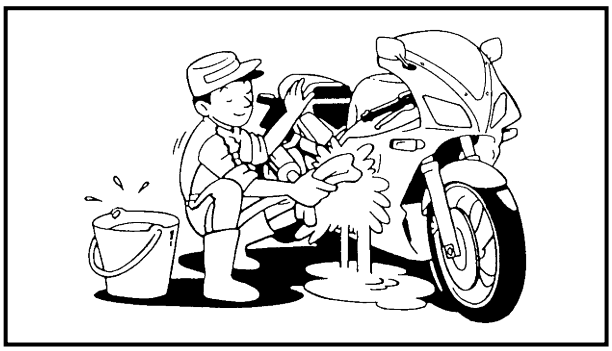
YAMAHA

YZF-R1 '98

4XV1-AE1

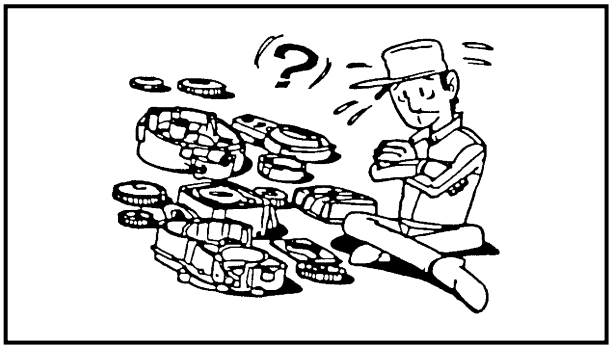
SERVICE MANUAL



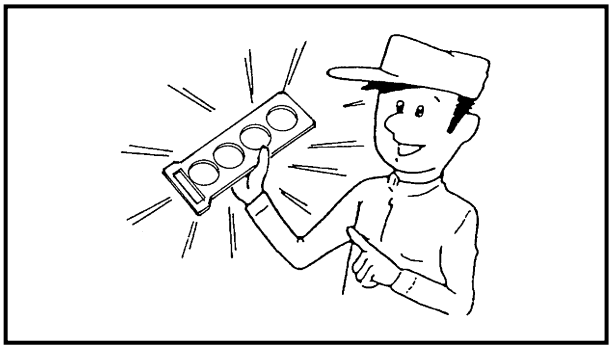
EB102000
IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust, and foreign material.



2. Use only the proper tools and cleaning equipment.
   Refer to "SPECIAL TOOLS".
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.
4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.



EB102010
REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

EB102020
GASKETS, OIL SEALS AND O-RINGS

1. When overhauling the engine, replace all gaskets, seals, and O-rings. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.

SPECIFICATIONS

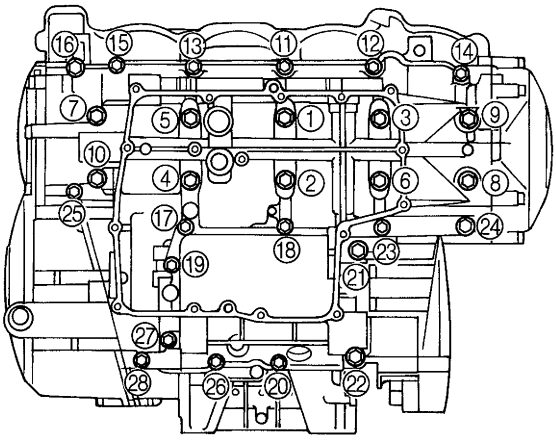
GENERAL SPECIFICATIONS

Item	Standard	Limit
Dimensions		
Overall length	2,035 mm (except for N, S, SF)	----
	2,095 mm (for N, S, SF)	----
Overall width	695 mm	----
Overall height	1,095 mm	----
Seat height	815 mm	----
Wheelbase	1,395 mm	----
Minimum ground clearance	140 mm	----
Minimum turning radius	3,400 mm	----
Weight		
Wet (with oil and a full fuel tank)	198 kg	----
Dry (without oil and fuel)	177 kg	----
Maximum load (total of cargo, rider, passenger, and accessories)	197 kg	----

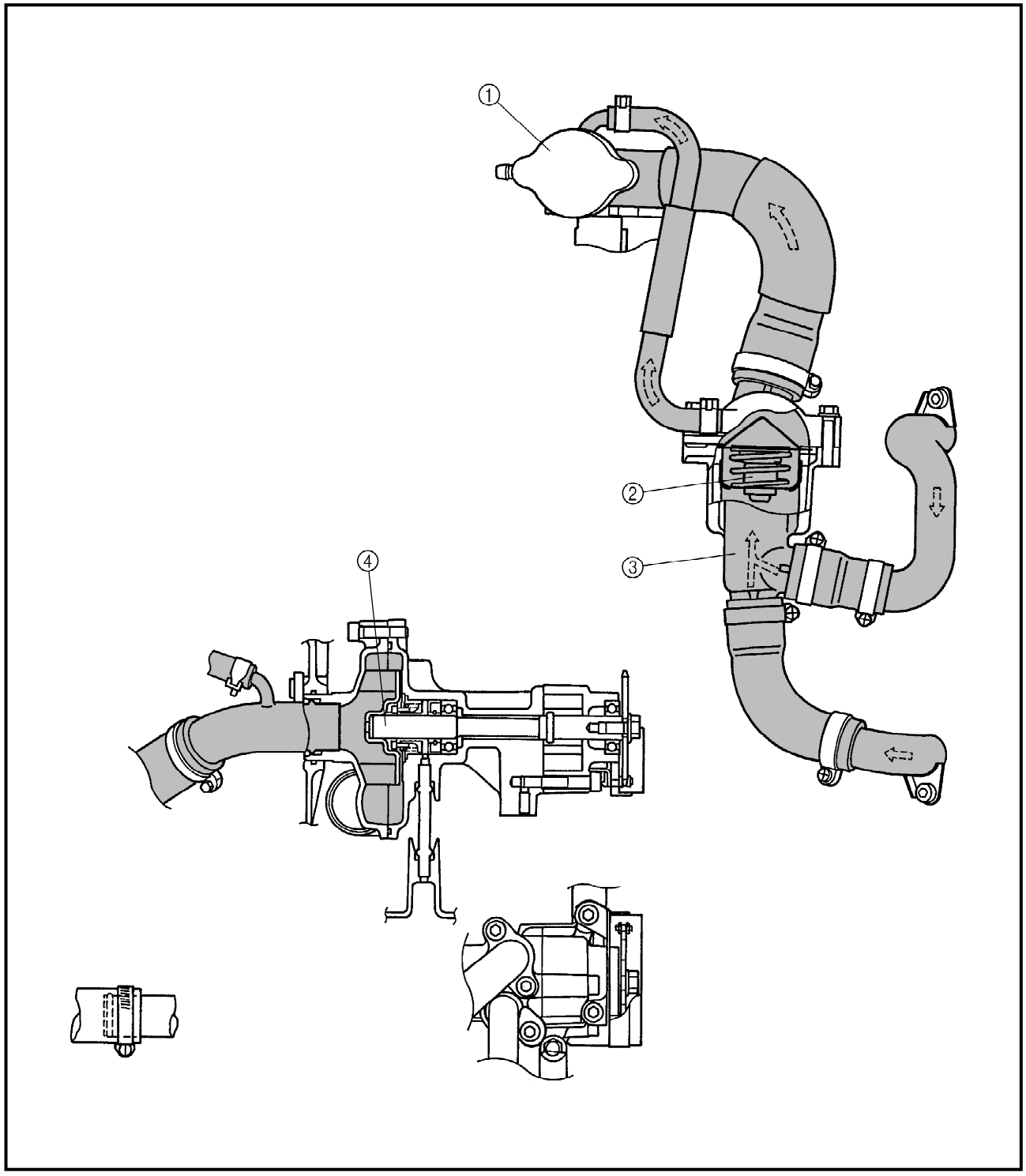
CHASSIS SPECIFICATIONS

Item	Standard	Limit
Frame		
Frame type	Diamond	----
Caster angle	24°	----
Trail	92 mm	----
Front wheel		
Wheel type	Cast wheel	----
Rim		
Size	17 × MT3.50	----
Material	Aluminum	----
Wheel travel	135 mm	----
Wheel runout		
Max. radial wheel runout	----	1 mm
Max. lateral wheel runout	----	0.5 mm
Rear wheel		
Wheel type	Cast wheel	----
Rim		
Size	17 × MT6.00	----
Material	Aluminum	----
Wheel travel	130 mm	----
Wheel runout		
Max. radial wheel runout	----	1 mm
Max. lateral wheel runout	----	0.5 mm
Front tire		
Tire type	Tubeless	----
Size	120/70 ZR17 (58W)	----
Model (manufacturer)	MEZ3 FRONT (METZELER) (for GB) TX15 (MICHELIN) (for N, D, NL, B, E, P, I, GR)	----
Tire pressure (cold)		
0 ~ 90 kg	250 kPa (2.5 kg/cm^2, 2.5 bar)	----
90 ~ 197 kg	250 kPa (2.5 kg/cm^2, 2.5 bar)	----
High-speed riding	250 kPa (2.5 kg/cm^2, 2.5 bar)	----
Min. tire tread depth	----	1.6 mm

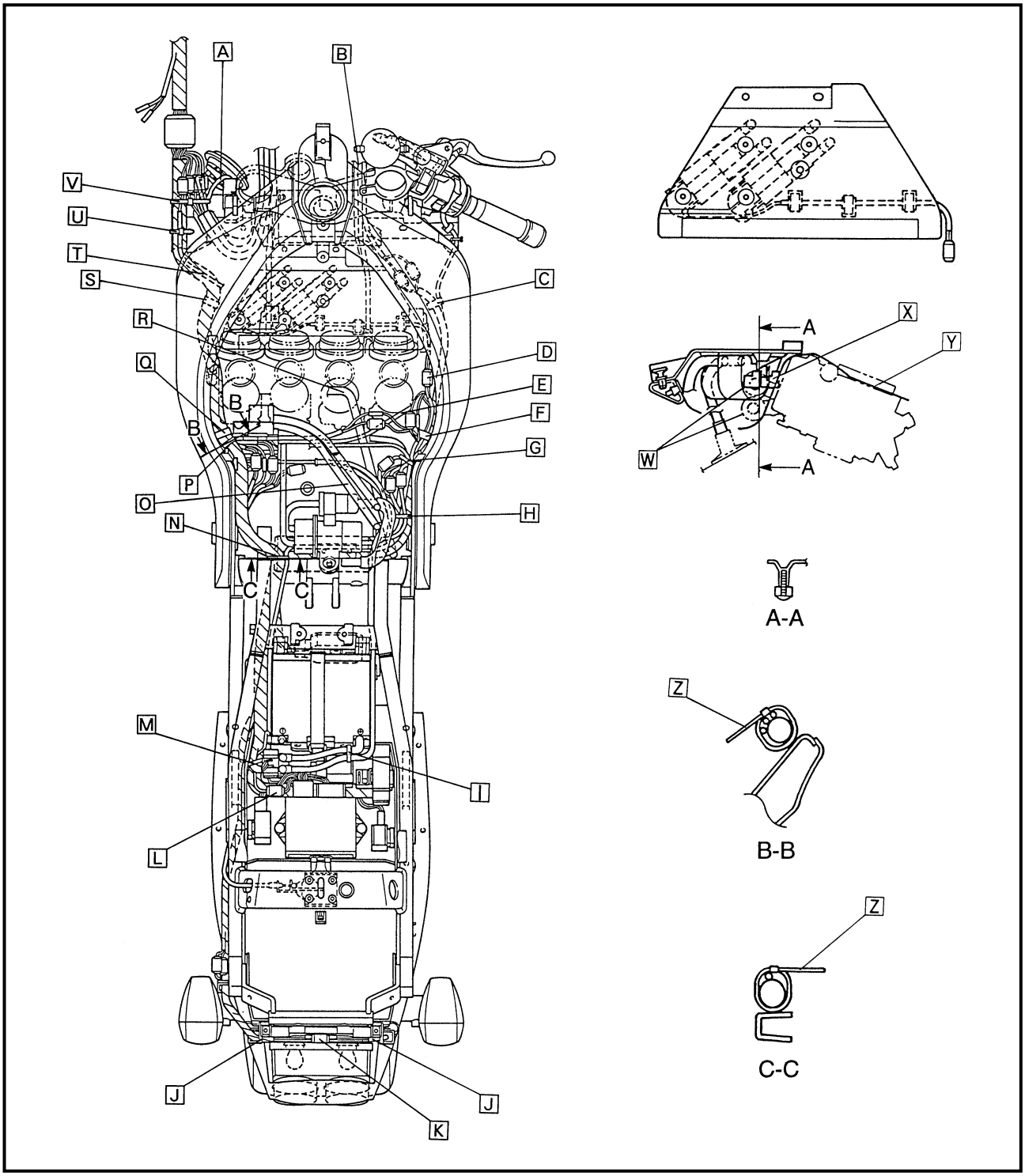
Crankcase tightening sequence:



