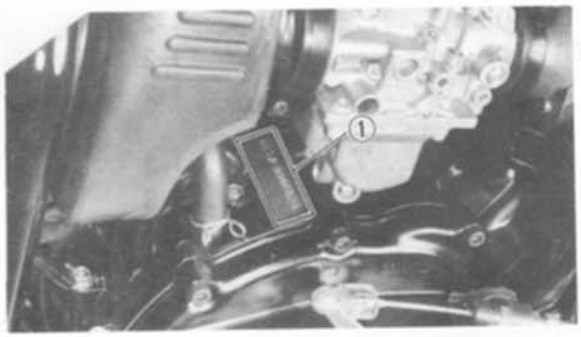


GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

FRAME SERIAL NUMBER

The frame serial number (1) is stamped into the right side of the steering head pipe.

Frame Serial Number:	
XJ600RL	49F-000101

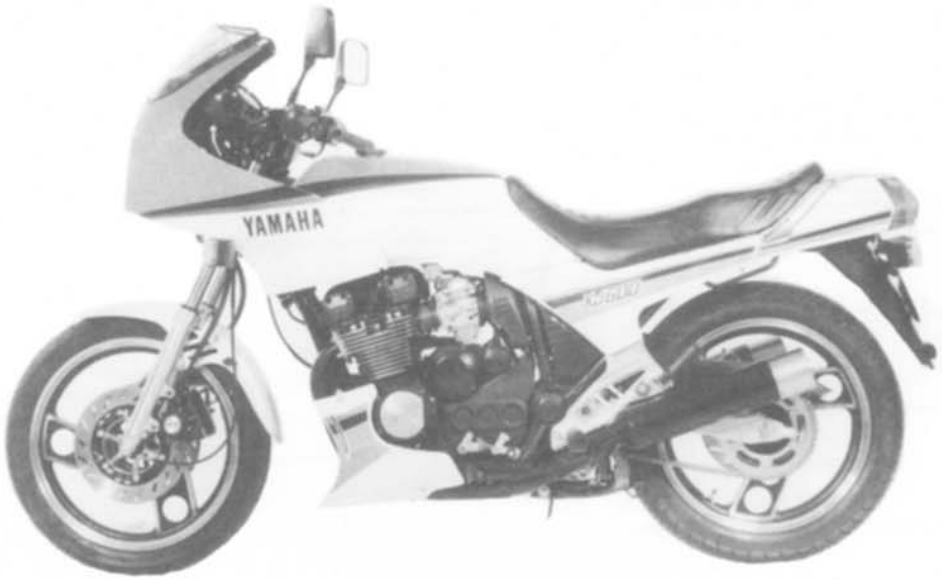
ENGINE SERIAL NUMBER

The engine serial number (1) is stamped into the elevated part of the left rear section of the engine.

NOTE:
The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.

Stating Serial Number:	
XJ600RL	49F-000101

NOTE:
Designs and specifications are subject to change without notice.



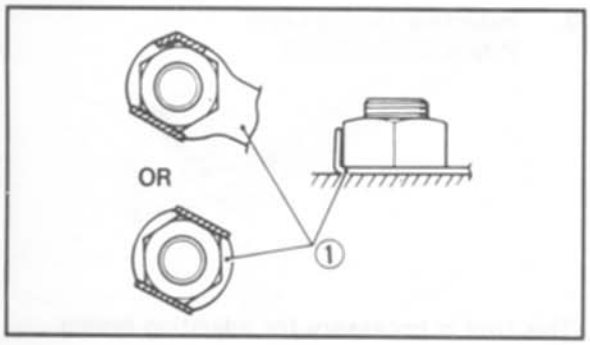
IMPORTANT INFORMATION

ALL REPLACEMENT PARTS

1. Use only genuine Yamaha parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment. Other brands may be similar in function and appearance, but inferior in quality.

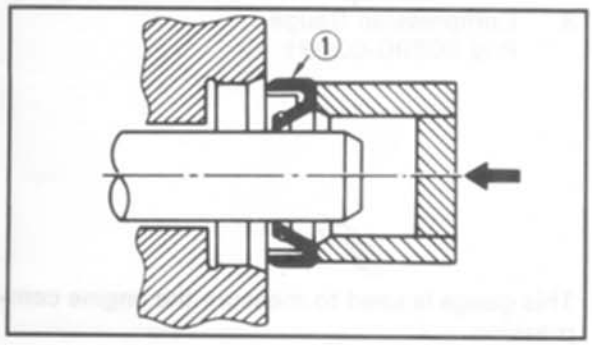
GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassmbly. Apply grease to the oil seal lips.



LOCK WASHERS/PLATES AND COTTER PINS

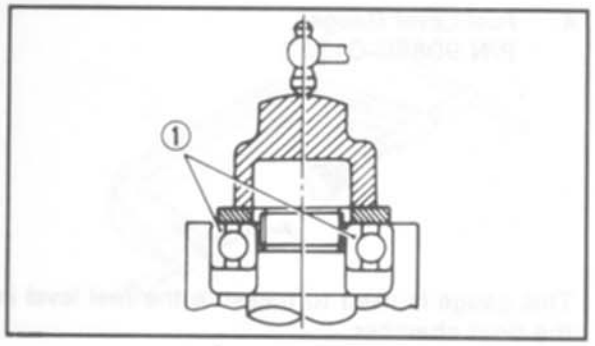
1. All lock washers/Plates ① and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.



BEARINGS AND OIL SEALS

1. Install the bearing(s) and oil seal(s) with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of light-weight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

① Oil seal



CAUTION:

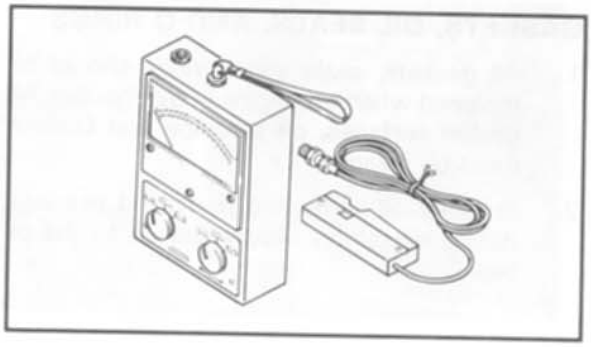
Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.

① Bearing

SPECIAL TOOLS

The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.

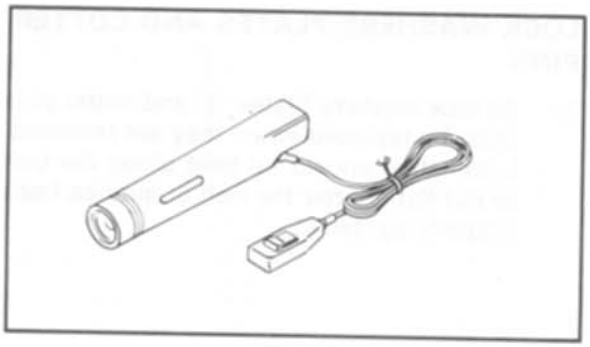
1



FOR TUNE UP

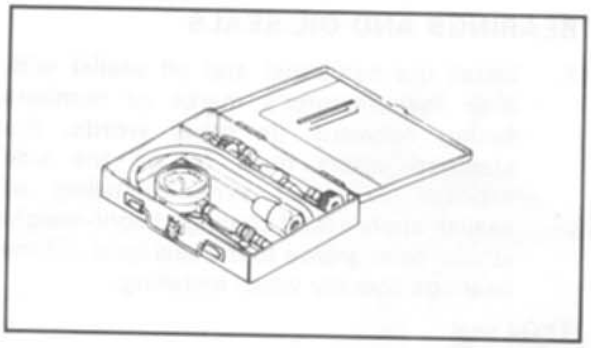
1. Inductive Tachometer
   P/N 90890-03082

This tool is needed for detecting engine rpm.



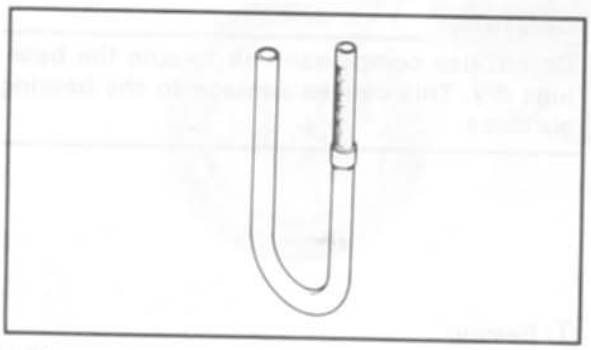
2. Inductive Timing Light
   P/N 90890-03109

This tool is necessary for adjusting timing.



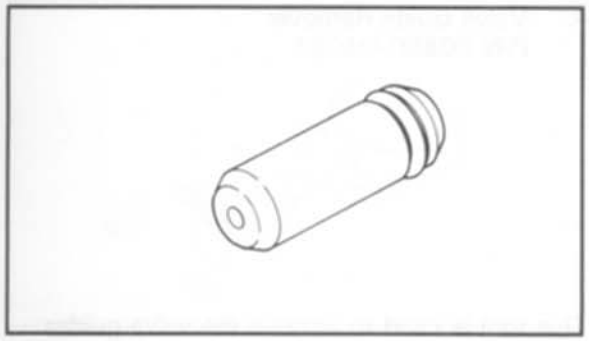
3. Compression Gauge
   P/N 90890-03081

This gauge is used to measure the engine compression.



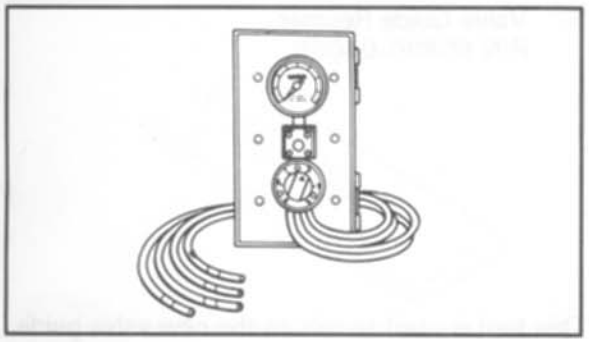
4. Fuel Level Gauge
   P/N 90890-01312

This gauge is used to measure the fuel level in the float chamber.



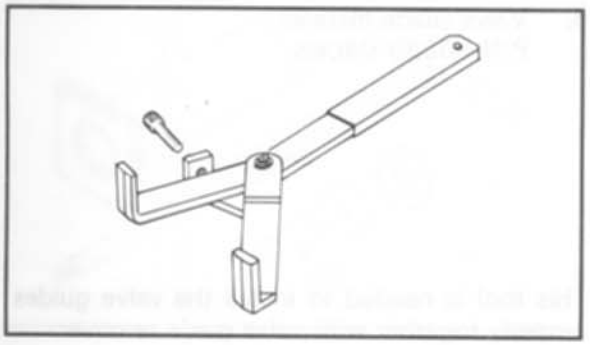
5. Fuel Level Gauge Adapter
P/N 90890-01329

This tool is needed when measuring the carburetor fuel level together with fuel level gauge.



6. Vacuum Gauge
P/N 90890-03094

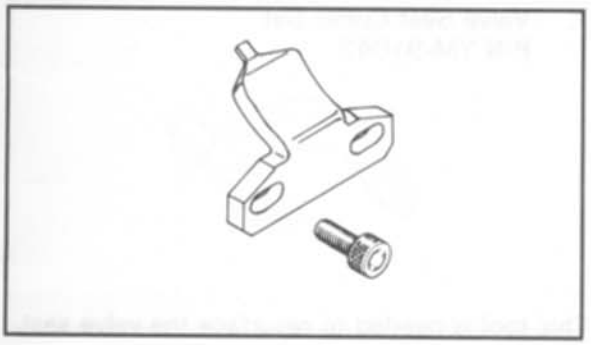
This gauge is needed for carburetor synchronization.



FOR ENGINE SERVICE

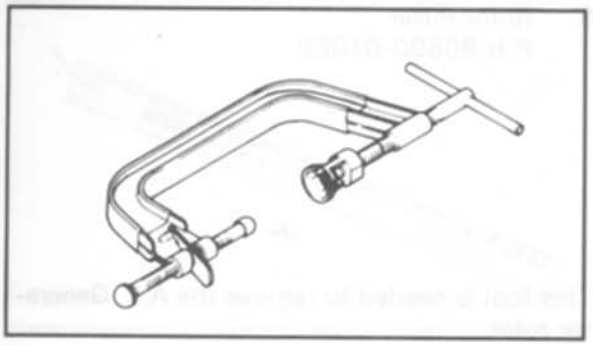
1. Universal Clutch Holder
P/N 90890-04086

This tool is used to hold the clutch when removing or installing the clutch boss locknut.



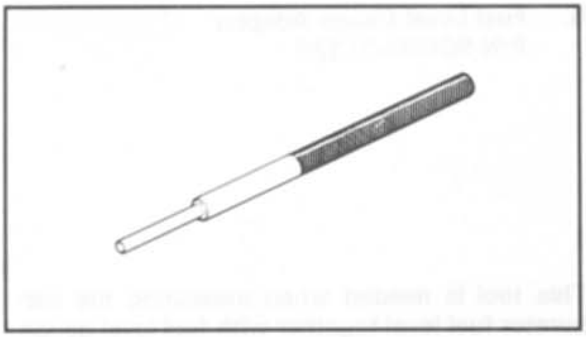
2. Tappet Adjusting Tool
P/N 90890-01245

This tool is necessary to replace valve adjusting pads.



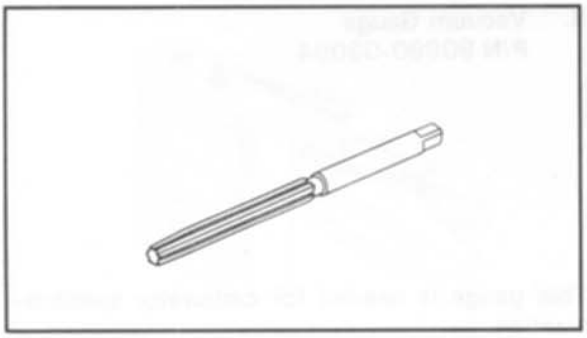
3. Valve Spring Compressor
P/N 90890-04019

This tool is needed to remove and install the valve assemblies.



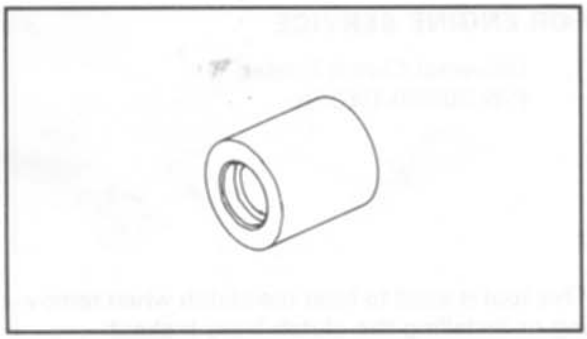
4. Valve Guide Remover
P/N 90890-04064

This tool is used to remove the valve guides.



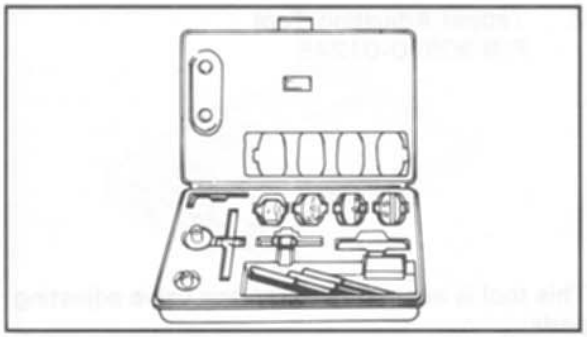
5. Valve Guide Reamer
P/N 90890-04066

This tool is used to rebore the new valve guide.



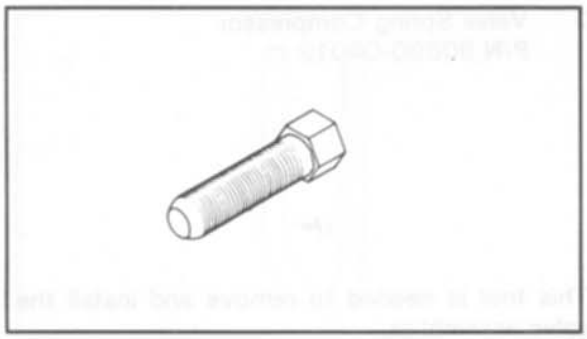
6. Valve Guide Installer
P/N 90890-04065

This tool is needed to install the valve guides properly together with valve guide remover.



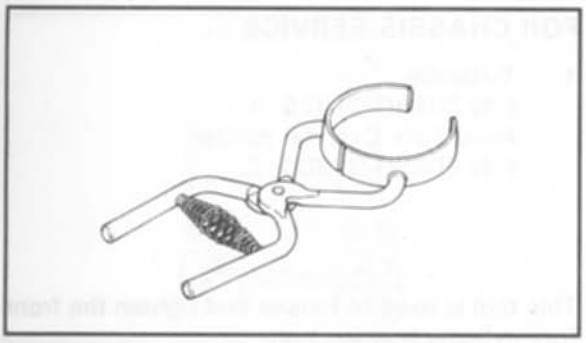
7. Valve Seat Cutter Set
P/N YM-91043

This tool is needed to resurface the valve seat.



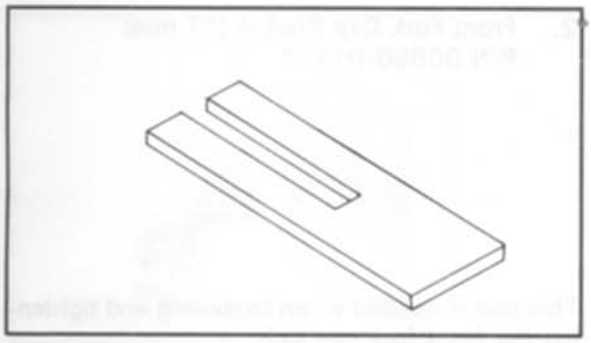
8. Rotor Puller
P/N 90890-01080

This tool is needed to remove the A.C. Generator rotor.



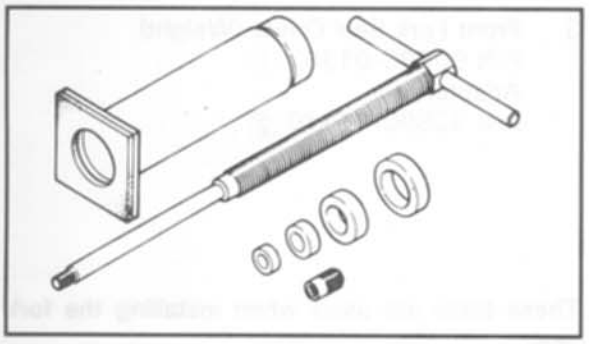
9. Piston Ring Compressor
P/N 90890-04047

This tool is used when installing the piston into the cylinder.



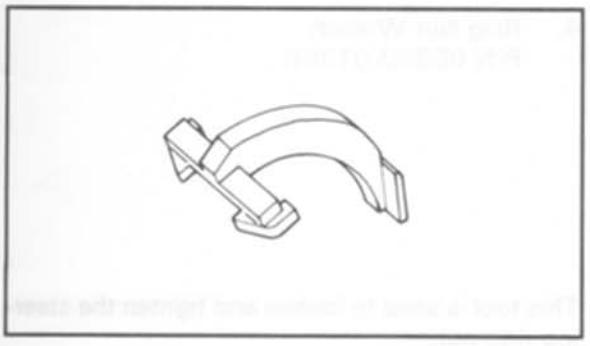
10. Piston Base
P/N 90890-01067

Use 4 of these to hold the pistons during cylinder installation.



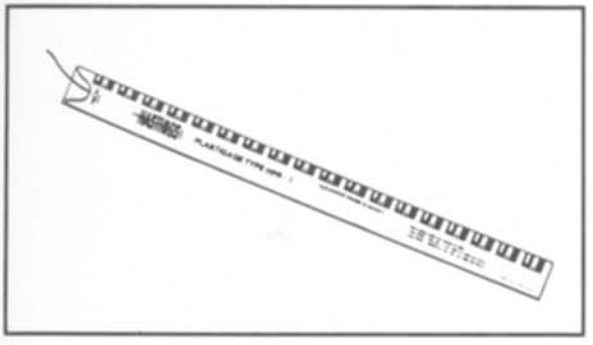
11. Piston Pin Puller
P/N YU-01304

This tool is used to remove the piston pin.



12. Rotor Holding Tool
P/N 90890-04067

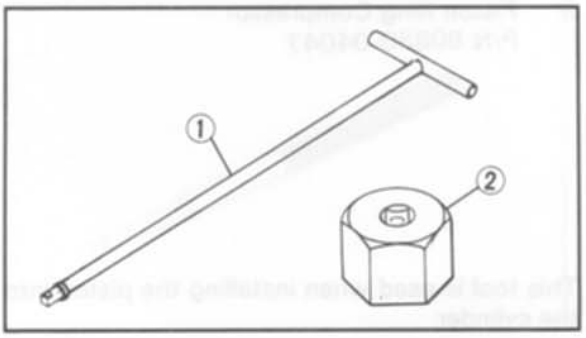
This tool is used to hold the A.C. Generator rotor during removal and installation.



13. Plastigage® Set "Green"
P/N YU-33210

This gauge is needed to measure the clearance for the connecting rod bearing.

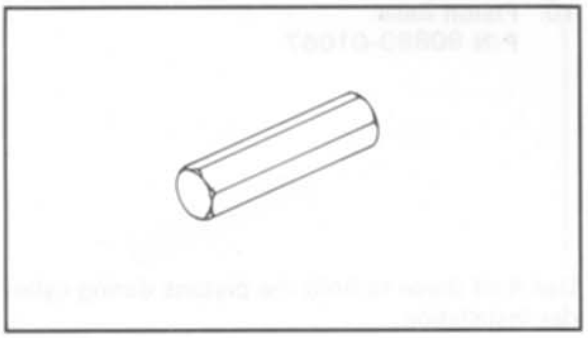
SPECIAL TOOLS



FOR CHASSIS SERVICE

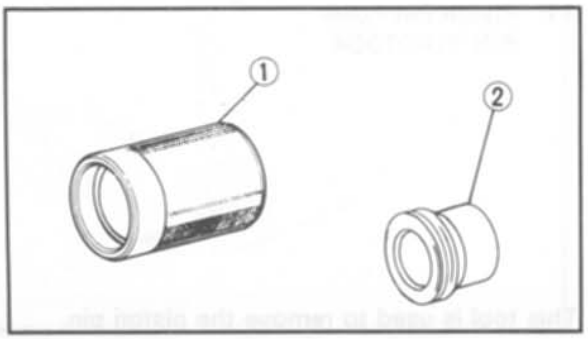
1. T-Handle
   P/N 90890-01326 ①
   Front Fork Cylinder Holder
   P/N 90890-01300 ②

This tool is used to loosen and tighten the front fork cylinder holding bolt.



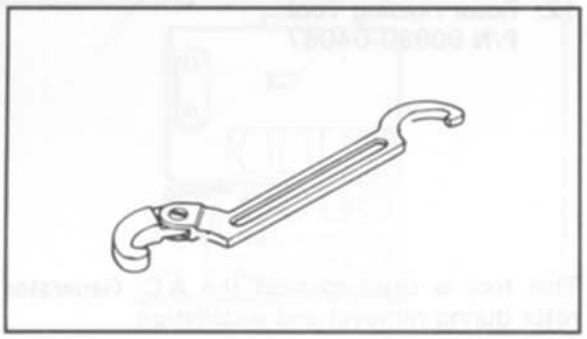
2. Front Fork Cap Socket (17 mm)
   P/N 90890-01104

This tool is needed when loosening and tightening the front fork cap bolt.



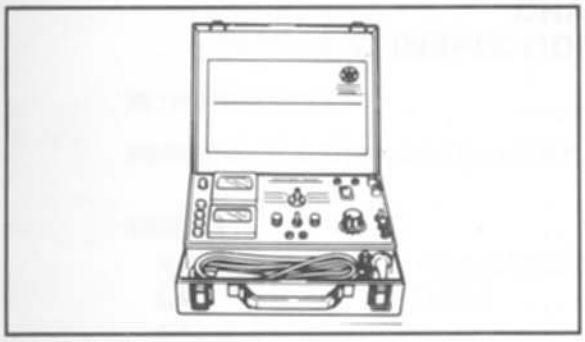
3. Front Fork Seal Driver (Weight)
   P/N 90890-01367 ①
   Adapter
   P/N 90890-01370 ②

These tools are used when installing the fork seal.



