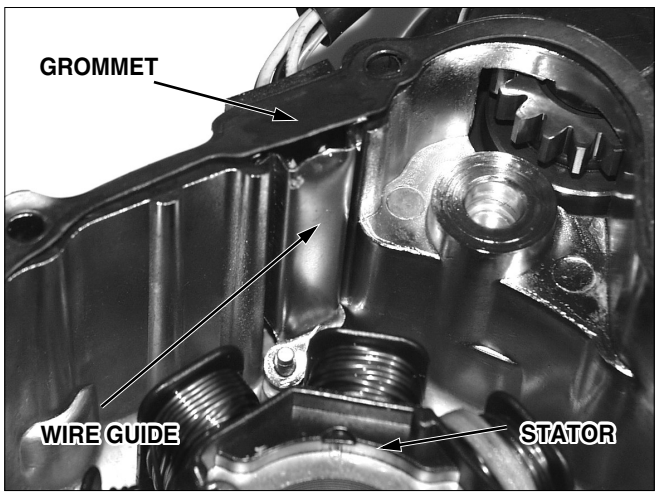


- Remove the woodruff key from the crank shaft.
- Remove the starter driven gear collar.

STATOR REMOVAL/INSTALLATION



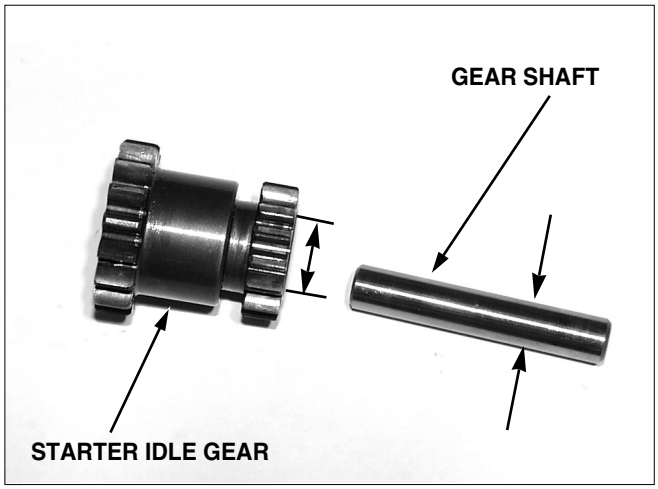
- Remove the pulse generator mounting screws and pulse generator.



- Loosen the screw and remove the wire guide.
- Remove the stator mounting screw and remove the stator.
- Install in the reverse order of removal.

⚠ NOTE

• Make sure that the grommet is correctly placed on the slot.



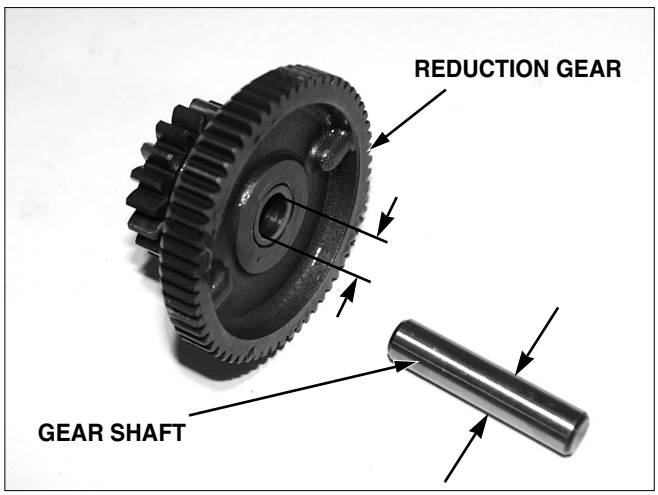
STARTER IDLE GEAR INSPECTION

- Inspect the wear and damage of starter ldle gear.
- Measure the gear inside diameter.

SERVICE LIMIT : 10.100mm

- Measure the gear shaft outside diameter.

SERVICE LIMIT : 9.970mm



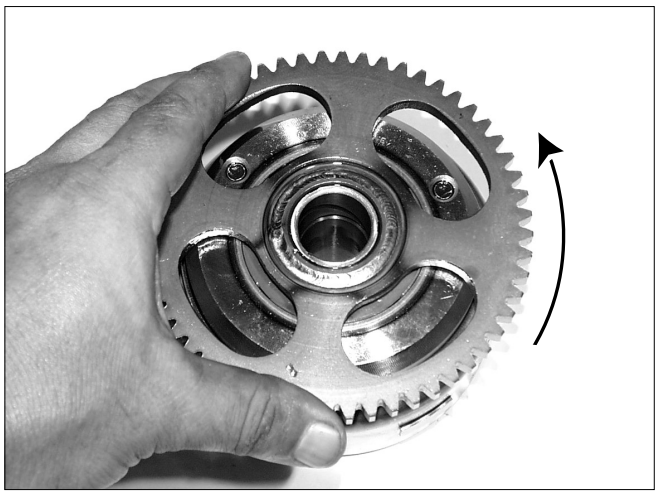
REDUCTION GEAR INSPECTION

- Inspect the wear and damage of reduction gear.
- Measure the gear inside diameter.

SERVICE LIMIT : 10.100mm

- Measure the gear shaft outside diameter.

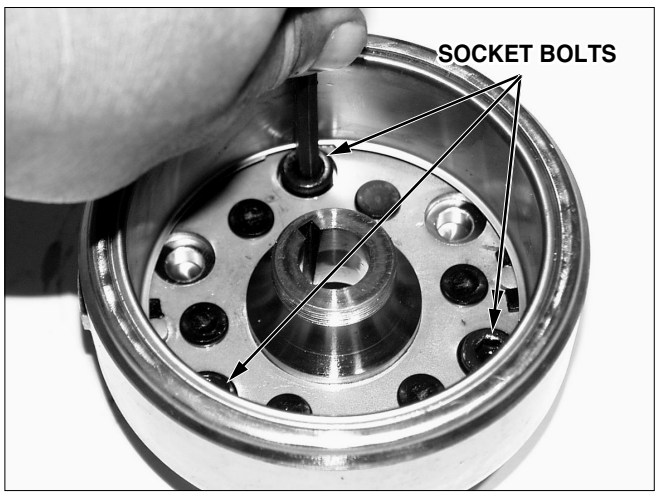
SERVICE LIMIT : 9.970mm



STARTER CLUTCH

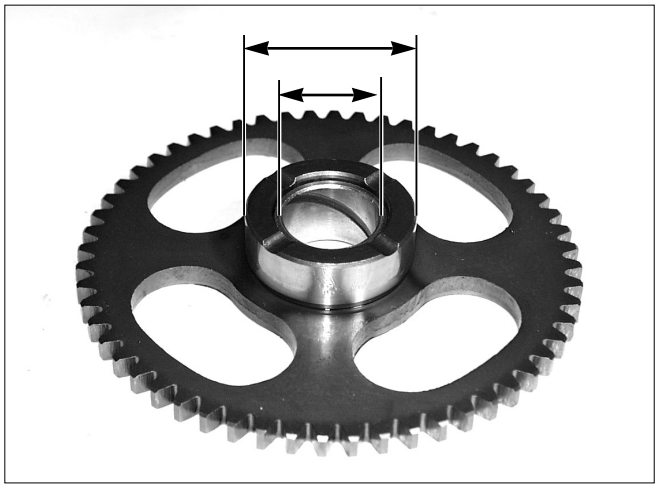
INSPECTION

- Check the operation of the one-way clutch by turning the driven gear.
- You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.



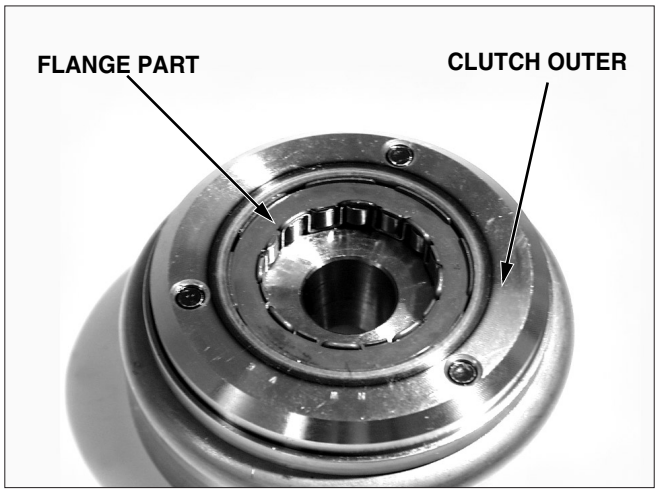
DISASSEMBLY

- Remove the three socket bolts, and remove the one way clutch from the flywheel.



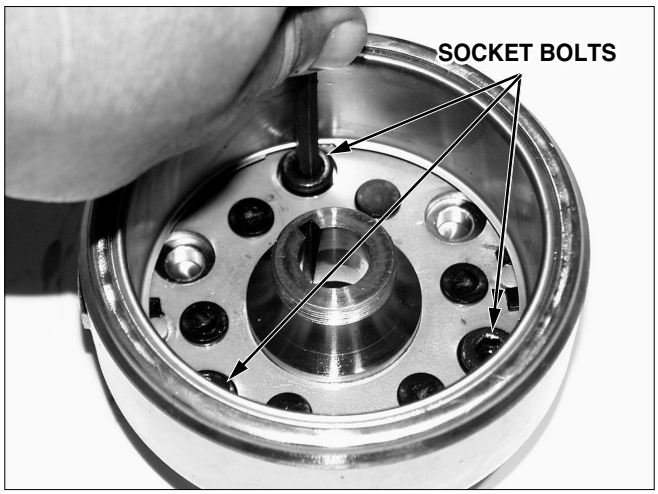
- Check the starter driven gear for damage or wear.
- Measure the starter driven gear I.D. and O.D.

SERVICE LIMIT : O.D. : 39.607mm
I.D. : 22.100mm



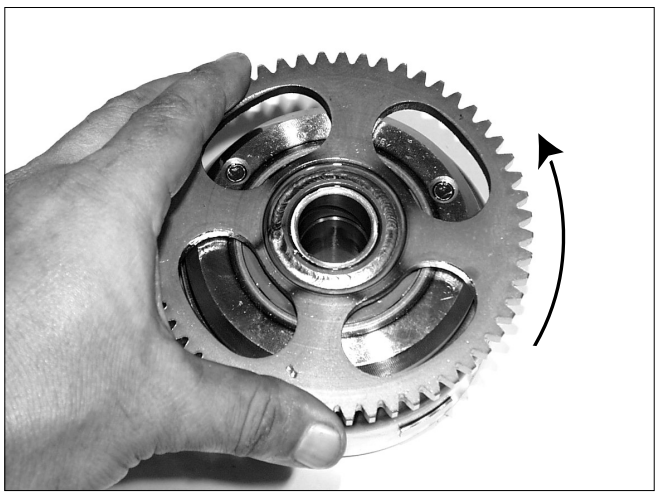
INSTALLATION

- Check the one-way clutch for wear or damage.
- Install the one-way clutch flange onto the clutch outer.

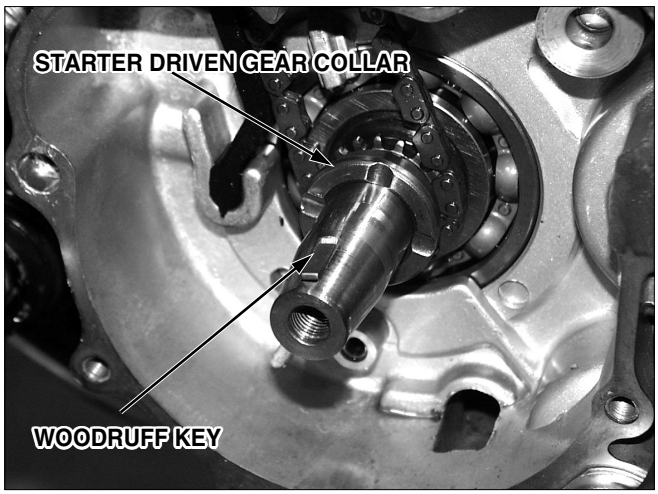


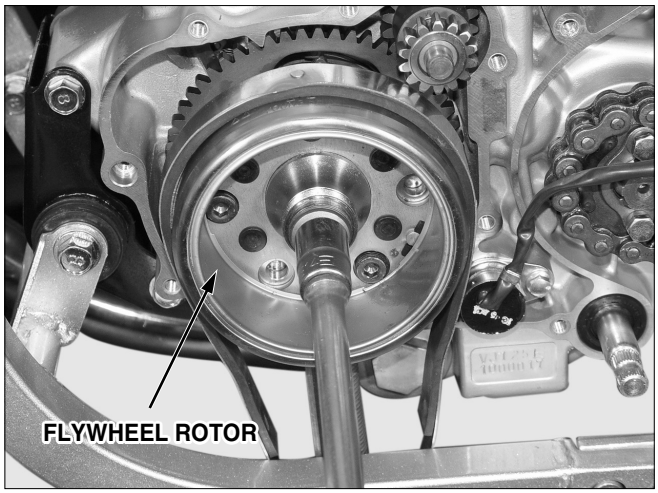
- Apply a locking agent to the starter clutch outer mounting bolt threads.
- Hold the flywheel with a flywheel holder, and tighten the starter clutch mounting socket bolts.

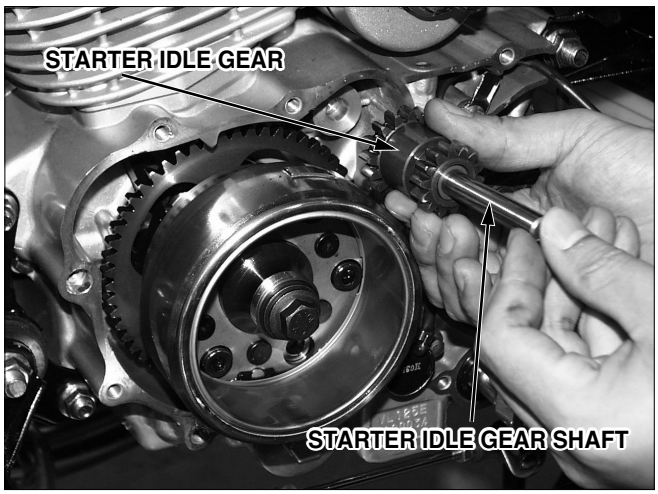
TORQUE : 3.2kgf · m(32N · m)

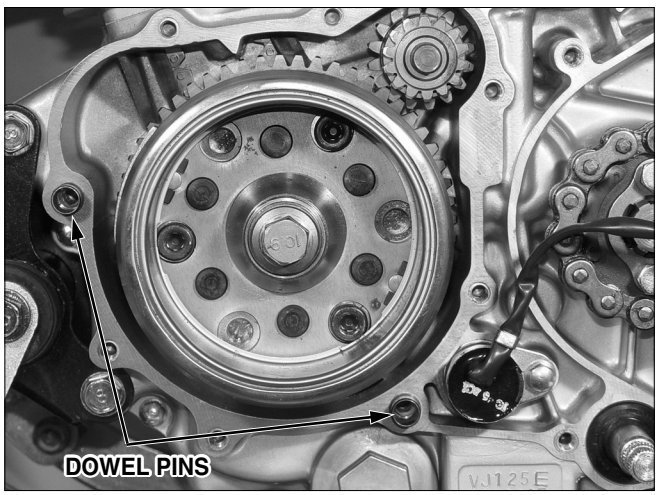


- Install the starter driven gear into the one-way clutch.
- Recheck the one-way clutch operation. (⇨8-5)









A.C GENERATOR INSTALLATION

- Install the starter driven gear collar.
- Clean the taper part of crank shaft and remove the dust. If installing the rotor with dust in taper part, the key will be damaged. Because the contacted area of taper will be small and it will occur the stress in the woodruff key.
- Install the woodruff key into the crank shaft key groove.

- Install the rotor into the crank shaft aligning the key.

⚠ NOTE

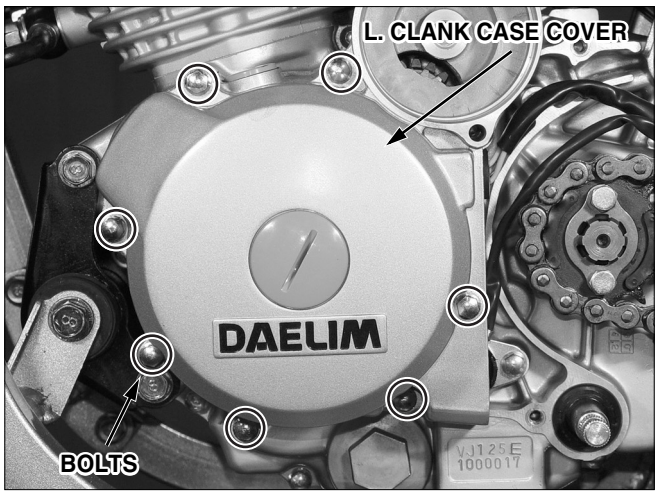
• After checking whether inside magnet of rotor is attached by the bolts and nuts, install them.
If installing the rotor with the foreign material, the starter coil is damaged.

- Install the rotor bolt temporarily. After fixing the flywheel with a holder, tighten the rotor bolt.

TORQUE : 5.5kgf · m(55N · m)
TOOL: FLYWHEEL HOLDER

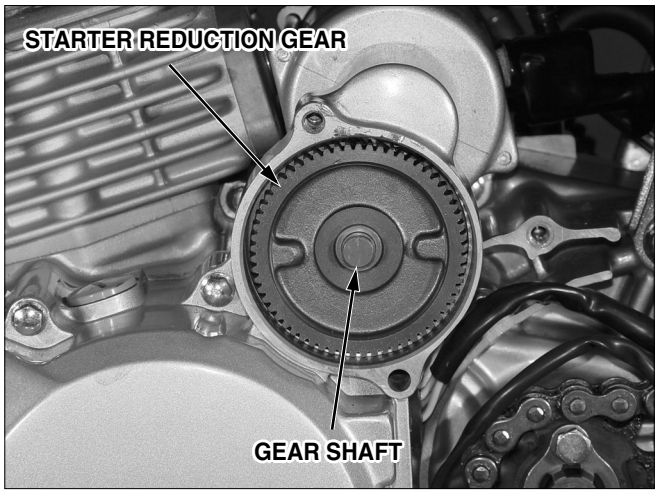
- Install the starter idle gear and starter idle gear shaft.

- Install the new gasket and dowel pins.

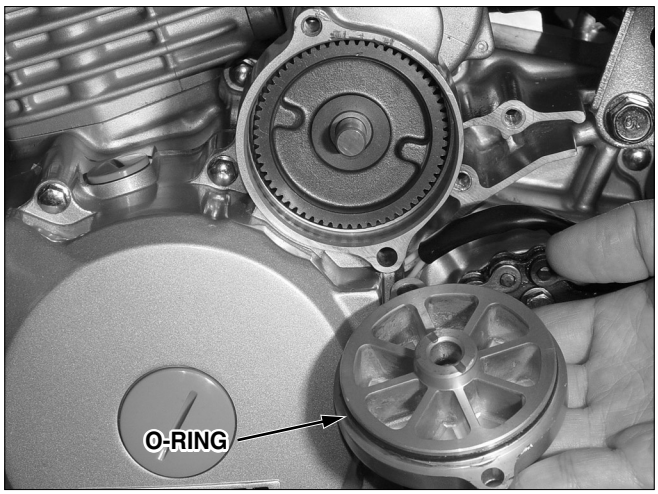


- Install the L. crankcase cover.
- Install and tighten the bolts to the specified torque.

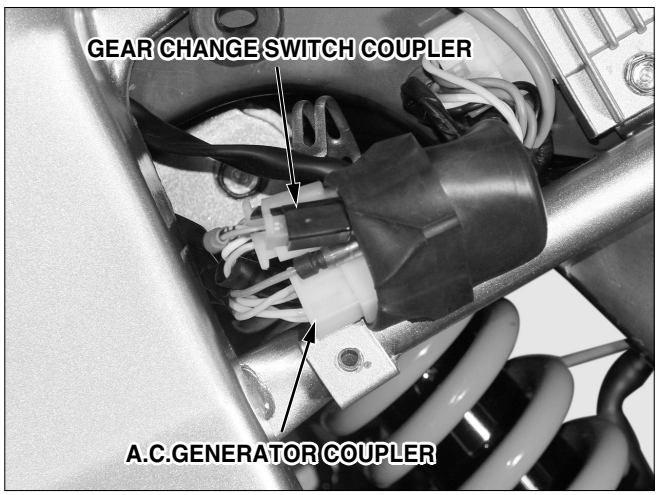
TORQUE : 1.1kgf · m(11N · m)



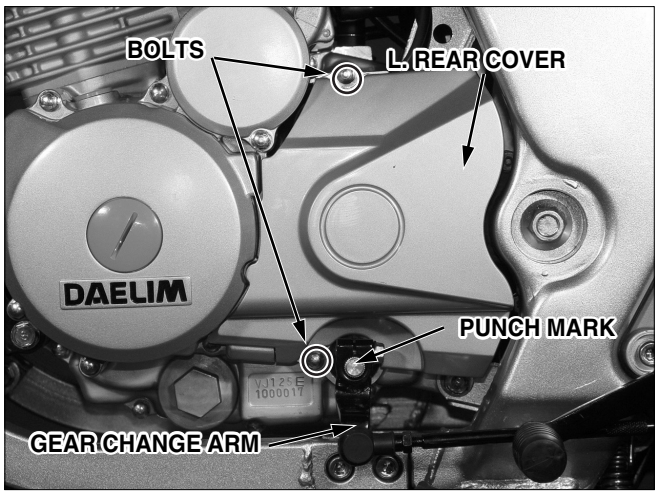
- Install the starter gear and shaft.



- Install the new O-ring.
- Install the reduction gear cover.



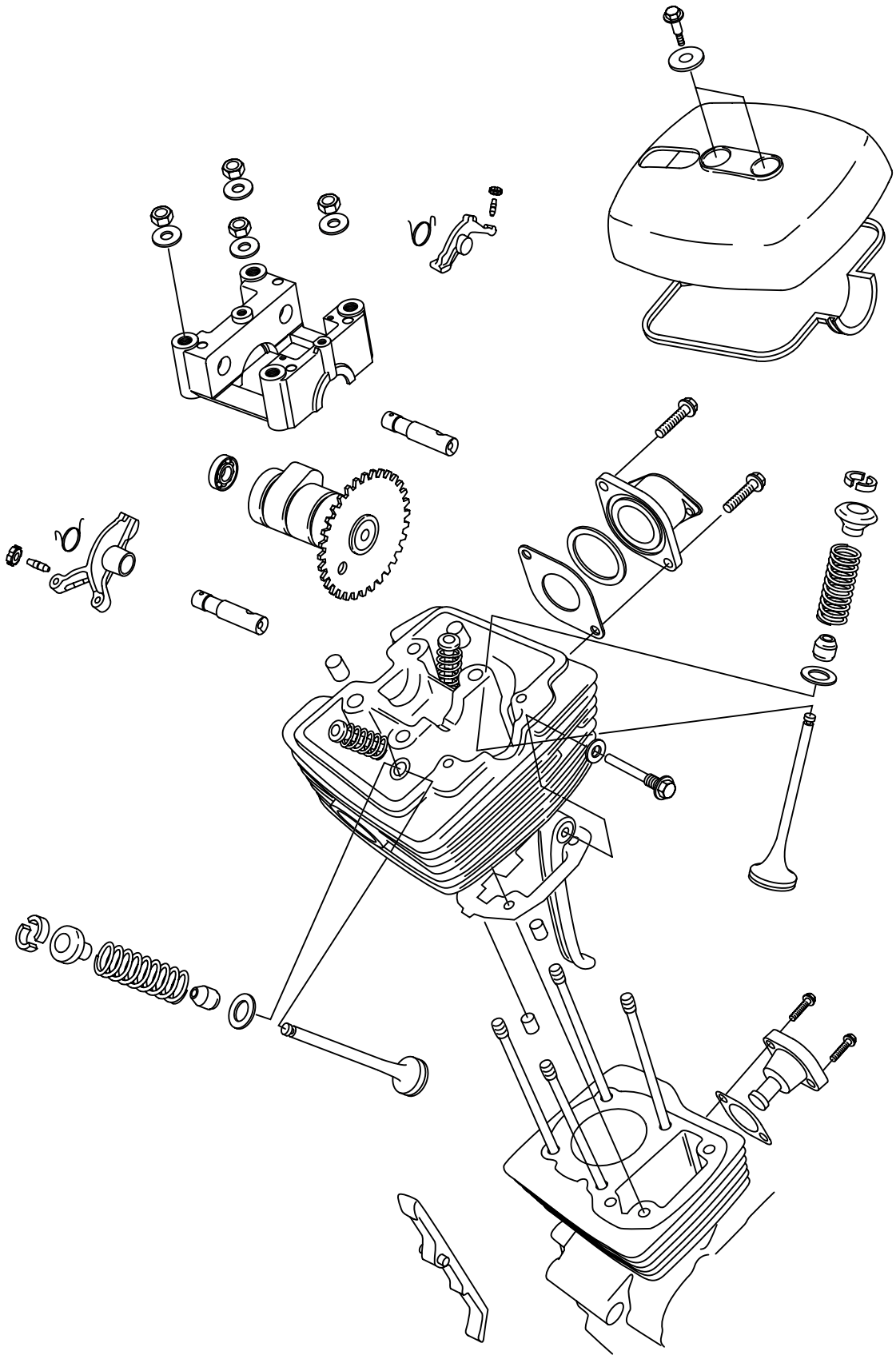
- Connect the A.C generator wire coupler and gear change switch wire coupler.
- Install the wire clamp.



- Install the L. rear cover.

- Install the gear change arm a ligning its slit with the punch mark on the gearshift spindle.
- Install and tighten the pinch bolt to the specified torque.

  TORQUE : 1.2 kgf · m (12 N · m)



9. CYLINDER HEAD / VALVES

SERVICE INFORMATION

GENERAL SAFETY

- The rocker arm and the camshaft can be serviced without removing the engine. However, the engine must be removed from the frame to maintain the cylinder head.
- The oil of camshaft is supplied through the cylinder head oil hole. Clean the oil hole prior to assembling the cylinder head.

SPECIFICATIONS

Unit : mm

ITEM			STANDARD VALUE	SERVICE LIMIT
ROCKER ARM	ROCKER ARM INNER DIAMETER		12.016~12.034	12.060
	ROCKER ARM SHAFT OUTER DIAMETER		11.982~12.000	11.950
CAMSHAFT	CAM HEIGHT	IN	37.330~37.490	37.110
		EX	37.089~37.249	36.870
VALVE, VALVE GUIDE	VALVE SPRING FREE LENGTH	IN,EX	41.65	40.00
	VALVE STEM OUTER DIAMETER	IN	4.975~4.990	4.925
		EX	4.995~4.970	4.905
	VALVE GUIDE INNER DIAMETER	IN,EX	5.000~5.012	5.030
	CLEARANCE BETWEEN STEM AND GUIDE	IN	0.010~0.037	0.080
		EX	0.030~0.057	0.100
	VALVE SEAT WIDTH		0.7~0.9	1.3

TORQUE VALUES

CAM CHAIN TENSIONER PIVOT BOLT	1.0 kgf · m (10N · m)
SPARK PLUG	1.1 kgf · m (11N · m)
CAMSHAFT HOLDER 8mm NUT	2.0 kgf · m (20N · m)
CAM CHAIN TENSIONER MOUNTING BOLT	1.2 kgf · m (12N · m)
CAM CHAIN TENSIONER SEALING SCREW	0.4 kgf · m (4N · m)
CYLINDER HEAD COVER BOLT	1.0 kgf · m (10N · m)
CRANK SHAFT HOLE CAP	0.8 kgf · m (8N · m)
A.C.GENERATOR CAP	0.6 kgf · m (6N · m)

TOOLS

VALVE GUIDE REAMER
VALVE GUIDE DRIVER
VALVE SPRING COMPRESSOR
VALVE SEAT CUTTER
SEAT CUTTER IN 35° (23mm)
EX 35° (20mm)
IN 45° (24.5mm)
EX 45° (24.5mm)
IN 60° (22mm)
EX 60° (22mm)
CUTTER HOLDER 5mm

TROUBLESHOOTING

Enging top-end problems useally 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 comperssion

- Valves
  - Incorrect valve adjustment (see section 3)
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damage head gasket
  - Warped or cracked cylinder head
- Cylinder, piston (see section 9)

Excessive white smoke

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

Rough idle

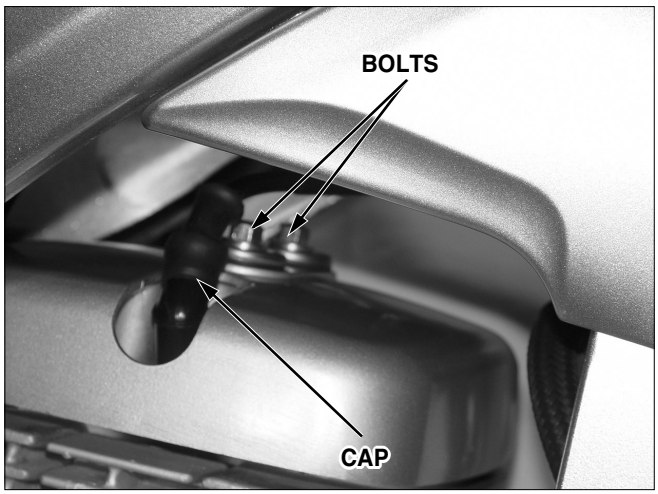
- Low cylinder compression

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
- Worn rocker arm and / or shaft
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Damaged cylinder head gasket
- Incorrect spark plug installation



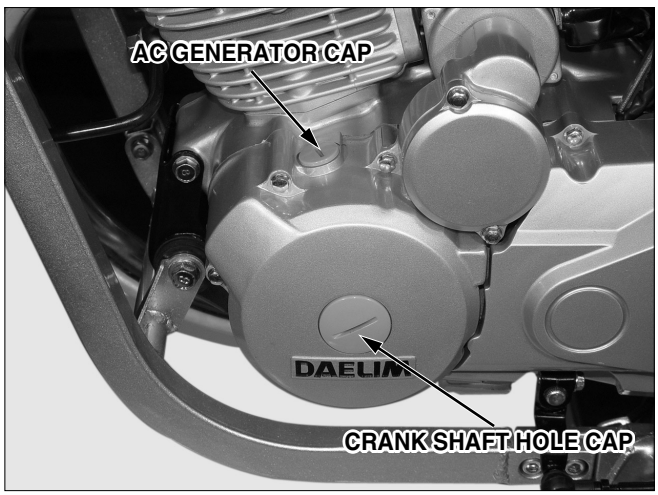
CAMSHAFT

REMOVAL

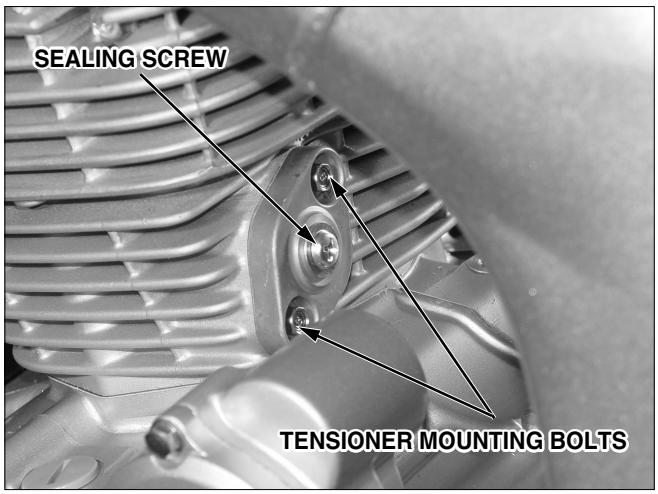
- Remove the noise suppressor cap assembly from the spark plug.
- Remove the cylinder head cover bolts and cover.

⚠ NOTE

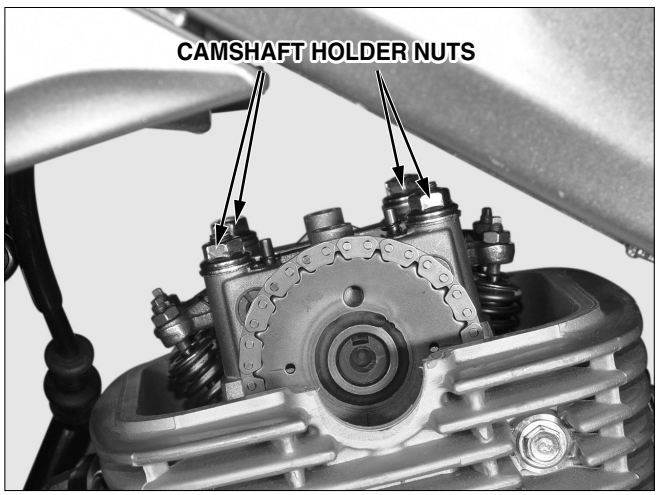
• The camshaft can be maintained without removing the engine.



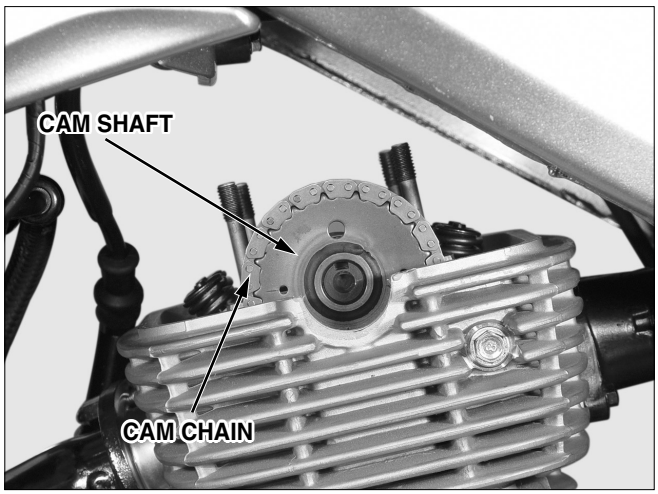
- Remove the AC generator cap and crank shaft hole cap out of the left crankcase cover.
- Turn the crankshaft to the left, and align the "T" mark of the flywheel with the index mark of the LH. crankcase cover.
- Verify that the piston is located at the top dead center. (Make all camshaft lobes face downward.)
- If all camshaft lobes face upward, rotate the crankshaft to the left for 1 turn (360°), and align the "T" mark with the index mark once again.



- Disconnect the starter motor cable from the starter motor.
- Remove the clutch wire holder.
- Remove the starter motor mounting bolts and starter motor.
- Remove the O-ring and pan screw from the cam chain tensioner lifter. Remove the tensioner mounting bolt and tensioner lifter.



- Remove the camshaft holder 8mm nuts and remove the camshaft holder from the cylinder.

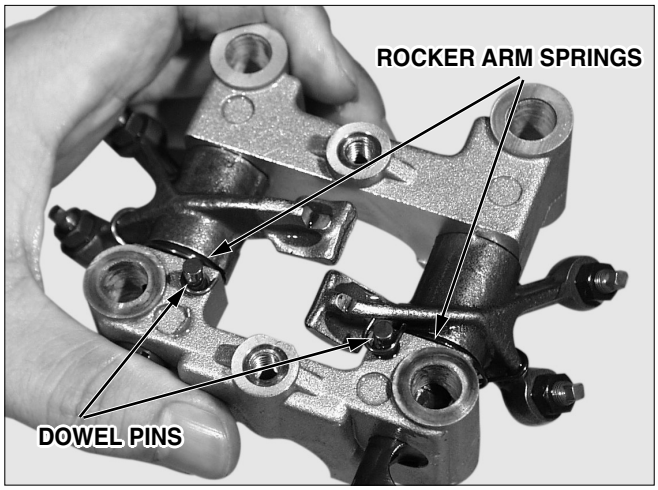


- Remove the cam chain from the camshaft.

NOTE

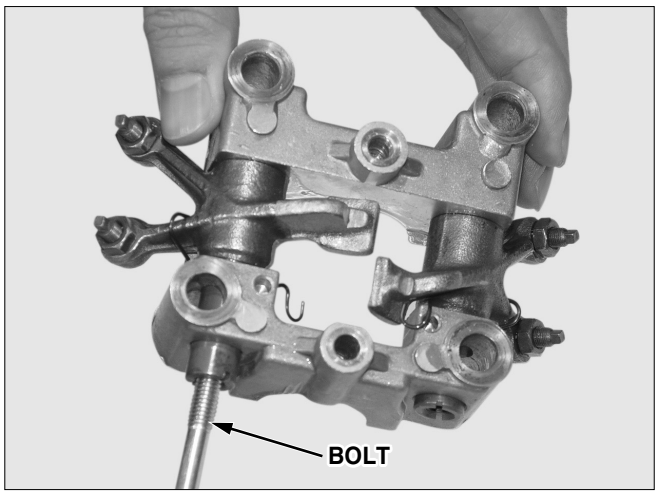
- Take precautions not to allow the cam chain to drop into the crankcase.

- Remove the camshaft.

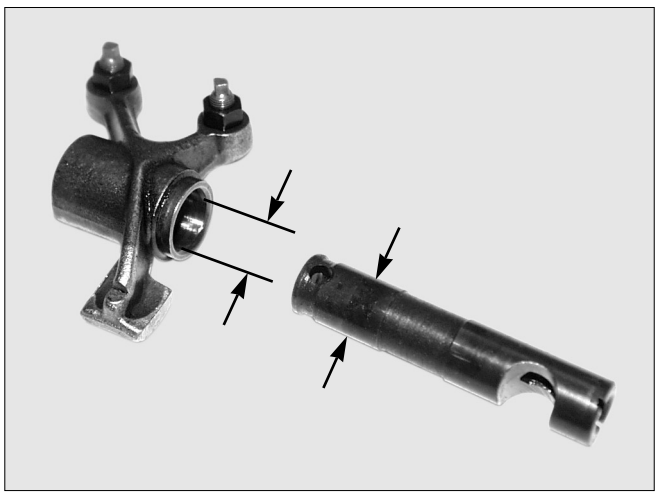


CAMSHAFT HOLDER DISASSEMBLY

- Remove the rocker arm springs from the gear shift drum pin.
- Remove the gear shift drum pin from the cam shaft holder. (IN/EX)



- Put the 6mm bolt into the rocker arm shaft, remove the rocker arm shaft pulling the bolt.
- Remove the rocker arm and rocker arm spring.
- Remove the other rocker arm shaft, rocker arm, and rocker arm spring following the same order.



INSPECTION

- Check the rocker arm and rocker arm shaft for wear or damage.
- Measure the inner diameter of the rocker arm.

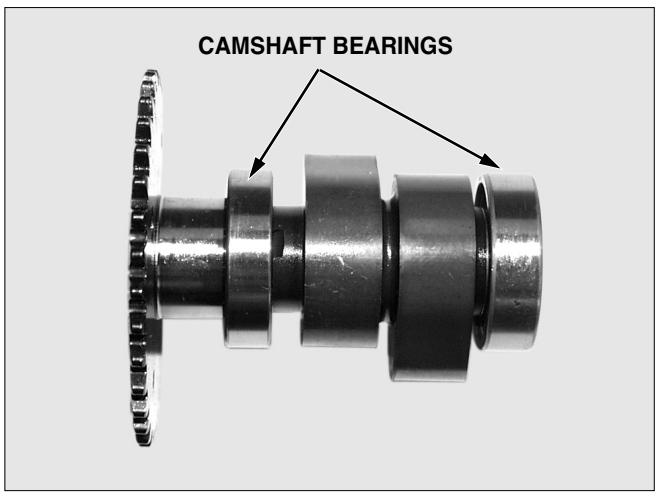
SERVICE LIMIT : 12.060 mm

- Measure the outer diameter of the rocker arm shaft.

SERVICE LIMIT : 11.950 mm

- Check the cam lobes of the camshaft for wear or damage.
- Measure the height of the cam lobe.

SERVICE LIMIT : IN : 37.110 mm
EX: 36.870 mm



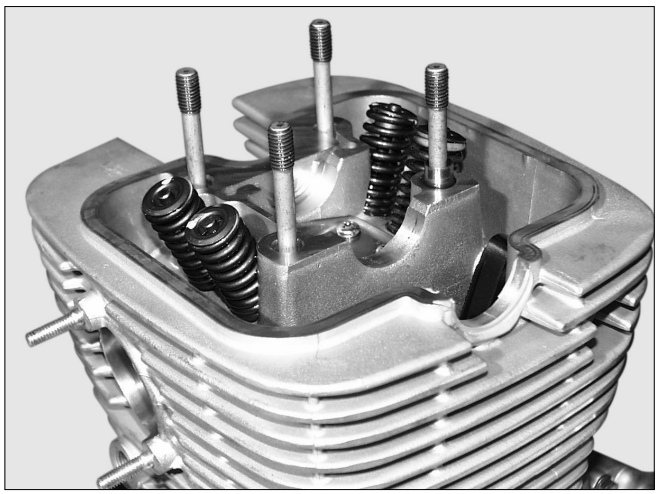
- Manually turn the camshaft bearing outer race, and check if it turns smoothly.
- Check the bearing for wear or damage.

⚠ CAUTION

• Be sure to check the valve clearance.

CYLINDER HEAD

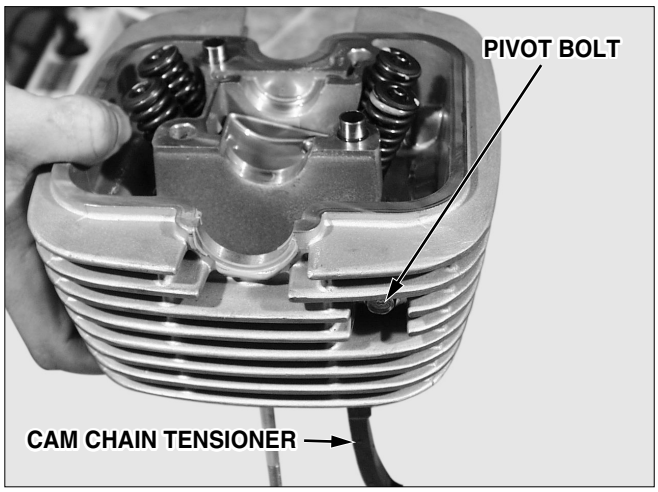
REMOVAL



- Remove the engine from the frame. (section 6)

- Remove the camshaft. (⇨9-3)
- Remove the cylinder head from the cylinder.

- Remove the gasket, dowel pins and cam chain guide from the cylinder.



DISASSEMBLY

- Loosen the pivot bolt and remove the cam chain tensioner.
- Remove the carburetor insulator.
- Remove the spark plug from the cylinder head.
- Remove the spark plug cover from the cylinder head.

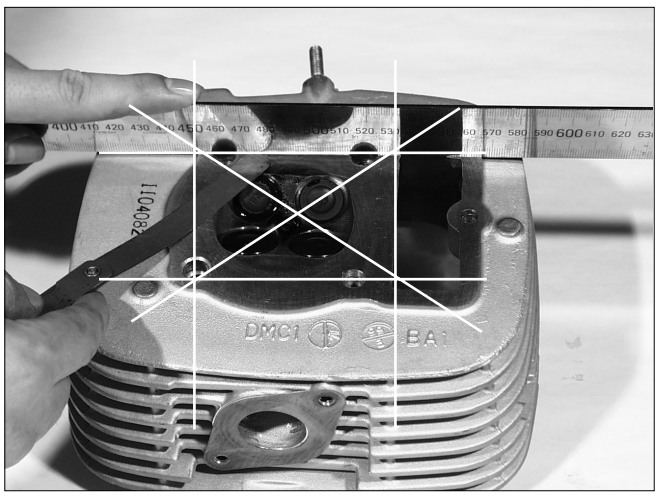
- Remove the valve spring, valve cotter, retainer, spring and valve. Using the valve spring compressor.

TOOL : VALVE SPRING COMPRESSOR

⚠ NOTE

- To prevent the loss of tension, do not compress the valve spring more than necessary.
- Mark the disassembled parts so that they can be reassembled into the original position later.

- Remove the valve spring seat and valve stem seal. Remove carbon deposits from the inside of the combustion chamber.



INSPECTION

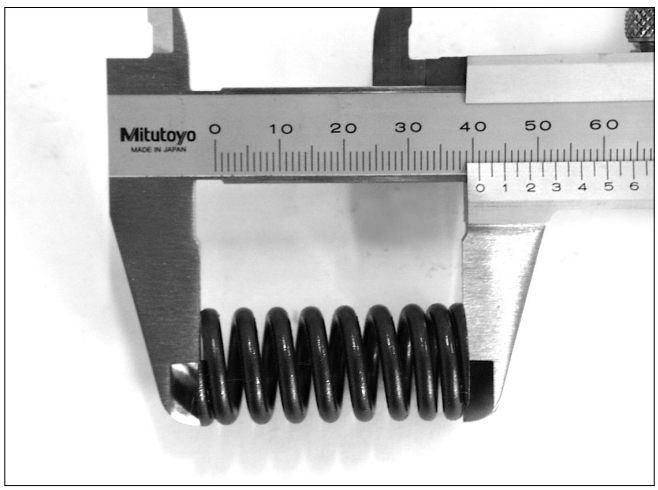
- Remove gasket marks from the cylinder head gasket.

⚠ NOTE

- Take precautions not to damage the cylinder head gasket attachment.

- Check the spark plug assembling hole and the valve seat for cracks.
- Using a square and a feeler gauge, check the cylinder head distortion.

SERVICE LIMIT : 0.1 mm



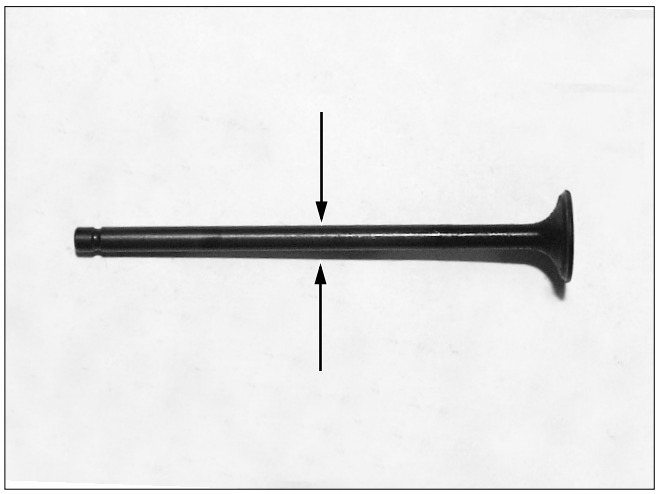
VALVE SPRINGS

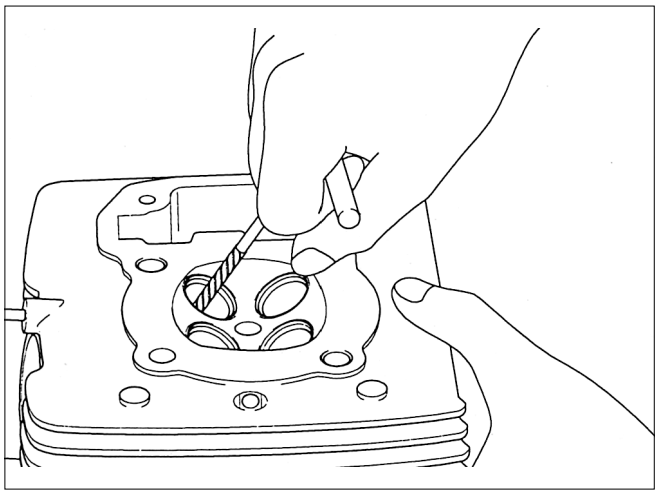
- Measure the free length of the inner and outer valve springs.

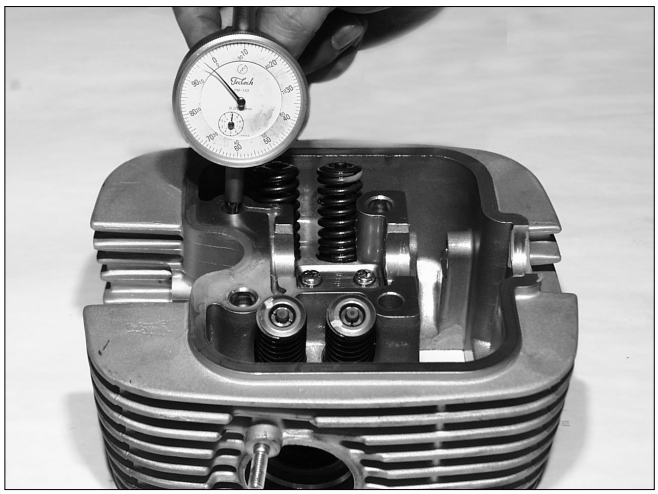
SERVICE LIMIT : 40.00 mm

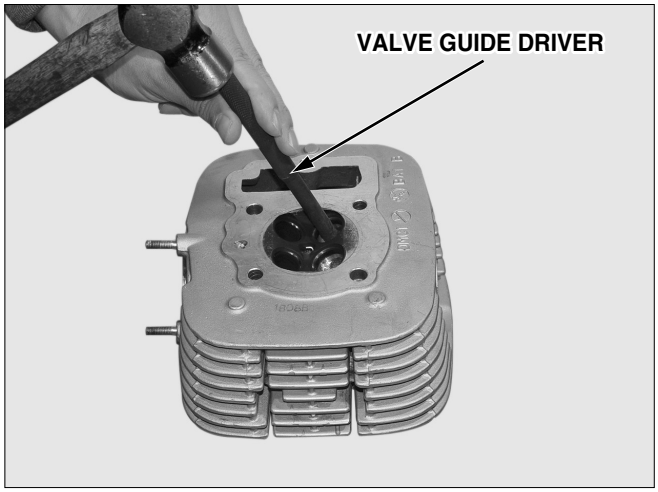
⚠ NOTE

- Replace the valve spring with new one if the length of any one is less than the service limit.









VALVES

- Inspect each valve for bending, burning, scratches or abnormal wear.
- Insert the valves in their original positions in the cylinder head.
  Check that each valve moves up and down smothly, without binding.
- Measure and record the valve stem outer diameter in three places along the valve guide sliding area.

SERVICE LIMIT : IN : 4.925 mm
EX: 4.905 mm

- Replace the valve with a new one if the service limit is exceeded.

VALVE GUIDES

INSPECTION

- Insert the valve guide reamer from the combustion chamber side and ream the guide to remove any carbon build-up before measuring the guide.

⚠ NOTE

- Take care not to tilt or lean the reamer in the guide while reaming.
  Otherwise, the valve is installed slanted, that causes oil leaks from the stem seal and improper valve seat contact and results in the valve seat refacing not able to be performed.
- Rotate the reamer clockwise, never counterclockwise when inserting and removing.

TOOL : VALVE GUIDE REAMER

- Measure and record each valve guide inner diameter.

SERVICE LIMIT : 5.030 mm

- Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust.

SERVICE LIMIT : IN : 0.080 mm
EX: 0.100 mm

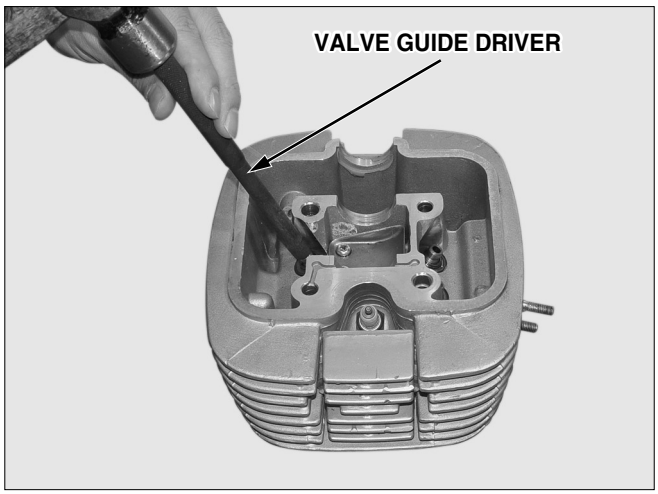
- Measure the inner diameter of the new valve guide. If the clearance is not within the service limit, replace the valve.

VALVE GUIDES REPLACEMENT

⚠ NOTE

- Refinish the valve seats whenever the valve guides are replaced to prevent uneven seating.

- Heat the cylinder head to 130˚C - 140˚C (275˚F - 290˚F).
- Do not heat the cylinder head beyond 150˚C (300˚F).
- Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.



⚠ CAUTION

• Using a torch to heat the cylinder head may cause warping.

⚠ WARNING

• Wear insulated gloves to avoid burns when handling the heated cylinder head.

● Support the cylinder head and drive the old guides out of the combustion chamber side of the cylinder head.

TOOL : VALVE GUIDE DRIVER

⚠ CAUTION

• Avoid damaging the head when driving the valve guide out.

● Apply oil to a new O-ring and install it onto a new valve guide.

● Drive the new guide in from the camshaft side of the cylinder head while the cylinder head is still heated.

TOOL : VALVE GUIDE DRIVER

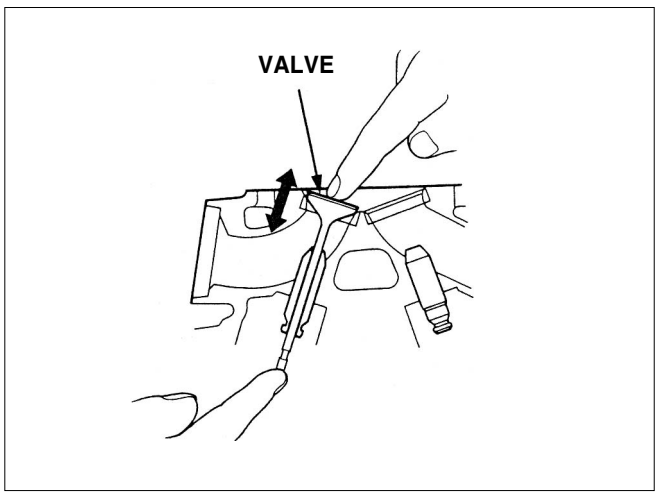
● When reaming new valve guides, insert the valve guide reamer from the combustion chamber side.

⚠ NOTE

· Take care not to tilt or lean the reamer in the guide while reaming.
Otherwise, the valve is installed slanted, that causes oil leaks from the stem seal and improper valve seat contact and results in the valve seat refacing not able to be performed.
· Use cutting oil on the reamer during this operation.
· Rotate the reamer clockwise, never counterclockwise when inserting and removing.

TOOL : VALVE GUIDE REAMER

● Reface the valve seats and clean the cylinder head thoroughly to remove any metal particles.



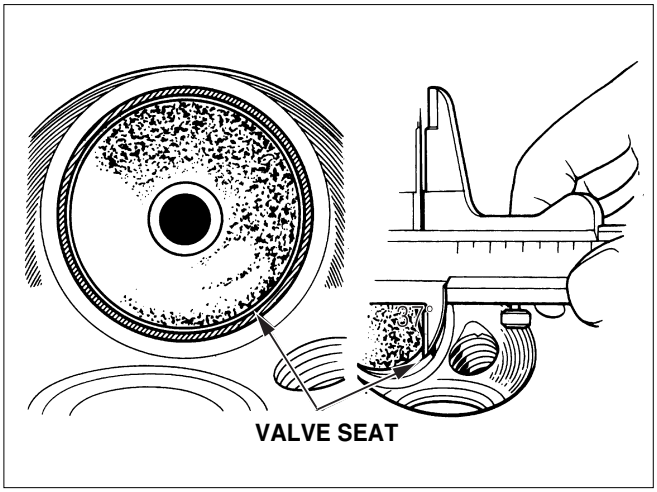
VALVE SEATS

INSPECTION

● Clean all intake and exhaust valves thoroughly to remove carbon deposits.
● Apply a light coating of Prussian Blue to each valve face.

⚠ NOTE

· Tap the valve against the valve seat serveral times with the valve guide reamer, without rotating the valve, to check for proper valve seat contact.



- Remove the valve and inspect the valve seat face.
- The valve seat contact should be within the specified width and evenly all around the circumference.
  If the valve seat width is not within specification, reface the valve seat.

⚠ NOTE

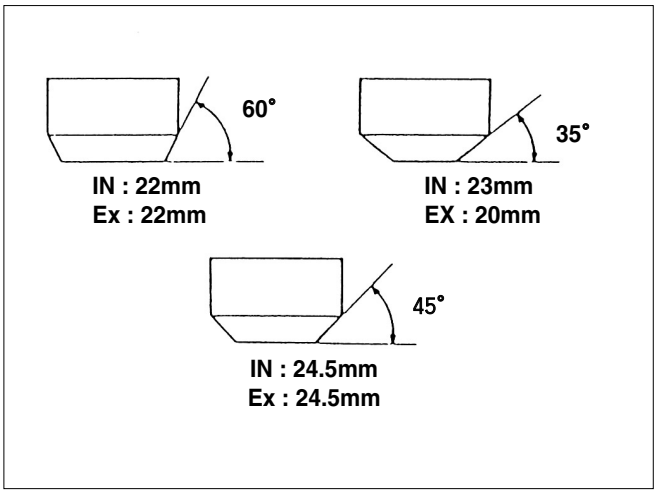
· Valve faces and stem tips cannot be ground. If a valve face or stem tip is rough, worn unevenly, or contacts the seat improperly, the valve must be replaced.

- Measure the valve seat width.

STANDARD VALUE : 0.7~0.9 mm
SERVICE LIMIT : 1.3 mm

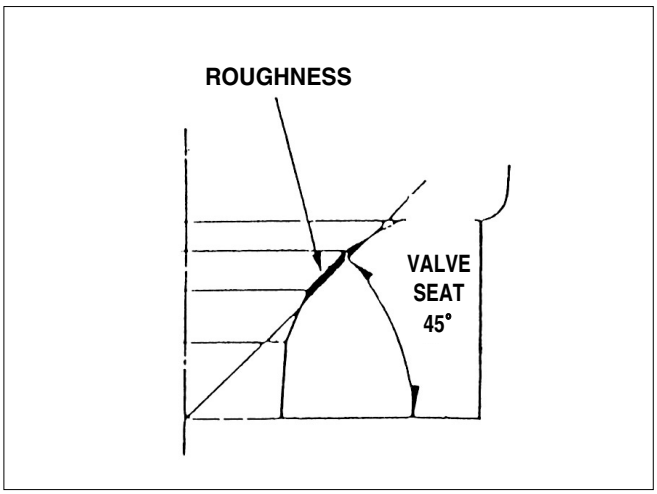
VALVE SEAT REFACING

- Reface the worn valve seat by using valve seat cutters and grinders.

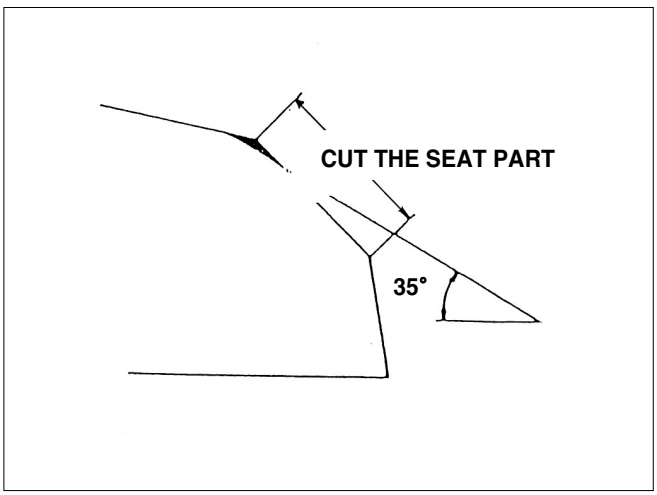


⚠ NOTE

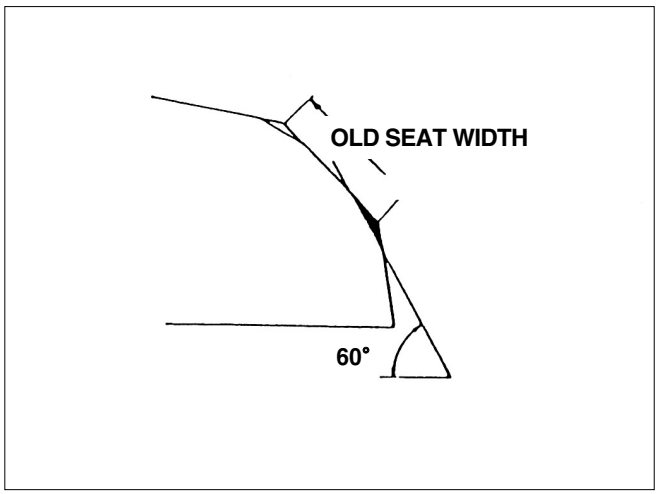
· Follow the refacer manufactuer's operating instructions.
· Reface the valve seat whenever the valve guide has been replaced.
· Be careful not to grind the seat more than necessary.



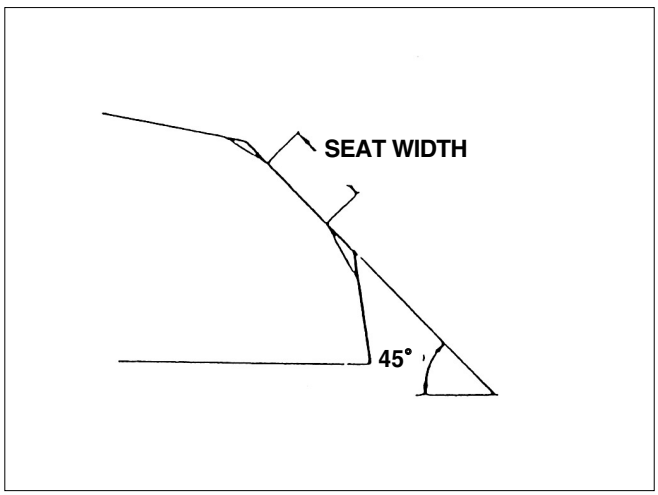
- Using a 45 degree cutter, remove any roughness or irregularities from the seat.



- Using a 35 degree cutter, remove ¼ of the existing valve seat material.

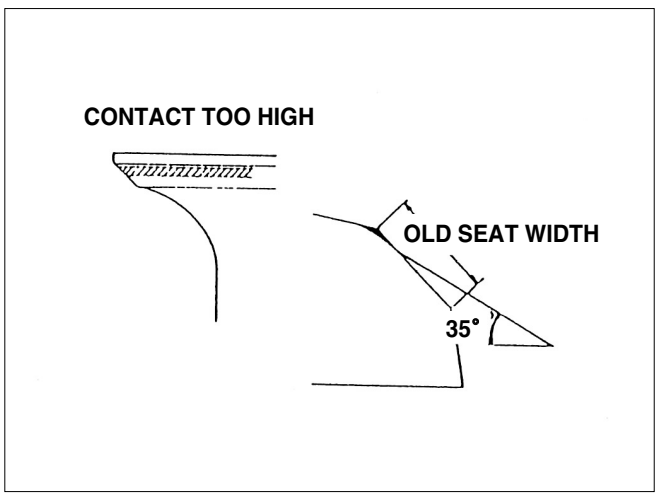


- Using a 60 degree cutter, remove the bottom ¼ of the old seat.

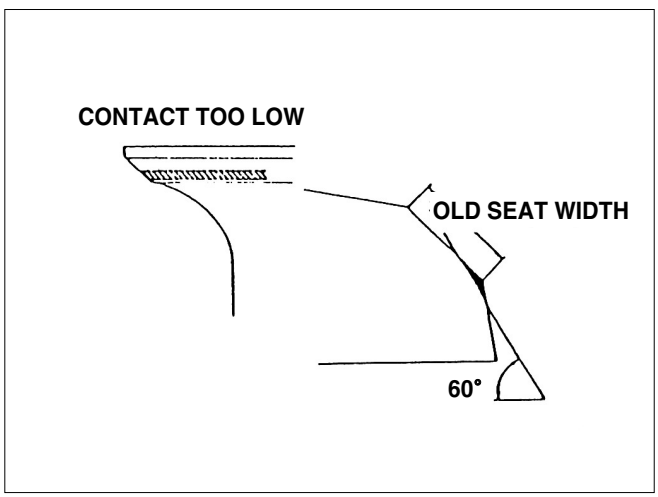


- Using a 45 degree cutter, cut the seat to the proper width.

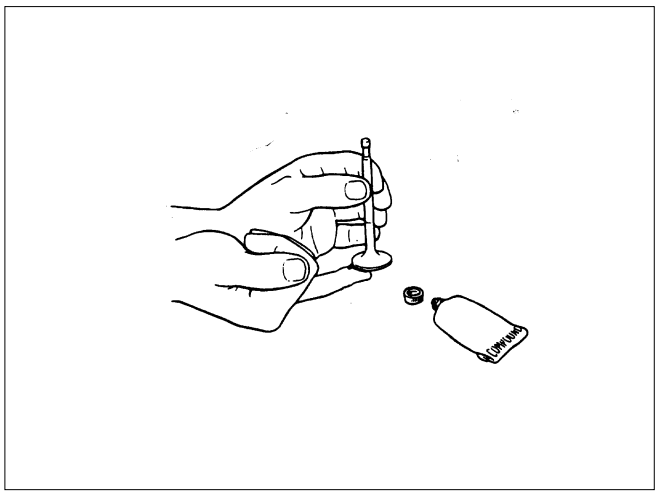
VALVE SEAT WIDTH : 0.9~1.1mm



- If the contact area is too high on the valve, the seat must be lowered using a 35 degree flat cutter.
- Refinish the seat to specifications, using a 45 degree finish cutter.



- If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.
- Refinish the seat to specifications, using a 45 degree finish cutter.

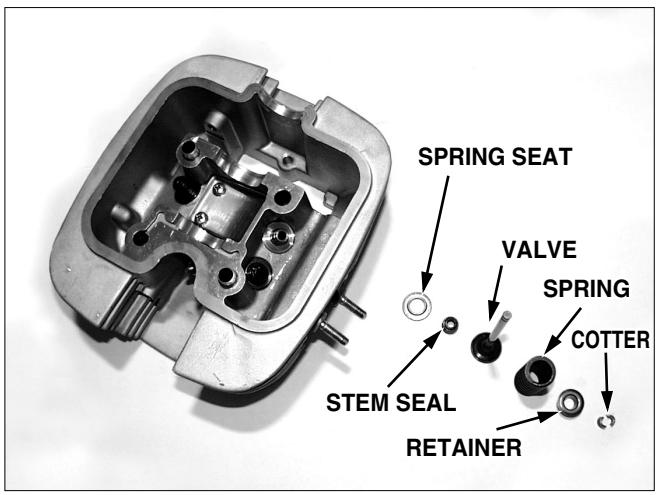


● After cutting the valve seat, apply lapping compound to the valve face, and insert the valve with a valve guide reamer.

⚠ NOTE

- Do not excessively press and turn the valve to set it as it may cause damage. Gently strike and set the valve.
- The seat surface may become worn on one side if the valve is set in the same position. Turn the valve slightly when setting it.
- Take precautions not to allow compound to get into the clearance between the stem and guide while the valve is being set.

CYLINDER HEAD ASSEMBLY



● Install new stem seals.

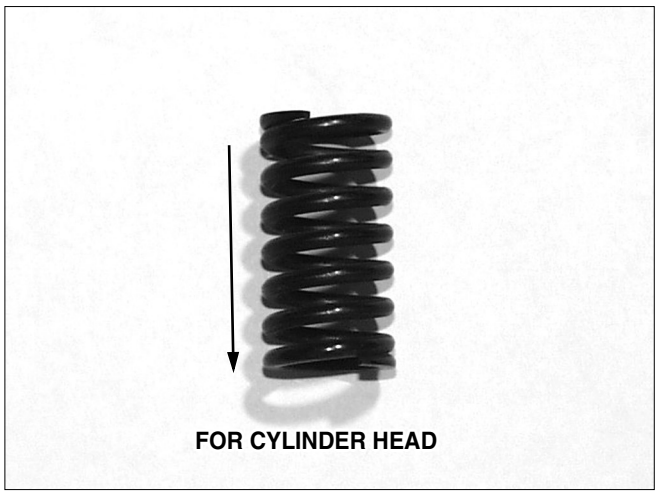
⚠ NOTE

- Replace the stem seals with new ones whenever a stem seal is removed.

● Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide.

⚠ CAUTION

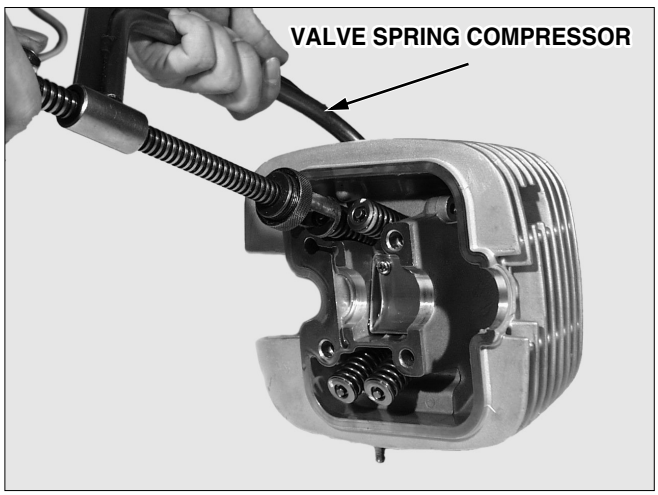
- Turning a valve too fast can damage the stem seals.



● Install the spring seats, valve springs and retainers.

⚠ NOTE

- For valve spring with varying pitch, install the valve springs with the narrow pitch end facing down.

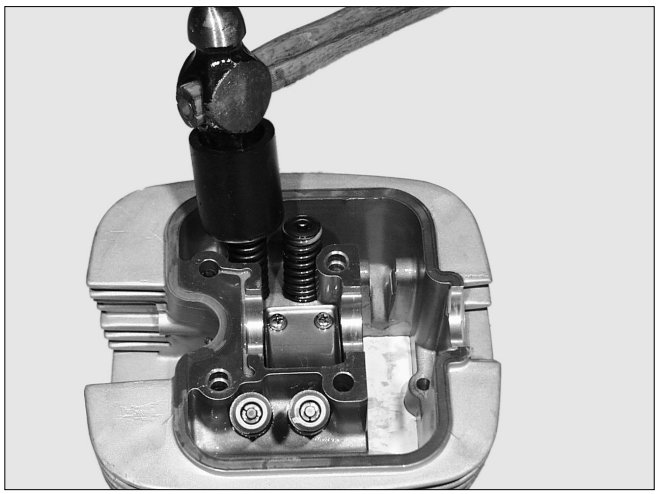


● Compress the valve springs with the valve spring compressor and install the valve cotters.

⚠ CAUTION

- Compressing the valve spring more than necessary when installing the valve cotters may cause loss of valve spring tension.

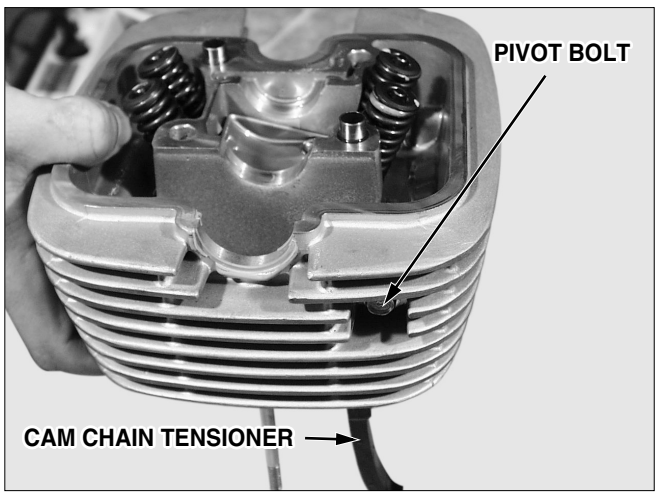
TOOL : VALVE SPRING COMPRESSOR



- Tap the valve stems gently with a soft hammer to firmly seat the cotters.

⚠ CAUTION

• Take necessary precautions not to damage the valve.

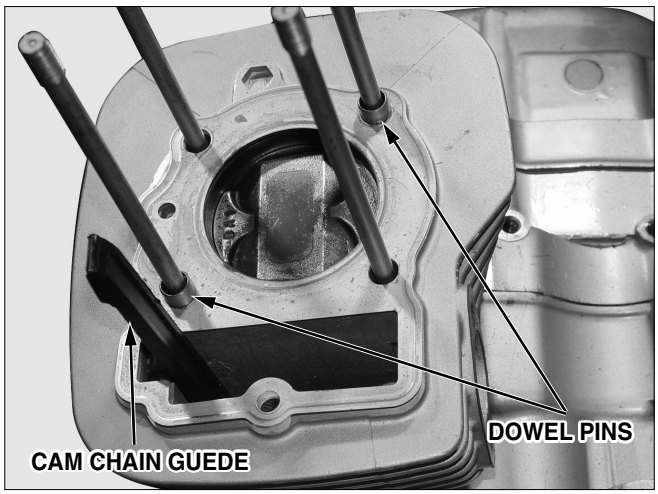


- Install the cam chain tensioner, and assemble pivot bolts.

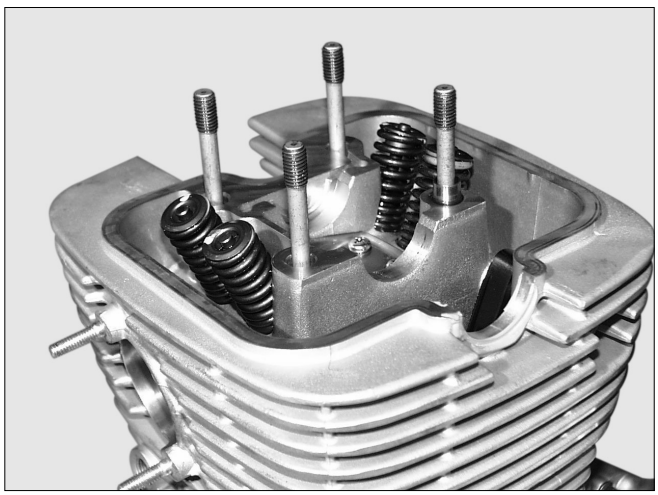
  TORQUE : 1.0 kgf · m (10N · m)

- Install the spark plug.