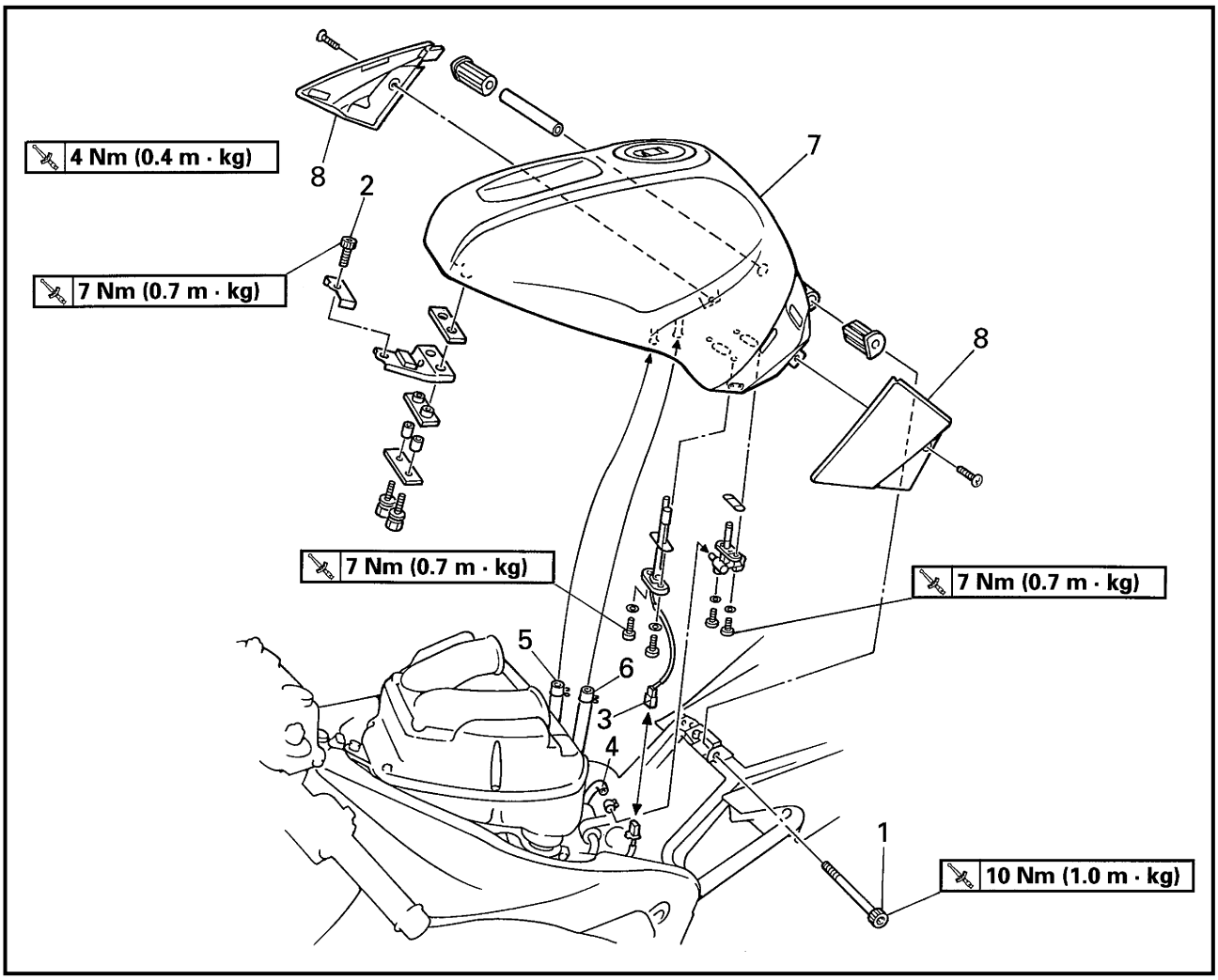
① Radiator cap
② Thermostat
③ Thermostat housing
④ Water pump



[J] Route the wire harness and turn signal leads under the rear cowling mounting post on the tail/brake light bracket.
[K] Insert the tail/brake light coupler and turn signal leads between the tail/brake light and tail/brake light bracket.
[L] Position the ground coupler over the oil level relay lead.
[M] Fasten the starter relay lead, ground lead, and wire harness with a plastic locking tie.
[N] Fasten the battery negative lead and wire harness with a plastic locking tie.
[O] Route the fuel tank overflow hose and fuel tank breather hose in front of the crankcase breather hose and under the fuel hose and EXUP servomotor.
[P] Fasten the sidestand switch lead, engine oil level switch lead, generator lead, and wire harness with a plastic locking tie.



EB302010
FUEL TANK



Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS".
1	Bolt		
2	Bolt		
3	Fuel sender coupler		Disconnect.
4	Fuel hose		**NOTE:** Before disconnecting the fuel hose, set the fuel cock to "OFF".
5	Fuel tank overflow hose	1	
6	Fuel tank breather hose	1	
7	Fuel tank	1	
8	Fuel tank side panel	2	
			For installation, reverse the removal procedure.

g. Measure the valve clearance again.

h. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

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7. Install:
   • all removed parts

NOTE:
For installation, reverse the removal procedure. Note the following points.

8. Install:
   • timing chain guide (exhaust side)
   • timing chain tensioner
   • pickup coil rotor cover
   • cylinder head cover
   • spark plugs
   Refer to “CAMSHAFTS” in chapter 4.

EB303010
SYNCHRONIZING THE CARBURETORS

NOTE:
Prior to synchronizing the carburetors, the valve clearance and the engine idling speed should be properly adjusted and the ignition timing should be checked.

1. Stand the motorcycle on a level surface.

NOTE:
Place the motorcycle on a suitable stand.

2. Remove:
   • rider seat
   • fuel tank
   • Refer to “SEATS” and “FUEL TANK”.

Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	**Diagnosis**
Higher than without oil	**Piston wear or damage → Repair.**
Same as without oil	**Piston ring(-s), valve(-s), cylinder head gasket or piston possibly defective → Repair.**

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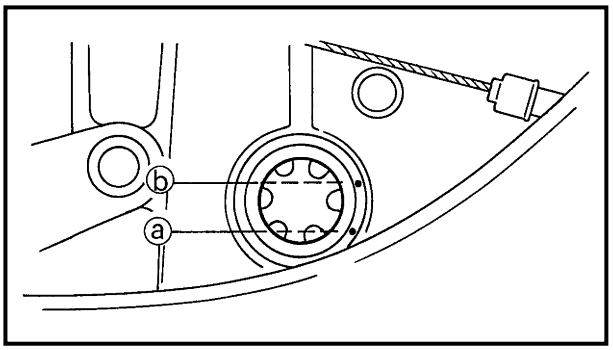
7. Install:
   • spark plug — **13 Nm (1.3 m · kg)**

EB303070
CHECKING THE ENGINE OIL LEVEL

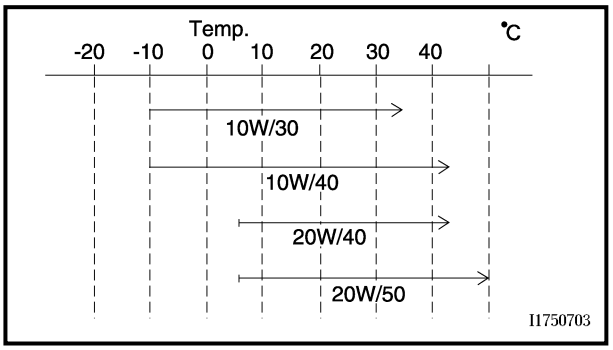
1. Stand the motorcycle on a level surface.

NOTE:
- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.

2. Start the engine, let it idle for several minutes, and then stop it.



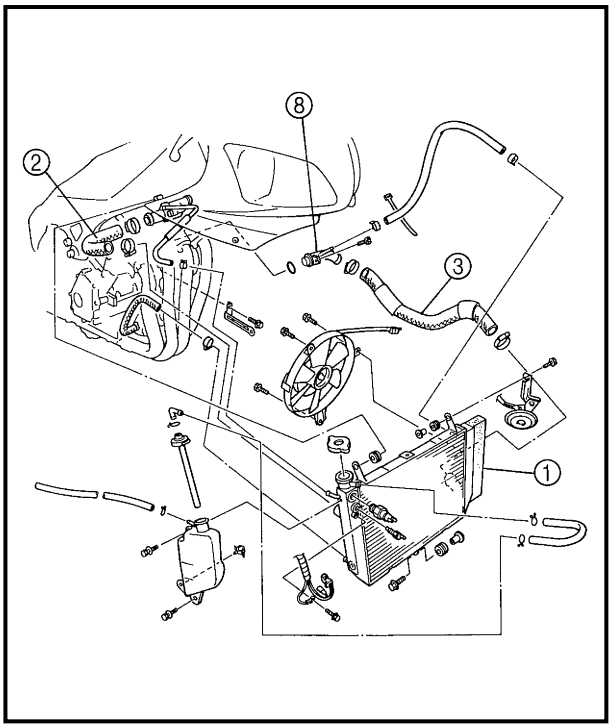
3. Check:
   • engine oil level
   The engine oil level should be between the minimum level mark ⓐ and maximum level mark ⓑ.
   Below the minimum level mark → Add the recommended engine oil to the proper level.

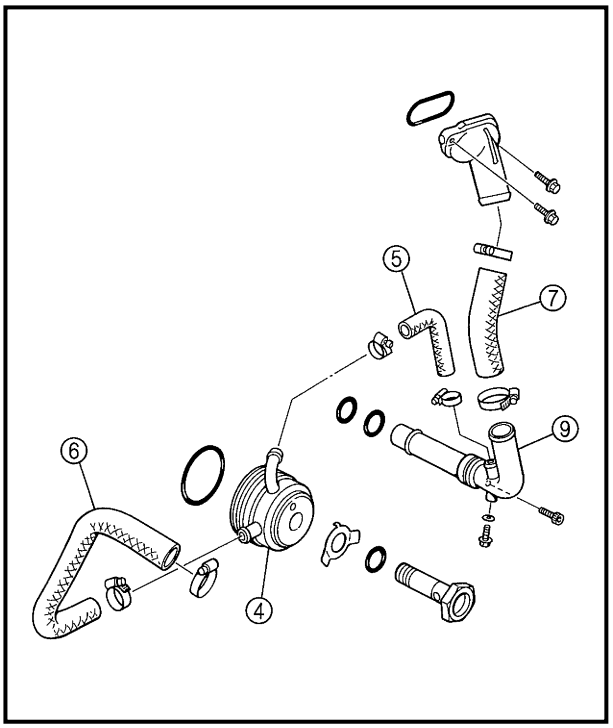


Recommended oil
Refer to the chart for the engine oil grade which is best suited for certain atmospheric temperatures.
API standard
SE or higher grade
(Non-Friction modified)

3. Start the engine, warm it up for several minutes, and then turn it off.
4. Check:
   • coolant level

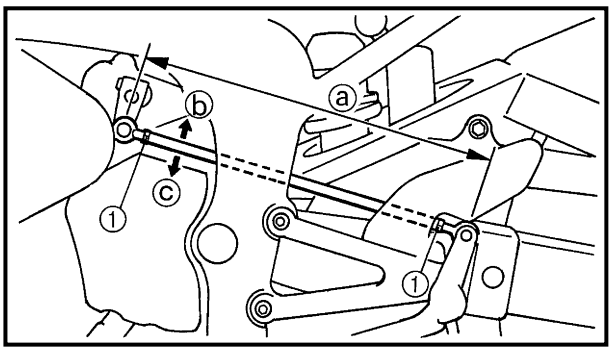
NOTE:
Before checking the coolant level, wait a few minutes until the coolant has settled.





EB303230
CHECKING THE COOLING SYSTEM

1. Remove:
   • bottom cowling
   • side cowlings
   Refer to "COWLINGS".
2. Check:
   • radiator ①
   • radiator inlet hose ②
   • radiator outlet hose ③
   • oil cooler ④
   • oil cooler inlet hose ⑤
   • oil cooler outlet hose ⑥
   • water jacket joint inlet hose ⑦
   • water pump inlet pipe ⑧
   • water pump outlet pipe ⑨
   Cracks/damage → Replace.
   Refer to "COOLING SYSTEM" in chapter 5.
3. Install:
   • side cowlings
   • bottom cowling
   Refer to "COWLINGS".



EB304081
ADJUSTING THE SHIFT PEDAL

NOTE:
The shift pedal position is determined by the installed shift rod length ⓐ.

1. Measure:
   • installed shift rod length ⓐ
   Incorrect → Adjust.

	Installed shift rod length 305 mm

2. Adjust:
   • installed shift rod length ⓐ

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a. Loosen both locknuts ①.

b. Turn the shift rod ② in direction ⓑ or ⓒ to obtain the correct shift pedal position.

Direction ⓑ	**Installed shift rod length increases.**
Direction ⓒ	**Installed shift rod length decreases.**

c. Tighten both locknuts.

d. Make sure that the installed shift rod length is within specification.

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EB304092
ADJUSTING THE DRIVE CHAIN SLACK

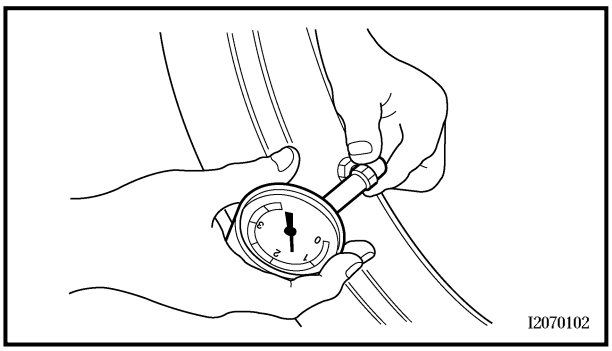
NOTE:
The drive chain slack must be checked at the tightest point on the chain.

CAUTION:
A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

1. Stand the motorcycle on a level surface.

⚠ WARNING
Securely support the motorcycle so that there is no danger of it falling over.

NOTE:
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



EB304170
CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Measure:
   • tire pressure
   Out of specification → Regulate.

⚠ WARNING

• The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
• The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
• Operation of an overloaded motorcycle could cause tire damage, an accident or an injury.

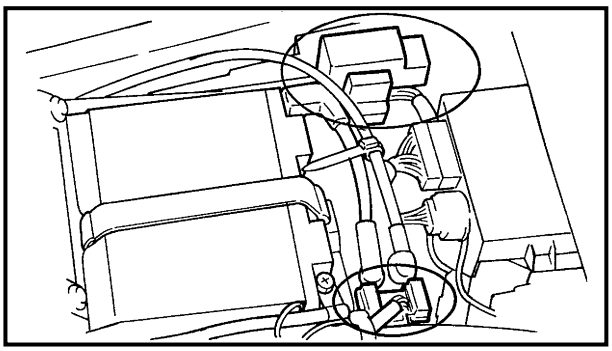
NEVER OVERLOAD THE MOTORCYCLE.

Basic weight (with oil and a full fuel tank)	**198 kg**	
Maximum load*	**197 kg**	
Cold tire pressure	**Front**	**Rear**
Up to 90 kg load*	**250 kPa (2.5 kgf/cm², 2.5 bar)**	**250 kPa (2.5 kgf/cm², 2.5 bar)**
90 kg ~ maximum load*	**250 kPa (2.5 kgf/cm², 2.5 bar)**	**290 kPa (2.9 kgf/cm², 2.9 bar)**
High-speed riding	**250 kPa (2.5 kgf/cm², 2.5 bar)**	**250 kPa (2.5 kgf/cm², 2.5 bar)**

* total of cargo, rider, passenger and accessories

⚠ WARNING

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.