4. Ring Nut Wrench
   P/N 90890-01268

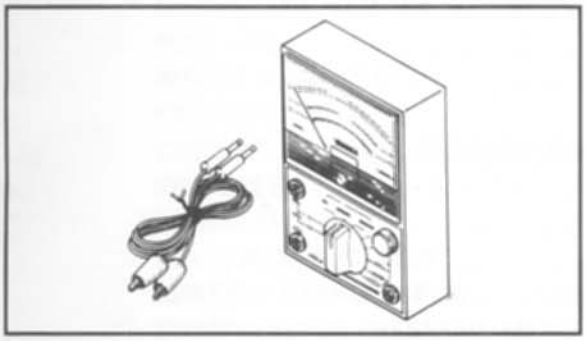
This tool is used to loosen and tighten the steering ring nut.



FOR ELECTRICAL COMPONENTS

1. Electro Tester
   P/N 90890-03021

This instrument is necessary for checking the ignition system components.



2. Pocket Tester
   P/N 90890-03021

This instrument is invaluable for checking the electrical system.

PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work wil be greatly reduced. This information applies to vehicles already in service as well as new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

Unit: km (mi)

ITEM	REMARKS	EVERY		
		BREAK-IN 1,000 (600)	6,000 (4,000) or 6 months	12,000 (8,000) or 12 months
Cam chain *	Adjust chain tension	○	○	○
Valve clearance*	Check/Adjust valve clearance.			○
Spark plug(s)	Check/Clean or replace.	○	○	Replace
Air filter	Clean. Replace if necessary.		○	○
Carburetor*	Check/Adjust/idle speed, synchronization, starter operation.	○	○	○
Fuel line*	Check fuel hose and vacuum pipe for cracks or damage.		○	○
Engine oil	Replace (Warm engine before draining).	○	○	○
Engine oil filter	Replace.	○		○
Drive chain	Check tension/alignment/clean/lube	Every 500 (300)		
Brake*	Check operation/fluid leakage/See NOTE. Adjust if necessary.		○	○
Clutch*	Check operation/Adjust if necessary.		○	○
Rear arm pivot*	Check rear arm assembly for looseness. Moderately repack every 24,000 (16,000) or 24 months.**			Check
Rear suspension* link pivots	Check operation. Apply grease lightly every 24,000 (16,000) or 24 months ***			Check
Wheels*	Check balance/damage/runout.		○	○
Wheel bearings*	Check bearings assembly for looseness/ damage. Replace if damaged.		○	○

PERIODIC MAINTENANCE/LUBRICATION INTER VALS

INSP ADJ

Unit: km (mi)

ITEM	REMARKS	BREAK-IN 1,000 (600)	EVERY 6,000 (4,000) or 6 months	EVERY 12,000 (8,000) or 12 months
Steering bearing*	Check bearings assembly for loseness. Moderately repack every 24,000 (16,000) or 24 months.**			Check
Front forks*	Check operation/oil leakage		○	○
Rear shock absorber*	Check operation/oil leakage		○	○
Fittings/Fasteners*	Check all chassis fittings and fasteners.	○	○	○
Center and sidestand	Check operation.	○	○	○
Battery*	Check specific gravity. Check breather pipe for proper operation.		○	○
A.C. Generator*	Replace generator brushes.			○

*: It is recommended that these items be serviced by a Yamaha dealer.
**: Medium weight wheel bearing grease.
***: Lithium soap base grease.

NOTE:

Brake fluid replacement:

- When disassembling the master cylinder or caliper cylinder, replace the brake fluid. Normally check the brake fluide level and add the fluid as required.
- On the inner parts of the master cylinder and caliper cylinder, replace the oil seals every two years.
- Replace the brake hoses every four year if cracked or damaged, replace immediately.

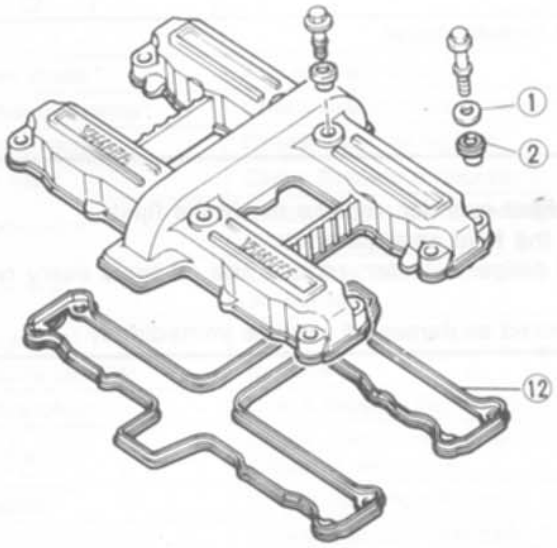
2

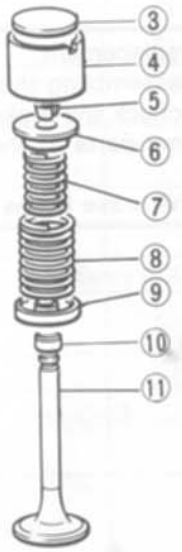
ENGINE

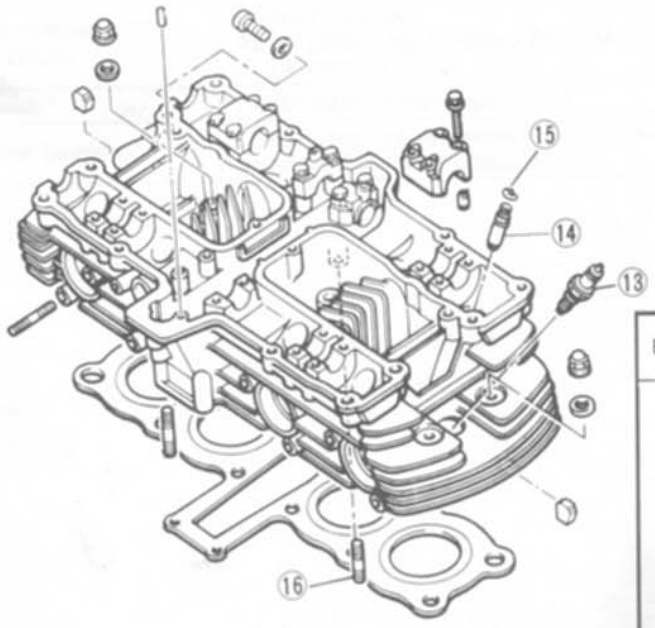
VALVE CLEARANCE ADJUSTMENT

1. Washer
2. Rubber washer
3. Pad
4. Valve lifter
5. Valve retainer
6. Spring seat
7. Inner spring
8. Outer spring
9. Spring seat
10. Oil seal
11. Valve
12. Gasket
13. Spark plug
14. Valve guide
15. Circlip
16. Stud bolt

A	VALVE CLEARANCE (COLD):	
B	Intake:	0.11 ~ 0.15 mm (0.004 ~ 0.006 in)
C	Exhaust:	0.16 ~ 0.20 mm (0.006 ~ 0.008 in)

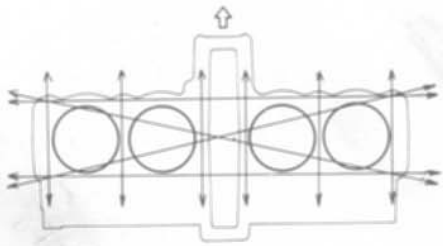






D	TYPE/GAP:
DR8ES-L	
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)	

E	CYLINDER HEAD WARP LIMIT: 0.03 mm (0.0012 in)



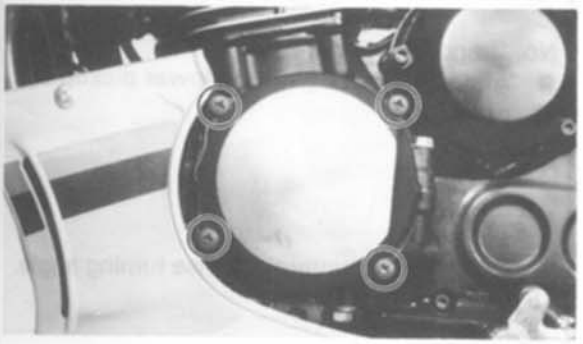
Removal

1. Remove:
   - Headlight unit assembly

2. Remove:
   - Cowling

3. Remove:
   - Side cover
   - Seat
   - Fuel tank
   - Relay assembly
   - Spark plug

4. Remove:
   - Cylinder head cover



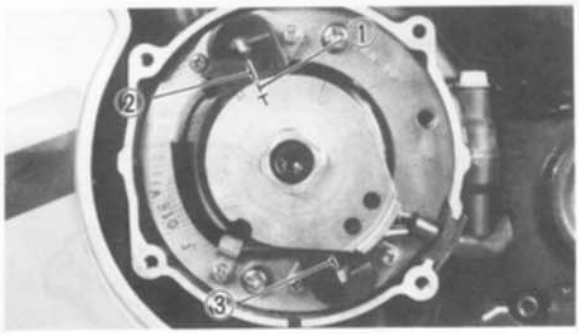
5. Remove:
   - Left crankcase cover

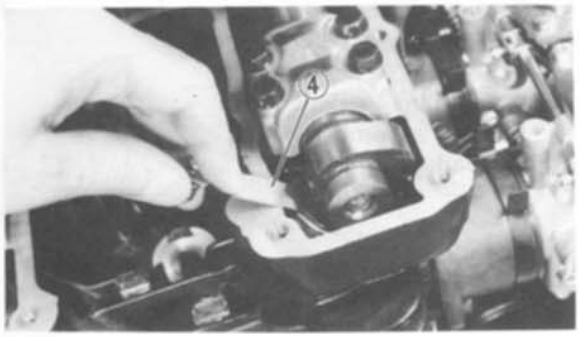
VALVE CLEARANCE ADJUSTMENT

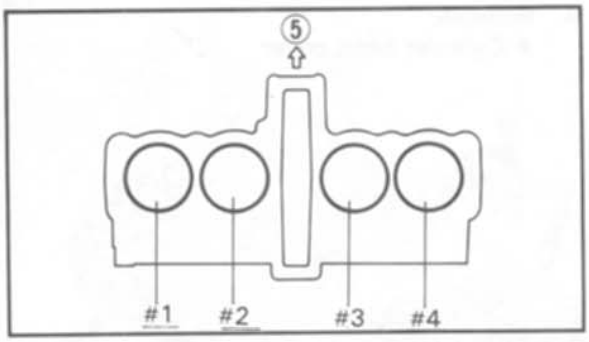
Inspection and Adjustment

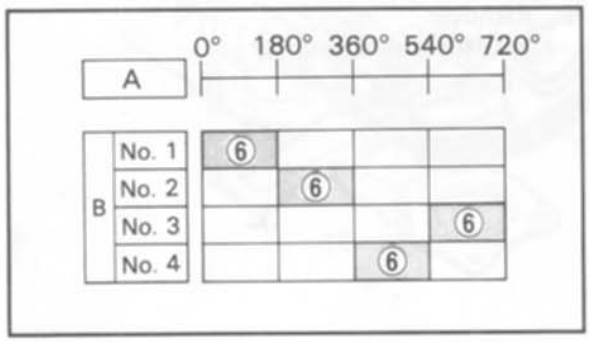
NOTE:
- Valve clearance must be measured and adjusted when the engine is cool to the touch.
- Measure and adjust valve clearance when piston is at TDC on compression stroke.

1. Measure:
   - Valve clearance









Valve Clearance Measurement Steps:
- Turn the crankshaft counterclockwise.
- Align the "T" mark ① on the timing plate with the upper pickup coil mark ② when #1 piston is at TDC on compression stroke.

③ Lower pickup coil mark.

- Measure the valve clearance using feeler gauge ④ .
- Record the measured amount if the clearance is incorrect.

Intake Valve (cold):
0.11 ~ 0.15 mm
(0.004 ~ 0.006 in)
Exhaust Valve (cold):
0.16 ~ 0.20 mm
(0.006 ~ 0.008 in)

- Measure valve clearance, in sequence, for No. 2, 4, and No. 3 cylinders.
  Out of specification → Adjust clearance.

Firing Sequence:
1 – 2 – 4 – 3

⑤ Front

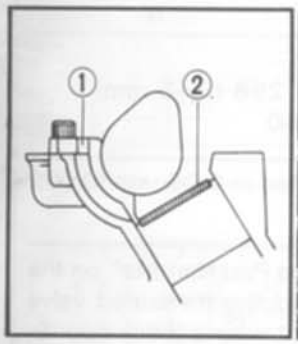
No. 2 and 3 cylinders
- Align "T" mark with the lower pickup coil mark.

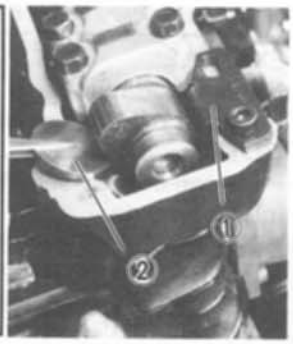
A Crankshaft counterclockwise turning angle.
B Cylinder
⑥ Combustion

No. 4 cylinder
- Align "T" mark with upper pickup coil mark

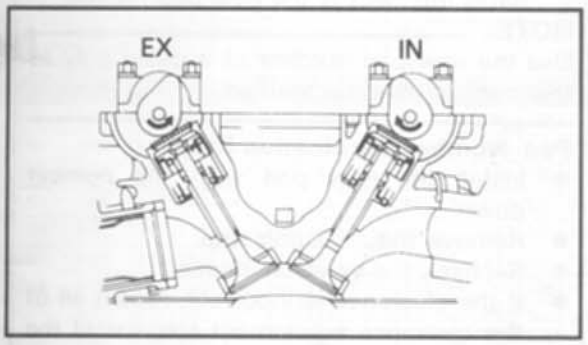
2. Adjust:
   - Valve clearance

Valve Clearance Adjustment Steps:
- Position the valve lifter slots (intake and exhaust side) facing each other.
- Depresse the valve lifer and install the Tappet Adjusting Tool (90890-01245) onto the cylinder head.





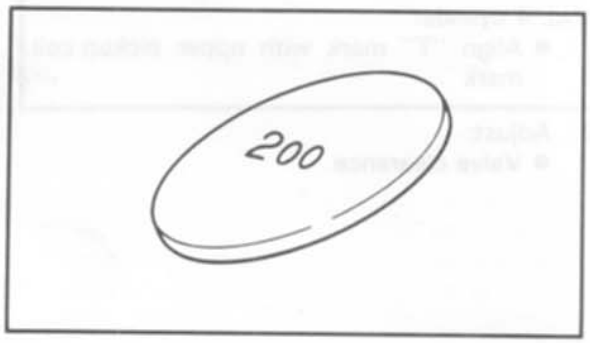
- Turn the camshaft until the lobe of the Tappet Adjusting Tool ① depresses the valve lifter.
- Remove the pads ② from the lifter. Use a small screwdriver and a magnetic rod for removal.
  Note pad numbers.



CAUTION:

Turn the camshaft as follows:
(view from left side of the motorcycle)
Intake: Carefully rotate CLOCKWISE.
Exhaust: Carefully rotate COUNTER-CLOCKWISE.

VALVE CLEARANCE ADJUSTMENT



- Select the proper valve adjusting pad from the chart below:

Pad range		Pad Availability: 25 increments
No. 200 ~ No. 320	200 mm (0.079 in) 320 mm (0.130 in)	Pads stepped in 0.05 mm (0.002 in) increments

NOTE:
The thickness of each pads is marked on the pad face that contacts the valve lifter (not the cam)

- Round off the hundredths digit of the original pad number to the nearest 0.05 mm increment.

Hundredths digit	Rounded valve
0 or 2	0
5	(NOT ROUNDED OFF)
8	10

EXAMPLE:
Original pad number = 258 (2.58 mm)
Rounded off digit = 260

NOTE:
Pads can only be selected in 0.05 mm (0.002 in) increments.

- Locate the "Installed Pad Number" on the chart, and then find the measured valve clearance. The point where these coordinates intersect is the new pad number.

NOTE:
Use the new pad number as a guide only as the number must be verified.

Pad Number Verification Steps:
- Install the new pad with the number down.
- Remove the adjusting tool.
- Recheck the valve clearance.
- If the clearance is incorrect, repeat all of the clearance adjustment steps until the proper clearance is obtained.

3. Assembly
Reverse removal steps.

Note the Following Assembly Step:
- Install head cover

Head Cover Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)

INTAKE

B MEASURED CLEARANCE	A INSTALLED PAD NUMBER																								
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320
0.00 ~ 0.05			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310
0.06 ~ 0.10		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315
0.11 ~ 0.15																									
0.16 ~ 0.20	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.21 ~ 0.25	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.26 ~ 0.30	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.31 ~ 0.35	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.36 ~ 0.40	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.41 ~ 0.45	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.46 ~ 0.50	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.51 ~ 0.55	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.56 ~ 0.60	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.61 ~ 0.65	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.66 ~ 0.70	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.71 ~ 0.75	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.76 ~ 0.80	265	270	275	280	285	290	295	300	305	310	315	320													
0.81 ~ 0.85	270	275	280	285	290	295	300	305	310	315	320														
0.86 ~ 0.90	275	280	285	290	295	300	305	310	315	320															
0.91 ~ 0.95	280	285	290	295	300	305	310	315	320																
0.96 ~ 1.00	285	290	295	300	305	310	315	320																	
1.10 ~ 1.05	290	295	300	305	310	315	320																		
1.06 ~ 1.10	295	300	305	310	315	320																			
1.11 ~ 1.15	300	305	310	315	320																				
1.16 ~ 1.20	305	310	315	320																					
1.21 ~ 1.25	310	315	320																						
1.26 ~ 1.30	315	320																							
1.31 ~ 1.35	320																								

VALVE CLEARANCE (cold):
0.11 ~ 0.15 mm (0.004 ~ 0.006 in)
Example: Installed is 250
Measured clearance is 0.32 mm (0.013 in)
Replace 250 pad with 270 pad
*Pad number : (example)
Pad No. 250 = 2.50 mm (0.098 in)
Pad No. 225 = 2.55 mm (0.100 in)
Always install pad with number down.

EXHAUST

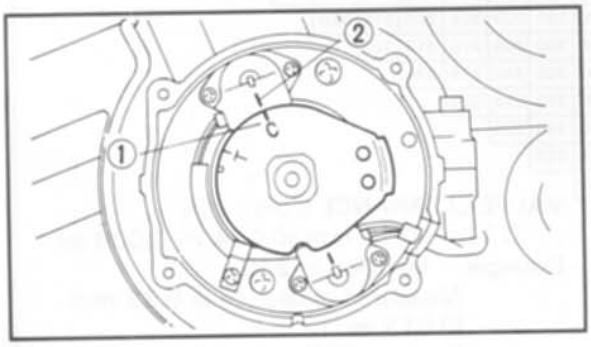
B MEASURED CLEARANCE	A INSTALLED PAD NUMBER																								
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320
0.00 ~ 0.05				200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305
0.06 ~ 0.10			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310
0.11 ~ 0.15		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315
0.16 ~ 0.20																									
0.21 ~ 0.25	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.26 ~ 0.30	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.31 ~ 0.35	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.36 ~ 0.40	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.41 ~ 0.45	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.46 ~ 0.50	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.51 ~ 0.55	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.56 ~ 0.60	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.61 ~ 0.65	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.66 ~ 0.70	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.71 ~ 0.75	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.76 ~ 0.80	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.81 ~ 0.85	265	270	275	280	285	290	295	300	305	310	315	320													
0.86 ~ 0.90	270	275	280	285	290	295	300	305	310	315	320														
0.91 ~ 0.95	275	280	285	290	295	300	305	310	315	320															
0.96 ~ 1.00	280	285	290	295	300	305	310	315	320																
1.10 ~ 1.05	285	290	295	300	305	310	315	320																	
1.06 ~ 1.10	290	295	300	305	310	315	320																		
1.11 ~ 1.15	295	300	305	310	315	320																			
1.16 ~ 1.20	300	305	310	315	320																				
1.21 ~ 1.25	305	310	315	320																					
1.26 ~ 1.30	310	315	320																						
1.31 ~ 1.35	315	320																							
1.36 ~ 1.40	320																								

VALVE CLEARANCE (cold):
0.16 ~ 0.20 mm (0.006 ~ 0.008 in)
Example: Installed is 250
Measured clearance is 0.32 mm (0.013 in)
Replace 250 pad with 265 pad
*Pad number : (example)
Pad No. 250 = 2.50 mm (0.098 in)
Pad No. 225 = 2.55 mm (0.100 in)
Always install pad with number down.

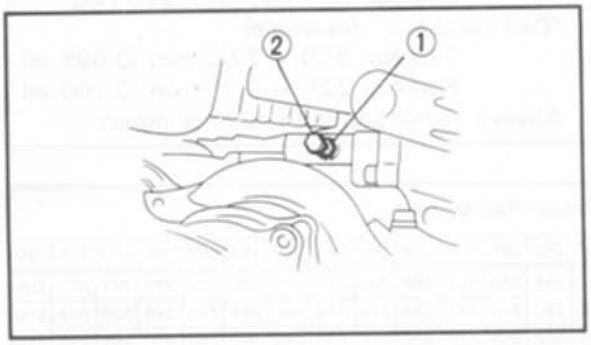
2

CAM CHAIN ADJUSTMENT

1. Remove:
   - Left crankcase cover
2. Turn:
   - Crankshaft
     (Counterclockwise)



3. Align:
   - Timing plate "C" mark ①
     (with the upper pickup coil mark ②)

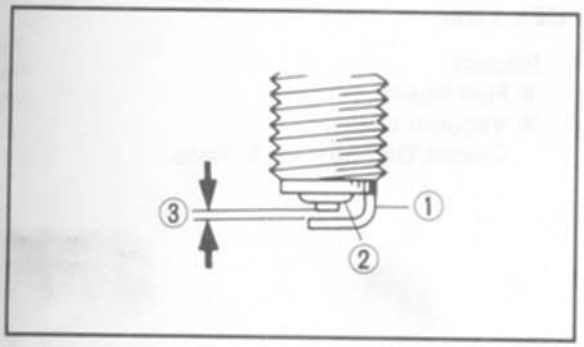


4. Loosen:
   - Tensioner locknut ①
   - Tensioner stopper bolt ②

5. Tighten:
   - Tensioner stopper bolt
   - Tensioner locknut

Stopper Bolt:
6 Nm (0.6 m·kg, 4.3 ft·lb)
Locknut:
9 Nm (0.9 m·kg, 6.5 ft·lb)

6. Install:
   - Left crankcase cover



SPARK PLUG

1. Inspect:
   - Electrode ①
     Wear/Damage → Replace.
   - Insulator color ②
2. Measure:
   - Plug gap ③
     Out of specification → Regap.
     Use a wire gauge.

Spark Plug Gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

Clean the plug with a spark plug cleaner if necessary.

Standard Spark Plug:
DR8ES-L/NGK

Before installing a spark plug, clean the gasket surface and plug surface.

3. Tighten:
   - Spark plug(s)

17.5 Nm (1.75 m·kg, 12.5 ft·lb)

NOTE:
Finger-tighten the spark plug(s) before torquing to specification.

CRANKCASE VENTILATION SYSTEM

1. Inspect:
   - Crankcase ventilation hose
     Cracks/Damage → Replace.
     (Refer to chapter 4, "CARBURETION".)

FUEL LINE/INTAKE MANIFOLD/EXHAST SYSTEM/CARBURETOR SYNCHRONIZATION

FUEL LINE

1. Inspect:
   - Fuel hoses
   - Vacuum lines
   Cracks/Damage → Replace.

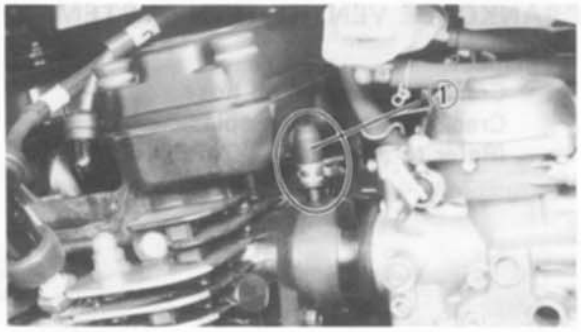
INTAKE MANIFOLD

1. Tighten:
   - Carburetor clamps
   - Carburetor joint bolts
   - Carburetor joint nuts
2. Inspect:
   - Carburetor joint
   - Gaskets
   Cracks/Damage → Replace.