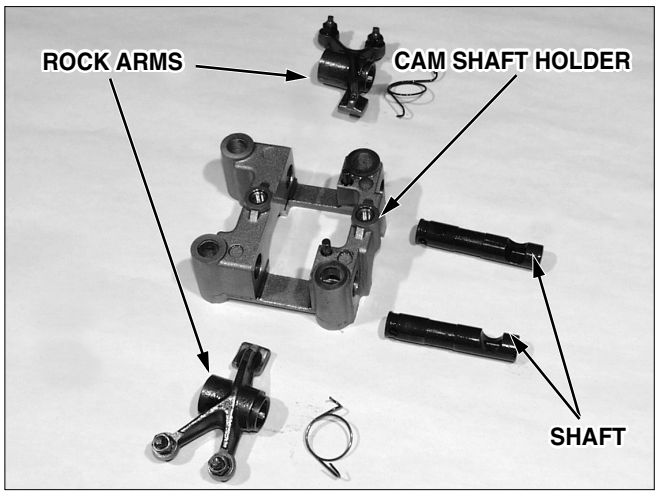
  TORQUE : 1.1 kgf · m (11N · m)



- Clean any gasket material from the cylinder mating surface.
- Install the cam chain guide to the cylinder.
- Install the dowel pins and new gasket.

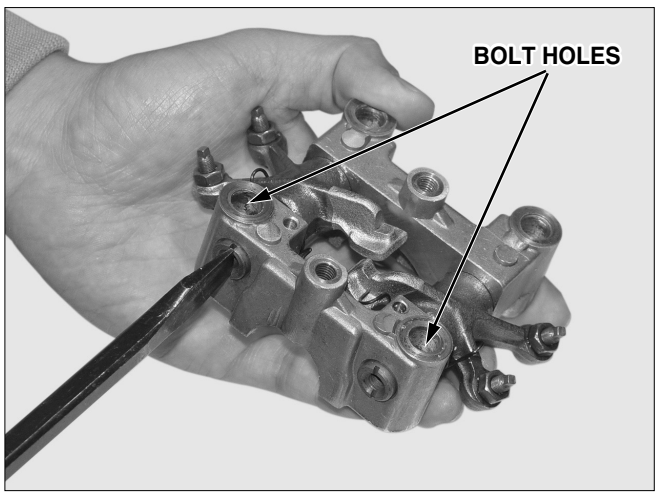


- Install the cylinder head.

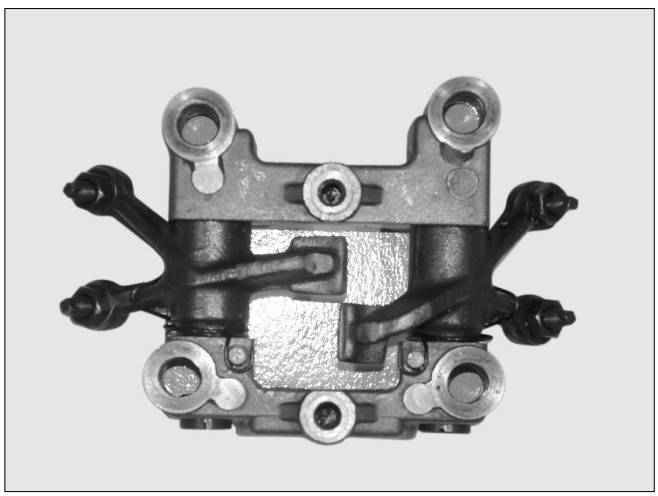


CAMSHAFT ASSEMBLY

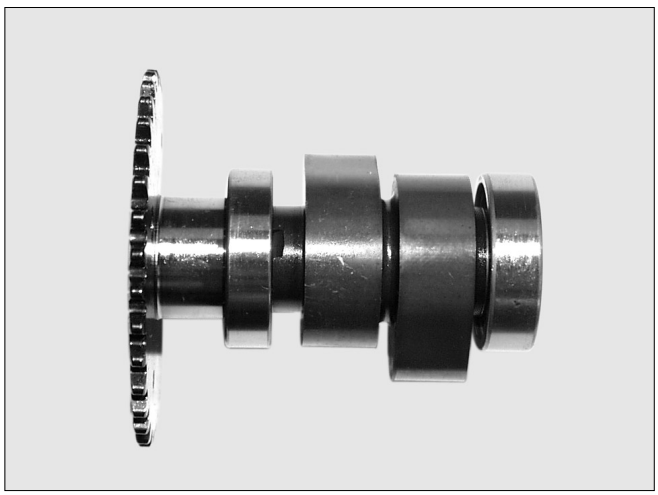
- Install the rocker arm spring and rocker arm on the camshaft holder.
- Apply engine oil to the rocker arm shaft, and assemble the rocker arm to the camshaft holder.



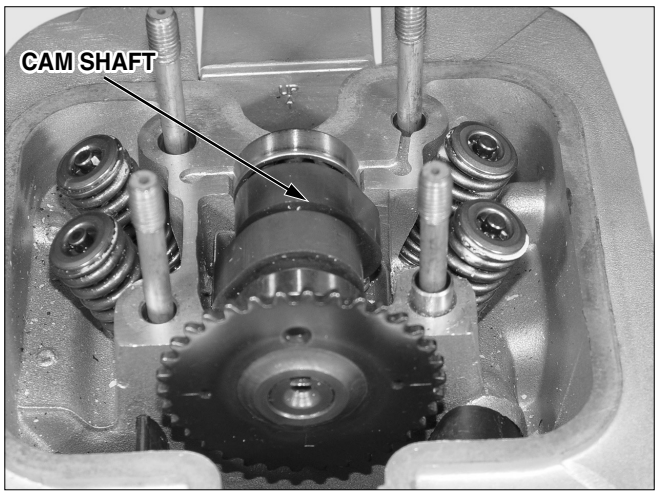
- Tighten the rocker arm shaft with driver, and align the bolt hole of the camshaft holder with the fitting side of the rocker arm shaft.



- Insert the dowel pins into the camshaft holder thoroughly. Align the rocker arm spring ends with the dowel pins as shown.



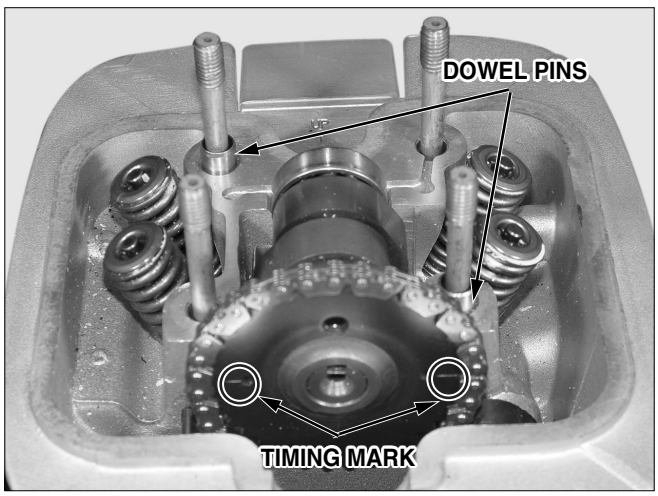
- Check the camshaft assembly for abnormal condition, and place it on the cylinder head.



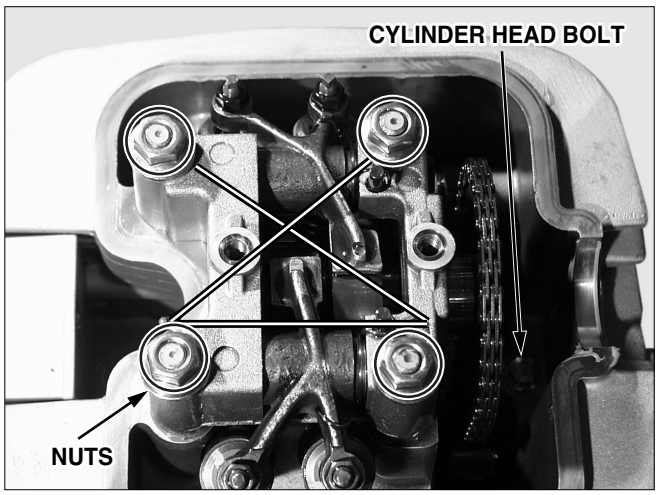
- Slowly rotate the crankshaft counterclockwise, and align the "T" mark of the flywheel with the index mark of the LH. crankcase cover.

⚠ CAUTION

- Take precautions not to allow the cam chain to come off the camshaft timing gear while turning the camshaft.



- Apply engine oil to the camshaft, and install it on the cylinder head with the cam thread facing downward.
- Assemble the cam chain and cam sprocket after matching the cam sprocket timing mark in parallel with the top of the cylinder head.
- Install the dowel pins on the cylinder head.



- Install the camshaft holder.

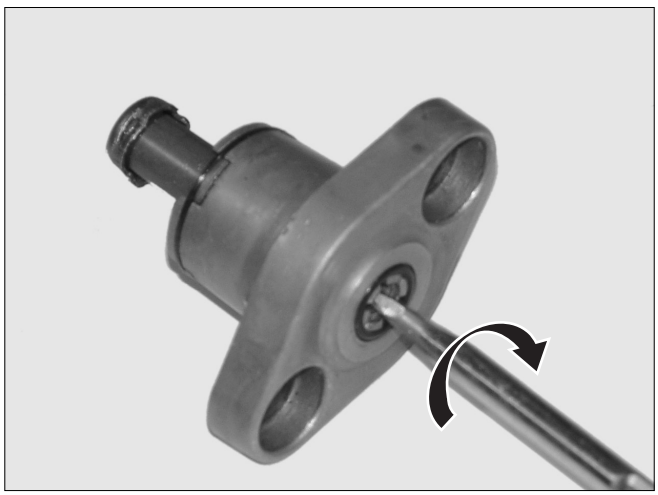
⚠ CAUTION

- The hole of the camshaft holder and the fitting section of the rocker arm shaft fit section must be in alignment.
- Of IN and EX, the shorter rocker arm should be installed on the IN side.

- Apply engine oil to the threaded part; install the camshaft holder nut and bolts, and tighten them driving with 2 - 3 times.

TORQUE : 2.0 kgf · m (20N · m)

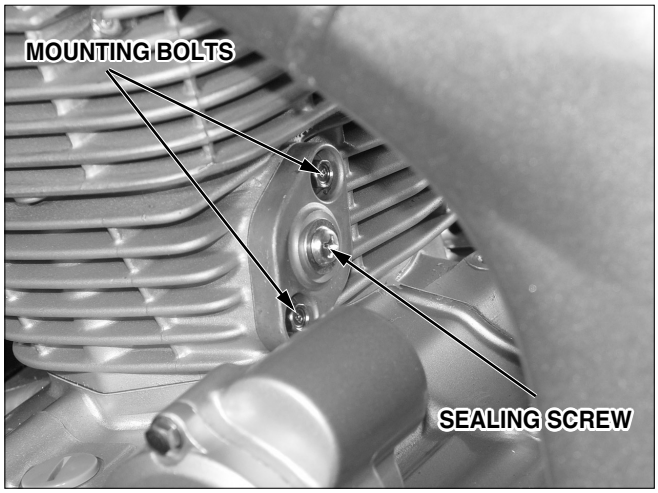
- Tighten the cylinder head bolt.



- Remove the pan screws and seals from the cam chain tensioner lifter.
- Rotate the tensioner shaft clockwise with a small driver, and insert the shaft into the body completely.

⚠ CAUTION

- If the cam chain tensioner lifter is dropped, the shaft will advance by the spring force.

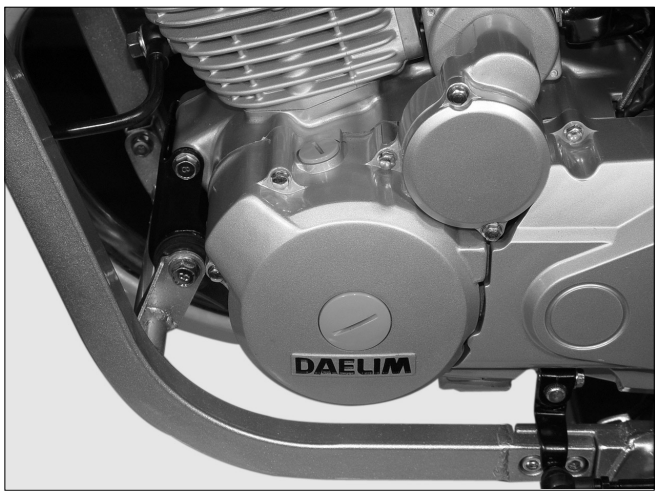


- Assemble a new gasket to the tensioner lifter, and install the tensioner lifter on the cylinder.
- Tighten the tensioner mounting bolts to the specified torque.

TORQUE : 1.2 kgf · m (12N · m)

- Install the O-ring and sealing screw to the tensioner lifer.
- Tighten the sealing screw to the specified torque.

TORQUE : 0.4 kgf · m (4N · m)

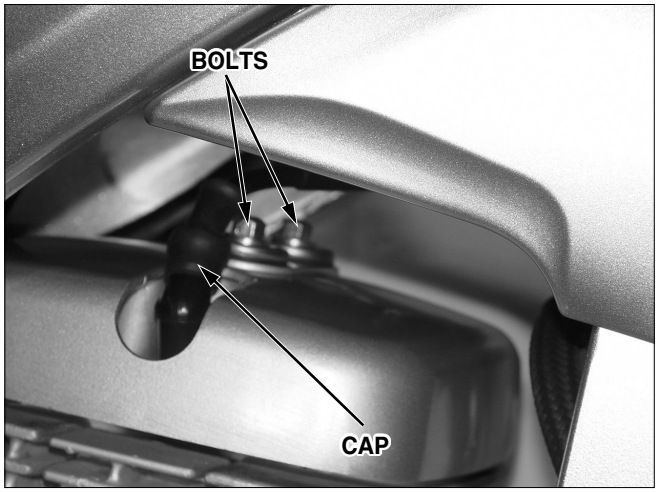


- Fill clean engine oil into the operating parts of the cylinder head.

- Adjust the valve clearance. (⇨ 2-6)
- Install the crankshaft hole cap and timing hole cap.

TORQUE :
CRANK SHAFT HOLE CAP : 0.8kgf · m(8N · m)
A.C.GENERATOR CAP : 0.6kgf · m(6N · m)

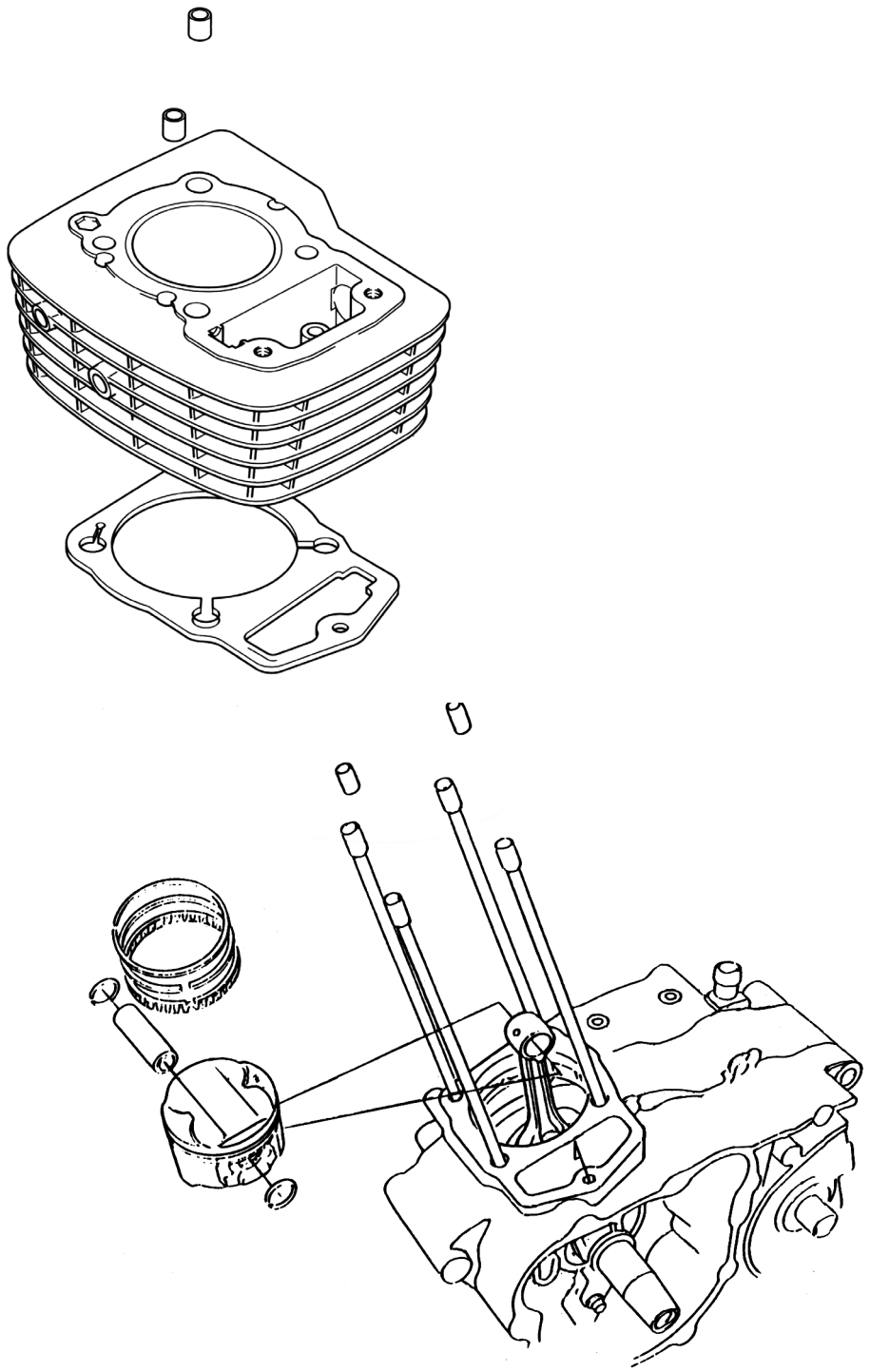
- Remove oil from the cylinder head cover grooves, and accurately assemble the gasket to the cylinder head cover.



- Install the cylinder head cover.
- Tighten the cylinder head cover bolts to the specified torque.

TORQUE : 1.0 kgf · m(10N · m)

- Install the noise suppressor cap assembly to the spark plug.



10. CYLINDER / PISTON

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 fins.
- Take care not to damage the cylinder wall and piston.
- Check parts after disassembling, and clean and dry with an air hose prior to taking measurements.

SPECIFICATIONS

Unit : mm

ITEM			STANDARD VALUE	SERVICE LIMIT
CYLINDER	INNER DIAMETER		56.500~56.510	56.600
	TAPER		-	0.050
	OUT-OF-ROUND		-	0.100
	HEAD CONTACT WARPAGE		-	0.100
PISTON, PISTON PIN, PISTON RING	PISTON SKIRT OUTER DIAMETER		56.470~56.490	56.370
	PISTON PIN HOLE INNER DIAMETER		15.002~15.008	15.040
	PISTON PIN OUTER DIAMETER		14.994~15.000	14.960
	PISTON-TO-PISTON PIN CLEARANCE		0.002~0.014	0.020
	PISTON RING-TO-GROOVE CLEARANCE	TOP	0.015~0.045	0.090
		SECOND	0.015~0.045	0.090
	PISTON RING JOINT GAP	TOP / SECOND	0.10~0.25	0.500
		OIL RING (SIDE RAIL)	0.20~0.70	1.100
CYLINDER-TO-PISTON CLEARANCE			0.010~0.040	0.150
CONNECTING ROD SMALL END INNER DIAMETER			15.010~15.028	15.060
GAP BETWEEN CONNECTING ROD SMALL END AND PISTON PIN			0.010~0.034	0.040

TROUBLESHOOTING

Compression too low

- Worn piston
- Worn, damaged piston ring
- Worn cylinder

Excessive smoke

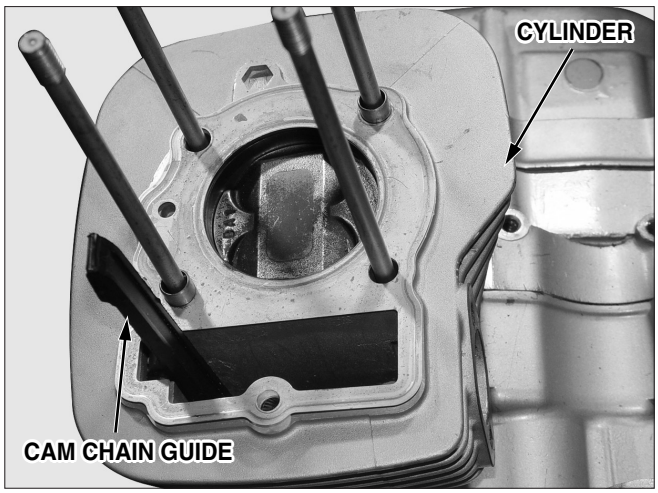
- Worn cylinder, piston or piston rings
- Improper installation of piston ring
- Scored or scratched piston or cylinder wall

Overheating

- Excessive carbon build-up on top of piston

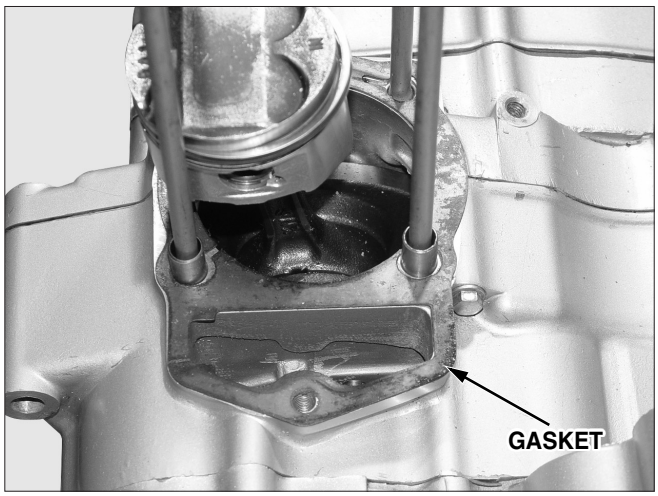
Abnormal noise

- Worn cylinder and piston
- Worn connecting rod small end bearing or piston pin
- Damaged piston ring
- Excessive carbon build-up on top of piston



CYLINDER REMOVAL

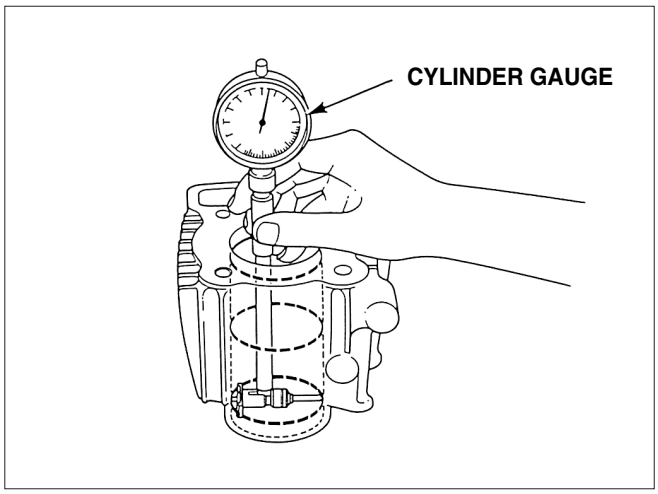
- Remove the cylinder head. (⇨9-5)
- Remove the cylinder head gasket.
- Remove the cam chain guide from the cylinder.
- Remove the cylinder.



- Remove the gasket and dowel pin. Carefully remove any adhering gasket material from the cylinder / head mating surface. Do not scratch the surface.

⚠ NOTE

• Take care not to damage the cylinder mating surface.



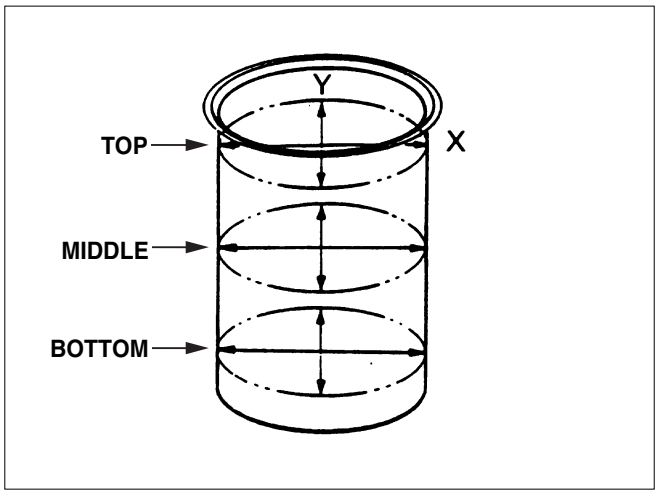
WEAR INSPECTION

- Inspect the cylinder wall for scratches and wear.
- Measure and record the cylinder inner diameter at three levels in both an X and Y axis.
- Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT : 56.600 mm

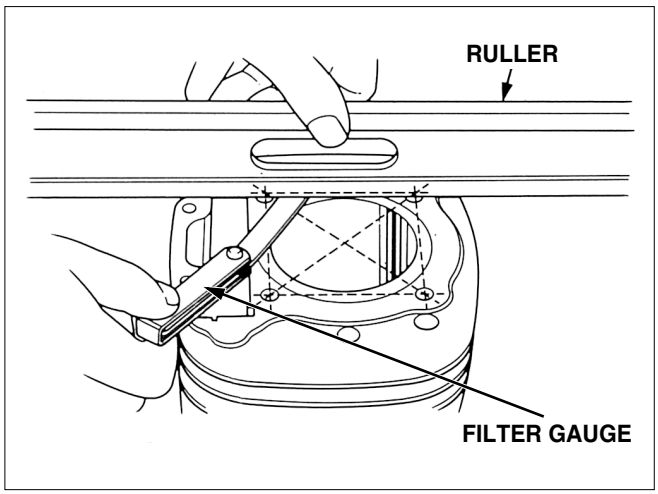
- Measure the piston outer diameter.
- Calculate the piston-to-cylinder clearance. Take the maximum reading to determine the clearance.

SERVICE LIMIT : 0.150 mm



- Calculate the cylinder for out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the out-of-round.
- Calculate the cylinder for taper at three levels in an X and Y axis. Take the maximum reading to determine the taper.
- If any of the cylinder measurements exceed the service limits, replace the cylinder.

SERVICE LIMIT : OUT-OF-ROUND : 0.100 mm
TAPER : 0.050 mm



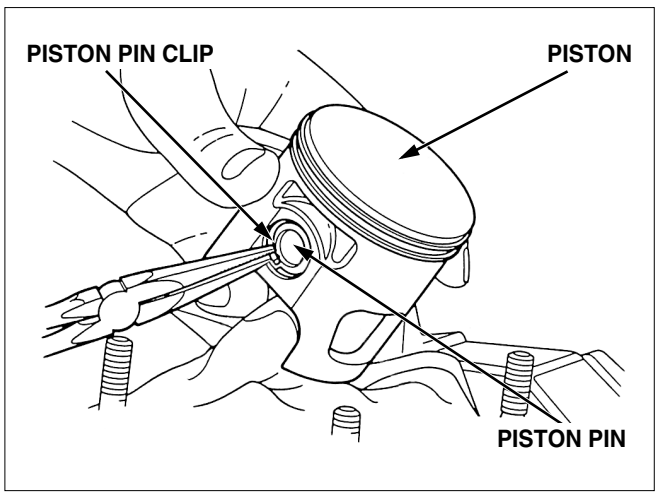
WARPAGE INSPECTION

- Check the cylinder for warpage by placing a straight edge and feeler gauge across the stud holes. Replace the cylinder if the service limit is exceeded.

SERVICE LIMIT : 0.100 mm

⚠ NOTE

· Any clearance between the cylinder and head due to damage or warpage will result in compression leaks and reduced performance.



PISTON / PISTON RING

REMOVAL

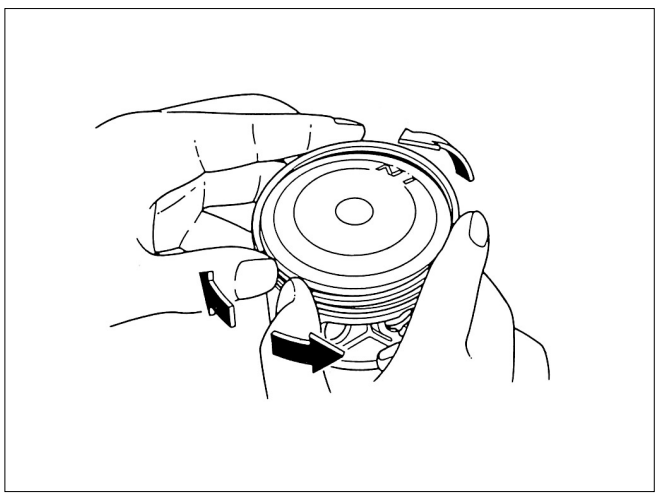
⚠ NOTE

· Place a clean shop towel over the crankcase to prevent the possibility of the clip falling into the crankcase.

- Remove the piston pin clip using a pair of pliers.
- Press the piston pin out of the piston.

⚠ NOTE

· Do not damage or scratch the piston.
· Do not apply side force to the connecting rod.
· Do not let the clip fall into the crankcase.

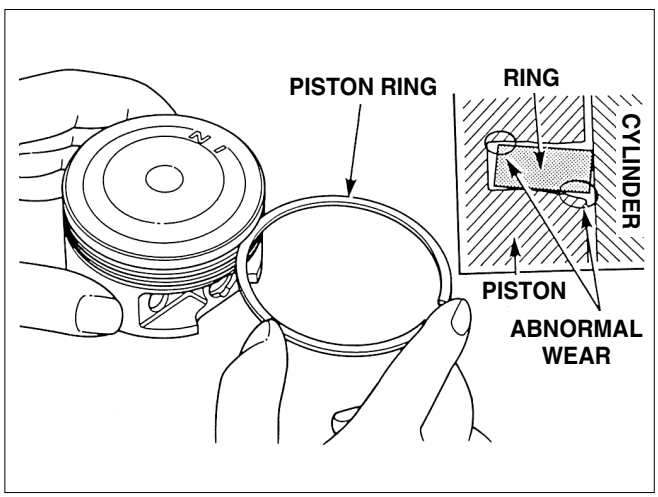


PISTON DISASSEMBLY

- Clean carbon deposits from the piston.
- Inspect the piston rings for movement by pressing the rings. The rings should be able to move in its groove without catching.
- Spread each piston ring and remove it by lifting it up at a point just opposite the gap.

⚠ CAUTION

· Do not damage the piston ring by spreading the ends too far.

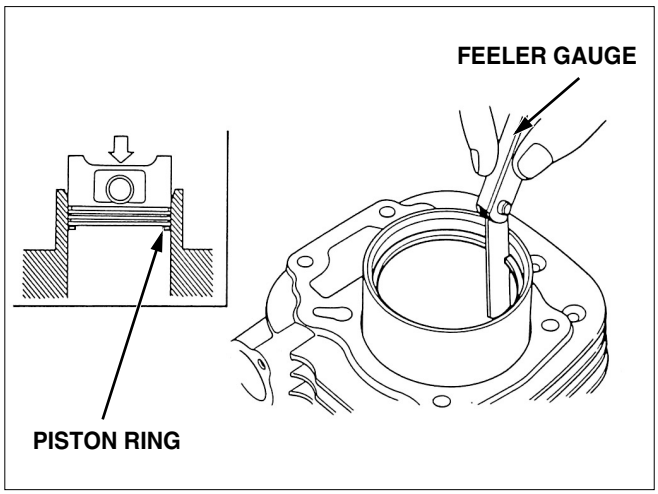


PISTON INSPECTION

- Measure the clearance between the piston ring and piston grooves.

SERVICE LIMIT : TOP : 0.090 mm
SECOND : 0.090 mm
OIL RING : 0.090 mm

- Inspect the piston for wear or damage.



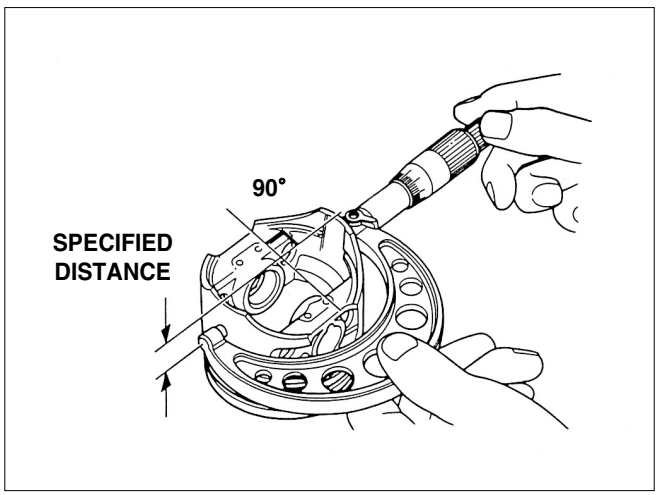
- Insert the piston ring squarely into the bottom of the cylinder, using the piston.

⚠ NOTE

· Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

- Measure the end gap using a feeler gauge. Replace the ring if the service limit is exceeded.

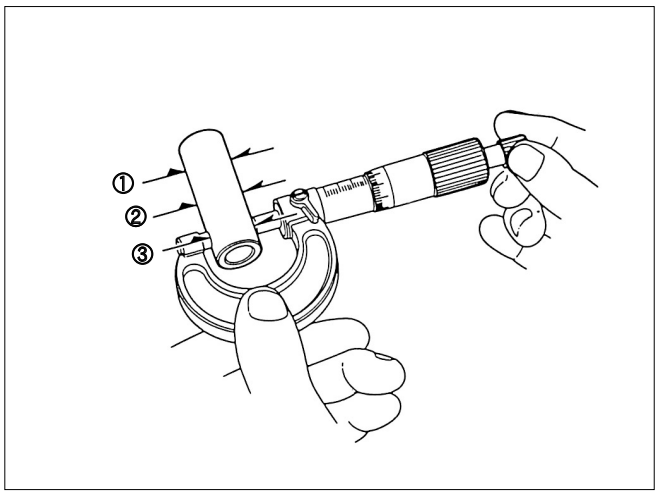
SERVICE LIMIT : TOP / SECOND : 0.50 mm
OIL RING (SIDE RAIL) : 1.10 mm
TOOL : FEELER GAUGE



- Measure and record the piston outer diameter 90° to the piston pin bore and at the point specified (10mm), near the bottom of the piston skirt.
- Replace the piston if the service limit is exceeded.

SERVICE LIMIT : 56.370 mm

PISTON PIN INSPECTION



- Measure the piston pin bore inner diameter in an X and Y axis. Take the maximum reading to determine the inner diameter.
- Replace the piston if the inner diameter is over the service limit.

SERVICE LIMIT : 15.040 mm

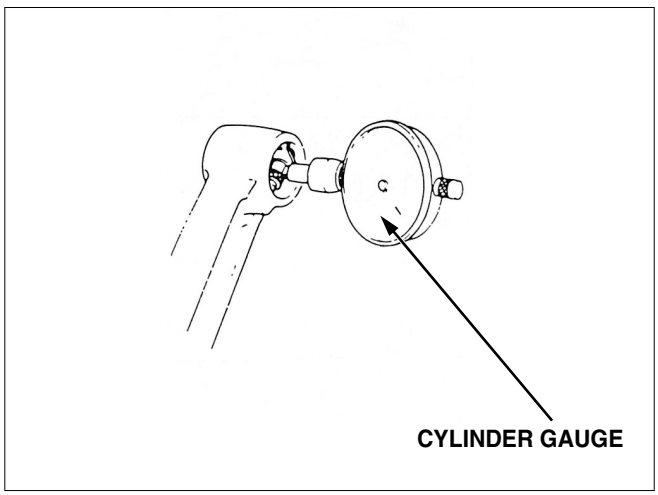
- Measure the piston pin outer diameter at three points.
- Replace the piston pin if the service limit is exceeded.

SERVICE LIMIT : 14.960 mm

- Calculate the piston pin-to-pin bore clearance by subtracting the piston pin outer diameter from the pin bore inner diameter.

SERVICE LIMIT : 0.020 mm

SMALL END BEARING SURFACE INSPECTION

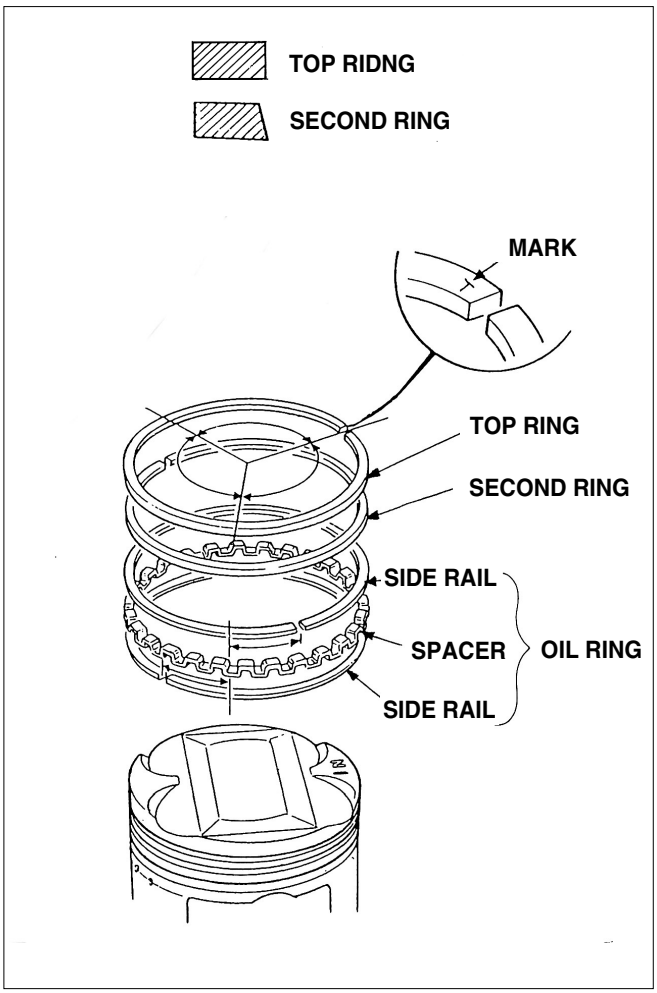


- Measure the inner dismeter of the connecting rod small end.

SERVICE LIMIT : 15.060 mm

- Calculate the connecting rod small end-to-piston pin clearance.

SERVICE LIMIT : 0.040 mm



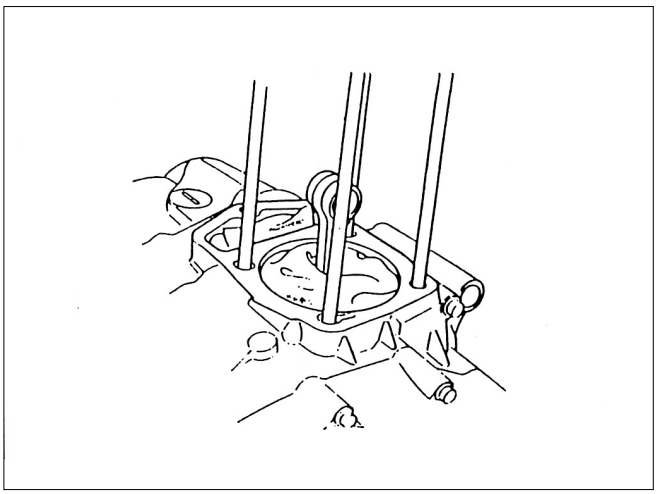
PISTON ASSEMBLY

- Clean the piston heads, ring lands and skirts.
- Carefully install the piston rings onto the piston with the markings facing up.

⚠ NOTE

- Be careful not to damage the piston and rings during assembly.
- Do not confuse the top and second rings.
- Space the ring end gaps 120 degrees apart.
- Space the side rail gaps 40mm or more apart as shown.

- After installation, the rings should rotate freely in the ring grooves.



PISTON INSTALLATION

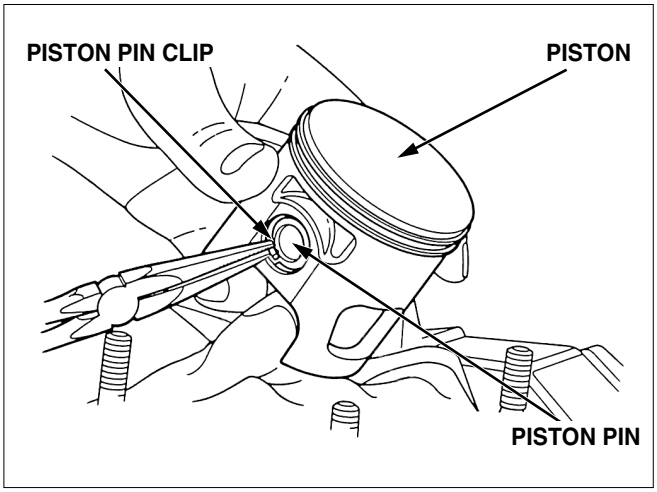
⚠ NOTE

- Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

- Install the piston and insert the piston pin.

⚠ NOTE

- The mark that is stamped on the piston head should be facing the correct direction.
  "IN" MARK : TO INTAKE SIDE
  "EX" MARK : TO EXHAUST SIDE



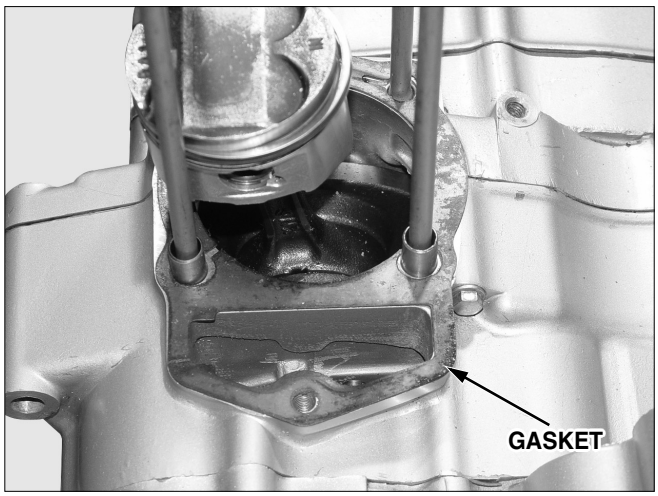
- Install new piston pin clips.

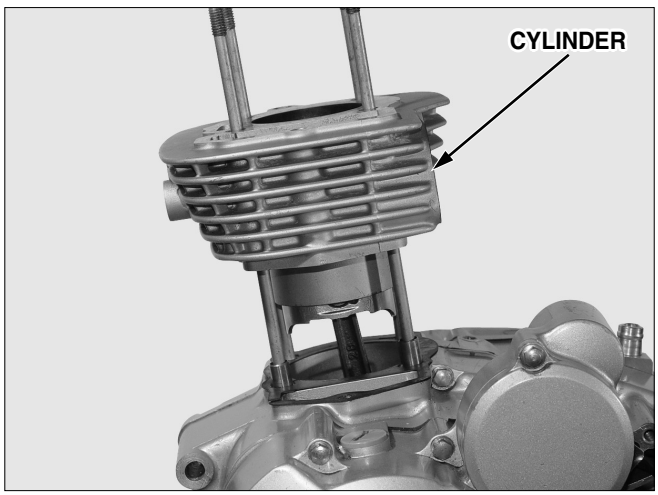
⚠ CAUTION

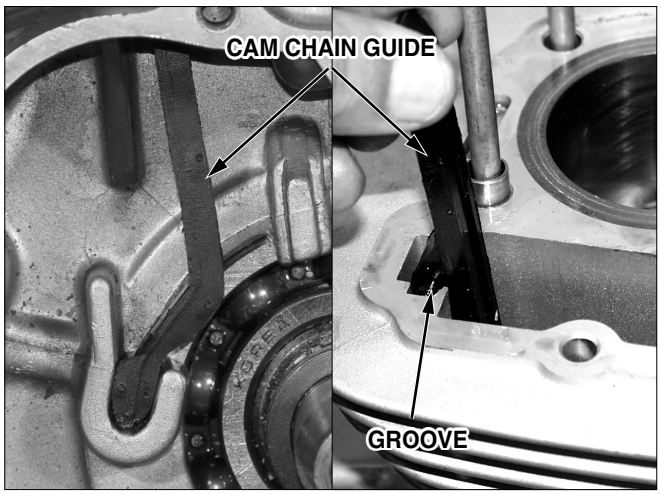
- Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.

⚠ NOTE

- Take care not to drop the piston pin clip into the crankcase.
- Set the piston pin clip in the groove properly.
- Do not align the clip's end gap with the piston cutout.







CYLINDER INSTALLATION

- Make sure that the piston ring end gap is correct.
- Carefully remove any adhering gasket material from the cylinder / head mating surface. Do not scratch the surface.
- Install a new cylinder gasket and dowel pins.

⚠ NOTE

・Take care not to damage the cylinder mating surface.

- Coat the cylinder wall with clean engine oil and lubricate the piston rings and install the cylinder.

⚠ NOTE

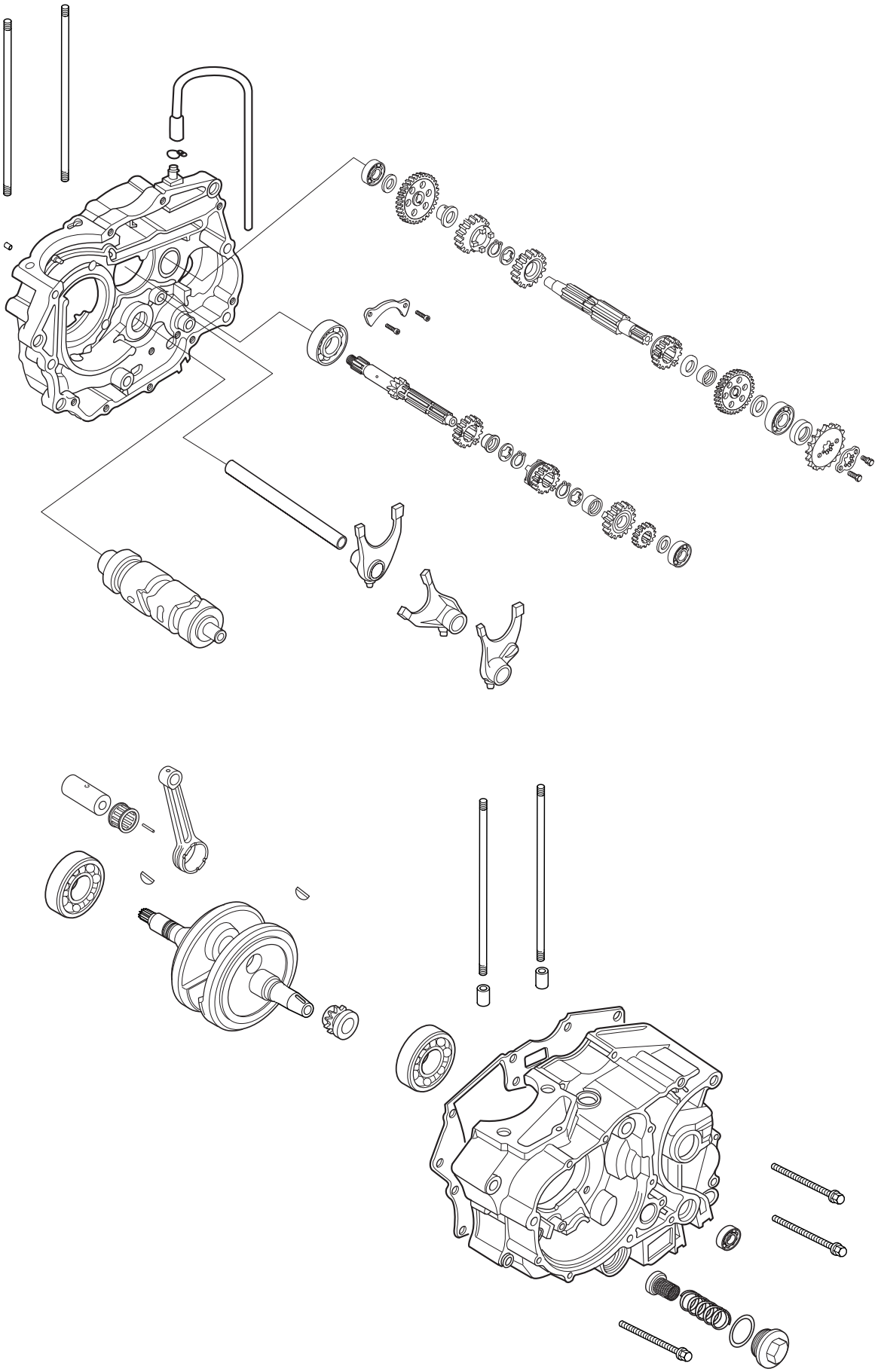
・Be careful not to damage the piston rings.
・Be careful not to drop the cam chain into the crankcase.

- Tighten the cylinder bolt.

- Install the lower part of the cam chain guide to the "凹" part of the crankcase, and install the cam chain guide by aligning the projection part with the "凹" part of cylinder.

- Install the cylinder head. (⇨9-12)

MEMO



11. CRANKCASE/TRANSMISSION/CRANKSHAFT

SERVICE INFORMATION

GENERAL SAFETY

- To service the transmission, crank shaft and kick starter, the crankcase should be disassembled.
- Before disassembling the crankcase, the following parts must be removed.
  - CLUTCH, GEAR SHIFT SPINDLE (⇨ SECTION 7)
  - A.C. GENERATOR, STARTER CLUTCH (⇨ SECTION 8)
  - CYLINDER HEAD (⇨ SECTION 9)
  - CYLINDER, PISTON (⇨ SECTION 10)
  - STARTER MOTOR (⇨ SECTION 18)

SPECIFICATIONS

Unit: mm

ITEM			STANDARD VALUE	SERVICE LIMIT
SHIFT FORK/SHAFT	FORK	I.D.	12.000~12.018	12.050
		POLE THICKNESS	4.930~5.000	4.500
	SHAFT O.D.		11.976~11.994	11.960
TRANSMISSION	MAIN SHAFT O.D.	M3, M5	19.967~19.980	19.930
	COUNTER SHAFT O.D.	C1	16.466~16.484	16.440
		C2	19.974~19.987	19.940
		C4	19.959~19.980	19.930
	GEAR I.D.	M5	23.000~23.021	23.050
		M3, C2	23.020~23.041	23.070
		C4	20.020~20.041	20.070
		C1	20.000~20.021	20.050
	GEAR BUSHING O.D.	M5	22.959~22.980	22.930
		M3, C2	22.979~23.000	22.950
		C1	19.959~19.980	19.930
	GEAR-TO-BUSHING I.D.	M3, C2	20.000~20.021	20.050
		C1	16.500~16.518	16.550
	GEAR-TO-BUSHING CLEARANCE	M3, M5 C1, C2	0.020~0.062	0.100
	GEAR-TO-SHAFT CLEARANCE	C4	0.040~0.082	0.120
	BUSH-TO-SHAFT CLEARANCE	M3	0.200~0.062	0.100
		C1	0.016~0.052	0.090
		C2	0.013~0.047	0.090

Unit: mm

ITEM			STANDARD VALUE	SERVICE LIMIT
CRANKSHAFT	CONNECTING ROD BIG END SIDE CLEARANCE		0.050~0.300	0.600
	CONNECTING ROD BID END VERTICAL DIRECTION CLEARANCE		0~0.008	0.050
	CRANKSHAFT RUNOUT	RIGHT	———	0.100
		LEFT	———	0.100

TORQUE VALUES

MAIN SHAFT BEARING SETTING PLATE 1.2kgf · m(12N · m)
CRANKCASE BOLT 1.1kgf · m(11N · m)

TOOLS

UNIVERSAL BEARING PULLER
BEARING REMOVER SET, 15mm
REMOVER ASSEMBLY 15mm
REMOVER SHAFT
REMOVER HEAD
SLIDING WEIGHT
THREAD ADAPTER
ASSEMBLY SHAFT
CRANKCASE ASSEMBLY COLLAR

TROUBLESHOOTING

Hard to shift

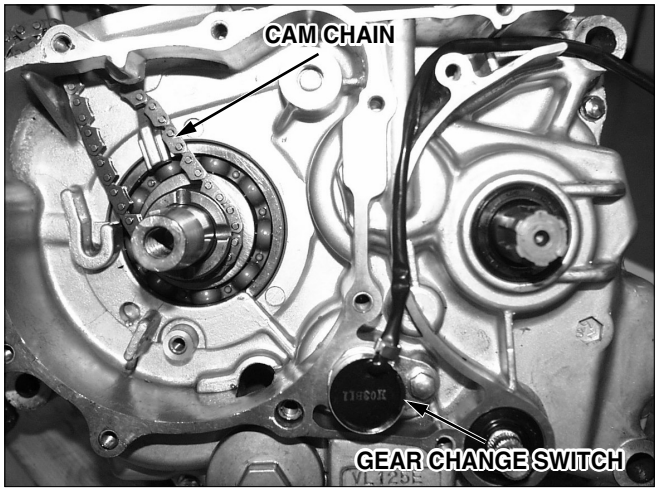
- Incorrect clutch system adjustment (Free play is too big)
- Shift fork bent
- Shift fork shaft bent
- Gear shift spindle claw bent
- Shift drum guide grooves damaged
- Shift drum guide pin damaged.

Transmission jumps out of gear

- Gear dogs worn
- Shift fork shaft bent
- Shift drum stopper damaged
- Shift drum guide grooves worn
- Gear shift fork slot worn

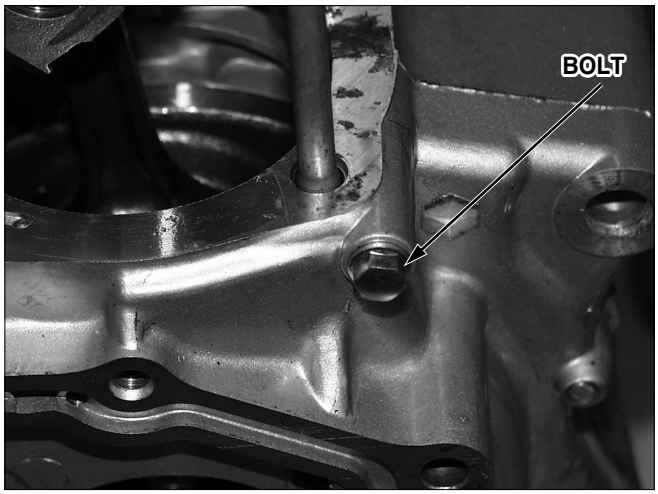
Engine noise

- Connecting rod big end bearing worn
- Connecting rod bent
- Crank shaft main bearing worn
- Transmission gear worn

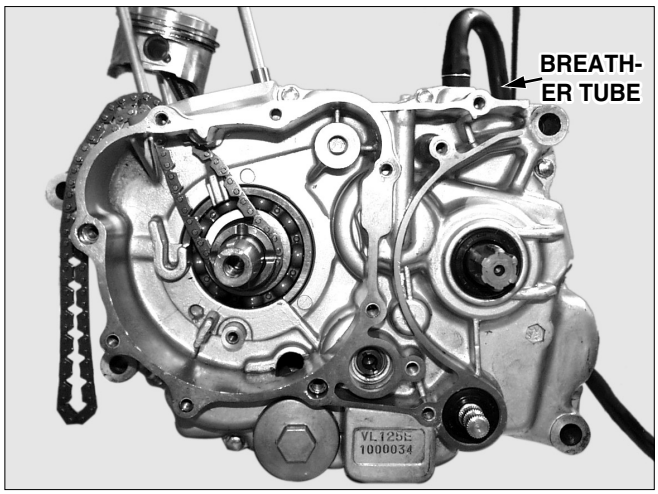


CRANKCASE DISASSEMBLY

- The engine must be separated from the frame. (⇨ section 6)
- Refer to the service information for removal of necessary parts before disassembling the crankcase.
- Remove the gear change switch.



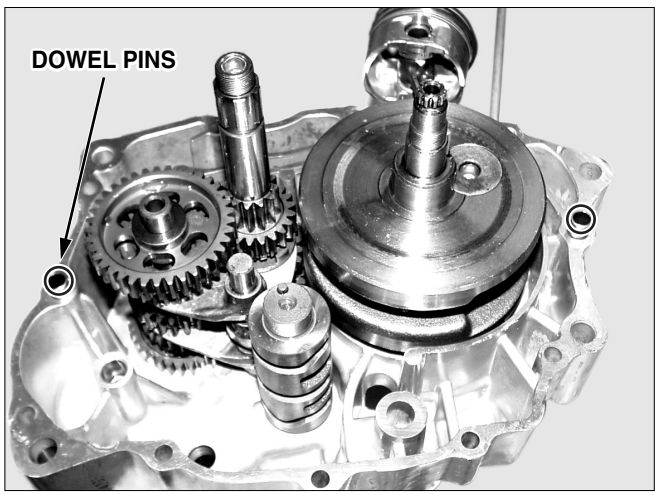
- Remove the 6mm bolt from the right crankcase.



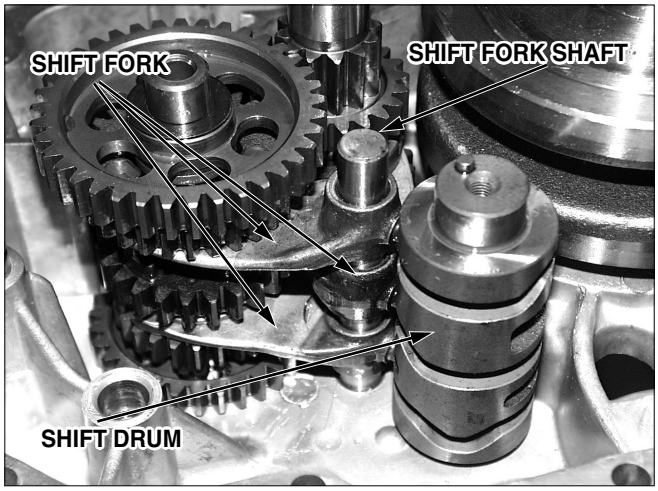
- Remove the cam chain.
- Remove the crankcase breather tube.
- Loosen the ten 6mm crankcase bolts in a crisscross pattern in 2~3 steps, remove the bolts.
- Place the crank case down, and separate the right crankcase from the left crankcase by tapping the crankcase with a soft hammer.

⚠ NOTE

• Be careful not to distort the mating surface of the crankcase during removal.

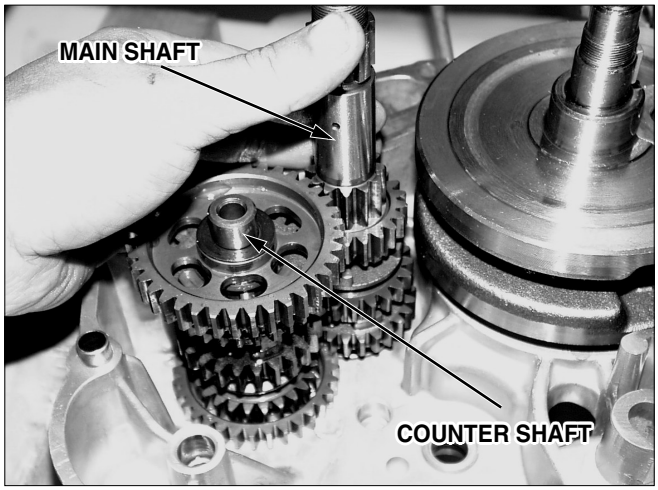


- Remove the dowel pins and gasket.

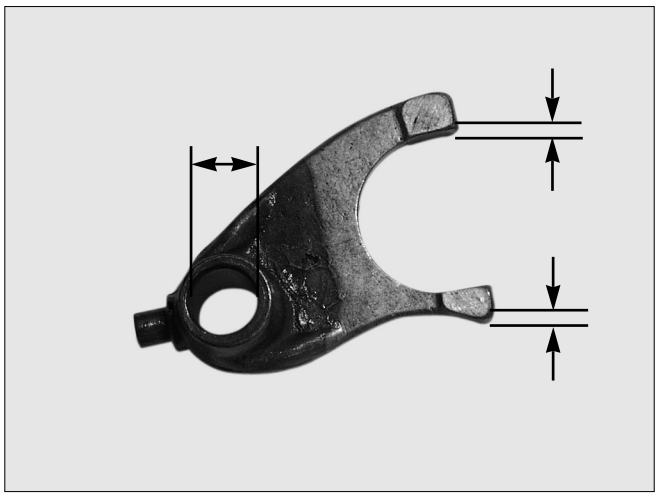


TRANSMISSION DISASSEMBLY

- Remove the shift fork shaft.
- Remove the shift fork and the shift drum.



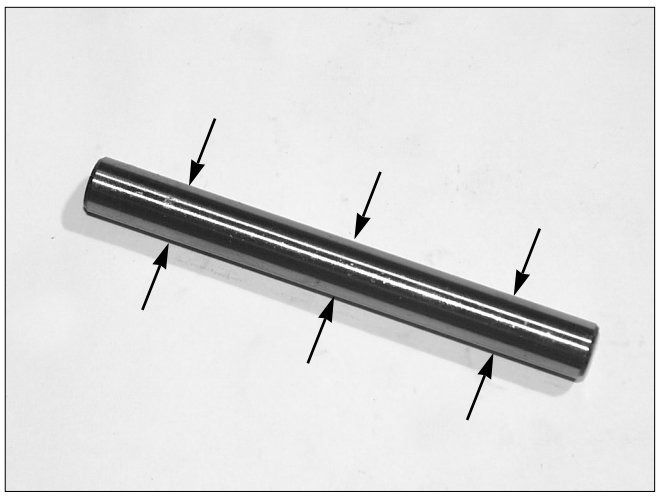
- Remove the main shaft and the counter shaft as an assembly.
- Disassemble the main shaft and the counter shaft.



INSPECTION

- Check the shift fork for wear or damage.
- Measure the shift fork inside diameter and projecting parts thickness in shift fork.

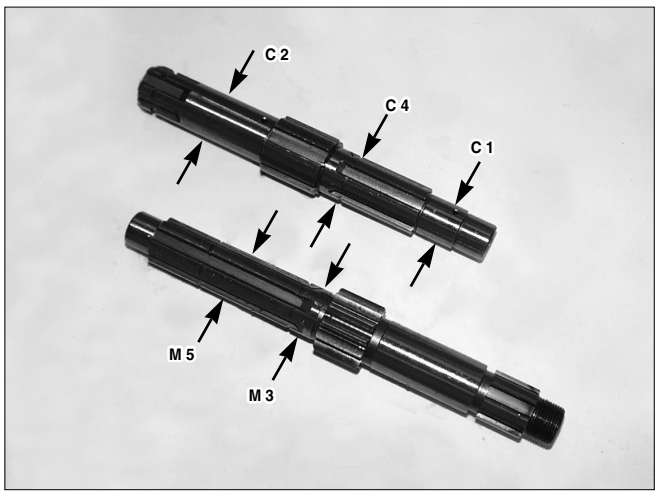
SERVICE LIMIT :
INSIDE DIAMETER : 12.050mm
PROJECTING PARTS THICKNESS : 4.500mm



- Check the shift fork shaft for wear or damage.
- Measure the shift fork shaft outside diameter in friction part.

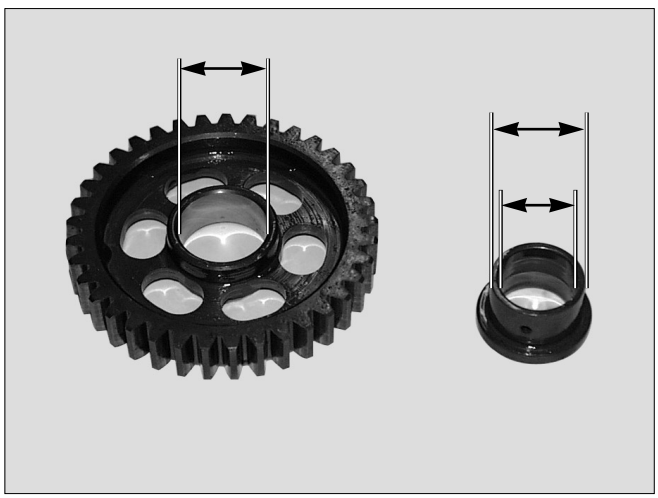
SERVICE LIMIT : 11.960mm

- Check the shift drum for wear or damage.
- Check the shift drum guide groove for partial wear or damage.



- Measure the main shaft and counter shaft outside diameter.

SERVICE LIMIT : M3, M5 : 19.930mm
C1 : 16.440mm
C2 : 19.940mm
C4 : 19.930mm



- Check the gear for hole, projection part in gear, shift groove, gear wear, and damage.
- Measure the gear inside diameter.

SERVICE LIMIT : M5 : 23.050mm
M3, C2 : 23.070mm
C4 : 20.070mm
C1 : 20.050mm

- Measure the gear bush inside diameter and outside diameter.

SERVICE LIMIT :
M5 : OUTSIDE DIAMETER : 22.930mm
M3, M2 OUTSIDE DIAMETER : 22.950mm
C1 OUTSIDE DIAMETER : 19.930mm
M3, C2 INSIDE DIAMETER : 20.050mm
C1 INSIDE DIAMETER : 16.550mm

- Measure out the gear-to-bush clearance.

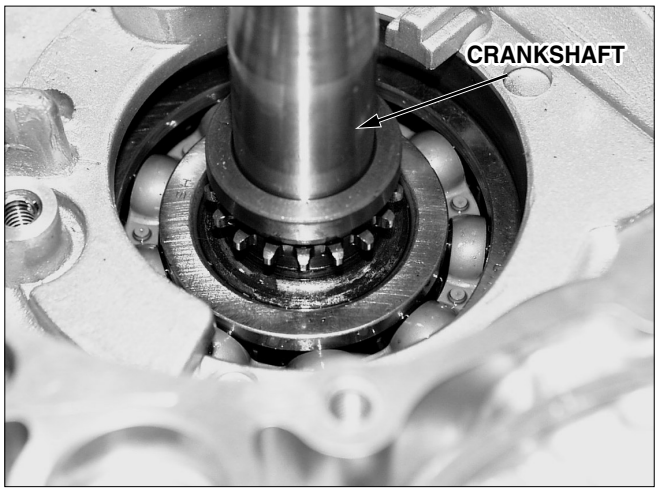
SERVICE LIMIT :
M3, M5, C1, C2 : 0.100mm

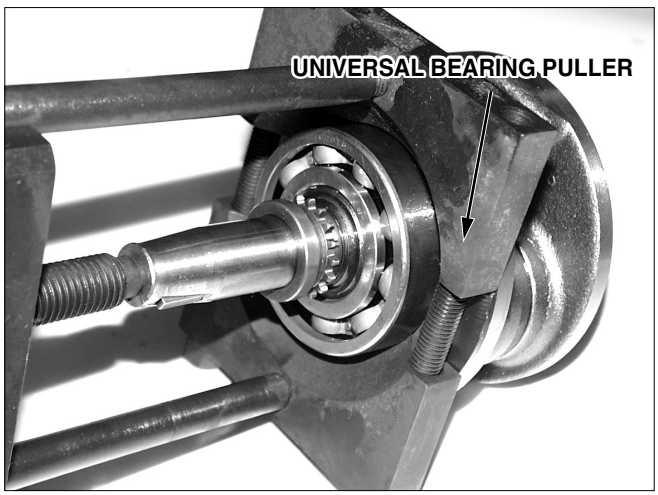
- Measure out the gear-to-shaft clearance.

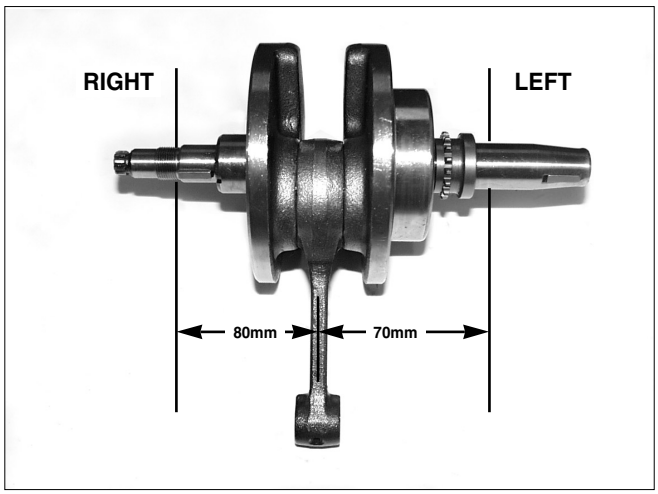
SERVICE LIMIT : C4 :0.120mm

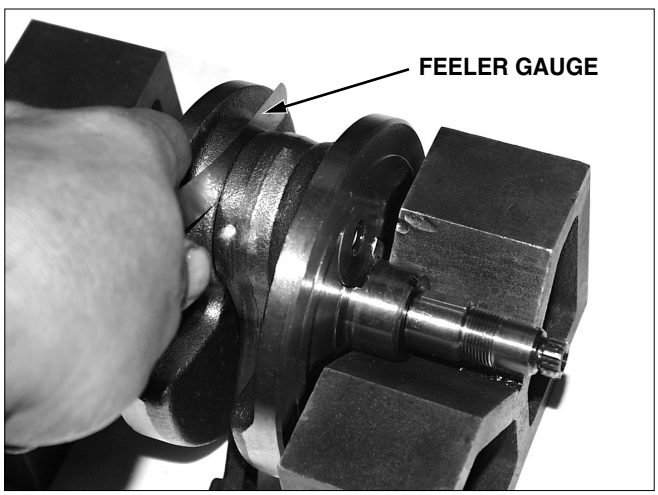
- Measure out the bush-to-shaft clearance.

SERVICE LIMIT : M3 : 0.100mm
C1 : 0.090mm
C2 : 0.090mm









CRANKSHAFT

REMOVAL

- Remove the transmission. (⇨11-4)
- Remove the crankshaft from the left crankcase using a crankshaft separating tool.
- Remove the remaining bearings in the left crankcase with a driver handle and outer driver.

TOOLS : DRIVER
ATTACHMENT, 42 X 47 mm

- If the bearing is left on the crankshaft, use a bearing puller to remove it.

TOOL : UNIVERSAL BEARING PULLER

⚠ NOTE

• After removing the crankshaft from the LH. crankcase, replace the LH. crankshaft bearing with a new one.

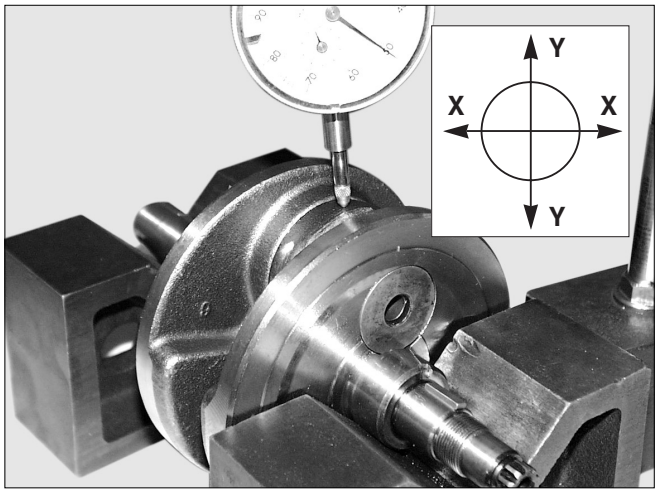
INSPECTION

- Place the crankshaft on a stand or V-block, and measure the crankshaft runout using dial gauge.

SERVICE LIMIT : RIGHT : 0.100 mm
LEFT : 0.100 mm

- Measure the side clearance by inserting the feeler gauge between the crankshaft and connecting rod big end as shown.

SERVICE LIMIT : 0.600mm
TOOL : FEELER GAUGE



- Measure the connecting rod radial clearance in both X and Y directions.
- Replace the crankshaft if the service limit is exceeded.

SERVICE LIMIT : 0.050 mm

CRANKCASE BEARING

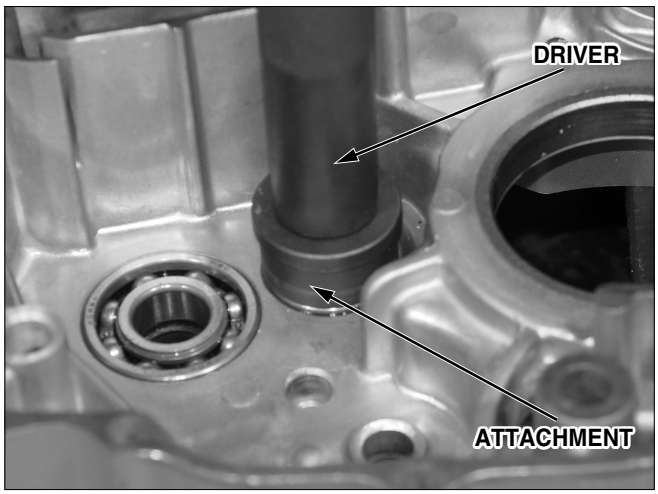
- Remove the transmission and crank shaft.

INSPECTION

- Turn the Inner race of bearing with fingers and inspect for smooth turning. Also inspect that the outer race is driven into the case exactly. If the clearance is excessive, or the driving for the case is loose, remove and replace them.

⚠ CAUTION

• Replace the transmission bearing with the right and left sets.



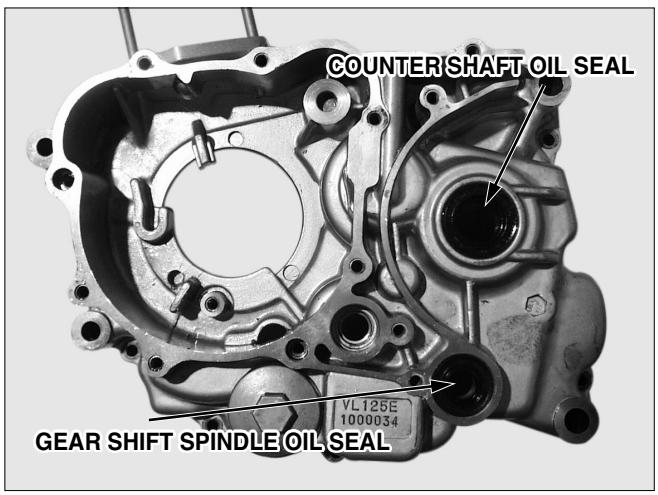
REPLACEMENT

LH. Crankcase

- Remove the main shaft bearing with the tools.

TOOL : BEARING REMOVER SET

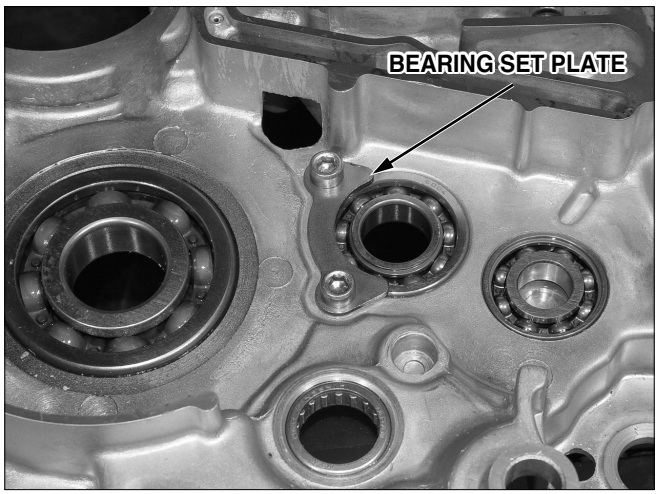
- Remove the counter shaft bearing and oil seal.