3. Replace:
   • blown fuse

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a. Set the main switch to "OFF".
b. Install a new fuse of the correct amperage.
c. Set the main switch to "ON" and verify if the electrical circuit is operational.
d. If the fuse immediately blows again, check the electrical circuit.

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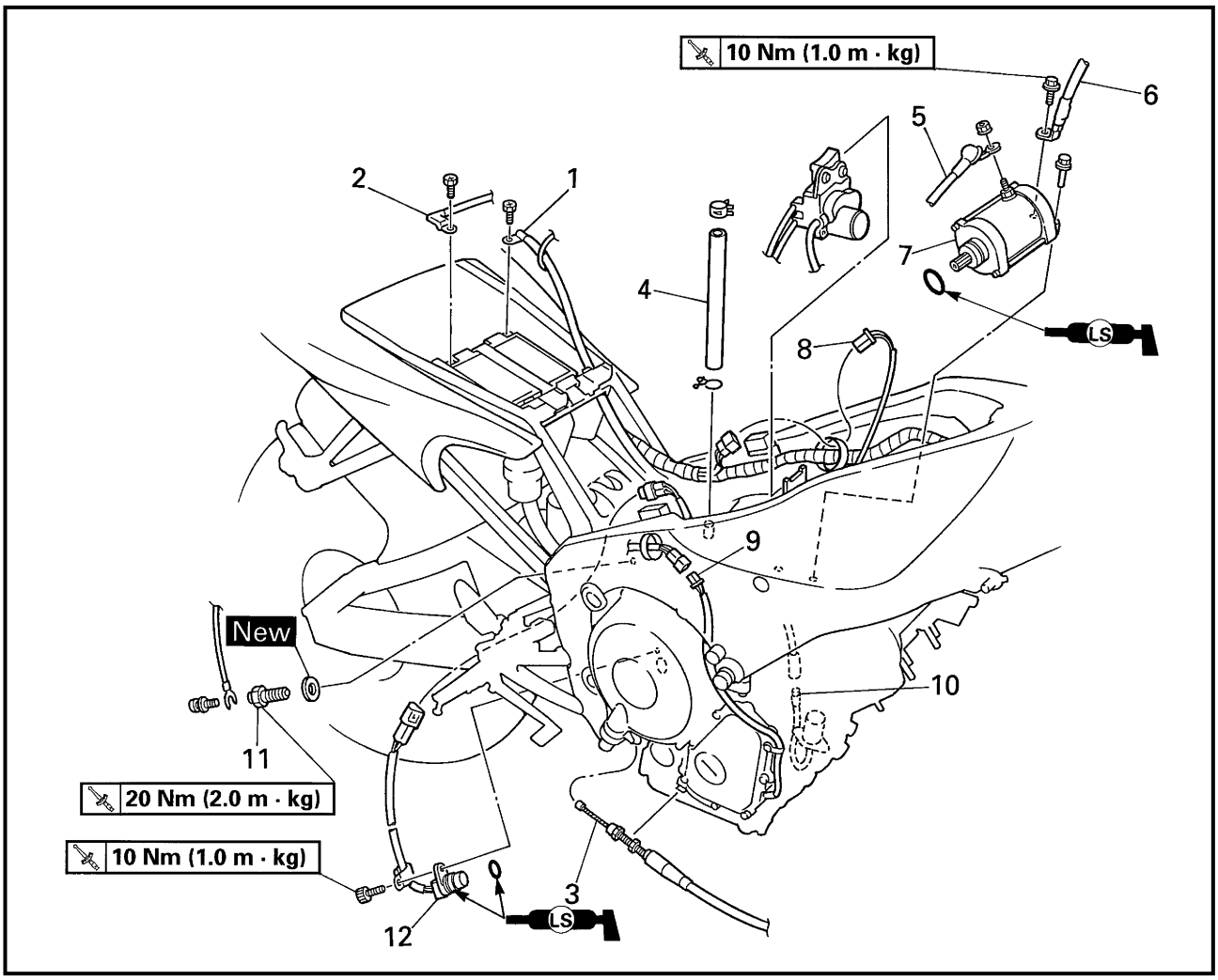
Item	Amperage	Q'ty
Main fuse	30 A	1
Headlight fuse	20 A	1
Signaling system fuse	20 A	1
Ignition fuse	15 A	1
Radiator fan motor fuse	7.5 A	1
Backup fuse (odometer)	7.5 A	1

⚠ WARNING

Never use a fuse with an amperage other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

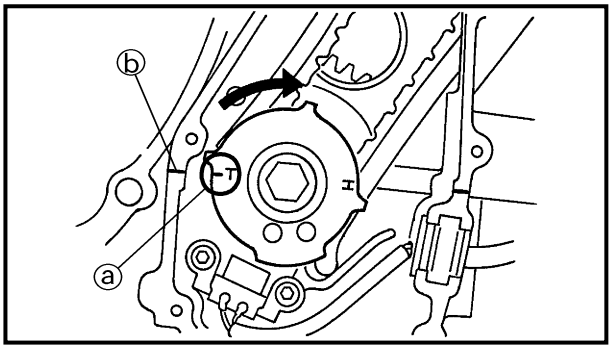
4. Install:
   • rider seat
   Refer to "SEATS".



Order	Job/Part	Q'ty	Remarks
3	Clutch cable	1	
4	Crankcase breather hose	1	
5	Starter motor lead	1	Disconnect.
6	Ground lead	1	Disconnect.
7	Starter motor	1	
8	Stator coil assembly coupler	1	Disconnect.
9	Pickup coil coupler	1	Disconnect.
10	Oil level switch connector	1	Disconnect.
11	Neutral switch	1	
12	Speed sensor	1	
			For connecting, reverse the disconnection procedure.

EB401701
INSTALLING THE CAMSHAFTS

1. Install:
   • timing chain guide (intake side) ①
2. Install:
   • intake camshaft sprocket
   24 Nm (2.4 m · kg)
   • exhaust camshaft sprocket
   24 Nm (2.4 m · kg)



3. Install:
   • exhaust camshaft
   • intake camshaft
   • exhaust camshaft caps
   • intake camshaft caps

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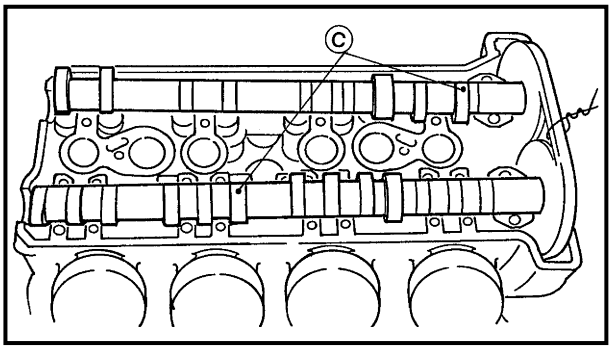
a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the TDC ⓐ mark on the pickup coil rotor with the crankcase mating surface ⓑ.
c. Install the timing chain onto both camshaft sprockets and then install the camshaft sprockets onto the camshafts.

CAUTION:

Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

NOTE:

Make sure that the punch marks ⓒ on the camshafts face up.

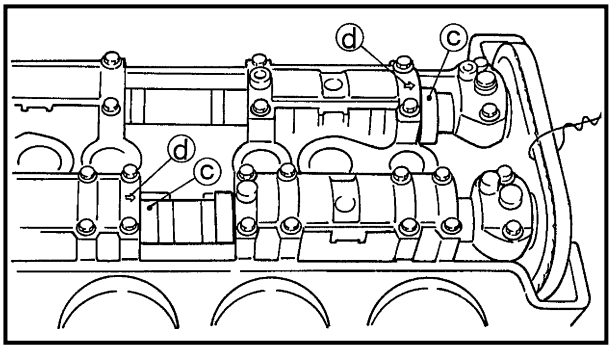


d. Install the exhaust and intake camshaft caps.

	Camshaft cap bolt **10 Nm (1.0 m • kg)**

NOTE:

Make sure that the punch marks ⓒ on the camshafts are aligned with the arrow marks ⓓ on the camshaft caps. Out of alignment → Reinstall.



e. Remove the wire from the timing chain.

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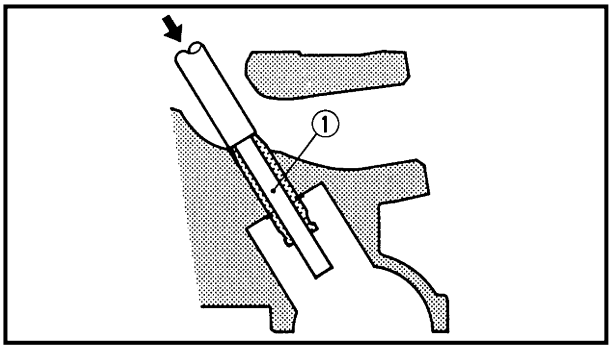

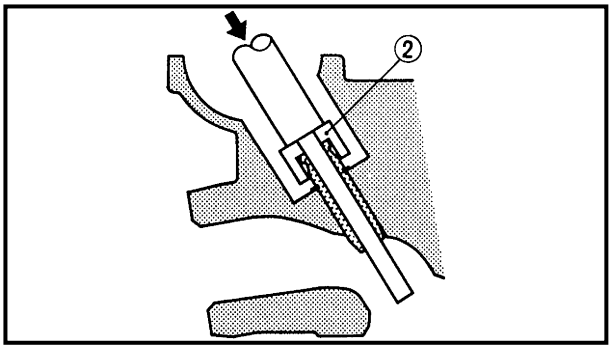

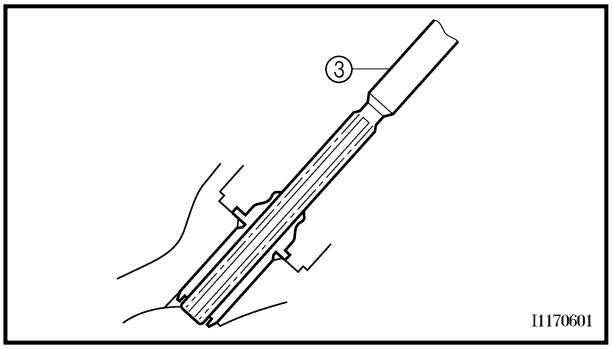

2. Replace:
   • valve guide

NOTE:
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C in an oven.

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a. Remove the valve guide with a valve guide remover ①.
b. Install the new valve guide with the valve guide installer ② and valve guide remover ①.
c. After installing the valve guide, bore the valve guide with a valve guide reamer ③ to obtain the proper valve-stem-to-valve-guide clearance.

NOTE:
After replacing the valve guide, reface the valve seat.

Valve guide remover
Intake (4.0 mm)
90890-04111
Exhaust (4.5 mm)
90890-04116
Valve guide installer
Intake (4.0 mm)
90890-04112
Exhaust (4.5 mm)
90890-04117
Valve guide reamer
Intake
90890-04113
Exhaust
90890-04118

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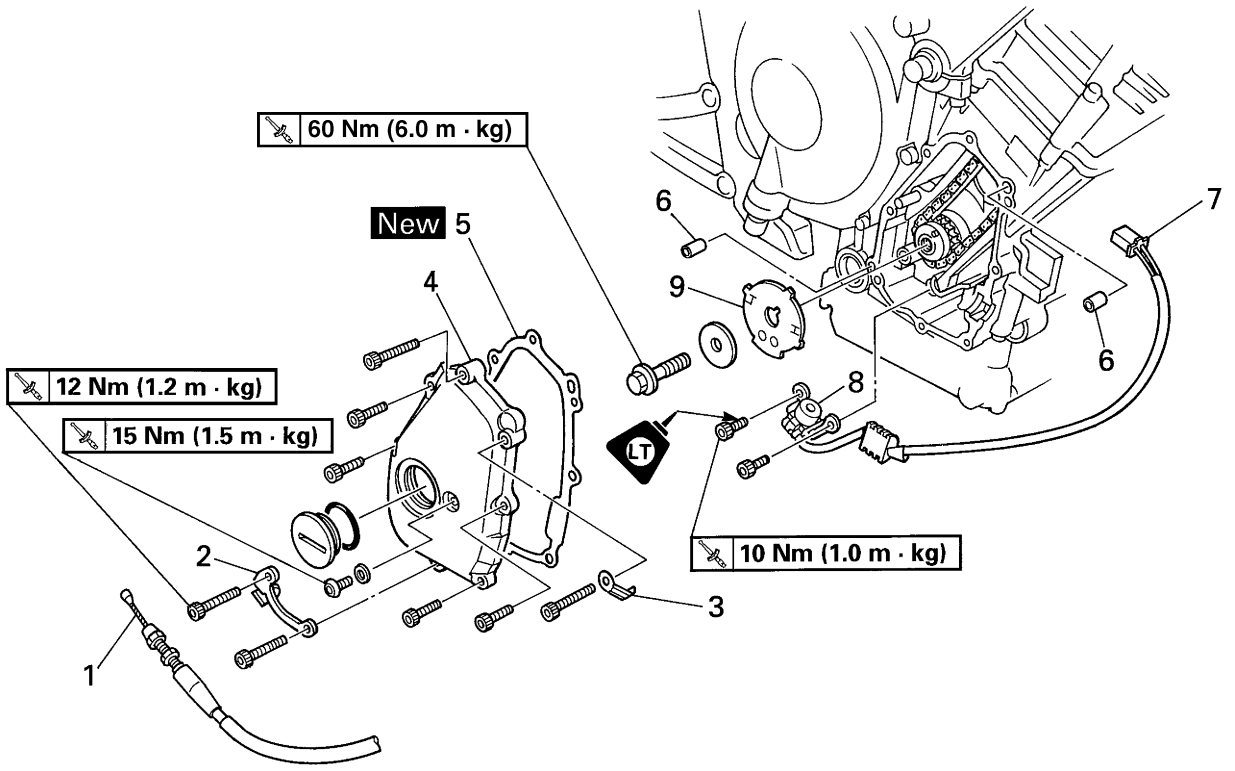
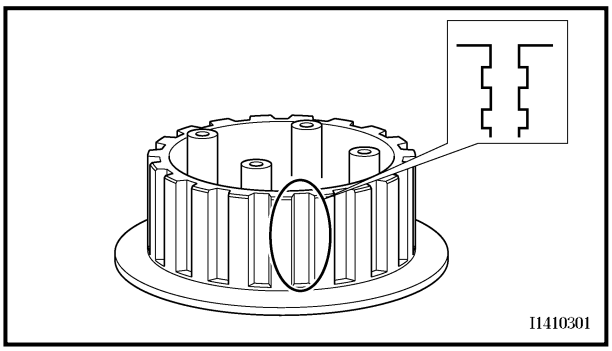
3. Eliminate:
   • carbon deposits
   (from the valve face and valve seat)
4. Check:
   • valve face
   Pitting/wear → Grind the valve face.
   • valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