EXHAUST SYSTEM

1. Inspect:
   - Exhaust pipe
   - Muffler clamp gasket(s)
   Damage → Replace.
2. Tighten:
   - Exhaust pipe bolts
   - Muffler bolts

Exhaust Pipe Joint:
20 Nm (2.0 m·kg, 14 ft·lb)
Exhaust Pipe Flange:
10 Nm (1.0 m·kg, 7.2ft·lb)
Muffler:
25 Nm (2.5 m·kg, 18ft·lb)



CARBURETOR SYNCHRONIZATION

Carburetors must be adjusted to open and close simultaneously.

NOTE:
Valve clearance must be set properly before synchronizing the carburetors.

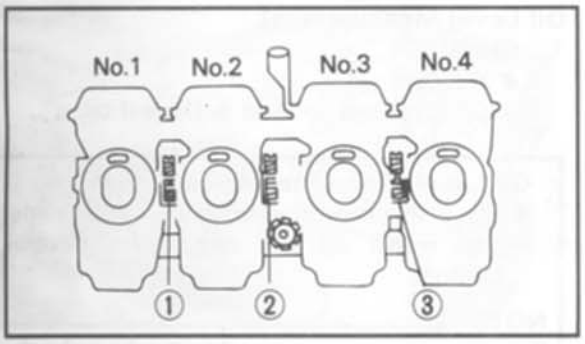
1. Remove:
   - Vacuum plugs ①

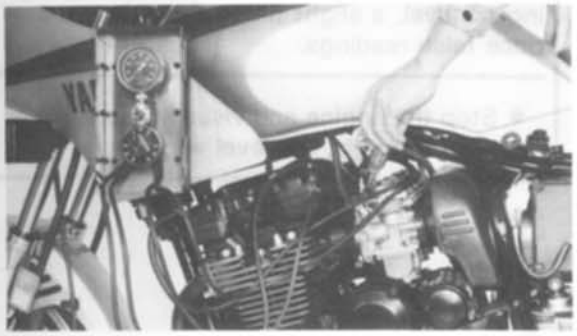
2. Remve:
   - Side cover
   - Seat
   - Fuel tank mounting bolt
3. Install:
   - Vacuum Gauge (90890-03094)
4. Start the engine and let it warm up.
5. Adjust:
   - Idle speed

   Turn throttle stop screw to adjust.

	1,200 ± 50 r/min

6. Adjust:
   - Carburetors





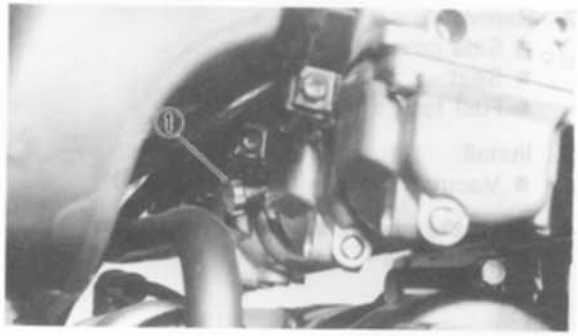
Carburetor Adjustment Steps:
- Lift up the rear of fuel tank
- Synchronize carburetor No. 1 to carburetor No. 2 by turning synchronizing screw ① until both gauges read the same.
- Rev the engine for a fraction of a second, two or three times, and check the synchronization again.

Vacuum Pressure at Idle Speed:
23.33 ± 0.6 kPa
(175 ± 5 mm Hg, 6.89 ± 0.2 in Hg)
Vacuum Synchronous Difference:
1.33 kPa (10 mm Hg, 0.4 in Hg)

- Repeat the above steps to synchronize carburetor No. 4 to carburetor No. 3 by turning synchronizing screw ③ until both gauges read the same.
- Repeat the same steps to synchronize No. 2 carburetor to No. 3 carburetor by turning synchronizing screw ② until both gauges read the same.

7. Adjust
   - Idle speed
8. Install
   - Fuel tank mounting bolt
   - Seat
   - Side cover
   - Vacuum plugs

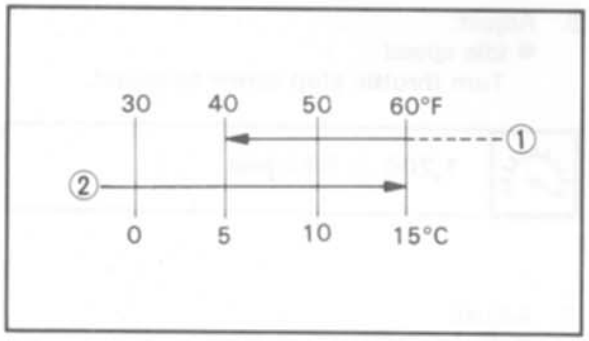
IDLE SPEED/ENGINE OIL



IDLE SPEED

1. Adjust:
   - Idle speed
     Warm up engine and turn throttle stop screw ① to adjust.

	1,200 ± 50 r/min



ENGINE OIL

	At 5°C (40°F) or Higher: **SAE 20W40 Type SE Motor Oil ①** **At 15°C (60°F) or Lower:** **SAE 10W30 Type SE Motor Oil ②**

Oil Level Measurement

1. Check
   - Oil level
     Oil level low → Add sufficient oil.

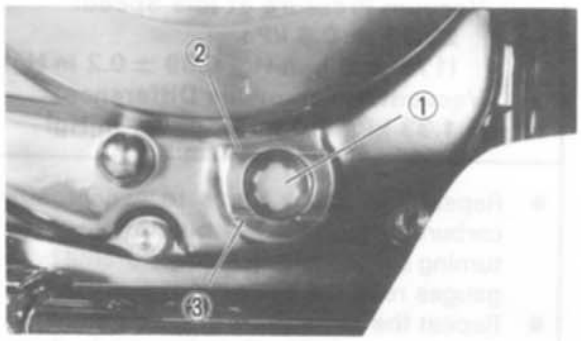
Oil Level Visual Inspection Steps:

- Place the motorcycle on its centerstand and warm up the engine for several minutes.

NOTE:

Position motorcycle straight up when checking oil level, a slight tilt to the side can produce false readings.

- Stop the engine and visually check the oil level throught the level window ① .



② Maximum
③ Minimum

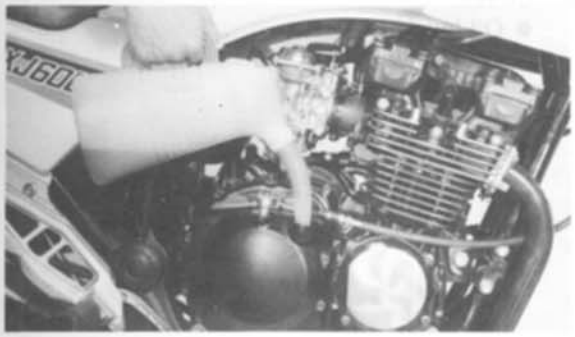
Oil Change (Without filter)

1. Remove:
   - Lower cowl
2. Warm up the engine for several minutes, then place a receptacle under the engine.

3. Remove:
   - Oil filler cap
4. Remove:
   - Drain plug (1)

   Drain the engine oil.
5. Tighten:
   - Drain plug (1)

	43 Nm (4.3 m·kg, 31 ft·lb)



6. Fill:
   - Crankcase

	2.3 L (2.0 Imp qt, 2.4 US qt)

CAUTION:

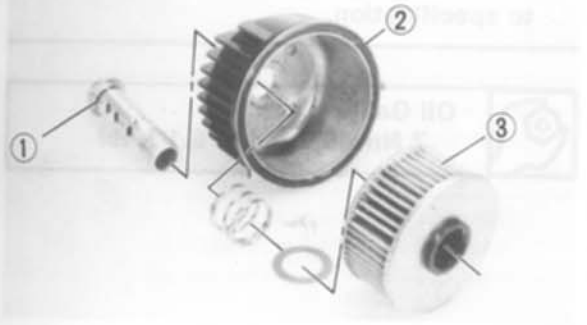
Do not allow foreign material to enter the crankcase.

7. Install:
   - Filler cap
   - Lower cowl

Oil and Filter Change (Refer to "Oil Change")

1. Warm up the engine and place a receptacle underneath.
2. Remove:
   - Lower cowl
   - Oil filler cap
   - Drain plug

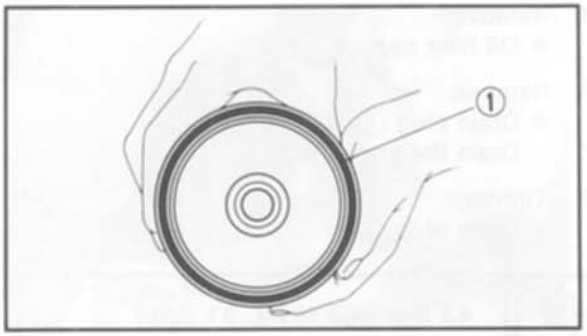
   Drain the engine oil.
3. Remove:
   - Oil filter bolt (1)
   - Filter cover (2)
   - Oil filter (3)



4. Install:
   - Drain plug

	Drain Plug: **43 Nm (4.3 m·kg, 31 ft·lb)**

   - Oil filter (New) (3)
   - Oil filter cover (2)



NOTE:
Be sure the O-ring (1) is positioned properly.

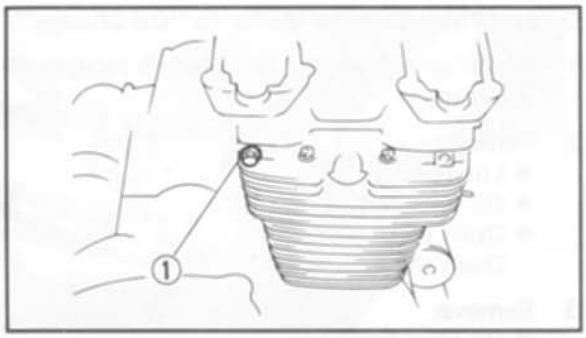
5. Tighten:
   - Oil filter bolt

15 Nm (1.5 m·kg, 11 ft·lb)

6. Fill:
   - Crankcase

2.6 L (2.3 Imp qt, 2.7 US qt)

7. Install:
   - Oil filler cap
   - Lower cowl
8. Warm up engine and check for oil leaks. Stop engine instantly if leaking occurs.
   Leaks → Check cause.
9. Check:
   - Oil level
     Level low → Add sufficient oil.



CAUTION:
After replacing the engine oil, be sure to check the oil flow in the follwing procedures:
- **Slightly loosen the oil gallery bolt (1) in the cylinder head.**
- **Start the engine and keep it idling until oil begins to seep from the oil gallery bolt. If no oil comes out after one minute, turn the engine off so it will not seize.**
- **Restart the engine after solving the problem(s), and recheck the oil pressure.**
- **After checking, tighten the oil gallery bolt to specification.**

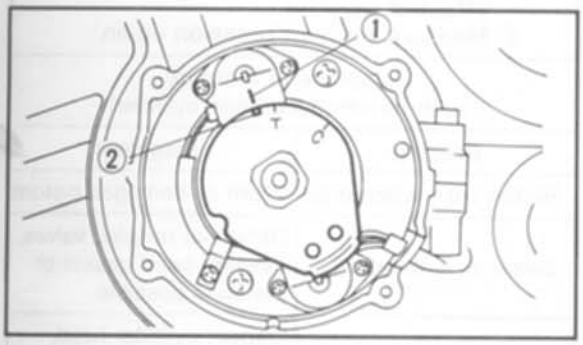
Oil Gallery Bolt:
7 Nm (0.7 m·kg, 5.1 ft·lb)

CLUTCH ADJUSTMENT

1. Loosen:
   - Adjuster locknut ①
2. Adjust:
   - Clutch lever free play ⓐ
     (by turning adjuster ② in or out)

Free play:
10 ~ 15 mm (0.4 ~ 0.6 in)

3. If free play can not be adjusted, adjust by clutch cable length adjuster.
4. Loosen:
   - Adjuster locknut ①
5. Adjust:
   - Clutch lever free play
     (by turning clutch cable length adjuster ② .)

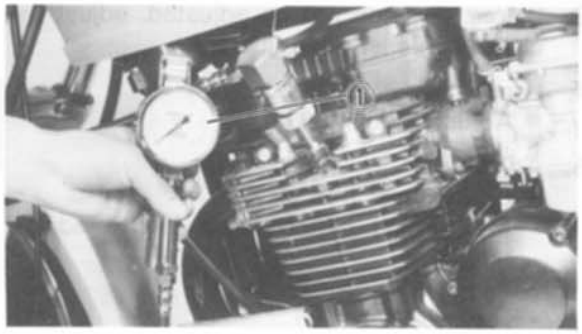


IGNITION TIMING CHECK

1. Check:
   - Ignition timing

Ignition Timing Check Steps:
- Remove the left crankcase cover.
- Connect the Timing Light (90890-03109) to No. 1 or No. 4 cylinder spark plug cord.
- Warm up the engine and let it idle at the standard idle speed.
- Visually check the upper pickup coil mark 1 is within the firing range 2 indicated on timing plate.

Incorrect firing range → Check flywheel and/or pickup assembly (tightness damage)
Refer to Chapter 6, "ELECTRICAL" for further information.



COMPRESSION PRESSURE MEASUREMENT

NOTE:
Insufficient compression pressure will result in performance loss.

1. Measure:
   - Valve clearance
     Out of specification → Adjust.
   Warm up the engine.
2. Remove:
   - Spark plugs

Compression Pressure Measurement Steps:
- Install the Compression Gauge (90890-03081) ① using an adapter.
- Crank over the engine with the electric starter (be sure the battery is fully charged) with the throttle wide open until the compression reading on the gauge stabilizes.
- Check readings with specified levels (See chart).

Compression Pressure (at sea level):
Standard:
1,079 kPa (11 kg/cm², 156 psi)
Minimum:
980 kPa (10 kg/cm², 142 psi)
Maximum:
1,128 kPa (11.5 kg/cm², 164 psi)

WARNING:
When cranking the engine, ground spark plug lead to prevent sparking.

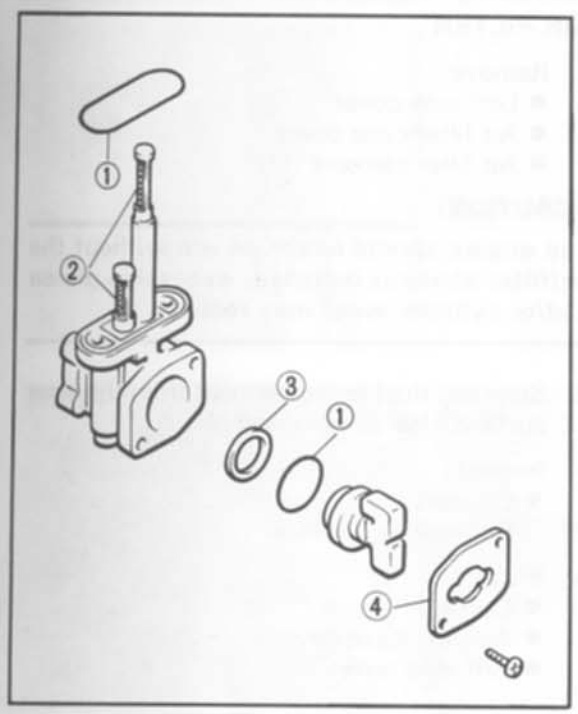
- Repeat the previous steps for the other cylinders.
- If pressure falls bellow the minimum level:
  1. Squirt a few drops of oil into the affected cylinder.
  2. Measure the compression again.

Compression Pressure
(with oil introduced into cylinder)

Reading	Diagnosis
Higher than without oil	Worn or damaged pistons
Same as without oil	Defective rintg(s), valves, cylinder head gasket or piston is possible.
Above maximum level	Inspect cylinder head, valve surfaces, or piston crown for carbon deposits.

NOTE:
The difference between the highest and lowest cylinder compression readings must not vary more than the specified value.

Difference Between Each Cylinder:
Less than 98 kPa (1 kg/cm², 14 psi)



CHASSIS

FUEL COCK

1. O-ring
2. Filter screen
3. Gasket
4. Cock plate

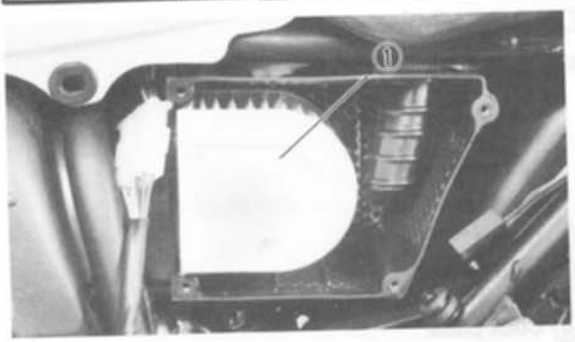
Removal and Inspection

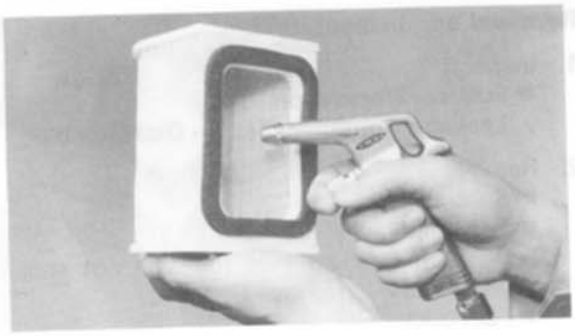
1. Inspect:
   - Fuel cock operation
     Leakage/Contamination → Disassemble
2. Remove:
   - Seat
   - Fuel tank
     Position tank so that fuel will not spill when cock is removed.
   - Fuel cock
3. Inspect:
   - Filter screen
     Contamination → Replace screen.
4. Remove:
   - Screws
   - Cock plate
   - O-ring
   - Gasket
5. Inspect:
   - Fuel cock components (all)
     Damage → Replace.
   - Diaphragm
     Damage → Replace cock assembly.
6. Inspect:
   - Gasket surfaces
     Scratches/Corrosion → Replace cock assembly.

NOTE:
Drain and flush fuel tank if abrasive damage to any components is evident.

7. Assemble:
   - Fuel cock
8. Install:
   - Fuel cock
     (On to fuel tank)

AIR FILTER/FRONT AND REAR BRAKE





AIR FILTER

1. Remove:
   - Left side cover
   - Air filter case cover
   - Air filter element ①

CAUTION:

The engine should never be run without the air/filter element installed; excessive piston and/or cylinder wear may result.

2. Blow out dust in the element from the inner surface. Use compressed air.
3. Inspect:
   - Element
     Damage → Replace.
4. Install:
   - Element
   - Air filter case cover
   - Left side cover

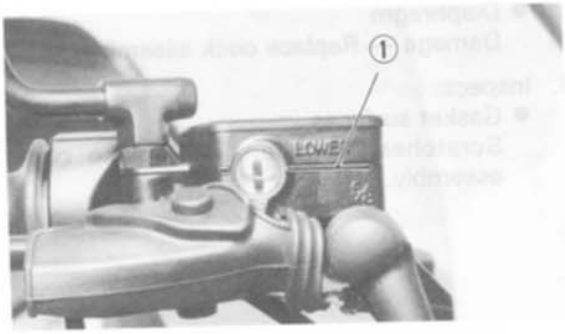
FRONT AND REAR BRAKE

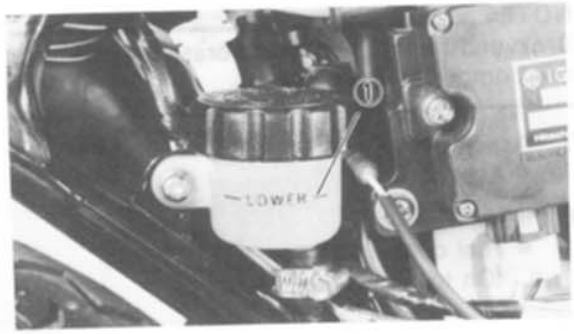
Brake Fluid Inspection

① Check:
- Brake fluid level

Fluid at lower level → Replenish.

① Front brake fluid lower level



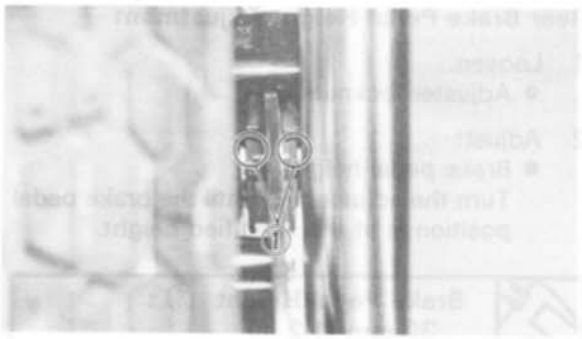


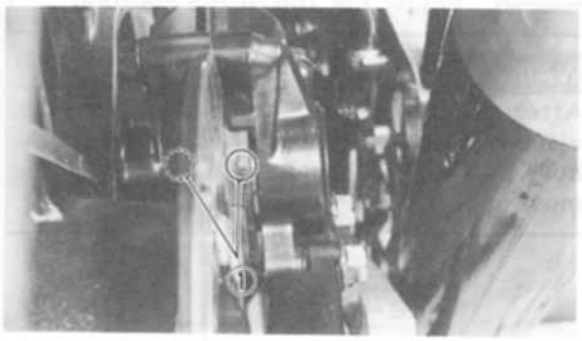
Brake Fluid: DOT #3

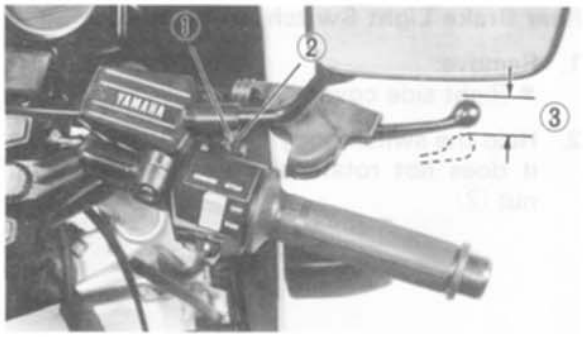
WARNING:

- **Use only designated qualty brake fluid to avoid poor brake performance.**
- **Refill with same type and brand of brake fluid; mixing fluids could result in poor brake performance.**
- **Be sure that water or other contaminants do not enter master cylinder when refilling.**
- **Clean up spilled fluid immediately to avoid erosion of painted surfaces or plastic parts.**

① Rear brake fluid lower level







Brake Pad Inspection

1. Depress the brake lever.
2. Inspect:
   - Wear indicator
     Indicator almost contacts disc → Replace pads.
     (Refer to Chapter 5 "CHASSIS")

① Front brake pad wear indicator

① Rear brake pad wear indicator

Front Brake Lever Free Play Adjustment

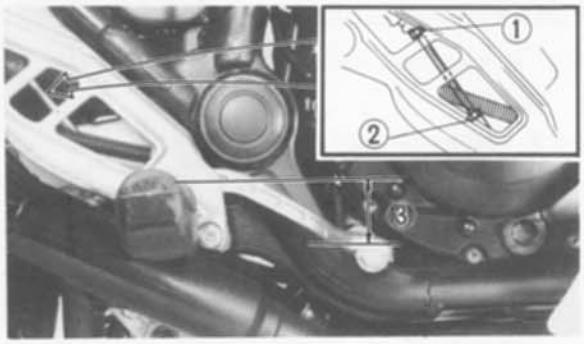
1. Loosen:
   - Adjuster locknut ①
2. Adjust:
   - Free play
     Turn the adjuster ② until the free play ③ is within the specified limits.

5 ~ 8 mm (0.2 ~ 0.3 in)

CAUTION:

Proper lever free play is essential to avoid excessive brake drag.

3. Tighten:
   - Adjuster locknut



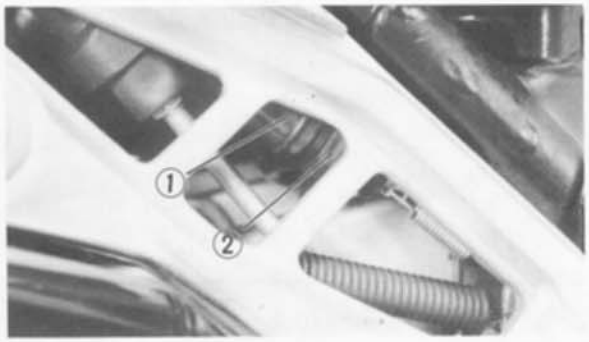
Rear Brake Pedal Height Adjustment

1. Loosen:
   - Adjuster locknuts ①
2. Adjust:
   - Brake pedal height.
     Turn the adjuster ② until the brake pedal position is at the specified height.

Brake Pedal Height ③ :
30 mm (1.2 in)
Below the Top of the Footrest

WARNING:

After adjusting the brake pedal height, visually check the adjuster end through the hole of the joint holder. The adjuster end must appear within this hole.