- Coat the new bearing with clean engine oil, and install it into the crank case.

TOOLS : MAIN SHAFT BEARING :
- DRIVER
- ATTACHMENT, 32 × 35mm
COUNTER SHAFT BEARING:
- DRIVER
- ATTACHMENT, 42 × 47mm
- PILOT, 20mm

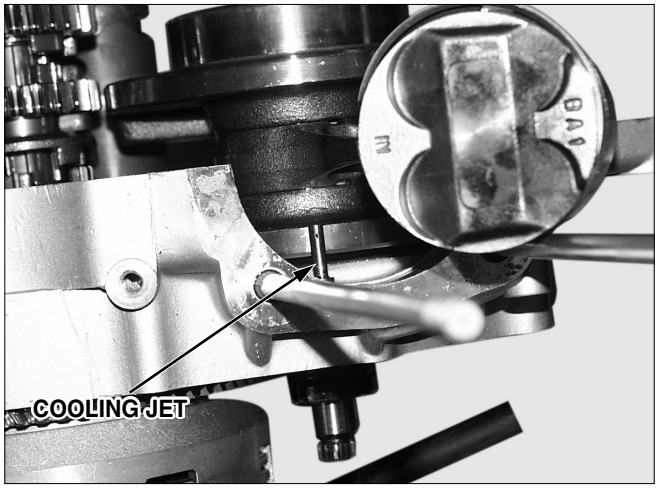
- Install the new counter shaft oil seal.
- Inspect the gear shift spindle oil seal for wear and damage, it must be replaced if necessary.



RH. Crank Case

- Remove the main shaft bearing set plate.
- Remove the main shaft bearing, counter shaft bearing and crank shaft bearing form crankcase.

- Coat the new bearing with clean engine oil and install it into crankcase.

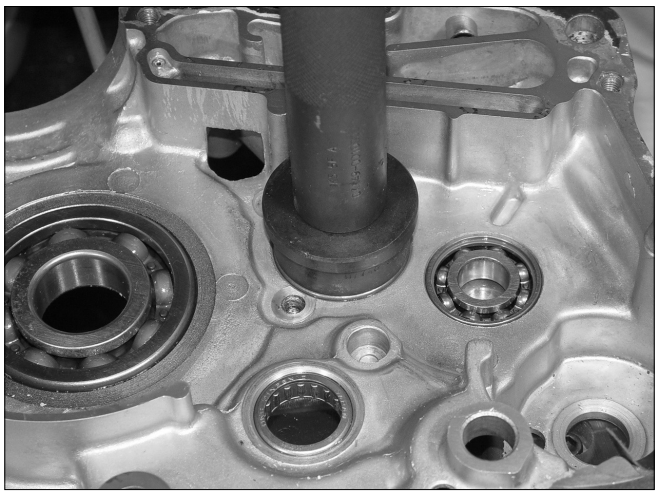


- Insert closely the cooling jet into crankcase.
  - Insert angle: 10° ±2°

TOOLS :
MAIN SHAFT BEARING :
- DRIVER / ATTACHMENT, 42 × 47mm / PILOT, 20mm

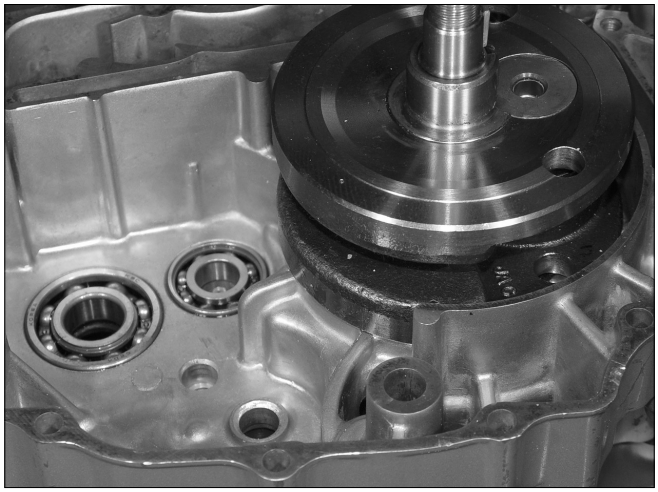
COUNTER SHAFT BEARING :
- DRIVER / ATTACHMENT, 32 × 35mm / PILOT, 15mm

CRANK SHAFT BEARING :
- DRIVER / ATTACHMENT, 62 × 68mm / PILOT, 28mm



- Coat the socket bolt screw part with oil and install the main shaft bearing set plate.

TORQUE : 1.2kgf · m (12N · m)



CRANKSHAFT INSTALLATION

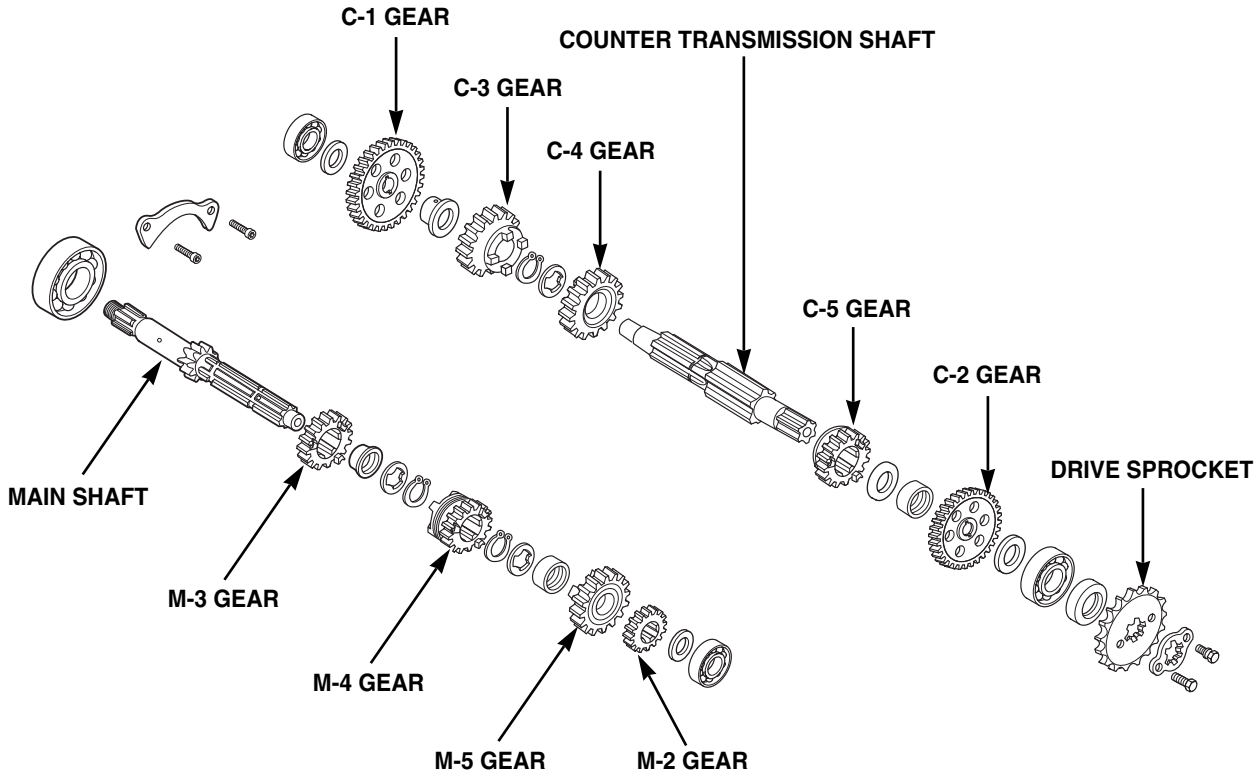
- Coat a new left crankshaft bearing with clean engine oil and install new bearings into the right crankcase.

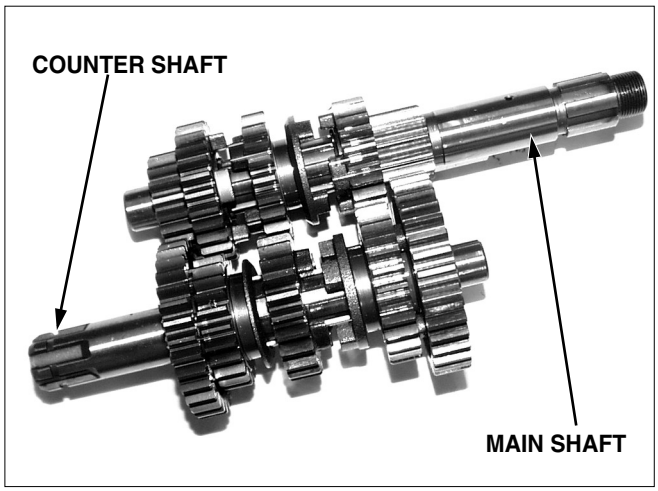
TOOLS : DRIVER
ATTACHMENT, 72 × 78mm
PILOT, 35mm

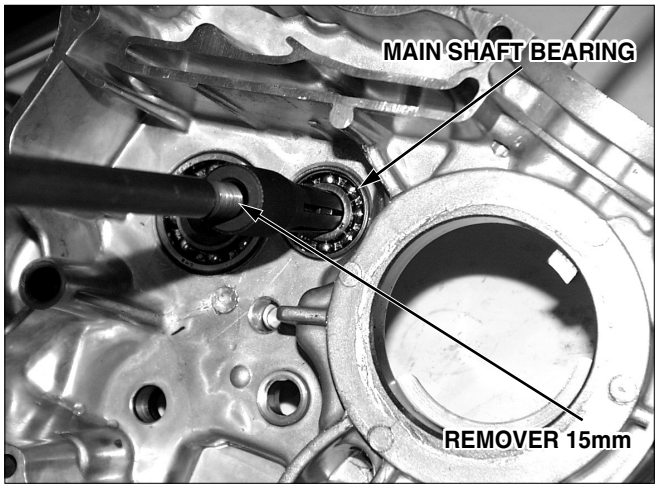
- Install the crankshaft into the left crankcase with the following tools:

TOOLS : THREAD ADAPTER
ASSEMBLY SHAFT
CRANKSHAFT ASSEMBLY COLLAR

TRANSMISSION ASSEMBLY





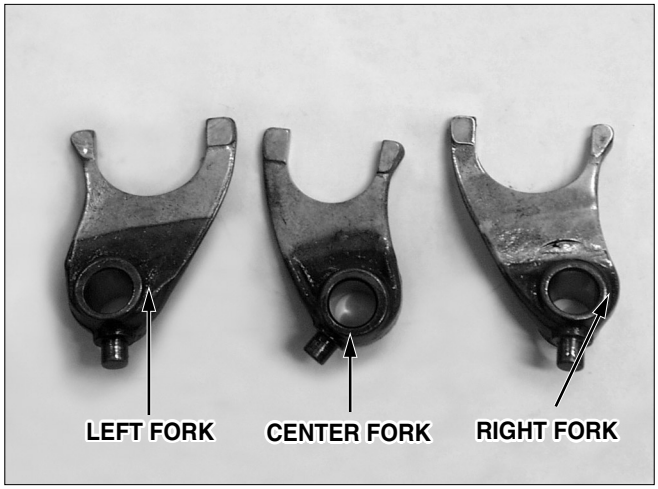


- Coat the gear and gear bush with clean engine oil and install the main shaft and counter shaft.
- Check the gears for freedom of movement or rotation on the shaft.

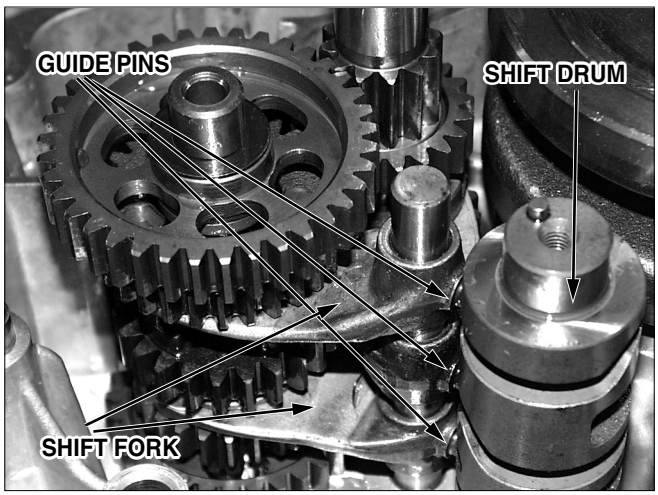
⚠ NOTE

- Note the installation direction of each snap ring.
- Do not use the worn snap ring again.
- Check the snap rings are seated in the grooves spinning the rings. Align the end gaps of the snap ring with the grooves of spline.

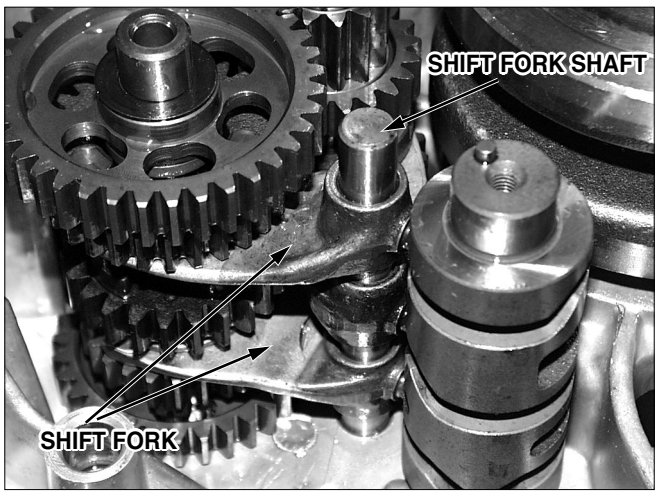
- Install the main shaft and counter shaft into the left crankcase together.



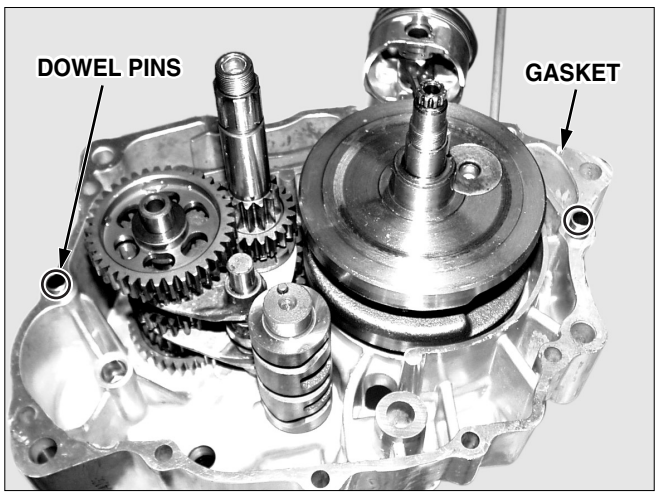
- Check the marks on the shift forks.
  - L. fork : “L” mark
  - Center fork : “C” mark
  - R. fork : “R” mark



- With the left fork mark and center fork mark facing down, assemble them.
- Install the shift drum. Install the shift fork guide pin into the guide groove of the drum.

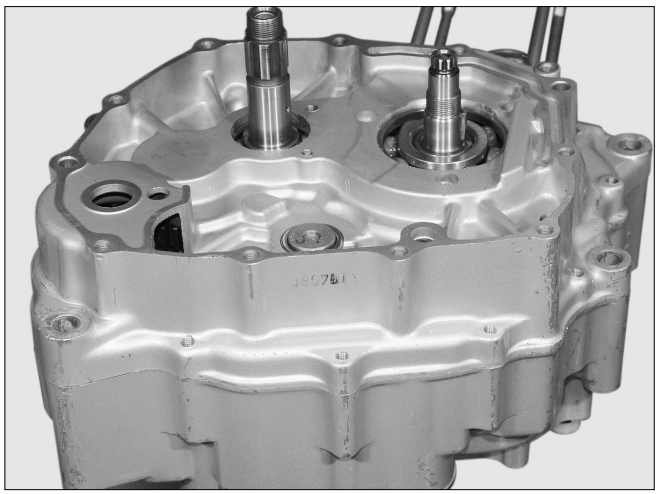


- Install the shift fork into the shift fork shaft, then install the shift fork into the left crankcase assembling hole.



CRANKCASE ASSEMBLY

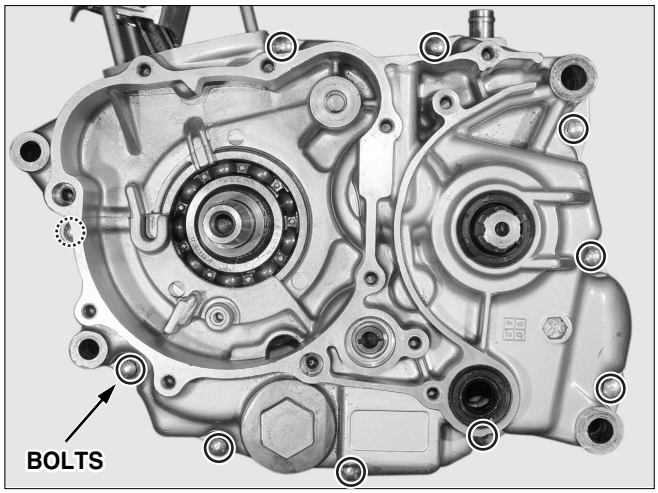
- Install the dowel pins and a new gasket.



● Install the right crankcase into the left crankcase .

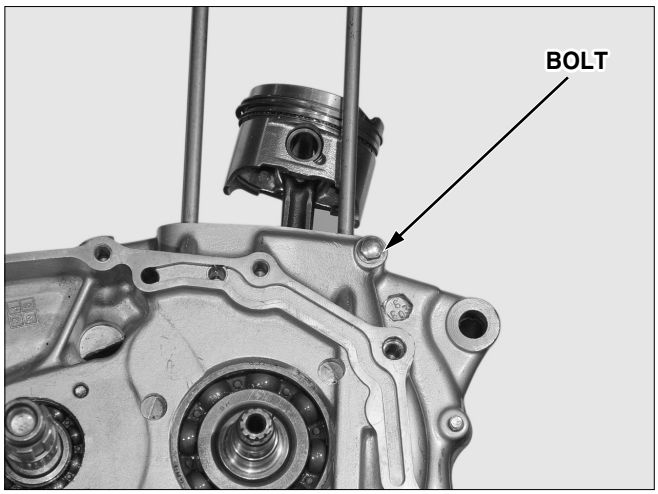
⚠ NOTE

• Make sure that there is no gap between the mating surfaces of the right and left crankcase.



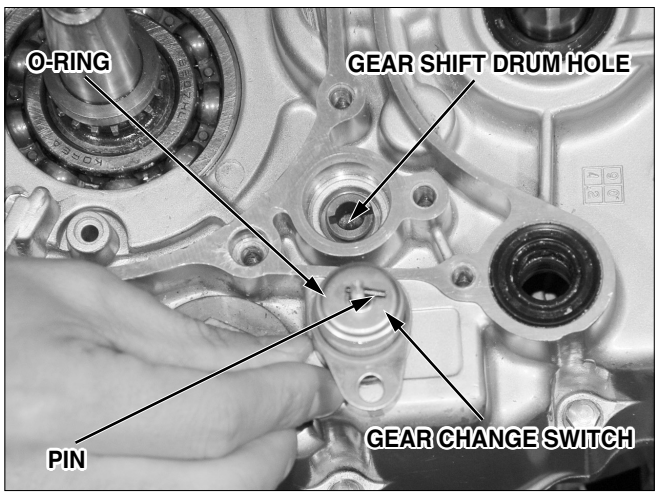
● Tighten the left crankcase bolts in a crisscross pattern in 2-3 steps.

TORQUE : 1.1kgf · m(11N · m)

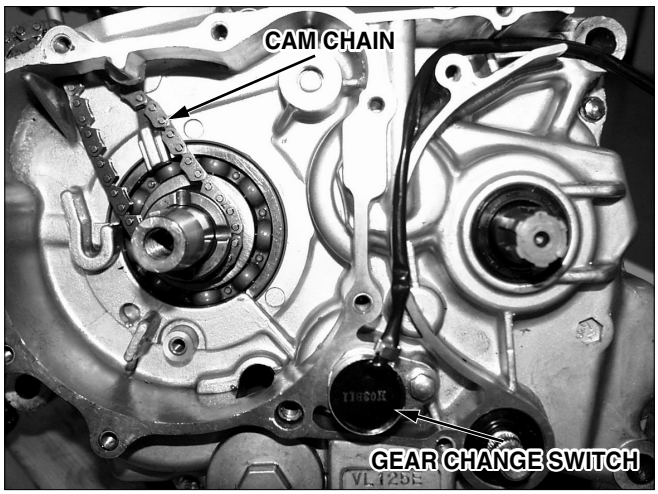


● Tighten the right crankcase bolt to the specified torque.

TORQUE : 1.1kgf · m(11N · m)



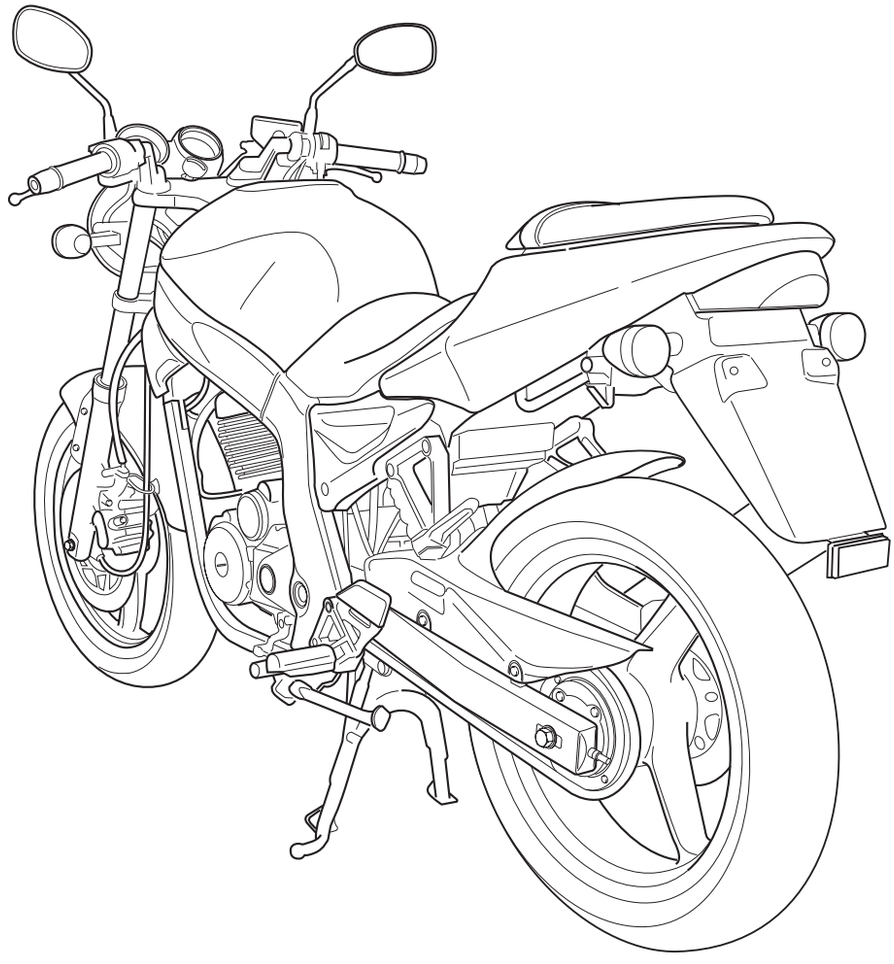
● After replacing the o-ring of the gear change switch to a new one, coat the new o-ring with engine oil, then install the switch pin into the groove of the shift drum.



- Install the cam chain.

- Install the disassembled parts.
- Install the engine on the frame. (⇨Section 6)

MEMO



12. EXTERNAL PARTS

SERVICE INFORMATION

GENERAL SAFETY

⚠ WARNING

• Because of the hat muffler, avoid the check immediately after the engine stop.

- This section covers removal and installation of the seat and exhaust muffler.
- Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.
- Always inspect the exhaust muffler for leaks after installation.

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

Poor performance

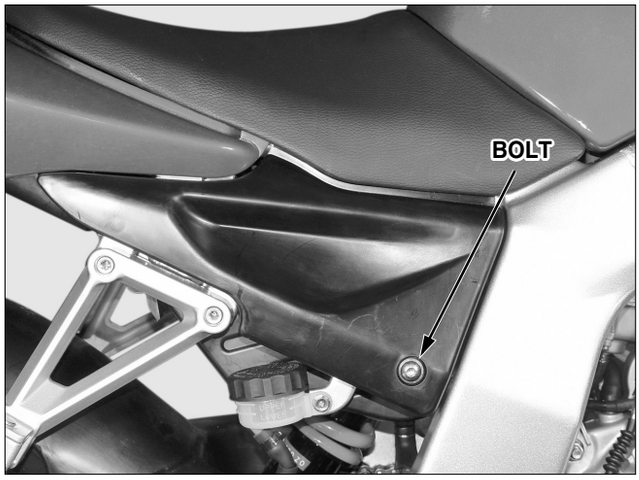
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

SEAT / SIDE COVER

SEAT REMOVAL

- Insert the ignition key into the seat lock.
- Turn the ignition key counterclockwise, and then pull the seat back and up.

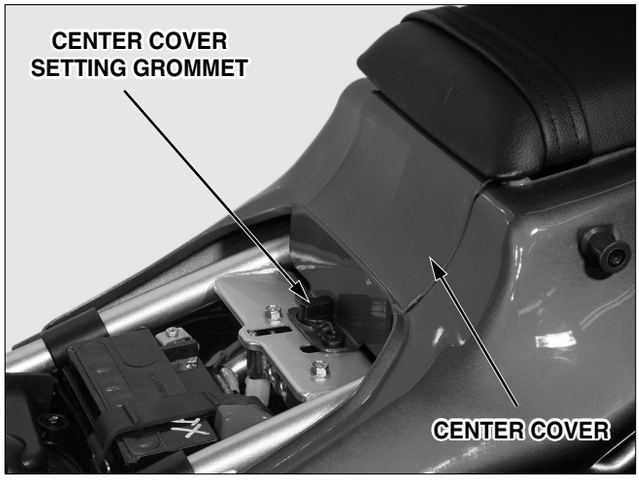
- Installation is in the reverse order of removal.



SIDE COVER REMOVAL

- Remove the seat (see above).
- Remove the R/L. side cover mounting bolts, then remove the R/L. side covers.

- Installation is in the reverse order of removal.

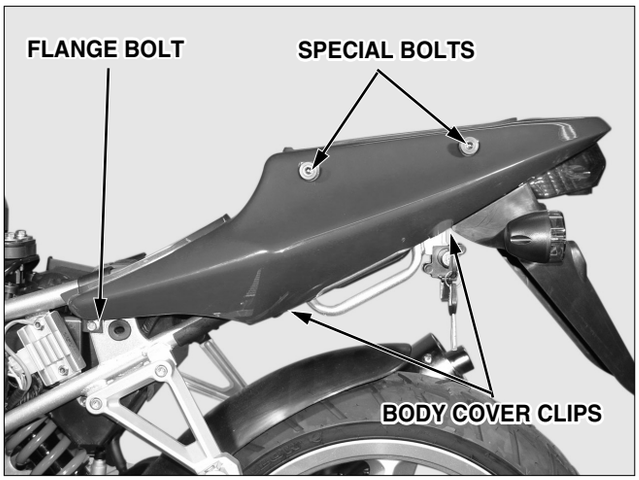


REAR SEAT(PILLION SEAT)

- Remove the seat (see above).
- Remove the center cover setting grommet and center cover.

- Remove the seat mounting bolt, and then pull the seat front and up.

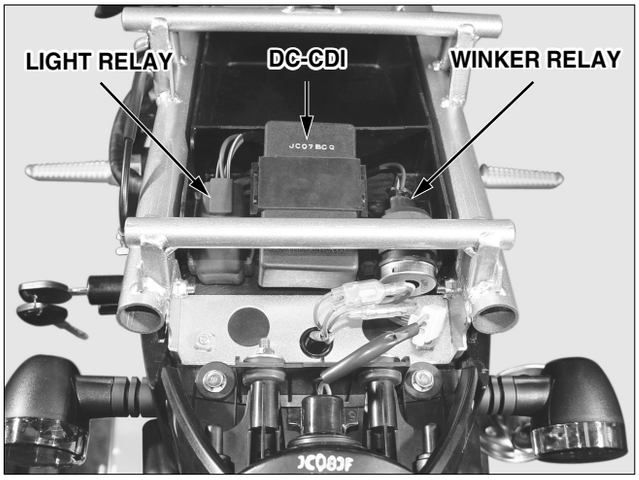
- Installation is in the reverse order of removal.



REAR COWL

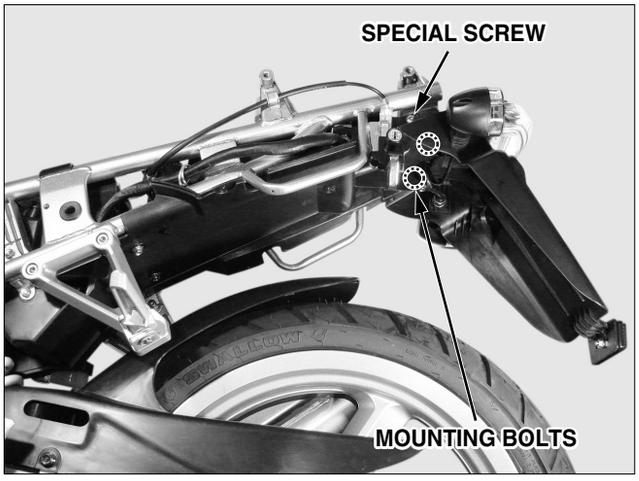
- Remove the seat.
- Remove the R/L. side cover.
- Remove the center cover.
- Remove the pillion seat.
- Remove the two flange bolts and two special bolts.
- Remove the rear fender mounting body cover clips.
- Carefully spread the bottom of both sides of the rear cowl, then remove it.

- Installation is in the reverse order of removal.



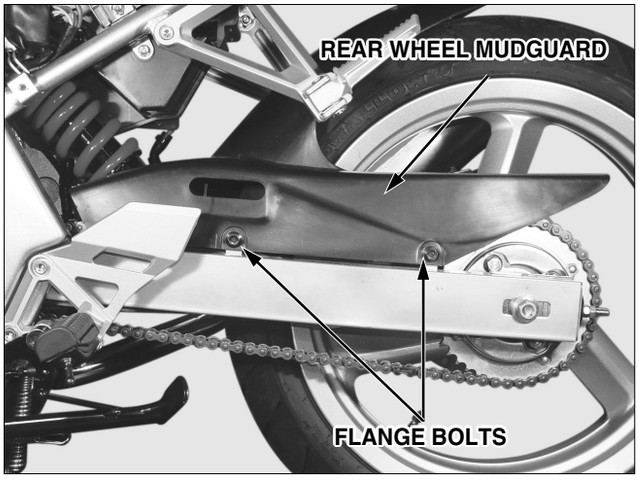
REAR FENDER

- Remove the rear cowl (see above).
- Remove the CDI, light relay and winker relay from the rear fender.
- Disconnect the taillight connector and winker connector.



- Remove the R/L special screws.
- Remove the rear fender mounting bolts, then remove the rear fender.

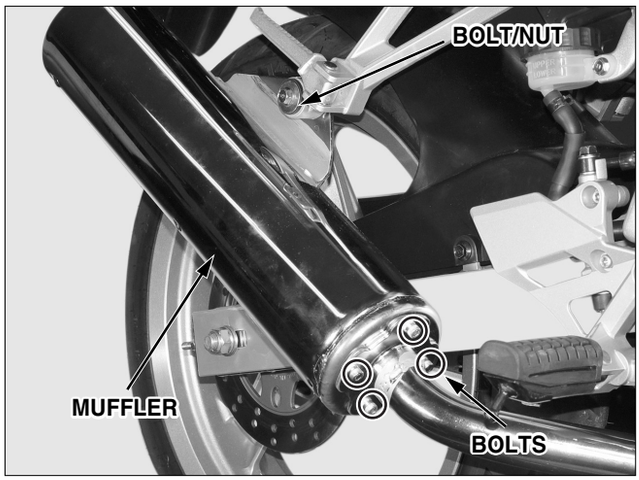
- Installation is in the reverse order of removal.



REAR WHEEL MUDGUARD

- Remove the rear wheel mudguard mounting bolts and rear wheel mudguard.

- Installation is in the reverse order of removal.



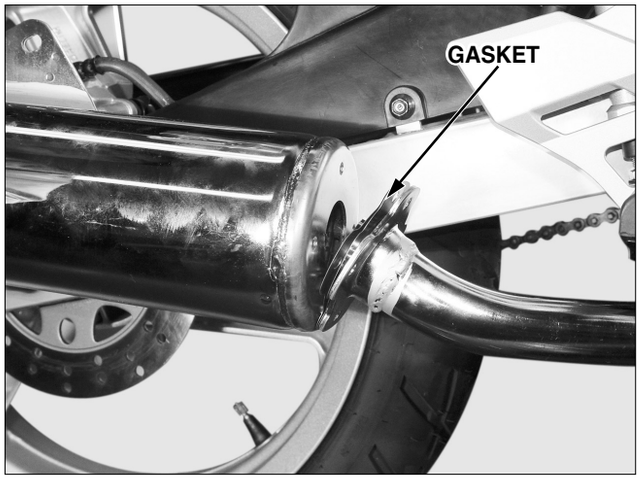
MUFFLER/EXHAUST PIPE

⚠ WARNING

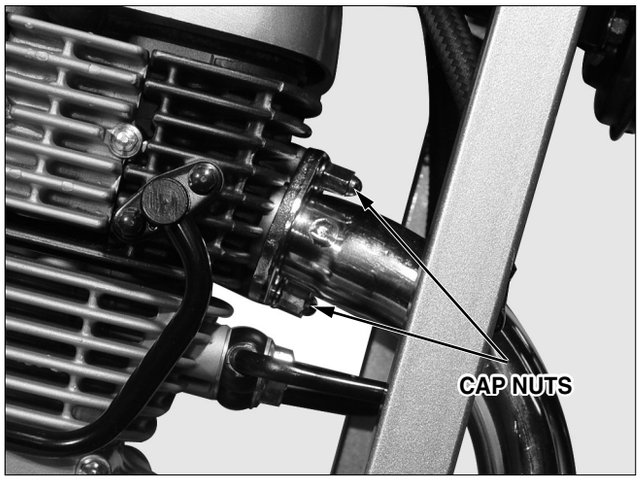
• Do not service the exhaust system while it is hot.

REMOVAL

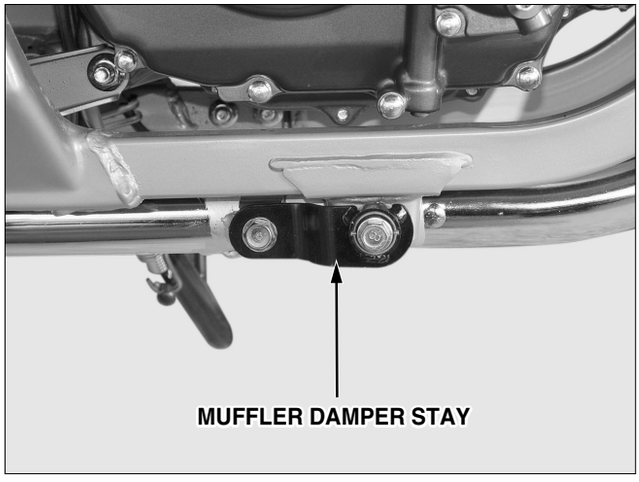
- Remove the exhaust pipe to muffler mounting bolts.
- Remove the muffler mounting bolt/nut and washer, then remove the muffler.



- Remove the exhaust pipe flange gasket.



- Remove the exhaust pipe joint cap nuts.



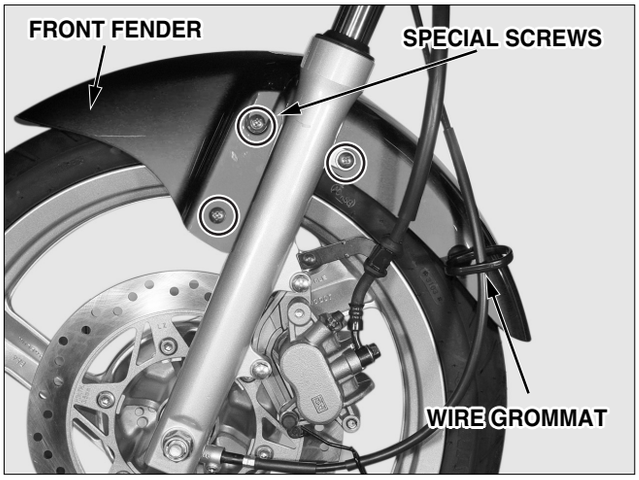
- Remove the following.
  - Exhaust pipe mounting bolt.
  - Exhaust pipe joint
  - Exhaust pipe joint collar
  - Exhaust pipe
  - Exhaust pipe gasket
  - Muffler damper stay

INSTALLATION

- Install the removed parts in the reverse order of removal.

⚠ CAUTION

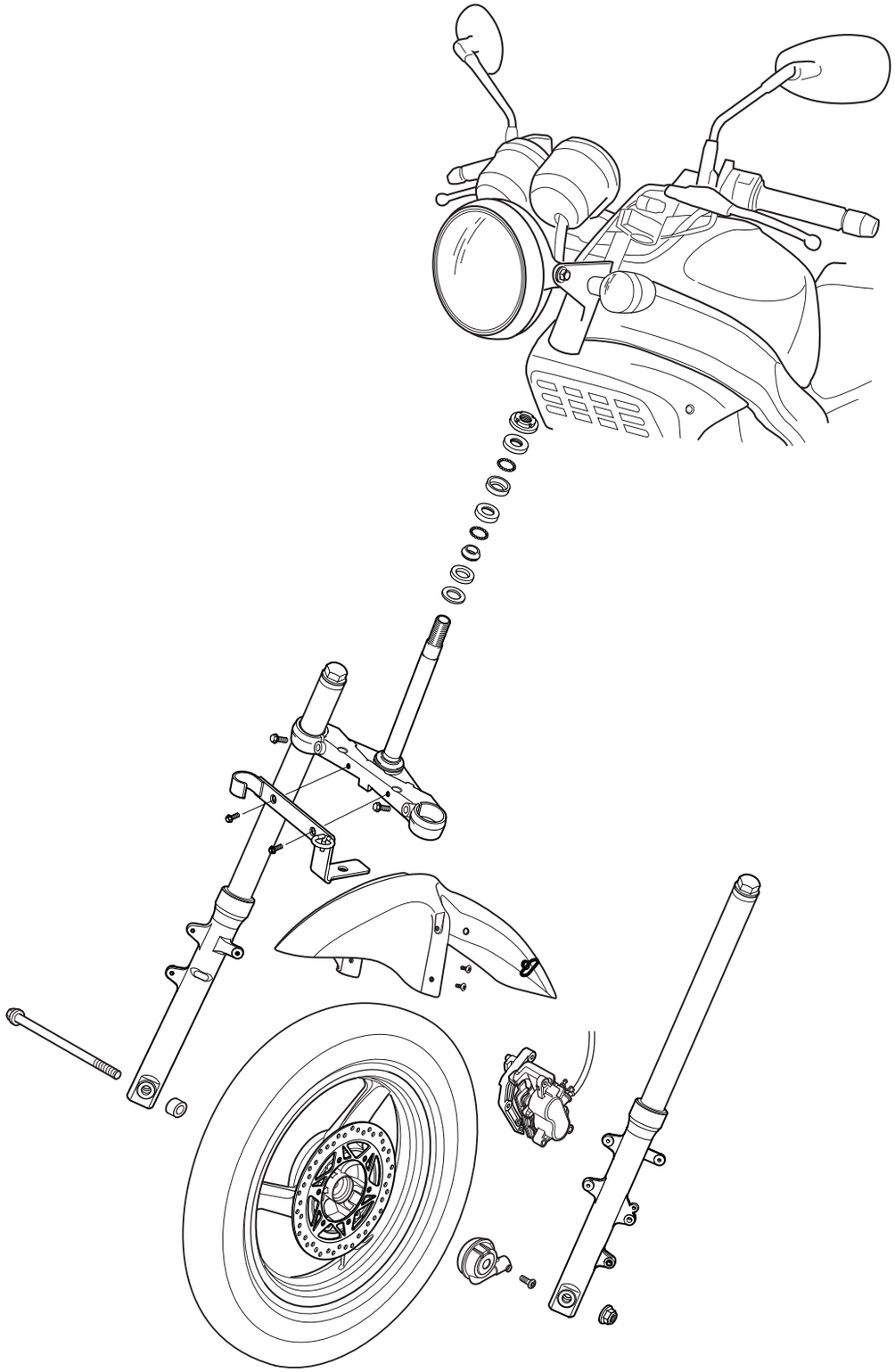
- Check the protrusion of the exhaust pipe stud bolt.
- Install the new exhaust pipe gasket onto the exhaust ports of the cylinder head.
- Install the new gasket onto the exhaust pipe.



FRONT FENDER

- Remove the wire grommat from the front fender.
- Remove the front fender mounting special screws.
- Remove the front fender forward.

- Installation is in the reverse order of removal.



13. FRONT WHEEL/FRONT FORK/STEERING

SERVICE INFORMATION

GENERAL SAFETY

⚠ WARNING

- A contaminated brake disk and pad reduce stopping power. Discard contaminated pads and clean a contaminated disk with a brake degreasing agent.
- Because inhaled asbestos fibers have been found to cause respiratory disease and cancer, work so that the fibers near the brake pad can't spread to the brake cleaner.
- When removing or installing tires from the rim, use the special tire lever and rim protector so that the rim can't be damaged.
- This section covers maintenance of the front wheel, front fork and steering stem. Refer to section 15 for front brake service.
- Use a jack or a hoist under the engine to support the motorcycle.

SPECIFICATIONS

Unit : mm

ITEM		STANDARD VALUE	SERVICE LIMIT
AXLE RUNOUT		-	0.2
FRONT WHEEL RIM RUNOUT	RADICAL	-	2.0
	AXIAL	-	2.0
FRONT FORK PIPE DEFLECTION		-	0.2
FRONT FORK FLUID CAPACITY		265±2.5cc	-
FORK SPRING FREE LENGTH		528.0	480.0
REBOUND SPRING FREE LENGTH		23.8	21.6

TORQUE VALUES

STEERING HANDLE PIPE BOLT	2.6kgf · m(26N · m)
FRONT BRAKE DISK BOLT	4.2kgf · m(42N · m)
FRONT AXLE NUT	5.9kgf · m(59N · m)
FORK TOP BRIDGE PINCH BOLT	2.6kgf · m(26N · m)
FORK BOTTOM BRIDGE PINCH BOLT	3.4kgf · m(34N · m)
FORK TUBE CAP BOLT	2.3kgf · m(23N · m)
FORK SOCKET BOLT	2.0kgf · m(20N · m) (Apply locking agent)
CALIPER BRACKET BOLT	3.0kgf · m(30N · m)
STEERING STEM NUT	7.4kgf · m(74N · m)
STEERING TOP THREAD NUT	2.5kgf · m(25N · m) (Initial torque)
	0.3kgf · m(3N · m) (Last torque)
HANDLE WEIGHT SOCKET BOLT	2.0kgf · m(20N · m)

TOOLS

BALL RACE DRIVER
STEERING STEM DRIVER
FORK SEAL DRIVER
STEERING STEM SOCKET
EXTENSION BAR
DRIVER
FORK SEAL DRIVER BODY
LOCK NUT WRENCH
BEARING REMOVER SHAFT
REMOVER HEAD
ATTACHMENT
PILOT

TROUBLESHOOTING

Hard steering
- Steering bearing adjustment nut too tight
- Damaged, worn steering head bearing
- Damaged, worn inner and outer race
- Insufficient tire pressure
- Worn tire

Steers to one side
- Damaged, incorrectly tightened steering head bearing
- Unbalance of left, right cushion
- Bent front fork
- Bent front axle shaft and inclind tire
- Worn tire
- Worn wheel bearing
- Worn swing arm pivot

Front wheel wobbling
- Bent rim
- Worn wheel bearings

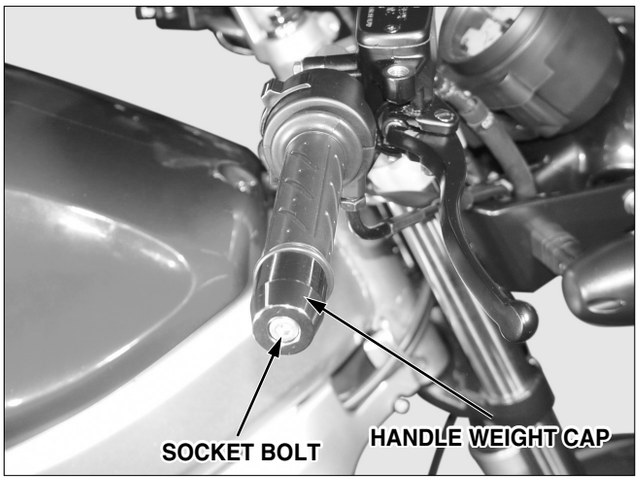
Soft suspension
- Weak springs
- Oil level too low
- Inferiorization of oil
- Oil viscosity too low

Hard suspension
- Bend fork tube
- Oil level too high
- Oil viscosity too high
- Too much air in tire

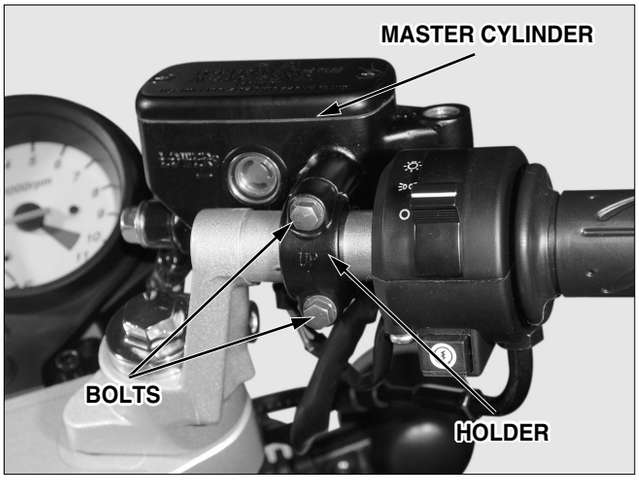
Strange noise of front cushion
- Defective bottom case
- Loose fork leg fasteners
- Insufficient fork oil

HANDLEBARS

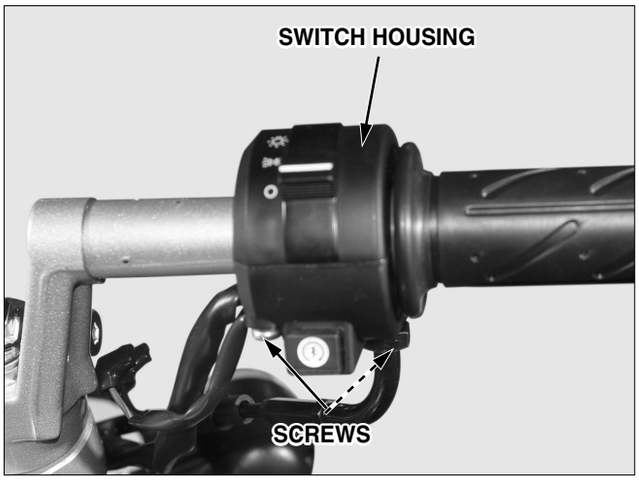
REMOVAL



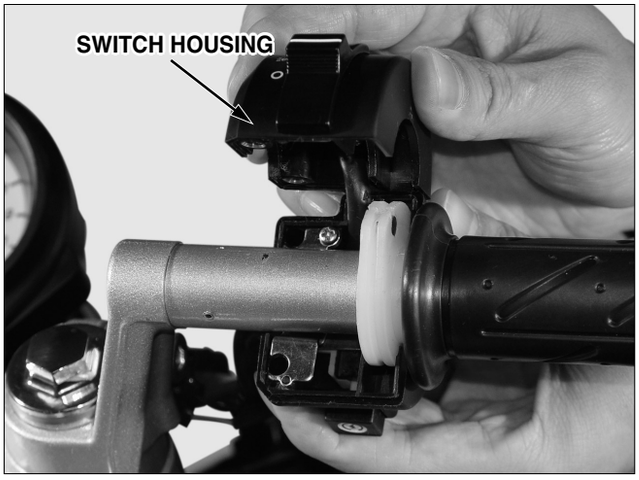
- Remove the back mirrors.
- Remove the socket bolt and right handle weight cap.



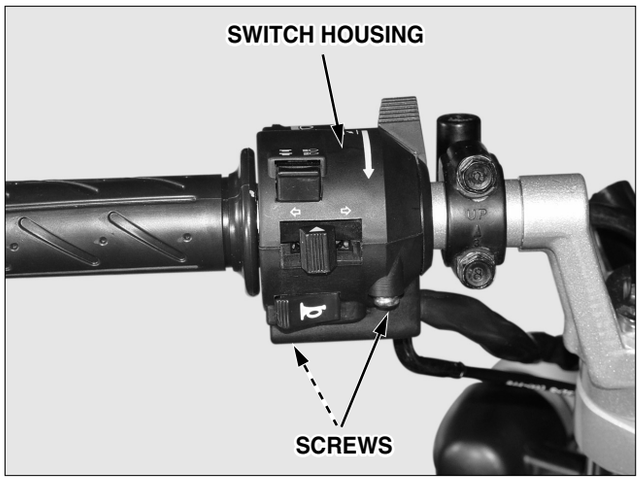
- Disconnect the front stop switch wires connectors from the switch.
- Remove the master cylinder holder bolts, holder and master cylinder assembly.



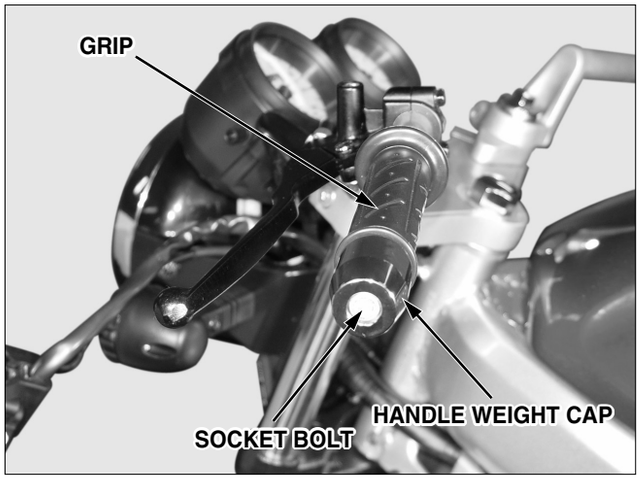
- Remove the right handlebar switch housing screws.



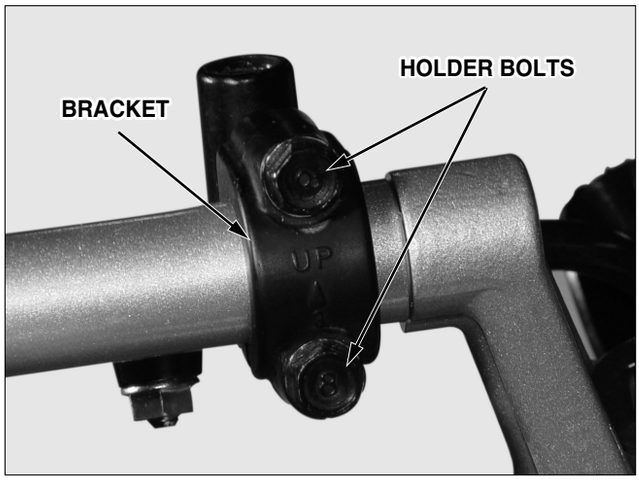
- Remove the right handlebar switch housing from the right steering steering handle pipe.



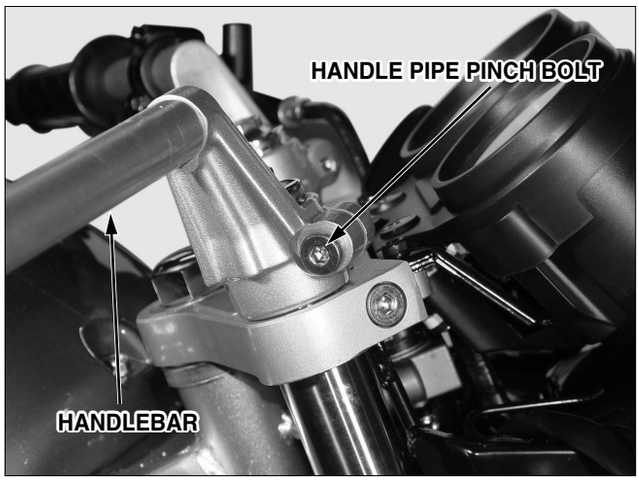
- Remove the screws and left handlebar switch housing.



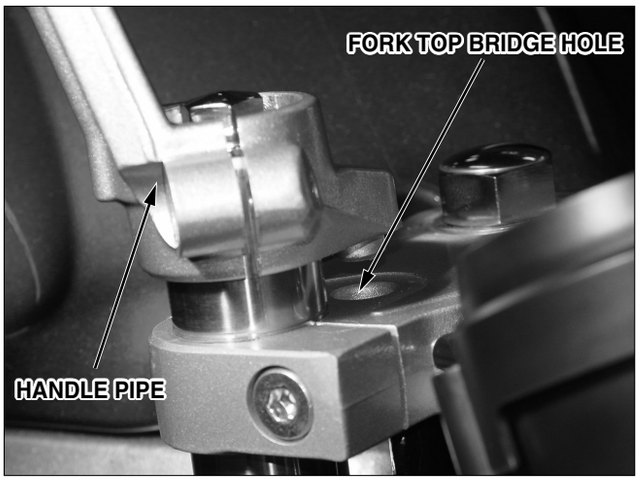
- Remove the socket bolt and left handle weight cap.
- Remove the left handle grip and choke lever from the handlebar.



- Loosen the clutch lever bracket holder bolts.



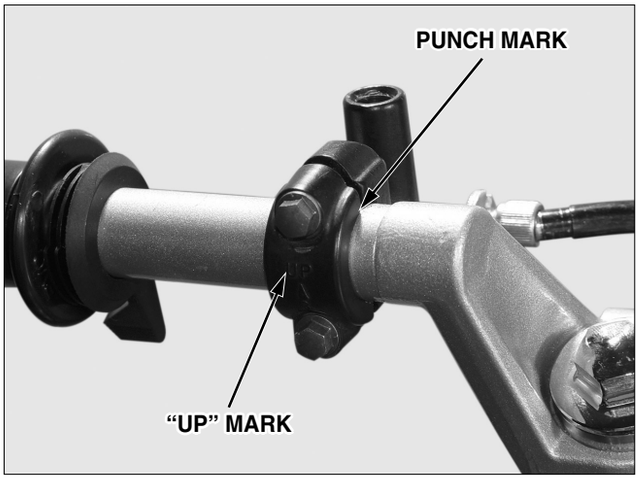
- Loosen the handle pipe pinch bolt.
- Remove the handlebars from the front forks.



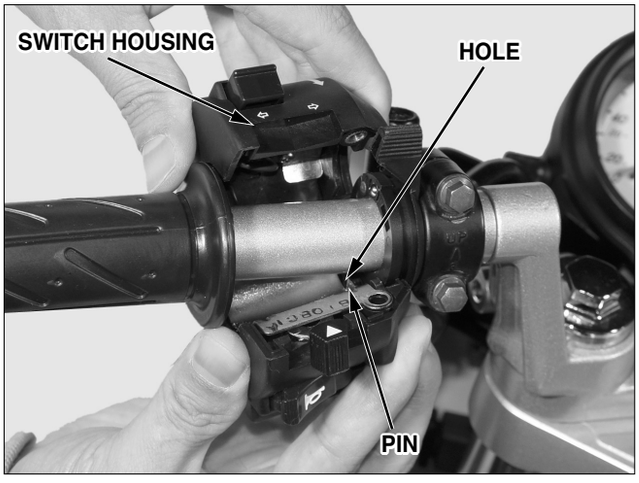
INSTALLATION

- Install the handlebars onto the front forks.
  Install the handle pipe while aligning its grooves with the fork top bridge holes.
- Tighten the handle pipe pinch bolts to the specified torque.

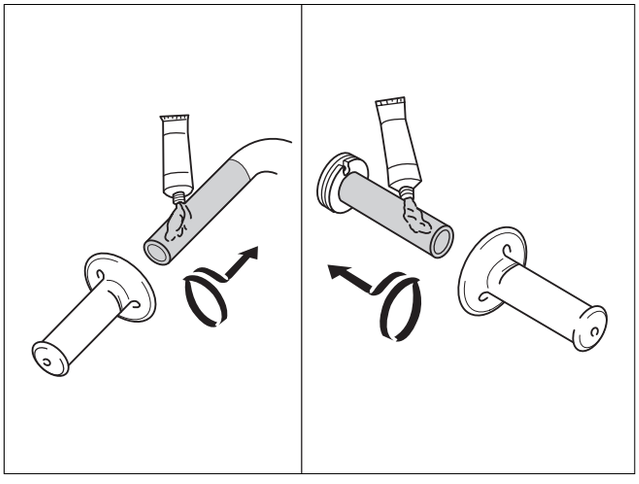
TORQUE : 2.6kgf · m (26N · m)



- Install the clutch lever bracket with the "UP" mark of the holder facing up.
- Install the clutch lever bracket by aligning the end of the holder with the punch mark on the handlebar.
- Tighten the upper bolt first, then the lower bolt.



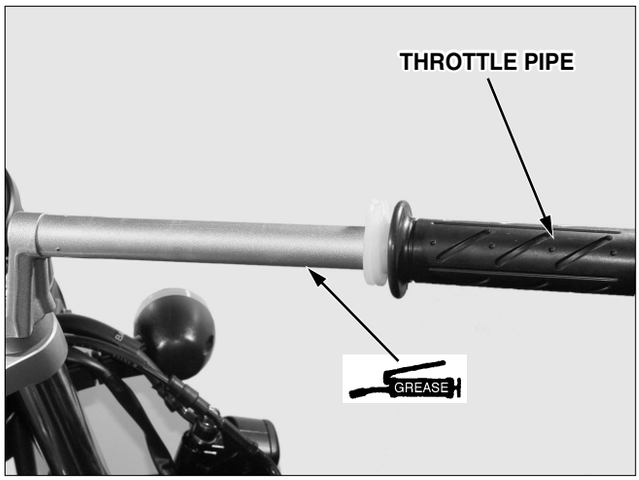
- Connect the choke cable to the choke lever.
- Install the winker switch housing aligning its locating pin with the hole in the handlebar.
- Tighten the forward screw first, then the rear screw.



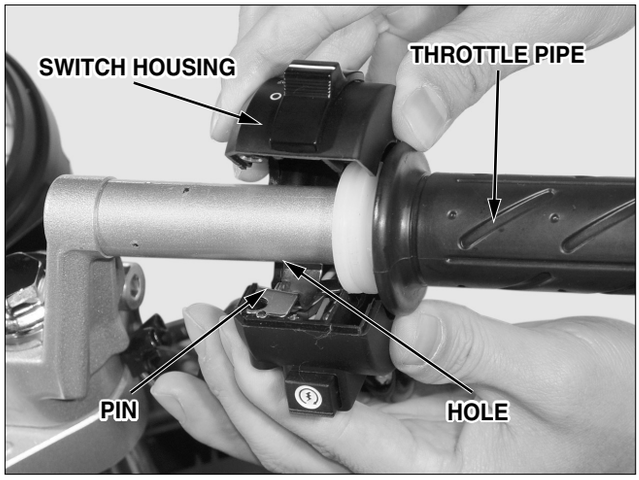
- Apply DAELIM Bond A to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.
- Wait 3~5 minutes and install the grip.
- Rotate the grip for even application of the adhesive.

⚠ CAUTION

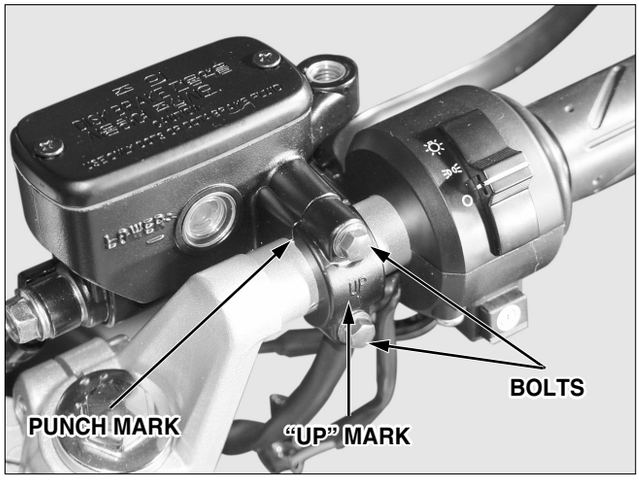
- Clean the bonding surface to avoid oil, grease or gasoline from attaching.
- Leave it for minimum 1 hour until the bond it dried.



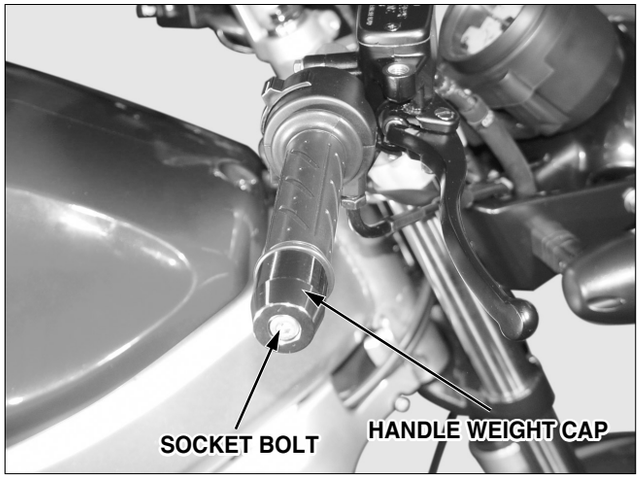
- Apply grease to the sliding surface of the throttle pipe.



- Connect the throttle cable to the throttle pipe.
- Install the right handlebar switch housing by aligning its locating pin with the hole in the handlebar.
- Tighten the forward screw first, then the rear screw.



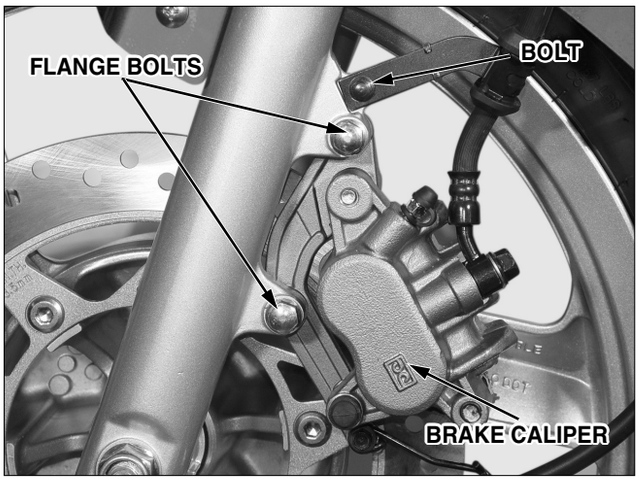
- Install the master cylinder with the "UP" mark of the holder facing up.
- Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.
- Tighten the upper bolt first, the lower bolt.
- Connect the front stop switch wires.



- Insall the handle weight cap and tighten the socket bolt to the specified torque.

  TORQUE : 2.0kgf · m (20N · m)

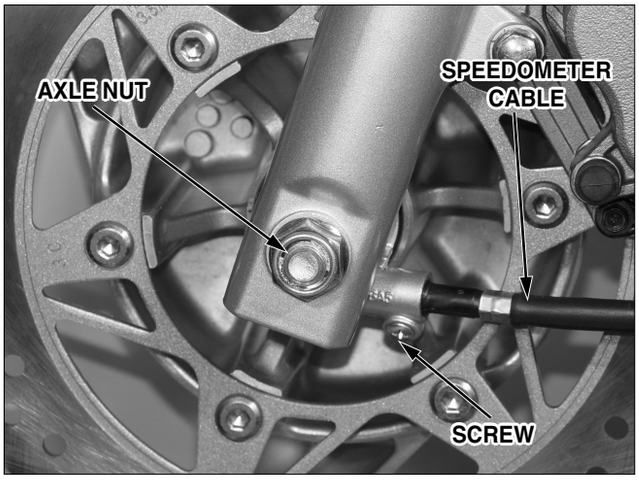
- Install the back mirrors.



FRONT WHEEL

REMOVAL

- Support the motorcycle securely and raise the front wheel off the ground using a safety stand or a hoist.
- Remove the brake hose clamp bolt.
- Remove the monting bolts and brake caliper.



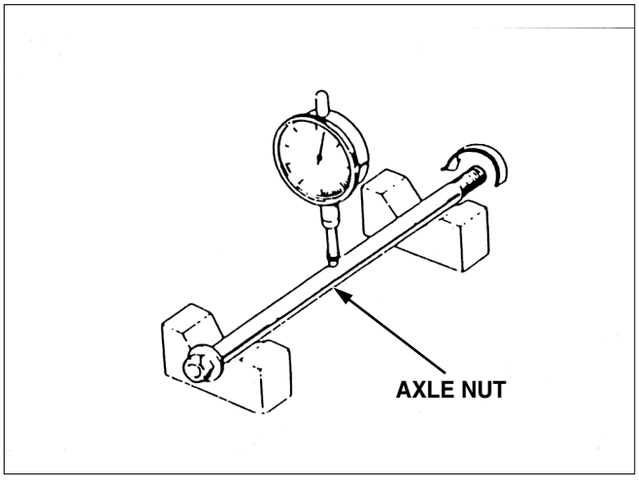
- Loosen the axle nut (U-nut).
- Loosen the oval screw and pull the speedometer cable out of the speedometer gear box.
- Remove the axle nut, front axle the front wheel and R. side collar.

⚠ NOTE

• Don't operate the brake lever after removing the front wheel.

INSPECTION

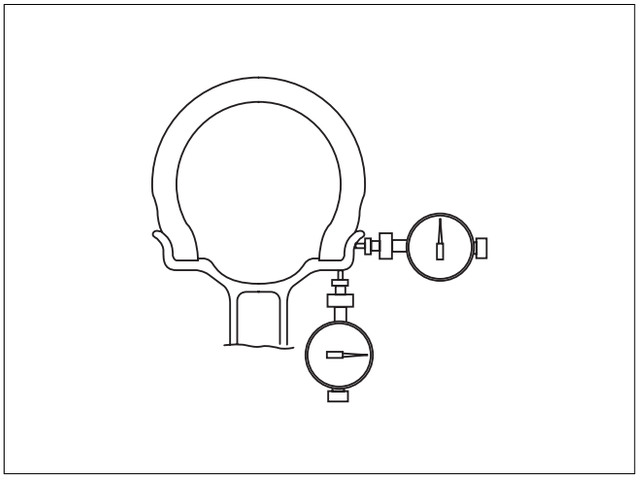
Axle



- Place the axle in V-block and measure the runout.
- Actual runout is 1/2 the total indicator reading.

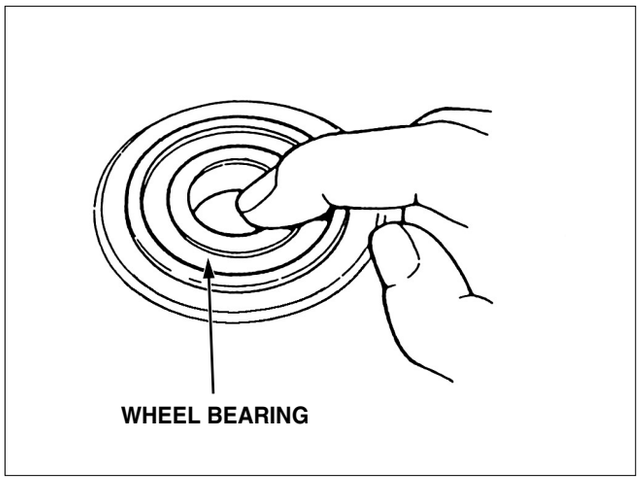
SERVICE LIMIT : 2.0mm

Wheel rim runout



- Check the rim runout by placing the wheel in a turning stand.
- Spin the wheel slowly and read the runout using a dial indicator.
- Actual runout is 1/2 the total indicator reading.

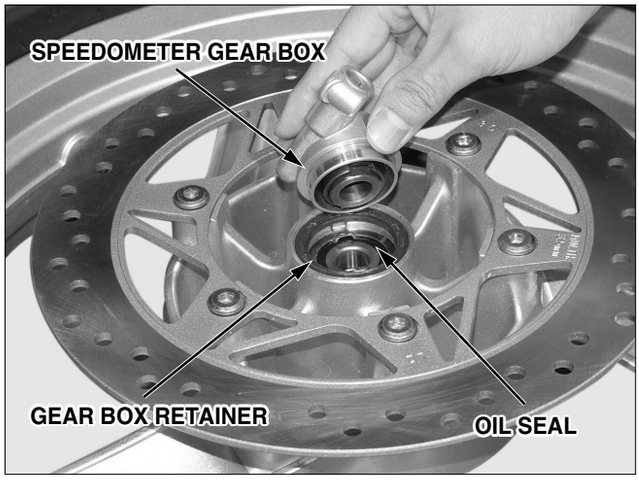
SERVICE LIMIT : RADIAL : 2.0mm
AXIAL : 2.0mm



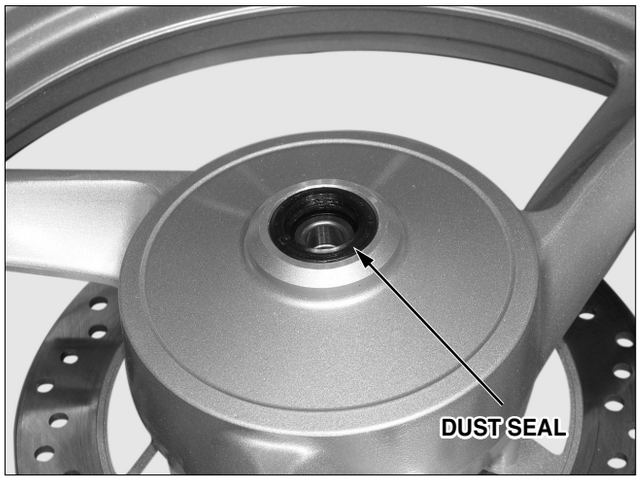
Wheel bearing

- Turn the inner race of each bearing with your finger.
- Bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.
- Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.

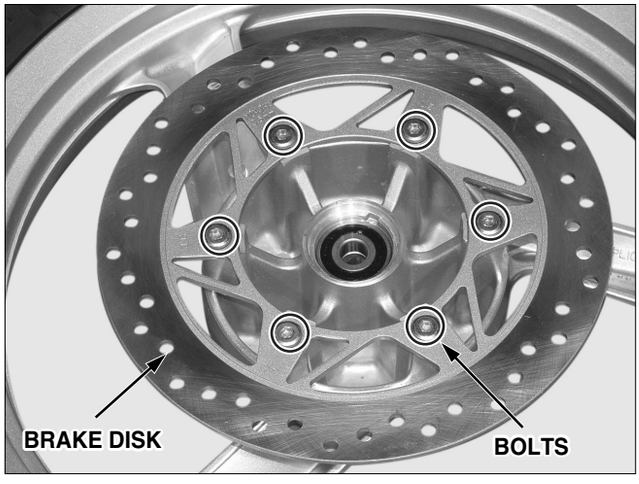
DISASSEMBLY



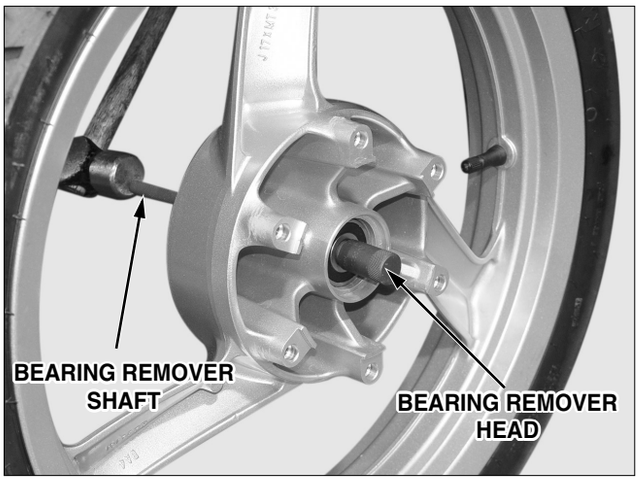
- Remove and speedometer gear box, oil seal and gar box retainer.

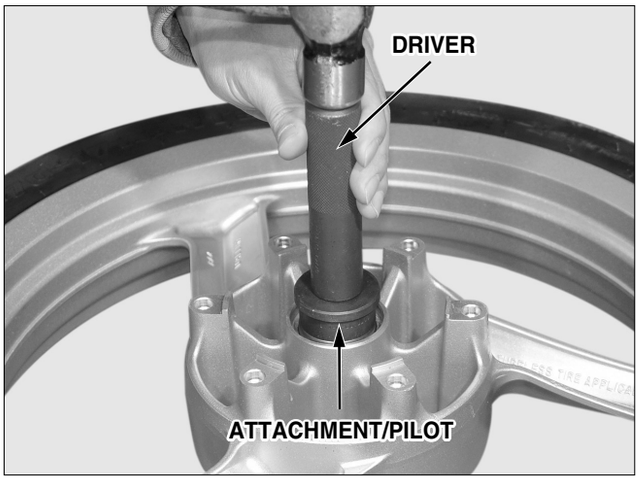


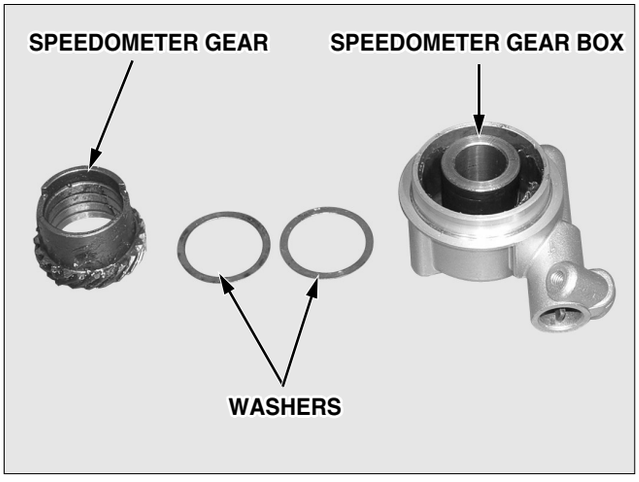
- Remove the dust seal.