PICKUP COIL



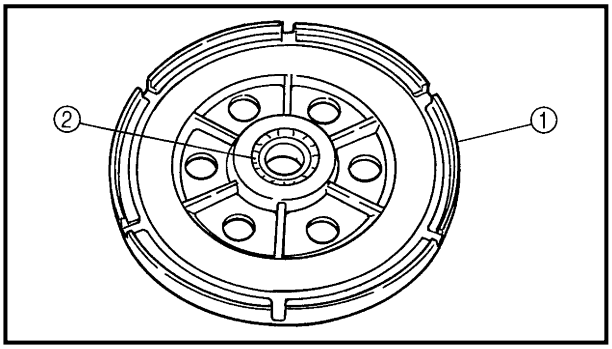
Order	Job/Part	Q'ty	Remarks
	Removing the pickup coil and pickup coil rotor		Remove the parts in the order listed.
	Rider seat and fuel tank		Refer to "SEATS" and "FUEL TANK" in chapter 3.
	Bottom cowling and right side cowling		Refer to "COWLINGS" in chapter 3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	Generator rotor cover		Refer to "GENERATOR".
1	Clutch cable	1	
2	Clutch cable holder	1	
3	Pickup coil lead holder	1	
4	Pickup coil rotor cover	1	
5	Pickup coil rotor cover gasket	1	
6	Dowel pin	2	



EB405450
CHECKING THE CLUTCH BOSS

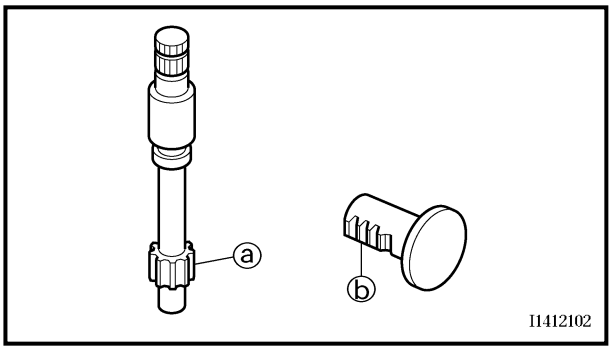
1. Check:
   - clutch boss splines
     Damage/pitting/wear → Replace the clutch boss.

NOTE:
Pitting on the clutch boss splines will cause erratic clutch operation.



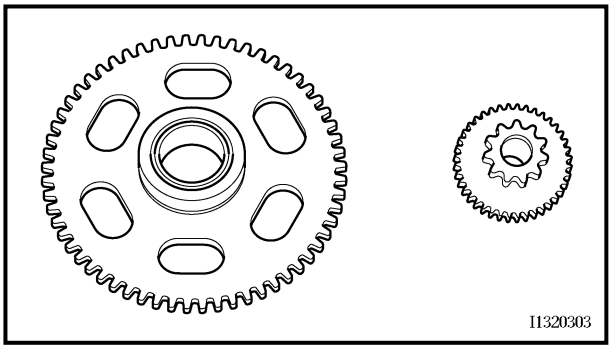
EB405460
CHECKING THE PRESSURE PLATE

1. Check:
   - pressure plate ①
     Cracks/damage → Replace.
   - bearing ②
     Damage/wear → Replace.



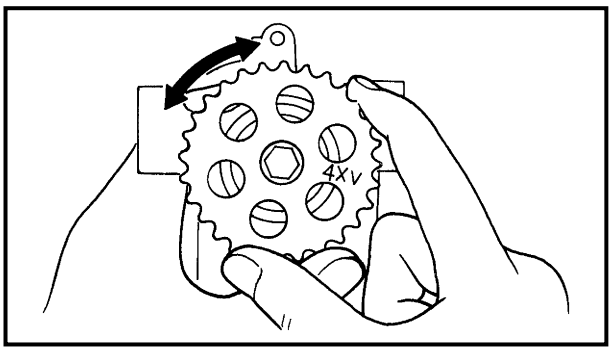
EB405470
CHECKING THE PULL LEVER SHAFT AND PULL ROD

1. Check:
   - pull lever shaft pinion gear teeth ⓐ
   - pull rod teeth ⓑ
     Damage/wear → Replace the pull rod and pull lever shaft as a set.
2. Check:
   - pull rod bearing
     Damage/wear → Replace.

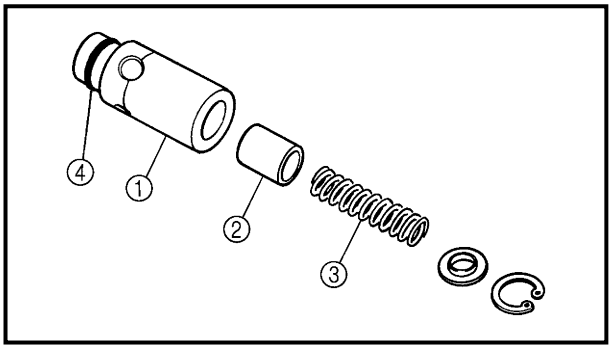


CHECKING THE STARTER CLUTCH

1. Check:
   - starter clutch gear
   - starter clutch idle gear
     Chips/pitting/roughness/wear → Replace the defective part(-s).

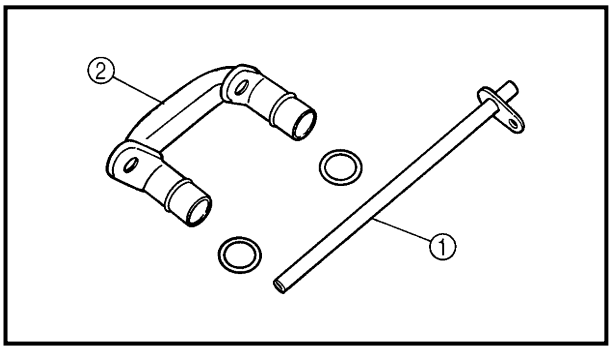


3. Check:
   • oil pump operation
   Unsmooth → Repair or replace the defective part(-s).
   Refer to "WATER PUMP" in chapter 5.



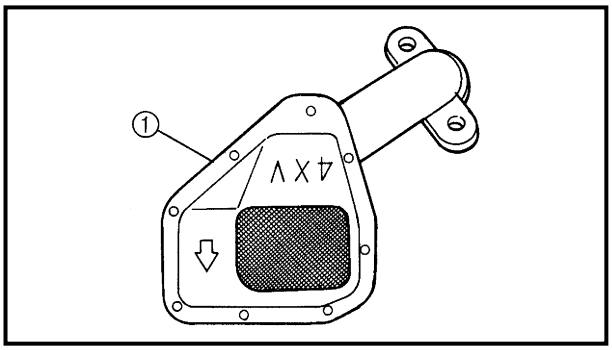
EB411410
CHECKING THE RELIEF VALVE

1. Check:
   • relief valve body ①
   • relief valve ②
   • spring ③
   • O-ring ④
   Damage/wear → Replace the defective part(-s).



EB411421
CHECKING THE OIL DELIVERY PIPE AND OIL PIPE

1. Check:
   • oil delivery pipe ①
   • oil pipe ②
   Damage → Replace.
   Obstruction → Wash and blow out with compressed air.



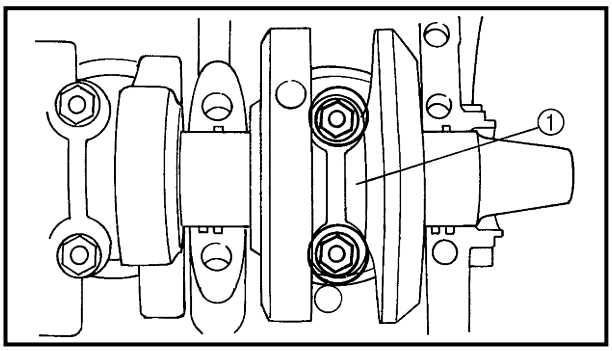
EB411430
CHECKING THE OIL STRAINER

1. Check:
   • oil strainer ①
   Damage → Replace.
   Contaminants → Clean with engine oil.

EB411701
ASSEMBLING THE OIL PUMP

1. Lubricate:
   • inner rotor
   • outer rotor
   • impeller shaft
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

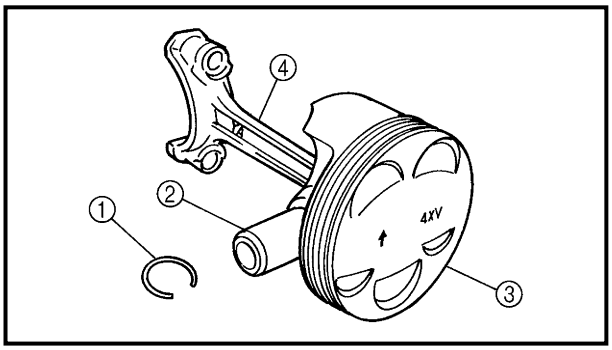


EB412131
REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:
   - connecting rod cap ①
   - big end bearings

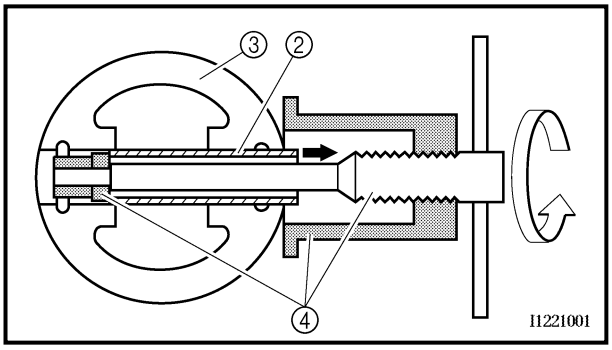
NOTE:
Identify the position of each big end bearing so that it can be reinstalled in its original place.



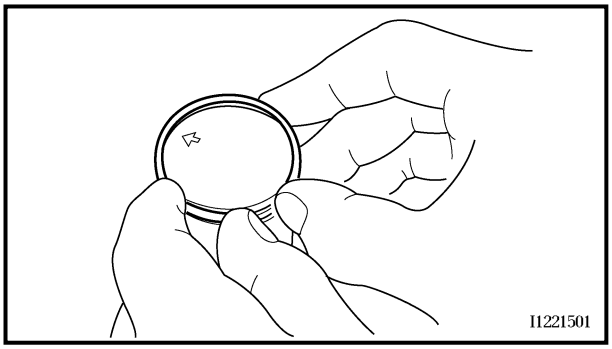
2. Remove:
   - piston pin clips ①
   - piston pin ②
   - piston ③
   - connecting rod ④

CAUTION:
Do not use a hammer to drive the piston pin out.

NOTE:
- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area in the piston. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller ④.

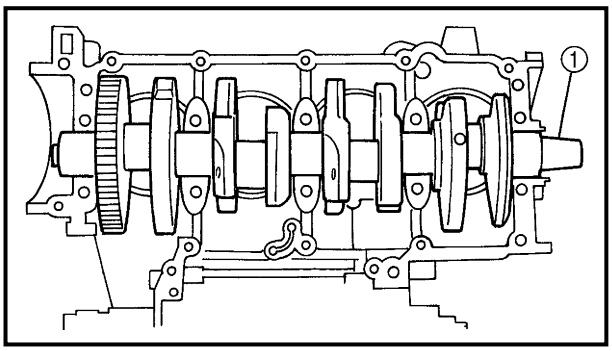


Piston pin puller
90890-01304



3. Remove:
   - top ring
   - 2nd ring
   - oil ring

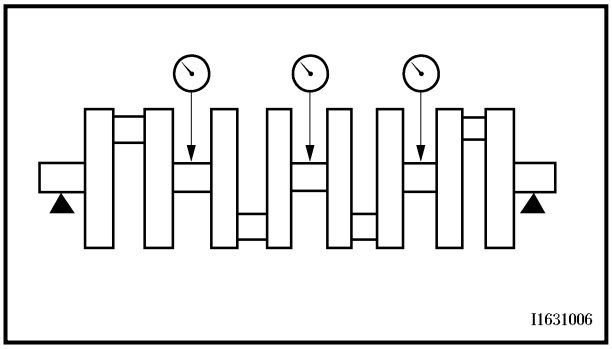
NOTE:
To remove a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EB412110
REMOVING THE CRANKSHAFT

1. Remove:
   • crankshaft ①
   • crankshaft journal upper bearings (from the upper crankcase)

NOTE:
Identify the position of each crankshaft journal upper bearing so that it can be reinstalled in its original place.



EB412403
CHECKING THE CRANKSHAFT

1. Measure:
   • crankshaft runout
   Out of specification → Replace the crankshaft.

Max. crankshaft runout
0.03 mm

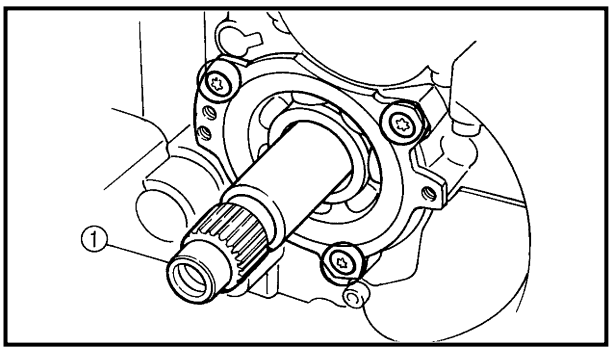
2. Check:
   • crankshaft journal surfaces
   • crankshaft pin surfaces
   • bearing surfaces
   Scratches/wear → Replace the crankshaft.