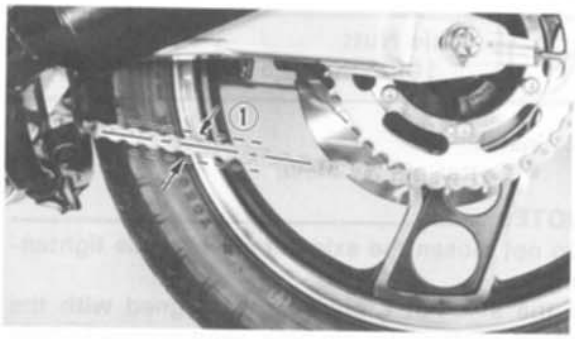
Rear Brake Light Switch Adjustment

1. Remove:
   - Right side cover
2. Hold the switch body ① with your hand so it does not rotate and turn the adjusting nut ②

DRIVE CHAIN

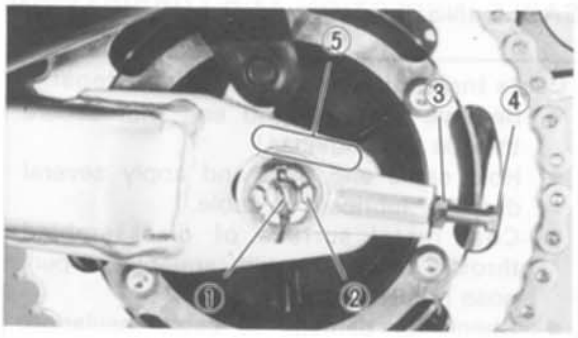
Drive Chain Tension Check

NOTE:
Before checking and/or adjusting, rotate the rear wheel through several revolutions and check the tension several times to find the tightest point. Check and/or adjust chain tension with rear wheel in this "tight chain" position.



1. Lift the rear wheel by apling centerstand.
2. Measure:
   - Chain deflection (1)
   (at the position shown in the photograph.)
   Out of specification → Adjust chain

Chain Deflection:
20 ~ 30 mm (0.8 ~ 1.2 in)



Drive Chain Tension Adjustment

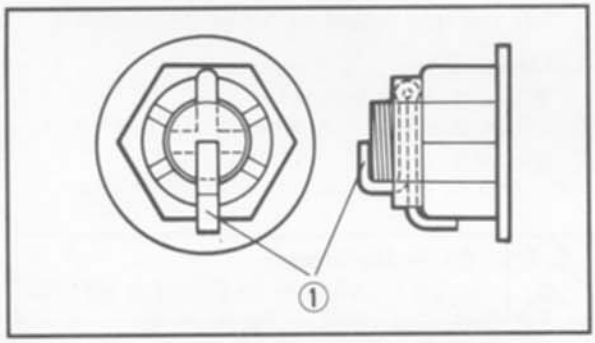
1. Remove:
   - Cotter pin (1)
2. Loosen:
   - Axle nut (2)
   - Chain puller locknut (3)

   (4) Adjusting bolt
   (5) Mark for alignment
3. Adjust:
   - Chain tension
   (by turninpg adjusting bolt in or out)

Adjusting bolt	Chain tension
Turn in	Tighten
Turn out	Loosen

NOTE:
There are marks on each side of rear arm and on each chain puller; use them to check for proper alignment.

4. Tighten:
   - Locknut
   - Axle nut



Axle Nut:
105 Nm (10.5 m·kg, 75 ft-lb)

5. Install:
   - Cotter pin (1) (new)

NOTE:
Do not loosen the axle nut after torque tightening.
If the axle nut groove is not aligned with the wheel shaft cotter pin hole, align groove to hole by tightening up on the axle nut.

CABLE INSPECTION AND LUBRICATION

Cable Inspection and Lubrication Steps:
- Remove the two grip end that secure throttle to handlebar.
- Hold cable end high and apply several drops of lubricant to cable.
- Coat metal surface of disassembled throttle twist grip with suitable all-purpose grease to minimize friction.
- Check for damage to cable insulation. Replace any corroded or obstructed cables.
- Lubricate any cables that do not operate smoothly.

SAE 10W30 Motor Oil

BRAKE AND CHANGE PEDALS/ BRAKE AND CLUTCH LEVERS

Lubricate pivoting parts of each lever and pedal.

	SAE 10W30 Motor Oil

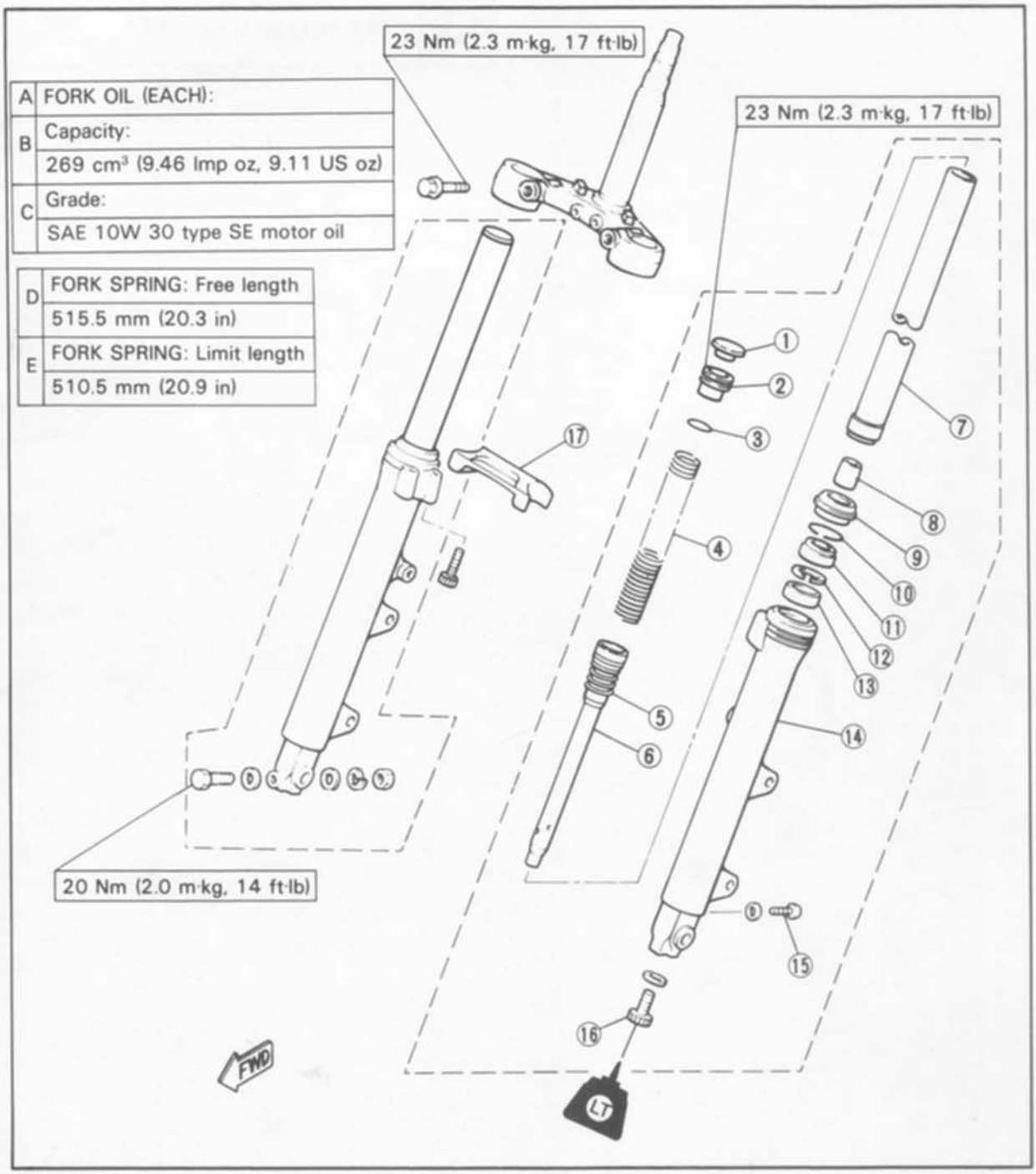
CENTERSTAND AND SIDESTAND

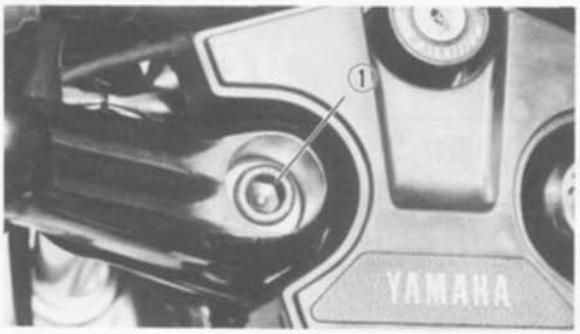
Lubricate centerstand and sidestand at their pivot points.

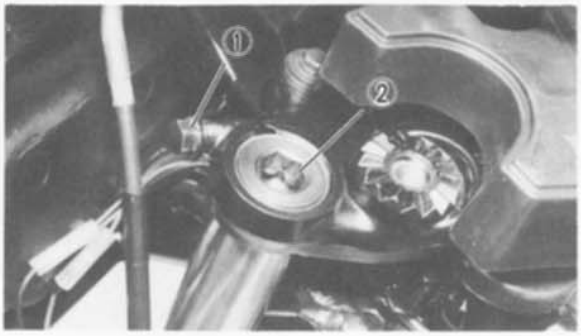
	SEA 10W30 Motor Oil

FRONT FORK OIL CHANGE

1. Rubber cap
2. Cap bolt
3. O-ring
4. Fork spring
5. Damper rod spring
6. Damper rod
7. Inner fork tube
8. Taper spindle
9. Dust cover
10. Retaining clip
11. Oil seal
12. Washer
13. Bushing
14. Outer fork tube
15. Drain bolt
16. Damper rod securing bolt
17. Front fork brace







WARNING:

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

1. Remove:
   - Handlebar installing bolt ①
   - Handlebar

2. Loosen:
   - Upper front fork pinch bolt ①

3. Remove:
   - Fork cap bolts ②
     Use Front Fork Cap Socket (90890-01104)

4. Remove:
   - Drain screws ①
     Drain the fork oil.

WARNING:

Do not allow any oil to contact the disc brake components. If oil is discovered, be sure to remove it, otherwise diminished braking capacity and damage to the rubber components of the brake assembly will occur.

5. Inspect:
   - Cap bolt O-ring ①
   - Drain screw gaskets
     Wear/Damage → Replace.

6. Install:
   - Drain screws

7. Fill:
   - Front forks

Each Fork:
269 cm³ (9.46 Imp oz, 9.1 US oz)
SEA 10W30 Type SE Motor Oil

After filling pump the forks slowly up and down to distribute the oil.

8. Tighten:
   - Cap bolts
   - Pinch bolts

	Cap Bolt: **23 Nm (2.3 m·kg, 17 ft·lb)** **Pinch Bolt:** **23 Nm (2.3 m·kg, 17 ft·lb)**

9. Install:
   - Handles

2

SHOCK ABSORBER ADJUSTMENT

1. Remove:
   - Right side cover
2. Adjust
   - Shock absorber preload

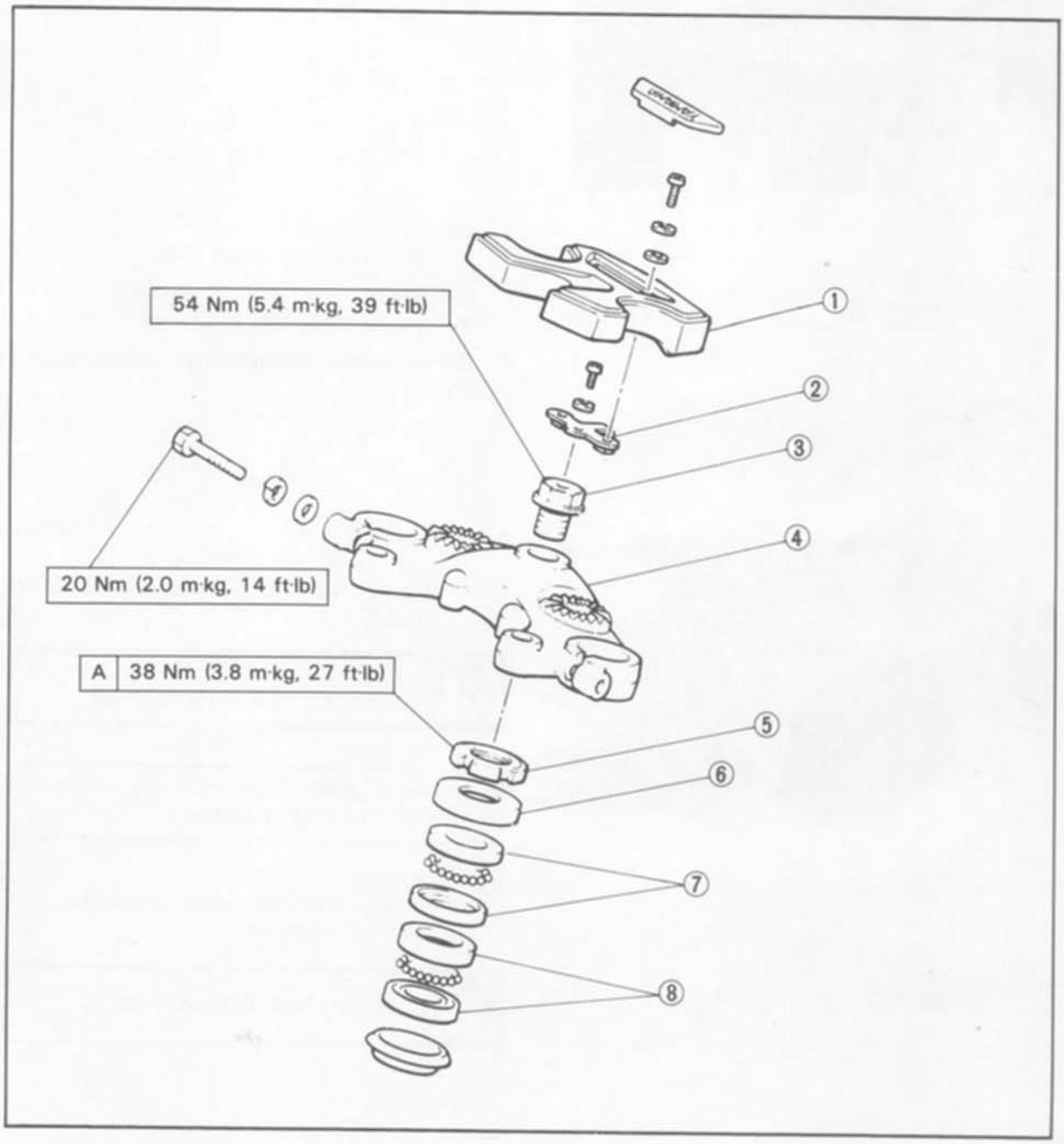
	← Stiffer			Std.	Softer
Adjusting position	5	4	3	2	1

① Macth mark

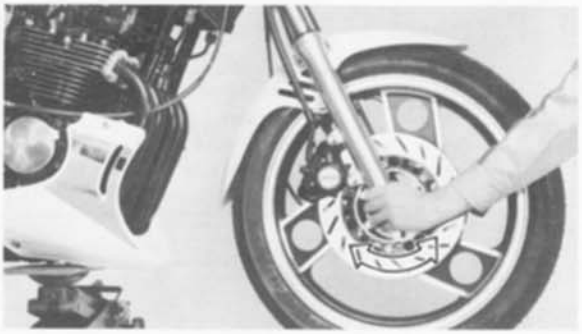
STEERING HEAD

1. Handle cover
2. Washer
3. Stering stem bolt
4. Handle crown
5. Ring nut
6. Bearing cover
7. Upper bearing races
8. Lower bearing races
9. Bearing (Upper)
10. Bearing (Lower)

A	• Tight specified torque. • If steering is binded loosen the ring nut so that there is no free play on bearing.



STEERING HEAD



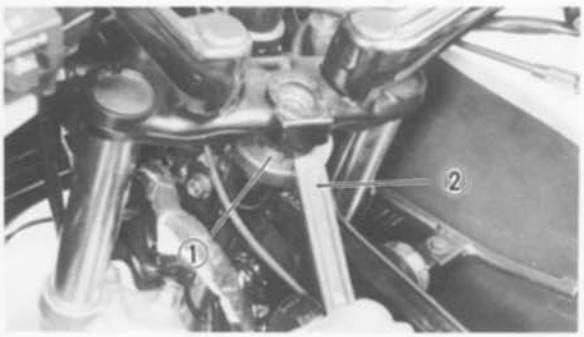
Steering Head Inspection

1. Place the motorcycle on its centerstand, then elevate the front wheel.
2. Check:
   - Steering assembly bearings
     Grasp the bottom of the forks and gently rock the fork assembly back and forth.
     Looseness → Adjust steering head.

Steering Head Adjustment

1. Remove:
   - Handle cover
   - Washer ①

2. Loosen:
   - Upper front fork pinch bolts
3. Remove:
   - Steering stem bolt
4. Lift the handle crown and handlebar assembly.



5. Tighten:
   - Ring nut ①
     Use the Ring Nut Wrench ② (90890-01268)

	Ring Nut **38 Nm (3.8 m·kg, 27ft·lb)**

NOTE:
If steering is binded, loosen the ring nut so that there is no free play on bearing.

6. Install:
   - Handle crown/Handlebar assembly
   - Steeringf stem bolt

	54 Nm (5.4 m·kg, 39ft·lb)

7. Tighten:
   - Upper front fork pinch bolts

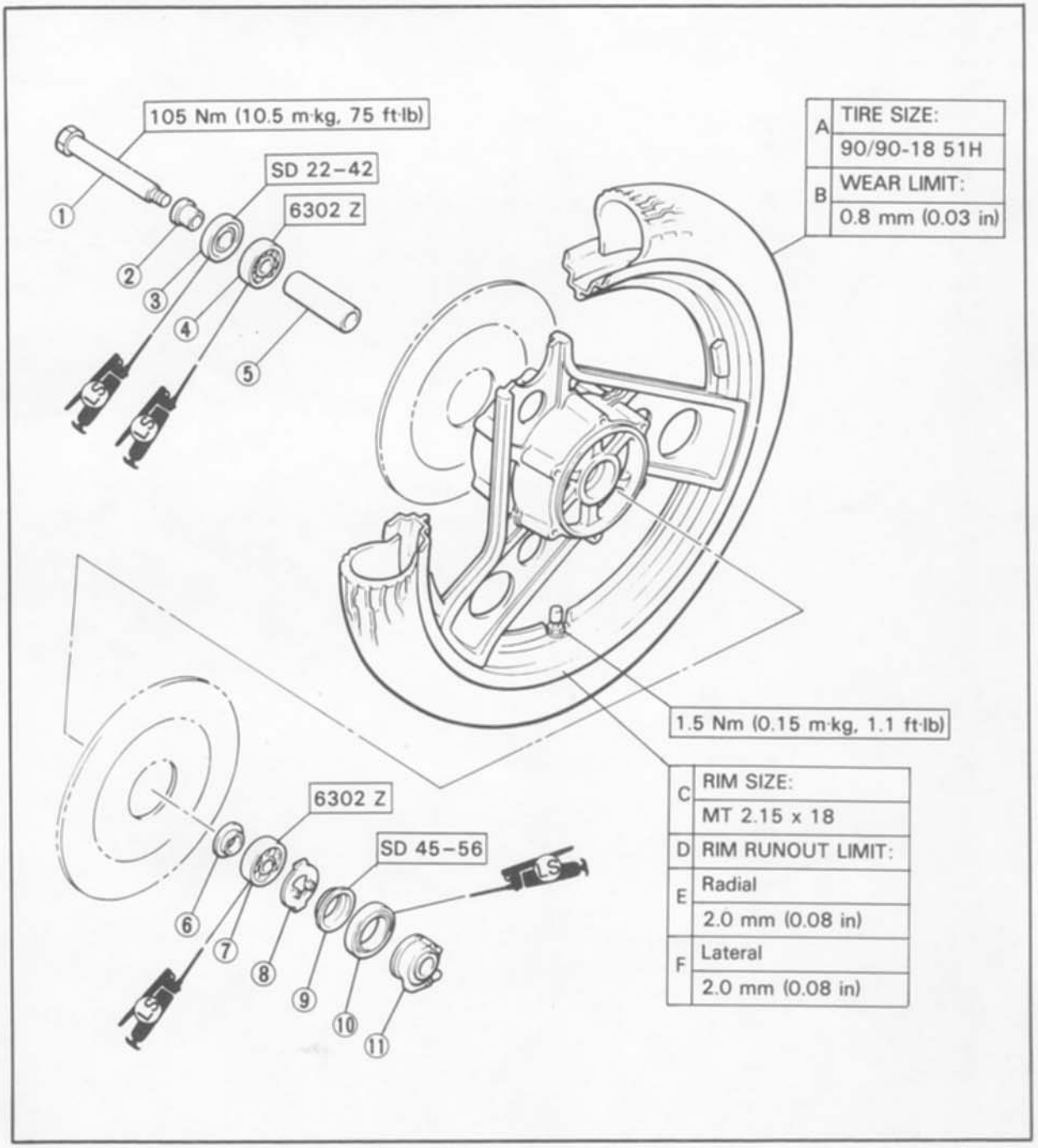
	20 Nm (2.0 m·kg, 14 ft·lb)

8. Install:
   - Washer
   - Handle cover

WHEEL BEARINGS

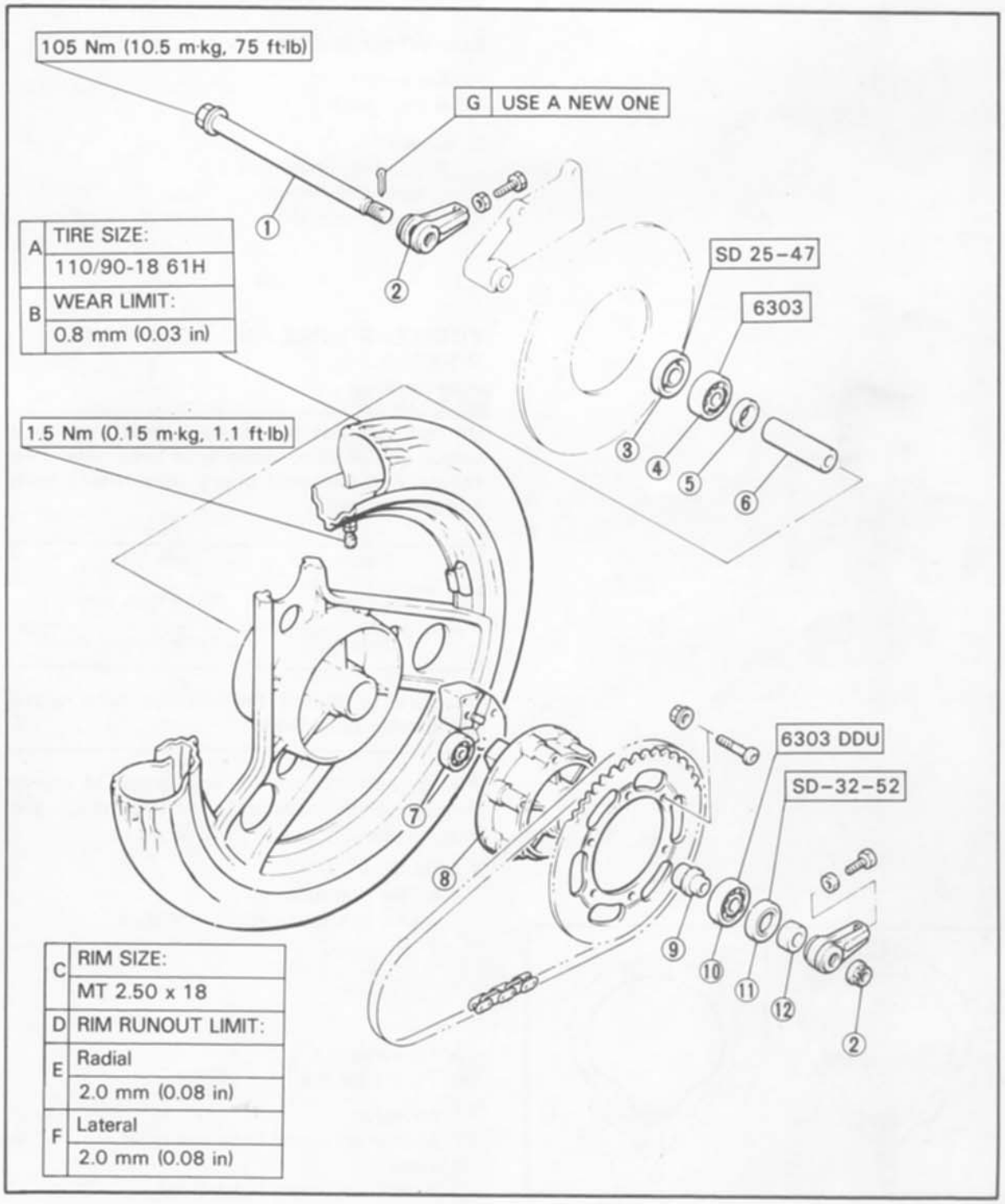
Front Wheel

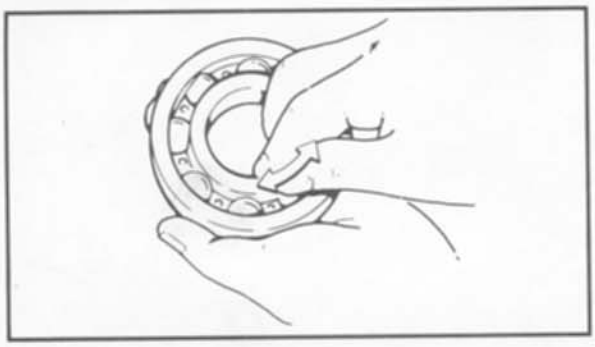
1. Front axle
2. Collar
3. Oil seal
4. Bearing
5. Spacer
6 Spacer flange
7. Bearing
8. Meter clutch
9. Clutch retainer
10. Oil seal
11. Gear unit assembly



Rear Wheel

1. Rear axle
2. Chain puller
3. Oil seal
4. Bearing
5. Spacer flange
6 Spacer
7. Bearing
8. Clutch hub
9. Collar
10. Bearing
11. Oil seal
12. Collar





Front Wheel Bearings

1. Raise the front end of the motorcycle, and spin the wheel by hand. Touch the axle or front fender while spinning the wheel.
   Excessive vibration → Replace bearings.