- Remove the bolts and brake disk.
- Check the disk for defects. (⇨15-9)







WHEEL BEARING REPLACEMENT

- Install the bearing remover head into the bearing. From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
- Remove the distance collar and drive out the other bearing.

TOOLS : BEARING REMOVER HEAD
BEARING REMOVER

⚠ NOTE

- Always replace bearings in pairs, and never use old bearings.

- Apply sufficient amount of grease to the bearing.
- Insert the right bearing with its seal surface facing outside.
- Do not tilt the bearing. Insert accurately.
- Upon assembling the distance collar, insert the left bearing with its seal surface facing outside.

TOOLS : DRIVER
ATTACHMENT, 32x35mm
PILOT, 15mm

⚠ CAUTION

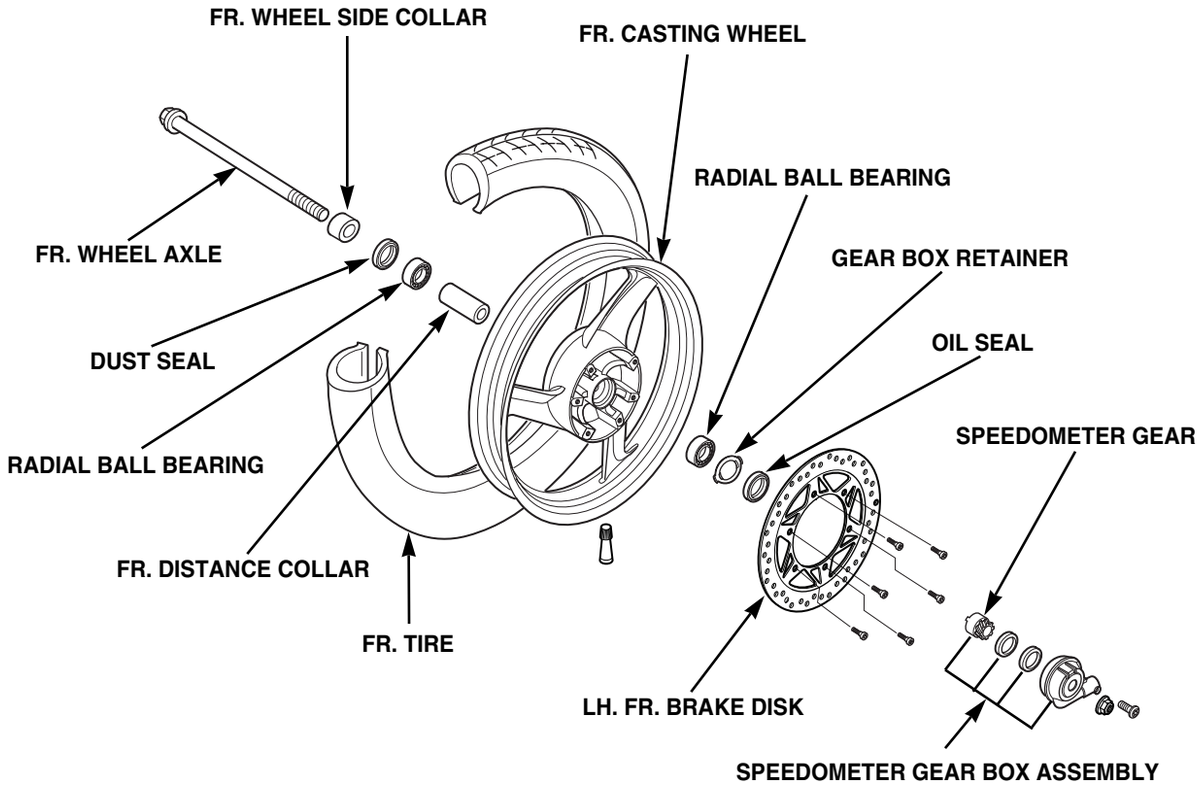
- The bearing inserted in the last must be inserted until it contacts with the distance collar.
- Excessively inserted bearing can cause damage the opposite side bearing.

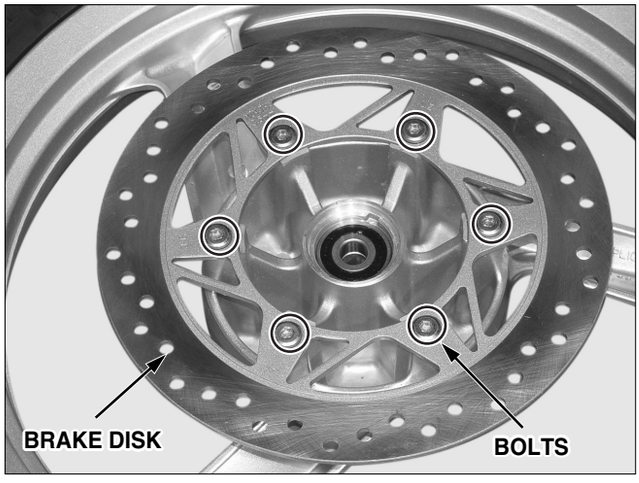
SPEEDOMETER GEAR REPLACEMENT

- Remove the speedometer gear and washer from the speedometer gear box.

- Check the gear for wear or damage.
- Install the washers.
- Apply grease to the speedometer gear and install it.

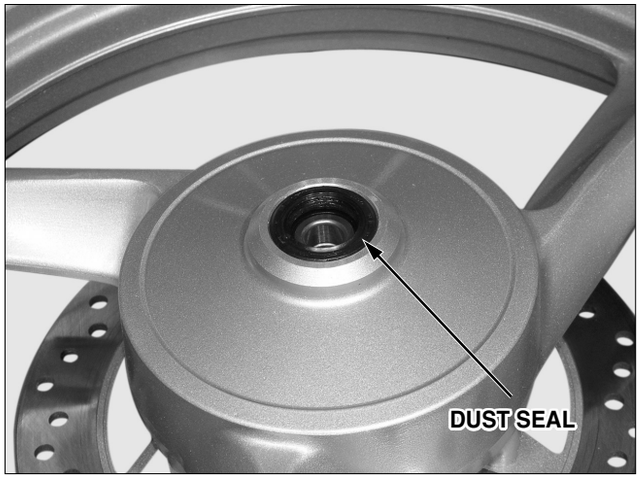
ASSEMBLY





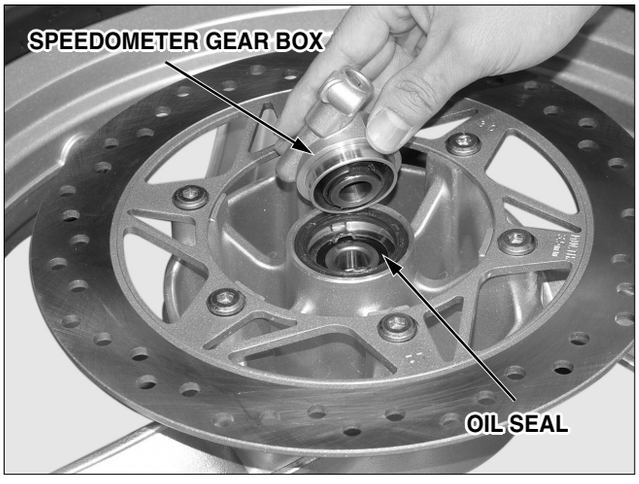
- Install the brake disk on the wheel hub.
- Install and tighten the new mounting bolts to the specified torque.

TORQUE : 4.2 kgf · m (42N · m)

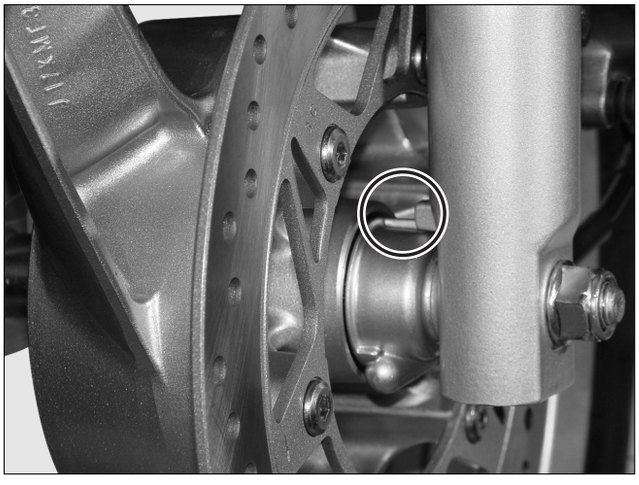


- Apply grease to the rim part of the dust seal.
- Inatall the dust seal.

- Align the wheel hub tangs with the slots of the gear box retainer, and assemble the speedometer gear box seal.

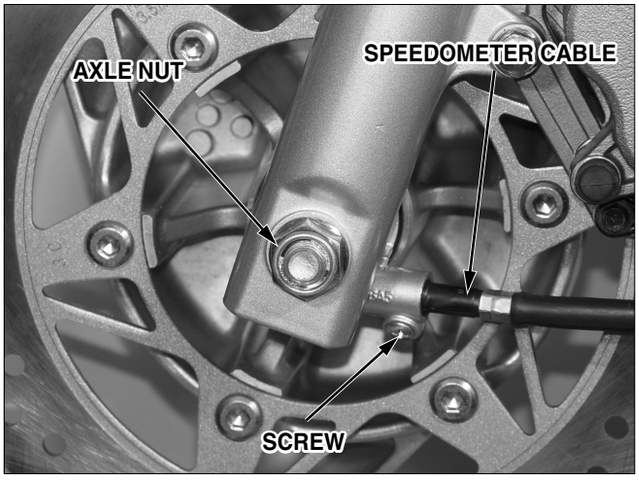


- Apply grease to the dust seal rim.
- Install the dust seal, and align the tangs of the gear box ratainer with the gear groove to assemble the speedometer gear box.



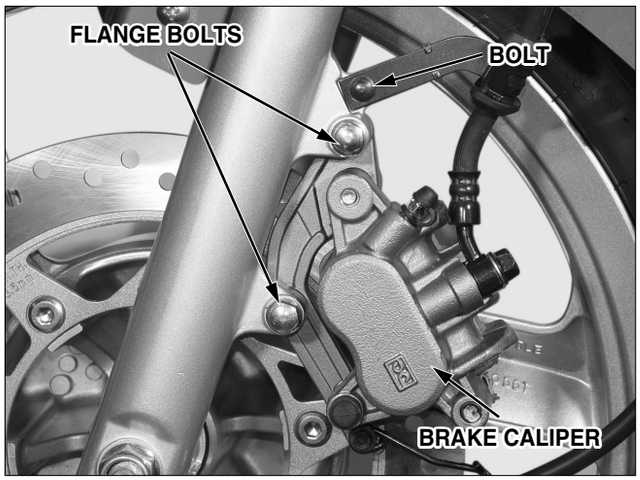
INSTALLATION

- Place the front wheel between the front forks.
- Install the wheel, driving the disk not to damage the pads.
- Align the slot of the speedometer gear box with the tangs of the left fork slider.
- Insert the front axle into the speedometer gear box and the wheel hub.
- Temporaily install the axle nut.



- Install the speedometer cable and tighten it correctly with the screw.
- Place the front wheel on the ground, and tighten the axle nut to the specified torque.

TORQUE : 5.9 kgf · m (59N · m)

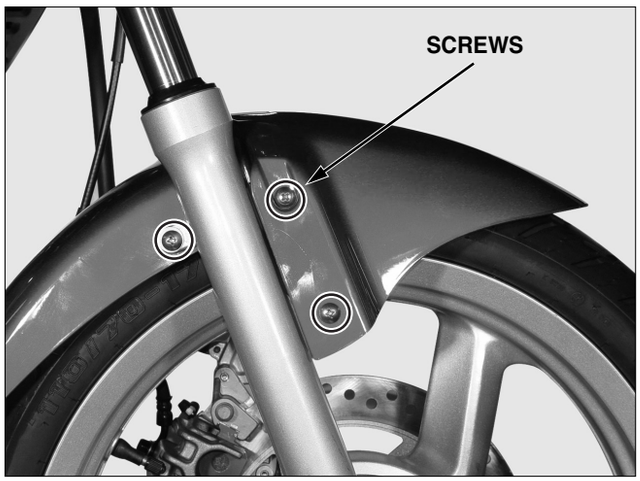


- Install the brake caliper and tighten the new mounting bolts to the specified torque.

  TORQUE : 3.0kgf · m (30N · m)

- Install the brake hose clamp.

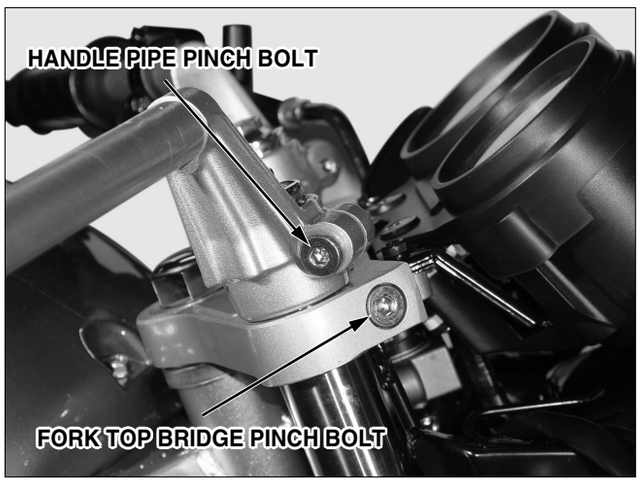
- With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation.
- Check the brake operation by applying the brake lever.
- Check the clearance between the brake disk and caliper bracket on each side after installation.
  The clearance should be at least 0.7mm.



FRONT FORK

REMOVAL

- Remove the front fender. (⇨12-5)
- Remove the front wheel. (⇨13-7)

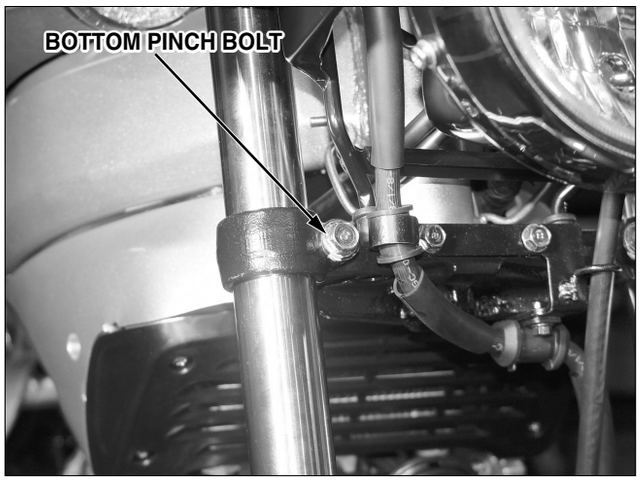


- When the front fork will be disassembled, loosen the fork pipe bolt, but do not remove it yet.

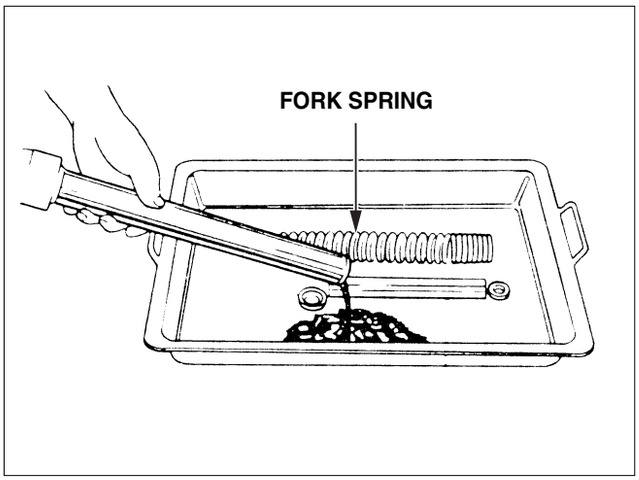
⚠ CAUTION

- Support the motorcycle securely under the engine not to turn over it.

- Loosen the handle pipe pinch bolt.
- Loosen the fork top bridge pinch bolt.



- Loosen the fork bottom pinch bolt and remove the fork pipe from the handle pipe, fork top bridge and steering stem.



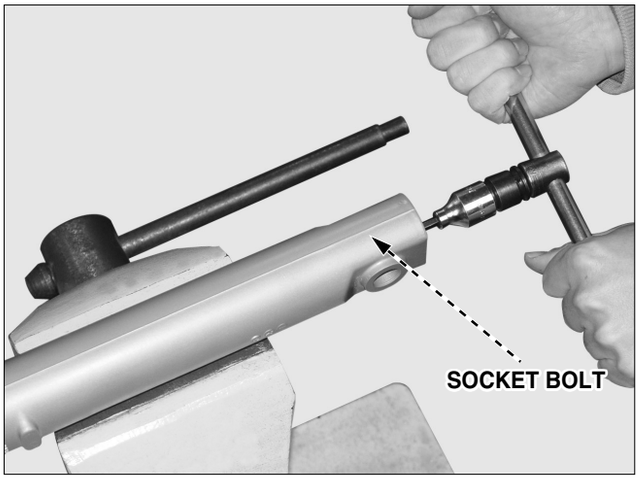
DESASSEMBLY

● Remove the fork pipe bolt from the fork.

⚠ NOTE

• If the bolt is completely loosened, the fork pipe bolt may spring out by the force for the spring. Take due precautions.

● Remove the fork spring, and expand and release the fork pipe several times to drain fork oil.

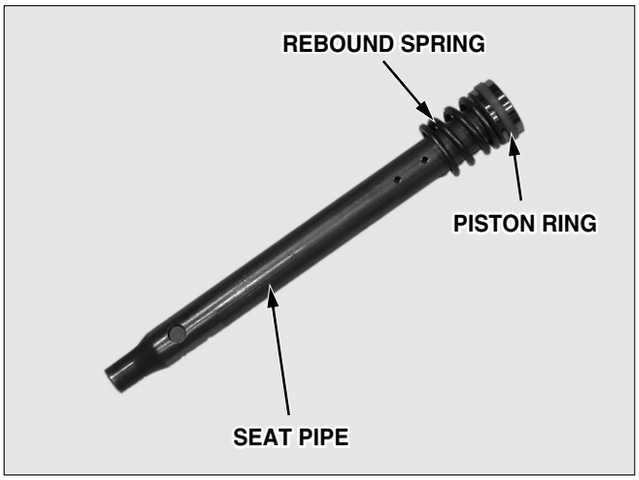


● Wrap the bottom case with a piece of cloth, and remove the socket bolt.

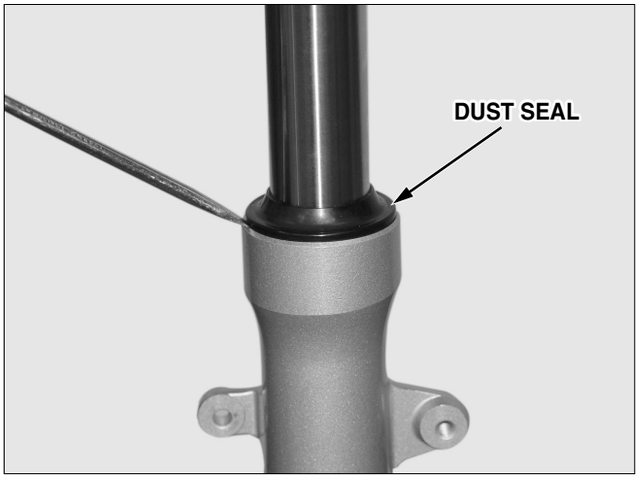
⚠ NOTE

• If the socket bolt turns idle cannot be removed, temporarily assemble the spring and the fork tube cap blot first.

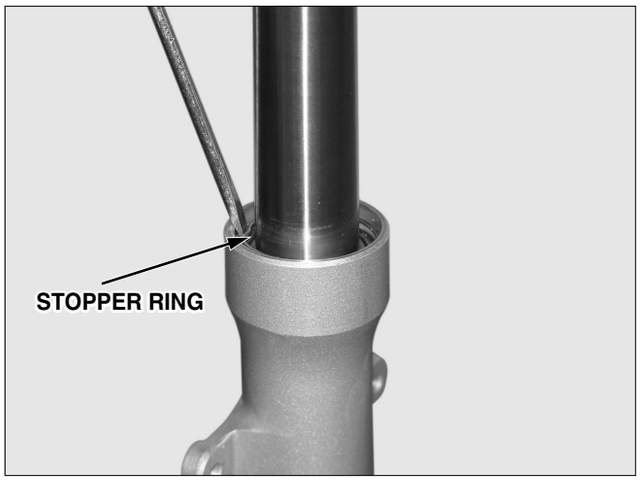
• Hold the bottom case firmly with a vise, taking precautions not to distort or damage it.



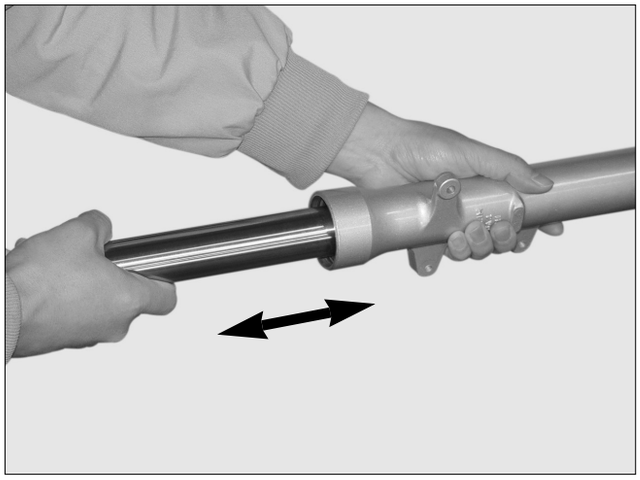
● Remove the piston ring, seat pipe and rebound spring from the fork pipe.



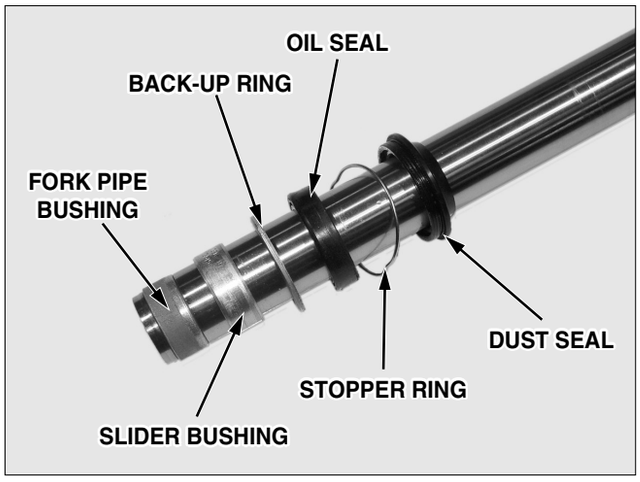
● Remove the dust seal.



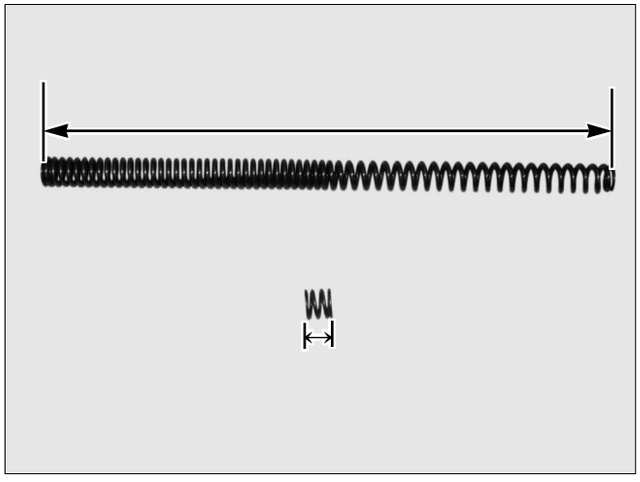
- Remove the oil seal stopper ring.



- Pull the fork pipe out until you feel resistance from the slider bushing.
- Then move it in and out, tapping the bushing lightly until the fork pipe separates from the bottom case.
- The slider bushing will be forced out by the fork pipe bushing.



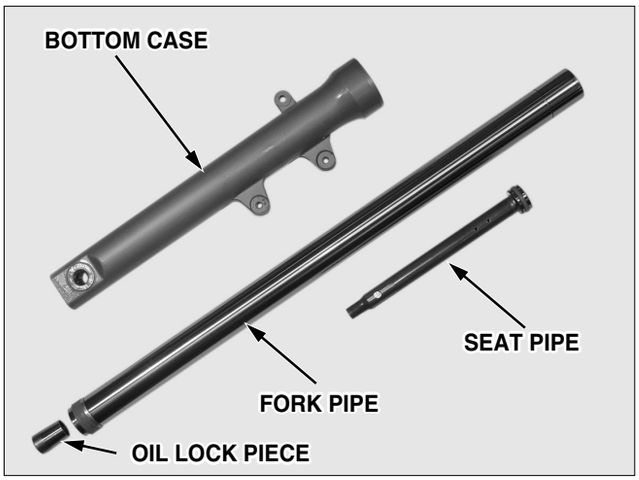
- Remove the fork pipe bushing, slider bushing, back-up ring, oil seal, stopper ring and dust seal from the fork pipe.



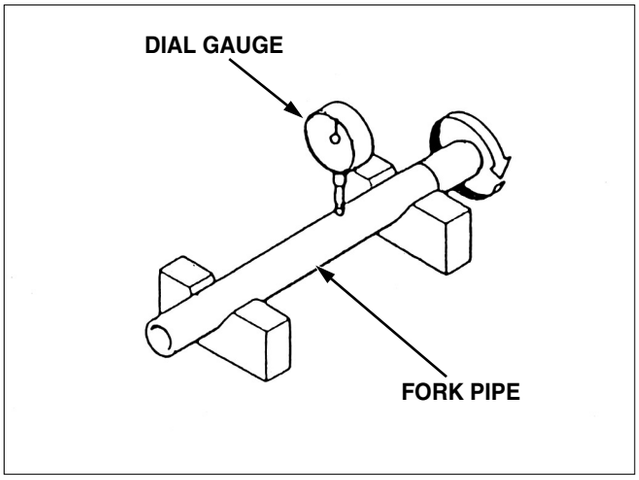
INSPECTION

- Place the fork spring on a level place, and measure the free length.
- If the free length deviates from the service limit, replace the springs with new ones.

SERVICE LIMIT : FORK SPRING : 480mm
REBOUND SPRING : 21.6mm

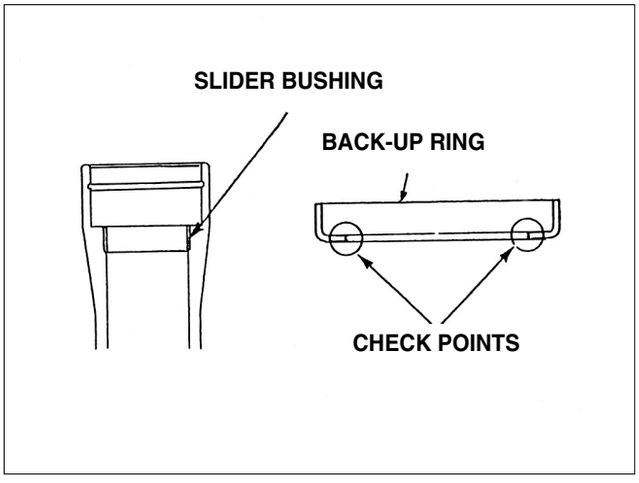


- Check components for damage or abnormal wear. Replace defective parts with new ones.



- Place the fork pipe in V-block and measure the runout. Actual runout is 1/2 the total indicator reading.

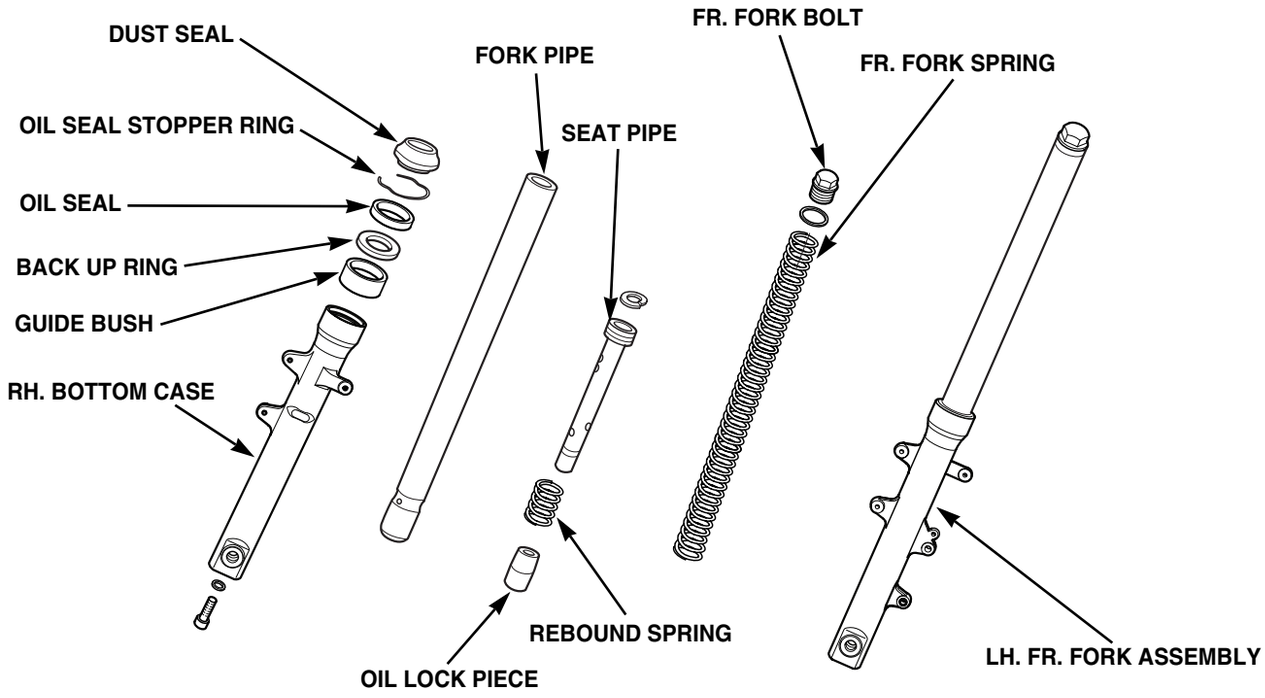
SERVICE LIMIT : 0.2mm

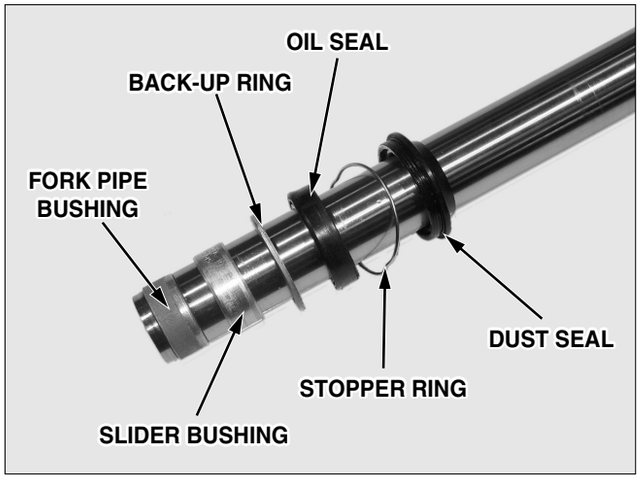


- Visually inspect the slider and fork pipe bushings.
- Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

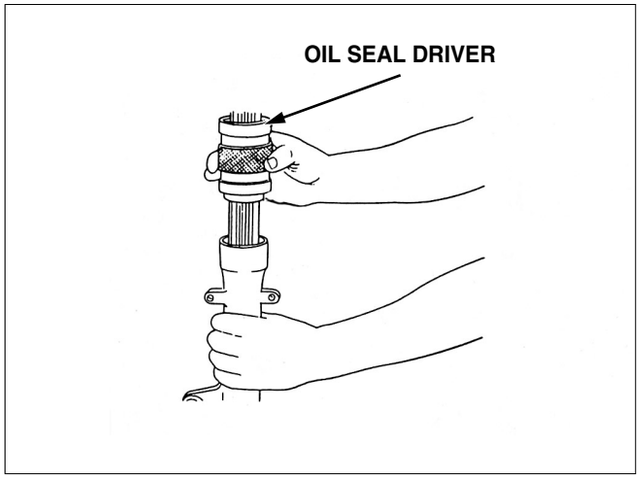
- Check the back-up ring ; replace it if there is any distortion at the points shown.

ASSEMBLY



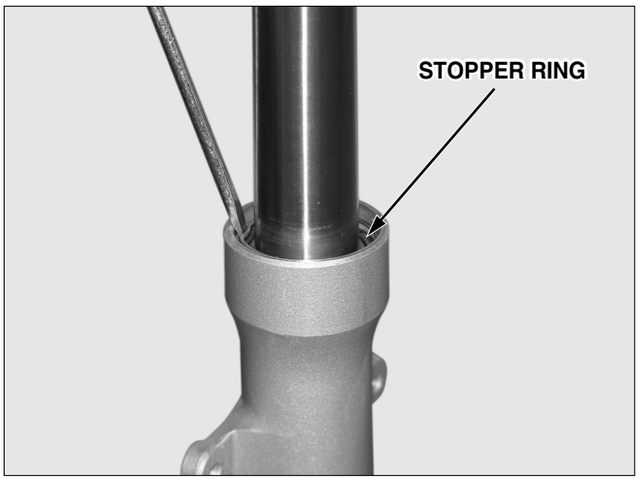


- Before assembly, wash all parts with a clean oil and wipe them dry.
- Install the dust seal, stopper ring, new oil seal, back-up ring, and slider bushing.
- Install a new fork pipe bushing.
- Install the fork pipe into the bottom case.

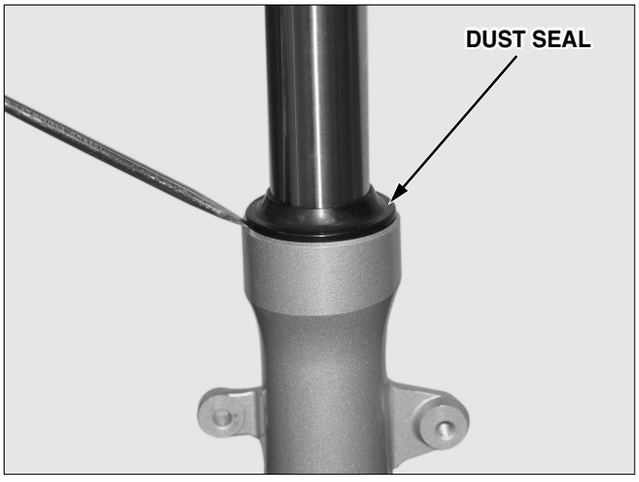


- Apply ATF to a new oil seal.
- Assemble the oil seal to the bottom case.
- Insert the oil seal with special tools until the attachment groove of the bottom case set ring is exposed.

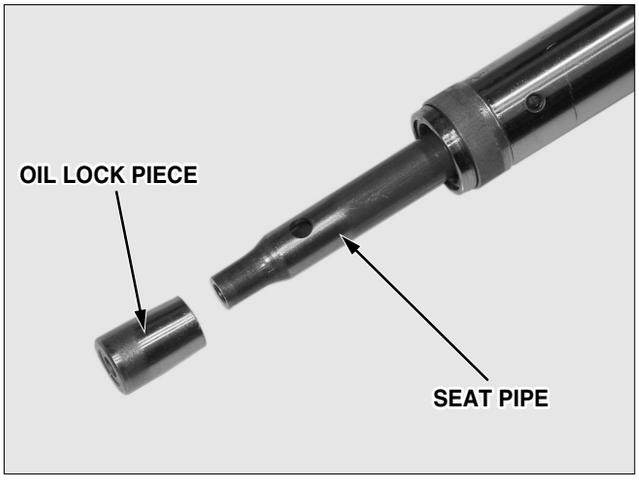
TOOLS : OIL SEAL DRIVER



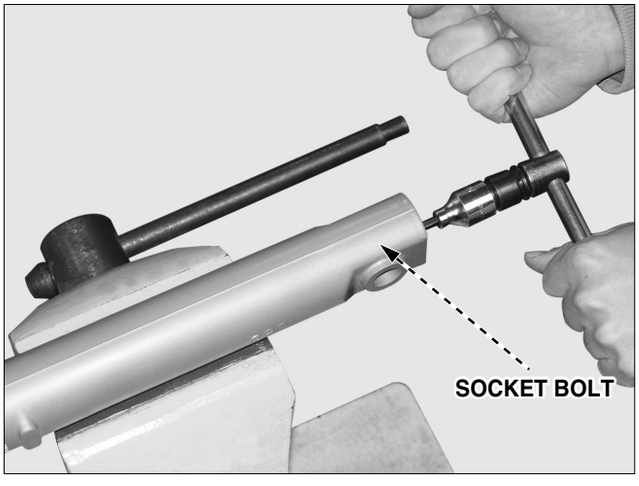
● Install the oil seal stopper ring into the bottom case groove securely.



● Install the dust seal.



● Install the oil lock piece onto the end of the seat pipe.
● Install the seat pipe into the fork pipe.

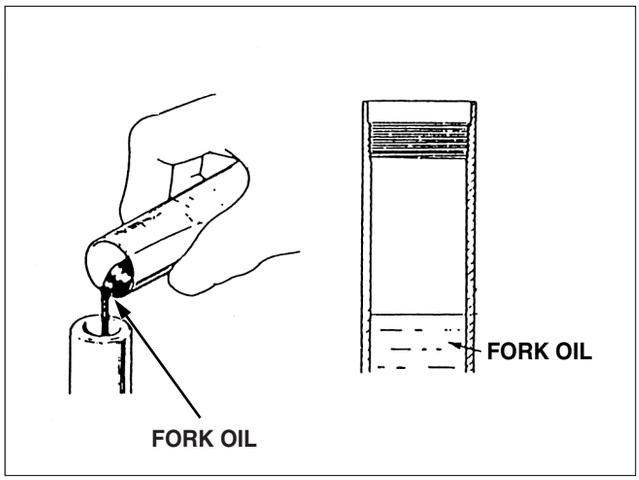


● Wrap the bottom case with a piece of cloth, and fix it to the vise.
● Apply screw locking agent to the socket bolt thread, and assemble the socket bolt to the seat pipe.

TORQUE : 2.0 kgf · m (20 N · m)

⚠ NOTE

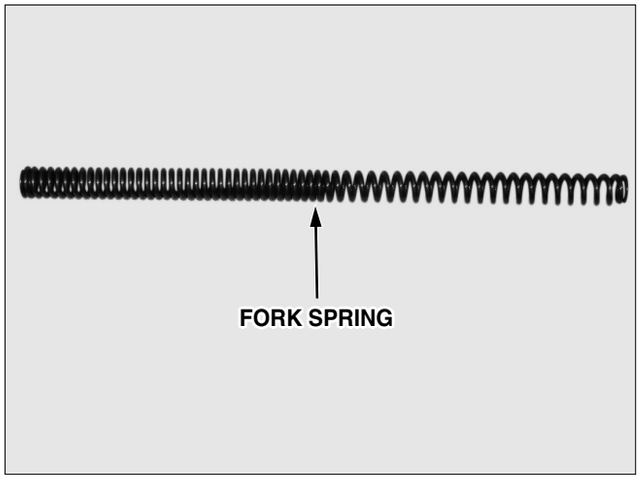
• When a vise is used to hole the bottom case, do not insert the case itself but insert the bracket.



● Pour the specified amount of automatic transmission fluid(ATF) into the fork pipe.

CAPACITY : 265±2.5cc

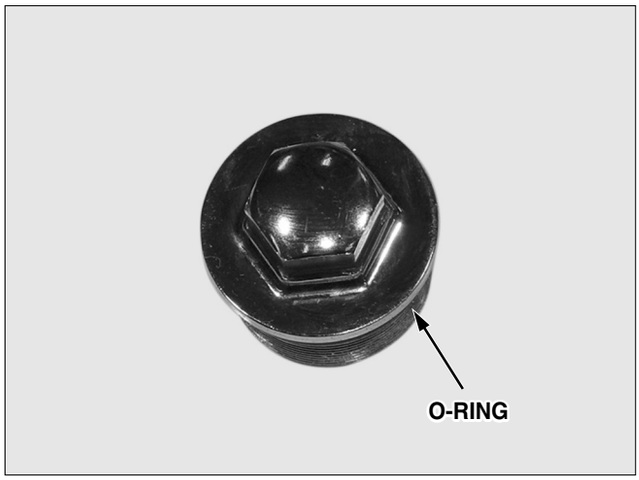
● Slowly press the fork tube 2-3 times to discharge air.



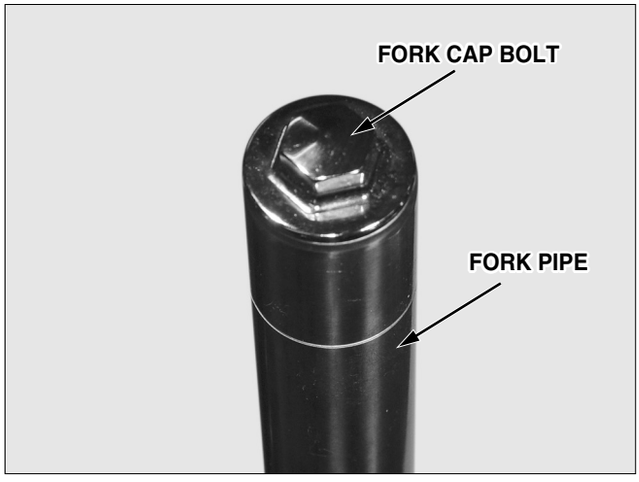
● Install the fork spring to the fork pipe.

⚠ NOTE

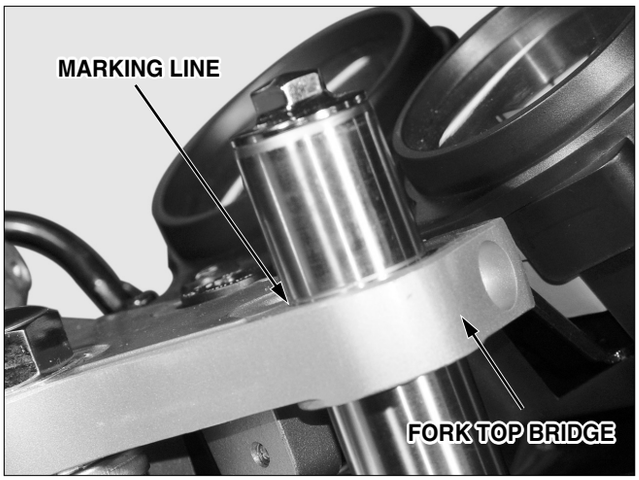
• Install the spring with the smaller pitch side facing downward.



● Install the new O-ring to the fork cap bolt.

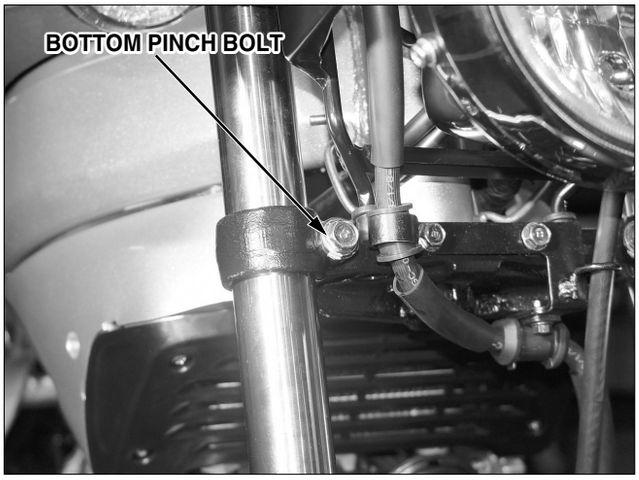


● Install the fork cap bolt to the fork pipe.



INSTALLATION

- Install the fork pipe through the bottom bridge, fork top bridge and handle pipe.
- Position the marking line of the fork pipe with the upper surface of the top bridge as shown.

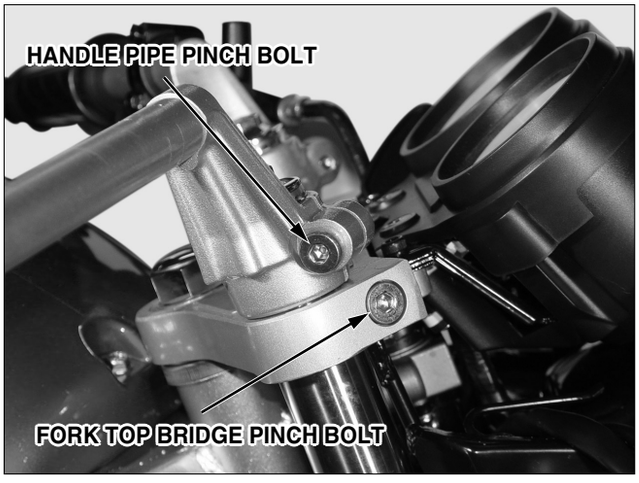


- Tighten the bottom bridge pinch bolt to the specified torque.

  TORQUE : 3.4 kgf · m (34 N · m)

- Tighten the fork cap bolt to the specified torque.

  TORQUE : 2.3 kgf · m (23 N · m)

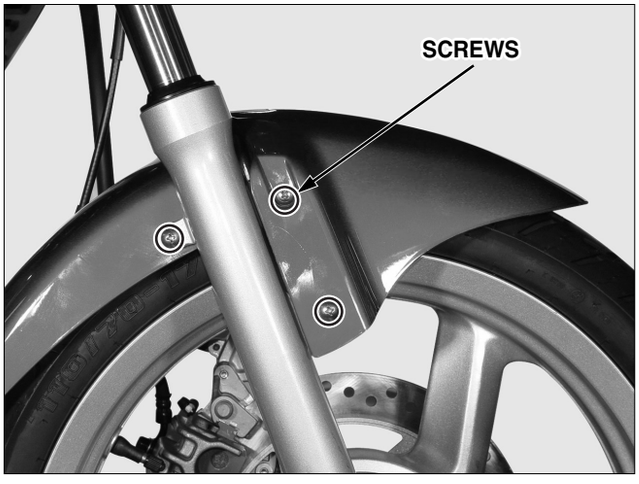


- Tighten the fork top bridge pinch bolt to the specified torque.

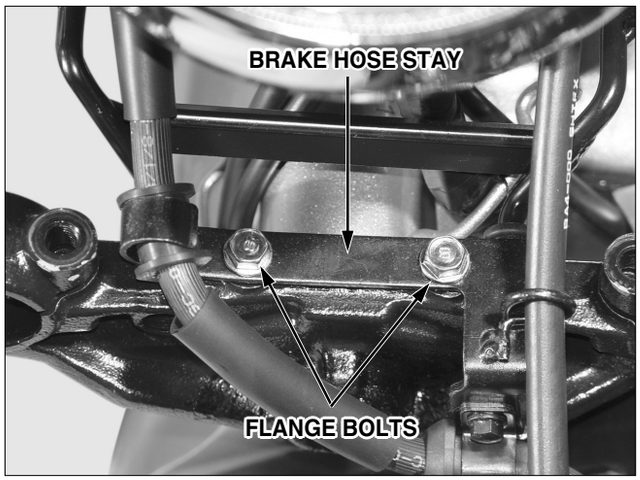
  TORQUE : 2.6 kgf · m (26 N · m)

- Tighten the handle pipe pinch bolt to the specified torque.

  TORQUE : 2.6 kgf · m (26 N · m)



- Install the following.
  - Front wheel. (⇨13-7)
  - Front fender. (⇨12-5)

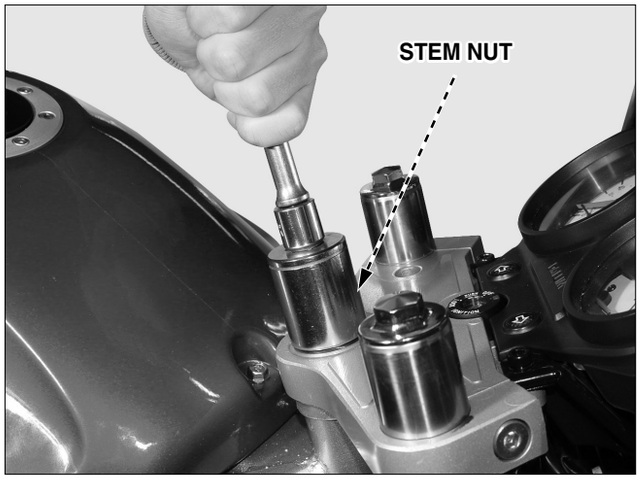


STEERING STEM

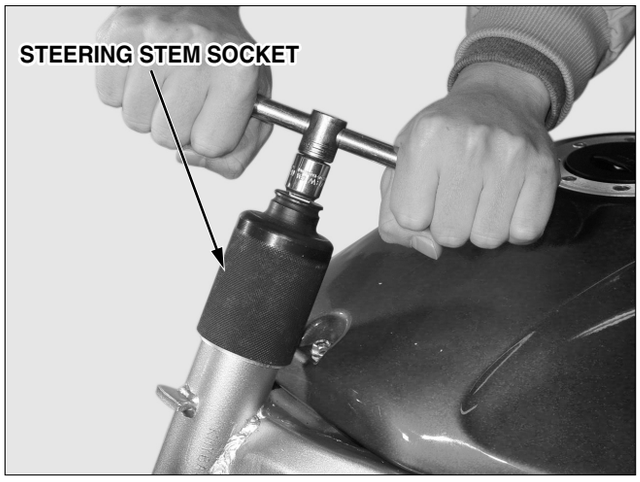
REMOVAL

- Remove the following :
  - Front wheel (⇨13-7)
  - Handlebar (⇨13-3)
  - Front fork (⇨13-12)

- Remove the flange bolts and front brake hose stay.

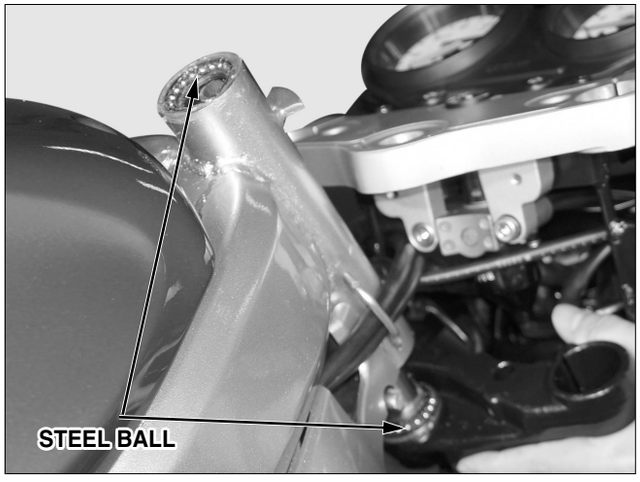


- Remove the steering stem nut.



- Remove the steering head top thread nut using the special tool.

  TOOL : STEERING STEM SOCKET

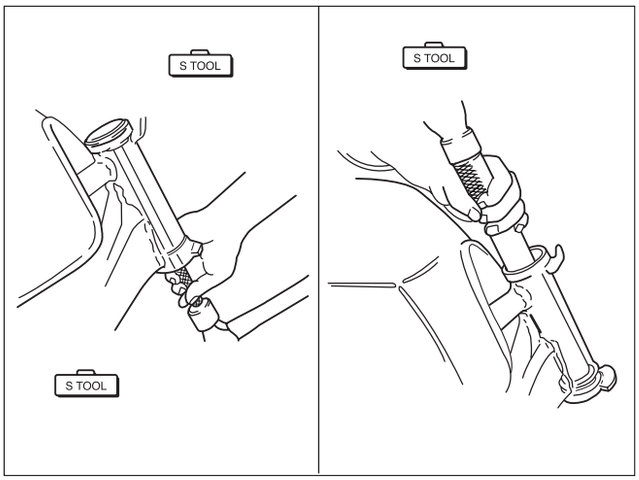


- Remove the following :
  - Steering top cone race
  - Steering steel ball
  - Steering stem

⚠ NOTE

• Place a shop towel under the steering stem to catch the steel balls.

- Check the steel ball, cone race, ball race for damage or abnormal wear and replace as necessary.



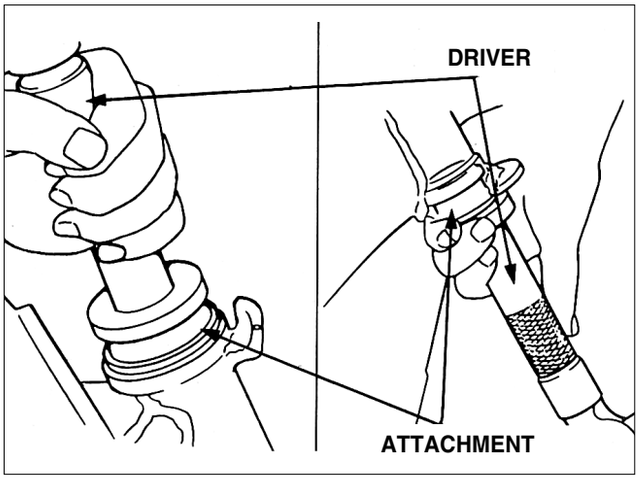
RACE REPLACEMENT

NOTE

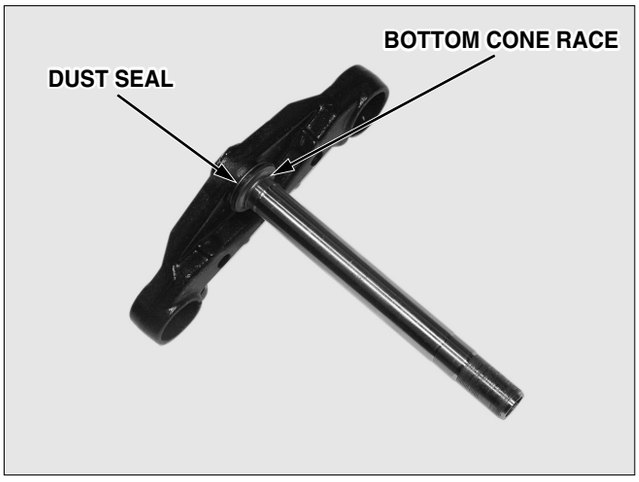
• Replace the cone reces and ball races in pairs.

● Remove the ball races from the steering head using the ball race dirver.

TOOL : BALL RACE DRIVER

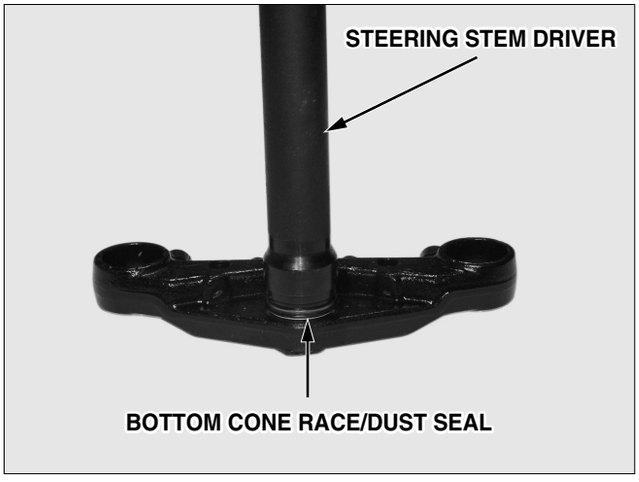


● Install the new ball races into the head pipe using the driver and attachment.



● Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the bottom cone race from the stem.

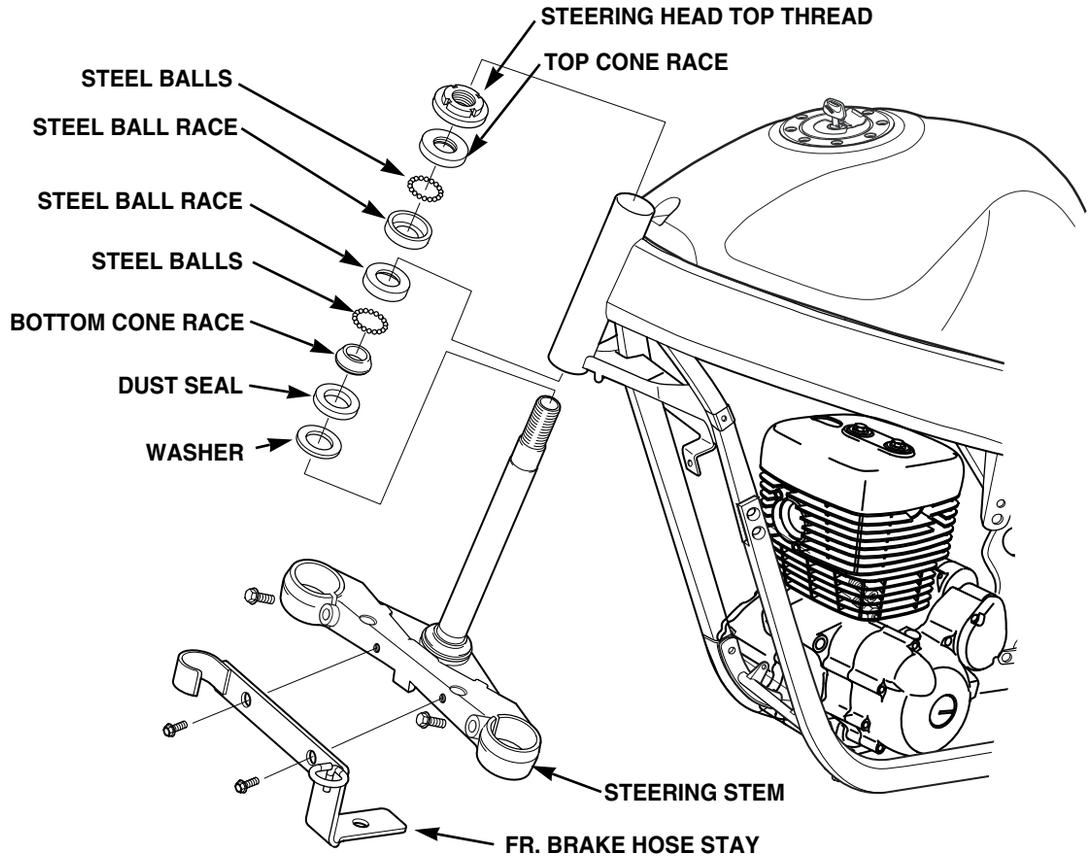
● Remove the bottom cone race with a chisel or equivalent tool, being careful not to damage the stem.
● Remove the dust seal and washer.

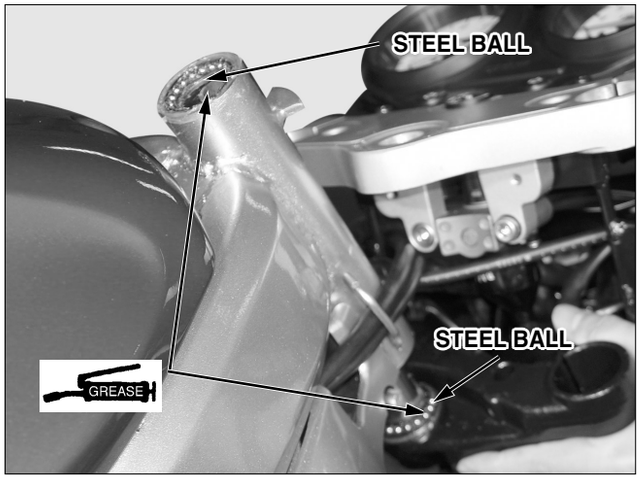


● Apply grease to new dust seal lips and install it over the steering stem.
● Install a new bottom cone race using a special tool and a hydraulic press.

TOOL : STEERING STEM DRIVER

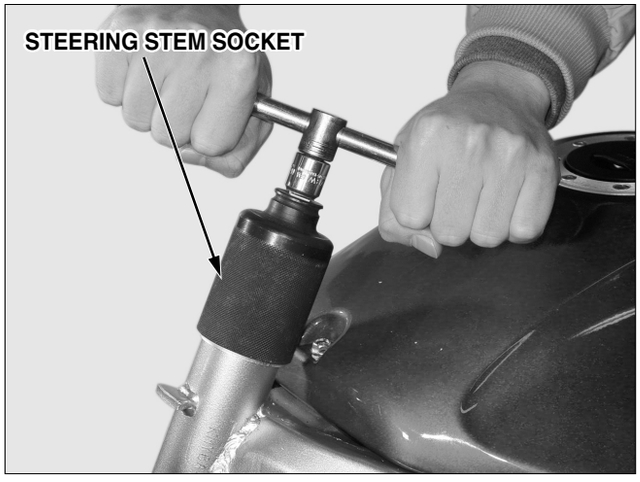
INSTALLATION





- Install the steel ball.
- Apply grease to top and bottom ball races and cone races.

- Instert the steering stem into the steering head pipe.
- Insall the steel ball and top cone race.



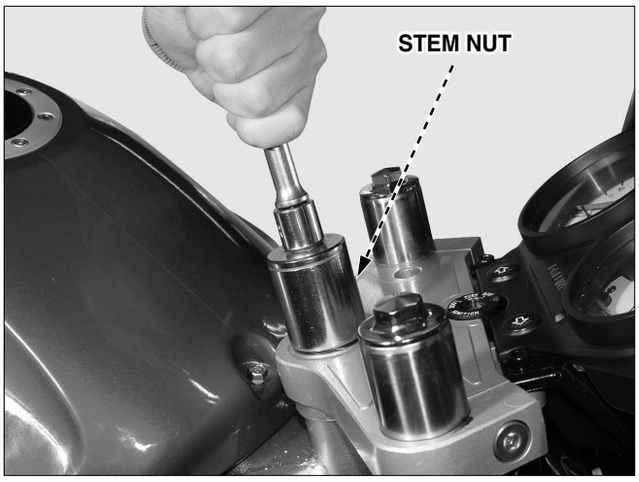
- Install and tighten the steering head top thread to the initial torque.

  TORQUE : 2.5 kgf · m (25N · m)
  TOOL : STEERING STEM SOCKET

- Move the steering stem right and left, five times to seat the steel balls.
- Make sure that the steering stem moves smoothly, without play or binding ; then loosen the steering head top thread.
- Retighten the steering head top thread to the specified torque.

  TORQUE : 0.3 kgf · m (3N · m)

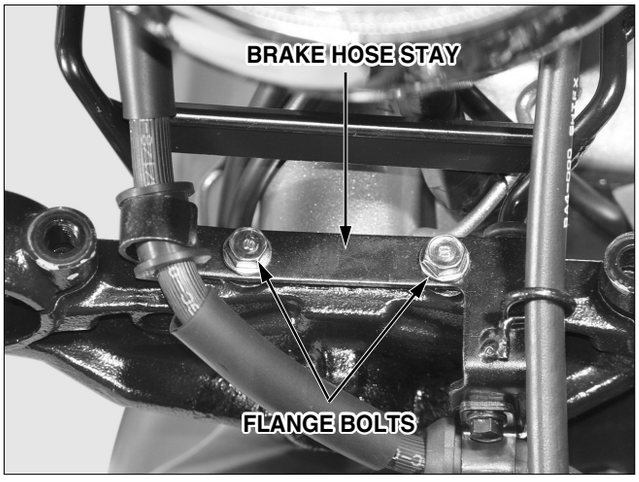
- Recheck that the steering stem moves smoothly without play or binding.



- Install the top bridge, washer and steering stem nut.
- Temporarily install the R/L front forks, then tighten the steering stem nut to the specified torque.

TORQUE : 7.4 kgf · m (74N · m)

- Install the following:
  - Front fork (⇨13-17)
  - Handlebar (⇨13-5)

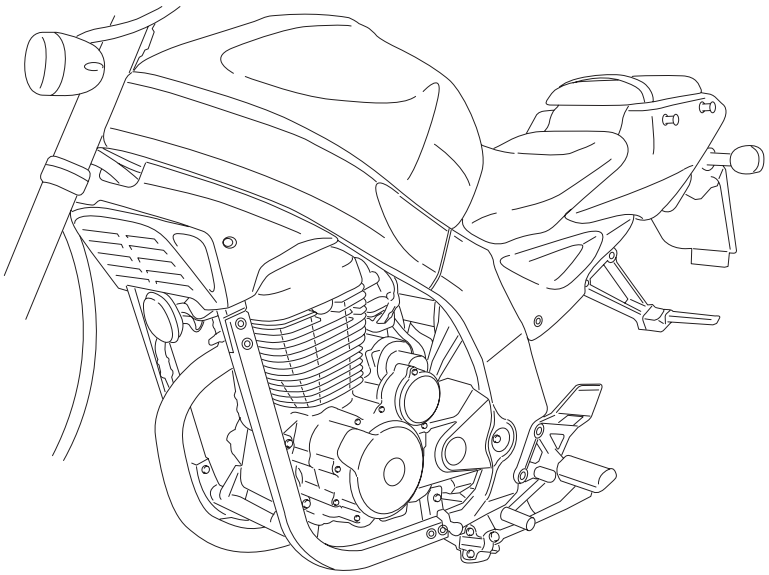


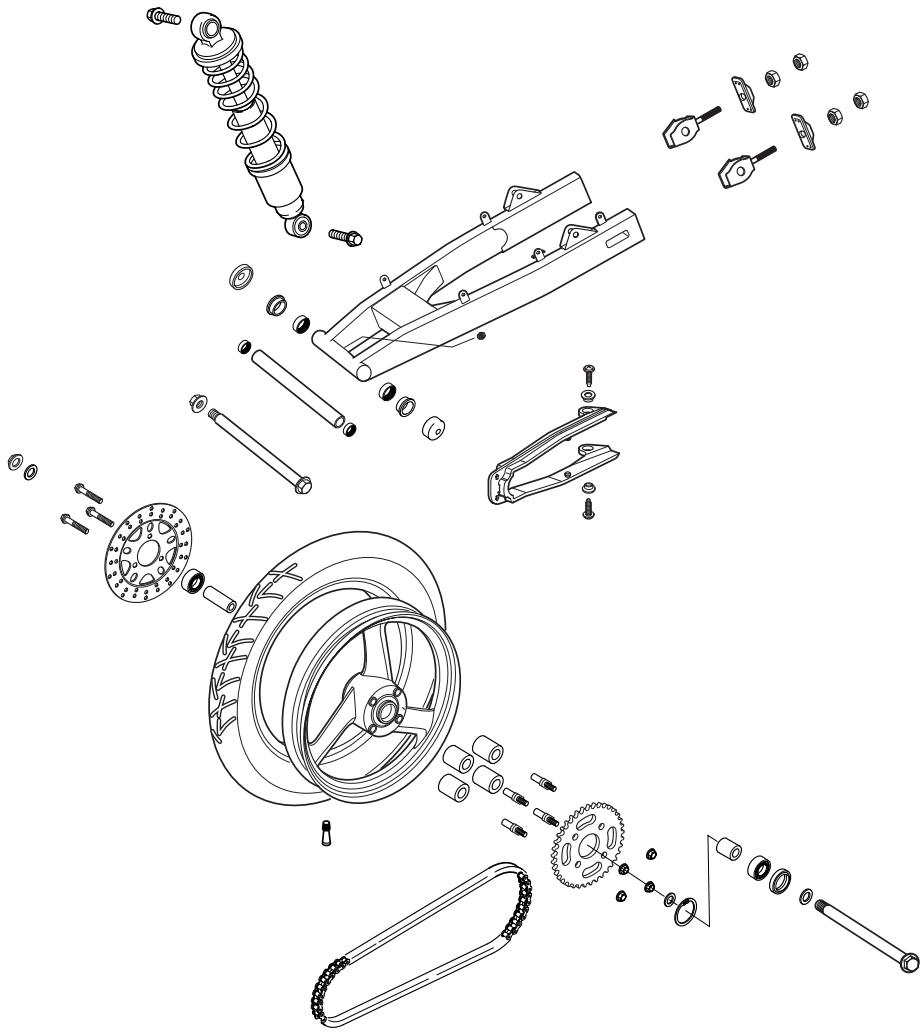
- Install the front brake hose stay and tighten the mounting bolts.

- Install the following:
  - Front wheel (⇨13-10)
  - Front fender (⇨12-5)

⚠ NOTE

• Check the cables and wiring for interference.





14. REAR WHEEL/REAR SUSPENSION

SERVICE INFORMATION

GENERAL SAFETY

- If the brake drum or lining is contaminated with oil, braking power will be lost. If contaminated with oil, clean the brake drum, and replace the brake shoe.
- Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies. Use a brake cleaner, designed to minimize the hazard caused by airborne asbestos fibers.

SPECIFICATIONS

Unit : mm

ITEM		STANDARD VALUE	SERVICE LIMIT
AXLE RUNOUT		-	0.2
REAR WHEEL RIM RUNOUT	RADICAL	-	2.0
	AXIAL	-	2.0
REAR CUSHION SPRING FREE LENGTH		131	-

TORQUE VALUES

REAR BRAKE DISK BLOT	4.2kgf · m (42N · m)
REAR AXLE NUT	8.8kgf · m (88N · m)
REAR CUSHION UPPER NUT	3.4kgf · m (34N · m)
REAR CUSHION LOWER BOLT	3.4kgf · m (34N · m)
SWINGARM PIVOT BOLT	8.8kgf · m (88N · m)
FINAL DRIVEN SPROCKET NUT	5.9kgf · m (59N · m)

TOOLS

ATTACHMENT, 30 × 35mm
ATTACHMENT, 42~47mm
PILOT, 15mm
DRIVER
BEARING REMOVER SHAFT
REMOVER HEAD, 15mm

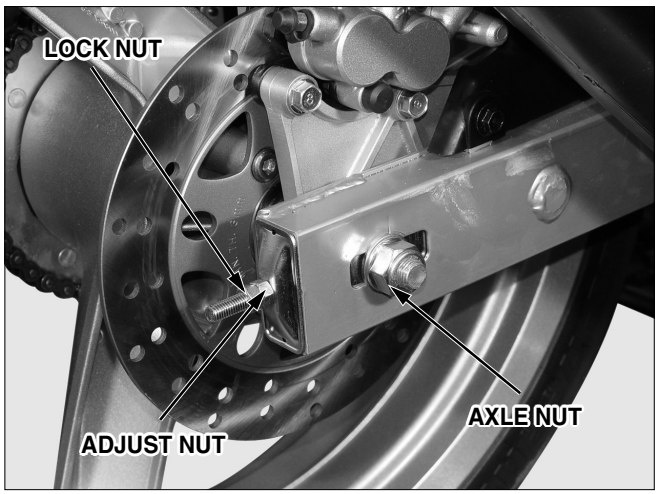
TROUBLESHOOTING

Wobble or vibration in motorcycle
- Bent rim
- Worn rear wheel bearing
- Damaged tire
- Axle not tightened properly
- Insufficient air in tire
- Worn rear fork bush

Soft suspension
- Weak spring
- Improper rear cushion adjust
- Incorrect rear damper

Hard suspension
- Improper rear cushion adjust
- Bent damper rod

Rear cushion noise
- Cushion case interference
- Loose fasteners

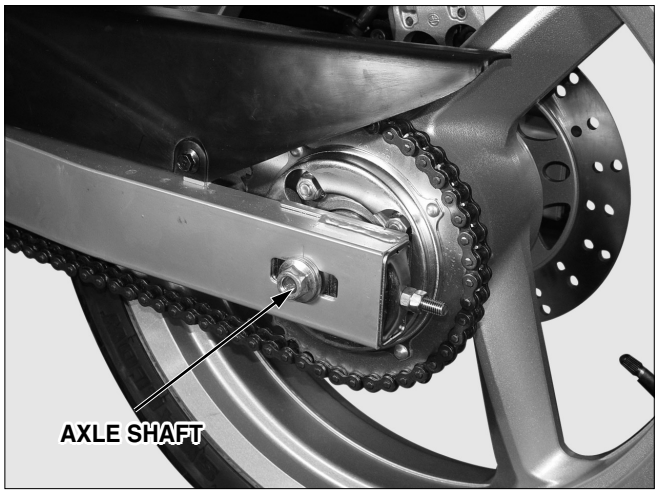


REAR WHEEL

REMOVAL

- Support the motorcycle using a safety stand or hoist, raise the rear wheel off the ground.

- Loosen the chain adjust nuts and lock nuts.
- Remove the axle nut (U-nut).



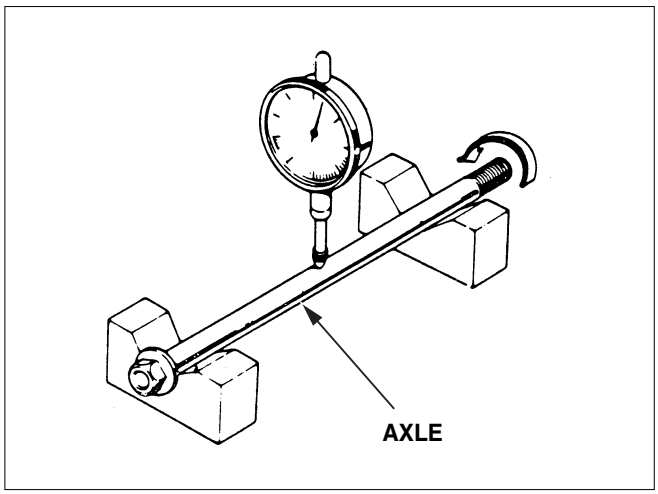
- Push the rear wheel forward.
- Derail the drive chain from the driven sprocket.

- Remove the axle from the left side and remove the rear wheel.

- Remove the side collars.

INSPECTION

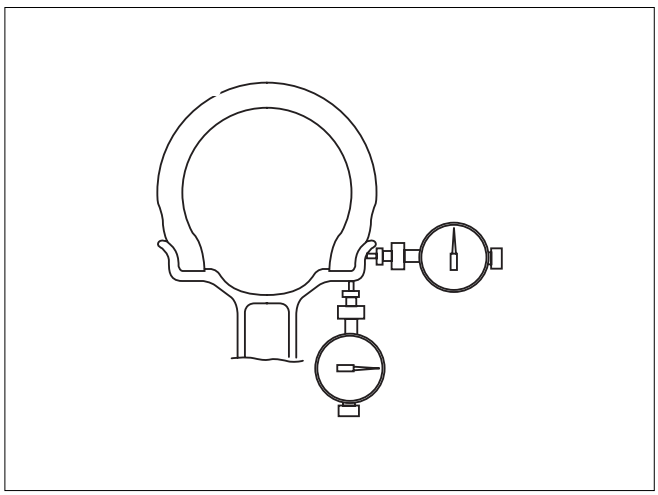
Axle



- Place the axle in V-blocks and measure the runout.
- Actual runout is 1/2 the total indicator reading.