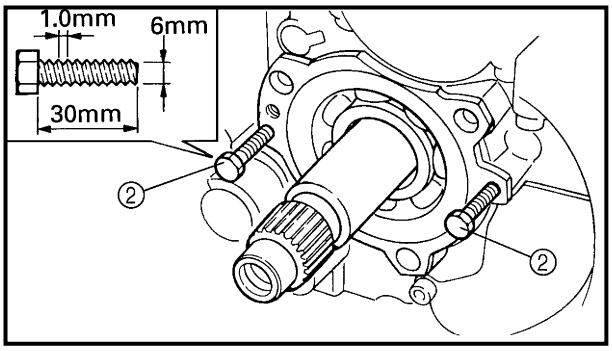
CHECKING THE CRANKSHAFT JOURNAL BEARINGS

1. Measure:
   • crankshaft-journal-to-crankshaft-journal-bearing clearance
   Out of specification → Replace the crankshaft journal bearings.

Crankshaft-journal-to-crankshaft-journal-bearing clearance
0.004 ~ 0.028 mm

CAUTION:
Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.





EB413100
REMOVING THE TRANSMISSION

1. Remove:
   • main axle assembly ①
   (with the Torx® wrench T30)

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a. Insert two bolts ② of the proper size, as shown in the illustration, into the main axle assembly bearing housing.

b. Tighten the bolts until they contact the crankcase surface.

c. Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.

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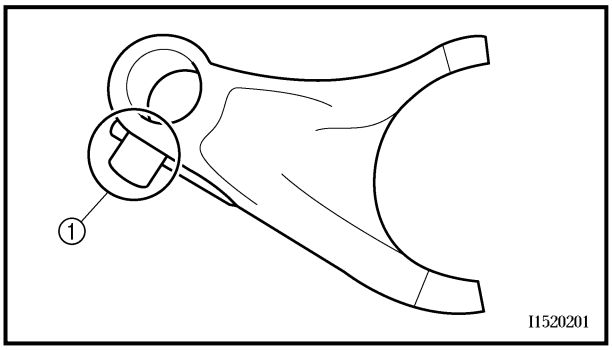
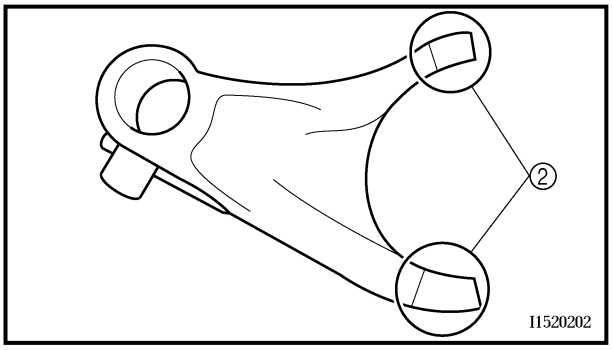
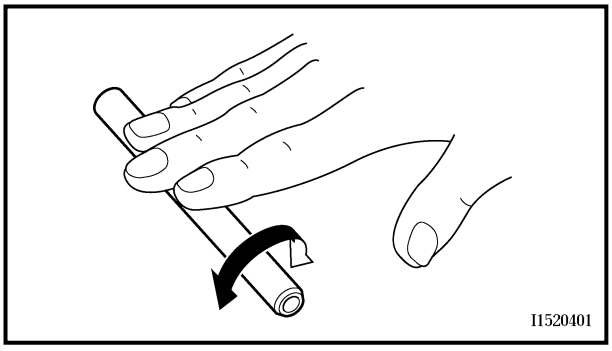


EB413400
CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:
   • shift fork cam follower ①
   • shift fork pawl ②
   Bends/damage/scoring/wear → Replace the shift fork.





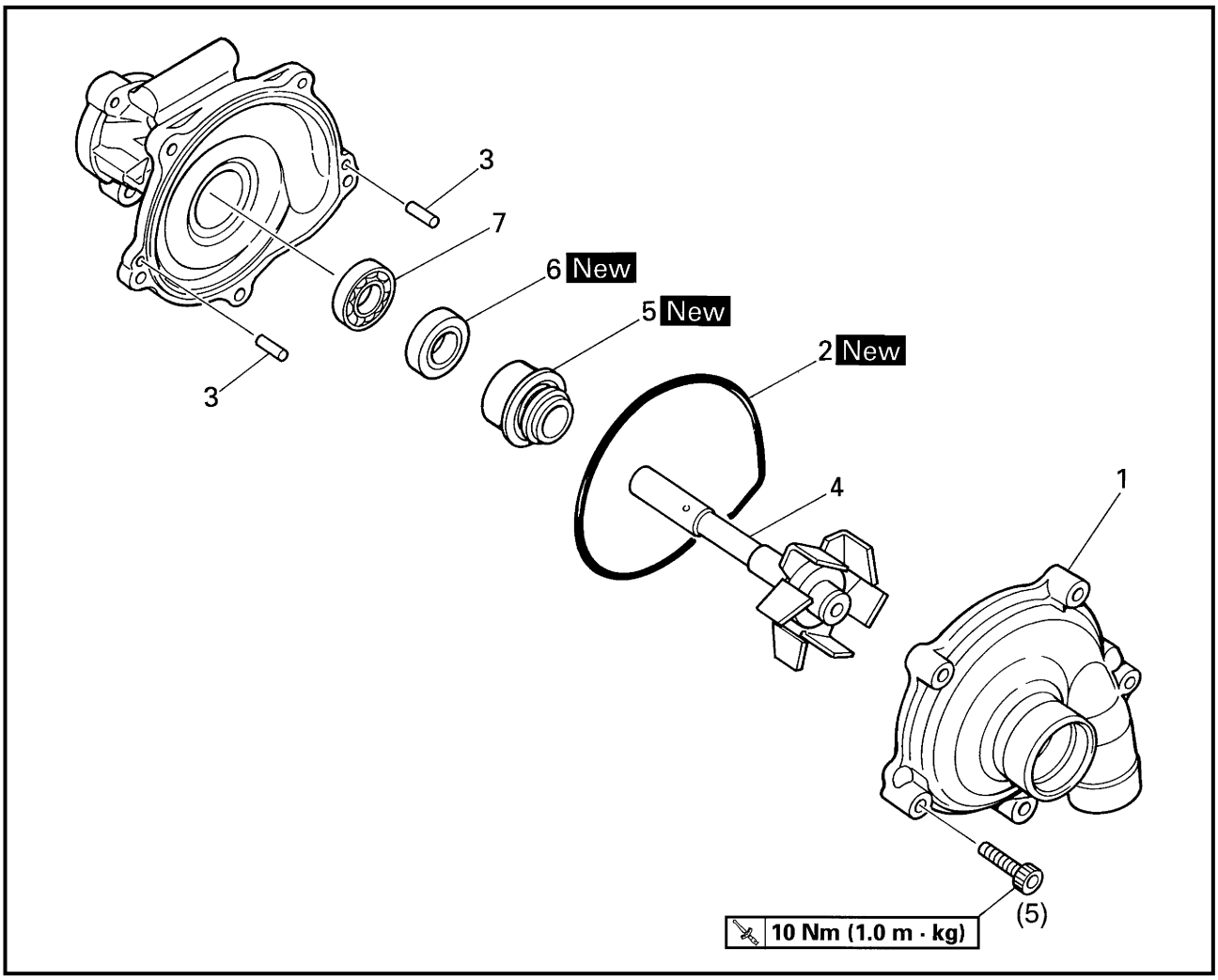
2. Check:
   • shift fork guide bar
   Roll the shift fork guide bar on a flat surface.
   Bends → Replace.

⚠ WARNING

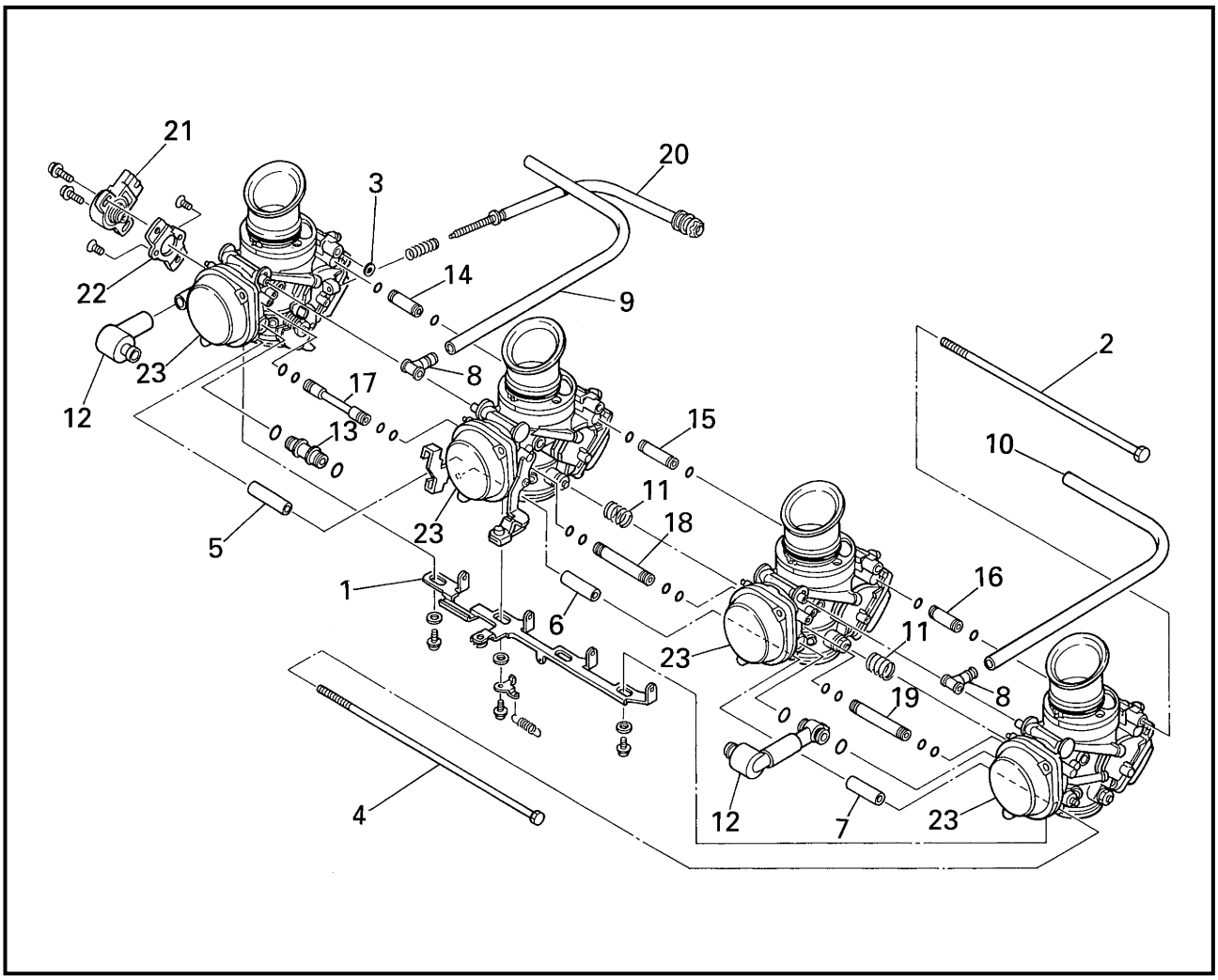
Do not attempt to straighten a bent shift fork guide bar.

EB500020
INSTALLING THE RADIATOR

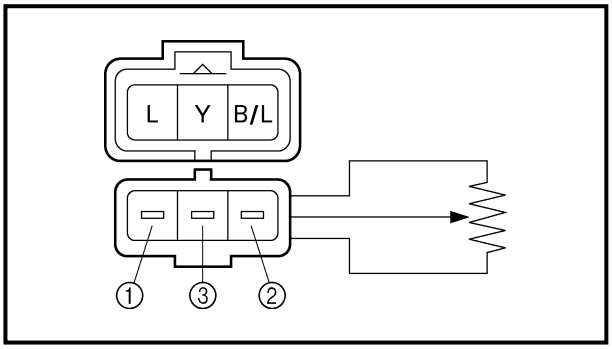
1. Fill:
   - cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" in chapter 3.
2. Check:
   - cooling system
     Leaks → Repair or replace any faulty part.
3. Measure:
   - radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to "CHECKING THE RADIATOR".



Order	Job/Part	Q'ty	Remarks
5	Water pump seal	1	
6	Oil seal	1	
7	Bearing	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
14	Fuel feed pipe	1	ℓ = 37 mm
15	Fuel feed pipe	1	ℓ = 32 mm
16	Fuel feed pipe	1	ℓ = 29 mm
17	Pipe	1	ℓ = 73 mm
18	Pipe	1	ℓ = 68 mm
19	Pipe	1	ℓ = 66 mm
20	Throttle stop screw	1	
21	Throttle position sensor	1	
22	Throttle position sensor bracket	1	
23	Carburetor	4	
			For installation, reverse the removal procedure.



2. Check:
   • throttle position sensor
     (removed from the carburetor)

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a. Disconnect the throttle position sensor coupler.

b. Remove the throttle position sensor from the carburetor.

c. Connect the pocket tester (Ω × 1k) to the throttle position sensor.

Tester positive probe → blue ①
Tester negative probe → black/blue ②

d. Measure the throttle position sensor maximum resistance.
   Out of specification → Replace the throttle position sensor.

Throttle position sensor maximum resistance
4.0 ~ 6.0 kΩ at 20 °C
(blue — black/blue)

e. Connect the pocket tester (Ω × 1k) to the throttle position sensor coupler.

Tester positive probe → yellow ③
Tester negative probe → black/blue ②

f. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.

The resistance does not change or it changes abruptly → Replace the throttle position sensor.
The slot is worn or broken → Replace the throttle position sensor.

NOTE:
Check mainly that the resistance changes gradually when turning the throttle, since the readings (from closed to wide-open throttle) may differ slightly from those specified.