Rear Wheel Bearings

1. Remove:
   - Rear wheel
2. Check:
   - Bearing movement
     With the fingers.
     Roughness/Wear → Replace.

TUBELESS TIRES AND ALUMINUM WHEELS

WARNING:

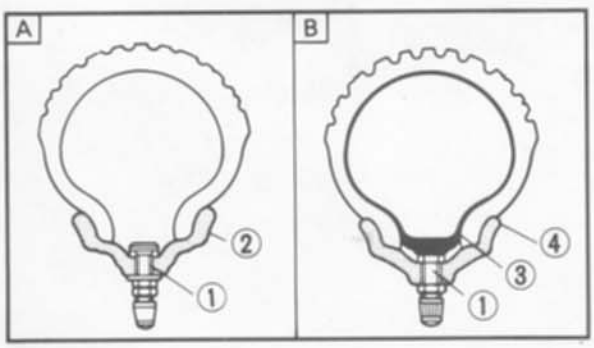
Do not attempt to use tubeless tires on a wheel designed for tube type tires only. Tire failure and personal injury may result from sudden deflation.

Wheel	Tire
Tube type	Tube type only
Tubeless	Tube type or tubeless

Be sure to install the correct tube when using tube type tires.

Always perform the following steps to ensure safe operation, maximum tire performance, and long sevice.

1. Measure:
   - Tire pressure
     Out of specification → Adjust.



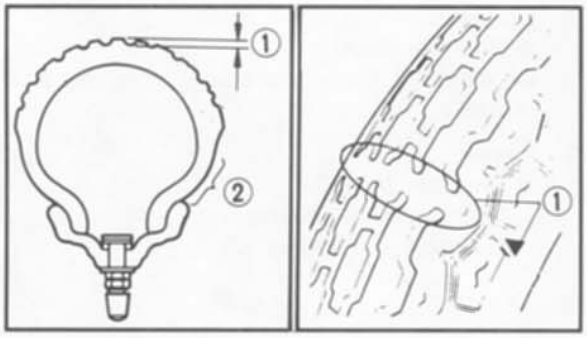
A Tubeless tire
B Tube type tire

1. Air valve
2. Aluminum wheel (tubeless type)
3. Tube
4. Aluminum wheel (tube type)

Basic weight: With oil and full fuel tank	208 kg (459 lb)	
Maximum load*	188 kg (414 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	177 kPa (1.8 kg/cm², 26 psi)	196 kPa (2.0 kg/cm², 28 psi)
90 kg (198 lb) ~ Maximum load*	196 kPa (2.0 kg/cm², 28 psi)	226 kPa (2.3 kg/cm², 32 psi)
High speed riding	196 kPa 2.0 kg/cm², 28 psi)	226 kPa 2.3 kg/cm², 32 psi)

*Load is the total weight of cargo, rider, passenger, and accessories.

2



2. Inspect:
   - Tire surfaces
     Wear/Damage → Replace.

Minimum Tire Tread Depth:
(Front and Rear)
0.8 mm (0.03 in)

① Tread depth
② Side wall
③ Wear indicator

3. Inspect:
   - Aluminum wheels
     Damage/Bends → Replace.
     Never attempt even small repairs to the wheel.

NOTE:
Always balance the wheel when a tire or wheel has been changed or replaced.

4. Tighten:
   - Valve stem locknut

1.5 Nm (0.15 m·kg, 1.1 ft·lb)

WARNING:
Ride conservatively after installing a tire to allow it to seat itself properly on the rim.

ELECTRICAL

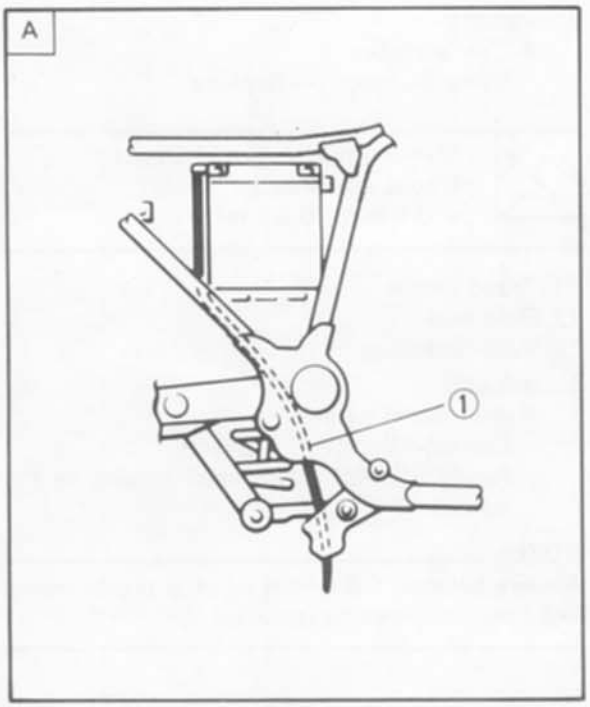
BATTERY

1. Check:
   - Fluid level
     Incorrect → Refill
     Fluid level should be between upper and lower level marks.

① Upper level
② Lower level

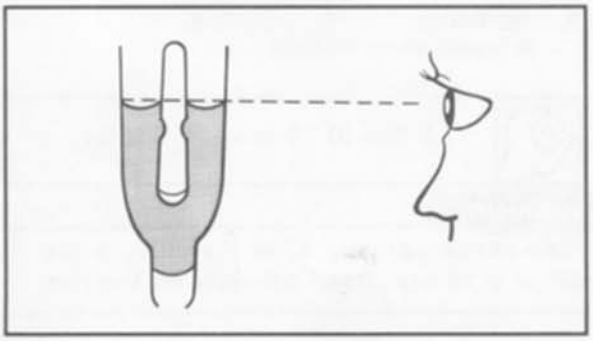
CAUTION:
Refill with distilles water only; tap water contains minerals harmful to a battery.

2



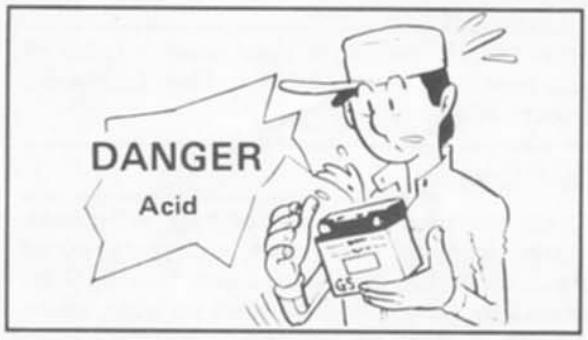
2. Connect:
   - Breather pipe ①
     Be sure the hose is properly attached and routed.
3. Inspect:
   - Breather pipe
     Obstruction → Remove.
     Damage → Replace.

A HOW TO LAY OUT BATTERY BREATHER PIPE.



CAUTION:
Always charge a new battery before using it to ensure maximum performance.

Charging Current:
1.2 amps/10 hrs
Specific Gravity:
1.280 at 20°C (68°F)



WARNING:

Battery electrolyte is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

- **Avoid bodily contact with electrolyte as it can cause severe bruns or permanent eye injury.**
- **Wear protective eye gear when handling or working near batteries.**

Antidote (EXTERNAL):

- **SKIN – Flush with water.**
- **EYES – Flush with water for 15 minutes and get immediate medical attention.**

Antidote (INTERNAL):

- **Drink large quantities of water or milk follow with milk of magnesia) beaten egg, or vegetable oil. Get immediate medical attention.**

Batteries also generate explosive hydrogen gas, therefore you should always follow these preventive measures:

- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks, or open flames (e.g, welding equipment, lighted cigarettes, etc.)**
- **DO NOT SMOKE when charging or handling batteries.**

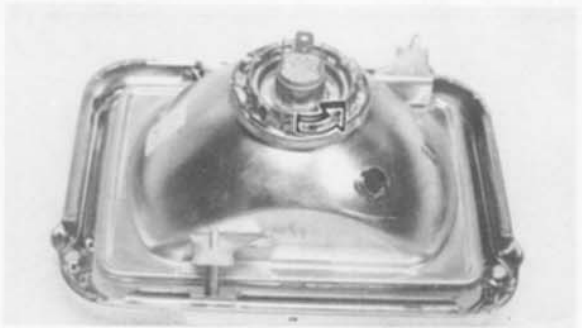
KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.

2

HEADLIGHT

Headlight Bulb Replacement

1. Remove:
   - Headlight holding screws
2. Disconnect:
   - Headlight leads

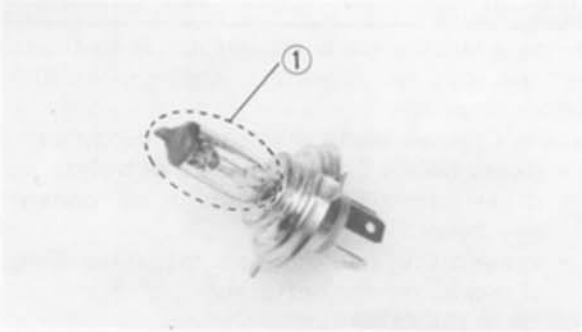


3. Remove:
   - Bulb

   Turn the bulb holder counterclockwise to release bulb.
4. Install:
   - Bulb (new)

   Secure the new bulb with the bulb holder.

HEADLIGHT ADJUSTMENT



WARNING:

Do not touch headlight bulb when it is on as bulb generates enormous heat; keep flammable objects away.

CAUTION:

Avoid touching glass part of bulb. Also keep it free from oil otherwise, transparency of glass, bulb life and illuminous flux will be adversely affected. If oil gets on bulb, clean it with a cloth moistened thoroughly with alcohol or lacquer thinner.

① Don't touch

5. Install:
   - Light until assembly

HEADLIGHT ADJUSTMENT

Horizontal Adjustment

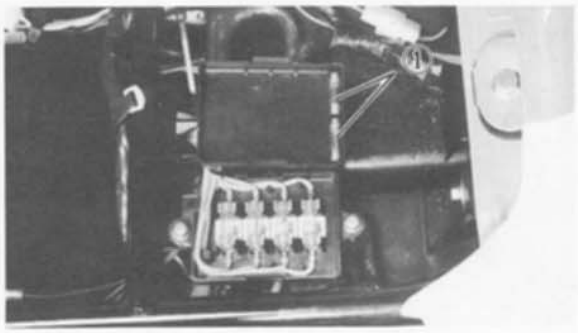
1. Rotate:
   - Horizontal adjusting screw ①

Horizontal adjustment of headlight beam	
Adjusting screw	Beam direction
Turn clockwise	→ Right
Turn counterclockwise	← Left

Vertical Adjustment

1. Rotate:
   - Vertical adjusting screw ②

Vertical adjustment of headlight beam	
Adjusting screw	Beam direction
Turn clockwise	↑ To raise
Turn counterclockwise	↓ To lower



FUSE

The fuse panel is located under the seat.

1. Inspect:
   - Fuses
     Defective → Replace.
     Blown fuse (new) → Inspect circuit.

NOTE:
Install new fuses of proper amperage.

① Spare fuses

Description	Amperage	Quantilty
Main	30A	1
Headlight	20A	1
Signal	10A	1
Ignition	10A	1
Reserve	30A 20A	1 1

Blown fuse procedure steps
- Turn off ignition and the circuit.
- Install a new fuse of proper amperage.
- Turn on switches to verify operation of electrical device.
- If fuse blows immediately again, check circuit in question.

WARNING:
Do not use fuses of higher amperage rating than recommended. Extensive electrical system damage and fire could result from substitution of a fuse of improper amperage.

ENGINE OVERHAUL

ENGINE REMOVAL

NOTE:
It is not necessary to remove the engine in order to remove the following components.

- Carburetor
- Clutch
- AC magneto

Preparation steps:

- Remove all dirt, mud, dust, and foreign material before removal and disassembly.
- Use proper tools and cleaning equipment.

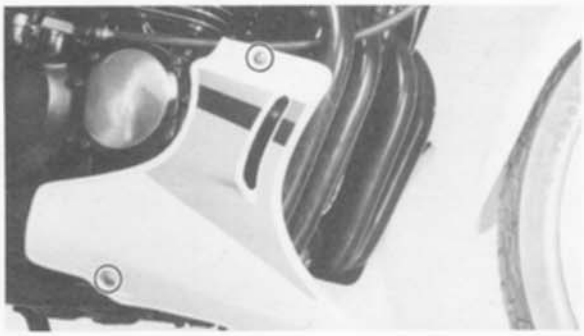
NOTE:
When disassembling the engine, keep mated parts together. This includes gears, cylinders, pistons, and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.

- During engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.
- Drain engine oil completely.

COWLING AND LOWER COWL

1. Remove:
   - Headlight unit assembly

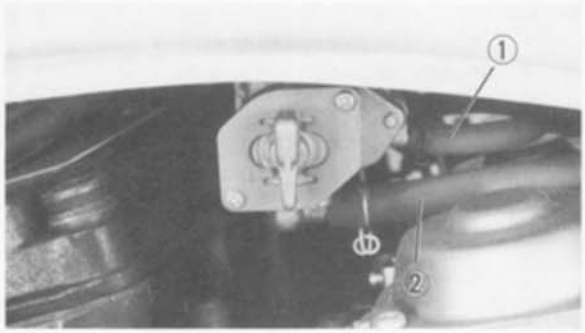
2. Remove:
   - Cowling



3. Remove:
   - Lower cowl

SEAT AND FUEL TANK

1. Remove:
   - Side cover
   - Seat
2. Turn fuel cock to "ON"



3. Disconnect
   - Fuel cock vacuum hose ①
   - Fuel feed hose ②
4. Remove:
   - Fuel tank bolt
   - Fuel sender unit lead
   - Fuel tank

EXHAUST PIPE AND MUFFLER

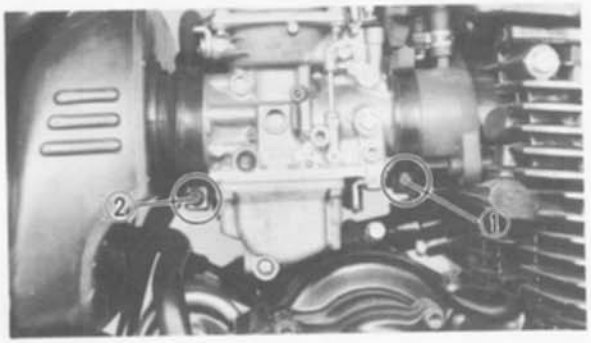
1. Remove:
   - Exhaust pipe

2. Loosen:
   - Exhaust pipe clamp

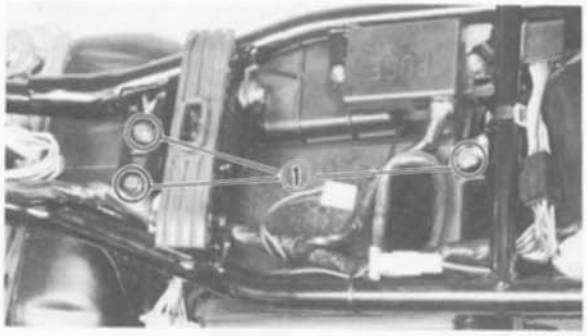
3. Remove:
   - Footrest bracket bolt ①
   - Lower cowl clamp ②

CARBURETOR AND CABLE

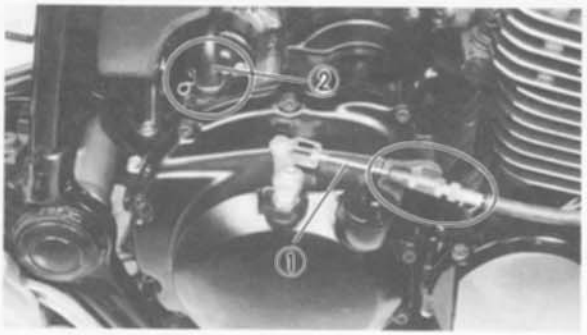
1. Remove:
   - Throttle cable ①
   - Starter cable ②



2. Loosen:
   - Carburetor joint clamp screw ①
   - Air cleaner joint clamp screw ②

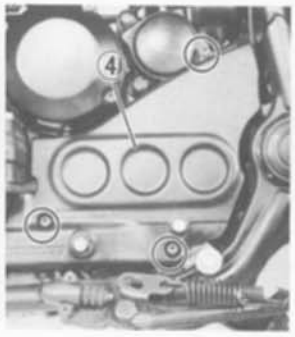


3. Loosen:
   - Air cleaner bolt ①
4. Remove:
   - Carburetor



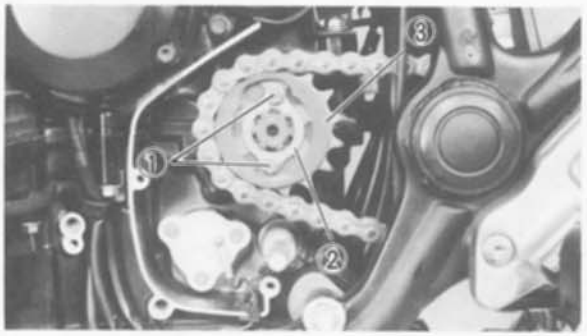
5. Disconnect:
   - Clutch cable ①
   - Crankcase ventilation hose ②

CHANGE PEDAL AND DRIVE CHAIN

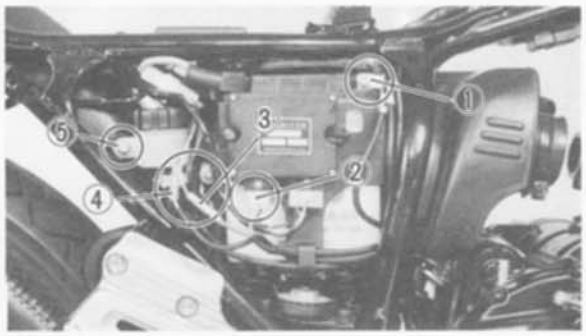


1. Remove:
   - E-clip ①
   - Washer ②
   - Bolt ③
   - Change pedal assembly
   - Crankcase cover ④

2. Loosen:
   - Rear axle nut
   - Adjusting bolt
   - Drive chain

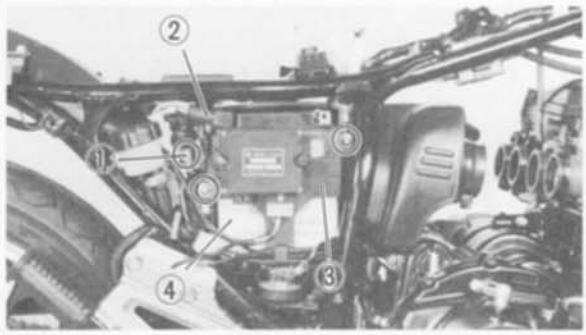


3. Remove:
   - Bolts ①
   - Stopper ②
   - Drive chain sprocket ③



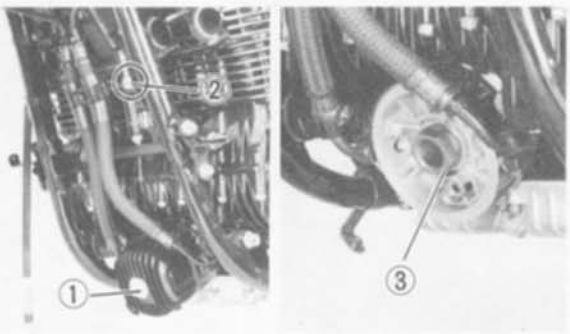
BATTERY AND WIRING

1. Disconnect:
   - Battery minus lead ①
   - Pulser coil lead ②
   - Oil level switch lead ③
   - Neutral switch lead ④
2. Remove:
   - Brake fluid tank screw ⑤



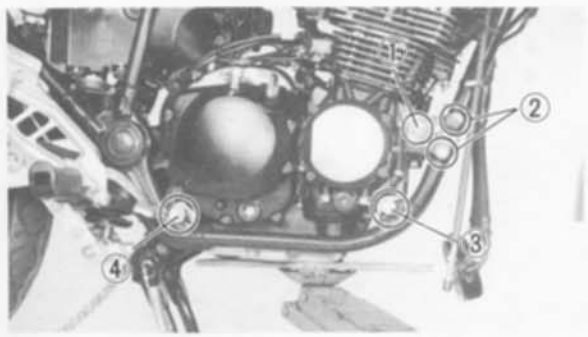
3. Disconnect:
   - Stater motor lead ①
   - Battery plus lead ②
4. Remove:
   - Battery cover ③
   - Battery ④

5. Disconnect:
   - Ground lead



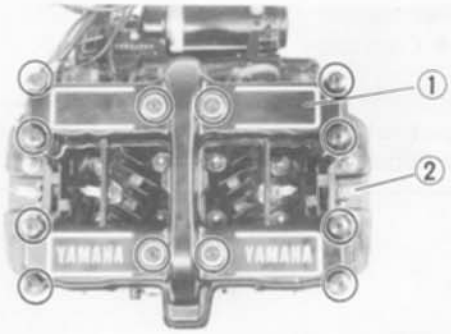
OIL COOLER

1. Remove:
   - Oil filter bolt ①
   - Oil filter clamp nuts ②
   - Spacer nut ③



ENGINE REMOVAL

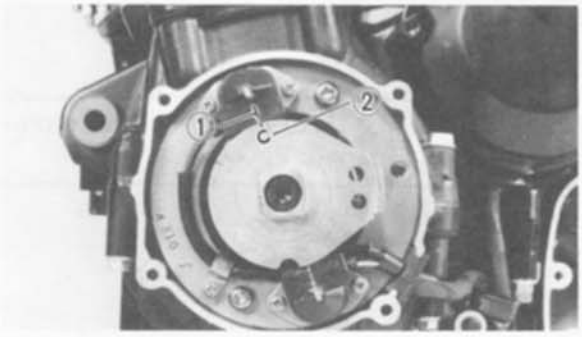
1. Place a suitable stand under the engine
2. Remove:
   - Front upper mounting bolt ①
   - Bracket bolt ②
   - Front lower mounting bolt ③
   - Rear mounting bolt ④
   - Engine assembly (from right chassis.)