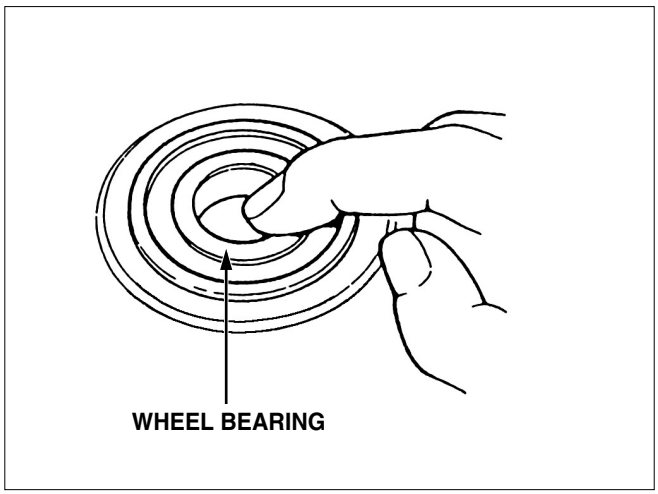
SERVICE LIMIT : 0.20mm

Wheel rim runout



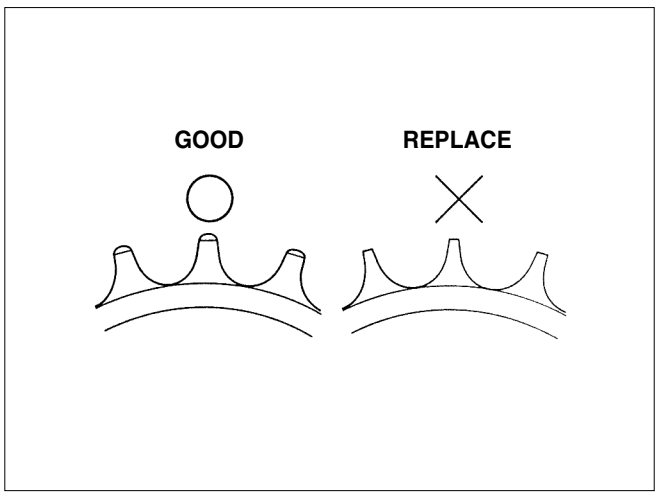
- Check the rim runout by placing the wheel in a turning stand.
- Spin the wheel slowly and read the runout using a dia indicator.
- Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT : RADIAL : 2.0mm
AXIAL : 2.0mm



Wheel bearing

- Turn the inner race of each bearing with your finger.
- Bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.
- Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.

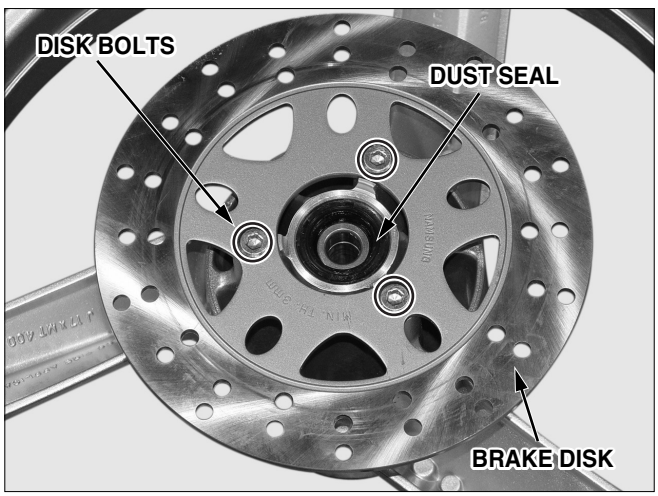


Driven sprocket

- Check the condition of the final driven sprocket teeth.
- Replace the sprocket if worn or damaged.

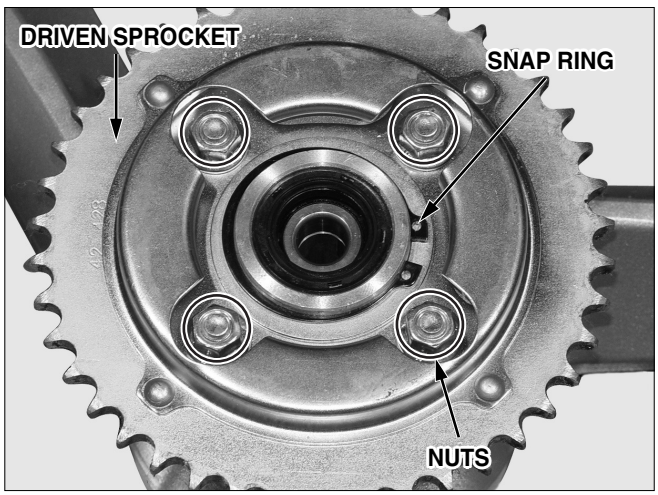
⚠ NOTE

• Inspect the drive chain and driven sprocket at the same time.

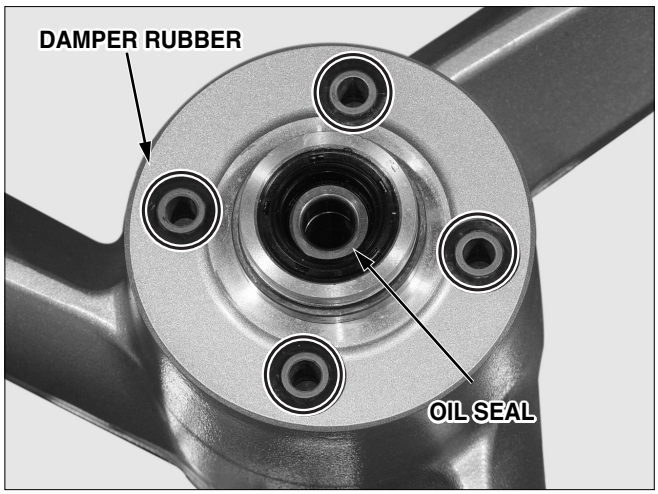


DISASSEMBLY

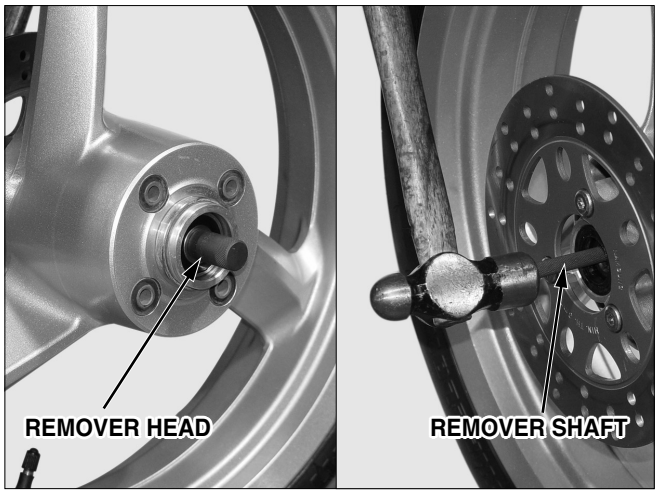
- Remove the bolts and brake disk.
- Remove the dust seal.



- Remove the snap ring.
- Remove the nuts and final driven sprocket.



- Inspect the damper rubber for deterioration or damage. Replace it if necessary.
- Remove the oil seal.

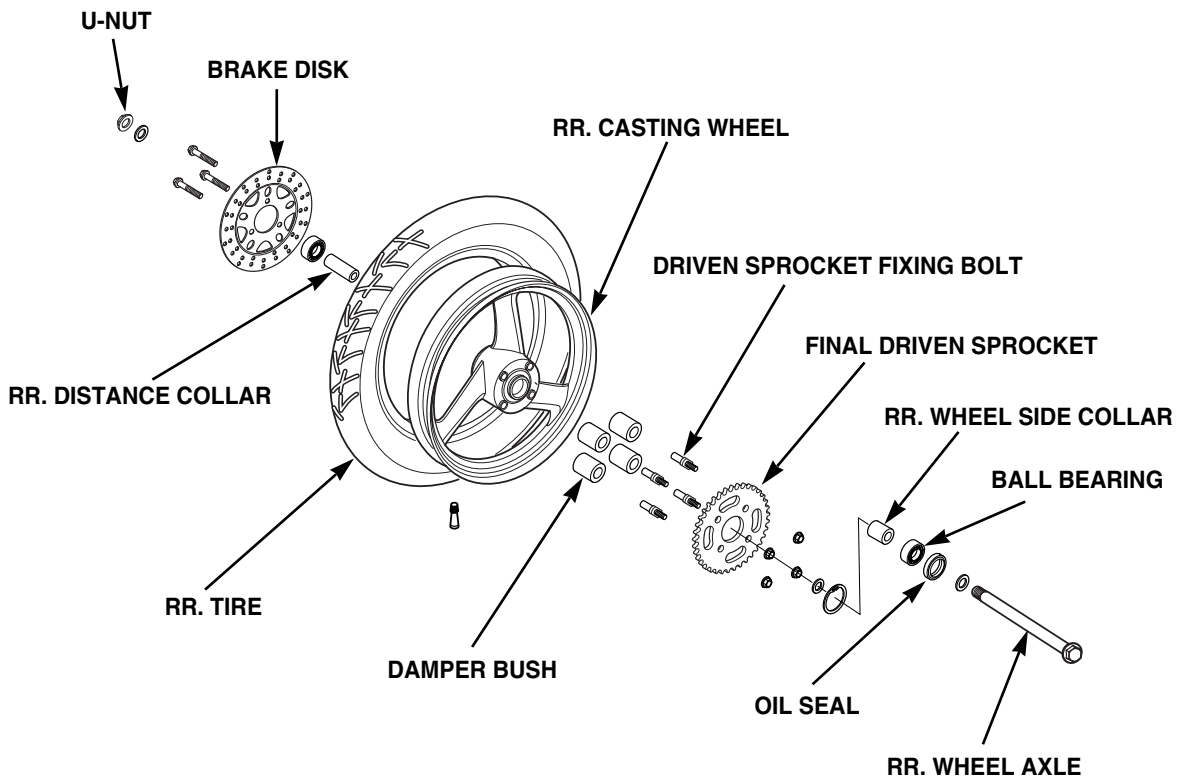


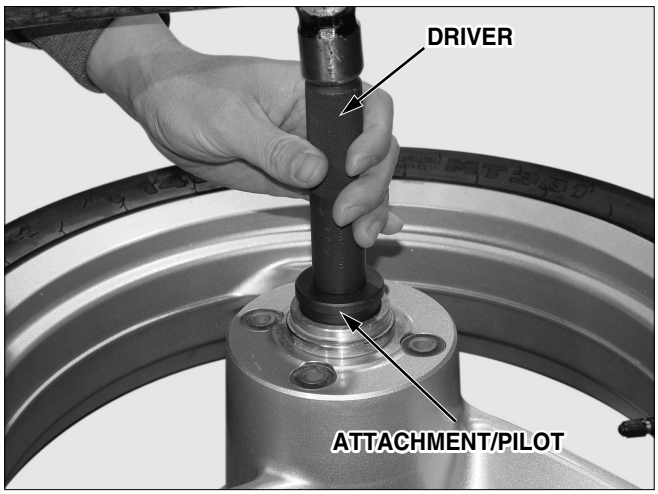
Wheel Bearing Removal

- Install the bearing remover head into the bearing.
- From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.
- Remove the distance collar and drive out the other bearing.

TOOLS :
BEARING REMOVER SHAFT
REMOVER HEAD

ASSEMBLY

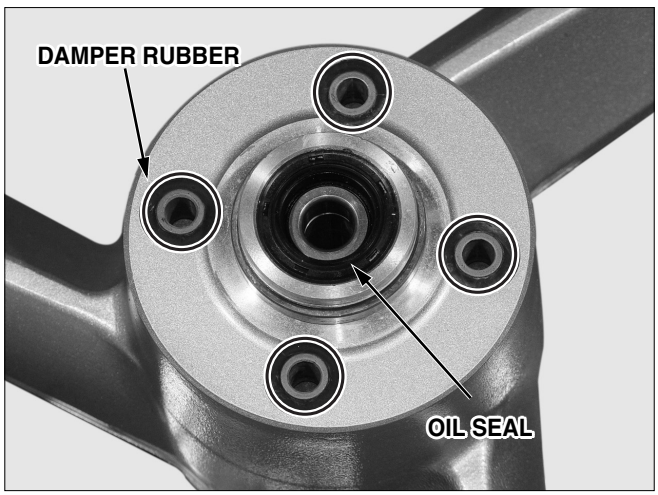




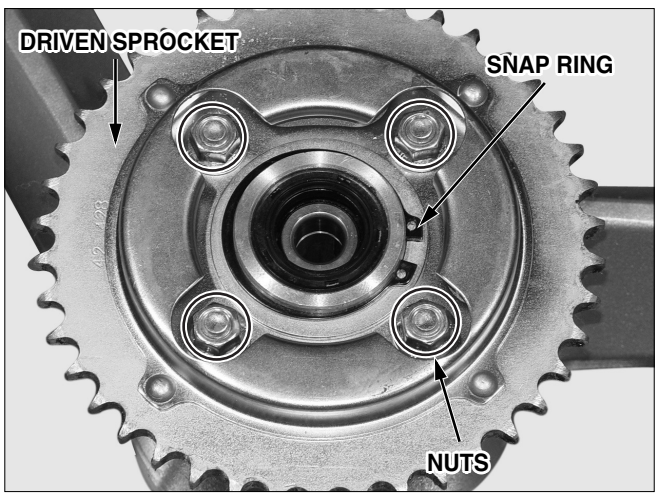
Wheel Bearing Installation

- Drive in a new left bearing squarely.
- Install the distance collar.
- Drive in a new right bearing.

TOOLS :
DRIVER
ATTACHMENT
PILOT 15mm



- Apply grease to the new dust seal and install it into the wheel hub.
- If having removed the damper rubbers, install them.



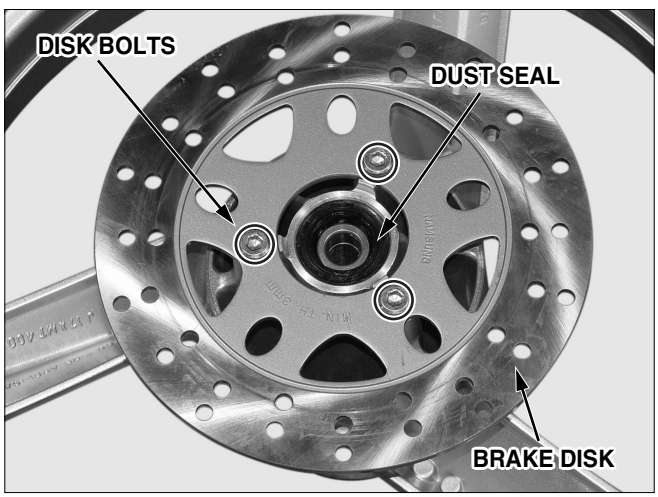
- Make the part in protection ring face the outside, and connect the final driven sprocket.
  Install the snap ring into the groove correctly.

⚠ NOTE

• Be sure to install the snap ring into the groove correctly.

- If having removed the driven sprocket nut, align the flange of the fixing bolt with the inner groove of the sprocket and install the nuts.

TORQUE : 5.9 kgf · m (59 N · m)



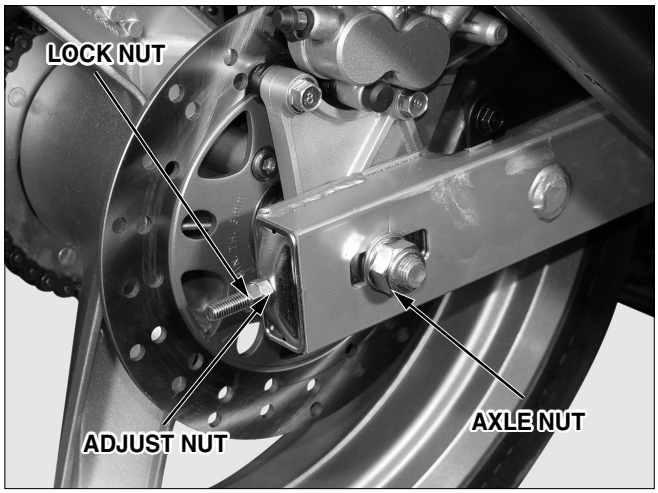
- Install the brake disk with its literal mark facing out.
- Install and tighten the new bolts to the specified torque.

TORQUE : 4.2 kgf · m (42 N · m)

- Apply grease to the dust seal lips, then install it into the wheel hub.

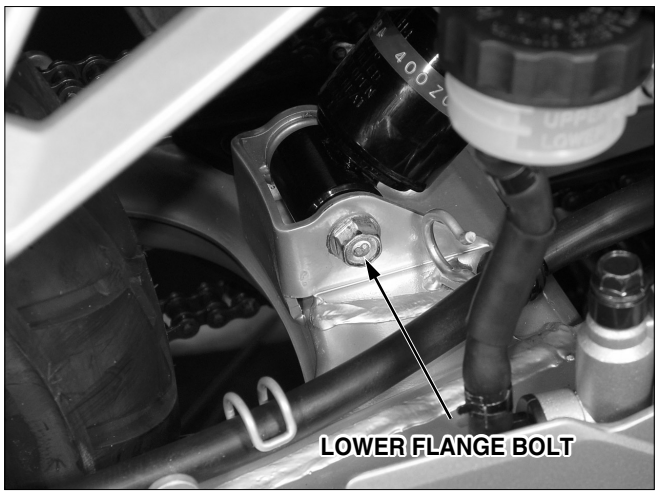
INSTALLATION

- Install the side collar.
- Place the rear wheel into the swingarm.
- Install the drive chain over the driven sprocket.
- Install the axle from the left side.



- Install the axle nut.
- Adjust the drive chain slack. (⇨2-8)
- Tighten the axle nut to the specified torque.

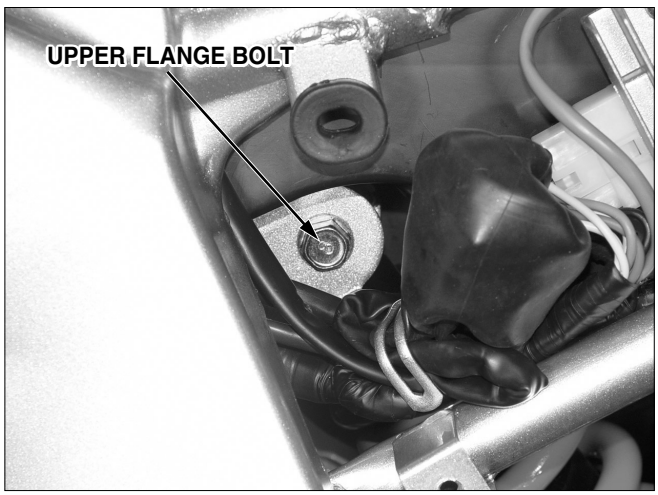
  TORQUE : 8.8 kgf · m (88 N · m)



REAR CUSHION

REMOVAL

- Place the motorcycle using a hoist or equivalent.
- Remove the rear wheel mudguard. (⇨12-3)
- Remove the rear cushion lower flange bolt.



- Remove the LH. side cover. (⇨12-2)
- Loosen the rear cushion upper flange bolt, and remove the rear cushion.

⚠ WARNING

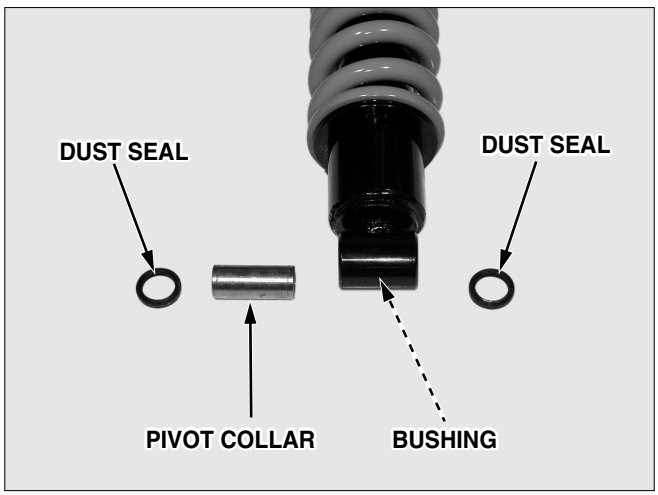
- The damper unit is filled with high pressure nitrogen gas. Do not disassemble gas damper unit.
- Heating a gas-filled damper can lead to an explosive release of pressure which can cause a serious injury.

INSPECTION

- Visually inspect the rear cushion for damage.

- Check for the :
  - Damper rod for bend or damage
  - Damper unit for deformation or oil leaks
  - Cushion rubber for wear or damage

- Inspect all the other parts for wear or damage.
- If necessary, replace the rear cushion as an assembly.

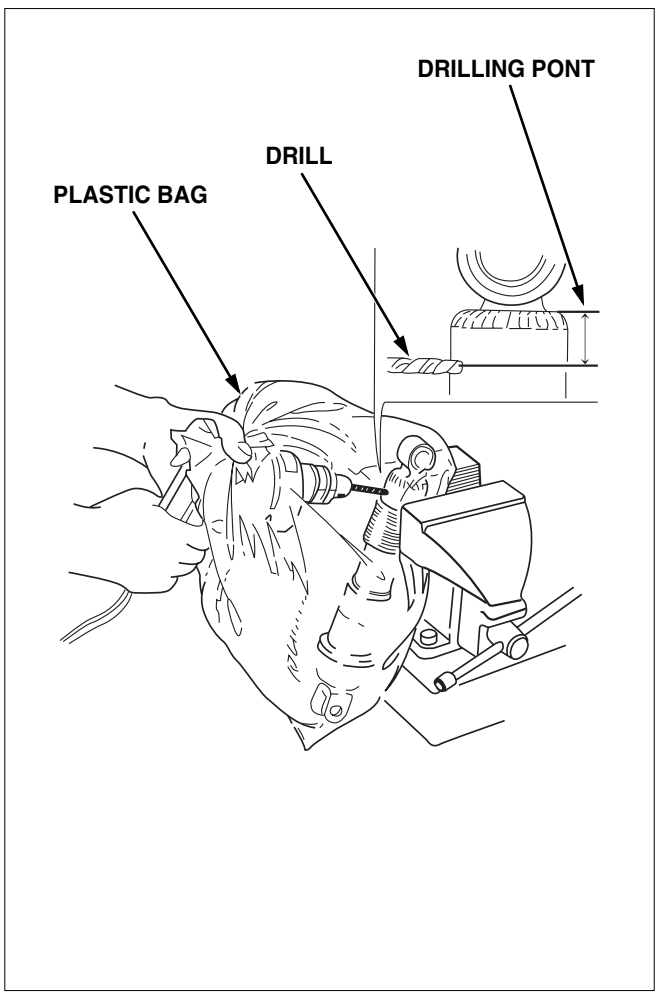


BUSHING REPLACEMENT

- Remove the pivot collar and dust seals.

- Press out the bushing out of the rear cushion lower mount using the special tools.
- Press a new bushing into the lower mount using the same tools.

- Apply grease to the new dust seal lips, install them into the lower mount.
- Install the pivot collar.

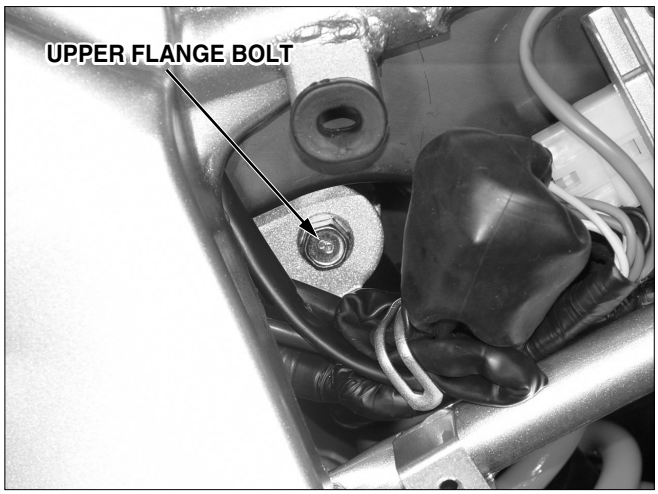


REAR CUSHION DISPOSAL PROCEDURE

- Center punch the damper case to mark the drilling point.
- Wrap the rear cushion inside a plastic bag.
- Support the rear cushion upright in a vise.
- Though the open end of the bag, insert a drill motor with a sharp 2~3mm drill bit.
- Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.

⚠ WARNING

- Always wear eyes protection to avoid getting metal shavings in your eyes when gas pressure is released.
- Drilling farther into the damper case than specified can puncture the oil chamber.

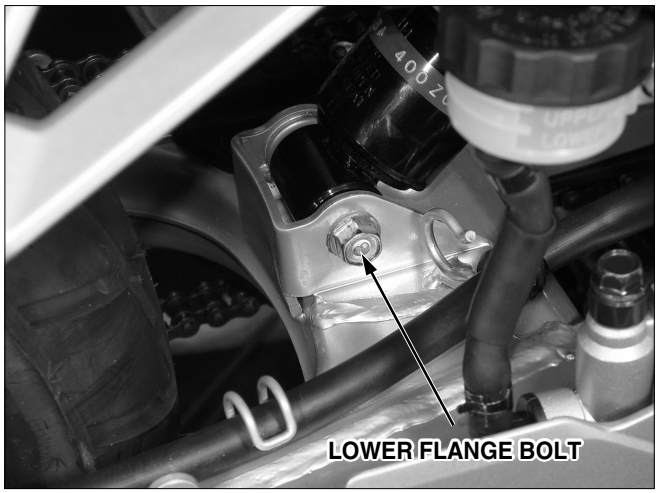


INSTALLATION

- Install the rear cushion into the frame from the bottom, and install the upper mounting bolt.
- Tighten the bolt to the specified torque.

  TORQUE : 3.4 kgf · m (3.4 N · m)

- Install the LH. side cover.



- Install the rear cushion lower mounting bolt.
- Tighten the bolt to the specified torque.

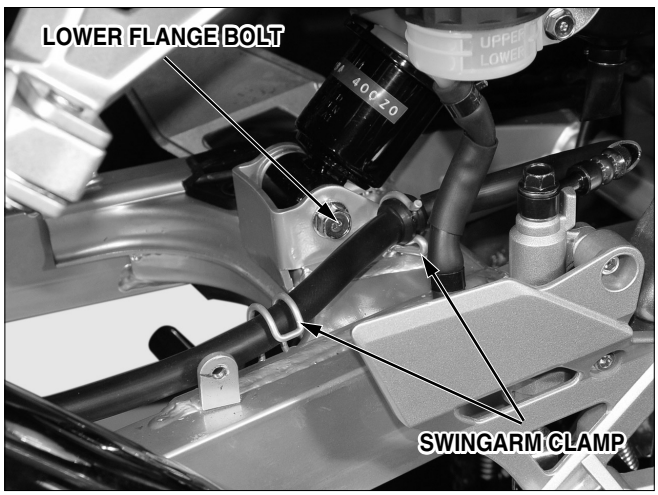
  TORQUE : 3.4 kgf · m (3.4 N · m)

- Install the rear wheel mudguard.

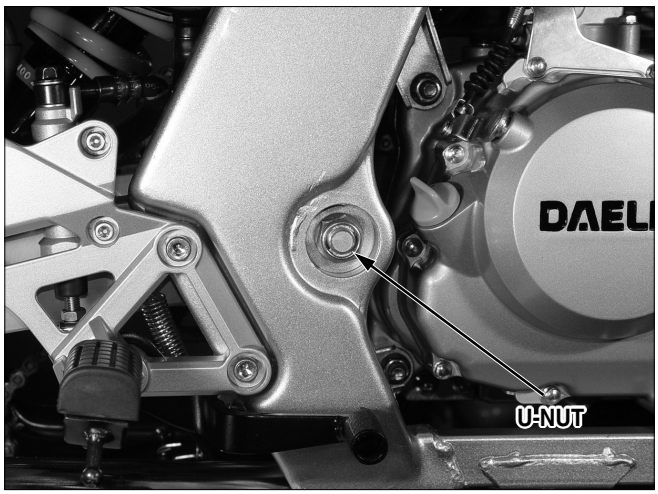
SWINGARM

REMOVAL

- Remove the rear wheel. (⇨14-3)
- Remove the mudguard mounting bolts and rear wheel mudguard.

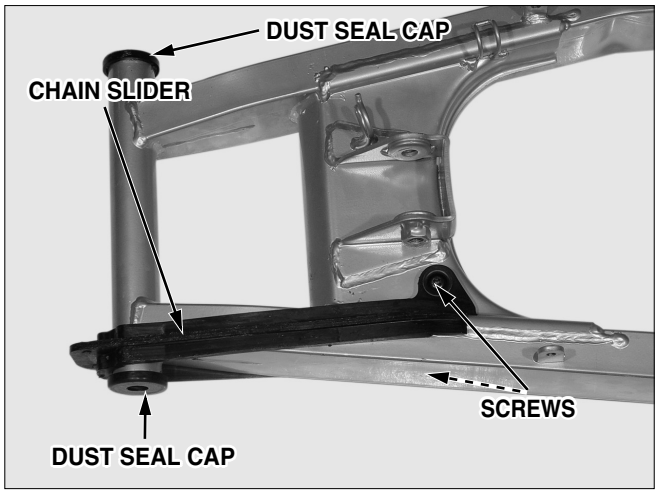


- Remove the brake hose from the swingarm.
- Remove the rear cushion lower flange bolt.

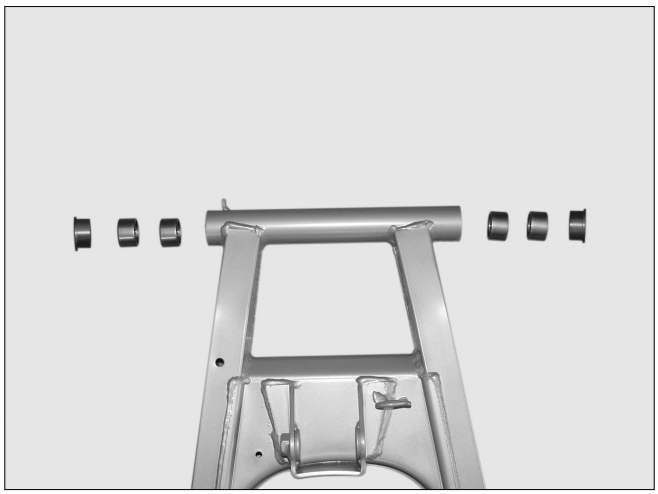


- Remove the U-nut and swingarm pivot bolt and then remove the swingarm from the frame.

DISASSEMBLY/INSPECTION

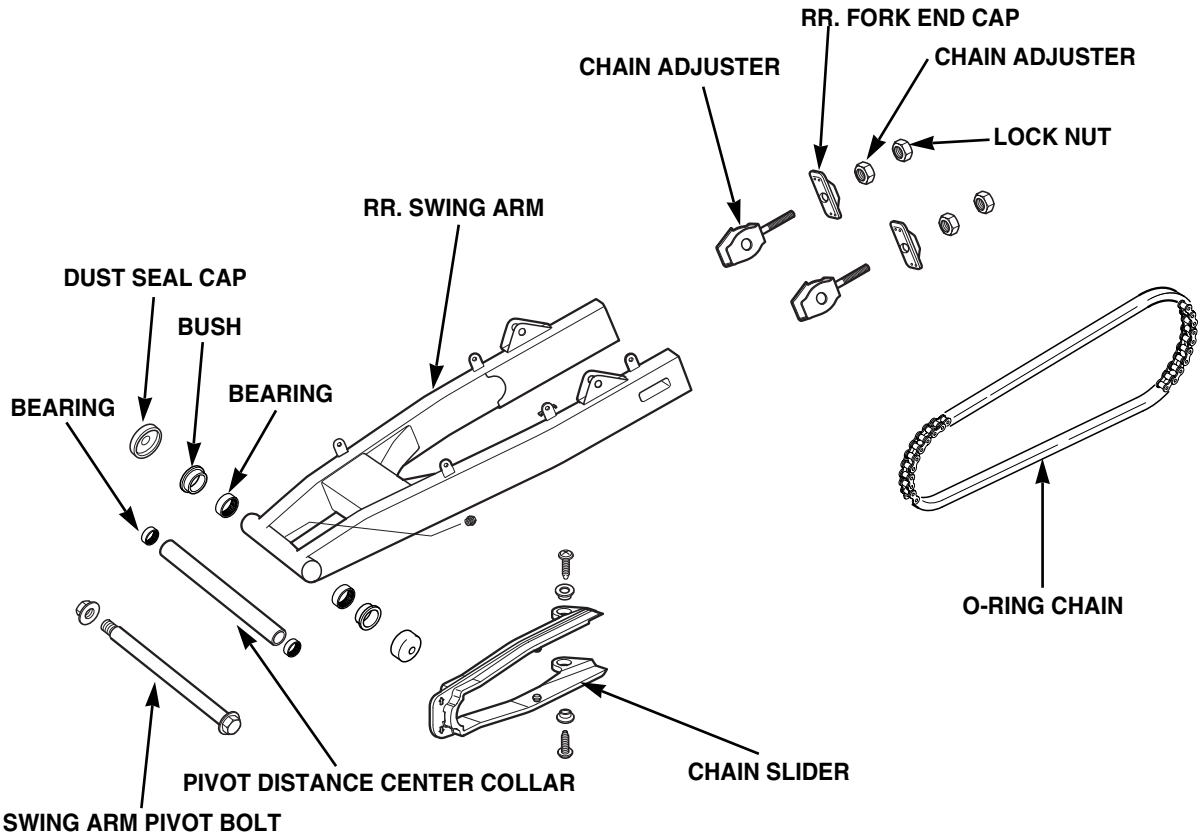


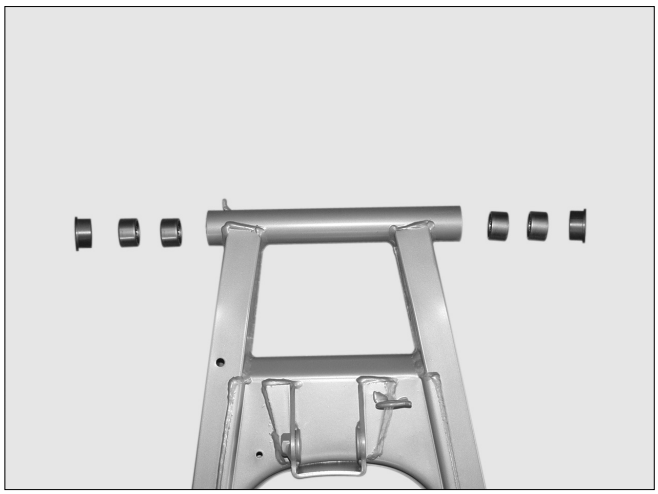
- Remove the two screws and chain slider.
- Check the chain slider for wear or damage.
- Remove the dust seal caps.



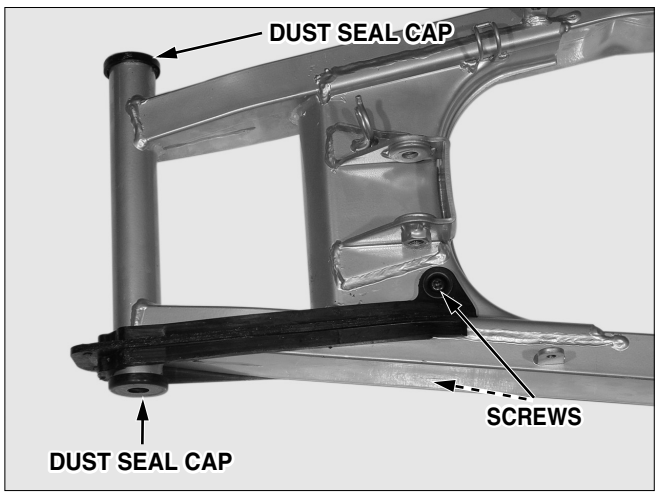
- Remove the bushes, pivot bearings and pivot distance center collar.
- Check the dust seal cap, bushes, bearings and center collar for wear or damage.

ASSEMBLY



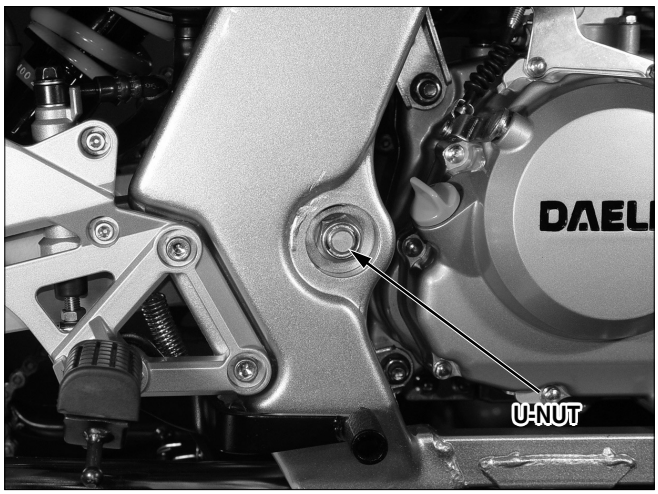


- Apply grease to the center collar, bearing and bushes.
- Install the center collar, bearings and bushes to the swingarm.



- Install the dust seal caps into the swingarm.
- Install the drive chain slider on the swingarm, then tighten the screws.

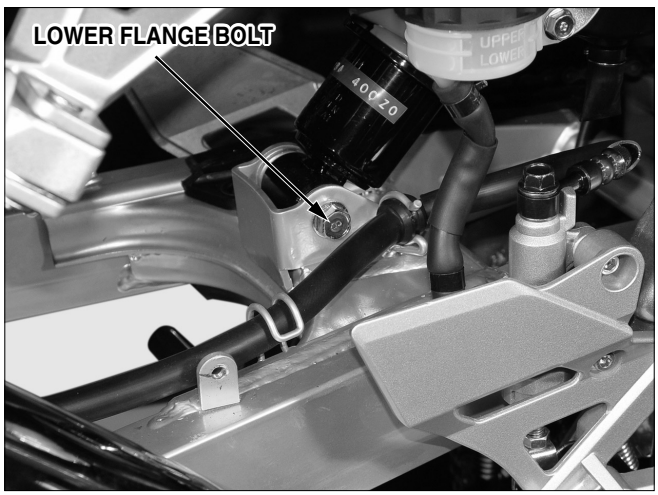
  TORQUE : 0.6 kgf · m (6 N · m)



INSTALLATION

- Apply thin coat of grease to the swingarm pivot bolt surface.
- Install the swingarm into the frame, then install the pivot bolt from the left side.
- Install the U-nut.
  Hold the pivot bolt using a special tool, tighten the U-nut to the specified torque using the same tool.

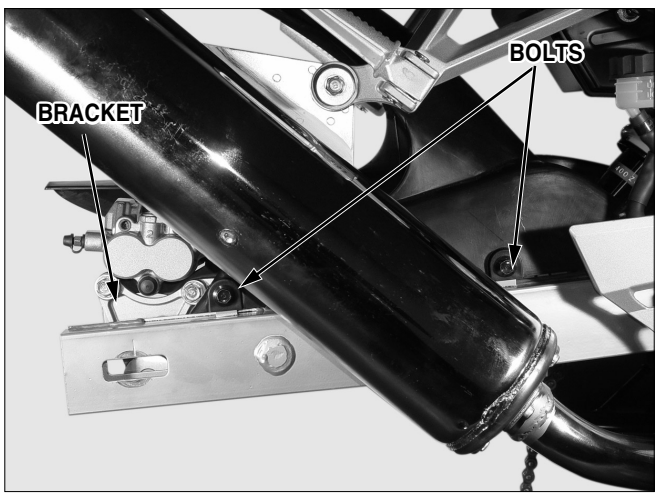
  TORQUE : 8.8 kgf · m (88 N · m)



- Install the swingarm-to-rear cushion lower flange bolt, then tighten the bolt to the specified torque.

  TORQUE : 3.4 kgf · m (3.4 N · m)

- Install the brake hose clamp correctly.
- Install the rear caliper bracket into the groove of the swingarm.



- Install the rear wheel mudguard.

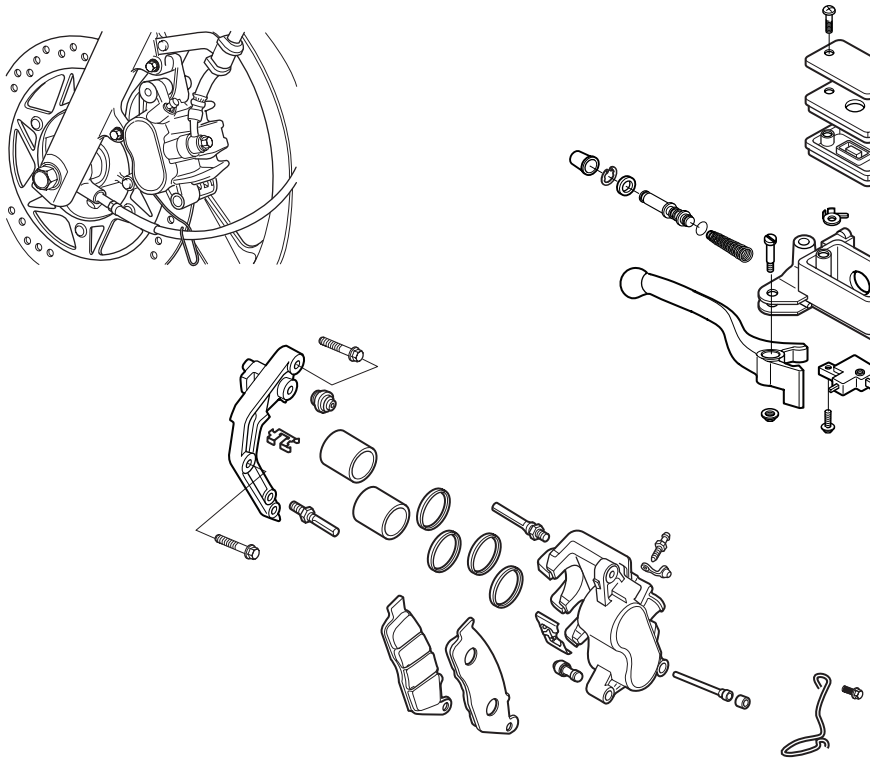
- Install the rear wheel. (⇨14-7)

- Install the removed parts in the reverse order of removal.

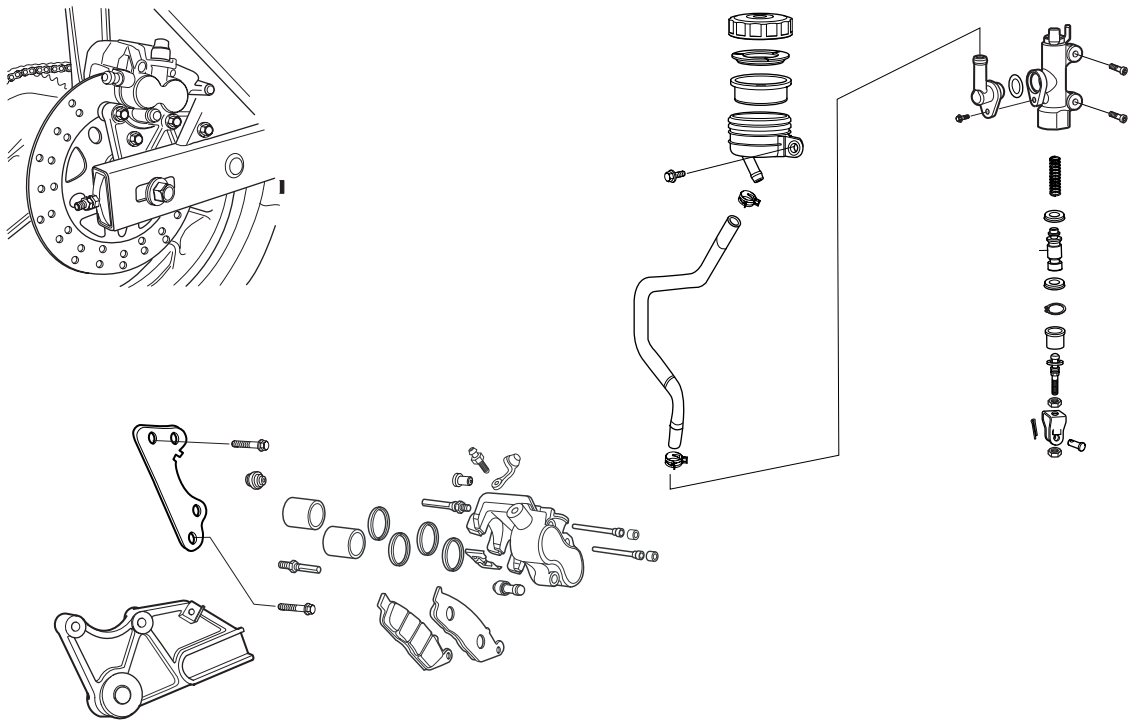
MEMO

HYDRAULIC BRAKE

FRONT :



REAR :



15. HYDRAULIC BRAKE

SERVICE INFORMATION

GENERAL SAFETY

- Don't put in dust or water when filling the reservoir.
- Don't mix different types of fluid to prevent from changing chemically.
- Don't use the removed brake fluid.
- Avoid spilling brake fluid or painted plastic and rubber parts because of damaging them.
- Cover the joint part of the hose to prevent the leak the brake fluid from leaked.
- Clean the removed parts with brake fluid and check the airing of each part with a compressed air.
- Arrange the removed parts not to be soiled with dust or dirt.
- After checking if dust or dirt soils each part, install them.
- Always replace the specified parts.
- Brake pad can be removed without disconnecting the hose.
- Bleed the air in case of removing the brake hose.

SPECIFICATIONS

Unti : mm

ITEM		STANDARD VALUE	SERVICE LIMIT
FRONT	SPECIFIED BRAKE FLUID	DOT3 or DOT4	-
	BRAKE DISK THICKNESS	4.0	3.0
	BRAKE DISK RUNOUT	0.1	0.3
	MASTER CYLINDER I. D.	12.700~12.743	12.755
	MASTER PISTON O. D.	12.657~12.684	12.645
	CALIPER CYLINDER I. D.	24.440~25.410	25.42
	CALIPER PISTON O. D.	25.278~25.328	25.27
REAR	SPECIFIED BRAKE FLUID	DOT3 or DOT4	-
	BRAKE DISK THICKNESS	4.0	3.0
	BRAKE DISK RUNOUT	0.1	0.3
	MASTER CYLINDER I. D.	12.700~12.743	12.755
	MASTER PISTON O. D.	12.657~12.684	12.645
	CALIPER CYLINDER I. D.	25.000~25.033	25.070
	CALIPER PISTON O. D.	24.914~24.935	24.870

TORQUE VALUES

BRAKE CALIPER BRACKET BOLT	3.0kgf・m (30N・m)
BRAKE CALIPER BLEEDER VALVE	0.6kgf・m (6N・m)
BRAKE CALIPER HANGER PIN	2.3kgf・m (23N・m)
BRAKE CALIPER PIN BOLT	1.8kgf・m (18N・m)
BRAKE PAD PIN BOLT	1.8kgf・m (18N・m)
BRAKE OIL BOLT	3.4kgf・m (34N・m)
MASTER CYLINDER RESERVE CAP SCREW	1.0kgf・m (10N・m)
BRAKE LEVER PIVOT BOLT	1.0kgf・m (10N・m)
BRAKE LEVER PIVOT LOCK NUT	1.0kgf・m (10N・m)
REAR MASTER CYLINDER HOLDER SOCKET BOLT	1.2kgf・m (12N・m)

TOOL

SNAP RING PLIERS

TROUBLESHOOTING

Brake lever/pedal soft or spongy

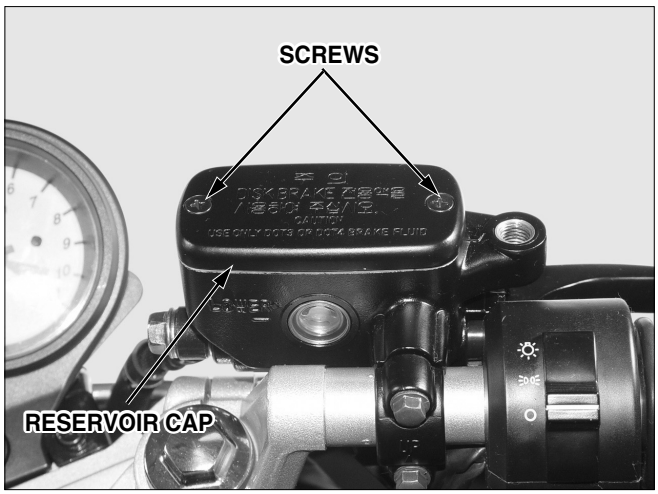
- Air bubbles in the hydraulic system.
- Leaking hydraulic system.
- Contaminated brake pad / disk .
- Worn caliper piston seal.
- Worn master cylinder piston seal.
- Worn brake pad/disk.
- Contaminated caliper.
- Caliper not sliding properly.
- Low brake fluid level.
- Clogged fluid passage.
- Warped / deformed brake disk.
- Sticking / worn caliper piston.
- Sticking / worn master cylinder piston.
- Contaminated master cylinder.
- Bent brake lever/pedal.

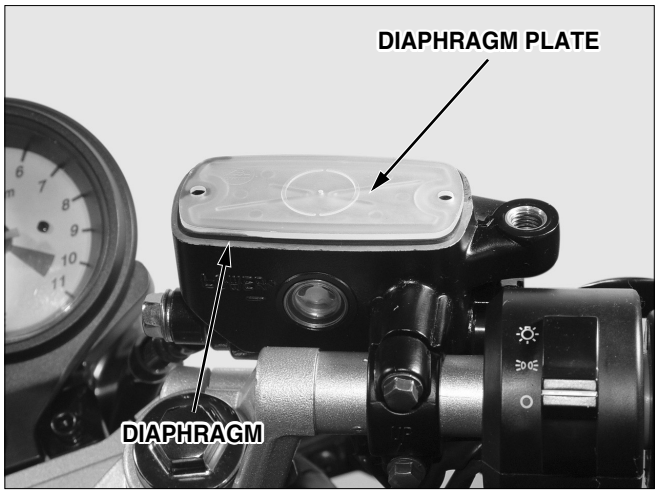
Brake lever/pedal hard

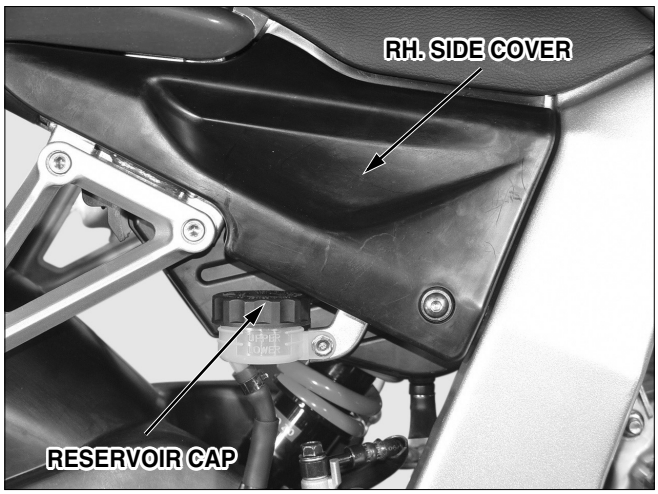
- Clogged / restricted brake system.
- Sticking / worn caliper piston.
- Caliper not sliding properly.
- Clogged / restricted fluid passage.
- Worn caliper piston seal.
- Sticking / worn master cylinder piston.
- Bent brake lever/pedal.

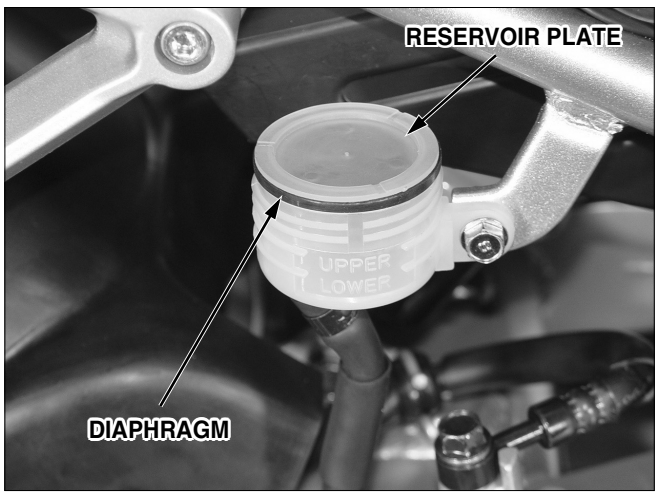
Brake drags

- Contaminated brake pad / disk.
- Misaligned wheel.
- Clogged / restricted brake hose joint.
- Warped / deformed brake disk.
- Caliper not sliding properly.
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port









BRAKE FLUID REPLACEMENT/ AIR BLEEDING

⚠ NOTE

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic, or rubber parts.

BRAKE FLUID DRAINING

<Front brake>

- Turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap.

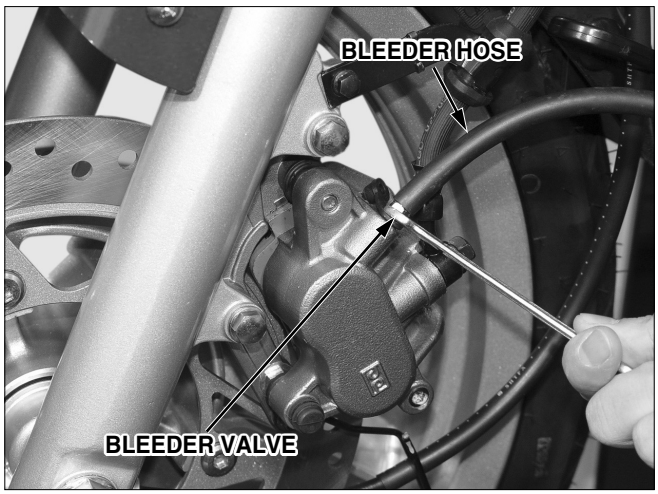
- Remove the screws and reservoir cap.
- Remove the diaphragm plate and diaphragm from the master cylinder.

<Rear brake>

- Remove the seat. (⇨12-2)
- Remove the RH. side cover. (⇨12-2)

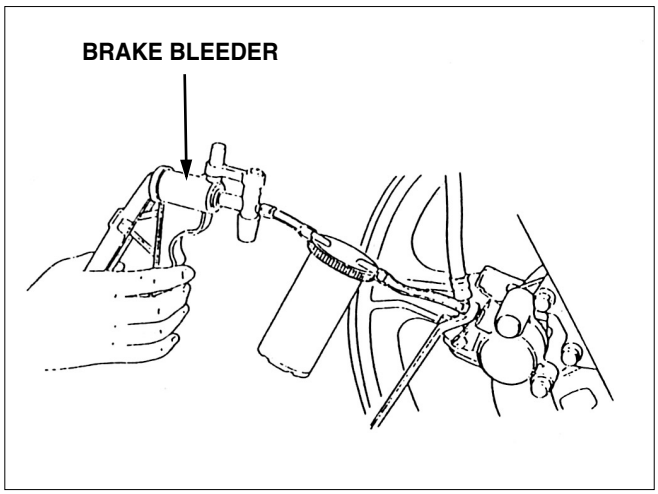
- Remove the reservoir cap.

- Remove the reservoir cap plate and diaphragm.



- Connect a bleeder hose to the caliper bleeder valve.

- Loosen the bleeder valve and pump the brake lever or pedal.
- Stop pumping the lever or pedal when no more fluid flows out of the bleeder valve.



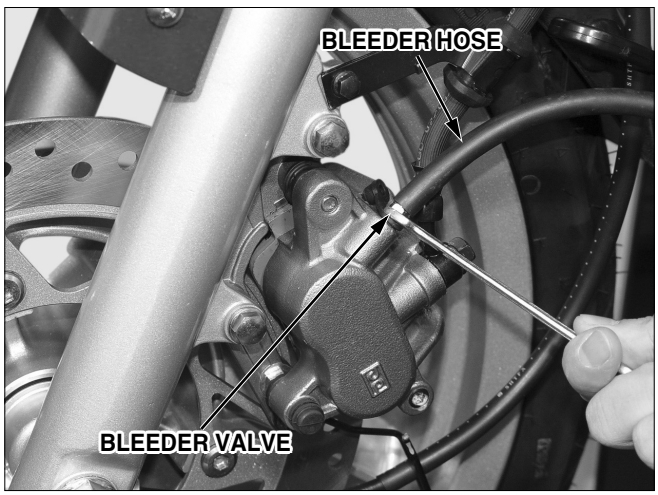
BRAKE FLUID FILLING

- Fill the reservoir with DOT3 or DOT4 brake fluid up to the upper level.

⚠ CAUTION

• Do not mix different types of fluid. There are not compatible.

- Connect a recommended brake bleeder to the bleeder valve.
- Pump the brake bleeder and loosen the bleeder valve, adding fluid when the fluid level in the master cylinder reservoir is low.

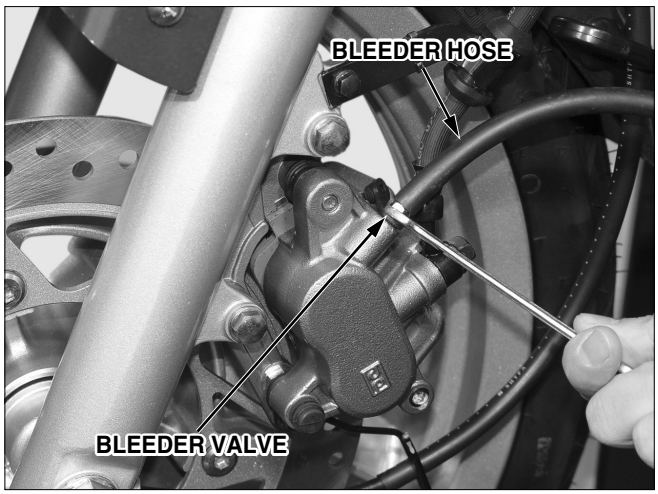


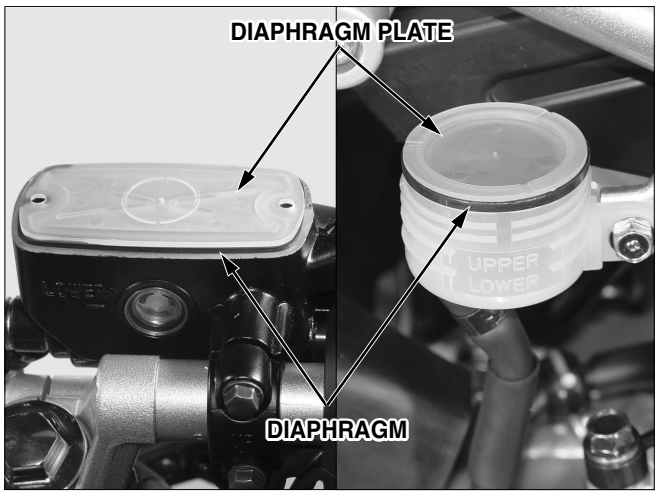
- Repeat the previous step procedures until air bubbles do not appear in the plastic hose.

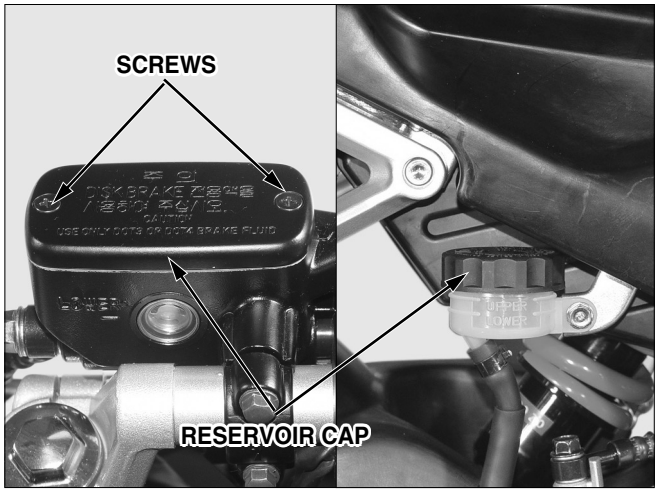
⚠ NOTE

• If a brake bleeder is not available, fill the master cylinder and operate the brake lever or pedal to fill the system.

- Close the bleeder valve.







BRAKE BLEEDING

<When the brake bleeder is not available>

- Connect a clear bleeder hose to the bleeder valve.
- Pump up the system pressure with the lever or pedal until there are no air bubbles in the fluid flowing out of the master cylinder and lever or pedal resistance is felt.

1. Squeeze the brke lever or push the brake pedal, open the bleeder valve 1/2 turn and then close the valve.

⚠ CAUTION

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

2. Release the brake lever or pedal until the bleeder valve has been closed.
3. Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleeder valve.

⚠ NOTE

- 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 : 0.6 kgf · m (6N · m)

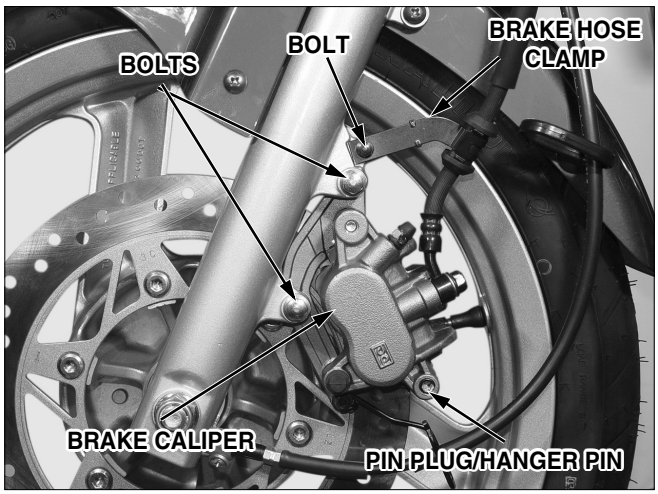
- Fill the fluid reservoir to the upper level.
- Reinstall the diaphragm and diaphragm plate.

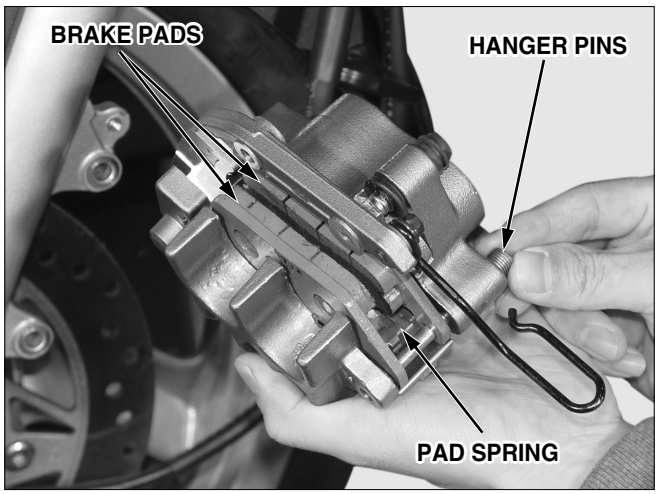
<Front brake>

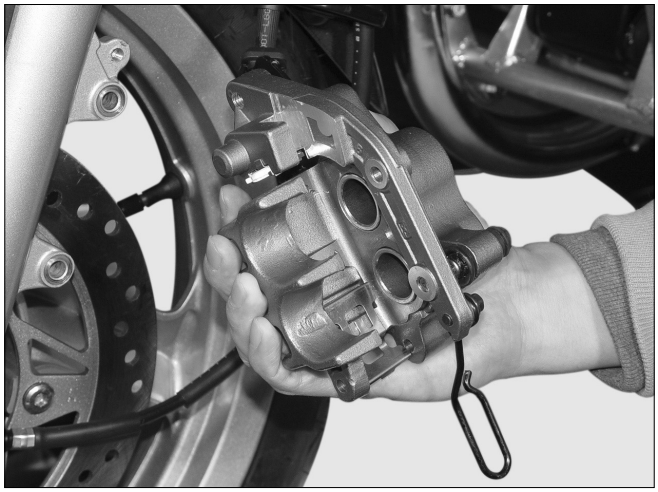
- Install the master cylinder cap, and tighten the screws.

<Rear brake>

- Install the reservoir cap securely.
- Install the RH. side cover.
- Install the seat.







BRAKE PAD/DISK

FRONT BRAKE PAD REPLACEMENT

⚠ NOTE

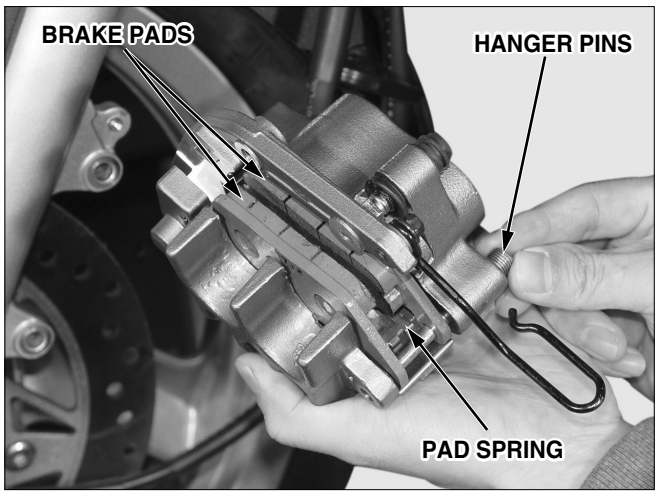
- When replacing brake pads, replace whole set.
- Do not remove the brake hose when replacing brake pads.

- Remove the brake hose clamp from the front fork.
- Remove the pin plug using the L. wrench.
- Loosen the hanger pin.
- Remove the caliper bracket bolts and brake capliper.

- Push the caliper pistons all the way in to allow installation of new brake pads.

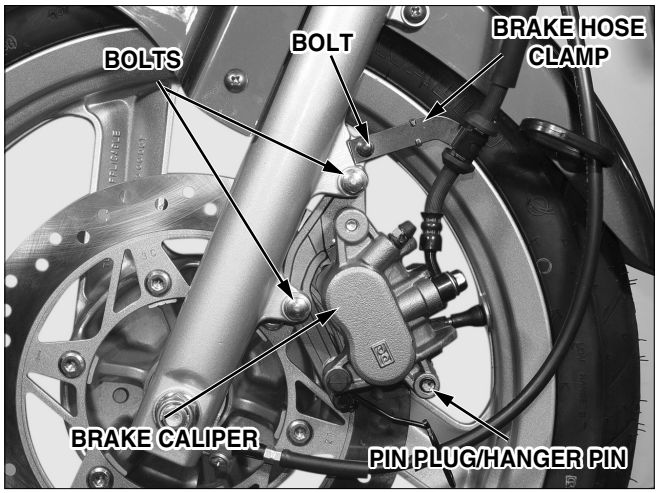
- Remove the hanger pin and brake pads.

- Clean the inside of the caliper especially around the caliper pistons.



- Make sure the brake pad spring is in place.

- Install the new brake pads.
- Install the hanger pin.



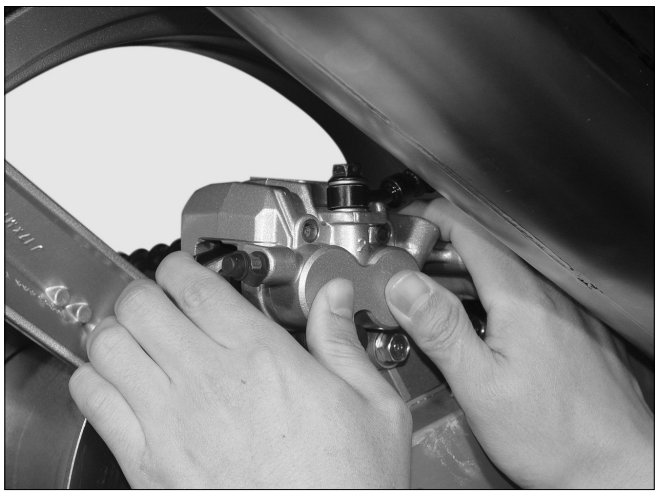
- Install the brake caliper to the fork so the disk is positioned between the pads.
- Install and tighten the new brake caliper mounting bolts.

  TORQUE : 3.0 kgf · m (30 N · m)

- Tighten the hanger pin and pin plug.

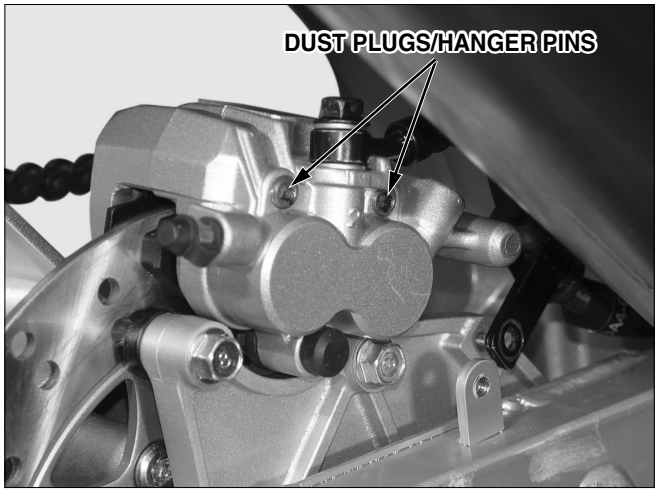
  TORQUE : 1.8 kgf · m (18 N · m)

REAR BRAKE PAD REPLACEMENT

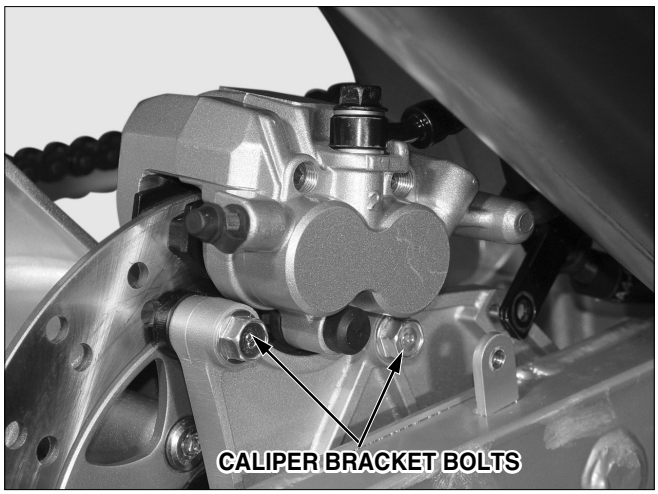


- Remove the rear wheel mudguard. (⇨12-3)
- Remove the rear brake hose clamp.

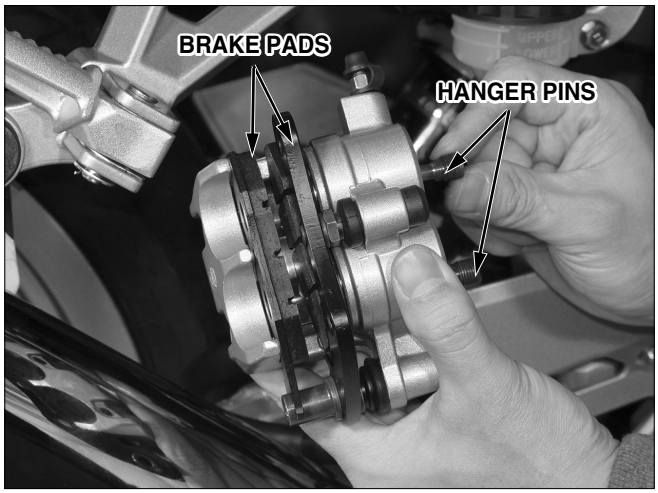
- Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.
- Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.



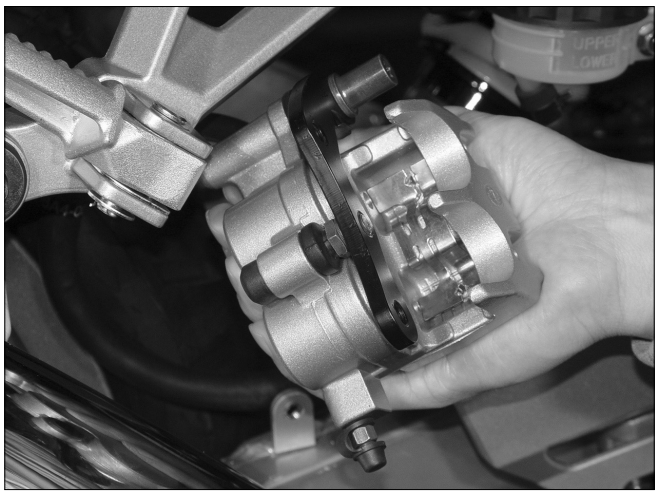
- Remove the dust plugs using the L. wrench.
- Loosen the hanger pins.



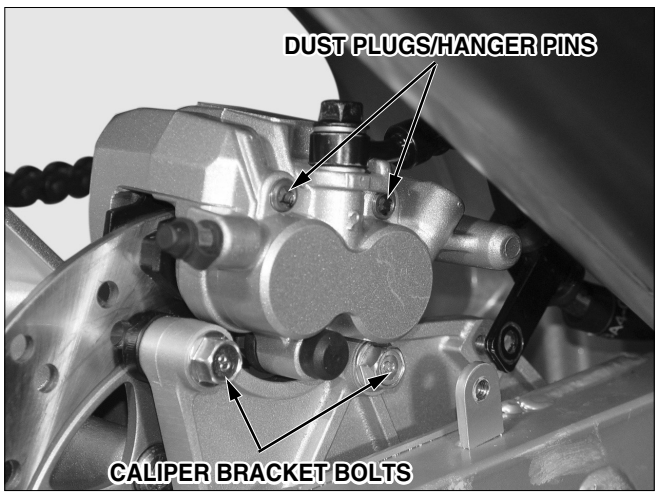
- Remove the rear caliper bracket bolts and brake caliper.



- Remove the hanger pins and brake pads.



- Make sure the brake pad spring is in place.
- Install the new brake pads.
- Install the hanger pins.