Throttle position sensor resistance
0 ~ 5 ± 1.0 kΩ at 20 °C
(yellow — black/blue)

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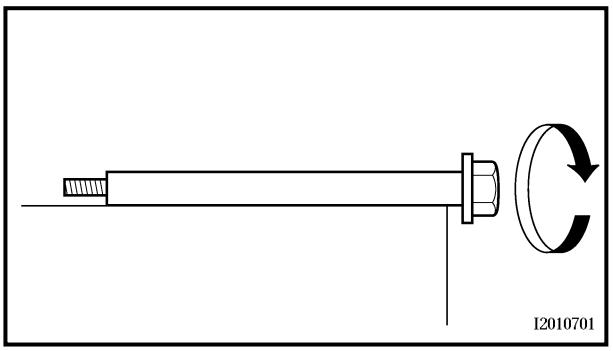


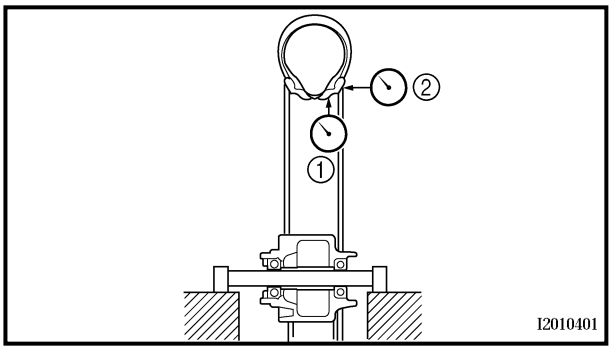
EB700400
CHECKING THE FRONT WHEEL

1. Check:
   • wheel axle
   Roll the wheel axle on a flat surface.
   Bends → Replace.

⚠ WARNING

Do not attempt to straighten a bent wheel axle.

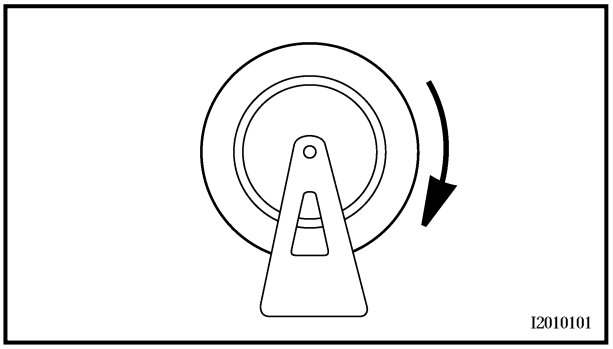
2. Check:
   • tire
   • front wheel
   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.

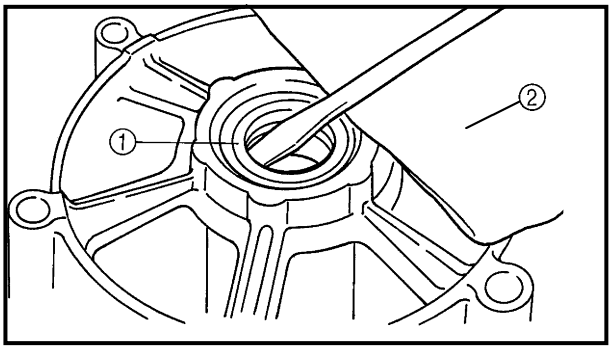


3. Measure:
   • radial wheel runout ①
   • lateral wheel runout ②
   Over the specified limits → Replace.

Max. radial wheel runout
1.0 mm
Max. lateral wheel runout
0.5 mm

4. Check:
   • wheel bearings
   Front wheel turns roughly or is loose → Replace the wheel bearings.
   • oil seals
   Damage/wear → Replace.





5. Replace:
   • wheel bearings New
   • oil seals New

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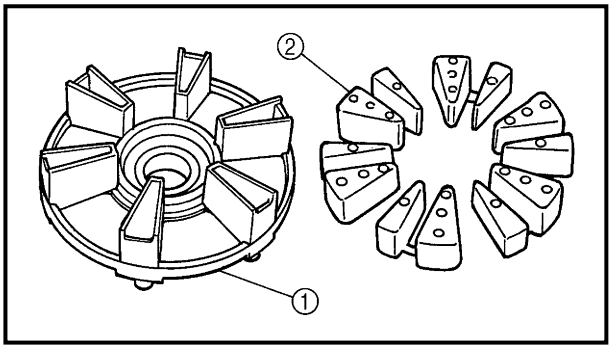
a. Clean the outside of the front wheel hub.

b. Remove the oil seals ① with a flat-head screwdriver.

NOTE:
To prevent damaging the wheel, place a rag ② between the screwdriver and the wheel surface.

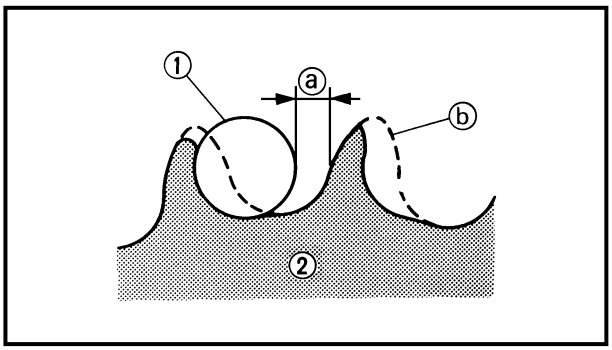
3. Measure:
   • radial wheel runout
   • lateral wheel runout
   Refer to "FRONT WHEEL".
   Over the specified limits → Replace.

Max. radial wheel runout
1.0 mm
Max. lateral wheel runout
0.5 mm



EB701430
CHECKING THE REAR WHEEL DRIVE HUB

1. Check:
   • rear wheel drive hub ①
   Cracks/damage → Replace.
   • rear wheel drive hub dampers ②
   Damage/wear → Replace.



EB701440
CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:
   • rear wheel sprocket
   More than 1/4 tooth ⓐ wear → Replace the rear wheel sprocket.
   Bent teeth → Replace the rear wheel sprocket.
   ⓑ Correct
   ① Drive chain roller
   ② Rear wheel sprocket

2. Replace:
   • rear wheel sprocket

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a. Remove the self-locking nuts and the rear wheel sprocket.

b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.

c. Install the new rear wheel sprocket.

Rear wheel sprocket self-locking nut
150 Nm (15.0 m • kg)

NOTE:
Tighten the self-locking nuts in stages and in a crisscross pattern.

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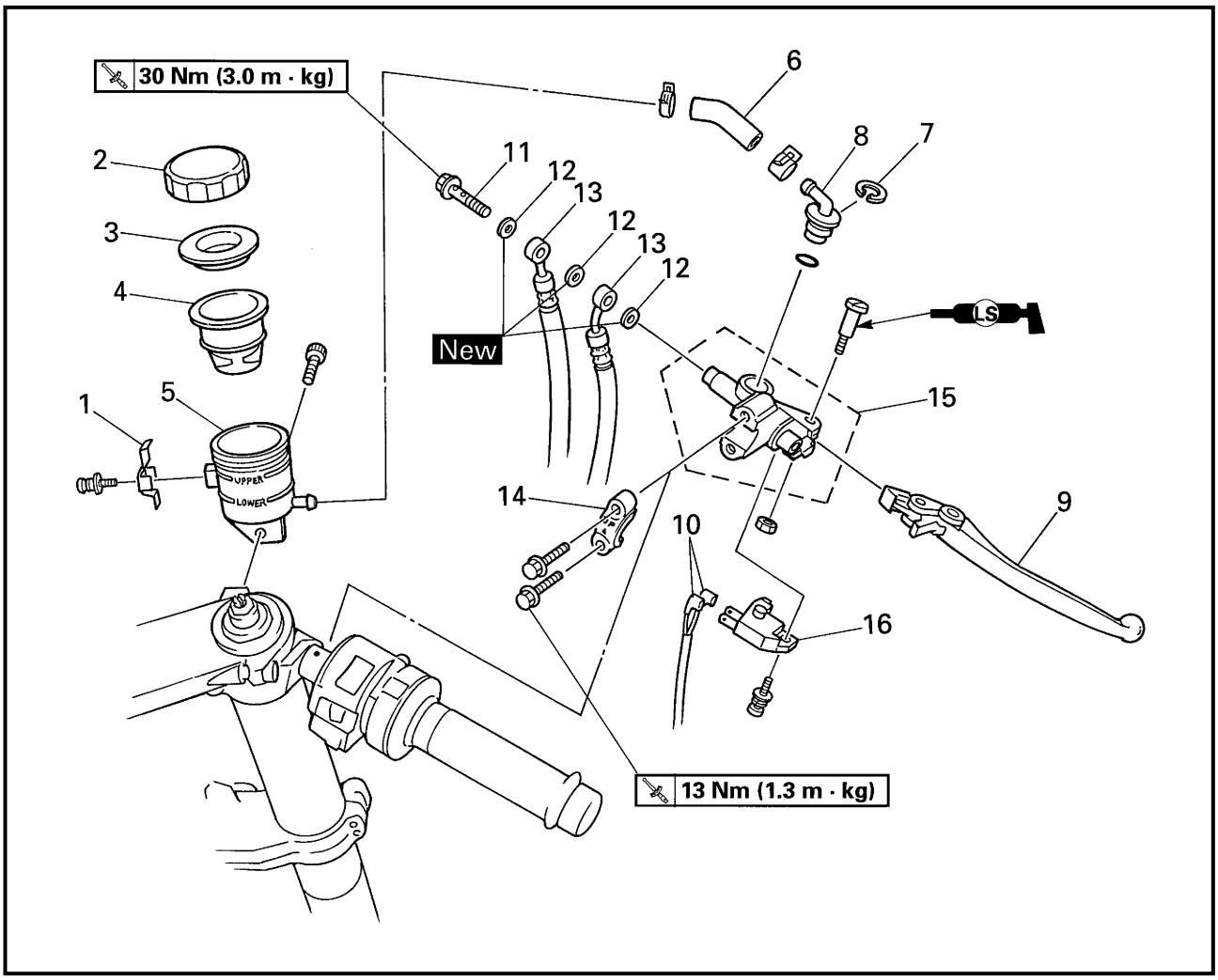
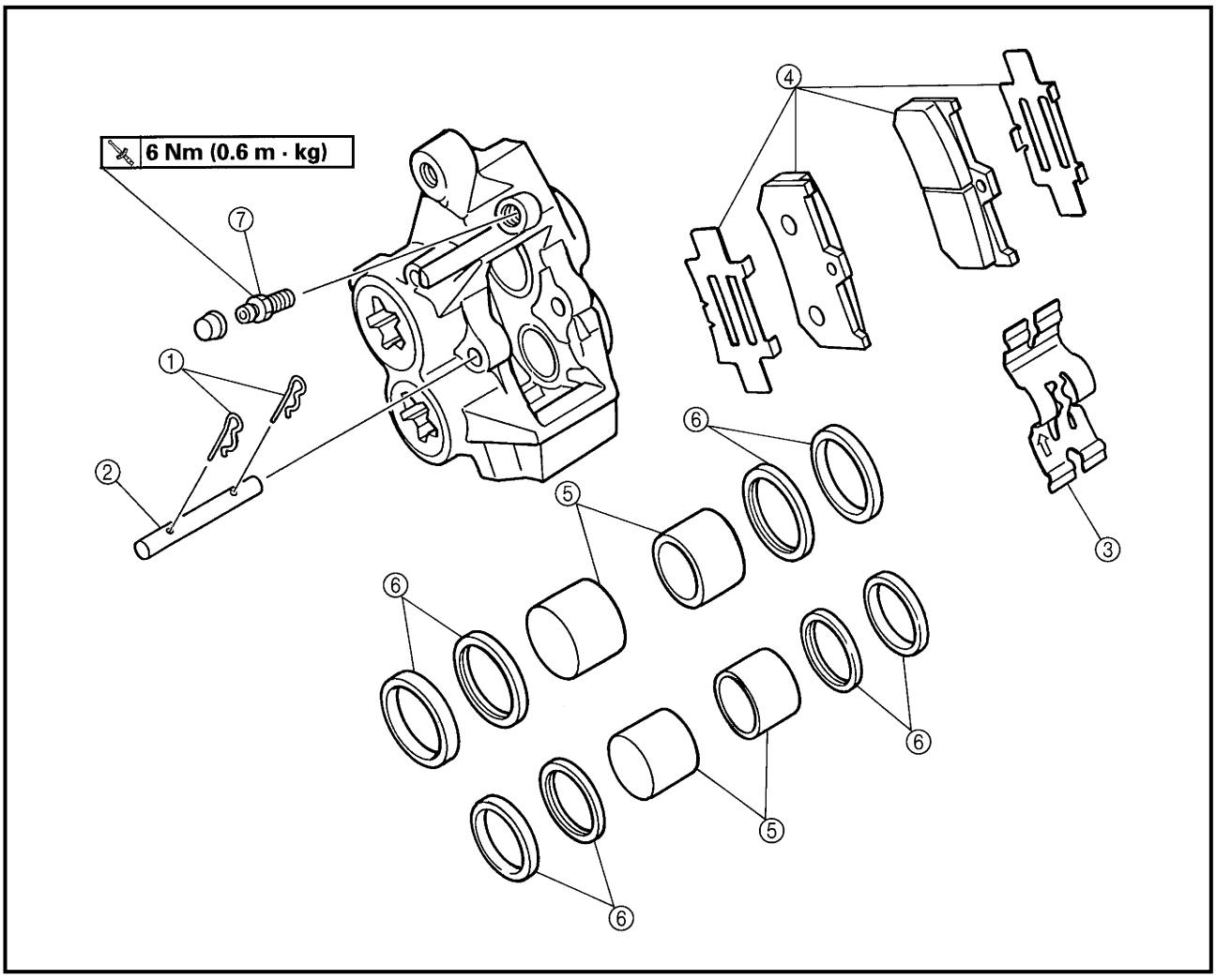