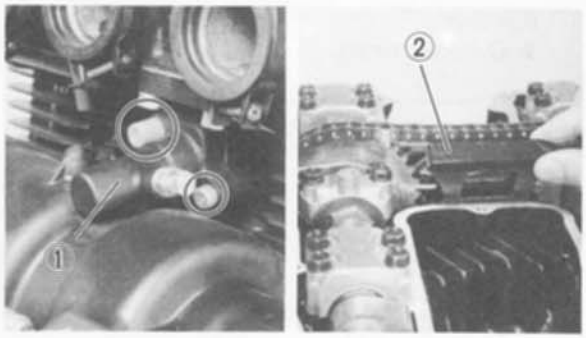
ENGINE DISASSEMBLY

CYLINDER HEAD AND CAMSHAFT

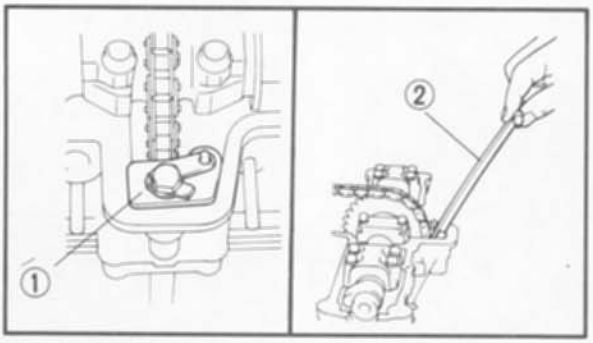
1. Remove:
   - Cylinder head cover ①
   - Spark plug ②
   - Left crankcase cover



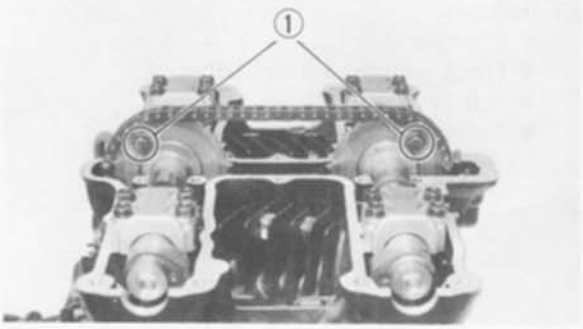
2. Turn:
   - Crankshaft
     (Counterclockwise)
3. Align:
   - Timing plate "C" mark ①
     (with the upper pick up coil mark ②)



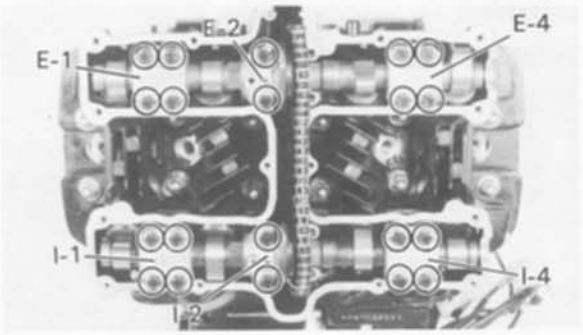
4. Remove:
   - Tensioner assembly ①
   - Upper chain guide ②



5. Remove:
   - Chain guide stopper ①
   - Exhaust side chain guide ②
   - No. 3 intake cam cap
   - No. 3 exhaust cam cap

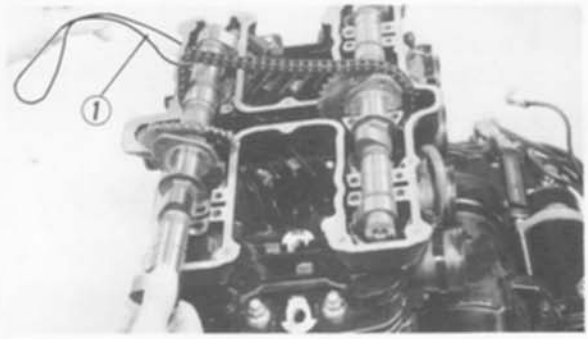


6. Remove:
   - Sprocket bolts ①
7. Dismount the sprockets from the camshaft sprocket seats



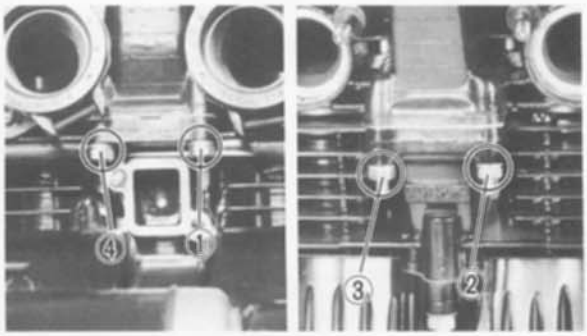
8. Remove:
   - Cam caps

CAUTION:
Do not rotate the camshaft or valve damage may occur.



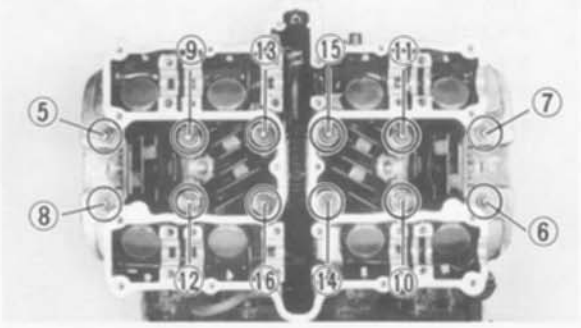
9. Remove:
   - Camshafts

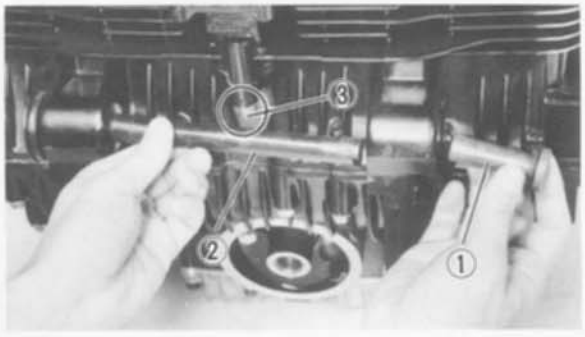
NOTE:
Fasten safety wire ① to the cam chain to prevent it from falling into the crankcase.



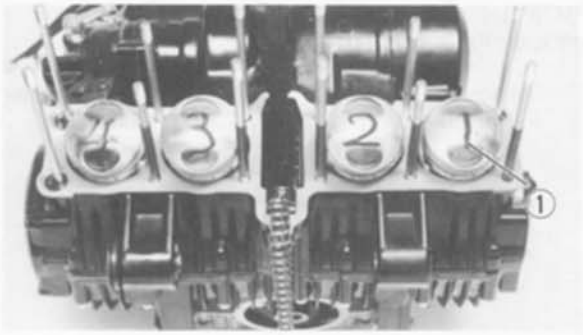
10. Remove:
    - Cylinder head

NOTE:
Loosen the nuts in their proper loosening sequence.





11. Remove:
    - Damper ①
    - Front engine mount spacer ②
    - Nut ③
    - Cylinder



PISTON AND INTAKE SIDE CAM CHAIN GUIDE

1. Mark:
   - Pistons

   (with piston number ① designations as shown)

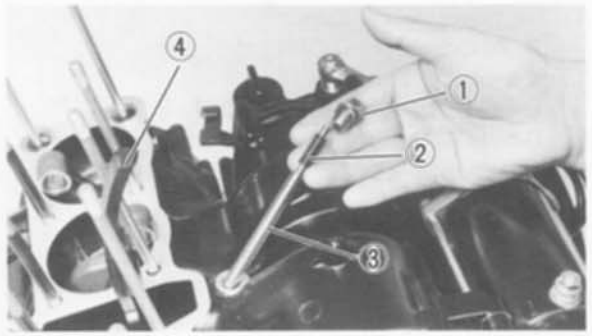
2. Remove:
   - Piston pin circlips

NOTE:
Before removing piston pin circlip, cover crankcase with a clean rag to prevent circlip from falling into crankcase cavity.

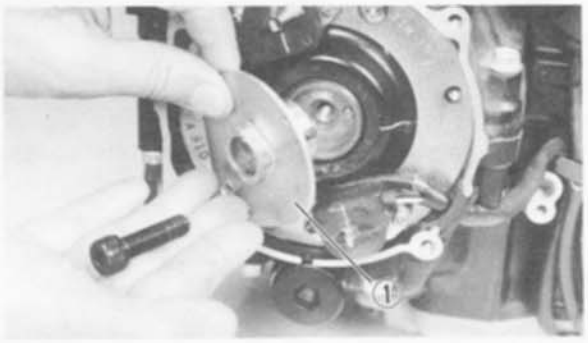
3

3. Remove:
   - Piston pins
   - Pistons

   Push piston pin from the opposite side, then pull it out.

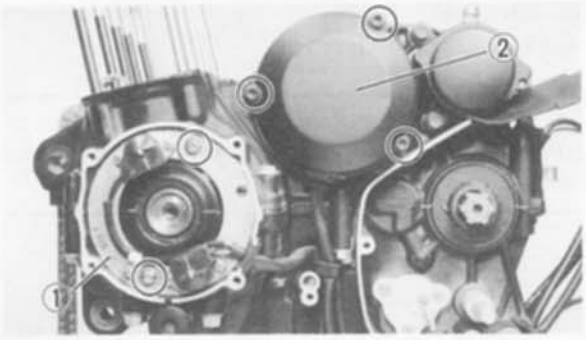


4. Remove:
   - Bolt ①
   - Plate washer
   - Spring ②
   - Stopper shaft ③
   - Intake side cam chain guide ④

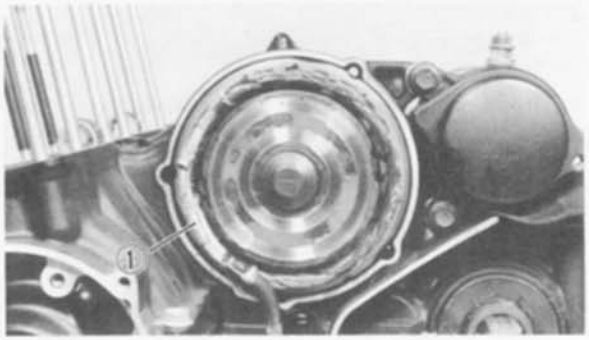


PICK UP COIL, GENERATOR AND STARTER MOTOR

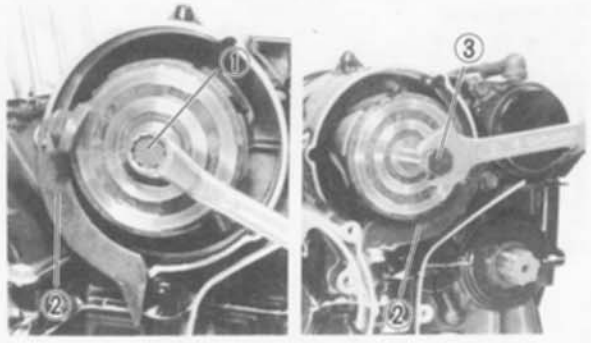
1. Remove:
   - Screw
   - Timing plate ①



2. Remove:
   - Pick up coil assembly ①
   - Generator cover ②



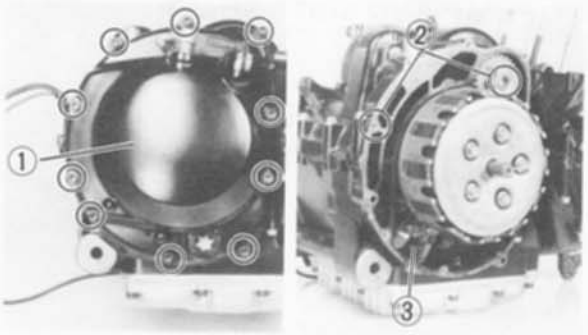
3. Remove:
   - Stator coil ①



4. Remove:
   - Rotor securing bolt ①
   - Rotor

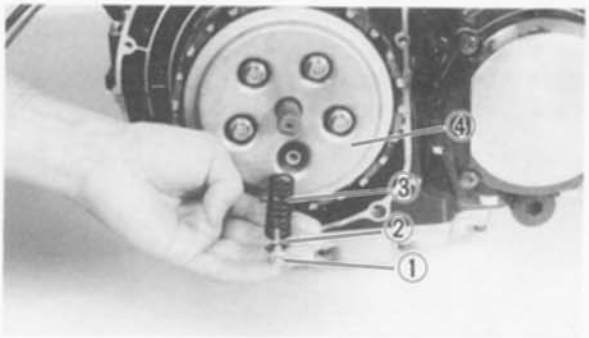
   Use Rotor Holding Tool ② (90890-04067) and Rotor Puller ③ (90890-01080).

5. Remove:
   - Starter motor

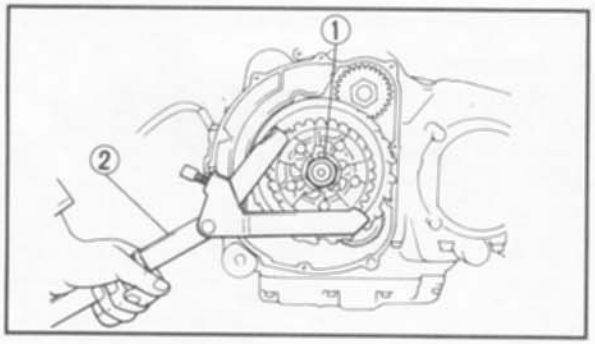


CLUTCH

1. Remove:
   - Right crankcase cover ①
   - Dowels ②
   - Gasket ③

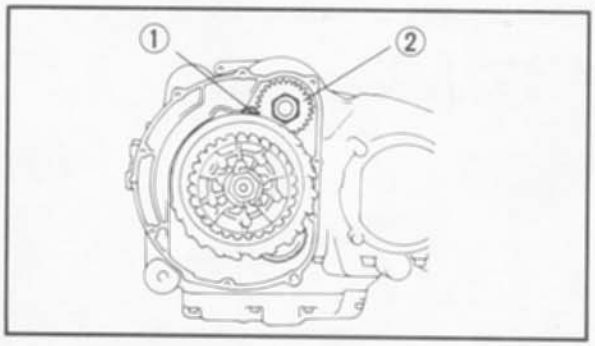


2. Remove:
   - Bolts ①
   - Plate washers ②
   - Springs ③
   - Pressure plate ④
   - Friction plates
   - Clutch plates



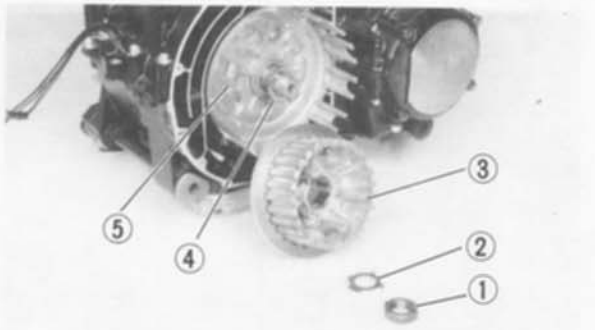
3. Loosen:
   - Nut ①

   Use universal Clutch Holder ② (90890-04086)

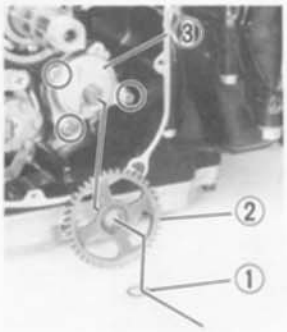


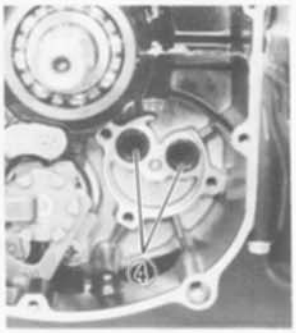
NOTE:

If you need to remove the primary drive gear at this stage, place a piece of rolled rug ① or lead between the primary drive gears.
Then loosen the drive gear nut ② .



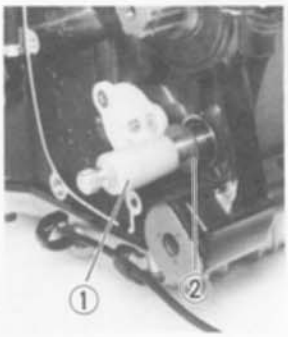
4. Remove:
   - Nut ①
   - Lock washer ②
   - Clutch boss ③
   - Thrust washer ④
   - Clutch housing ⑤

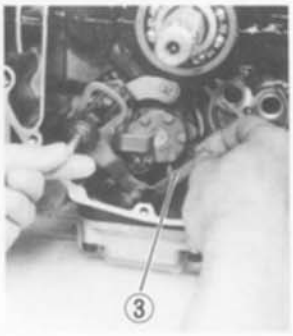




OIL PUMP AND SHIFT SHAFT

1. Remove:
   - Circlip ①
   - Oil pump driven gear ②
   - Oil pump assembly ③
   - O-rings ④

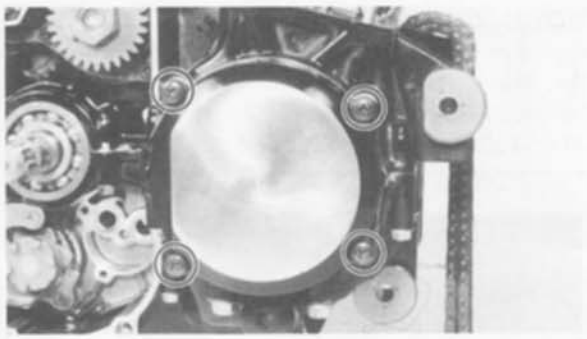




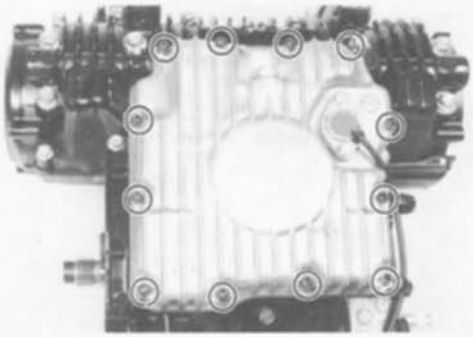
2. Remove:
   - Collar ①
   - Plate washer ②
     (from left side shift shaft.)
3. Unhook the shift lever 2 ③ and pull the shift shaft.

4. Unhook the stopper lever ①
5. Remove:
   - Shift shaft assembly ②

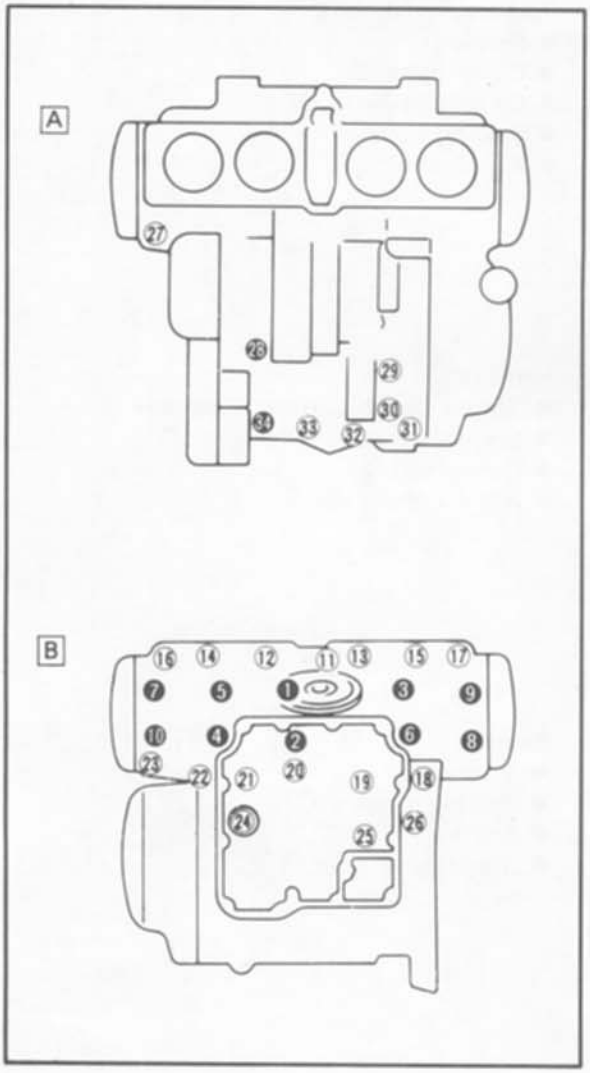
CRANKCASE DISASSEMBLY



1. Remove:
   - Right-front crankcase cover



2. Remove:
   - Oil pan

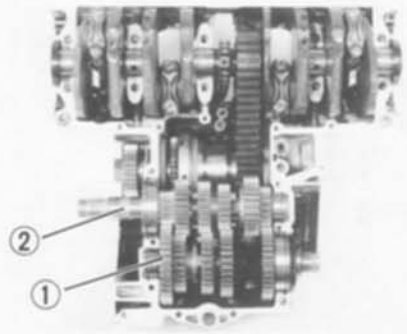


3. Remove:
   - Upper crankcase bolts [A]
   - Lower crankcase bolts [B]

NOTE:
- Remove the bolts starting with the highest numbered one.
- The embossed numbers in the crankcase designate the crankcase tightening sequence.

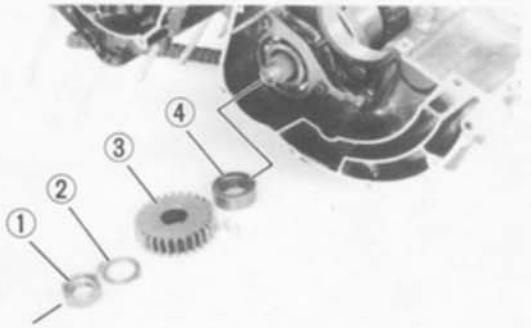
4. Remove:
   - Lower crankcase
     Use a rubber hammer

○ 6 mm bolts
● 8 mm bolts

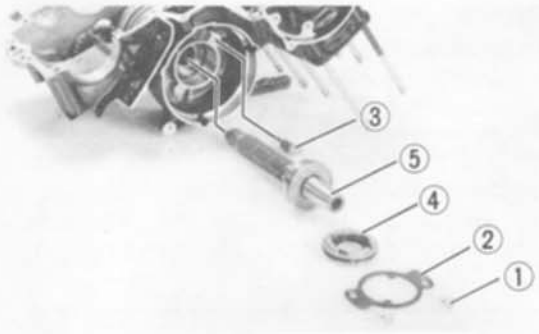


UPPER CRANKCASE

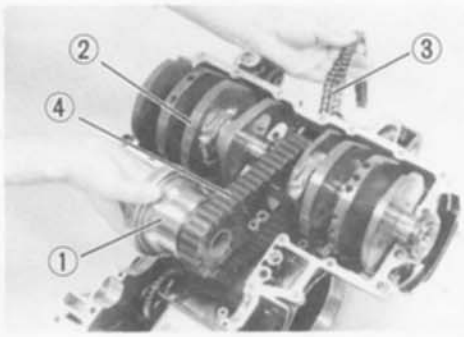
1. Remove:
   - Drive axle assembly ①
   - Main axle assembly ②



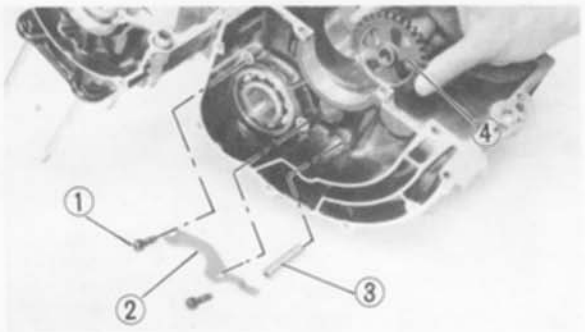
2. Remove:
   - Nut ①
   - Lock washer ②
   - Primary drive gear ③
   - Collar ④



3. Remove:
   - Screw ①
   - Cover plate ②
   - Oil spray nozzle ③
   - Bearing housing ④
   - A.C.G. shaft ⑤

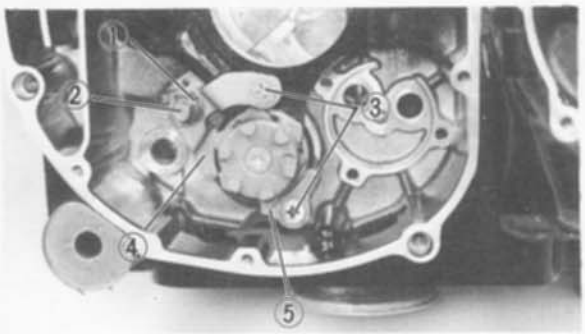


4. Remove:
   - Starter clutch damper assembly ①
   - Crankshaft assembly ②
   - Cam chain ③
   - HY-VO chain ④

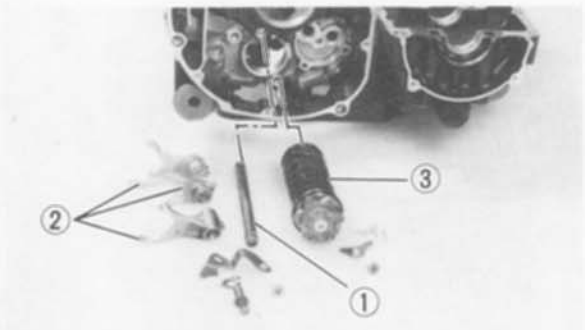


5. Remove:
   - Screws ①
   - Bearing stopper ②
   - Shaft ③
   - Starter idler gear ④

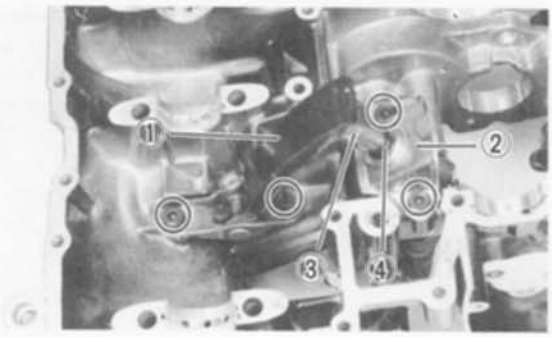
LOWER CRANKCASE



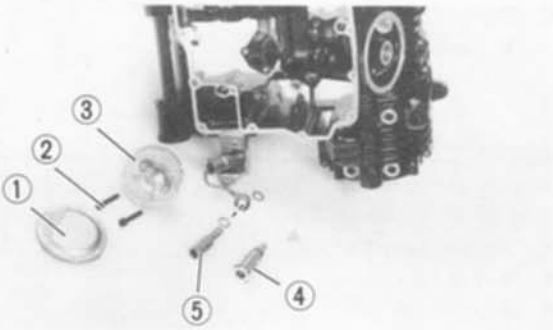
1. Remove:
   - Lock washer ①
   - Stopper screw ②
   - Screws ③
   - Guide bar stopper ④
   - Bearing stopper ⑤