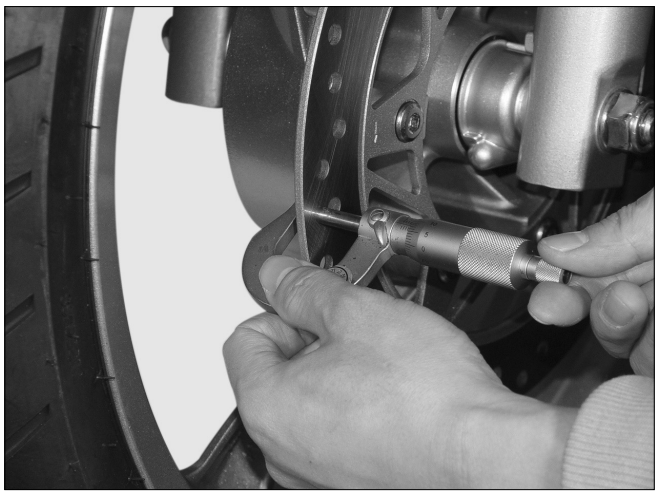
- Install the brake caliper to the caliper bracket so the disk is positioned between the pads.
- Install and tighten the caliper bracket bolts.

  TORQUE : 3.0 kgf · m (30 N · m)

- Tighten the hanger pins and pin plugs.

  TORQUE : 1.8 kgf · m (18 N · m)

- Install the rear brake hose clamp.
- Install the rear wheel mudguard.

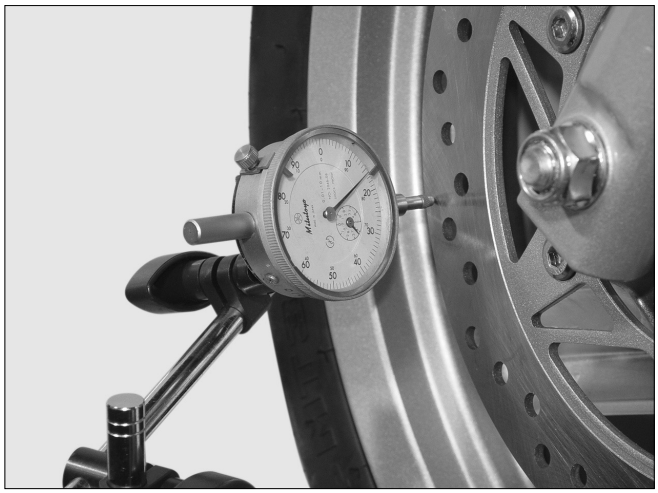


BRAKE DISK INSPECTION

- Visually inspect the brake disk for damage or crack.
- Measure the brake disk thickness with a micrometer.

SERVICE LIMIT : FRONT: 3.0mm
REAR : 3.0mm

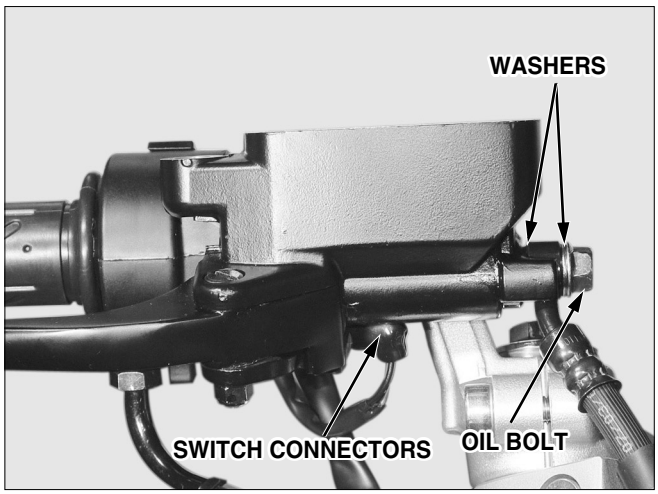
- Replace the brake disk if the smallest measurement is less than the service limit.

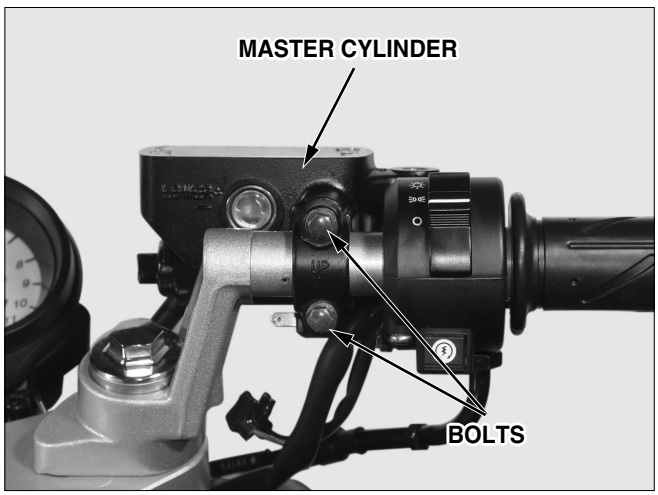


- Measure the brake disk runout with a dial indicator.

SERVICE LIMIT : 0.3mm

- Check the wheel bearing for excessive play, if the warpage exceeds the service limit.
- Replace the brake disk if the wheel bearings are normal.





FRONT MASTER CYLINDER

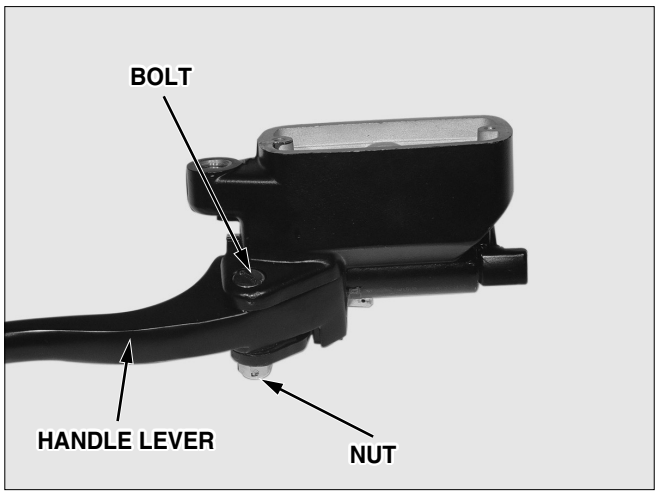
REMOVAL

- Drain the front hydraulic system. (15-3)
- Disconnect the brake light switch wire connectors.
- Remove the brake hose oil bolt and washers.

⚠ CAUTION

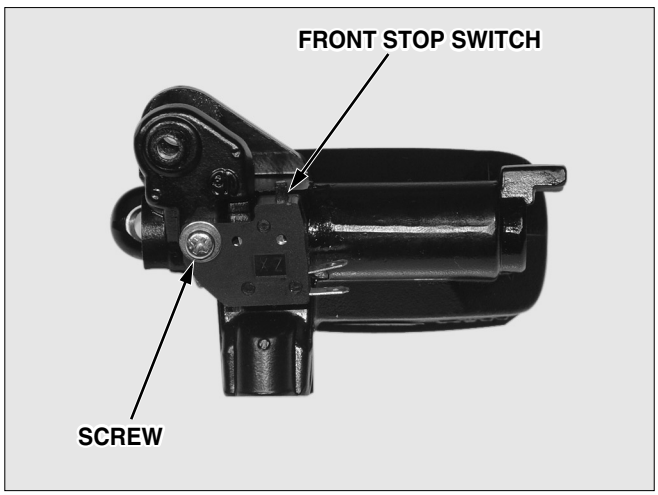
- Brake fluid causes damage to the painted, plastic or rubber parts. Do not spill fluid on these parts.
- If contaminated, gently wipe off the fluid with a piece of cloth or wash in water. Close hose joints properly to prevent leakage of brake fluid.

- Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



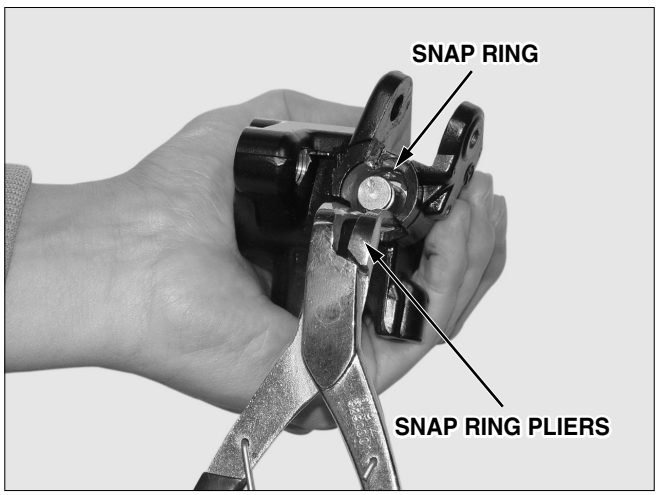
DISASSEMBLY

- Remove the handle lever bolt/nut and RH. handle lever assembly.



- Remove the screw and front stop switch.

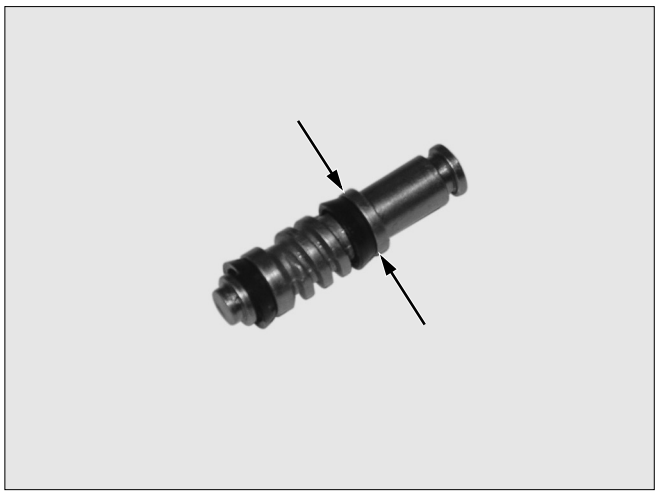
- Remove the boot.



- Remove the snap ring from the master cylinder body using the special tool as shown.

  TOOL : SNAP RING PLIERS

- Remove the master piston and spring.
- Clean the inside of the cylinder and reservoir with brake fluid.



INSPECTION

- Check the piston for abnormal scratches.
- Check the primary cup and secondary cup for fatigue or damage.

- Measure the master cylinder piston O. D.

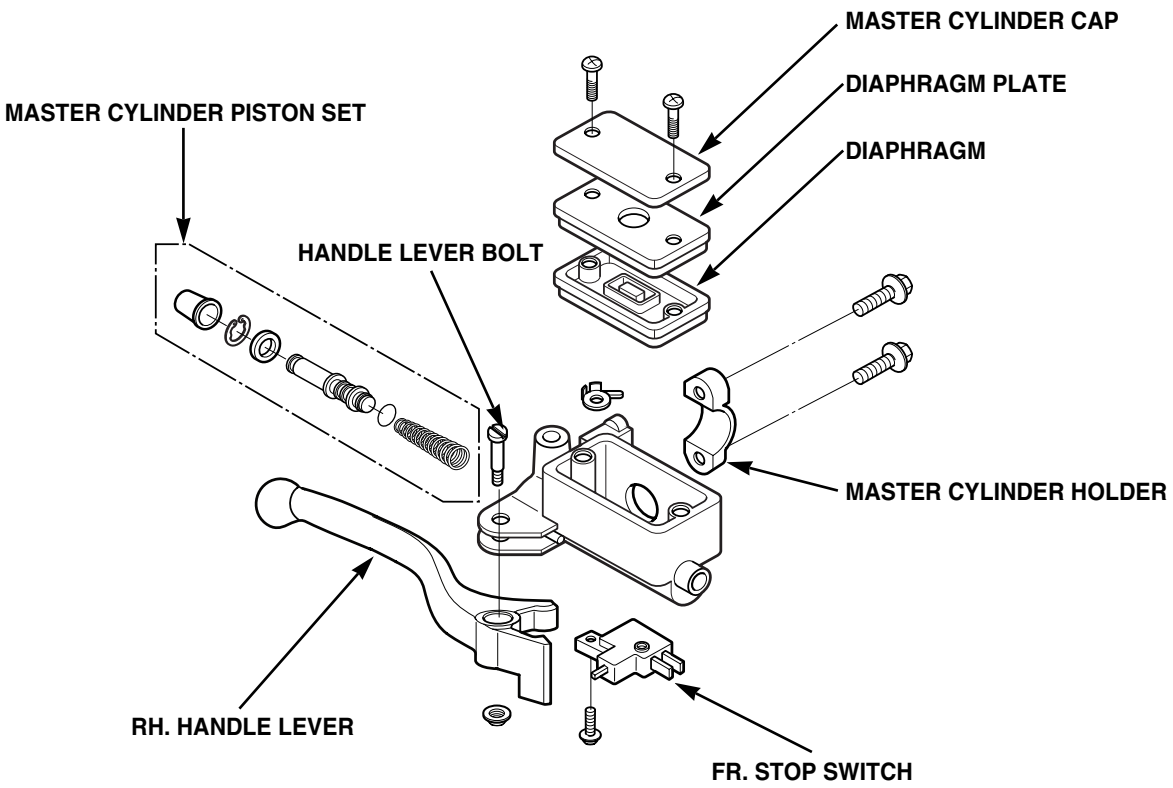
  SERVICE LIMIT : 12.645mm

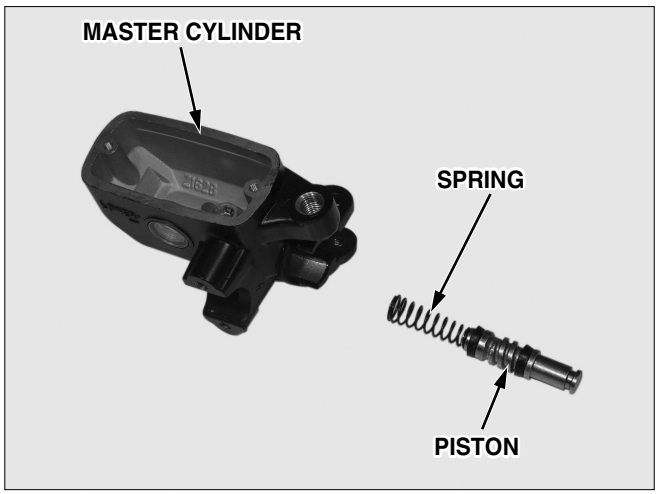
- Check the master cylinder for abnormal scratches.

- Measure the master cylinder I.D.

  SERVICE LIMIT : 12.755mm

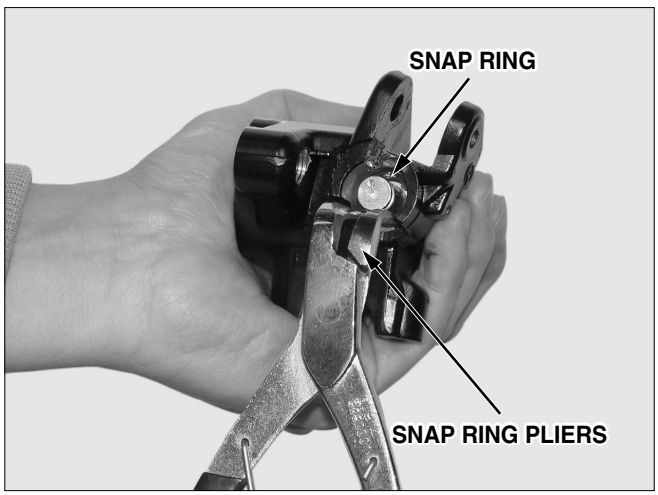
ASSEMBLY





- Coat all parts with clean brake fluid before assembly.

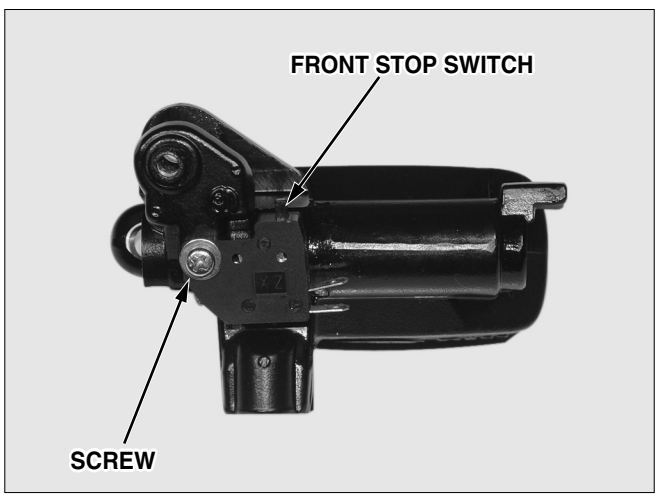
- Dip the piston in brake fluid.
- Install the spring into the piston.
- Install the piston assembly into the master cylinder.



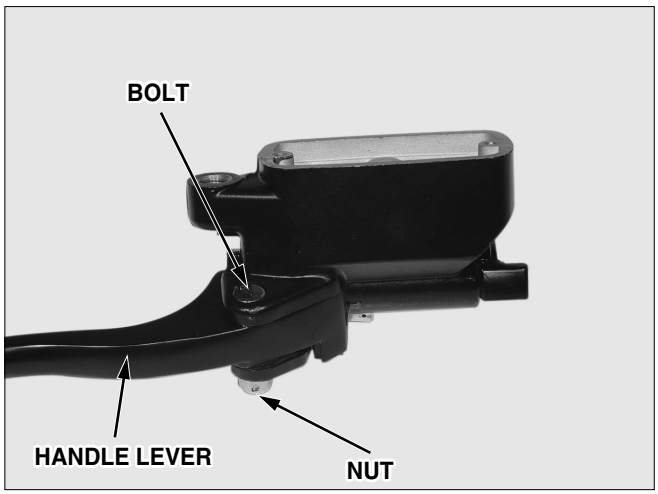
- Install the snap ring.

  TOOL : SNAP RING PLIERS

- Install the boot.

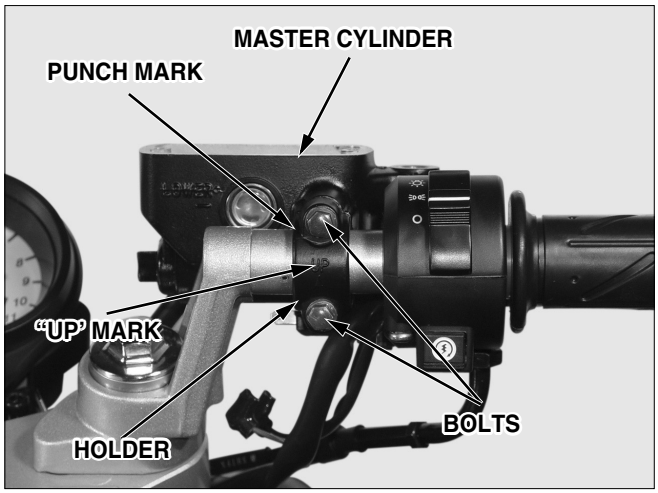


- Install the front stop switch and tighten the screw.

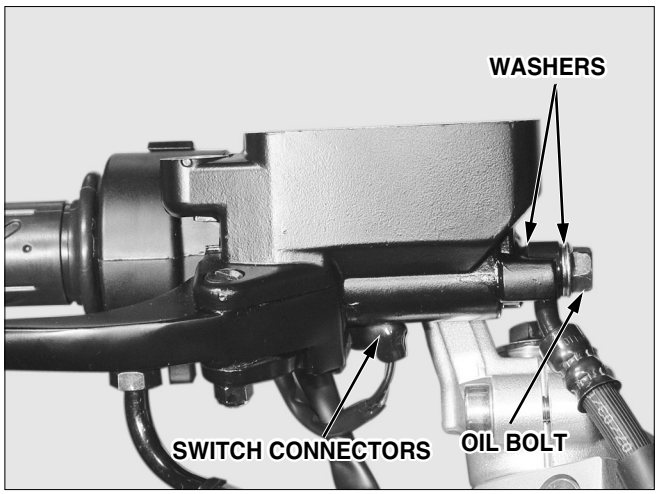


- Install the RH. handle lever assembly, tighten the bolt.
- Hold the bolt and tighten the nut.

INSTALLATION



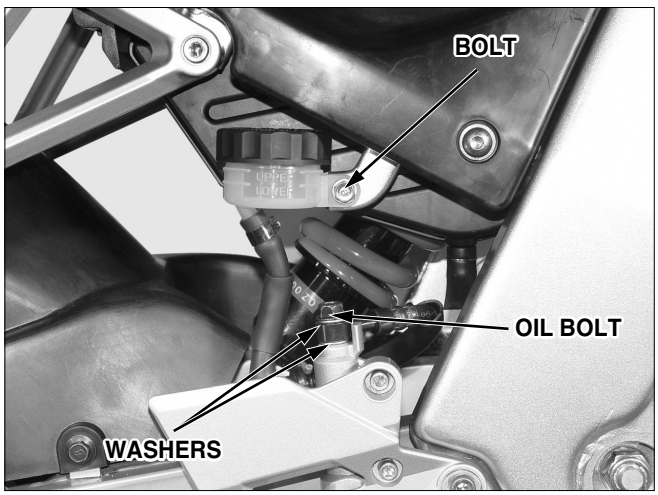
- Place the master cylinder assembly on the handlebar.
- Align the end of the master cylinder with the punch mark on the handlebar.
- Install the master cylinder holder with the "UP" mark facing up.
- Tighten the upper bolt first, then the lower bolt.



- Install the brake hose eyelet with the oil bolt and new washers.
- Tighten the oil bolt to the specified torque.

  TORQUE : 3.4 kgf · m (34 N · m)

- Connect the brake light switch wire connectors.
- Fill the reservoir to the upper level and bleed the brake system. (⇨15-7)



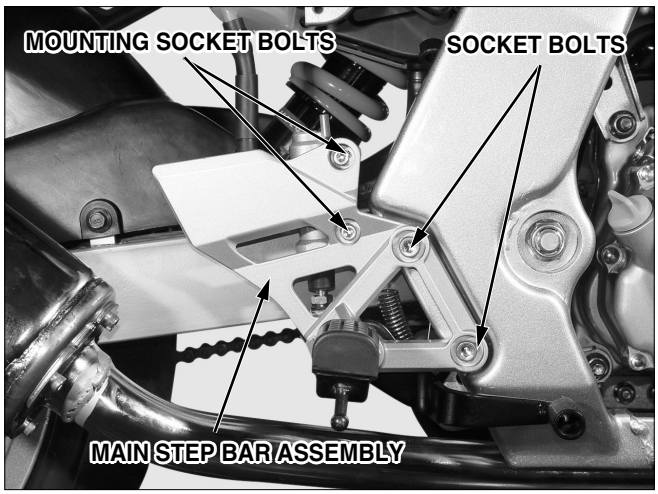
REAR MASTER CYLINDER

REMOVAL

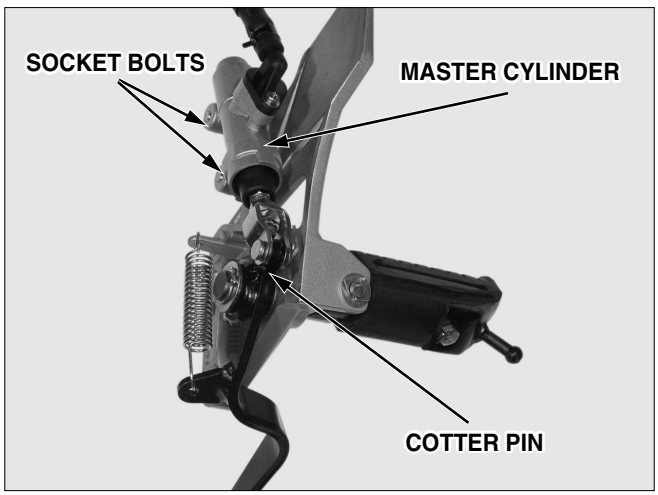
- Drain the rear hydraulic system. (⇨15-3)
- Remove the rear reservoir mounting bolt.
- Remove the rear brake hose oil bolt and washers.

⚠ CAUTION

- Brake fluid causes damage to the painted, plastic or rubber parts. Do not spill fluid on these parts.
- If contaminated, gently wipe off the fluid with a piece of cloth or wash in water. Close hose joints properly to prevent leakage of brake fluid.

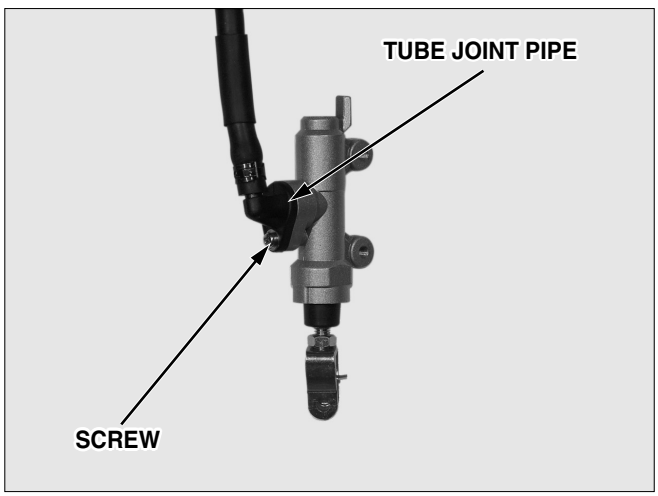


- Loosen the rear master cylinder mounting socket bolts.
- Remove the main step holder socket bolts and main step bar assembly.
- Unhook the stop switch spring from the brake pedal spring.

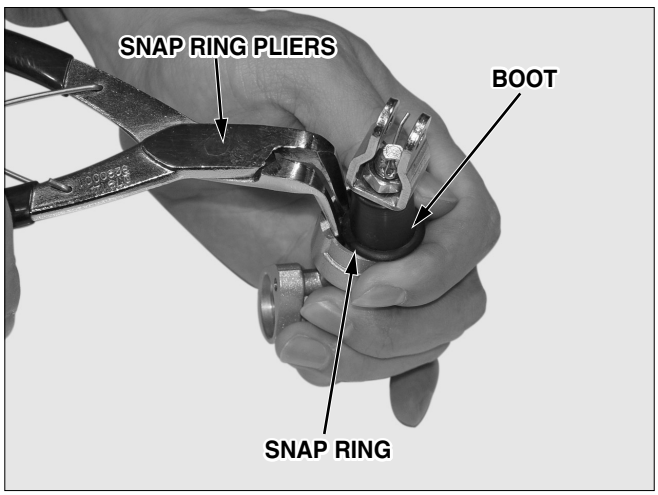


- Remove and discard the brake pedal joint cotter pin.
- Remove the joint pin C.
- Remove the master cylinder mounting socket bolts and master cylinder assembly.

DISASSEMBLY

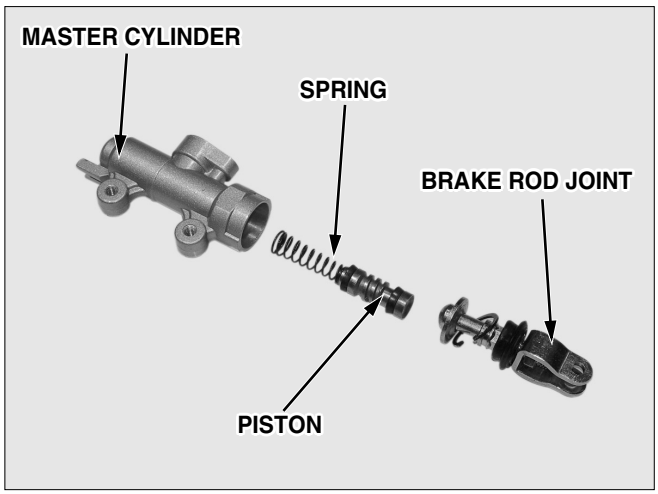


- Remove the screw and tube joint pipe from the master cylinder.

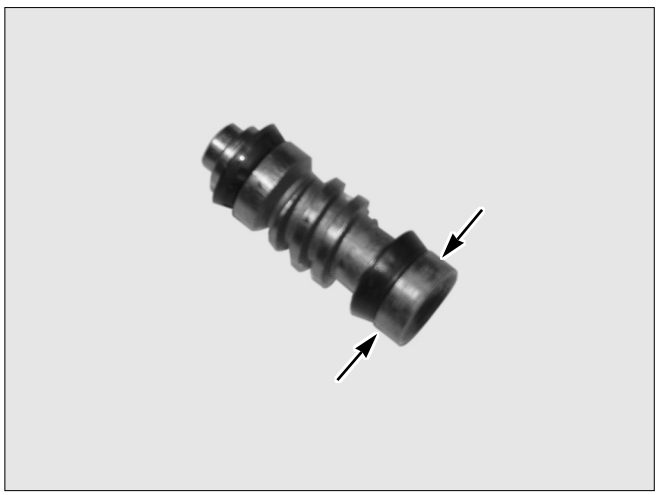


- Remove the boot.
- Remove the snap ring from the master cylinder body using the special tool as shown.

  TOOL : SNAP RING PLIERS



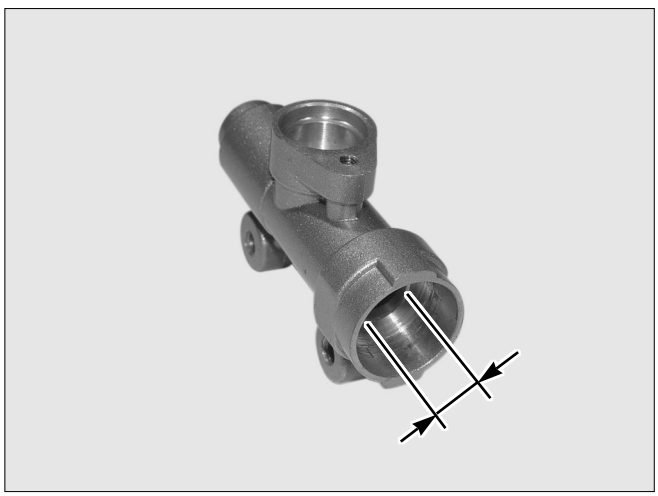
- Remove the brake rod joint, master piston and spring.
- Clean the inside of the cylinder with brake fluid.



INSPECTION

- Check the piston for abnormal scratches.
- Check the primary cup and secondary cup for fatigue or damage.
- Measure the master cylnder piston O.D.

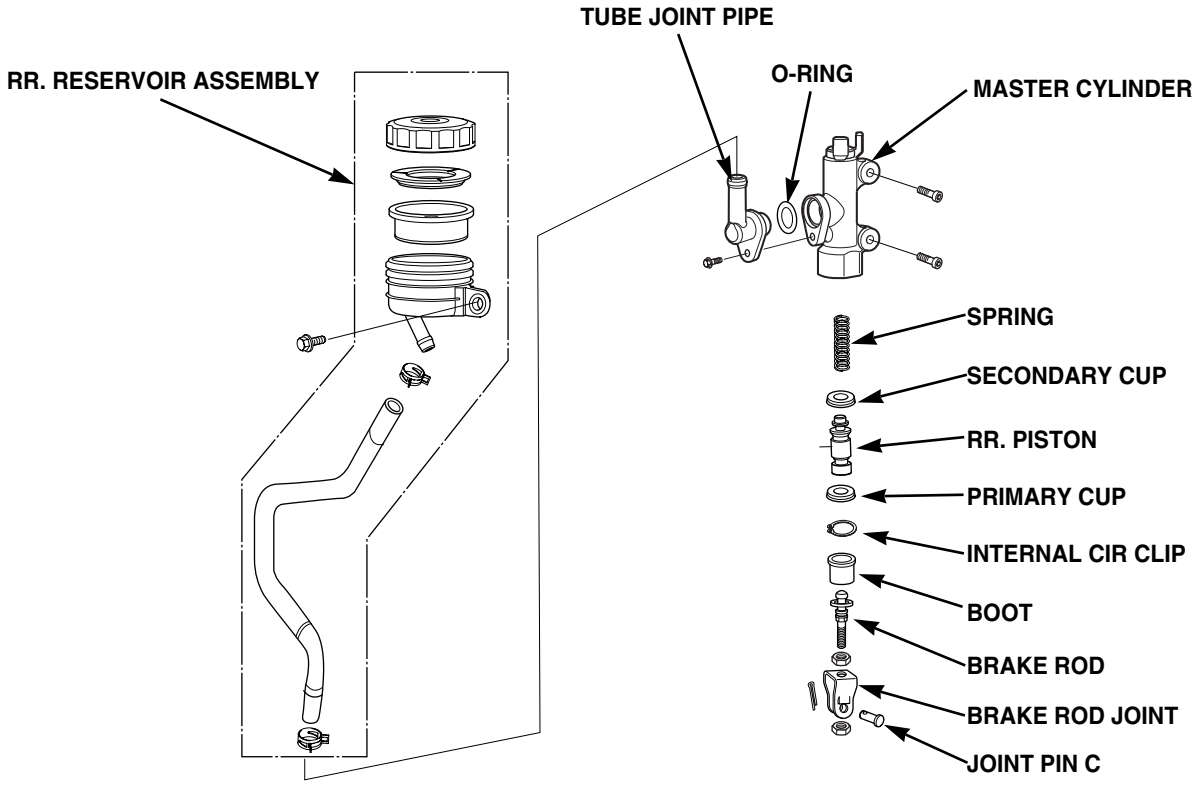
  SERVICE LIMIT : 12.645mm

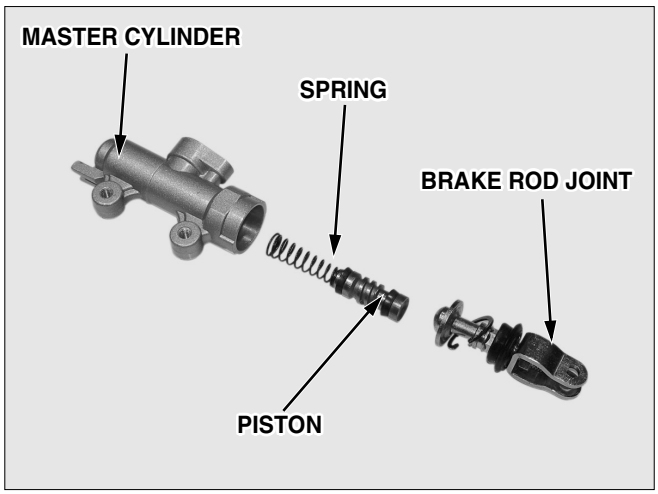


- Check the master cylinder for abnormal scratches.
- Measure the master cylinder I.D.

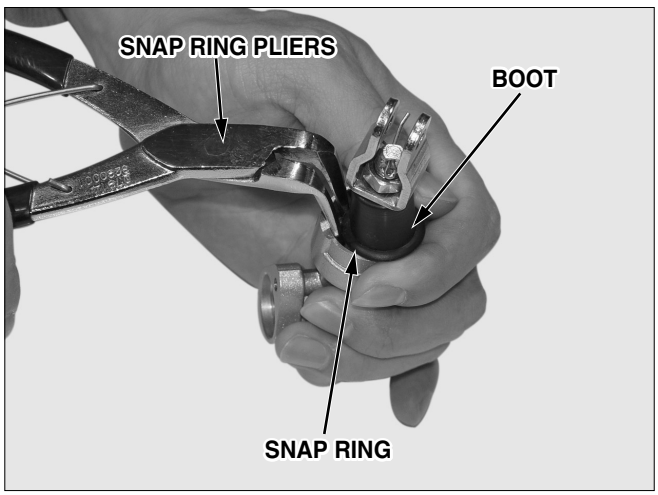
  SERVICE LIMIT : 12.755mm

ASSEMBLY



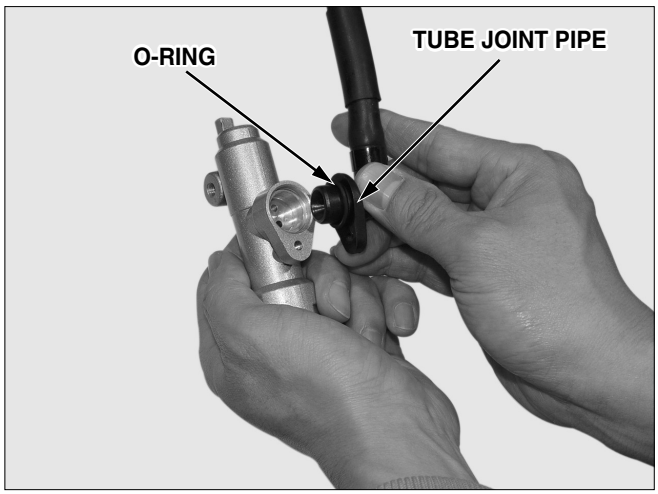


- Coat all parts with clean brake fluid before assembly.
- Dip the piston in brkae fluid.
- Install the spring to the secondary cup.
- Install the spring/secondary cup and master piston assembly.

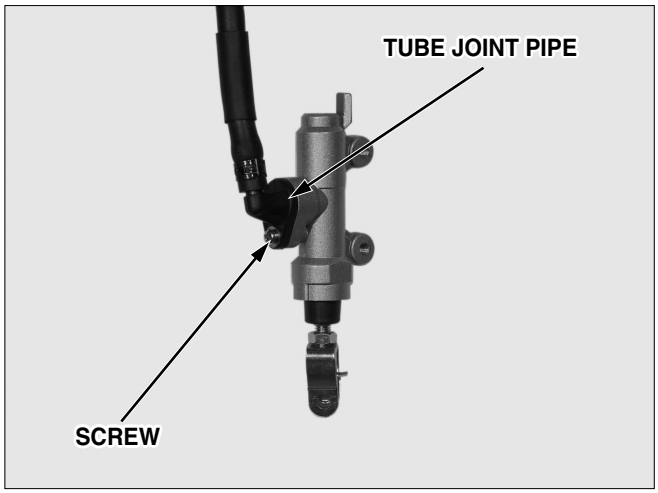


- Install the rear brake rod into the master cylinder.
- Install the snap ring.

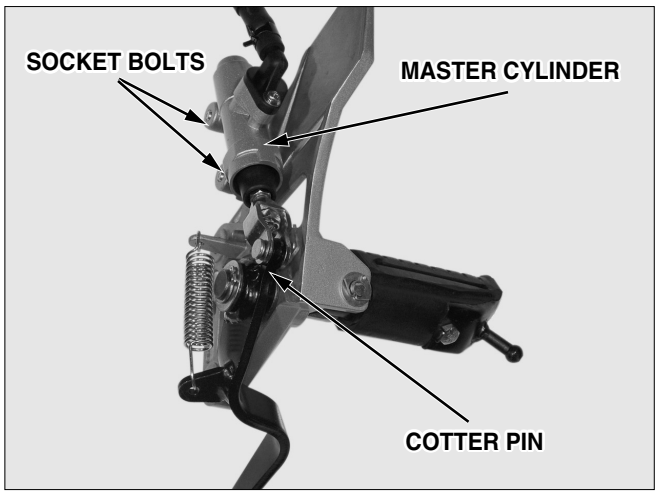
  TOOL : SNAP RING PLIERS
- Install the boot.



- Apply brake fluid to a new O-ring and install it onto the tube joint pipe.
- Install the tube joint pipe into the master cylinder.

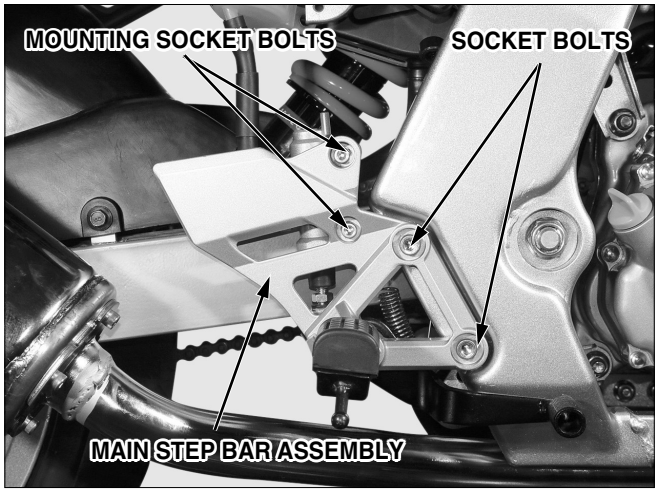


- Install and tighten the screw to the specified torque.



INSTALLATION

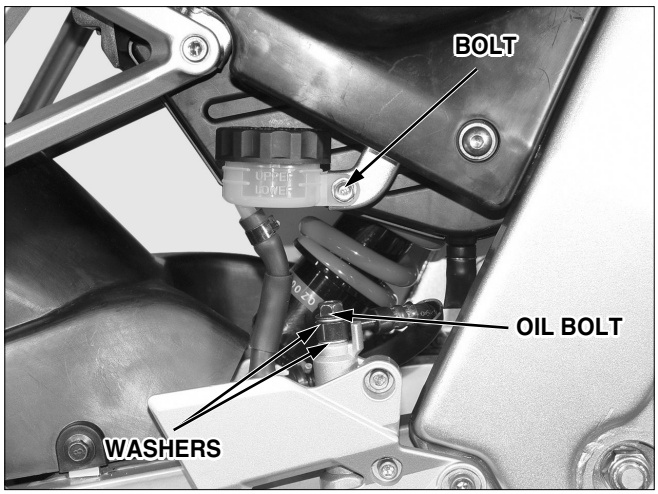
- Place the master cylinder onto the main step holder, install the master cylinder mounting socket bolts.
- Connect the brake pedal to the brake rod joint.
- Install the joint pin C and secure it with a new cotter pin.



- Hook the stop switch spring to the brake pedal spring.
- Install the main step bar assembly to the frame, tighten the socket bolts to the specified torque.

TORQUE : 3.5kgf · m (35N · m)

- Tighten the master cylinder mounting socket bolts.

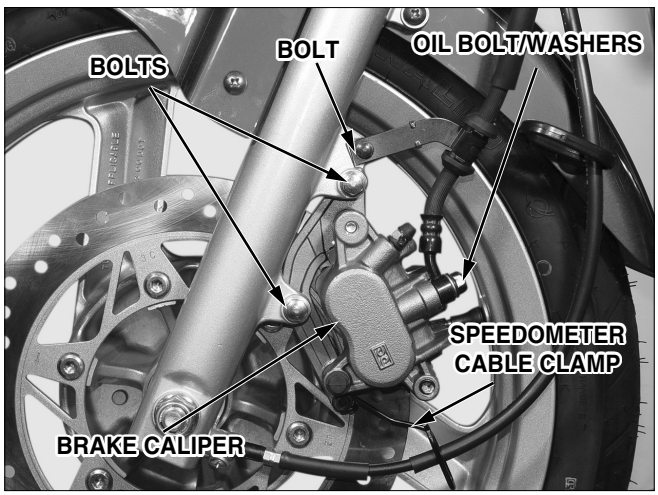


- Install the brake hose with the oil bolt and new washers.
- Tighten the oil bolt to the specified torque.

TORQUE : 3.4 kgf · m (34 N · m)

- Install and tighten the rear reservoir mounting bolt.

- Fill the reservoir to the upper level and bleed the brake system. (⇨15-7)
- Adjust the brake pedal height. (⇨2-12)



FRONT BRAKE CALIPER

REMOVAL

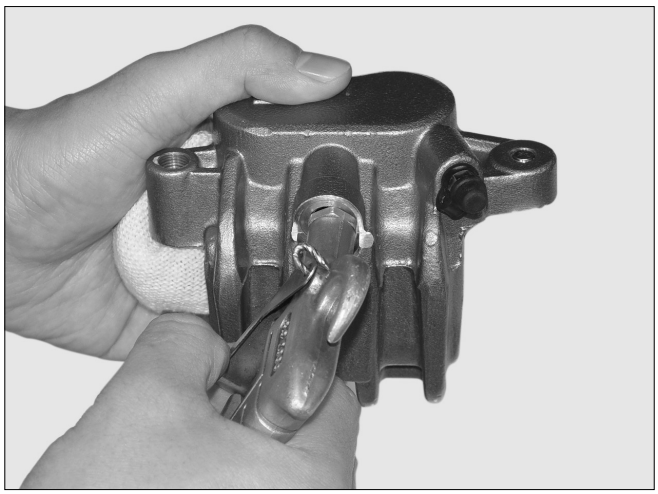
- Drain the front brake hydraulic system. (⇨15-5)
- Remove the oil bolt and washers.
- Remove the speedometer cable clamp.
- Remove the caliper mounting bolts, caliper and the brake pads. (⇨15-6)

⚠ NOTE

• Avoid spilling fluid on painted, plastic, or rubber parts.

DISASSEMBLY

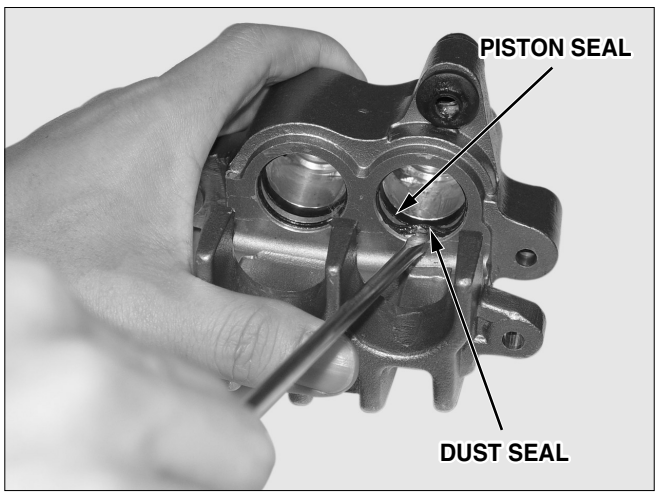
- Remove the pad spring, slide pin, calipper bracket and boot from the caliper body.
- If there is any wear or damage in the boot, replace it with a new one.



- Install corrugated cardboard or soft wood sheet between the pistons.
- Apply small squirts of air pressure to the fluid inlet to remove the pistons.

⚠ CAUTION

• Do not use high pressure air or bring the nozzle too close to the inlet.

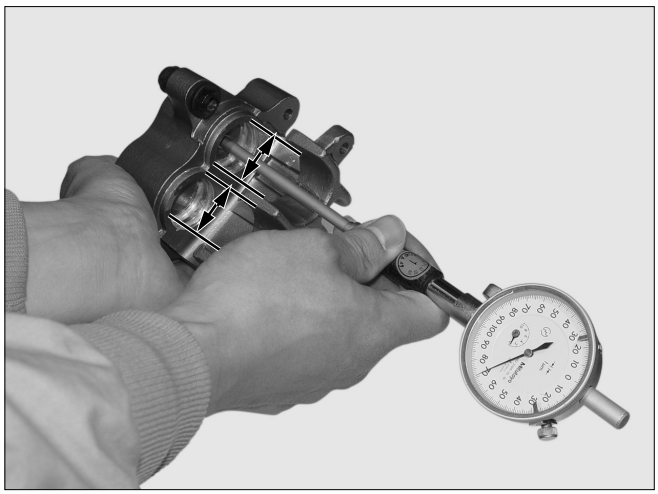


- Push the dust seals and piston seals in and lift them out.

⚠ NOTE

• Be careful not to damage the piston sliding surface.

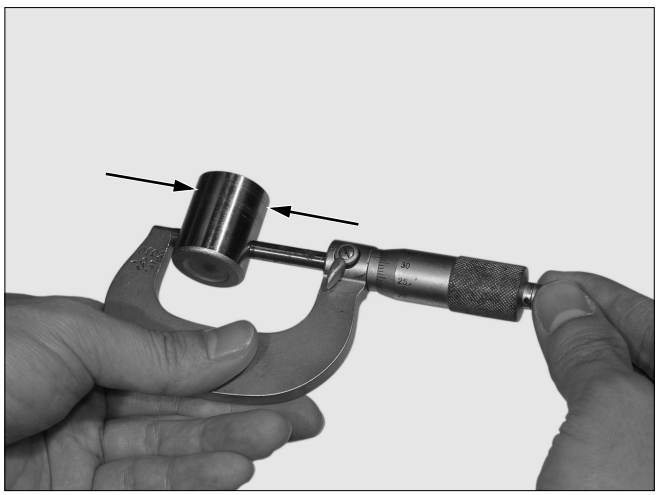
- Clean the seal grooves with clean brake fluid.



INSPECTION

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

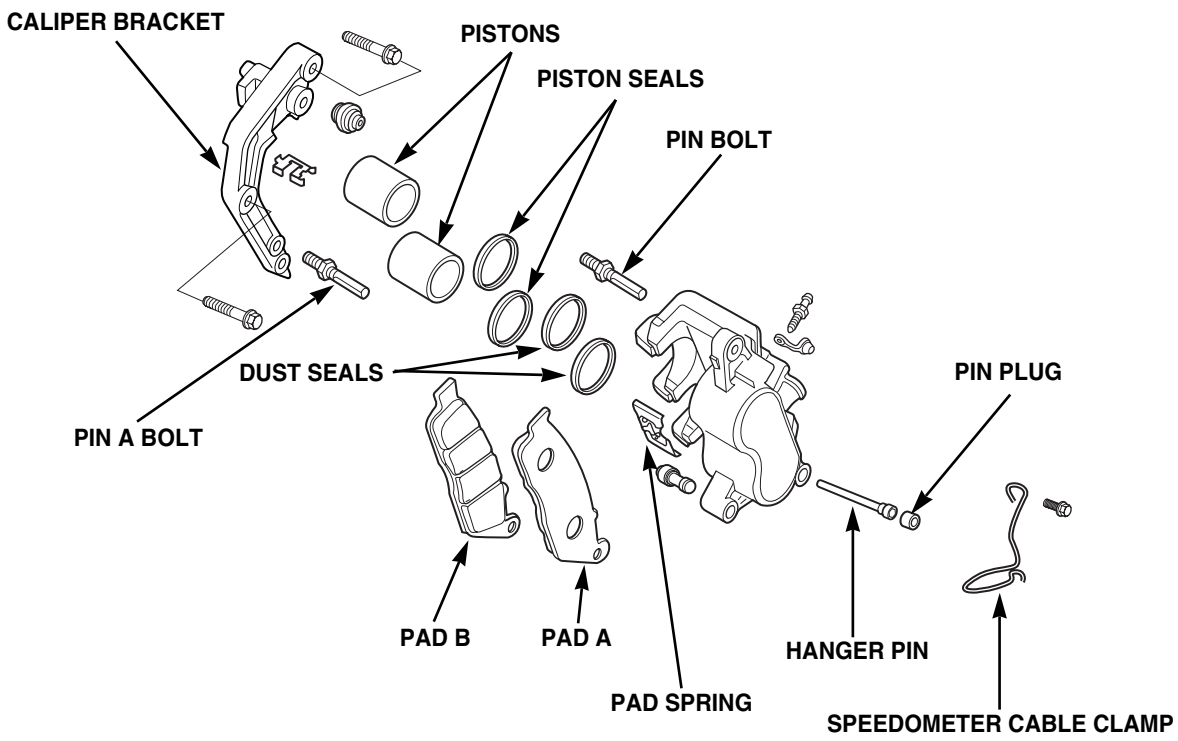
  SERVICE LIMIT : 25.42mm

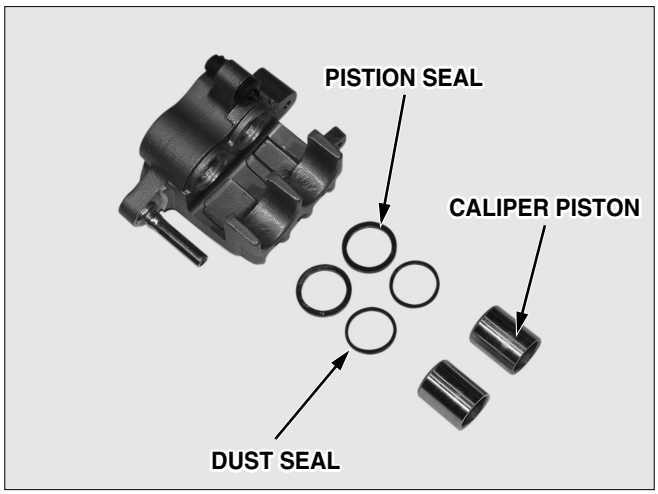


- Check the caliper pistons for scratches, scoring or other damage.
- Measure the caliper piston O. D.

  SERVICE LIMIT : 25.27mm

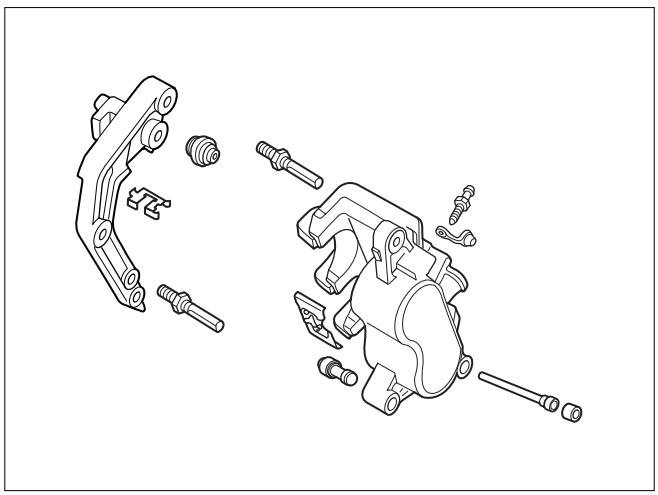
ASSEMBLY



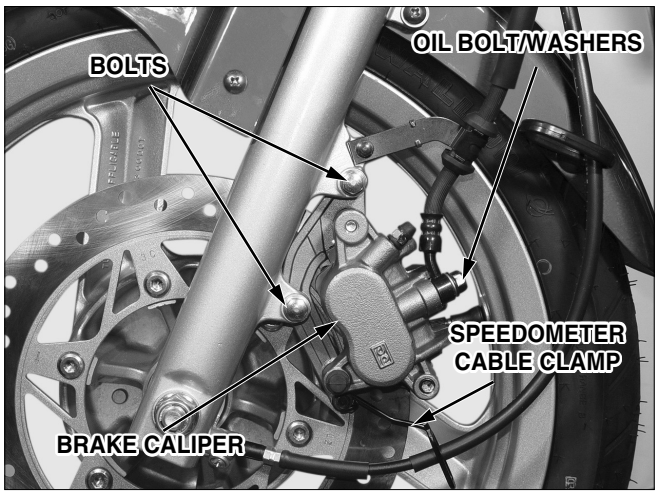


- Coat the new piston seals with clean brake fluid.
- Coat the new dust seals with silicone grease.

- Install the piston seal and dust seal into the groove of the caliper body.
- Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



- Apply the boot with silicone grease.
- Install the boot into the groove of the caliper body.
- Install the pad spring into the caliper body.
- Install the caliper pin bolt and caliper bracket into the caliper body.



INSTALLATION

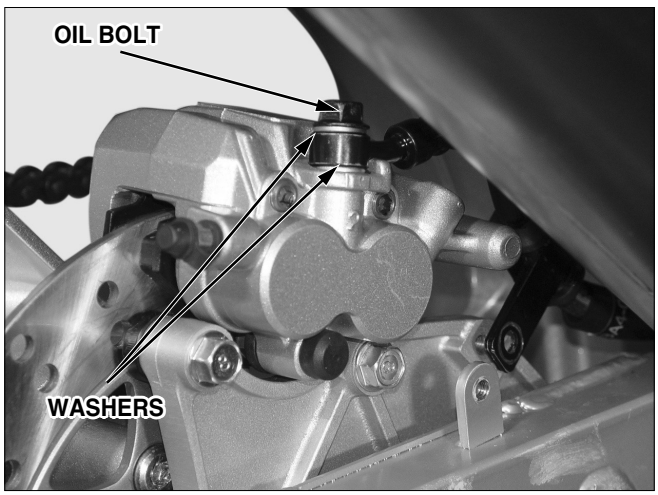
- Install the brake pads and caliper onto the front fork. (⇨15-6)
- Install the tighten the new caliper mounting bolts to the specified torque.

  TORQUE : 3.0kgf · m (30 N · m)

- Install the brake hose eyelet to the caliper body with two new washers and oil bolt.
- Tighten the oil bolt to the specified torque.

  TORQUE : 3.4kgf · m (34 N · m)

- Fill and bleed the front brake hydraulic system. (⇨15-5)



REAR BRAKE CALIPER

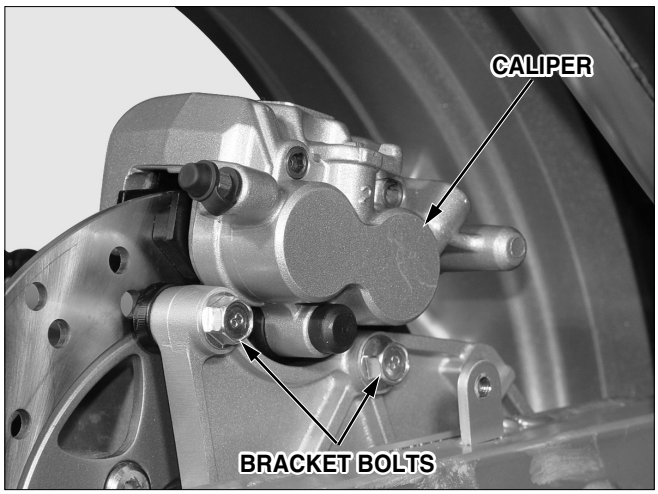
REMOVAL

- Drain the rear brake hydraulic system. (⇨15-5)

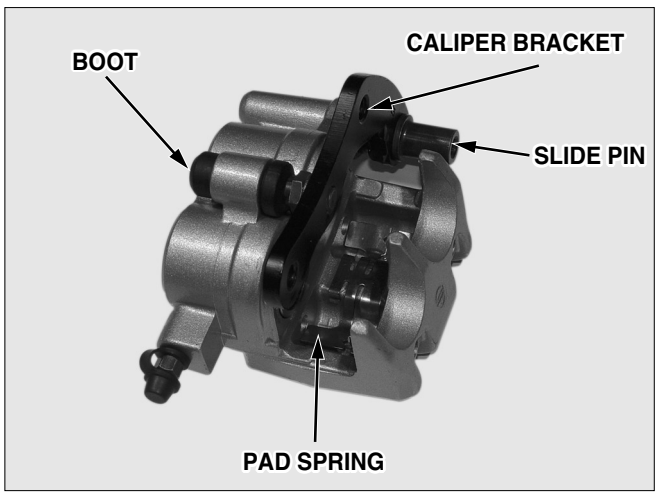
- Remove the oil bolt, washers and brake hose eyelet joint.

⚠ NOTE

• Avoid spilling fluid on painted, plastic, or rubber parts.



- Remove the rear caliper bracket bolts and the brake pads. (⇨15-7)
- Pivot the caliper up and remove it.



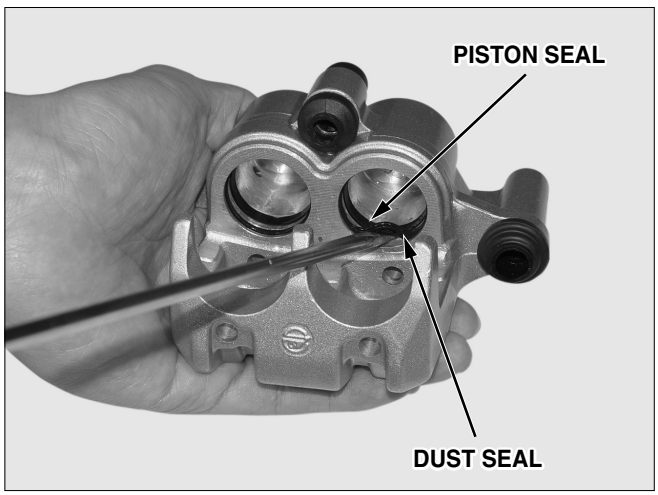
DISASSEMBLY

- Remove the pad spring, slide pin, caliper bracket and boot from the caliper body.
- If there is any wear or damage in the boot, replace it with a new one.

- Place a shop towel over the piston.
- Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.

⚠ CAUTION

• Do not use high perssure air or bring the nozzle too close to the inlet.

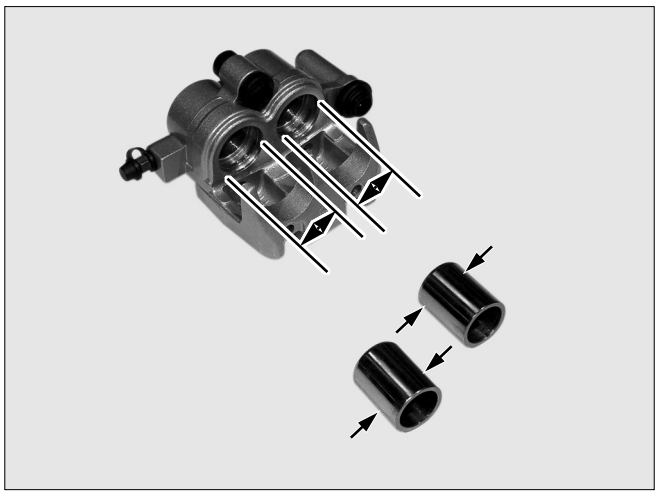


- Push the dust seals and piston seals in and lift them out.

⚠ NOTE

• Be careful not to damage the piston sliding suface.

- Clean the seal grooves with clean brake fluid.



INSPECTION

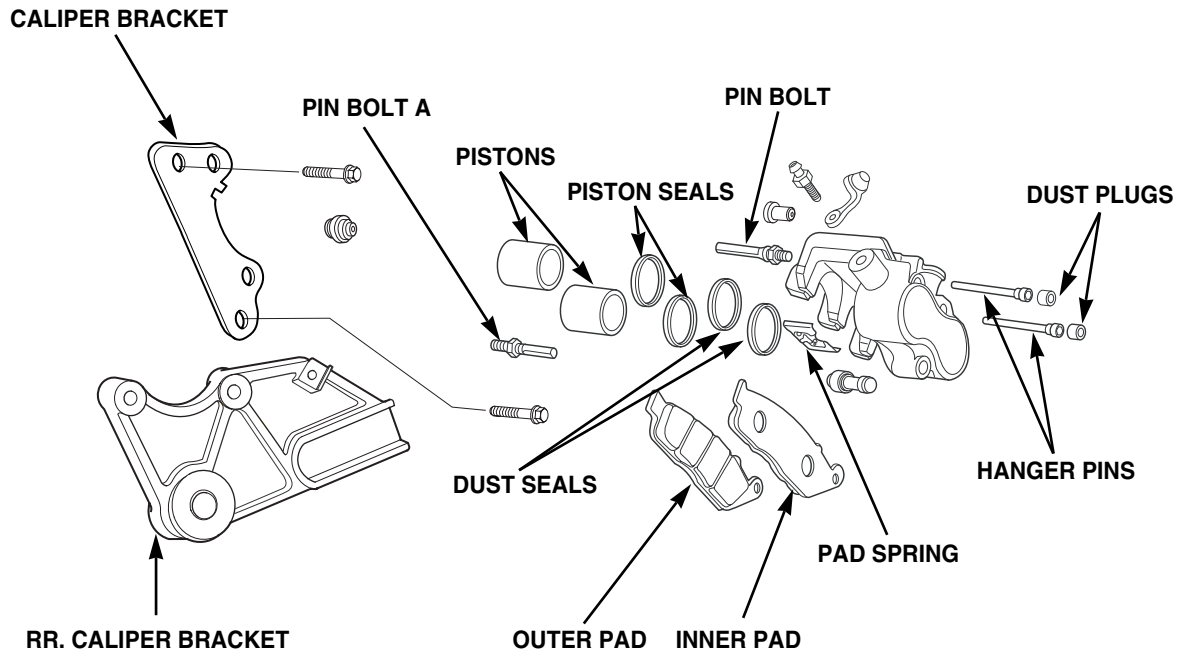
- Check the caliper cylider for scoring or other damage.
- Measure the caliper cylinder I. D.

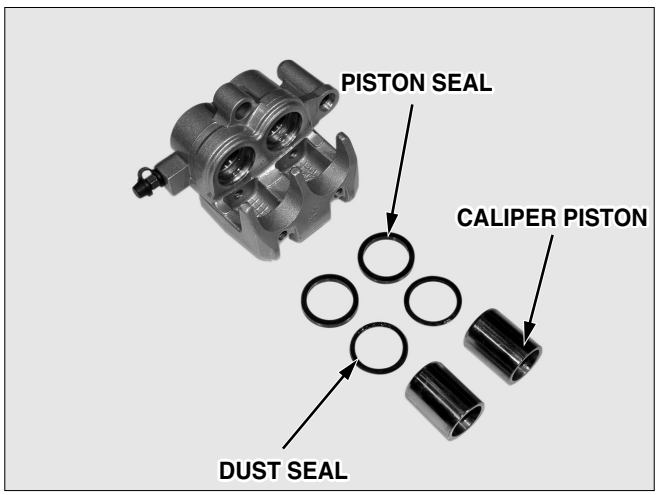
  SERVICE LIMIT : 25.070mm

- Check the caliper pistons for scratches, scoring or other damage.
- Measure the caliper piston O. D.

  SERVICE LIMIT : 24.870mm

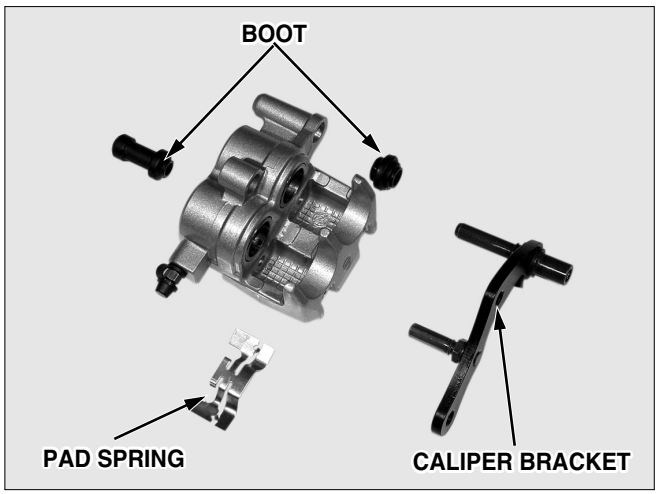
ASSEMBLY



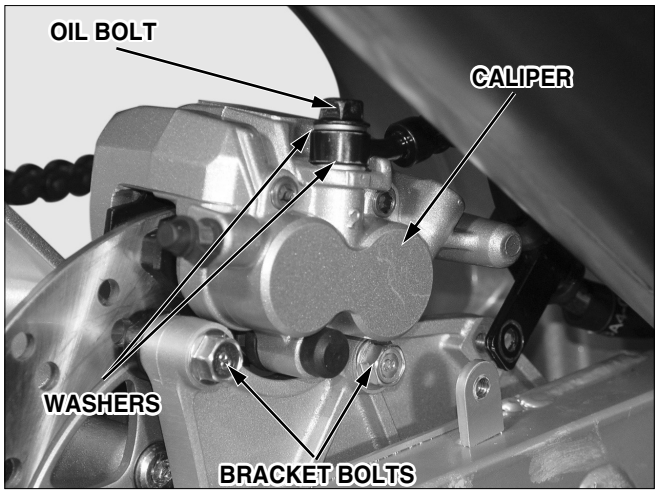


- Coat the new piston seals with clean brake fluid.
- Coat the new dust seals with silicone grease.

- Install the piston seal and dust seal into the groove of the caliper body.
- Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



- Apply the boot with silicone grease.
- Install the boot into the groove of the caliper body.
- Install the pad spring into the caliper body.
- Install the caliper pin bolt and caliper bracket into the caliper body.



INSTALLATION

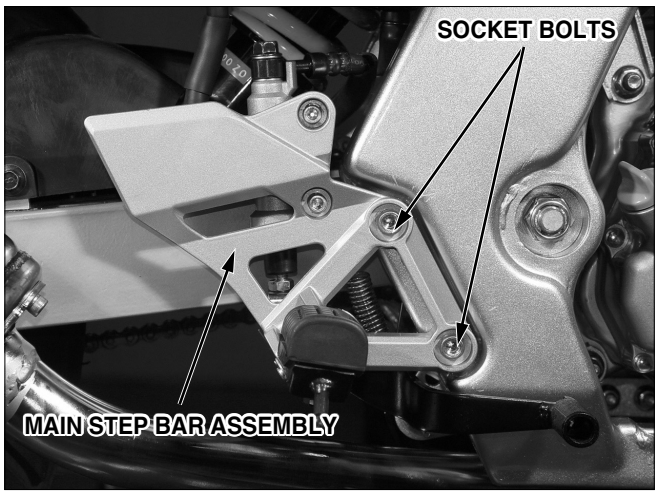
- Install the brake pads and caliper onto the rear caliper bracket. (⇨15-7)
- Install and tighten the caliper mounting bolt to the specified torque.

  TORQUE : 3.0 kgf · m (30 N · m)

- Install the brake hose eyelet to the caliper body with two new washers and oil bolt.
- Tighten the oil bolt to the specified torque.

  TORQUE : 3.4 kgf · m (34 N · m)

- Fill and bleed the rear brake hydraulic system. (⇨15-7)

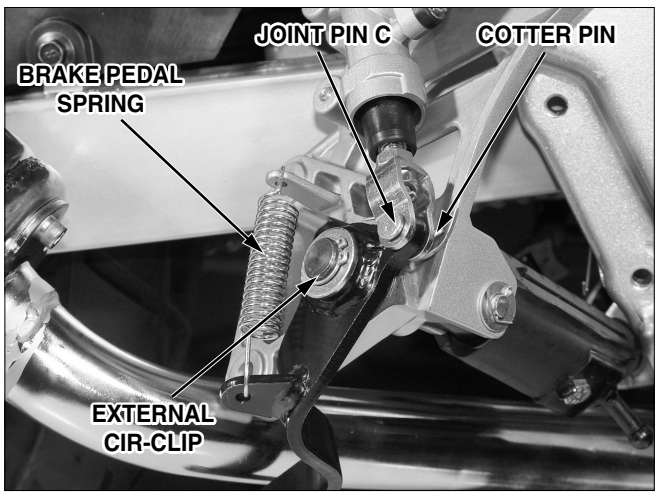


BRAKE PEDAL

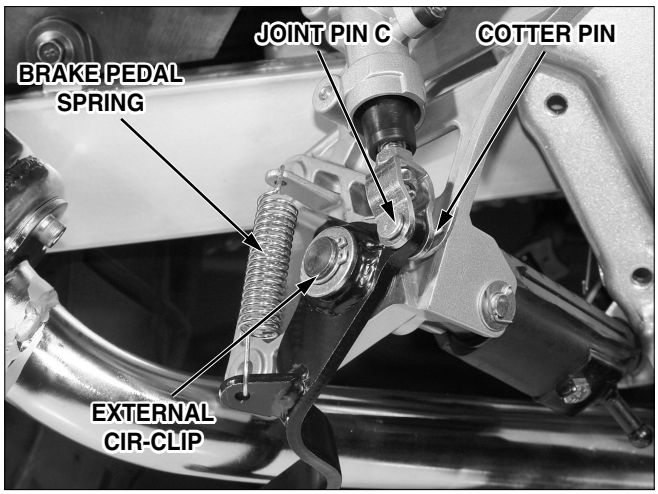
REMOVAL

- Remove the main step holder mounting socket bolts and main stepbar assembly.

- Unhook the stop switch spring from the brake pedal spring.

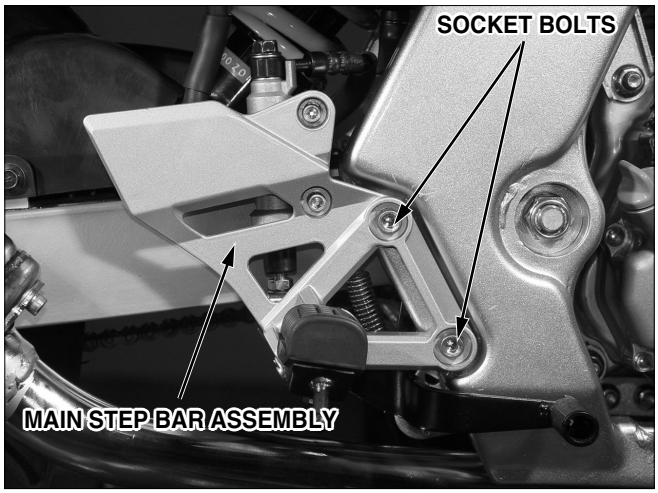


- Remove and discard the brake pedal joint cotter pin.
- Remove the joint pin C.
- Unhook the brake pedal spring from the brake pedal.
- Remove the external cir-clip, washer and brake pedal.