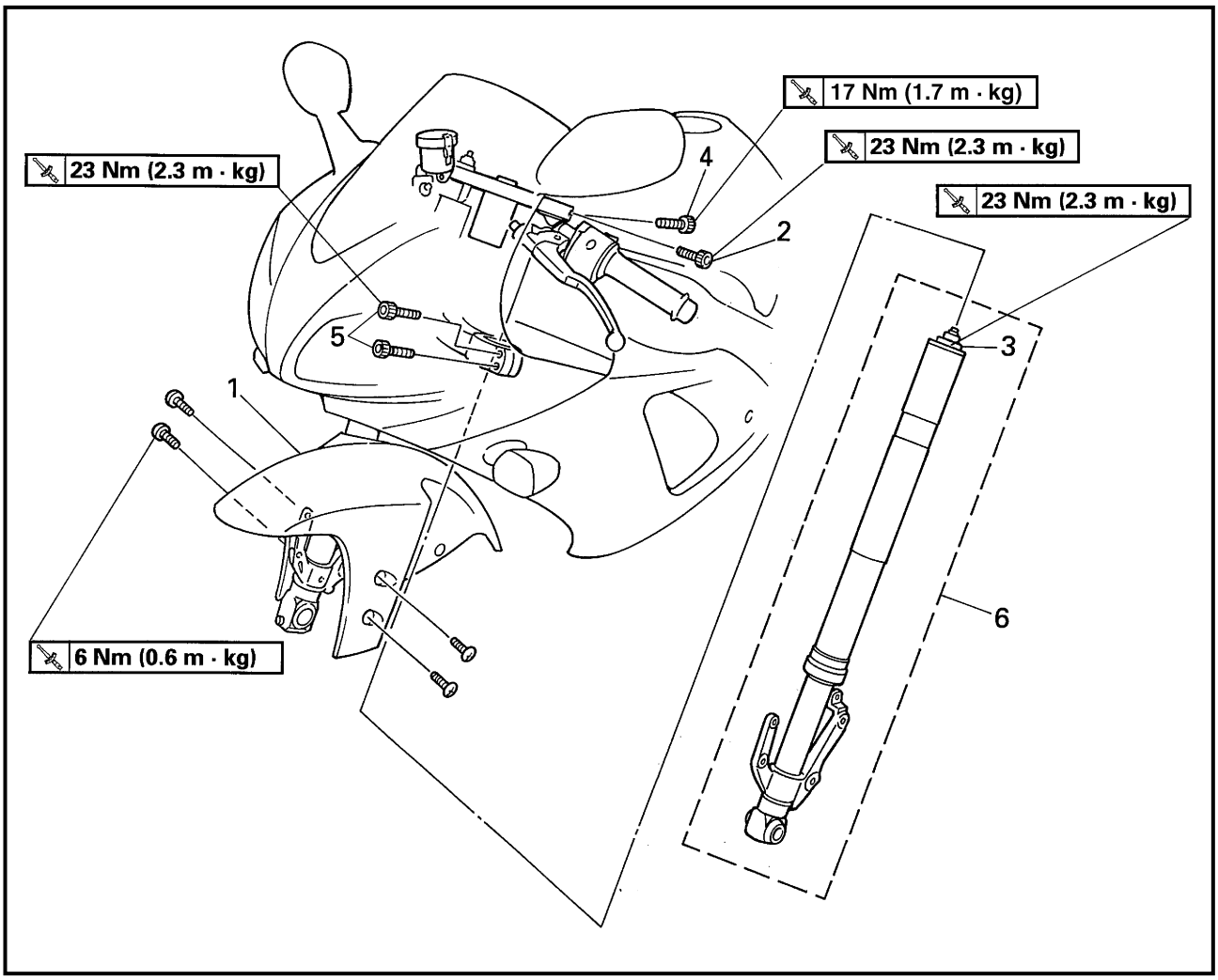
Order	Job/Part	Q'ty	Remarks
13	Brake hose	2	
14	Brake master cylinder holder	1	
15	Brake master cylinder	1	
16	Front brake switch	1	
			For installation, reverse the removal procedure.

EB702303

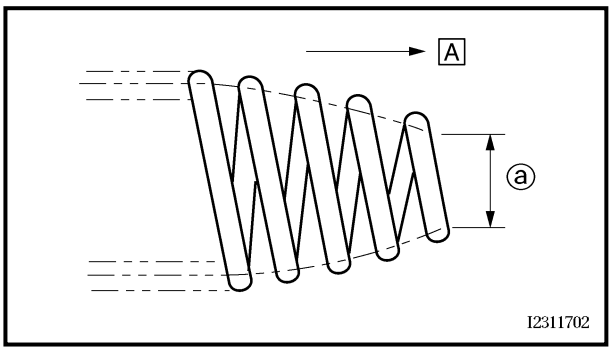


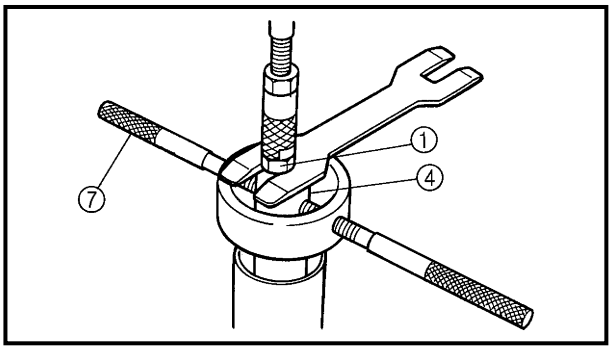
Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake calipers		Remove the parts in the order listed. The following procedure applies to both of the front brake calipers.
①	Brake pad clip	2	
②	Brake pad pin	1	
③	Brake pad spring	1	
④	Brake pad	2	
⑤	Brake caliper piston	4	
⑥	Brake caliper piston seal	8	
⑦	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

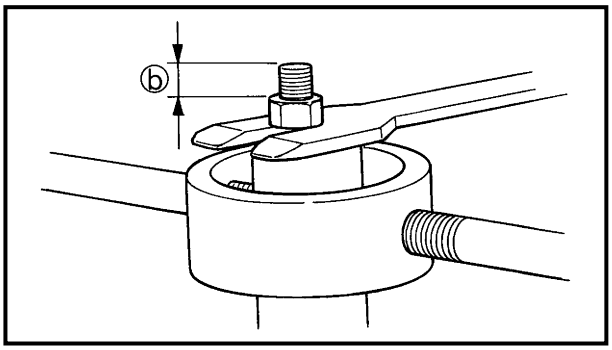
EB703001
FRONT FORK



Order	Job/Part	Q'ty	Remarks
	Removing the front fork legs		Remove the parts in the order listed.
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL AND BRAKE DISCS".
	Front cowling inner panels		Refer to "COWLINGS" in chapter 3.
1	Front fender	1	
2	Upper bracket pinch bolt	1	
3	Cap bolt	1	
4	Handlebar pinch bolt	1	
5	Lower bracket pinch bolt	2	
6	Front fork leg	1	
			For installation, reverse the removal procedure.







c. Install the rod puller and adapter onto the damper rod.

	**Rod puller** **90890-01437** **Adapter** **90890-01436**

d. Install the fork spring, spring seat, and spacer.

NOTE:
Install the spring with the smaller pitch ⓐ facing up A.

e. Press down on the spacer with the fork spring compressor ⑦.

f. Pull up the rod puller and install the rod holder ⑧ between the nut ① and the spacer ④.

NOTE:
Use the side of the rod holder that is marked “B”.

	**Fork spring compressor** **90890-01441** **Rod holder** **90890-01434**

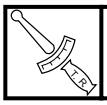
g. Remove the rod puller and adapter.

h. Install the nut ① and position it as specified ⓑ.

	**Distance ⓑ** **11 mm**

i. Install the damper adjusting rod and cap bolt, and then finger tighten the cap bolt.

j. Hold the cap bolt and tighten the nut to specification.

	**Nut** **15 Nm (1.5 m • kg)**

k. Remove the rod holder and fork spring compressor.

⚠ WARNING

- **The fork spring is compressed.**
- **Always use a new cap bolt O-ring.**

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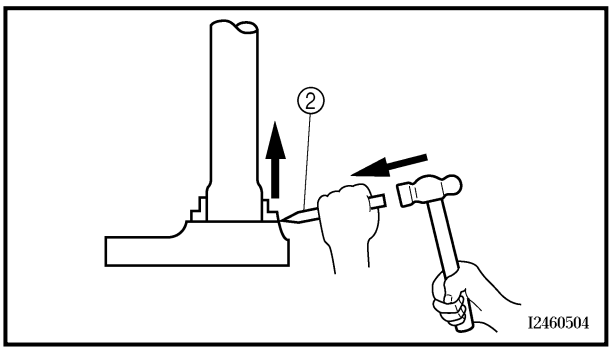

b. Remove the bearing race from the lower bracket with a floor chisel ② and hammer.

c. Install a new dust seal and new bearing races.

CAUTION:

If the bearing race is not installed properly, the steering head pipe could be damaged.

NOTE:

- Always replace the bearing balls and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.

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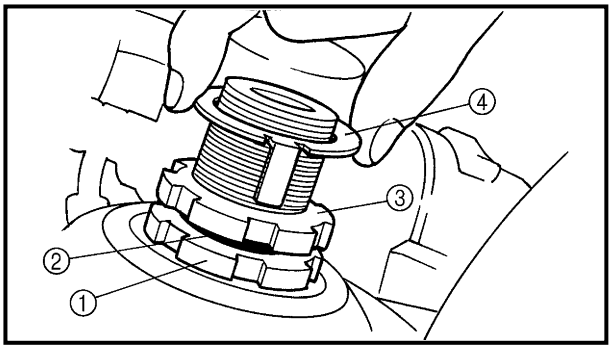
4. Check:
   - upper bracket
   - lower bracket
   (along with the steering stem)
   Bends/cracks/damage → Replace.

EB705700

INSTALLING THE STEERING HEAD

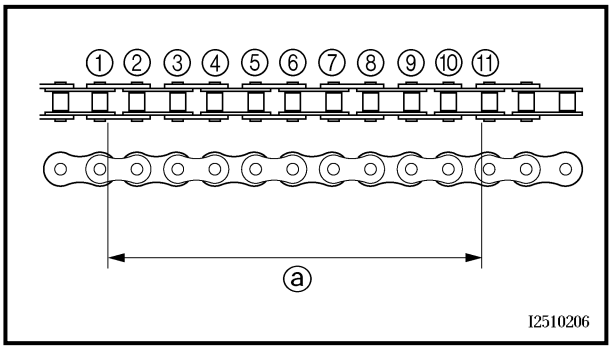
1. Lubricate:
   - upper bearing
   - lower bearing
   - bearing races

	Recommended lubricant **Lithium soap base grease**



2. Install:
   - lower ring nut ①
   - rubber washer ②
   - upper ring nut ③
   - lock washer ④
   Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” in chapter 3.

4. Check:
   - dust covers
   - spacer
   - oil seals
     Damage/wear → Replace.
   - bearings
     Damage/pitting → Replace.

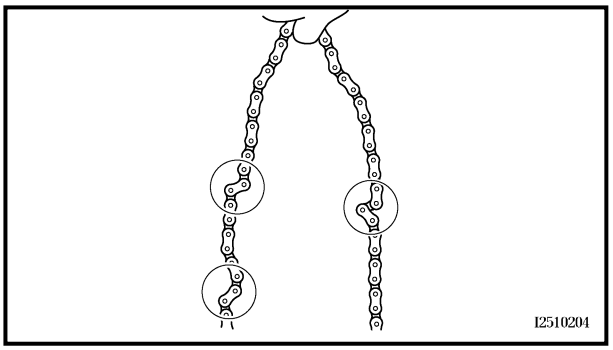


EB707410
CHECKING THE DRIVE CHAIN

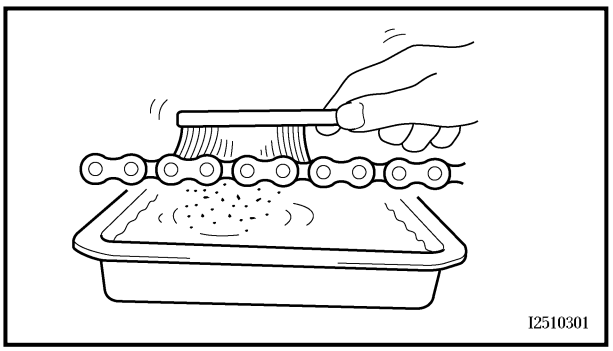
1. Measure:
   - ten-link section ⓐ of the drive chain
     Out of specification → Replace the drive chain.

Max. ten-link drive chain section
150.1 mm

NOTE:
- While measuring the ten-link section, push down on the drive chain to increase its tension.
- Measure the length between drive chain roller ① and ⑪ as shown.
- Perform this measurement at two or three different places.



2. Check:
   - drive chain
     Stiffness → Clean and lubricate or replace.



3. Clean:
   - drive chain

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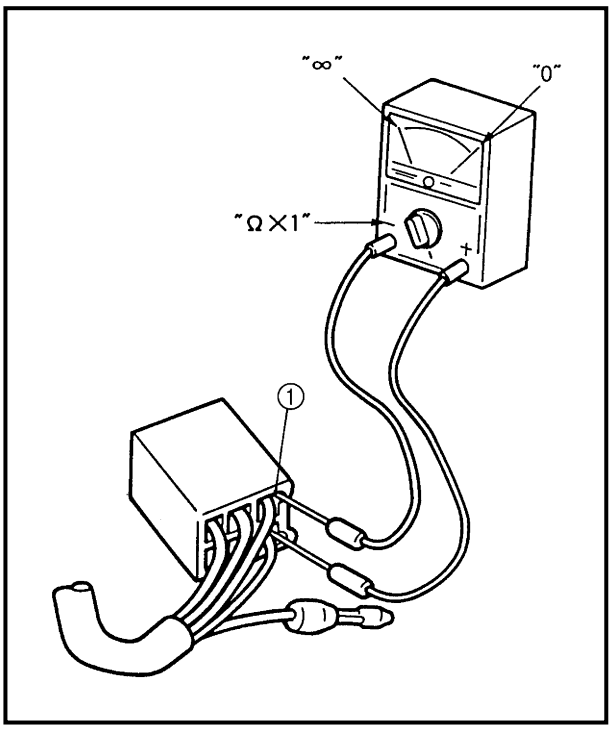
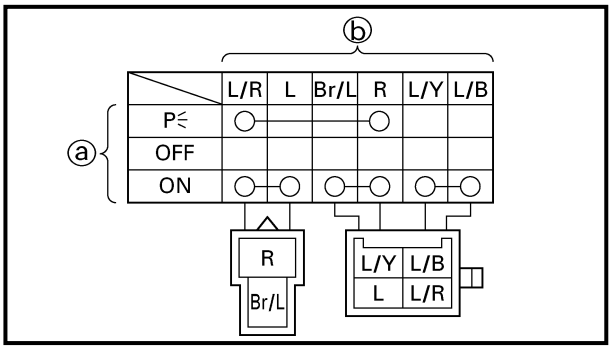
a. Wipe the drive chain with a clean cloth.

b. Put the drive chain in kerosine and remove any remaining dirt.





EB801000

SWITCHES

CHECKING SWITCH CONTINUITY

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

CAUTION:

Never insert the tester probes into the coupler terminal slots ①. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.