2. Remove:
   - Guide bar ①
   - Shift forks ②
   - Shift cam assembly ③



3. Remove:
   - HY-VO chain guide ①
   - HY-VO chain tensioner ②
   - Tensioner plunger ③
   - Spring ④

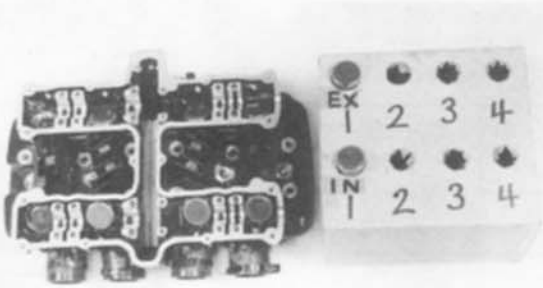


4. Remove:
   - Oil strainer ①
   - Screw ②
   - Strainer housing ③
   - Relief valve ④
   - Tensioner side relief valve ⑤

3

INSPECTION AND REPAIR

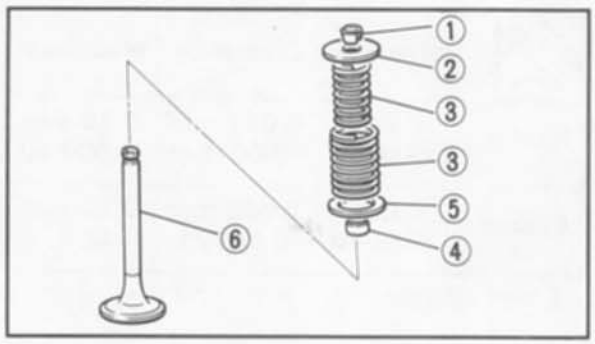
CYLINDER HEAD



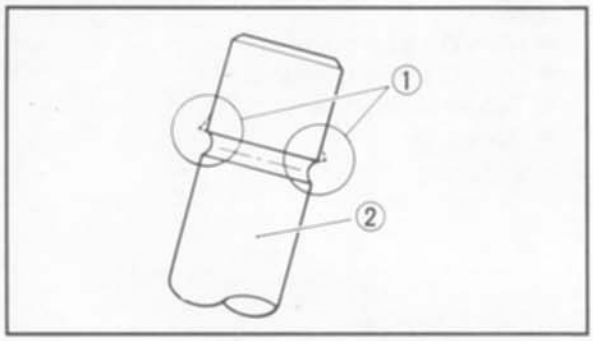
1. Remove:
   - Valve pads
   - Lifters
   - Spark plugs

NOTE:
Identify each lifter and pad position very carefully so that it can be reinstalled in its original place.

2. Attach:
   - Valve Spring Compressor (90890-04019) ①



3. Remove:
   - Valve retainers ①
   - Valve spring seat ②
   - Valve springs ③
   - Oil seal ④
   - Valve spring seat ⑤
   - Valve ⑥

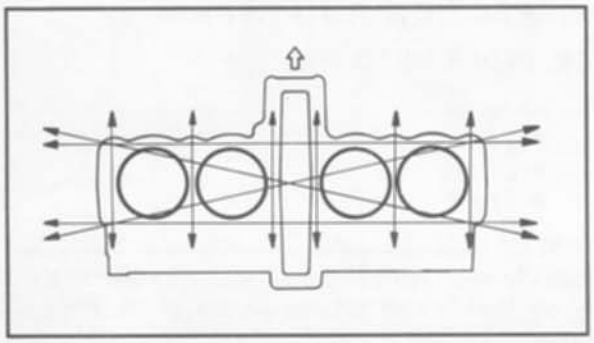


NOTE:
Deburr any deformed valve stem end. Use an oil stone to smooth the stem end.

① Deburr
② Valve stem

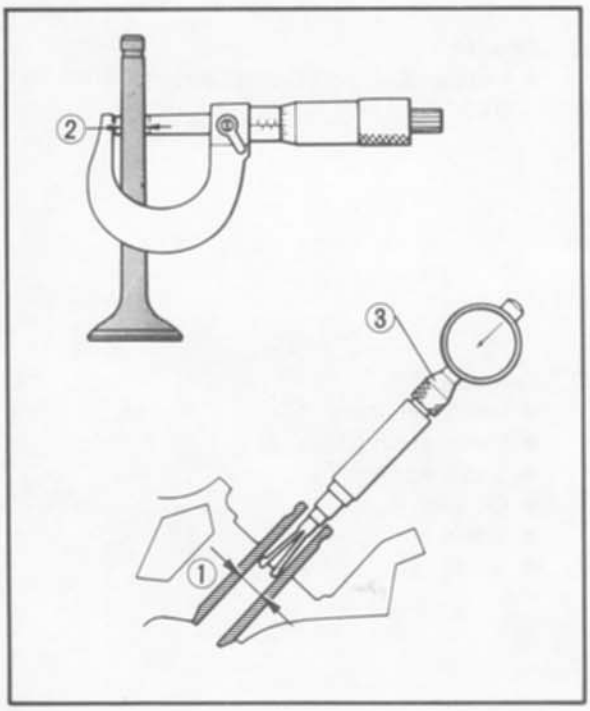
4. Eliminate:
   - Carbon deposit
     (from combustion chamber)
     Use rounded scraper

NOTE:
Do not use a sharp instrument and avoid damaging or scratching:
- Spark plug threads
- Valve seat
- Aluminum



5. Measure:
   - Warpage
     Exceeds allowable limit → Resurface.

Cylinder Head Warpage:
Less than 0.03 mm (0.0012 in)
Allowable Limit:
0.25 mm (0.010 in)



VALVE, VALVE GUIDE, VALVE SEATS, AND VALVE SPRING

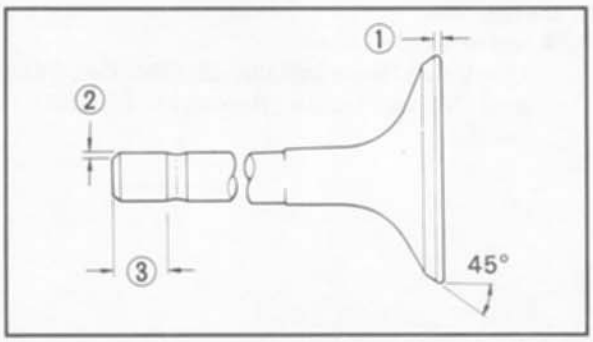
1. Measure:
   - Valve stem clearance

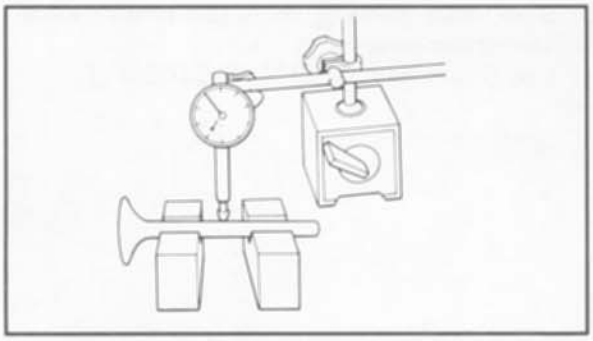
Valve stem clearance =
Valve guide inside diameter ①
– Valve stem diameter ②

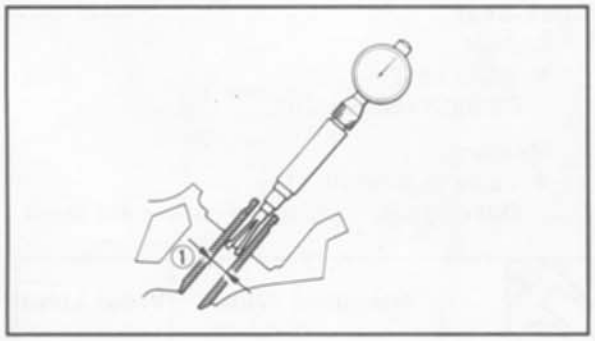
Out of specification → Replace valve or guide.

	Valve Stem Clearance	Maximum
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.10 mm (0.004 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.12 mm (0.005 in)

③ Bore gauge







2. Measure:
   - Valve face
     Pitting/Wear → Regrind.
     Out of specification → Replace.

Minimum Thickness
(Service limit) ① :
0.7 mm (0.0276 in)
Beveled ② : 0.5 mm (0.020 in)
Minimum Length
(Service limit) ③ :
4.0 mm (0.157 in)

3. Check
   - Valve stem end
     Mushroom shape or diameter larger than rest of stem → Replace.
   - Runout
     Out of specification → Replace.

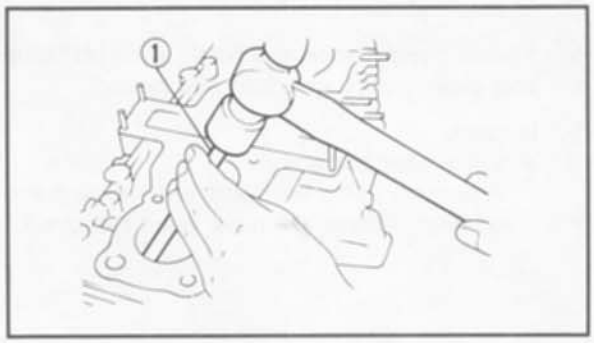
Maximum Valve Stem Runout:
0.03 mm (0.0012 in)

4. Measure:
   - Valve guide (inside diameter) ①
     Out of specification → Replace.

Guide Inside Diameter:
Limit: 6.10 mm (0.240 in)

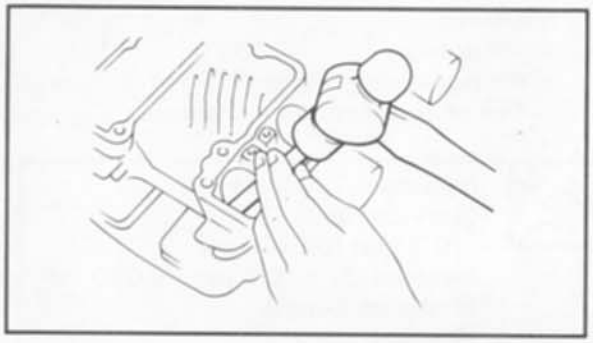
5. Inspect:
   - Valve guide
     Wear/Oil leakage → Replace.

NOTE:
Heat the cylinder head in an oven to 100°C (212°F) to ease valve guide removal and reinstallation and to maintain correct interference fit.

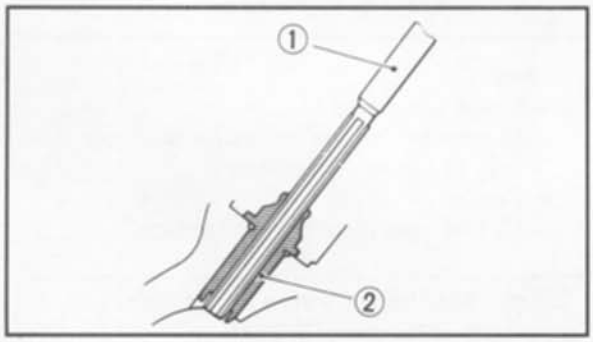


Valve Guide Replacement
1. Remove:
   - Valve guide
     Use Valve Guide Remover (90890-04064) ①.

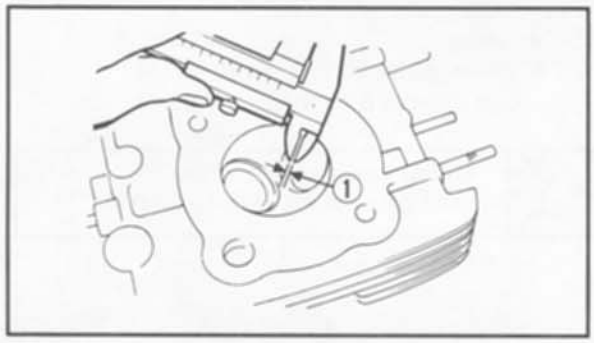
NOTE:
- Always replace valve guide if valve is replaced.
- Always replace oil seal if valve is removed.



2. Install:
   - Valve Guide (new)
     Use Valve Guide Installer (90890-04065) and Valve Guide Remover (90890-04064)



3. Bore valve guide ② to obtain proper valve stem clearance.
   Use 6 mm Reamer (90890-04066) ①

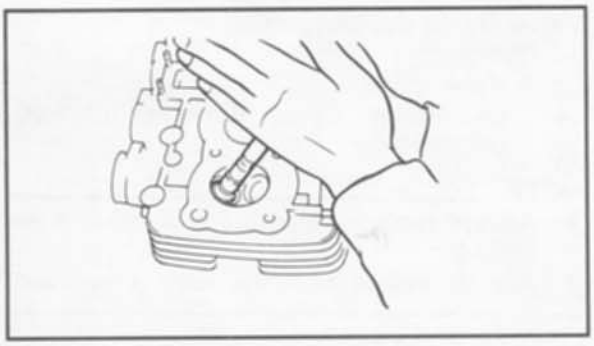


Valve Seat

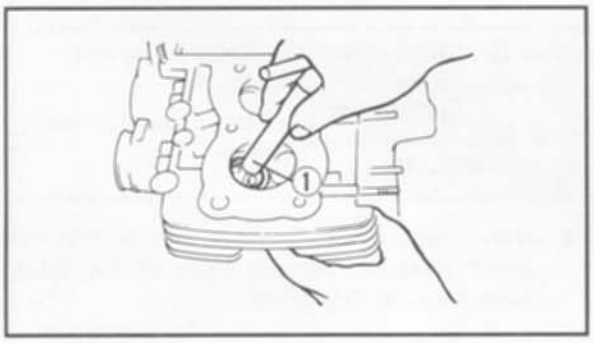
1. Inspect:
   - Valve seat
     Pitting/Wear → Cut.
2. Measure:
   - Valve seat width ①
     Out of specification → Follow next steps.

	Standard Width	Wear Limit
Valve Seat Width	1.0 ± 0.1 mm (0.039 ± 0.0039 in)	1.7 mm (0.067 in)

3. Apply:
   - Mechanic's bluing dye (Dykem) (to valve and seat)
   - Fine grinding compound (Small amount) (to valve face surface)
4. Position:
   - Valve
     (into cylinder head)
5. Spin it rapidly back and forth, then lift valve and clean off all grinding compound.
6. Inspect:
   - Valve seat surface
     Wherever valve seat and valve face made contact, bluing will have been removed.



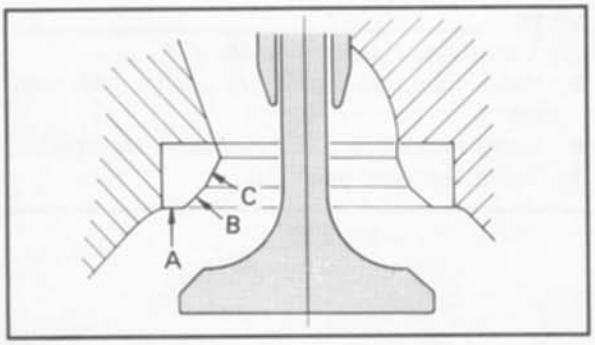
7. Measure:
   - Valve seat width
     Valve seat width must be uniform in contact area.
     Out of specification → Cut.

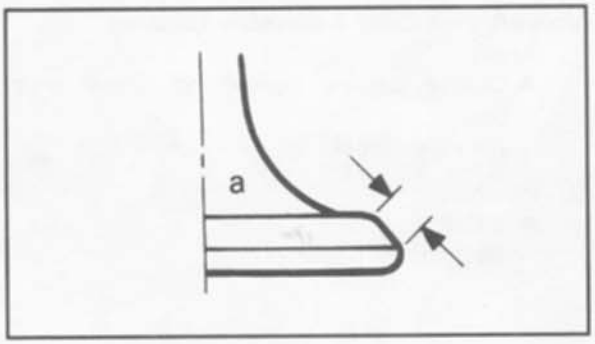


8. Cut valve seat.

NOTE:
Cut valve seat using valve seat cutter ① if valve seat width exceeds limit or if valve seat is pitted or worn.

CAUTION:
When twisting cutter, keep an even downward pressure to prevent chatter marks.



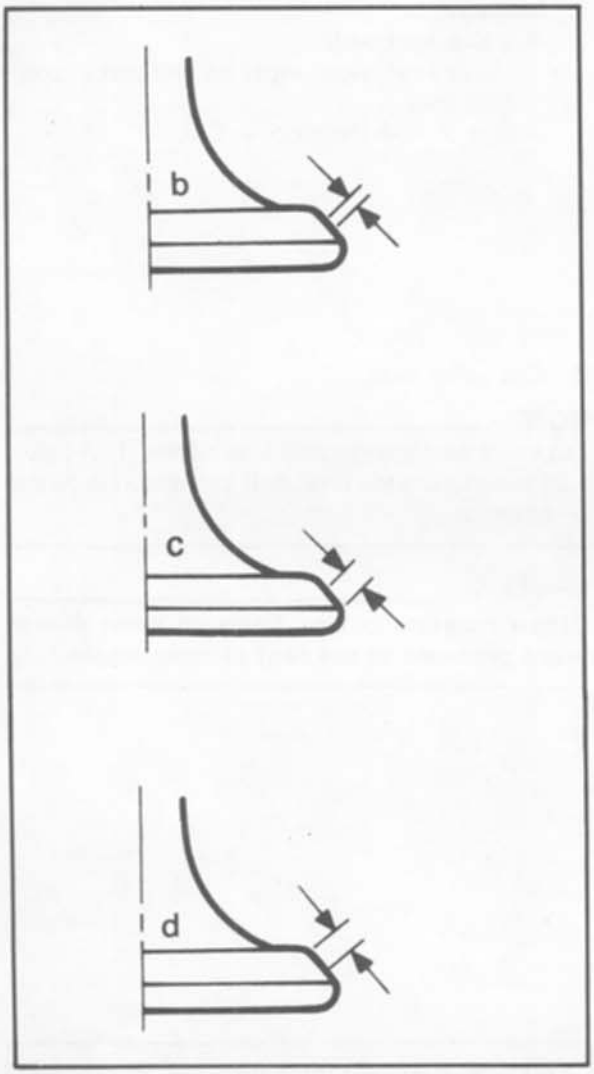


Valve seat recutting steps are necessary if:
- Valve seat is uniform around perimeter of valve face but too wide or too narrow or not centered on valve face.

Cut Valve Seat As Follows:	
Section A	0° Cutter
Section B	45° Cutter
Section C	60° Cutter

- Valve face indicates that valve seat is centered on valve face but is wide (See "a" diagram).

Valve Seat Cutter Set		Desired Result
Use	0° Cutter	to reduce valve seat width.
	60° Cutter	



- Valve seat is in the middle of the valve face but too narrow (See "b" diagram).

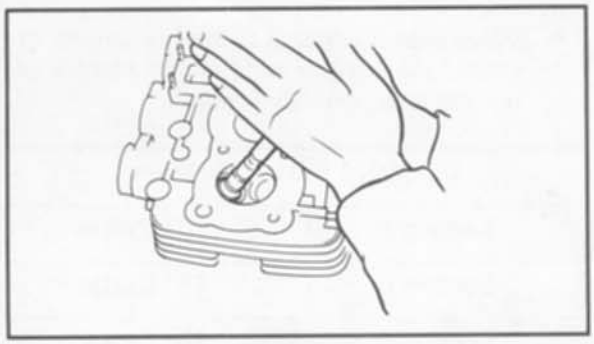
Valve Seat Cutter Set		Desired Result
Use	45° Cutter	to achieve a uniform valve seat width (Standard specification).

- Valve seat is too narrow and right up near valve margin (See "c" diagram).

Valve Seat Cutter Set		Desired Result
Use	0° Cutter, first	to obtain correct seat width.
	45° Cutter	

- Valve seat is too narrow and is located down near the bottom edge of the valve face (See "d" diagram).

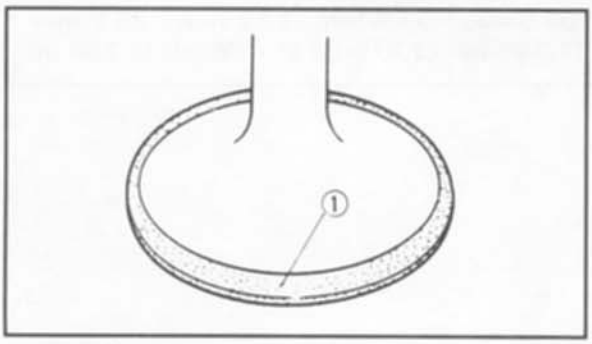
Valve Seat Cutter Set		Desired Result
Use	60° Cutter, first	to obtain correct seat width.
	45° Cutter	



NOTE:
Lap valve/valve seat assembly if:
- Valve face/valve seat are used or severely worn.
- Valve and valve guide has been replaced.
- Valve seat has been cut.

Valve/Valve Seat Assembly Lapping
1. Apply:
   - Coarse lapping compound (Small amount)
     (to valve face)
2. Position
   - Valve
     (in cylinder head)

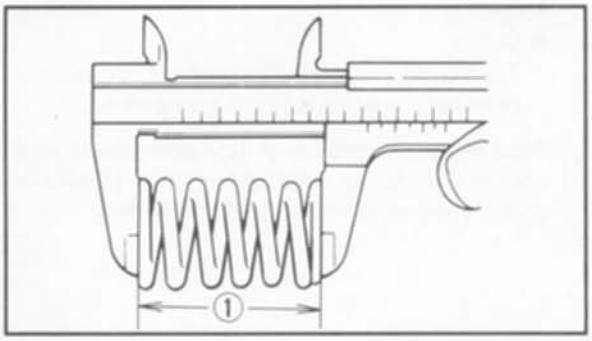
3. Rotate:
   - Valve
     Turn until valve and valve seat are evenly polished, then clean off compound.
4. Repeat above steps with fine compound and continue lapping until valve face shows a completely smooth surface uniformly.



5. Eliminate:
   - Compound
     (from valve face)
6. Apply:
   - Mechanic's bluing dye (Dykem) ①
     (to valve face and seat)
7. Rotate:
   - Valve
     Valve must make full seat contact indicated by grey surface all around valve face where bluing was removed.
8. Apply:
   - Solvent
     (into each intake and exhaust port)
     Leakage past valve seat → Replace valve until seal is complete.

NOTE:
Pour solvent into intake and exhaust ports only after completion of all valve work and assembly of head parts.

Relapping steps:
- Reassemble head parts.
- Repeat lapping steps using fine lapping compound.
- Clean all parts thoroughly.
- Reassemble and check for leakage again using solvent.
- Repeat steps as often as necessary to effect a satisfactory seal.