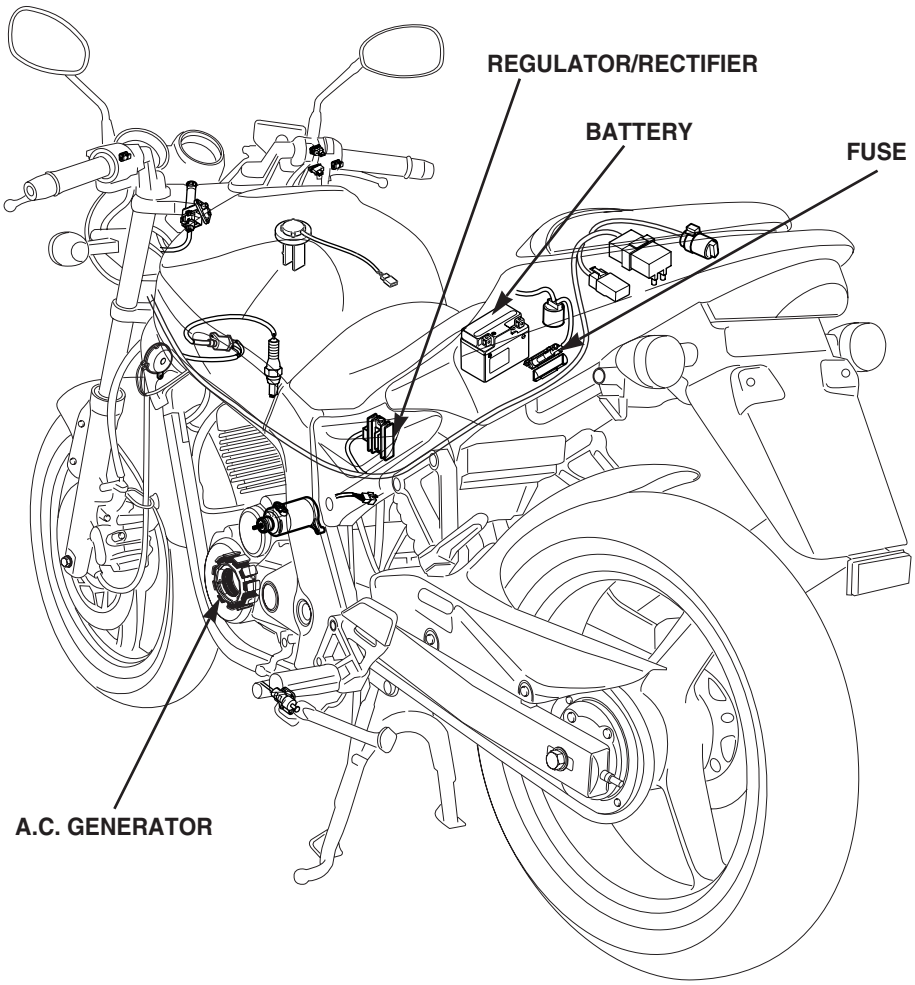
INSTALLATION

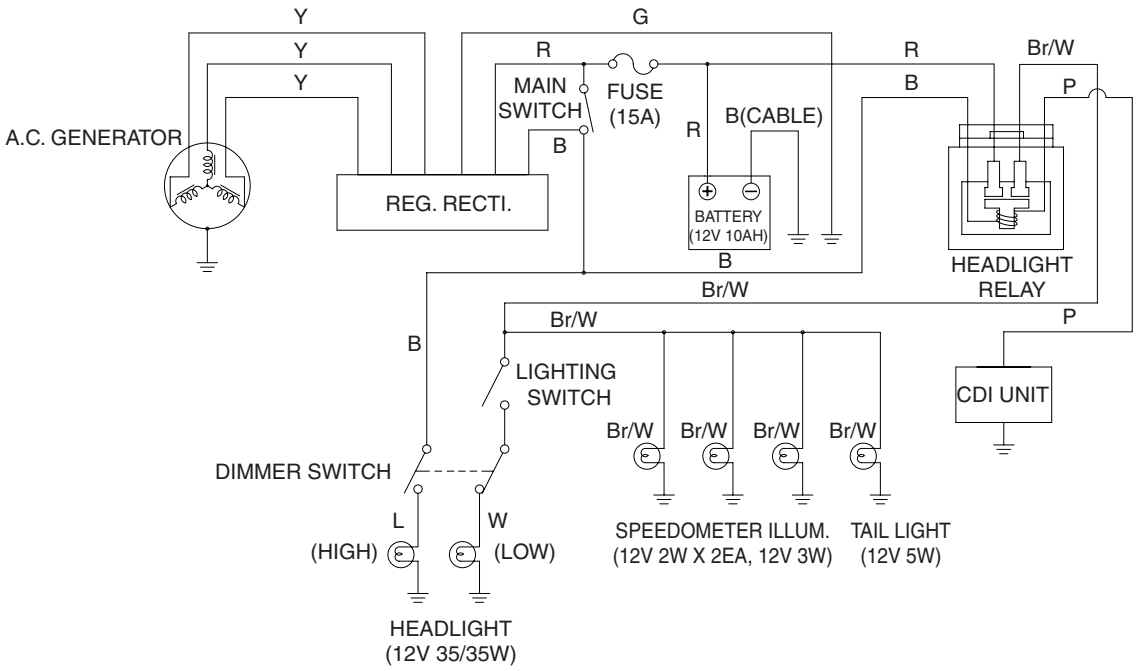
- Apply grease to the sliding surface of the brake pedal.
- Assemble the brake pedal, washer and external cir-clip.
- Hook the brake pedal spring.
- Connect the brake pedal to the brake rod joint.
- Install the joint pin C and secure it with a new cotter pin.



- Hook the stop switch spring to the brake pedal spring.
- Install the main stepbar assembly to the frame.
- Install and tighten the main step holder socket bolts to the specified torque.

MEMO





B.....Black
Y.....Yellow
L..... Blue
G..... Green
R.....Red
W..... White
Br.....Brown
P..... Pink

16. BATTERY/CHARGING SYSTEM

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.
- 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 in the battery and normal cell electrolytes will decrease.
- If the vehicle is not used for a long period, make sure to chage 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.

16

SPECIFICATIONS

ITEM		STANDARD VALUES
BATTERY	Capacity	12V - 10AH (MF)
	Terminal-to-terminal voltage (When fully charged)	13.0-13.2V
	Charging Current	1.0A
	Current leakage	Not to exceed 1mA
A.C.GENERATOR	Charging Coil resistance value (20° C)	0.1-1.0 Ω (20° C)
	rpm at Charging Start	1,600 rpm (night load)
REGULATOR / RECTIFIER	Type	Thyristor system
	Regulated Voltage	14.5 ± 0.5V / 5,000(rpm)

TOOLS

DIGITAL TESTER, PVA MULTI-TESTER, BATTERY TESTER

TROUBLESHOOTING

No power (Key turned on)

- Dead battery.
  - Low fluid level.
  - Low specific gravity.
  - Charging system failure.
- Disconnected battery cable.
- Main fuse burned out.
- Faulty ignition switch.

Low power (Key turned on)

- Battery undercharged.
  - Low fluid level.
  - Low specific gravity.
- Charging system failure.
- Loose battery connection.

Low power (Engine running)

- Battery undercharged.
- Battery is failing.
- Charging system failure.

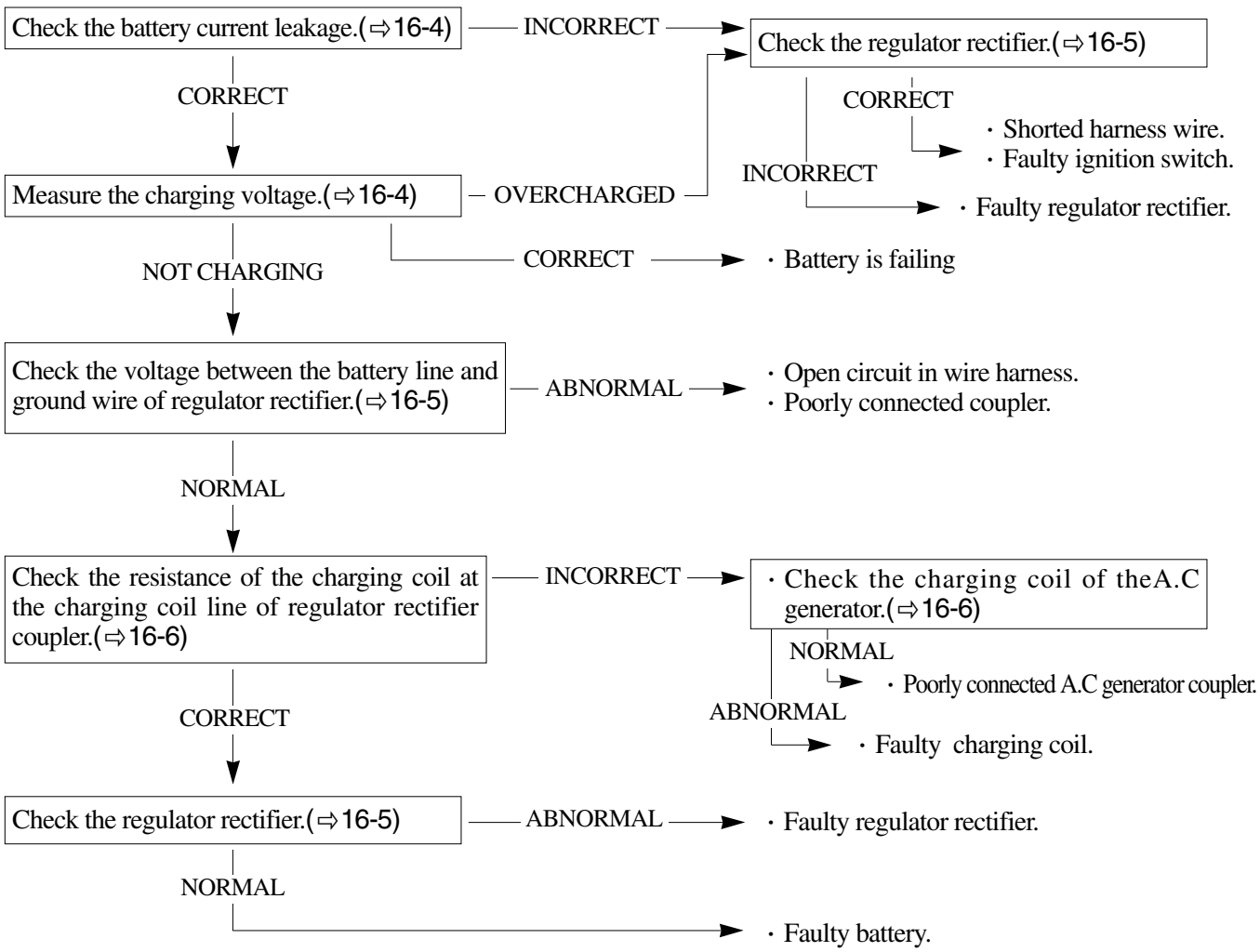
Intermittent power

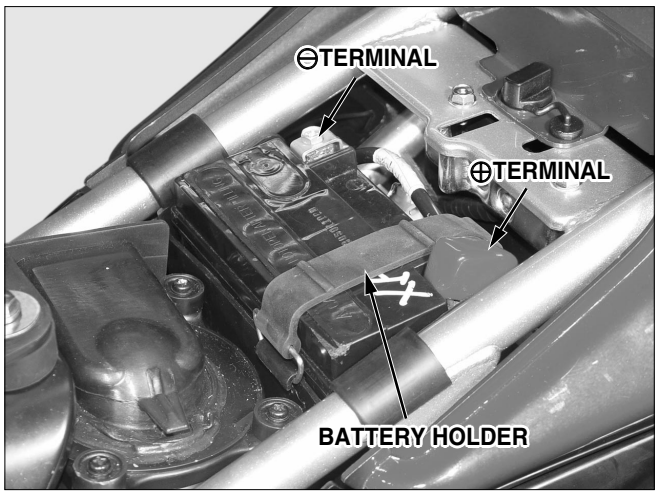
- Loose battery connection.
- Loose charging system connection.
- Loose starting system connection.
- Loose connection or short circuit in ignition system.
- Loose connection or short circuit in lighting system.

Charging system failure

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

Charging System faulty





BATTERY

REMOVAL/INSTALLATION

- Remove the seat. (⇨12-2)
- Remove the battery band.
- Disconnect the negative cable and then the positive cable and remove the battery.

- Install the battery in the reverse order of removal with the proper wiring.

⚠ CAUTION

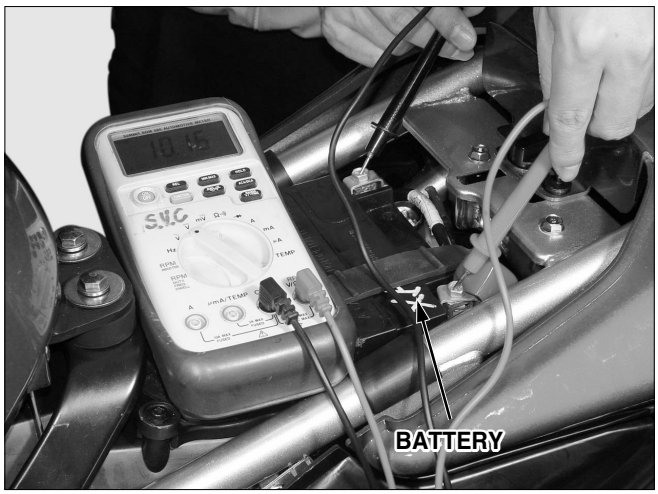
- Always turn the ignition switch to "OFF" before removing the battery.
- Connect the positive terminal first and then the negative cable.

VOLTAGE INSPECTION

- Measure the battery voltage using a multi tester.

VOLTAGE:
- Fully charged : 13.0~13.2V
- Under charged : Below 12.3V

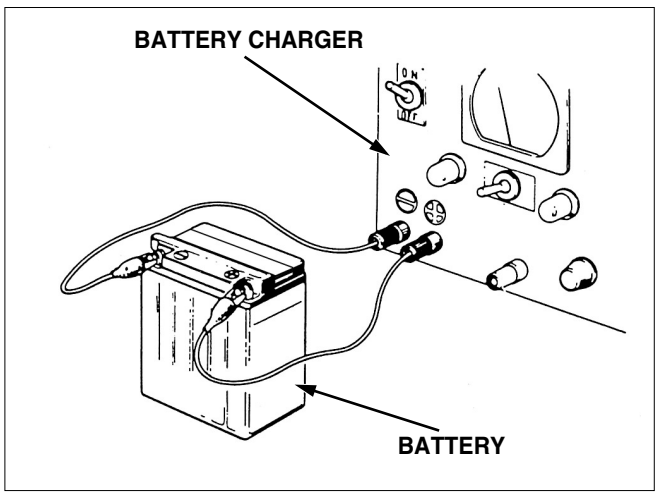
TOOL : MULTI-TESTER



⚠ NOTE

- Use a voltmeter that will accurately indicate 0.1V difference.
- Never open the sealed filler cap.
- 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.

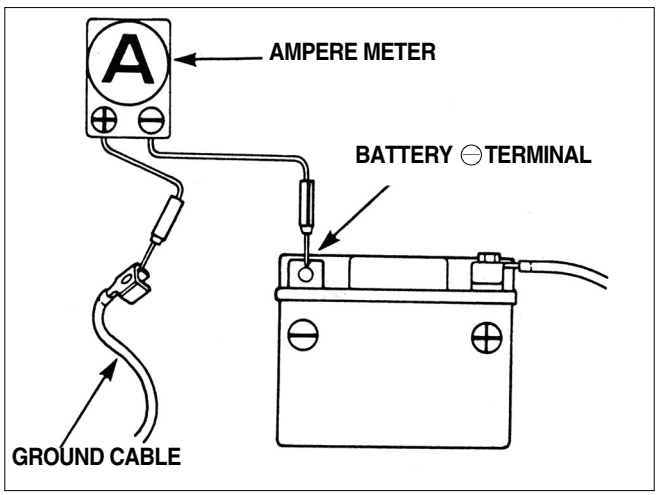
BATTERY CHARGING

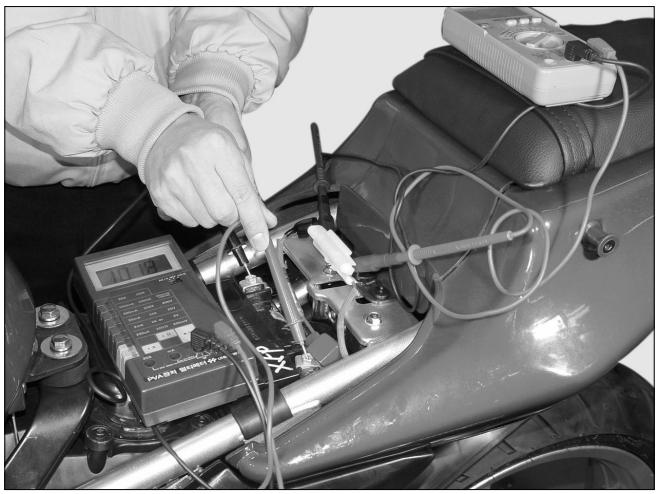


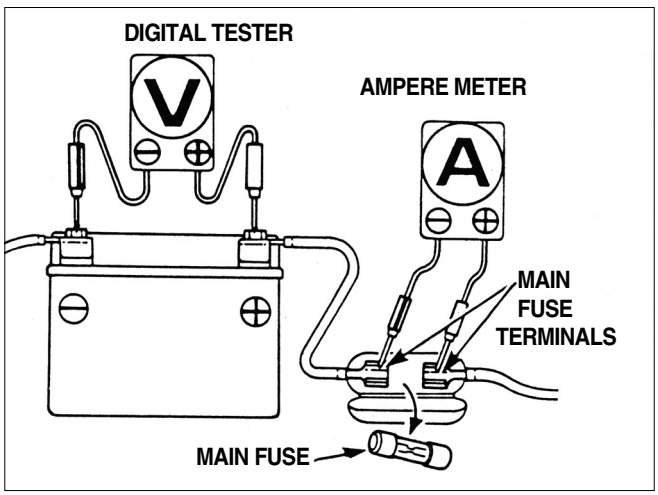
- Remove the battery.
- Connect the charger positive (+) cable to the battery positive (+) terminal.
- Connect the charger negative(-) cable to the battery negative(-) terminal.

⚠ NOTE

- Quick-charging should only be done in an emergency ; slow charging is preferred.
- For battery charging ; do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.







CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE INSPECITION

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

LEAK CURRENT : Not to exceed 1mA
TOOL : DIGITAL TESTER

⚠ NOTE

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher 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.

- If current leakage exceeds the standard value, a shorted circuit is likely to exist.

CHARGING VOLTAGE INSPECTION

⚠ NOTE

- 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 specific gravity is greater than 1.27 (20°C/68°F).
- When the engine is started using the starter motor, a large amount of current may flow from the battery temporarily.

- After warming up the engine, replace the battery with a fully charged battery.
- Connect a tester between the battery terminals.
- Connect an ampere meter between the terminals of the main fuse.

⚠ NOTE

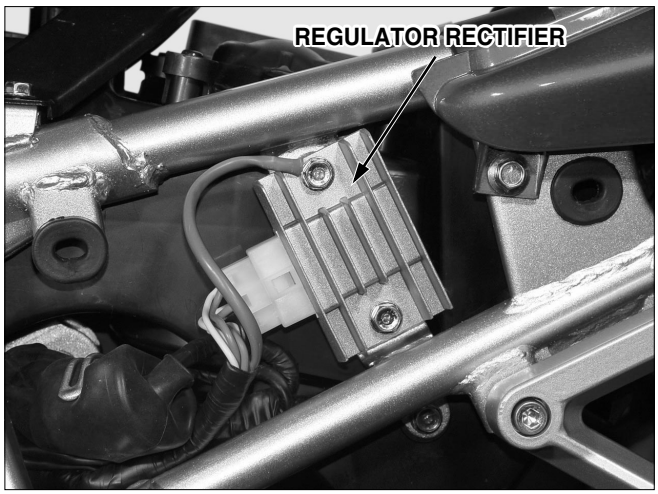
- If the probes are connected in reverse order, the registered current flow direction when charging and discharging the battery will be reversed as well.

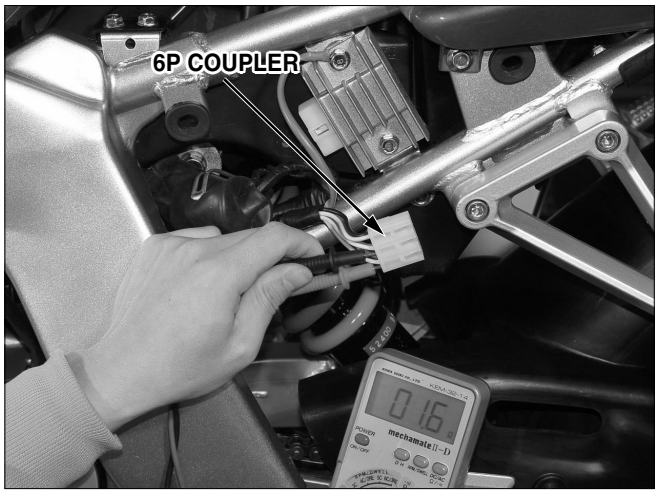
- Turn the headlight ON and start the engine.
- Gradually increase the engine speed and measure the charging voltage at the specified rpm.

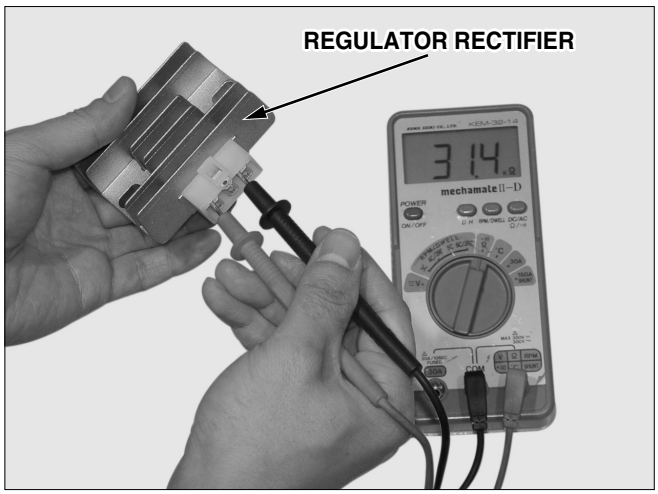
CONTROL VOLTAGE : 1~2.5A / 5,000rpm
CONTROL VOLTAGE : 14.5±0.5V / 5,000rpm
TOOL : DIGITAL TESTER, AMPERE METER

⚠ CAUTION

- Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch.
  Failure to follow this precaution can damage the tester or electrical components.







REGULATOR/RECTIFIER

HARNESS SIDE CIRCUIT INSPECTION

- Remove the seat. (⇨12-2)
- Remove the LH. side cover. (⇨12-2)
- Disconnect the regulator/rectifier coupler.
- Inspect the wiring circuits at each terminal of the wire harness side.

Inspection Items

ITEM	INSPECTION
BATTERY WIRE(RED)	Check that there is voltage between battery line (+) and ground line.
GROUND WIRE(GREEN)	Check continuity between ground and frame.
CHARGING COIL WIRE (YELLOW)	Check that the resistance of the coil is within the specified range. (0.5~1.5 Ω)
	Check not continuity between coil and frame.
VOLTAGE DETECTION LINE(BLACK)	Check that there is battery voltage between voltage detection line (+) and ground wire when the ignition is ON.

REGULATOR / RECTIFIER UNIT INSPECTION

- If all inspections on the wire harness side are normal and there are no loose connections at the regulator rectifier coupler, inspect the regulator rectifier unit by measuring the resistance between the terminals.

⚠ NOTE

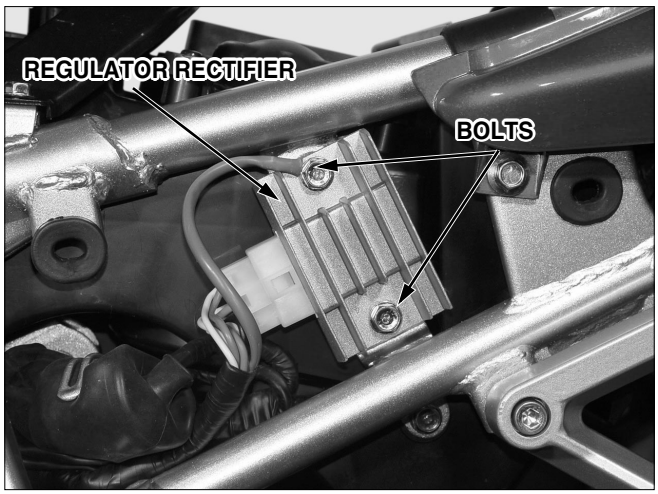
- Resistance value will not be accurate if the probes touch your fingers.
- Use the following recommended tester.
- Using another manufacturer's equipment may not allow you to obtain the specified values.

RESISTANCE VALUE — Unit : KΩ, (20℃)

Tester ⊕ / Tester ⊖	R	B	Y	Y	Y	G
R		0-5	1-3	1-3	1-3	1-4
B	∞		∞	∞	∞	25-40
Y	∞	1-4		∞	∞	1-4
Y	∞	1-4	∞		∞	1-4
Y	∞	1-4	∞	∞		1-4
G	∞	25-40	∞	∞	∞	

- Replace the regulator rectifier unit if the resistance value between the terminals is abnormal.

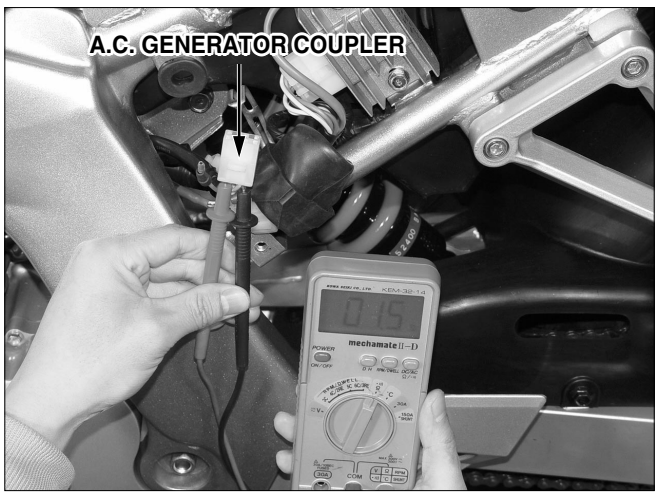
TOOL : DIGITAL TESTER



REMOVAL/INSTALLATION

- Disconnect the regulator/rectifier 6P coupler.
- Remove the regulator/rectifier unit mounting bolts and regulator/rectifier.

- Install the reguator/rectifier unit in the reverse order of removal.



A.C. GENERATOR CHARGING COIL INSPECTION

- Remove the seat. (⇨12-2)
- Remove the LH. side cover. (⇨12-2)
- Disconnect the A.C generator cord coupler.
- Measure the resistance between the yellow leads.

RESISTANCE VALUE : 0.5~1.5Ω (20℃)

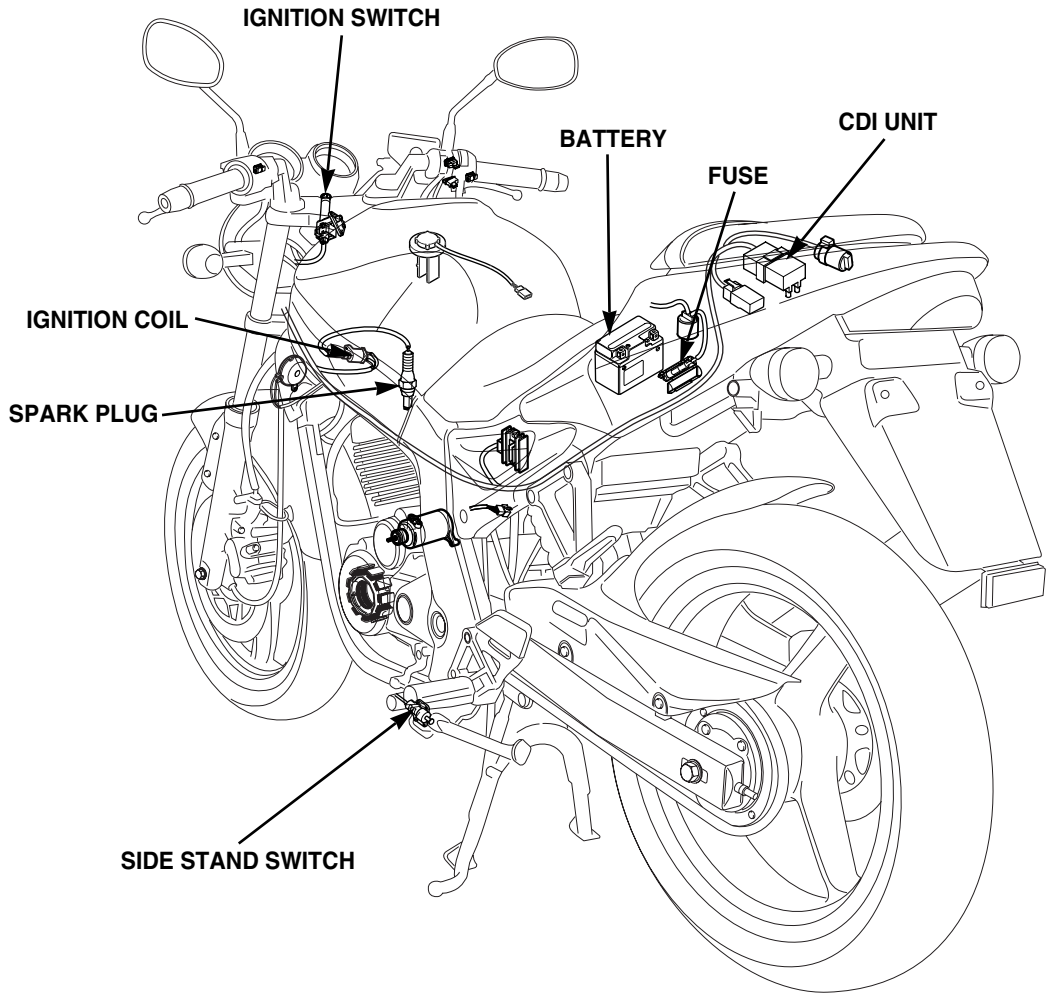
- If the resistance values are much larger than the specified value, or if there is continuity between terminals and earth terminals, replace the stator with a new one.

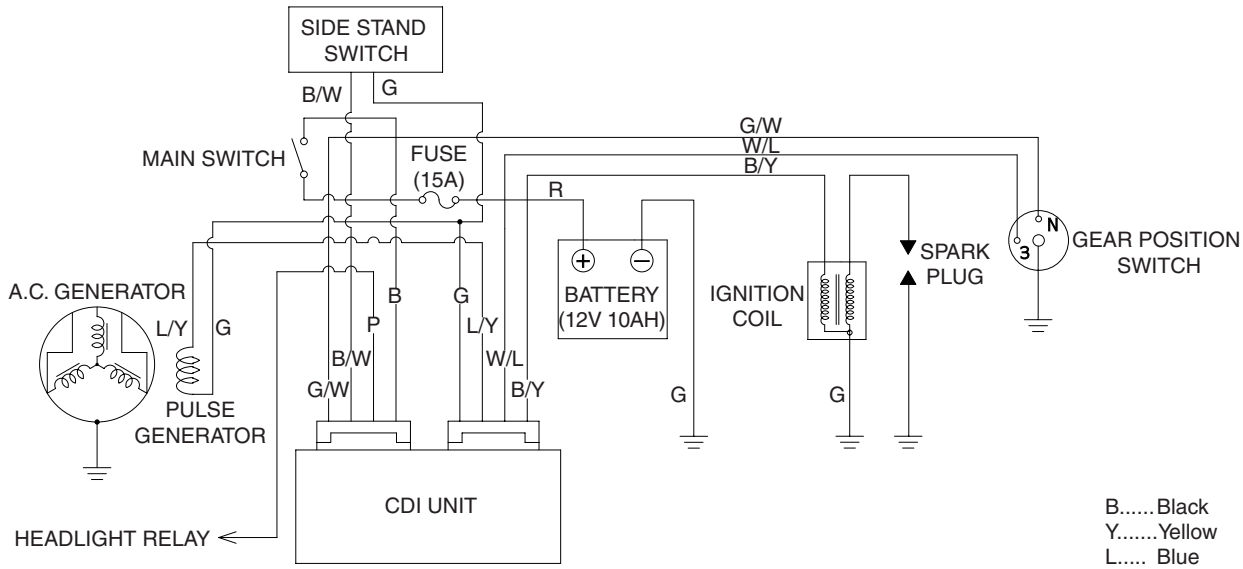
- Install in the reverse order of removal.

⚠ NOTE

• This test is done with the starter mounted to the engine.

MEMO





B.....Black
Y.....Yellow
L..... Blue
G..... Green
R.....Red
W..... White
P..... Pink

17. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL SAFETY

- Follow the steps described in the troubleshooting flow chart when servicing the ignition system.
- The CDI unit may be damage if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the unit. Always turn off the ignition switch before servicing.
- The CDI unit use an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- Use spark plug of the correct heat range. Using spark plug with 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 diagram continuity chart. (⇨chapter 20)

SPECIFICATIONS

ITEM			STANDARD VALUE
IGNITION COIL RESISTANCE VALUE 20℃	PRIMARY COIL		0.1 ~ 0.3 Ω
	SECONDARY COIL	WITH PLUG CAP	6.75~10.05 KΩ
		WITHOUT PLUG CAP	3.0~3.8 KΩ
PULSE GENERATOR COIL RESISTANCE VALUE 20℃			90 ~ 150 Ω

TOOLS

DIGITAL TESTER
PVA MULTI-TESTER
CDI TESTER

TROUBLESHOOTING

No spark at plug.

UNUSUAL CONDITION		PROBABLE CAUSE (CHECK IN NUMERICAL ORDER)
IGNITION COIL PRIMARY VOLTAGE	Low peak voltage.	1. The multitester impedance is too low. 2. Cranking speed is too slow. – Battery is undercharged (or operating force of the kick starter is weak). 3. The sample timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Poorly connected connectors or an open circuit in ignition system. 5. Faulty ignition system control circuit such as side stand switch. 6. Faulty ignition coil. 7. Faulty CDI unit (in case when above No. 1~6 are normal).
	No peak voltage.	1. Incorrect peak voltage adaptor connections. 2. Faulty ignition switch. 3. Loose or poorly connected CDI unit connector. 4. Open circuit or poor connection in ground cord of the CDI unit. 5. Faulty ignition system control circuit such as side stand switch. 6. Faulty peak voltage adaptor. 7. Faulty CDI unit (in case when above No. 1~6 are normal).
	Peak voltage is normal, but no spark jumps at plug.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil.
PULSE GENERATOR	Low peak voltage.	1. The multitester impedance is too low. 2. Cranking speed is too slow. – Battery is undercharged (or operating force of the kick starter is weak). 3. The sample timing of the tester and measured pulse were not synchronized.(System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty pulse generator (in case when above No. 1~3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty pulse generator.

CDI UNIT INSPECTION

CDI IGNITION CIRCUIT INSPECTION

⚠ NOTE

• Follow the steps described in the troubleshooting flow chart when servicing the ignition system.

- Remove the seat. (⇨12-2)
- Remove the rear seat. (⇨12-2)

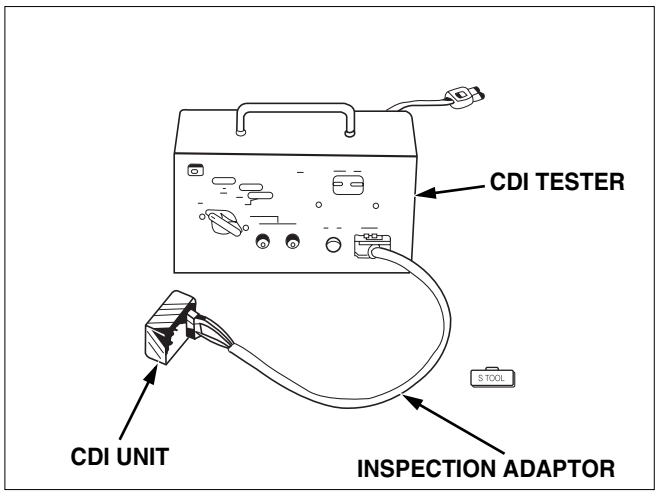
- Disconnect the CDI unit coupler and check the ignition system circuits from the wire harness side.

Inspection Items

ITEM	INSPECTION
MAIN SWITCH	Check that there is battery voltage between main switch wire (black) and ground wire when the ignition is ON
PULSE GENERATOR	Check that the resistance of coil (between blue / yellow and green) is within the specified range. (90~150 Ω, 20℃)
IGNITION COIL (PRIMARY COIL)	Check that the resistance of coil (between black / yellow and green) is within the specified range. (0.1~0.3 Ω, 20℃)
GROUND WIRE	Check continuity between ground and frame.

- If there are a normality in the diagonosis above, and if there is no spark at plug, check the CDI unit and ignition coil by using a CDI tester.

TOOL : DIGITAL TESTER

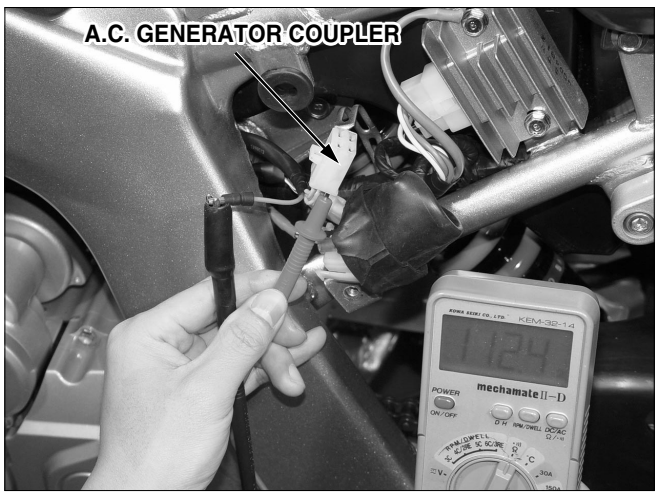


CDI UNIT PERFORMANCE TEST

- The CDI unit is checked by the CDI tester.

⚠ NOTE

• Follow the tester manufacturer's instructions.
• Improper connections could damage the CDI unit or tester.

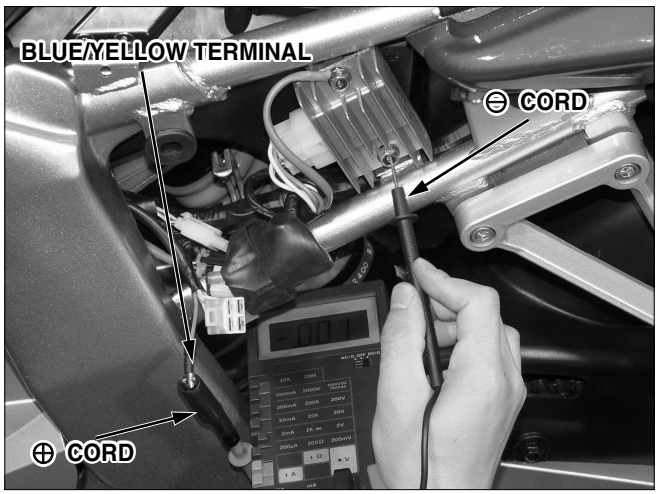


PULSE GENERATOR INSPECTION

RESISTANCE MEASUREMENT

- Remove the seat. (⇨12-2)
- Remove the LH. side cover (⇨12-2)
- Disconnect the A. C. generator 4P coupler and blue/yellow wire connector.
- Measure the resistance between the green and blue/yellow.

STANDARD VALUE : 90~150 Ω (20℃)

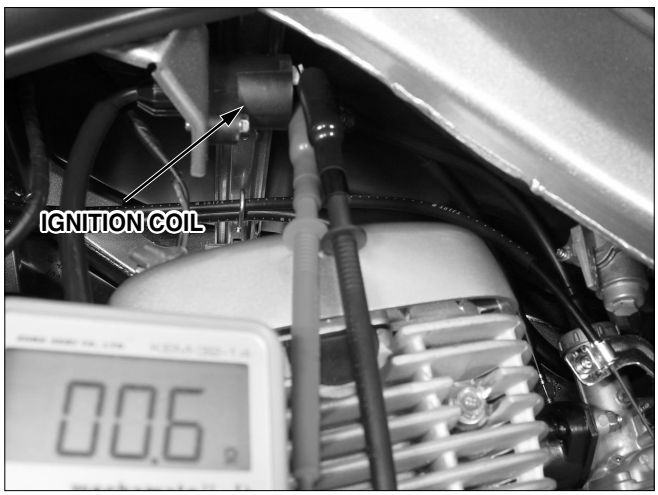


PVA MEASUREMENT

- Disconnect the A.C generator blue / yellow wire connector.
- Connect the peak voltage adaptor probes to the pulse generator wire terminal of the wire harness side connector and ground.
- Crank the engine with the starter motor and measure the peak voltage of pulse generator.

PEAK VOLTAGE : OVER 1.5V
TOOL : PVA MULTI TESTER

- Install in the reverse order of removal.



IGNITION COIL INSPECTION

- Disconnect the primary wire.

⚠ NOTE

- Measure the peak voltage of the ignition coil primary side first.
- Since the resistance value of the primary coil is inherently very small, it is difficult to distinguish it from a shorted wire.

PRIMARY COIL INSPECTION

- Measure the resistance between the two terminals of the ignition primary coil.
- If the resistance value is within the specified range the coil is good.
- If resistance is ∞ (infinite), replace the coil with a new one.

STANDARD VALUE : 0.1~0.3 Ω

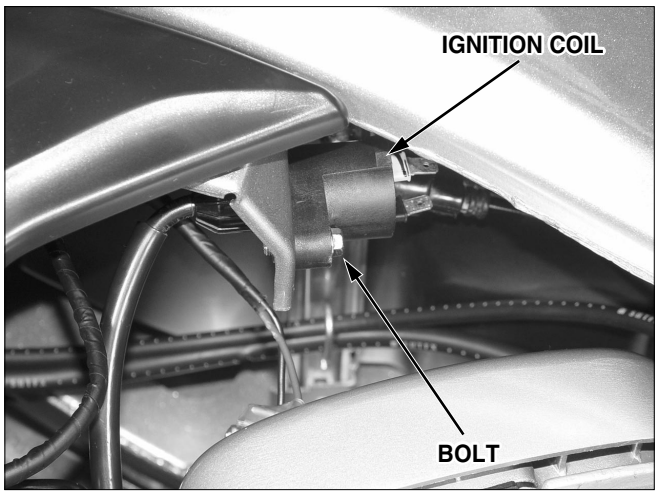
SECONDARY COIL INSPECTION

- With the spark plug cap on, measure the resistance between the primary coil terminal and the spark plug cap.
- If the resistance value is within the specified range, then the coil is good.
- If the resistance is ∞ (open wire), disconnect the spark plug cap and measure the secondary coil resistance.

STANDARD VALUE : 6.75~10.05 kΩ

- Without the spark plyg cap on, measure resistance between the primary coil terminal and high-tension cord.
- If the resistance value is within the specified range, then the coil is good.
- If the resistance is ∞ (open wire), replace the coil with a new one.

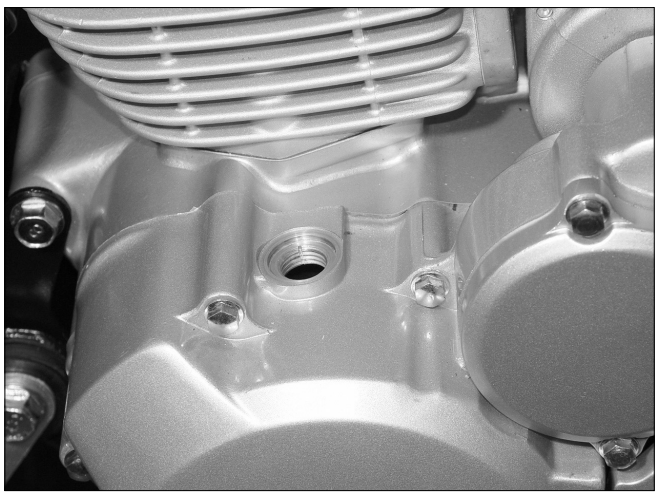
STANDARD VALUE : 3.0~3.8 kΩ



REPLACEMENT

- Remove the high-tension cord from the plug, remove the plug cap.
- Remove the wire from the ignition coil.
- Remove the primary wire from the ignition coil.
- Loosen the ignition coil mounting bolt securing the frame, remove the ignition coil.

- Install in the reverse order of removal.



IGNITION TIMING

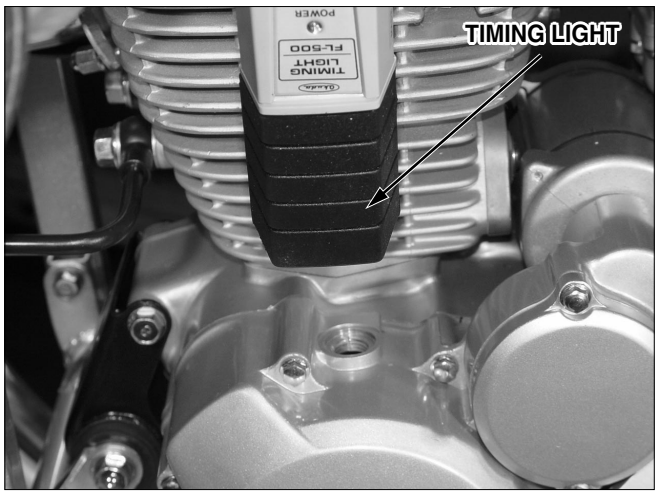
⚠ NOTE

・As the system uses the CDI unit, the ignition timing need not be adjusted. Check the ignition system if the ignition timing is incorrect.

- Warm up the engine.
- Stop the engine and remove the AC. generator cap.

⚠ NOTE

・Read the instruction for timing light operation.



- Connect the timing light to the high-tension cord.
- Start the engine and let it idle.

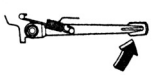
IDLE SPEED : 1,600 ±100rpm

- The ignition timing is correct if the "F" mark aligns with the index mark on the case.
- Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move counterclockwise when the the engine speed at approximately 4,000 rpm.
- Install in the reverse order of removal.

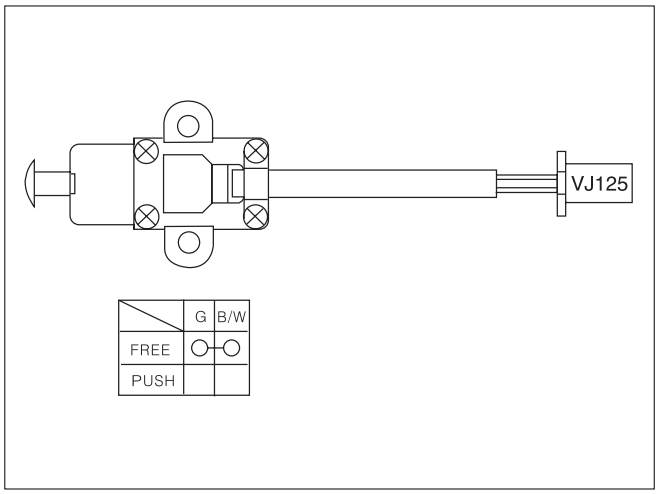
SIDE STAND SWITCH

OPERATING PRINCIPLE

- Elect the main stand to park the motorcycle.

SIDE STAND POSITION	TRANSMISSION	CLUTCH LEVER	IGNITION	STARTING
LOWERED 	NEUTRAL	PULLED IN	POSSIBLE	POSSIBLE
		RELEASED	POSSIBLE	POSSIBLE
	IN GEAR	PULLED IN	NOT POSSIBLE	NOT POSSIBLE
		RELEASED	NOT POSSIBLE	NOT POSSIBLE
RETRACTED 	NEUTRAL	PULLED IN	POSSIBLE	POSSIBLE
		RELEASED	POSSIBLE	POSSIBLE
	IN GEAR	PULLED IN	POSSIBLE	POSSIBLE
		RELEASED	POSSIBLE	NOT POSSIBLE

※ ”Starting” in the table above means “Starting the engine with the starter motor”



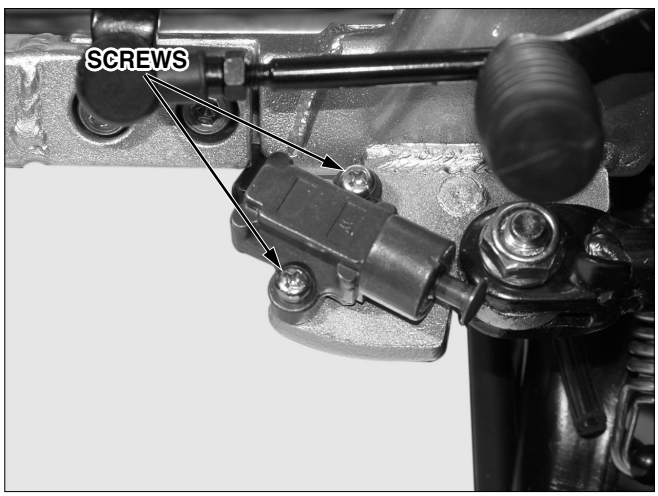
SIDE STAND SWITCH INSPECTION

- Remove the RH. side cover. (⇨12-2)
- Remove the side stand switch coupler connected with wire.
- Check the following terminals.

ITEM	TERMINALS	STANDARD
ON (Side stand retracted)	BLACK/WHITE AND GREEN TERMINAL	NORMAL IF THERE IS CONTINUITY
OFF (Side stand lowered)	BLACK/WHITE AND GREEN TERMINAL	NORMAL IF THERE IS NO CONTINUITY

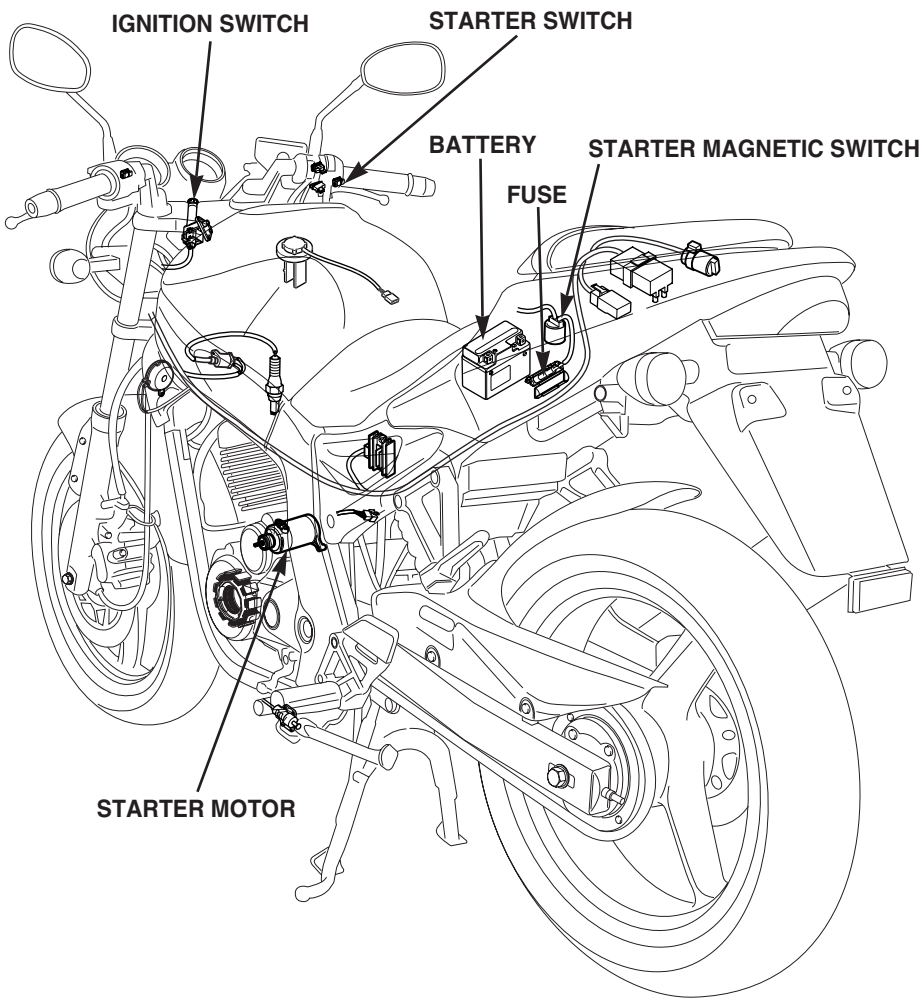
REPLACEMENT

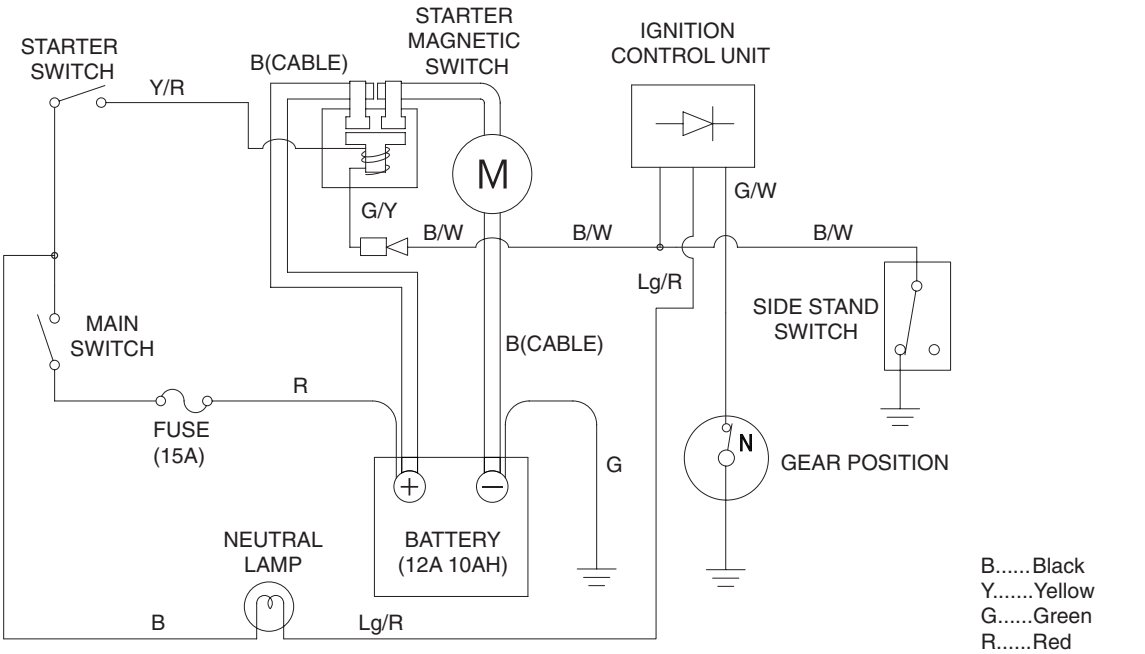
- Remove the RH. side cover. (⇨12-2)
- Disconnect the side stand coupler from the wire harness.



- Remove the side stand switch mounting screws and side stand switch.
- Install in the reverse order of removal.

MEMO


IGNITION SWITCH
STARTER SWITCH
BATTERY
STARTER MAGNETIC SWITCH
FUSE
STARTER MOTOR


STARTER SWITCH
Y/R
B(CABLE)
STARTER MAGNETIC SWITCH
IGNITION CONTROL UNIT
M
G/W
G/Y
B/W
B/W
B/W
Lg/R
SIDE STAND SWITCH
MAIN SWITCH
B(CABLE)
R
FUSE (15A)
G
N
GEAR POSITION
NEUTRAL LAMP
BATTERY (12A 10AH)
B
Lg/R
B.....Black
Y.....Yellow
G.....Green
R.....Red
W.....White
Lg.....Light green

18. ELECTRIC STARTER

SERVICE INFORMATION

GENERAL SAFETY

⚠ WARNING

· Always turn the ignition switch OFF before servicing the starter motor. The moter could suddenly start, causing serious injury.

- The starter motor can be maintained without removing the engine from the vehicle.
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.

SPECIFICATION

Unit : mm

ITEM	STANDARD VALUE	SERVICE LIMIT
STARTER MOTOR BRUSH LENGTH	10.2	5.0

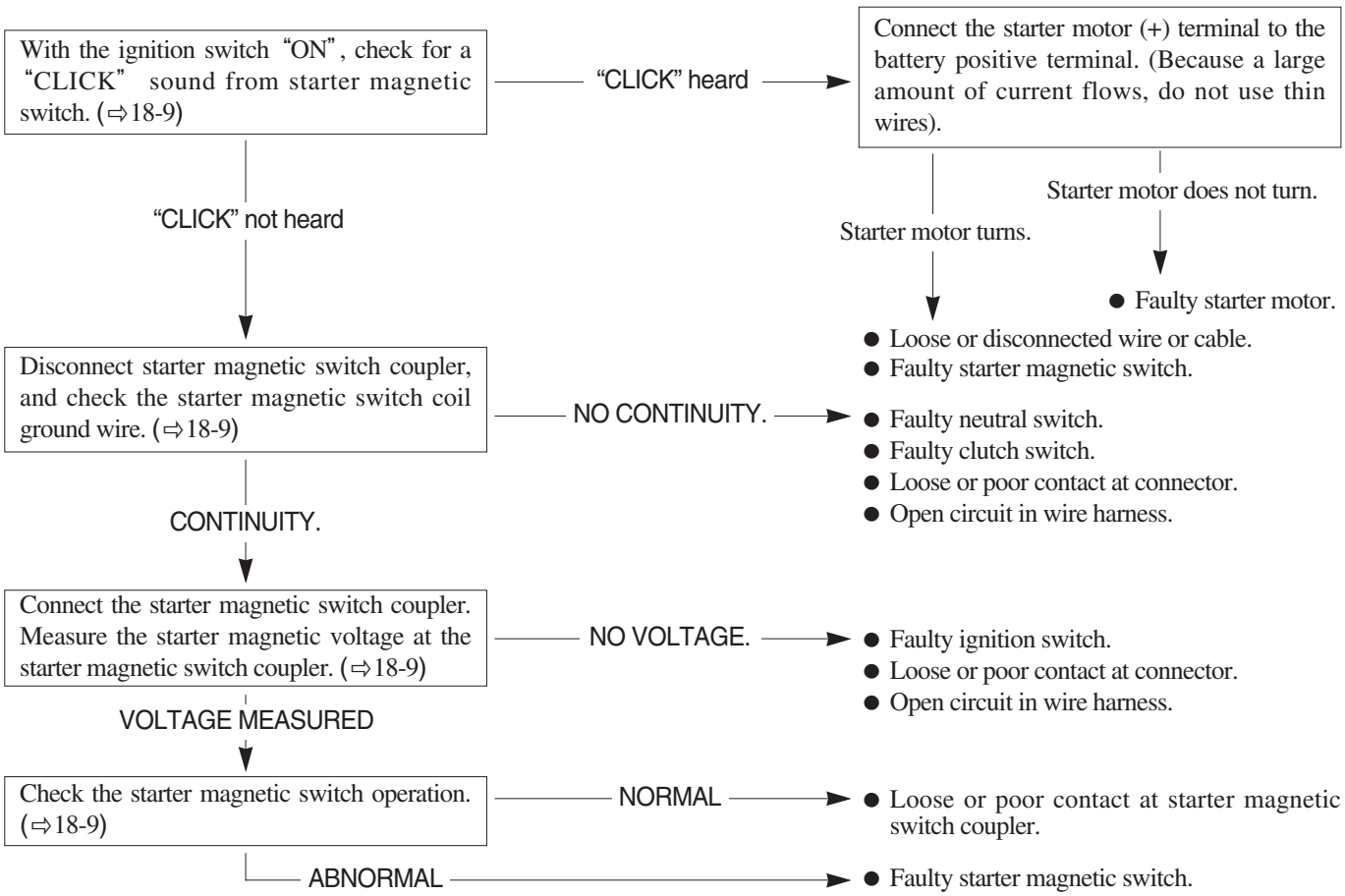
TOOLS

- MULTI TESTER

TROUBLESHOOTING

Starter motor will not turn.

- Check for a blown out main fuse before servicing.
- Make sure the battery is fully charged and in good condition.



Starter motor turns engine slowly.

- Low battery voltage.
- Poorly connected battery terminal cable.
- Poorly connected starter motor cable.
- Faulty starter motor.
- Poorly connected battery ground cable.
- Damaged or worn brush.

Starter motor and engine turns, but engine does not start.

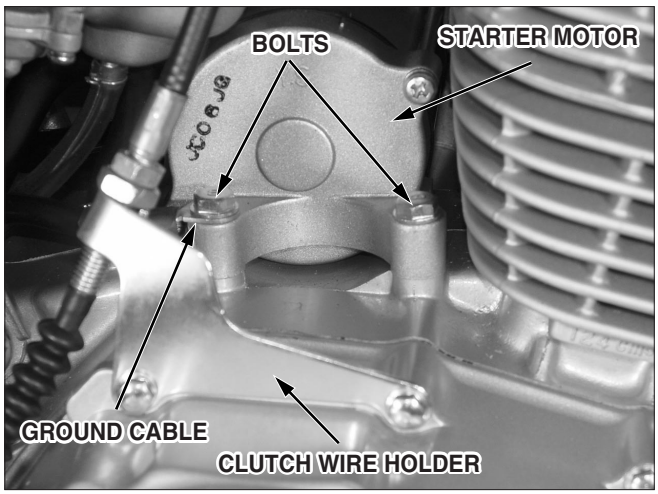
- Faulty ignition system.
- Engine problems.
- Excessive reduction gear friction.

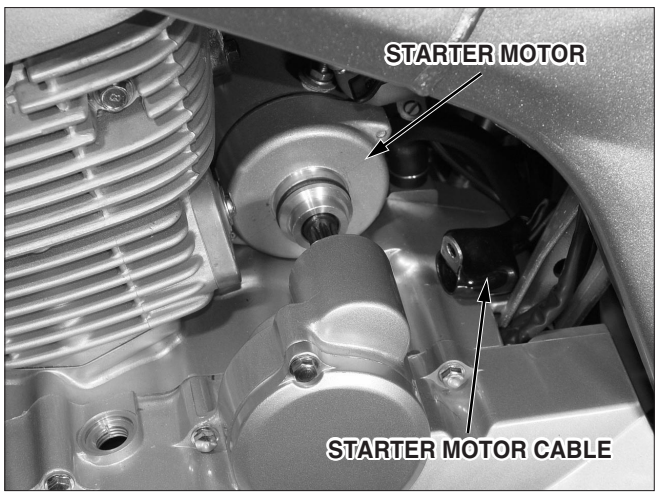
Starter motor turns, but engine does not turn

- Starter motor is running backwards.
  - Brushes assembled improperly.
  - Case assembled improperly.
  - Terminals connected improperly.
- Faulty starter clutch.
- Damaged or faulty starter drive gear

Starter magnetic switch "Clicks", but engine does not turn over

- Crankshaft does not turn due to engine problems.





STARTER MOTOR

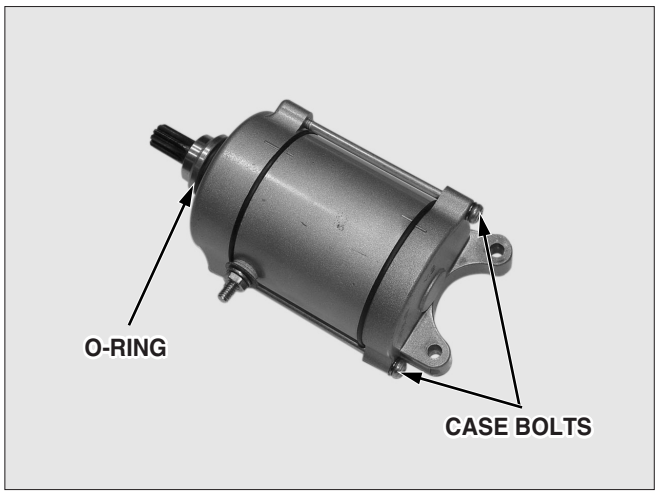
REMOVAL

- With the ignition switch turned to "OFF", remove the negative cable at the battery before servicing the starter motor.
- Remove the rubber cap.
- Remove the nut and starter motor cable from the starter motor.
- Remove the holder mounting bolts and clutch wire holder.
- Remove the starter motor mounting bolts and ground cable.

- Pull the starter motor out of the crankcase.

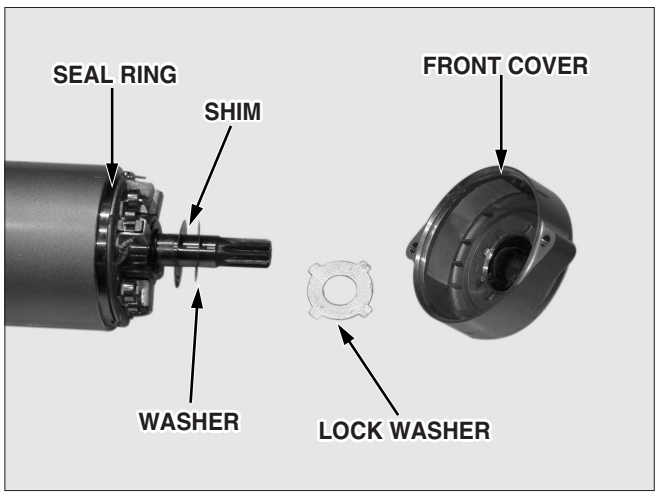
⚠ WARNING

• Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

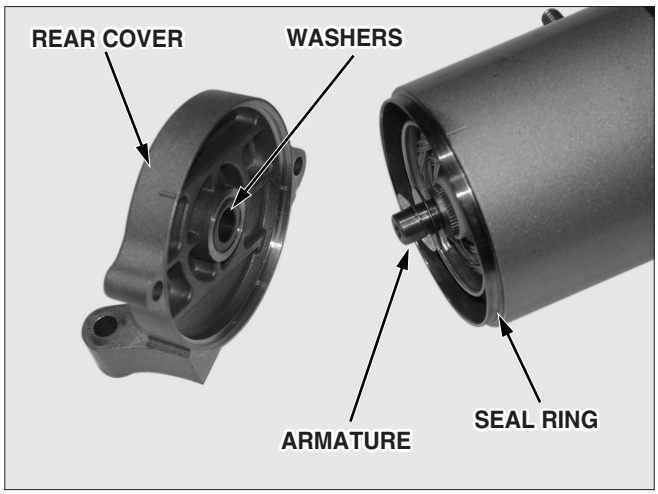


DISASSEMBLY

- Remove the following.
  - O-ring
  - Starter motor case bolts / spring washers

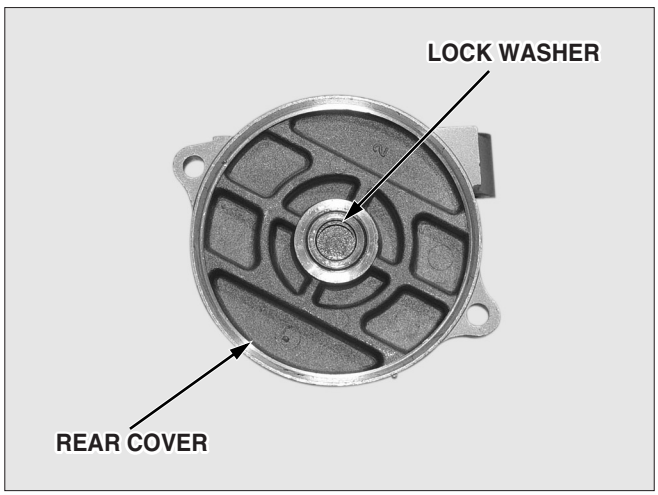


- Front cover
- Seal ring
- Lock washer
- Washer
- Shim

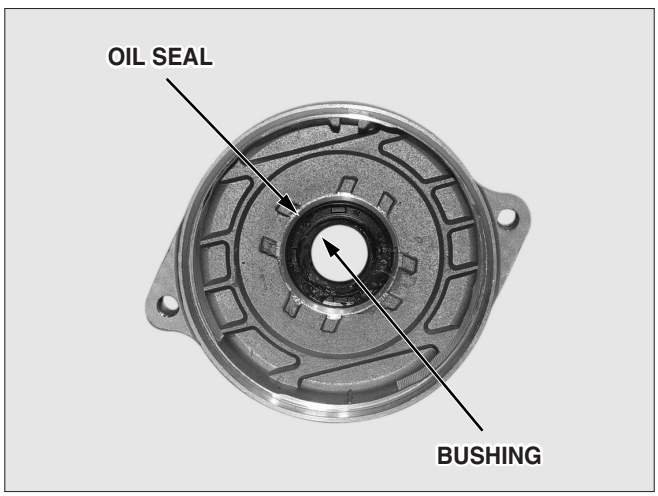


- Remove the following :
  - Rear cover assembly
  - Seal ring
  - Washers
  - Armature

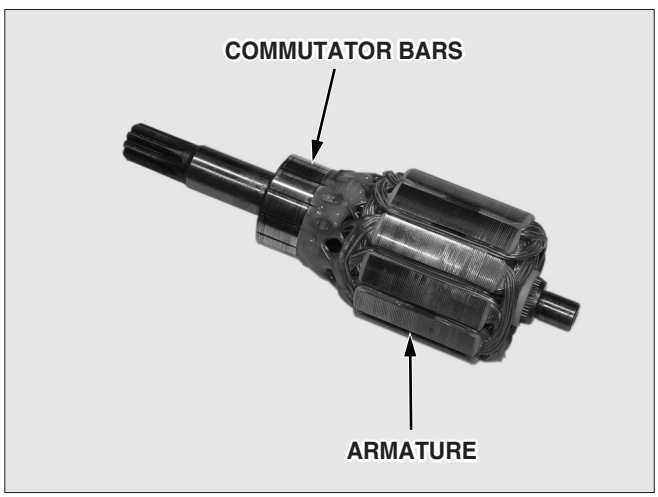
INSPECTION



- Check the bushing in the rear cover for wear or damage.

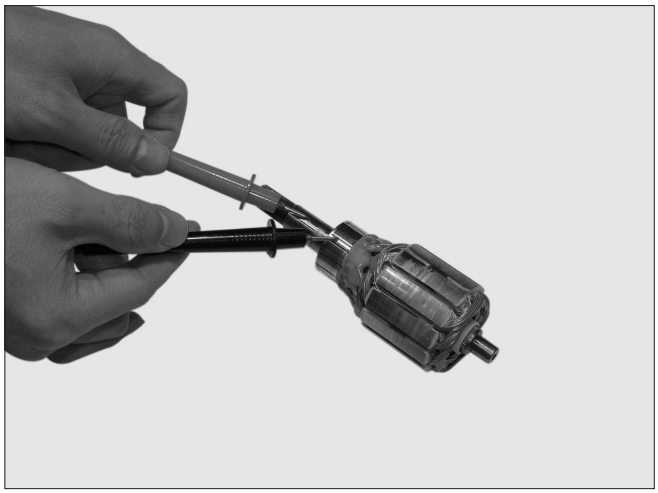


- Check the oil seal and bushing in the front cover for wear or damage.

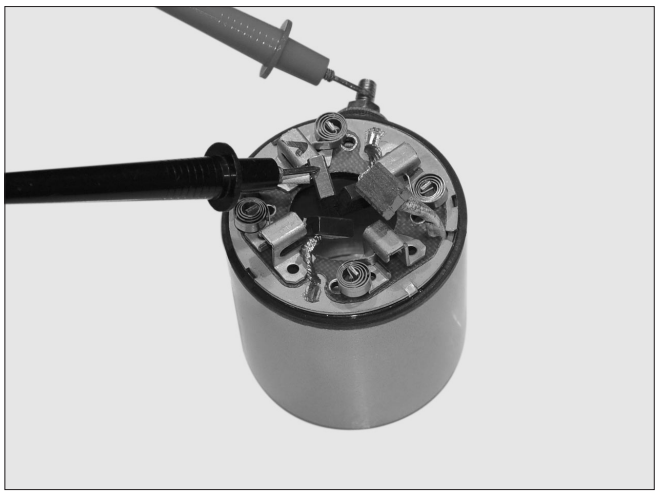


- Check the commutator bars of the armature for discoloration.
- Discoloration of the commutator bars.→ Replace with a new one.

- Check for continuity between pairs of commutator bars.
- There should be continuity.

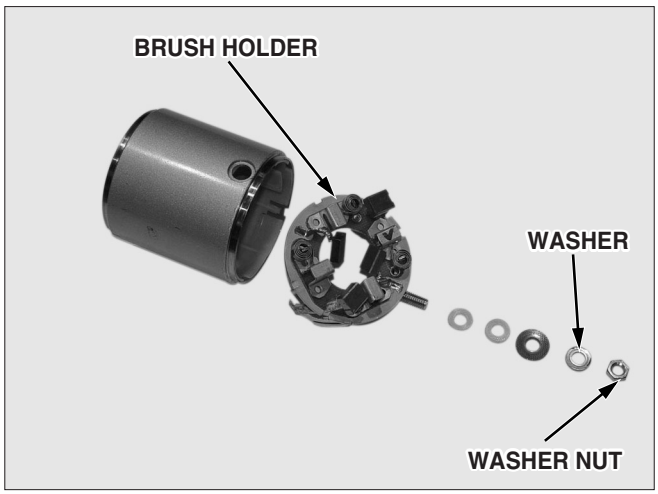


- Check for continuity between each commtator bar and armature shaft.
- There should be no continuity.

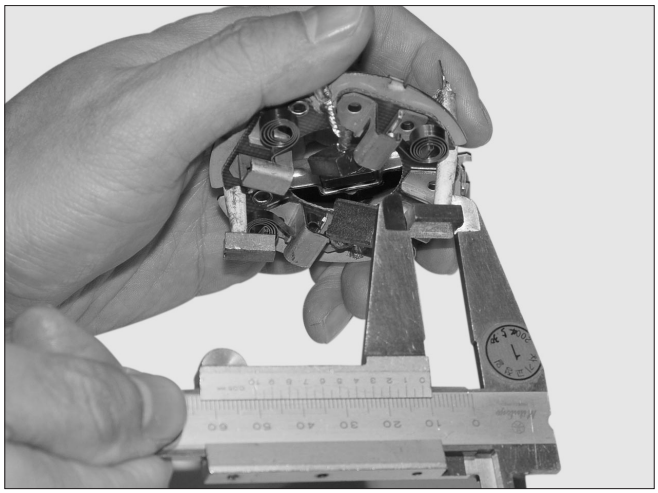


- Check for continuity between the insulated brush and cable terminal.
- There should be continuity.

- Check for continuity between the cable terminal and the case.
- There should be no continuity.