	Pocket tester 90890-03112

NOTE:

- Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.

The switch positions ⓐ are shown in the far left column and the switch lead colors ⓑ are shown in the top row in the switch illustration.

NOTE:

"○——○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration on the left shows that:

There is continuity between blue/red and red when the switch is set to " P≦ ".

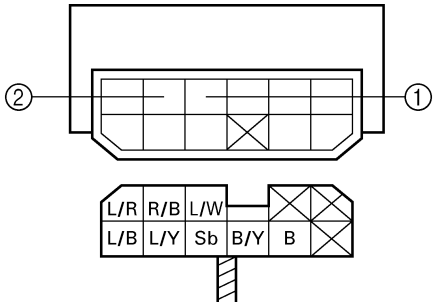
There is continuity between blue/red and blue, between brown/blue and red, and between blue/yellow and blue/black when the switch is set to "ON".

EB802415

12.Relay unit

- Remove the relay unit from the wire harness.
- Connect the pocket tester (Ω × 1) to the relay unit terminals as shown.
- Check the starting circuit cutoff relay for continuity.

Tester positive probe → sky blue ① Tester negative probe → blue/yellow ②	**Continuity**
Tester positive probe → blue/yellow ② Tester negative probe → sky blue ①	**No continuity**



NOTE:
When you switch the tester's positive and negative probes, the readings in the above chart will be reversed.

- Are the tester readings correct?

YES → NO

Replace the relay unit.

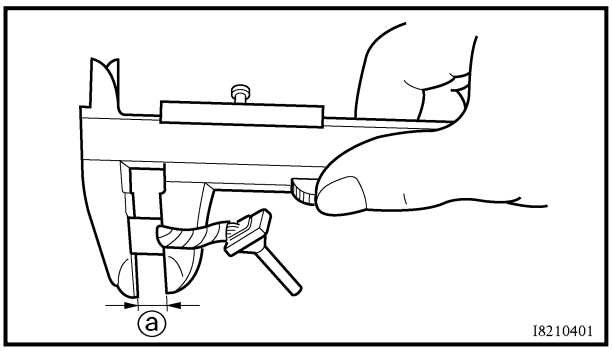
EB802416

13.Wiring

- Check the entire ignition system's wiring.
  Refer to "CIRCUIT DIAGRAM".
- Is the ignition system's wiring properly connected and without defects?

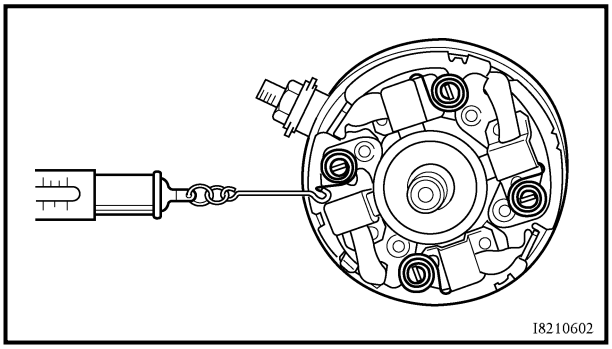
NO → Properly connect or repair the ignition system's wiring.

YES → Replace the ignitor unit.



5. Measure:
   • brush length ⓐ
   Out of specification → Replace the brushes as a set.

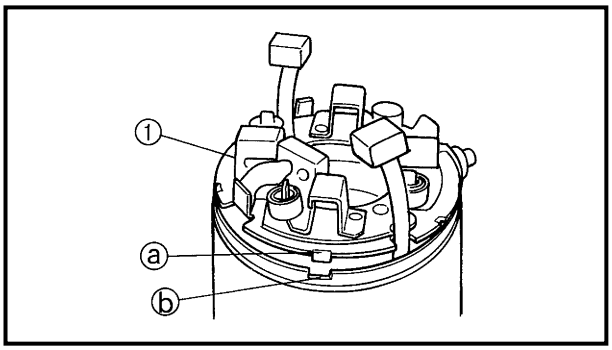
	Min. brush length 5 mm



6. Measure:
   • brush spring force
   Out of specification → Replace the brush springs as a set.

	Brush spring force 7.03 ~ 10.63 N (717 ~ 1,084 gf)

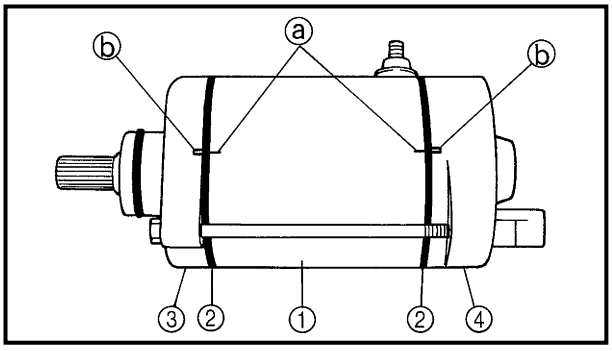
7. Check:
   • gear teeth
   Damage/wear → Replace the gear.
8. Check:
   • bearing
   • oil seal
   Damage/wear → Replace the defective part(-s).



EB803701
ASSEMBLING THE STARTER MOTOR

1. Install:
   • brush seat ①

NOTE:
Align the tab ⓐ on the brush seat with the slot ⓑ in the starter motor rear cover.

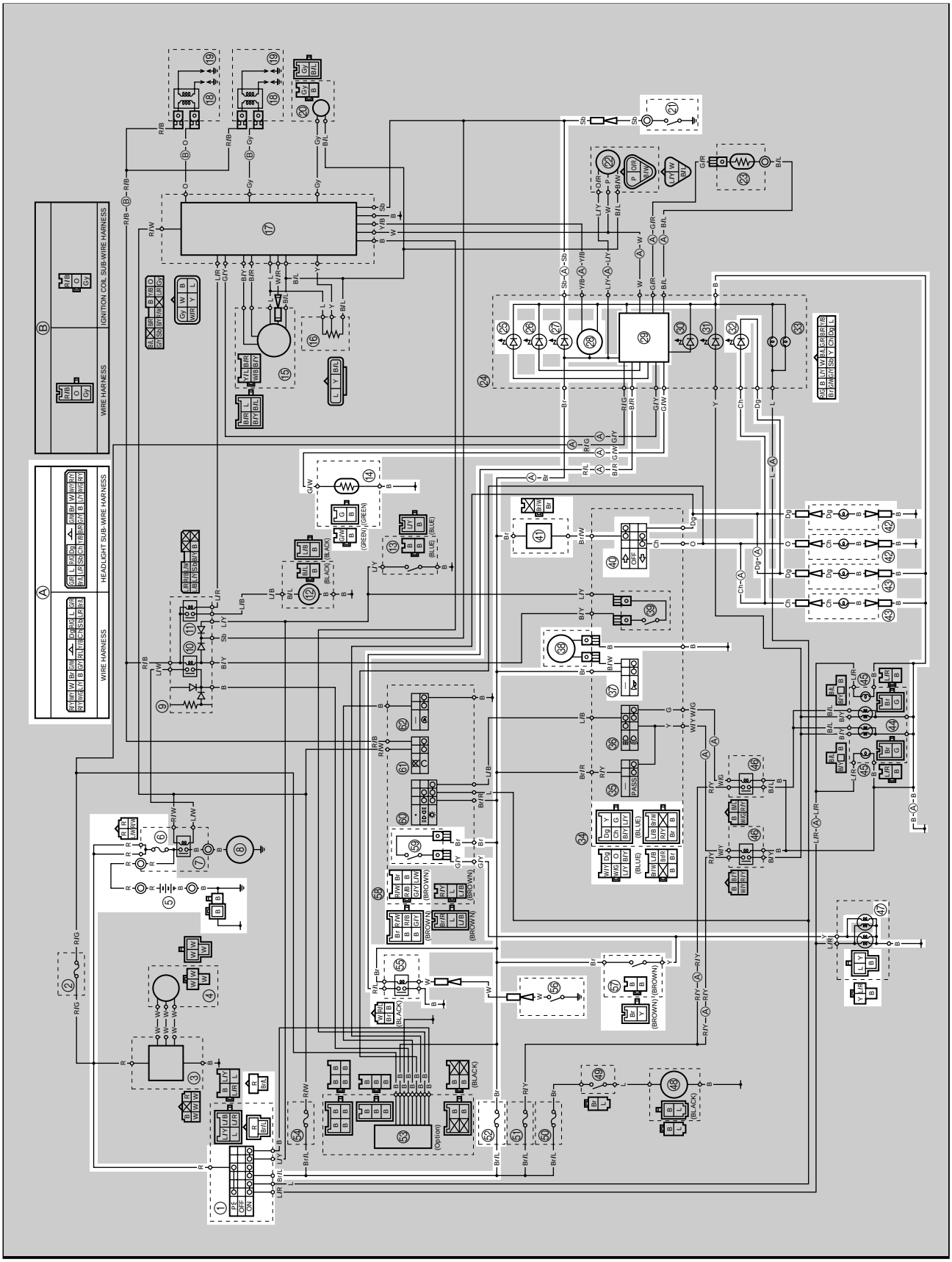


2. Install:
   • starter motor yoke ①
   • O-rings ② New
   • starter motor front cover ③
   • starter motor rear cover ④
   • bolts **5 Nm (0.5 m · kg)**

NOTE:
Align the match marks ⓐ on the starter motor yoke with the match marks ⓑ on the front and rear covers.

EB806000
SIGNALING SYSTEM

CIRCUIT DIAGRAM



EB807010
TROUBLESHOOTING

• The radiator fan motor fails to turn.
• The coolant temperature meter needle fails to move when the engine is warm.

Check:
1. main, signal system, and radiator fan motor fuses
2. battery
3. main switch
4. radiator fan motor
5. thermo switch
6. temperature sender
7. wiring
   (the entire cooling system)

NOTE:
- Before troubleshooting, remove the following part(-s):

1) rider seat
2) bottom cowling
3) front cowling inner panels
4) left side cowling
5) windshield

- Troubleshoot with the following special tool(-s).

Pocket tester
90890-03112

EB802400

1.Main, signal system and radiator fan motor fuses

- Check the main, signal system, and radiator fan motor fuses for continuity.
  Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main, signal system, and radiator fan motor fuses OK?

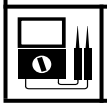
YES → NO

Replace the fuse(-s).

EB802401

2.Battery

- Check the condition of the battery.
  Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



Open-circuit voltage
12.8 V or more at 20 ˚C

- Is the battery OK?

YES → NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB802411

3.Main switch

- Check the main switch for continuity.
  Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

YES → NO

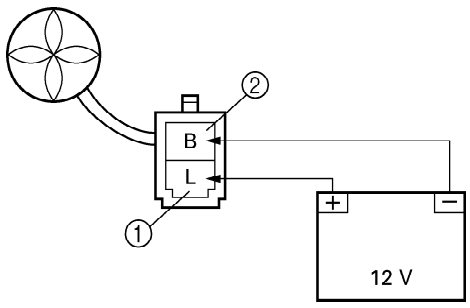
Replace the main switch.

EB807400

4.Radiator fan motor (test 1)

- Disconnect the radiator fan motor coupler from the wire harness.
- Connect the battery (12 V) as shown.

Battery positive lead → blue ①
Battery negative lead → black ②



- Does the radiator fan motor turn?

YES → NO

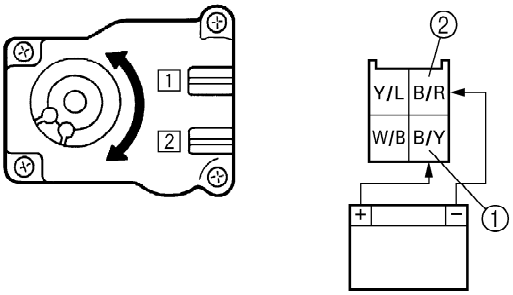
The radiator fan motor is faulty and must be replaced.

EB811402

3.EXUP servomotor operation (with the servomotor coupler disconnected from the wire harness)

- Disconnect the EXUP cables from the EXUP servomotor pulley.
- Disconnect the EXUP servomotor coupler from the wire harness.
- Connect the battery leads to the EXUP servomotor coupler (servomotor side) as shown.

Battery positive terminal → black/yellow ①
Battery negative terminal → black/red ②



- Check that the EXUP servomotor pulley rotates several times.

CAUTION:

To prevent damaging the EXUP servomotor, perform this test within a few seconds of connecting the battery.

- Does the EXUP servomotor pulley turn?

YES

NO

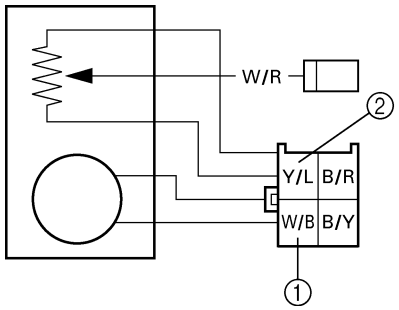
Replace the EXUP servomotor.

EB811403

4.EXUP servomotor resistance

- Disconnect the EXUP servomotor coupler from the wire harness.
- Connect the pocket tester (Ω × 1k) to the EXUP servomotor coupler.

Tester positive probe → white/black ①
Tester negative probe → yellow/blue ②

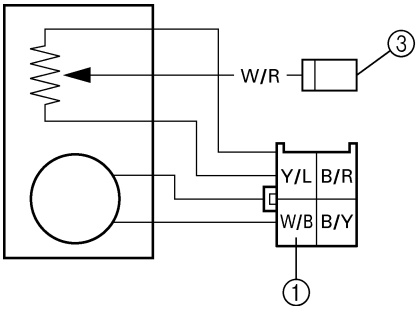


- Measure the EXUP servomotor resistance.

EXUP servomotor resistance
5.3 ~ 9.8 kΩ
(between white/black and yellow/blue)

- Connect the pocket tester (Ω × 1k) to the EXUP servomotor coupler.

Tester positive probe → white/black ①
Tester negative probe → white/red ③



- While slowly turning the EXUP servomotor pulley by hand, measure the EXUP servomotor resistance.

EXUP servomotor resistance (when the pulley is turned one full rotation)
0 ~ approximately 7.5 kΩ
(between white/black and white/red)

- Is the EXUP servomotor OK?

YES

NO

The EXUP servomotor is faulty and must be replaced.