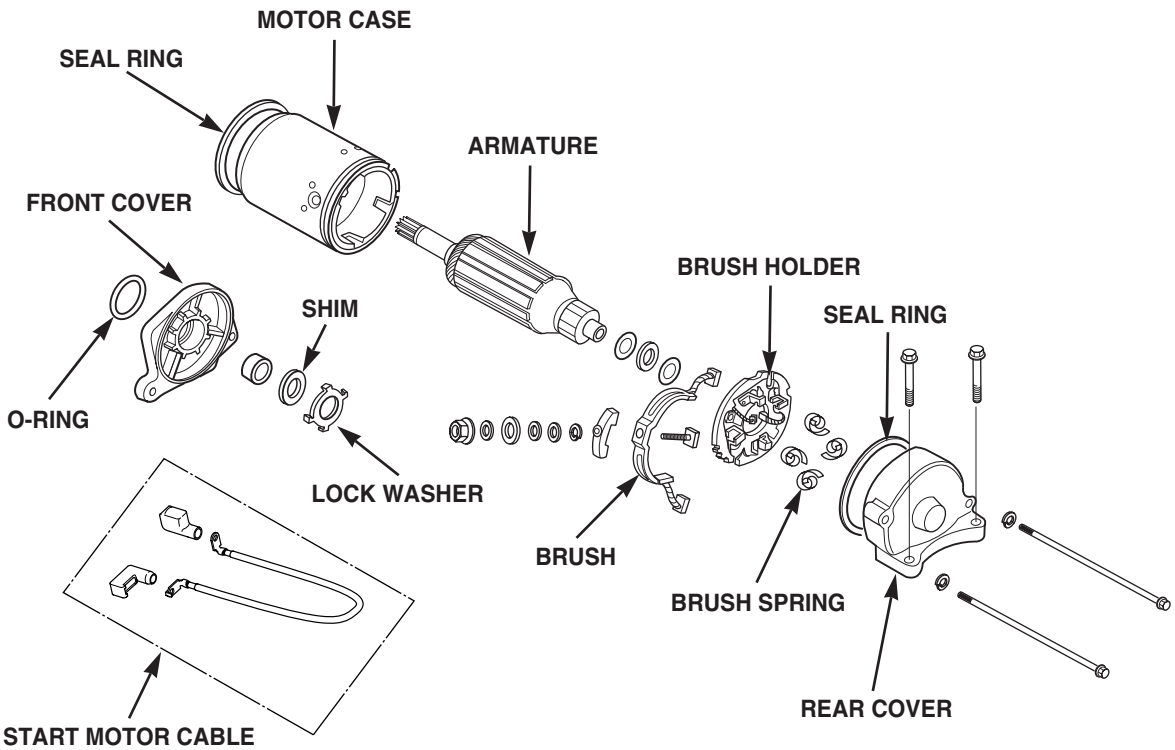
- Remove the following:
  - Washer nut
  - Washer
  - O-ring
  - Terminal setting bush
  - Brush holder



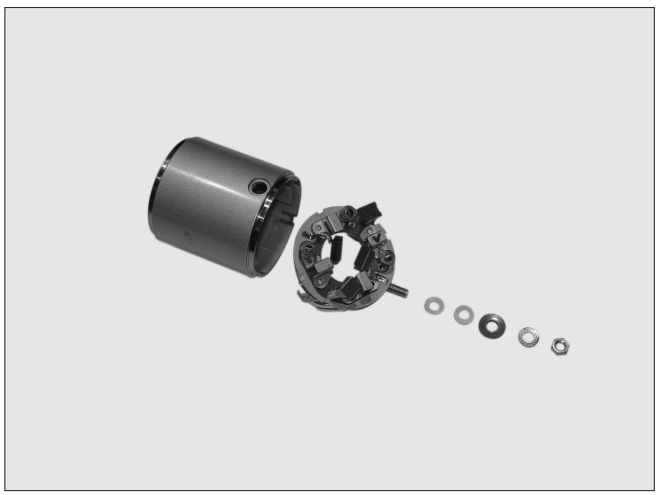
- Inspect the brushes for damage and measure the brush length.

  SERVICE LIMIT : 5 mm

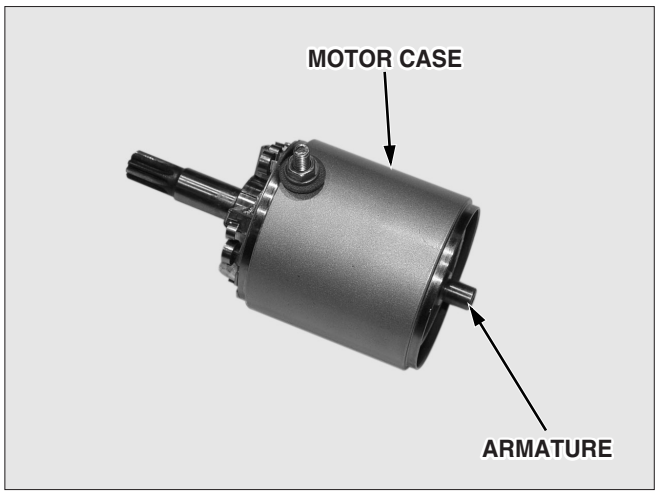
ASSEMBLY



- Install the brushes into the brush holder.
- Install the brush holder into the motor case, aligning the holder tab with the motor case groove.



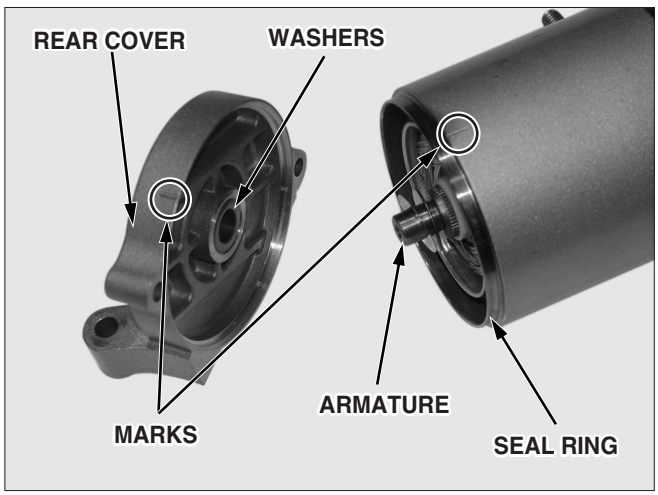
- Install the following :
  - New O-ring
  - Insulators
  - Washer
  - Washer nut



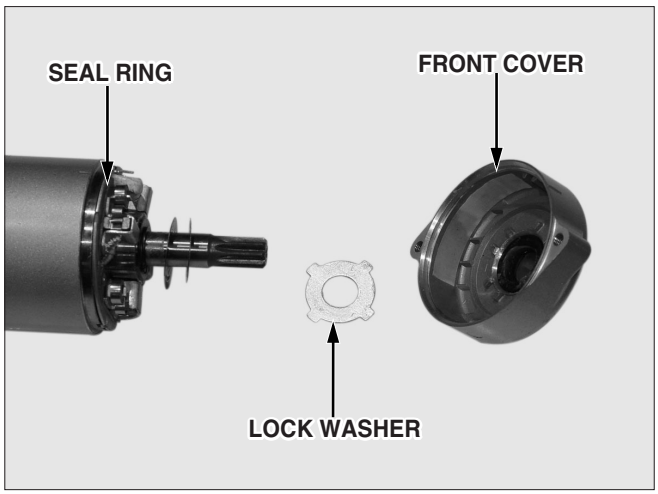
- Install the armature in the motor case, while pushing in the brushes into the brush holder.
- When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

⚠ NOTE

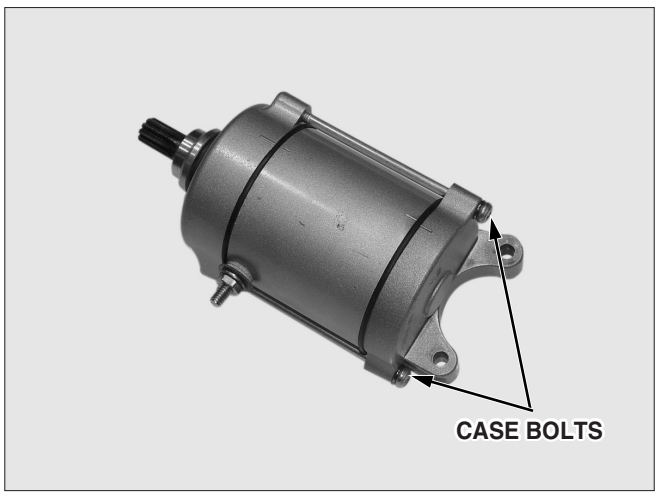
• The coil may be damaged if the magnet pulls the armature against the case.



- Install the two washers.
- Install a new seal ring onto the motor case.
- Apply thin coat of grease to the armature shaft end.
- Install the rear cover, aligning its mark with the motor case mark.

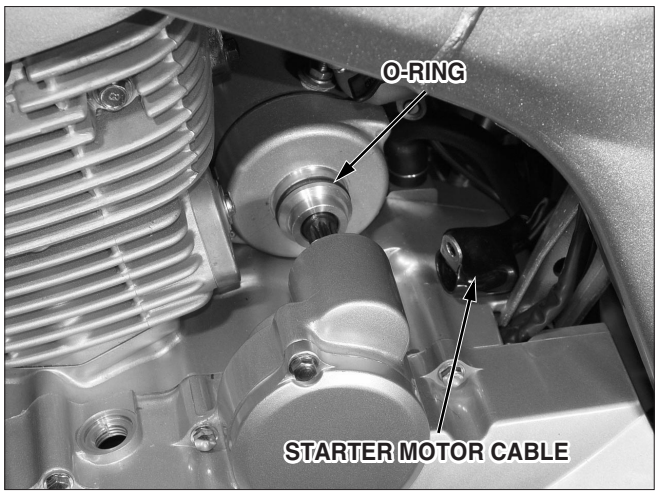


- Install the cir-clip and washers onto the armature shaft.
- Install a new seal ring onto the motor case.
- Apply grease to the bushing in the front cover.
- Install the lock washer onto the front cover.
- Install the front cover, aligning its mark with the motor case mark.

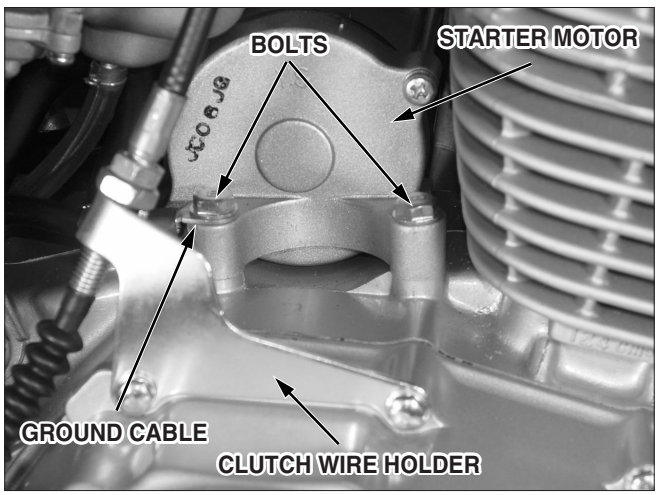


- Install and tighten the motor case bolts securely.

INSTALLATION

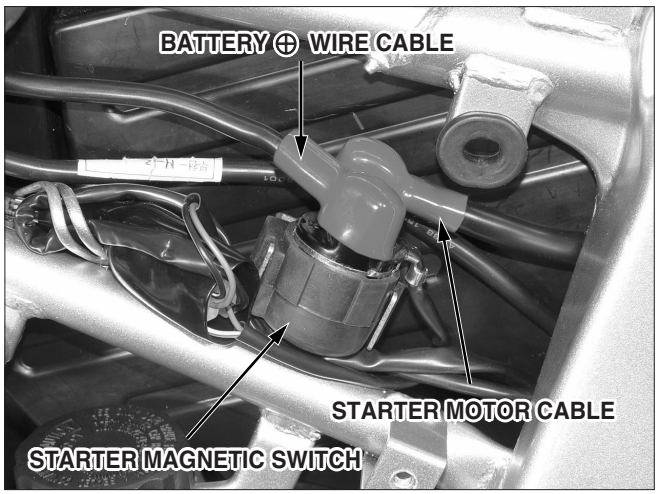


- Coat a new O-ring with oil and install it into the starter motor groove.
- Install the starter motor into the crankcase.



- Install the ground cable and mounting bolts, and tighten the bolts securely.
- Install the clutch wire holder.

- Install the starter motor cable, then tighten the terminal nut securely.
- Install the rubber cap securely.



STARTER MAGNETIC SWITCH

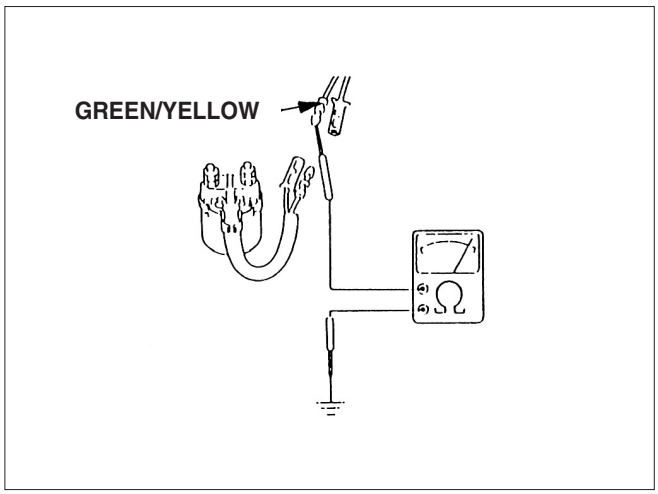
REMOVAL

- Remove the seat. (⇨12-2)
- Remove the RH. side cover. (12-2)
- Disconnect the battery ⊕ wire cable from the starter magnetic switch terminal.
- Disconnect the starter motor cable from the starter magnetic switch terrminal.
- Disconnect the Yellow/Red and Green/Yellow connector from the wire harness.
- Remove the starter magnetic switch from the bracket of the frame.

OPERATION INSPECTION

- Shift the transmission into neutral.
- Turn the ignition switch to "ON", and push the starter switch button.

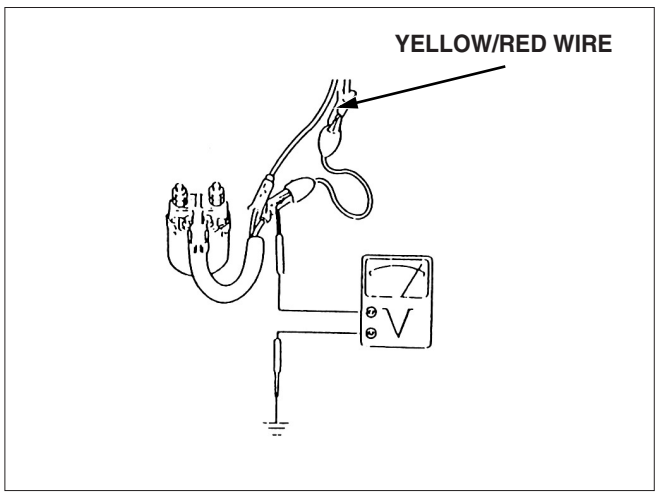
- The coil is normal if the starter magnetic switch clicks.
- If you don't hear the switch "CLICK", inspect the magnetic switch using the procedure below.



GROUND LINE INSPECTION

- Disconnect the magnetic switch connector.

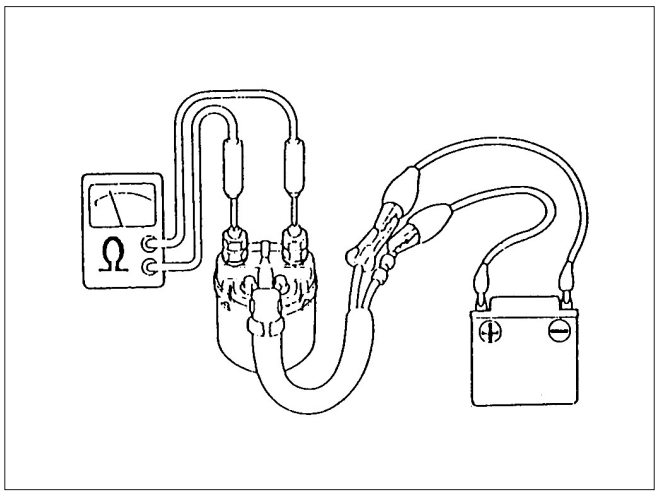
- Check for continuity between the Green/Yellow wire terminal and ground.
- There should be continuity.



STARTER MAGNETIC SWITCH VOLTAGE INSPECTION

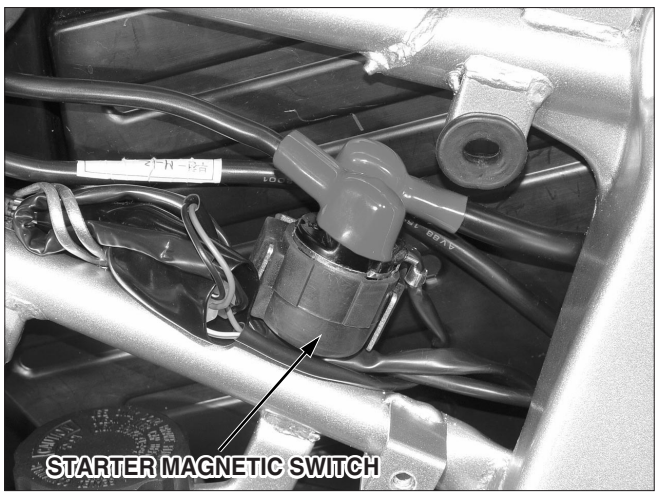
- Connect the starter magnetic switch connector.
- Shift the transmission into neutral.

- Measure the voltage between the Yellow/Red wire terminal(+) and ground (-).
- If the battery voltage appears only when the starter switch is pushed with the ignition switch to "ON", it is normal.



CONTINUITY INSPECTION

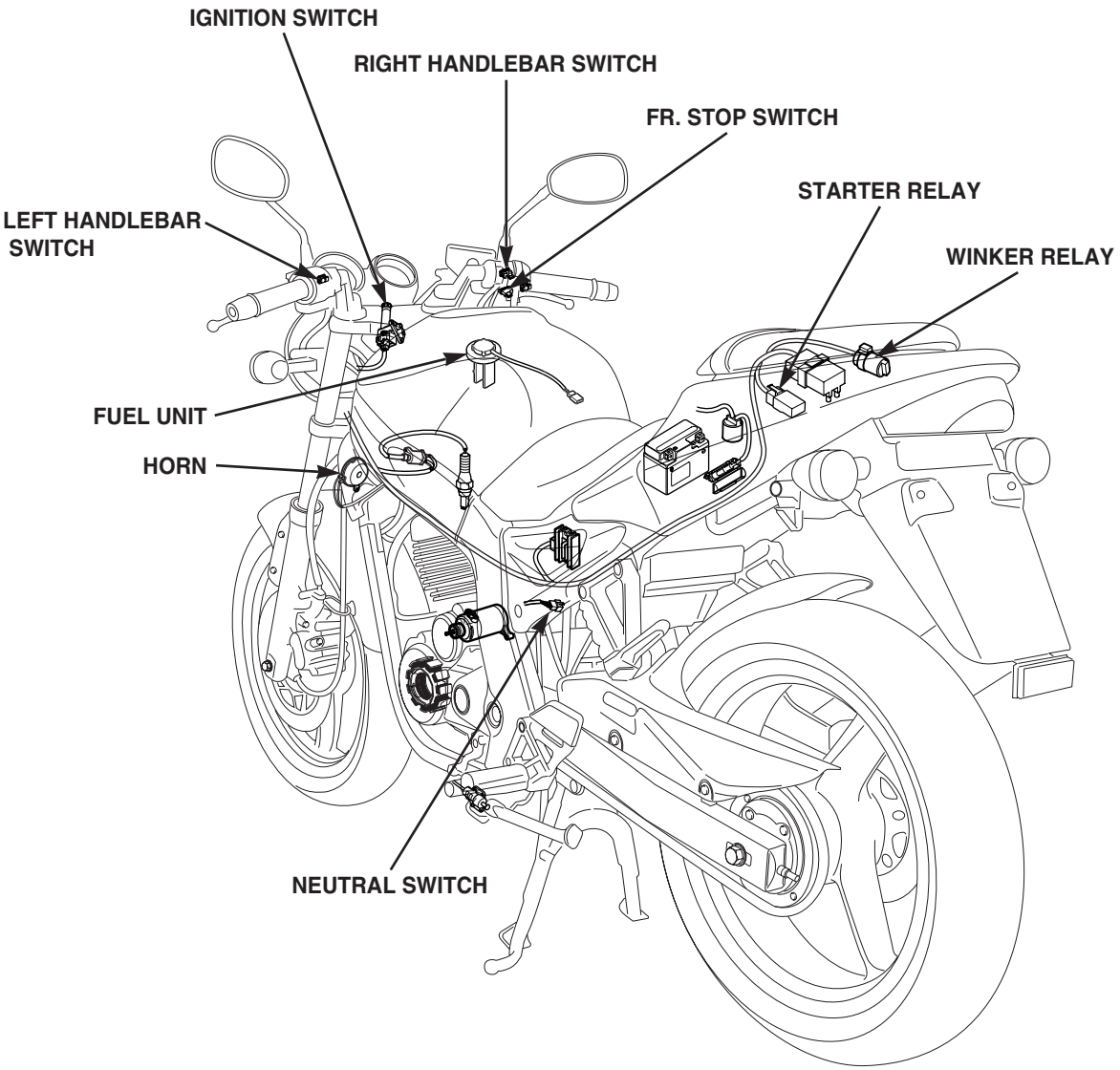
- Disconnect the wire connector of the magnetic switch.
- Connect the positive wire to the yellow/red wire terminal and the negative wire to the green/yellow wire terminal.
- There should be continuity.



INSTALLATION

- Install in the reverse order of removal.

MEMO


IGNITION SWITCH
RIGHT HANDLEBAR SWITCH
FR. STOP SWITCH
STARTER RELAY
LEFT HANDLEBAR SWITCH
WINKER RELAY
FUEL UNIT
HORN
NEUTRAL SWITCH

19. LIGHTS/METER/SWITCHES

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 terminals 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 form the connector corrosion, an ohmmeter is required to check the circuit resistance value.
- The following color codes are used throughout this section.

B = Black	Y = Yellow	L = Blue	G = Green
R = Red	W = White	Br = Brown	O = Orange
Sb = Sky Blue	Lg = Light Green	P = Pink	V = Violet
Gr = Gray			

SPECIFICATIONS

ITEM		STANDARD VALUES
BULBS	HEADLIGHT (HIGH/LOW)	12V 35W/35W
	POSITION LIGHT	12V 3W
	STOP/TAIL LIGHT	12V 21W/5W
	FRONT WINKER LIGHT	12V 10W
	REAR WINKER LIGHT	12V 10W
	WINKER INDICATOR	12V 3W
	HIGH BEAM INDICATOR	12V 3W
	NEUTRAL INDICATOR	12V 3W
FUSE		15A

TROUBLESHOOTING

Light not turned on when the main switch is ON
- Faulty light bulb
- Faulty switch
- Faulty or disconnected wiring
- Fuse cut
- Battery discharged

Dim headlight
- Battery discharged
- Wiring and switch resistance high

Headlight Hi-Low bean cannot be charged
- Faulty light bulb
- Faulty dimmer switch

Fuel meter indicator malfunctioning
- Coupler separated.
- Harness disconnected.
- Float operation malfuction.
- Fuel unit damaged.

Fuel meter needle unstable
- Coupler loose.
- Fuel unit damaged.
- Meter damaged.

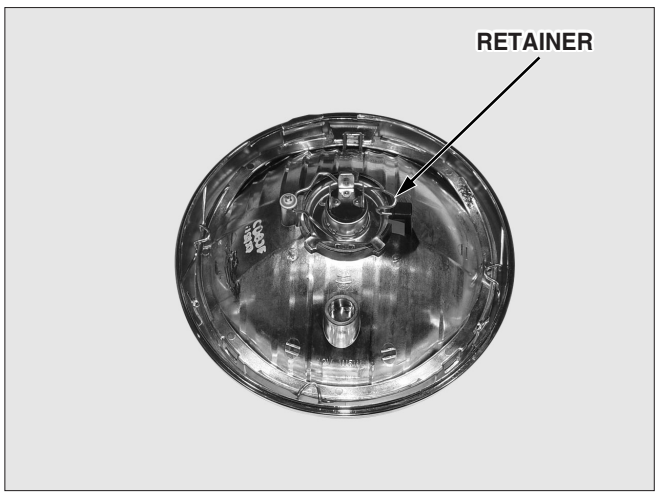
HEADLIGHT

BULB REPLACEMENT

⚠ WARNING

- Headlight bulbs become very hot while the headlight is ON, and remain hot for a while after they are turned OFF. Be sure to turn the ignition switch OFF and let the bulb cool down before replacement.

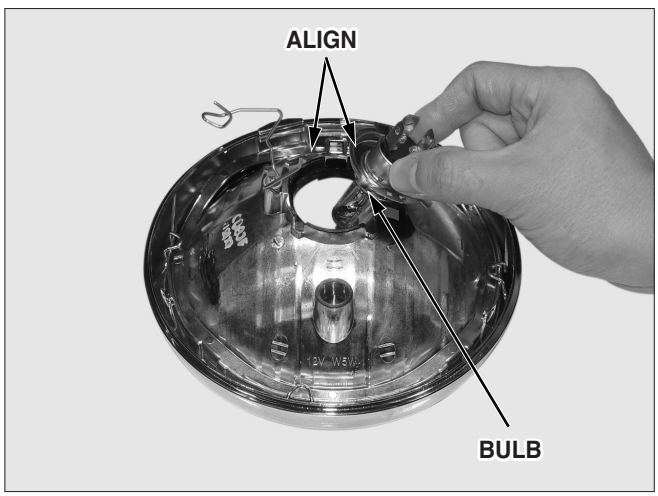
- Remove the headlight mounting screws and headlight.
- Disconnect the headlight socket.



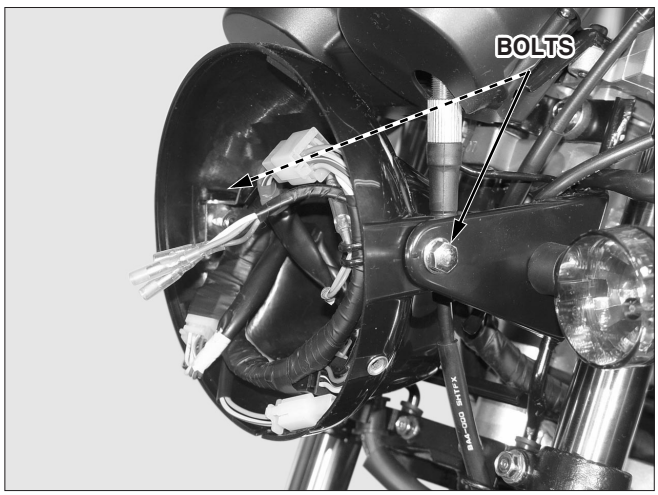
- Unhook the bulb retainer and remove the headlight bulb.

⚠ CAUTION

- If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent early bulb failure.
- Avoid touching Halogen headlight bulb. Finger prints can create hot sport that cause a bulb to break.



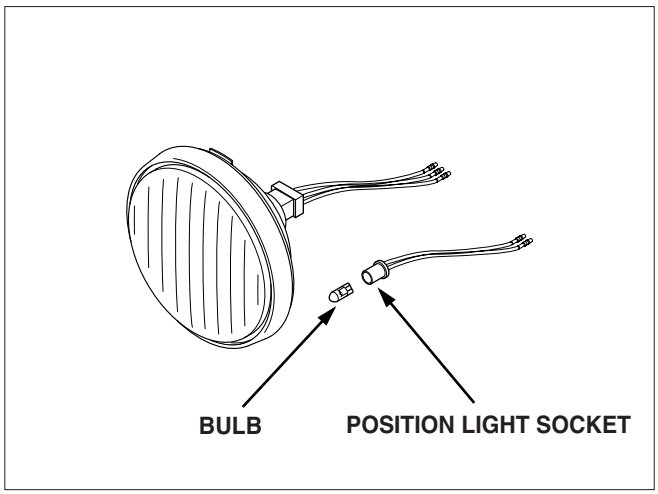
- Install the new headlight bulb aligning its tabs with the groove in the headlight unit.
- Hook the bulb retainer into the headlight unit groove.
- Connect the headlight socket.
- Install the headlight and tighten the headlight mounting screws securely.



HEADLIGHT CASE REMOVAL/INSTALLATION

- Remove the headlight case mounting bolts and headlight case from the headlight stay.
- Disconnect the all cords from the wiring.
- Remove the headlight case.

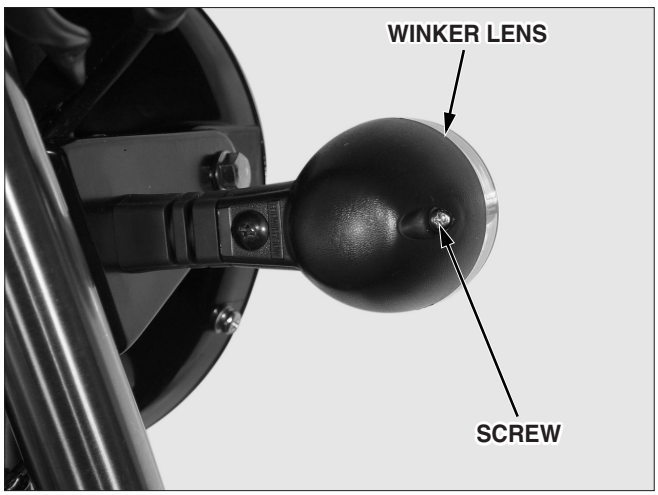
- Install in the reverse order of removal.



POSITION LIGHT

BULB REPLACEMENT

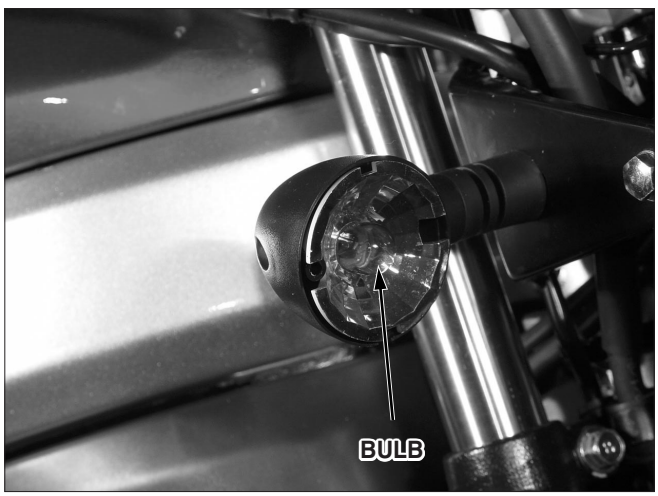
- Pull out the position light bulb socket.
- Remove the bulb from the socket, replace it with a new one.
- Install the position light bulb socket and headlight unit in the reverse order of removal.



FRONT/REAR WINKER

BULB RREPLACEMENT

- Remove the screw and winker lens.

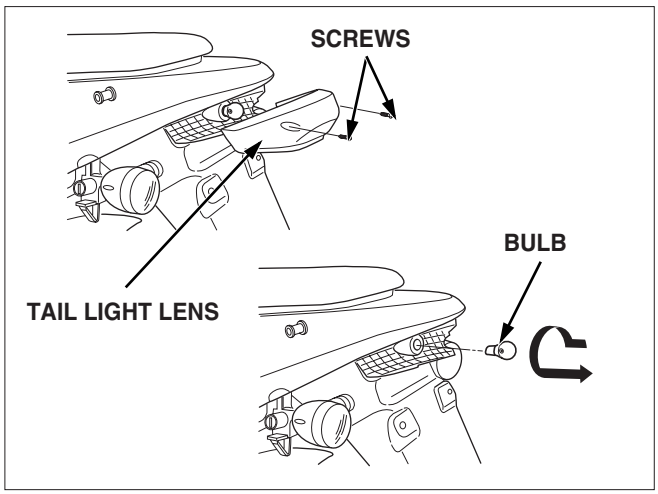


- While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.
- Install the winker lens in the reverse order of removal.

STOP/TAIL LIGHT

INSPECTION

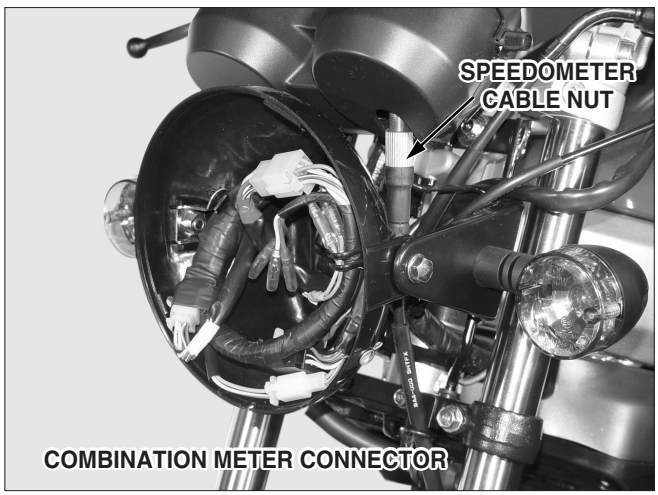
- Turn the ignition switch to "ON", and check the tail light operation.
- Check that the stop/tail light unit light on with the front brake lever and/or rear brake pedal applied.
- When ever any one does not turn on, replace the stop/tail light bulb.



BULB REPLACEMENT

- Remove the screws and tail light lens.
- Slightly press down on the bulb and turn it counterclockwise.
- Replace with a new bulb.

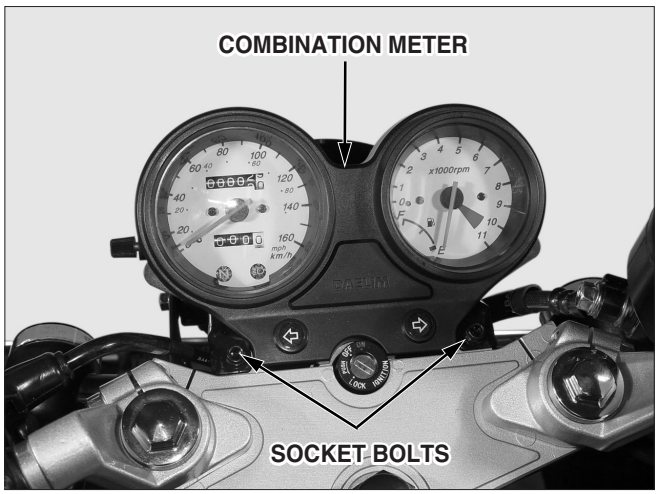
- Install in the reverse order of removal.



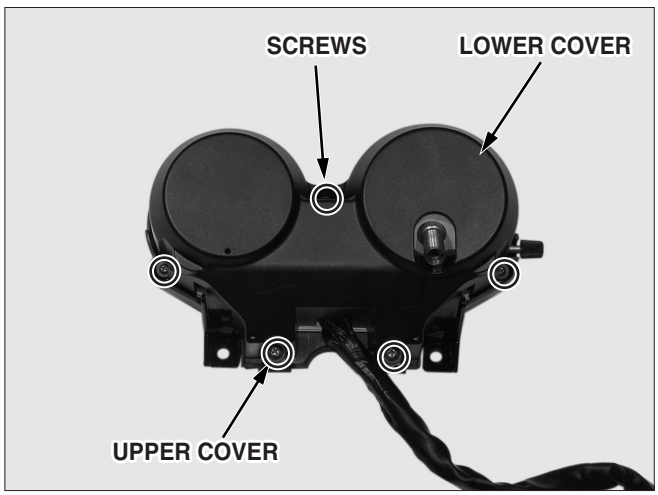
COMBINATION METER

REMOVAL

- Loosen the speedometer cable nut and remove the cable from the meter.
- Remove the headlight (⇨19-3)
- Disconnect the combination meter connector.

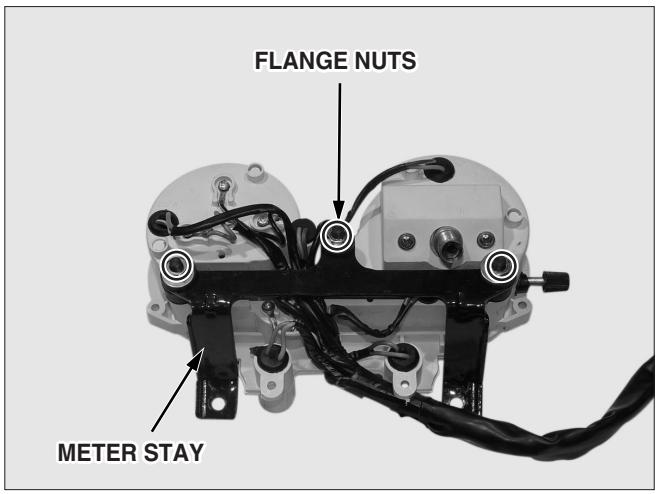


- Remove the combination meter mounting socket bolts and combination meter.



DISASSEMBLY

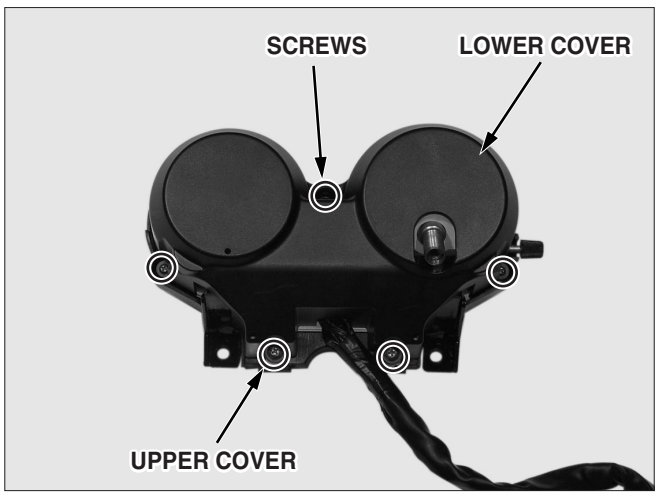
- Remove the screws and combination meter upper cover and lower cover.



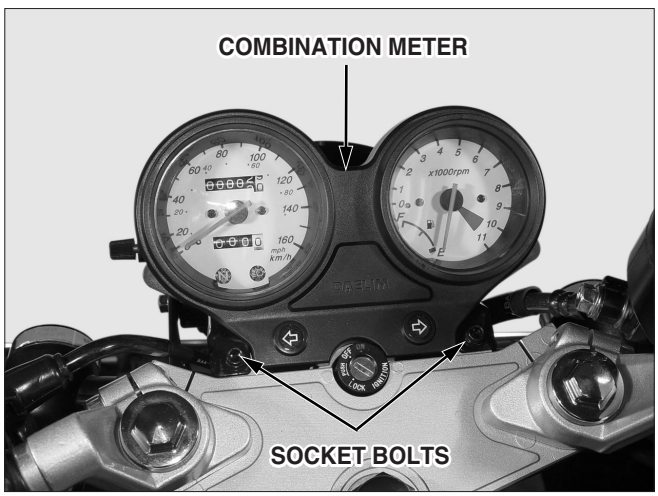
- Remove the meter stay mounting nuts.
- Remove the meter stay from the combination meter

ASSEMBLY

- Install the meter stay to the combination meter and tighten the meter stay mounting nuts securely.

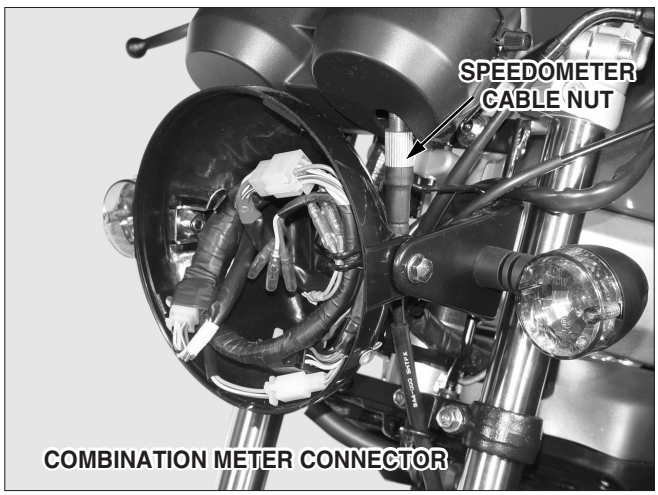


- Install the meter upper cover and lower cover, and tighten the screws securely.



INSTALLATION

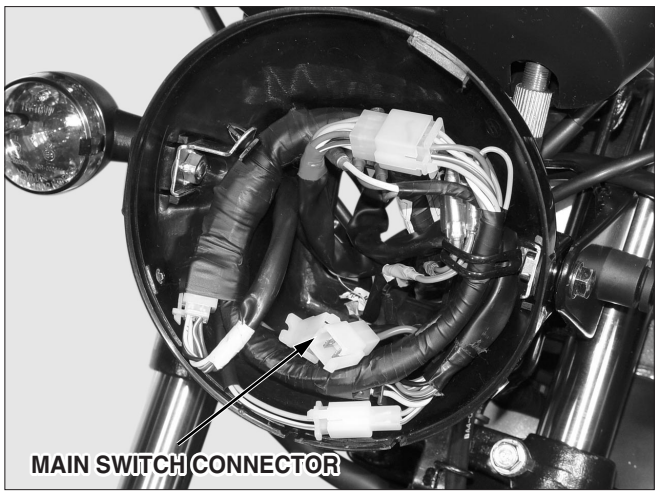
- Install the combination meter onto the fork top bridge.
- Install and tighten the mounting socket bolts.



- Connect the combination meter connector.
- Install the headlight. (⇨19-2)
- Install the speedometer cable into the meter.

⚠ NOTE

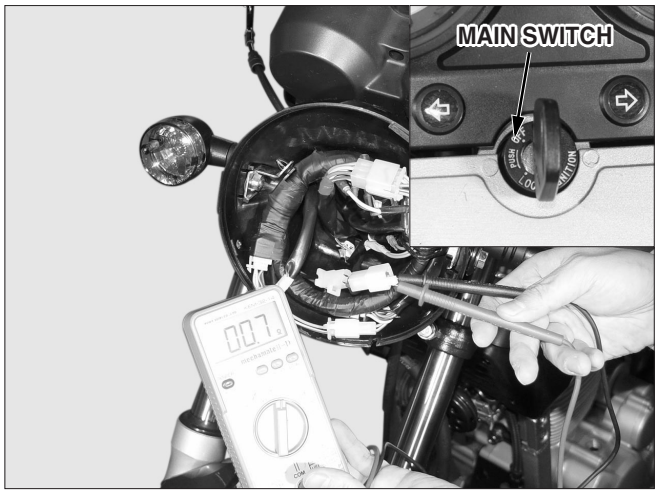
- Check the each switch for proper operation.
- The wire and cable must be connected accurately.



MAIN SWITCH

INSPECTION

- Remove the headlight. (⇨19-3)
- Disconnect the main switch wire connector.



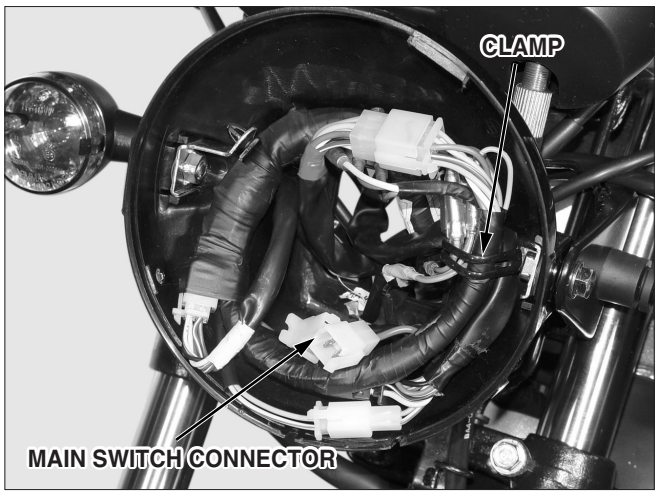
- Check for continuity between the wire terminals of the main switch connector in each switch position.
- Continuity should exist between the color coded wires as follows:

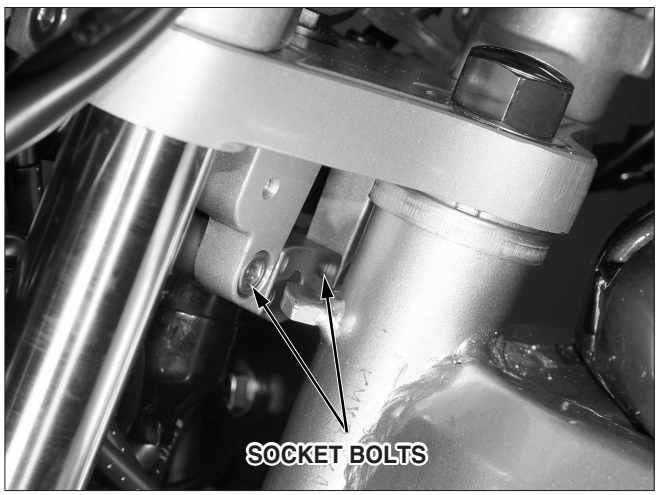
MAIN SWITCH

	BAT1	BAT2	KEY
ON	○	○	KEY ON
OFF			KEY OFF
LOCK			KEY OFF/LOCK
COLOR	R	B	-

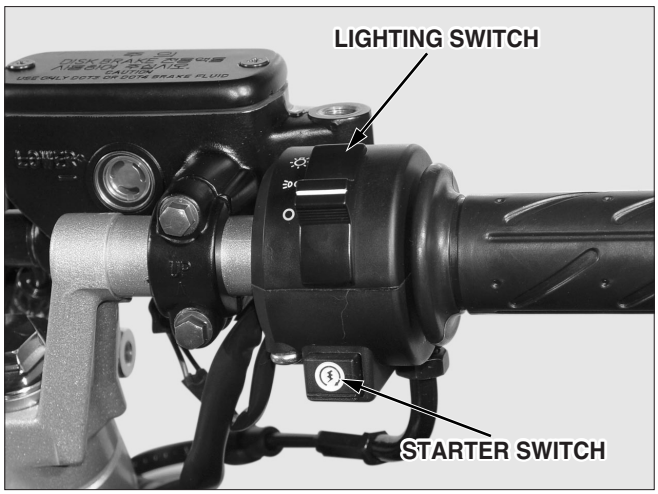
REMOVAL/INSTALLATION

- Remove the headlight (⇨19-3)
- Disconnect the main switch wire connector.
- Release the connector boot from the wire clamp.





- Remove the socket bolts and combi switch.
- Install the new main switch mounting socket bolts and tighten the bolts to the specified torque.
- Install in the reverse order of removal.



HANDLEBAR SWITCHES

- Remove the headlight. (19-3)
- Disconnect the handlebar switch connectors.
- Check for continuity between the wire terminals of the handlebar switch connector.
- Continuity should exist between the color coded wire terminals as follows:

STARTER SWITCH

	ST 1	BAT 2
FREE		
PUSH	○——	——○
COLOR	Y/R	B

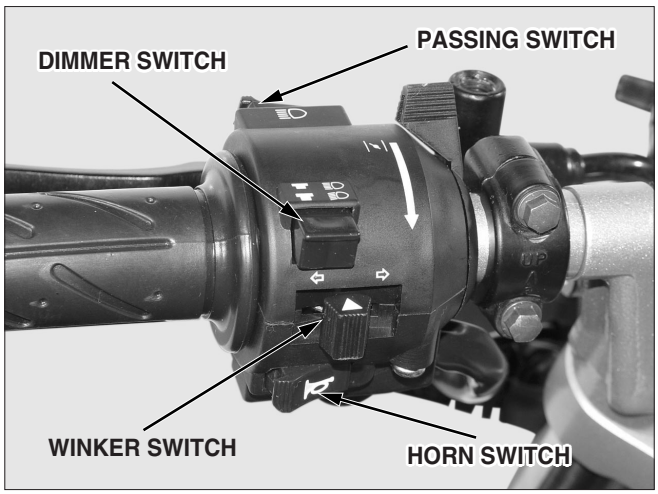
LIGHTING SWITCH

	BAT2	TL	HL
OFF			
P	○——	——○	
H	○——	——○	——○
COLOR	V	Br	Br/L

HAZARD SWITCH

(Domestic only)

	W	R	L
OFF			
HAZ	○——	——○	——○
COLOR	Gr	SB	O



WINKER SWITCH

	W	R	L
R	○——	——○	
N			
L	○——		——○
COLOR	Gr	SB	O

HORN SWITCH

	HO	BAT 2
FREE		
PUSH	○——	——○
COLOR	LG	B

DIMMER SWITCH

	BAT3	HI	LO	BAT2
Hi		○——	——	——○
(N)	○——	——○	——○	
Lo	○——	——	——○	
COLOR	B/W	L	W	B

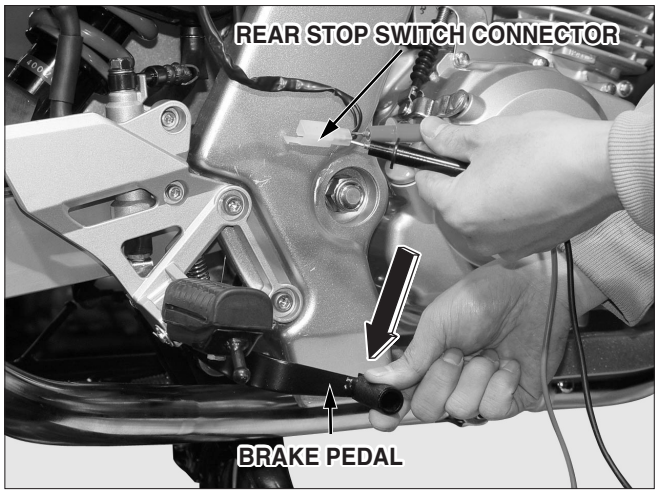
PASSING SWITCH

	BAT2	HI
Hi	○——	——○
COLOR	B	L

FRONT/REAR STOP SWITCH

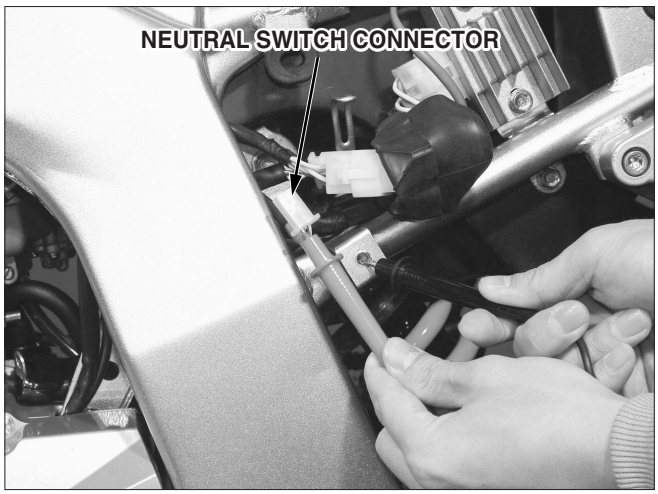
FRONT

- Disconnect the front stop switch connectors and check for continuity between the terminals.
- There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.



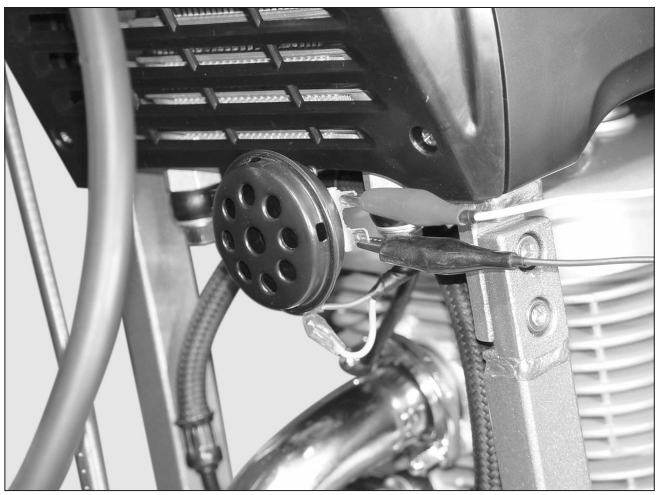
REAR

- Remove the seat (⇨12-2)
- Remove the RH. side cover. (⇨12-2)
- Disconnect the rear stop switch connector and check for continuity between the terminals.
- There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



NEUTRAL SWITCH

- Remove the seat. (12-2)
- Remove the LH. side cover. (12-2)
- Disconnect the neutral switch connector from the switch.
- Shift the transmission into neutral and check for continuity between the green/white wire terminal and ground.
- There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.



HORN

- Disconnect the wire connectors from the horn.
- Connect the 12V battery to the horn terminal directly. The horn is normal if it sounds when the 12V battery is connected acress the horn terminals.

WINKER RELAY

- Remove the rear seat. (⇨12-2)
- Check the following:
  - Battery condition
  - Burned bulbs
  - Burned fuse
  - Main switch and winker switch function
  - Loose connectors

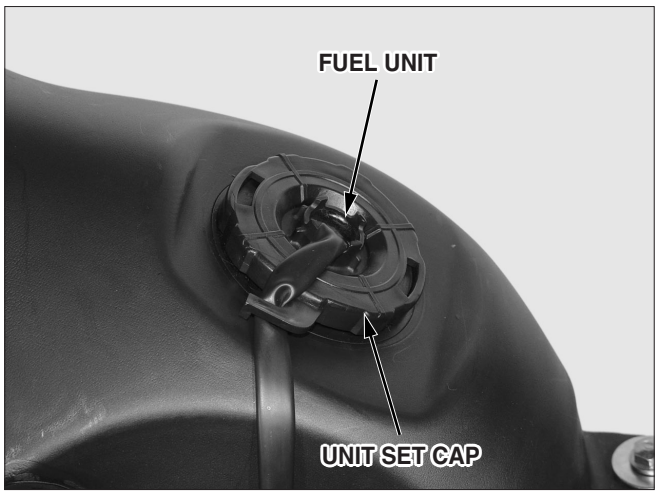
- If the above items are all normal, check the following:

1. Short the Black and Gray terminals of the winker relay connector with a jumper wire.

Start the engine and check the winker light by turning the switch to ON.

- Light comes on
- Light does not come on
  - • Broken wire harness

- • Faulty winker relay
- • Poor connection of the connector



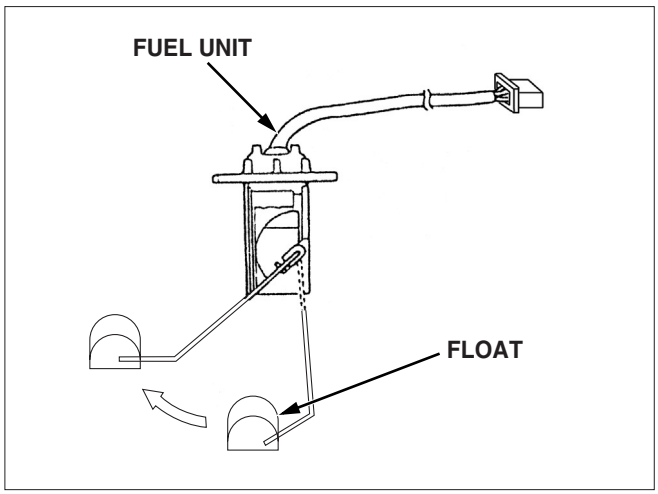
FUEL UNIT

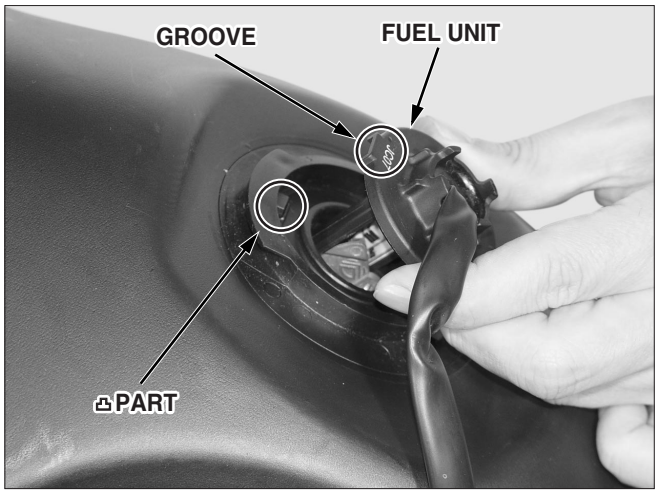
REMOVEL

- Remove the seat. (⇨12-2)
- Remove the fuel tank cover. (⇨4-3)
- Remove the LH. side cover. (⇨12-2)
- Disconnect the fuel unit coupler.
- Remove the unit set cap and remove the fuel unit from the fuel tank.
- Remove the base packing.

⚠ NOTE

- Be careful not to damage the wire.
- Be careful not to damage the float arm.
- Check the base packing for damage.





INSPECTION

- Move the float upward and downward, and measure the resistance between the terminals.

Unit : Ω, (20℃)

WIRE TERMINAL	FLOAT UPPER LINE	FLOAT LOWER LINE
GREEN AND YELLOW/WHITE	30~36	400~750
GREEN AND BLUE/WHITE	400~700	140~160
BLUE/WHITE AND BLUE/WHITE	450~750	450~750

- When the measured value differs greatly from the standard value, replace the fuel unit.

INSTALLATION

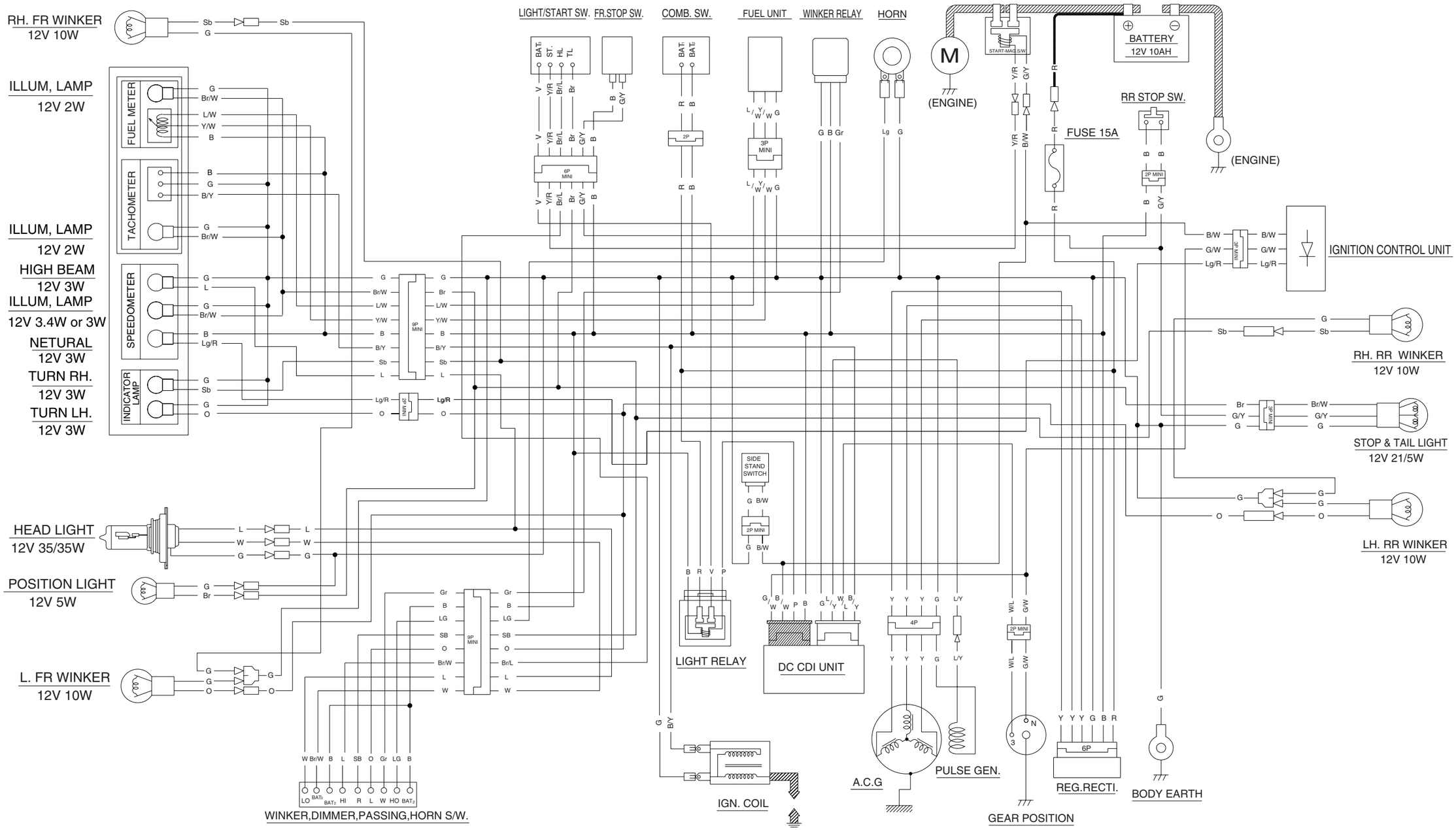
- Install the base packing
- Install the fuel unit aligning its groove with the ⏃part of the fuel tank.
- Install the unit set cap.
- Connect the fuel unit coupler.
- Install the LH.side cover.
- Install the fuel tank cover.
- Install the seat.

⚠ NOTE

• Check the fuel leakage.

MEMO

20. WIRING DIAGRAM



COMB. SW.		
	BAT_1	BAT_2
ON	○	○
OFF		
LOCK		
COLOR	R	B

START		
	ST	BAT_2
FREE		
PUSH	○	○
COLOR	Y/R	B

WINKER			
	W	R	L
R	○	○	
N			
L	○		○
COLOR	Gr	Sb	O

HORN		
	Ho	BAT_2
FREE		
PUSH	○	○
COLOR	Lg	B

DIMMER				
	BAT_3	Hi	Lo	BAT_2
Hi		○	○	
(N)	○	○	○	
Lo	○		○	
COLOR	B/W	L	W	B

PASSING		
	BAT_2	Hi
Hi	○	○
COLOR	B	L

SIDE STAND SW.		
	E	CDI
FREE	○	○
STAND		
COLOR	G	B/W

LIGHTING			
	BAT_3	TL	HL
OFF			
P	○		
H	○	○	○
COLOR	V	Br	Br/L

B	BLACK	V	VIOLET
Y	YELLOW	Br	BROWN
L	BLUE	O	ORANGE
G	GREEN	Sb	SKY BLUE
R	RED	Lg	LIGHT GREEN
W	WHITE	P	PINK
Gr	GRAY		

COLOR COMB : GROUND/MARKING

21. TROUBLESHOOTING

ENGINE WON'T START OR IS HARD TO START

INSPECTION → **CAUSE OF TROUBLE**

1. Check fuel flow to carburetor.
   - Fuel not supplied to the carburetor →
     - ● Fuel tank empty.
     - ● Clogged fuel tube or fuel filter.
     - ● Sticking float valve.
     - ● Clogged fuel tank cap hole.
   - Fuel is supplied ↓

2. Check the spark plug.
   - Weak or no spark →
     - ● Faulty spark plug.
     - ● Contaminated spark plug.
     - ● Faulty CDI unit.
     - ● Disconnected or shorted high tension wires.
     - ● Faulty pulse generator.
     - ● Faulty main switch.
   - Good spark ↓

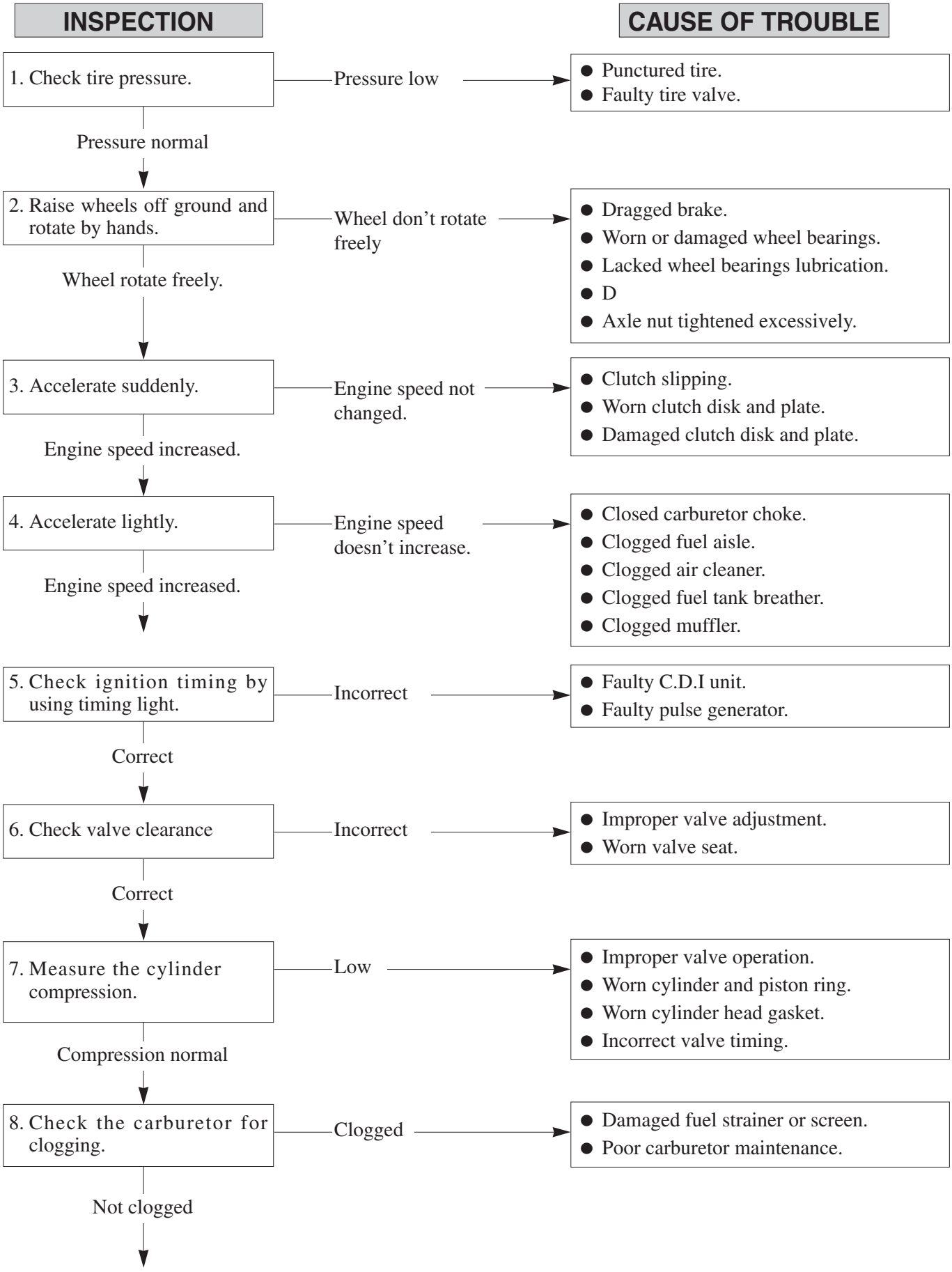
3. Test cylinder compression.
   - Low compression →
     - ● Low speed of starter crank.
     - ● Incorrect valve clearance.
     - ● Faulty valve seat.
     - ● Worn cylinder and piston rings.
     - ● Seized valve.
     - ● Improper valve timing.
   - Compression normal ↓

4. Start by following normal procedure.
   - Engine starts but stops. →
     - ● Improper chock valve operation.
     - ● Improper chock cable free play.
     - ● Carburetor incorrectly adjusted.
     - ● Improper ignition timing. (Faulty CDI unit or pulse generator.)
     - ● Fuel contaminated.
     - ● Lean fuel mixture.
   - Engine does not start. ↓

5. Remove and inspect spark plug.
   - Wet plug →
     - ● Carburetor flooded.
     - ● Throttle valve open.
     - ● Choke closed.
     - ● Air cleaner dirty.
     - ● Rich fuel mixture.
   - Dry plug ↓

6. Close the choke and start engine again.

ENGINE LACKS POWER



INSPECTION		CAUSE OF TROUBLE
9. Check the spark plug.	Contaminated or discolored	● Lean fuel mixture. ● Using spark plug with on incorrect heat range.
Not contaminated or not discolored.		
10. Check oil level.	Level low or high	● Oil level too high. ● Oil level too low. ● Contaminated oil.
Level normal		
11. Remove cylinder head 30mm hole cap, and inspect lubrication.	Valve train lubricated improperly.	● Oil level too low. ● Contaminated oil. ● Faulty oil pump. ● Clogged oil passage.
Valve train lubricated properly.		
12. Check for engine overheating.	Overheated	● Excessive carbon build-up in combustion chamber. ● Poor quality fuel being used. ● Lean fuel mixture. ● Clutch slipping.
Not overheated.		
13. Accelerate or run at high speed.	Engine knocking	● Worn piston ring and cylinder. ● Lean fuel mixture. ● Excessive carbon build-up in cambustion chamber. ● Incorrect ignition timing.
Engine does not knocking.		

POOR PERFORMANCE (AT LOW AND IDLE SPEED)

INSPECTION		CAUSE OF TROUBLE
1. Check ignition timing and valve clearance.	Incorrect	● Incorrect valve clearance. ● Faulty C.D.I unit. ● Faulty pulse generator.
Correct		
2. Check carburetor air screw adjustment.	Incorrect	● Lean fuel mixture (Tighten screw to correct adjustment level) ● Rich fuel mixture (Loosen screw to correct adjustment level)
Correct		
3. Check inlet pipe for leakage.	Leaking	● Faulty insulator O-ring. ● Loose carburetor.
No leak		
4. Check sparks.	Weak or intermittent sparks	● Carbon depasited on spark plug or spark plug contaminated.
Sparks normal.		

POOR PERFORMANCE(AT HIGH SPEED)

INSPECTION		CAUSE OF TROUBLE
1. Check the ignition timing and valve clearance.	Incorrect.	● Faulty valve clearance adjustment. ● Faulty CDI unit. ● Faulty pulse generator.
Correct.		
2. Disconnect fuel tube at carburetor.	Fuel flows restricted.	● No fuel to fuel tank. ● Carburetor choke closed. ● Clogged fuel tube. ● Clogged fuel tank cap hole. ● Clogged fuel strainer or screen.
Fuel flows freely.		
3. Remove the carburetor and check for clogged jets.	Clogged.	● Damaged fuel strainer or screen.
No clogged.		
4. Check valve timing	Incorrect.	● Cam sprocket not installed properly.
Correct.		
5. Check valve spring tension.	Weak.	● Faulty valve spring.

POOR HANDLING

INSPECTION	CAUSE OF TROUBLE
1. If steering is heavy.	● Too tight steering top thread. ● Damaged steering bearings.
2. If either wheel is wobbling	● Excessive wheel bearing play. ● Bent rim. ● Improperly installed wheel hub. ● Worn rear fork pivot bush. ● Bent frame. ● Rear fork pivot adjusting bolt is too tight.
3. If the motorcycle pulled to one side.	● Front and rear wheels are not aligned. ● Bent front fork. ● Bent rear fork.

POOR FRONT/REAR SUSPENSION PERFORMANCE

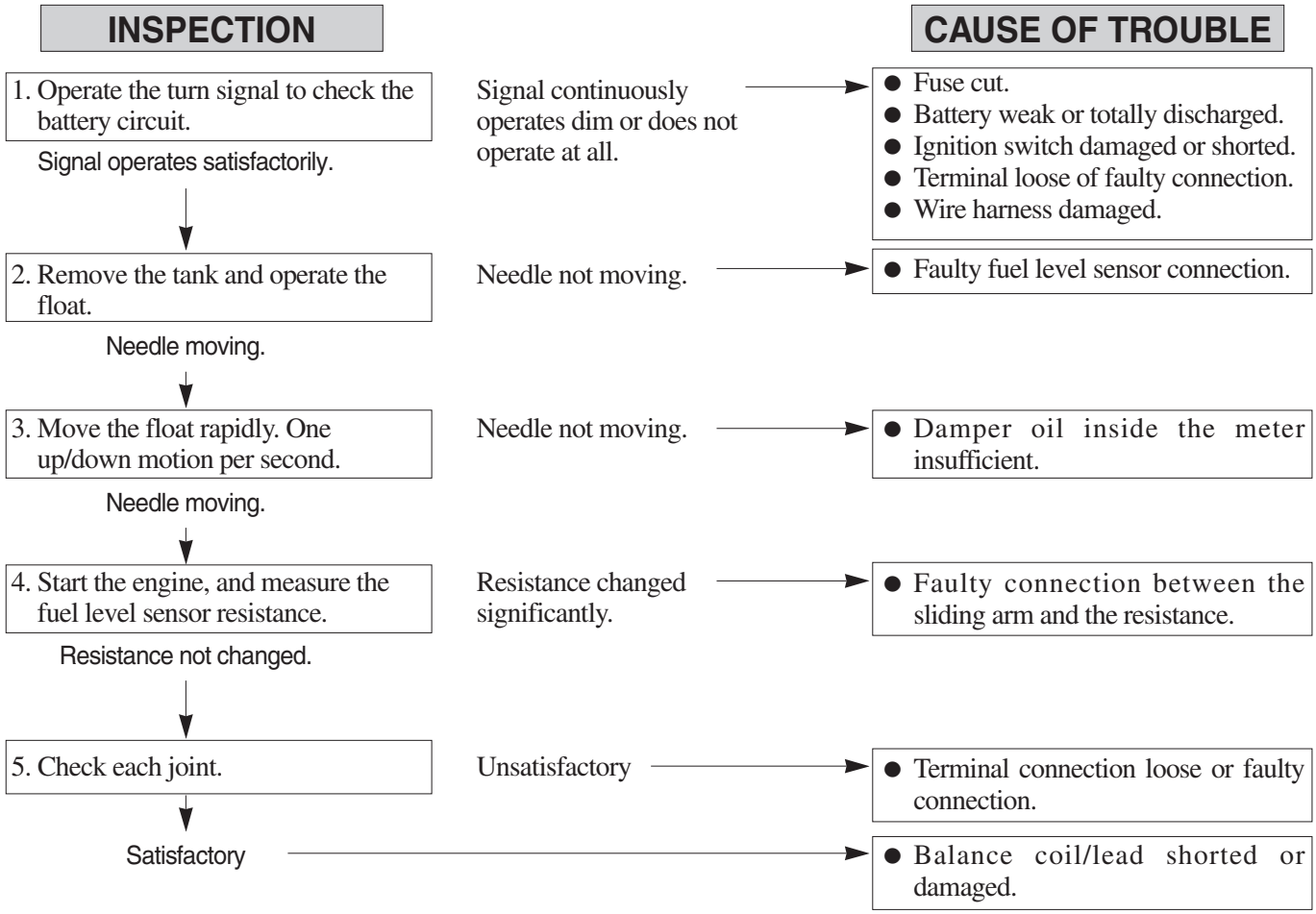
INSPECTION	CAUSE OF TROUBLE
1. Suspension excessively soft.	● Cushion spring weak. ● Overloaded. ● Damper oil leaks.
2. Suspension excessively hard.	● Fork pipe or cushion rod bent.
3. Noise from the suspension.	● Sliders stuck. ● Cushion stopper rubber damaged.

FUEL GAUGE

GAUGE READING INACCURATE (IGNITION SWTICH ON)

INSPECTION		CAUSE OF TROUBLE
1. Operate the turn signal to check the battery circuit.	Signal continuously operates dim or does not operate at all.	● Fuse cut. ● Battery weak or totally discharged. ● Faulty ignition swtich. ● Faulty terminal connection. ● Wire harness damaged.
Signal operates satisfactorily.		
2. Remove the fuel level sensor, and move float to check the status of operation. **Float up : Full position** **Float down : Empty position**	Needle moves.	● Faulty float.
Needle not moving.		
3. Short-circuit the tank unit terminal on the wire harness side.	Needle not moving.	● Balance coil damaged or shorted.
Needle not moving.		
4. Terminal joints loose or faulty connection.	Unsatisfactory	● Terminal loose. ● Faulty terminal connection.
Check		● Balance coil/lead shorted or damaged.

GAUGE NEEDLE SHAKES OR VERTICALLY WOBBLES. (IGNITION SWTICH ON)



MEMO

MEMO

ROADWIN SERVICE MANUAL

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