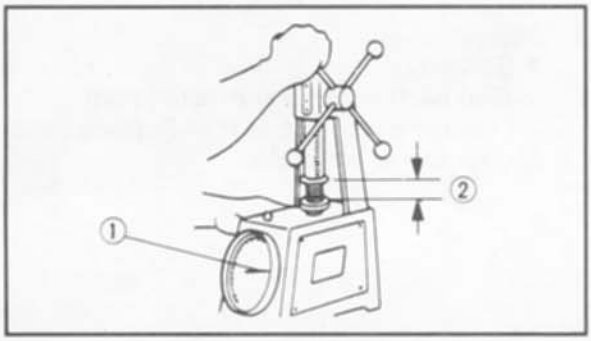


Valve Spring Measurement

1. Measure:
   - Valve spring free length ①
     Out of specification → Replace.

Valve Spring Free Length			
Inner Spring		Outer Spring	
Standard	Wear limit	Standard	Wear limit
35.5 mm (1.398 in)	33.5 mm (1.319 in)	37.2 mm (1.465 in)	35.2 mm (1.386 in)

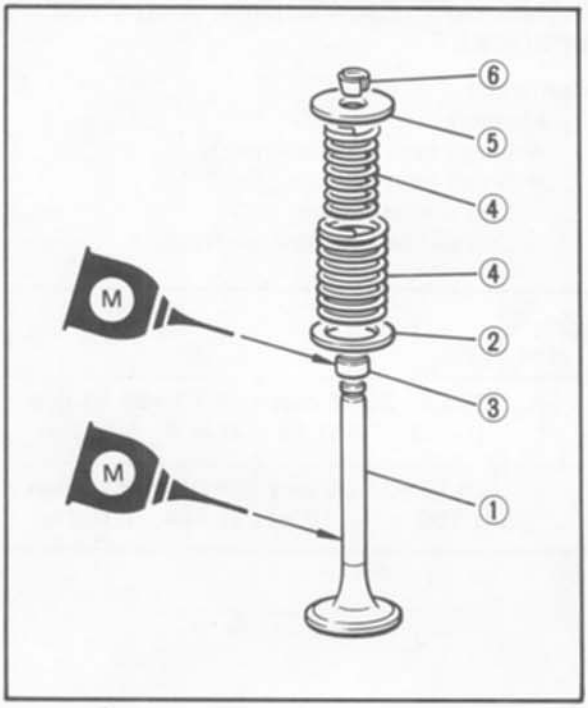
3



2. Measure:
   - Valve spring installed force ①
     Out of specification → Replace.

Valve Spring Installed Force			
Inner Spring		Outer Spring	
②	①	②	①
30.5 mm (1.20 in)	9.3 kg (20.5 lb)	32.0 mm (1.26 in)	18.5 kg (40.8 lb)

② Installed length



Valve Installation

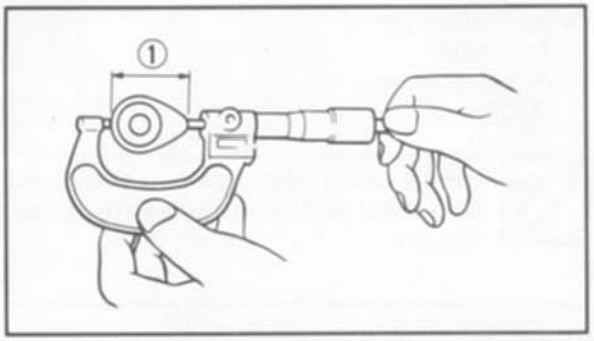
1. Lubricate
   - Valve stem
   - Oil seal

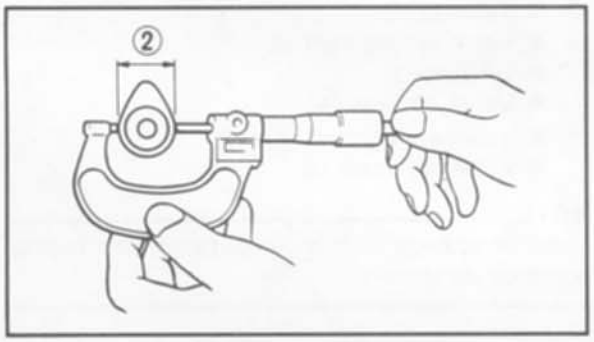
High-Quality Molybdenum Disulfide Motor Oil or Molybdenum Disulfide Grease.

2. Install:
   - Valve (1)
   - Valve spring seat (2)
   - Oil seal (3)
   - Valve springs (4)
   - Valve spring seat (5)
   - Valve retainers (6)

NOTE:
Install all springs with wider-gapped coils facing upwards as shown.

3





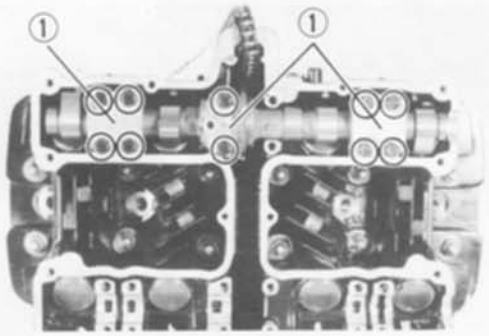
CAMSHAFT, CAM CHAIN, AND CAM SPROCKET

Camshaft

1. Measure:
   - Large cam lobe length ①
   - Small cam lobe length ②

   Use a micrometer.
   Out of specification → Replace.

	Intake	Exhaust
①	36.25~36.35 mm (1.427~1.431 in)	35.75~35.85 mm (1.408~1.411 in)
②	28.10~28.20 mm (1.106 ~ 1.110 in)	28.05~28.15 mm (1.104~1.108 in)



Camshaft/Cap Clearance Measurement

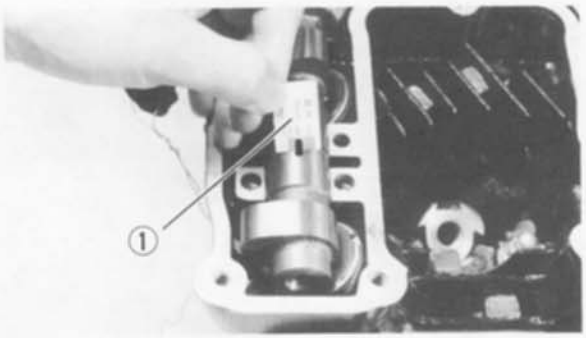
1. Install
   - Camshaft
2. Position:
   - Strip of Plastigage® (YU-33210) (onto camshaft.)
3. Install:
   - Camshaft caps ①

10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
Do not turn the camshaft when measuring clearance with plastigage.

4. Remove:
   - Camshaft caps
5. Measure:
   - Width of Plastigage® ①

   Out of specification → Follow step 6.



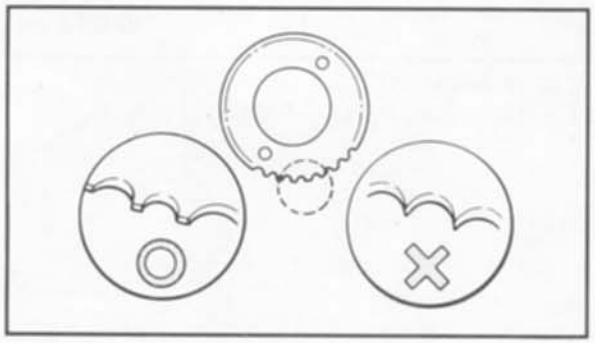
Camshaft-to-cap Clearance:
Standard: 0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)
Maximum: 0.160 mm (0.006 in)

6. Measure:
   - Camshaft bearing surface diameter
     Use micrometer.
     Out of specification → Replace camshaft.
     Within specification → Replace cylinder head.

Bearing Surface Diameter:
Standard: 24.967~24.980 mm (0.9830~0.9835 in)

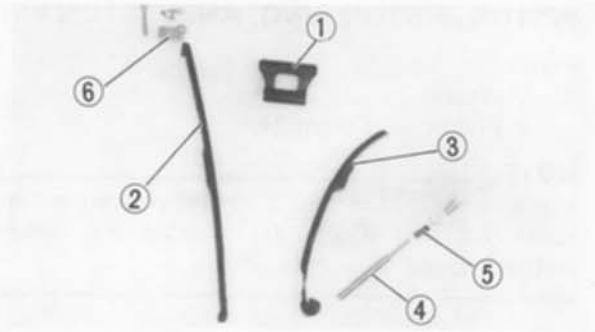
Cam Chain

1. Inspect:
   - Cam chain
     Chain stretch/Cracks → Replace.



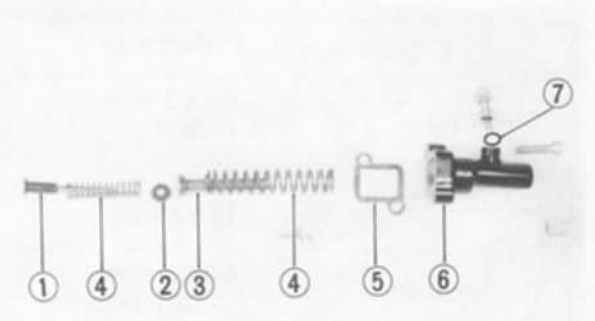
Cam Sprockets

1. Inspect:
   - Cam sprockets
     Wear/Damage → Replace.



Cam Chain Dampers

1. Inspect:
   - Upper damper (1)
   - Exhaust side chain guide (2)
   - Intake side chain guide (3)
   - Chain guide stopper (4)
   - Spring (5)
   - Guide stopper plate (6)
     Wear/Damage → Replace



Cam Chain Tensioner

1. Inspect:
   - All parts
     Damage/Wear → Replace.

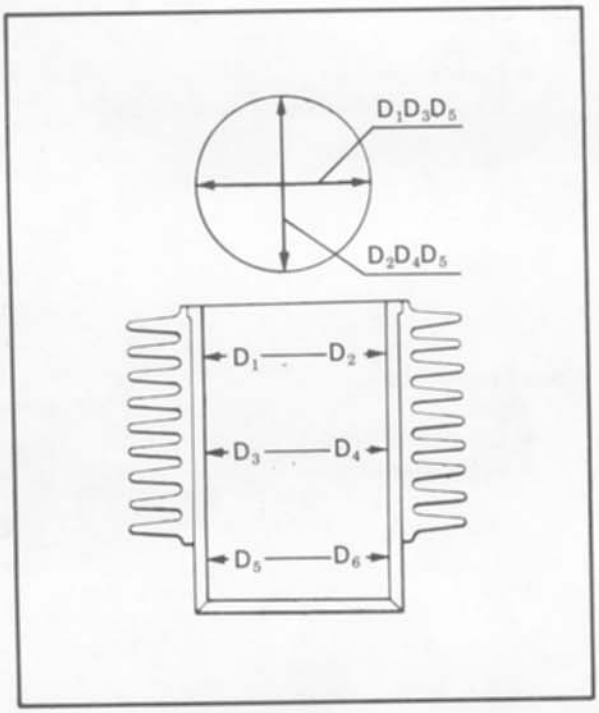
(1) Tensioner rod (Small)
(2) Damper
(3) Tensioner rod (Large)
(4) Spring
(5) Gasket
(6) Tensioner body
(7) O-ring

CYLINDER

1. Inspect:
   - Cylinder walls
     Vertical scratches → Rebore or Replace cylinder.
2. Measure:
   - Cylinder inside diametor

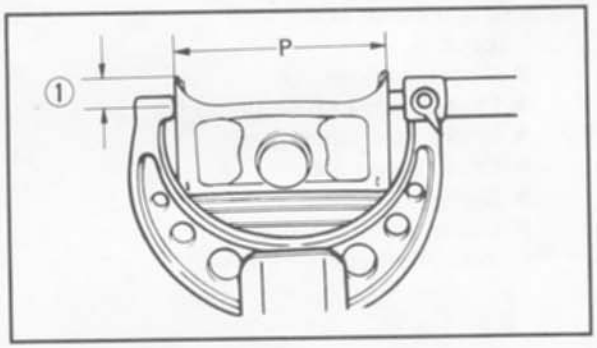
NOTE:
Obtain measurements at three depths by placing measuring instrument paralle to and at right angles to crankshaft.

Out of specification → Rebore cylinder, and replace piston and piston rings.



	Standard	Wear limit
Cylinder Bore: C	58.5 mm (2.303 in)	58.6 mm (2.307 in)
Cylinder Taper: T	—	0.05 mm (0.002 in)

C = Maximum D
T = Maximum D_1, D_2 — Minimum D_5, D_6



PISTON, PISTON RING, AND PISTON PIN

Piston

1. Measure:
   - Piston skirt diameter "P"

NOTE:
Measure the piston skirt diameter where the distance 7.0 mm (0.276 in) (1) from the piston bottom edge.

	Piston size
Standard	58.50 mm (2.303 in)
Oversize 2	59.00 mm (2.323 in)
Oversize 4	60.00 mm (2.362 in)

2. Measure:
   - Piston clearance

   Out of specification → Rebore cylinder or replace piston.

Piston Clearance = C − P:
0.025 ~ 0.045 mm (0.0010 ~ 0.0019 in)

C: Cylinder bore P: Piston outside diameter

Piston Ring

1. Measure:
   - Ring side clearance
     Use a feeler gauge.
     Out of specification → Replace piston.

NOTE:
Clean carbon from piston ring grooves and rings before measuring side clearance.

	Piston Ring Side Clearance:
Top	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
2nd	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)

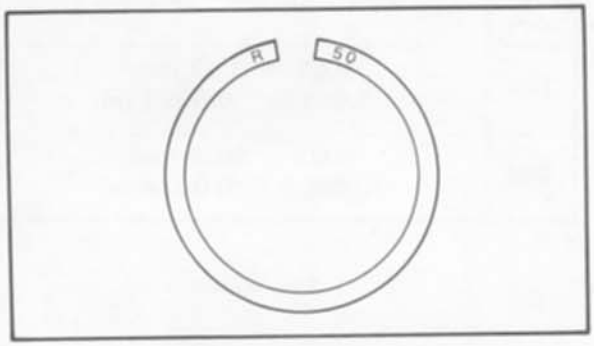
2. Position:
   - Piston ring
     (in cylinder)

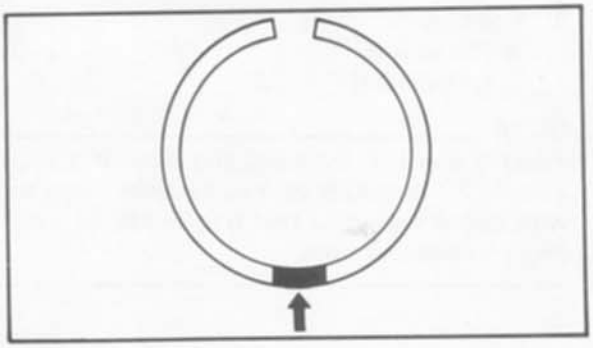
NOTE:
Insert a ring into cylinder, and push it approximarely 20 mm (0.8 in) into cylinder. Push ring with piston crown so that ring will be at a right angle to cylinder bore.

3. Measure:
   - Ring end gap
     Out of specification → Replace.

NOTE:
You cannot measure end gap on expander spacer of oil control ring. If oil control ring rails show excessive gap, replace all three rings.

	Standard	Limit
Top ring	0.15~0.30 mm (0.0059~0.0118 in)	0.70 mm (0.0276 in)
2nd ring	0.15~0.30 mm (0.0059~0.0118 in)	0.70 mm (0.0276 in)
Oil control (Rails)	0.2~0.7 mm (0.008~0.028 in)	–





Piston Ring Oversize
- Top and 2nd piston ring

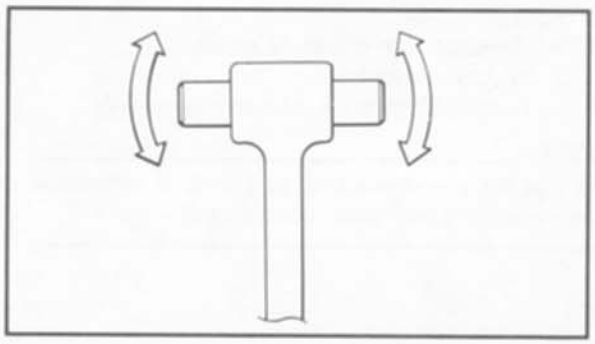
Oversize top and middle ring sizes are stamped on top of ring.

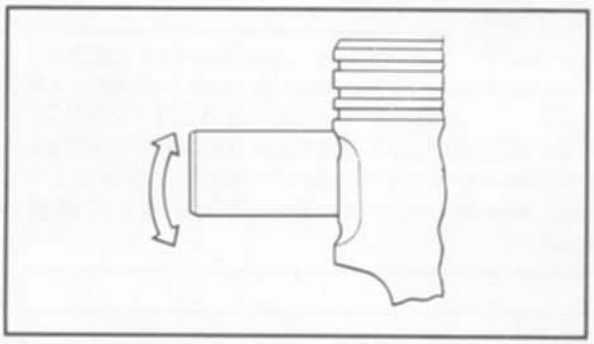
Oversize 2	0.50 mm (0.0197 in)
Oversize 4	1.00 mm (0.0394 in)

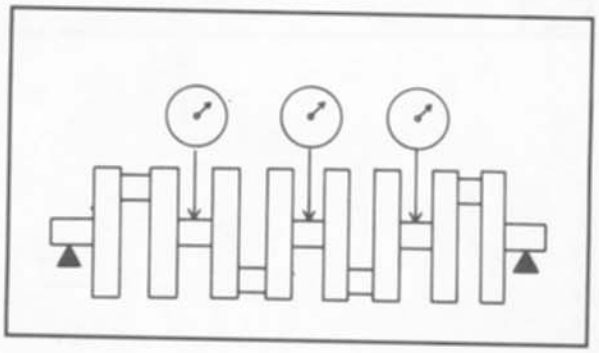
- Oil control ring

Expander spacer of bottom ring (oil control ring) is color-coded to identify sizes.

Size	Color
Oversize 2	Blue
Oversize 4	Yellow







Pistion Pin

1. Lubricate:
   - Piston pin (Lightly)
2. Install:
   - Piston pin
     (into small end of connecting rod)
3. Check:
   - Free play
     Free play → Inspect connecting rod for wear.
     Wear → Replace connecting rod and piston pin.
4. Position:
   - Piston pin
     (into piston)
5. Check:
   - Free play
     (into piston)
     Free play → Replace piston pin and/or piston.

CRANKSHAFT AND CONNECTING ROD

Crankshaft Runout

1. Place both ends of crankshaft on V-blocks.
2. Rotate:
   - Crankshaft
3. Measure:
   - Crankshaft runout
     (at main journal bearings)
     Use a Dial Gauge (90890-03097).

Maximum Crankshaft Runout:
0.03 mm (0.0012 in)

Connecting Rod Bearings

1. Inspect:
   - Bearings
     Burns/Flaking/Roughness/Scratches → Replace.

Connecting Rod Bearing Clearance

1. Clean all parts thoroughly.
2. Install:
   - Connecting rod bearings
     (into connecting rod and cap)
3. Attach:
   - Plastigage®
     (onto crankpin)
4. Position:
   - Connecting rod
     (onto crankshaft)
   - Connecting rod cap

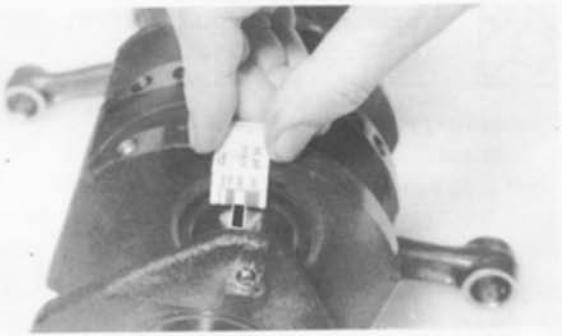
5. Apply:
   - Molybdenum disulfide grease (to bolt threads)

   Torque both ends of rod cap evenly.

NOTE:
Do not move connecting rod until a clearance measurement has been completed.

CAUTION:
Tighten to full torque specification without pausing. Apply continuous torque between 2.0 and 2.5 m·kg. Once you reach 2.0 m·kg DO NOT STOP TIGHTENING unitl final torque is reached. If tightening is interrupted between 2.0 and 2.5 m·kg, loosen nut to less than 2.0 m·kg and start again.

25 Nm (2.5 m·kg, 18 ft·lb)



6. Remove:
   - Connecting rod cap

   Remove carefully.
7. Measure:
   - Plastigage width

   Out of specification → Replace connecting rod bearing.

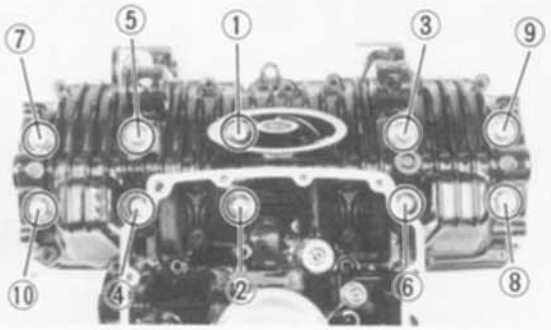
Connecting Rod Bearing Clearance:
0.016 ~ 0.040 mm
(0.0006 ~ 0.0016 in)

Crankshaft Main Bearing Clearance Measurement

1. Clean all parts.
2. Position:
   - Upper crankcase half
     Place on a bench in au upside down position.
3. Install:
   - Bearings
     (into the upper crankcase)
   - Crankshaft
4. Attach:
   - Plastigage® (YU-33210)
     (onto the crankshaft journal surface)

NOTE:
Do not move crankshaft until clearance measurement has been completed)

5. Install:
   - Bearings
     (into lower crankcase)
   - Lower crankcase



6. Tighten:
   - Bolts

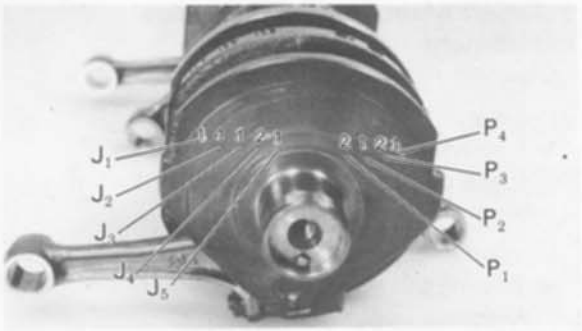
CAUTION:
Tighten to full torque in torque sequence cast on the crankcase.

	8 mm (0.3 in) Bolt: 24 Nm (2.4 m·kg, 17 ft·lb)

7. Remove:
   - Bolts
     Reverse assembly order
   - Lower crankcase
     Use care in removing.

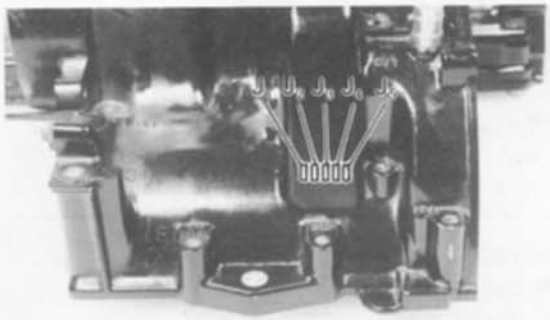
8. Measure:
   - Plastigage width® ① (YU-33210)
     Out of specification → Replace bearings; replace crankshaft if necessary.

	Main Bearing Oil Clearance: 0.021 ~ 0.044 mm (0.0008 ~ 0.0017 in)

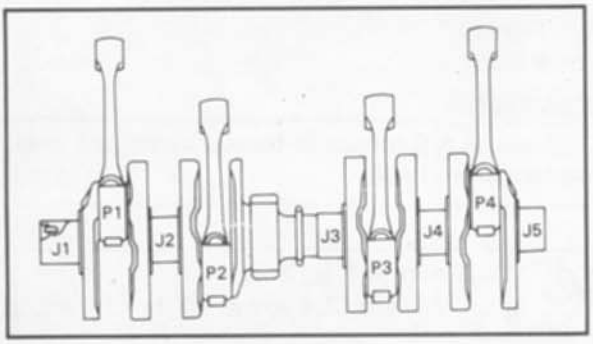


Crankshaft Main and Connecting Rod Bearing Selection

- Numbers used to indicate crankshaft journal sizes are stamped on the LH crankweb. The first five (5) are main bearing journal numbers, starting with the left journal. The four (4) rod bearing journal numbers follow in the same sequence.



- The upper crankcase half is numbered J1, J2, J3, J4, and J5 on the rear right bosse as shown.



- The connecting rods are numbered 4 or 5. The numbers are stamped in ink on the rod cap ①

BEARING COLOR CODE	
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green
* No. 5	Yellow

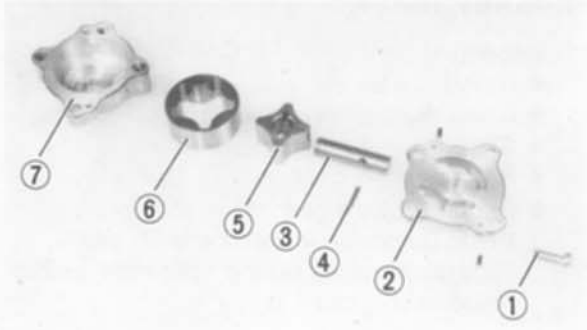
* No. 5 applies only to the crankshaft main bearing selection.

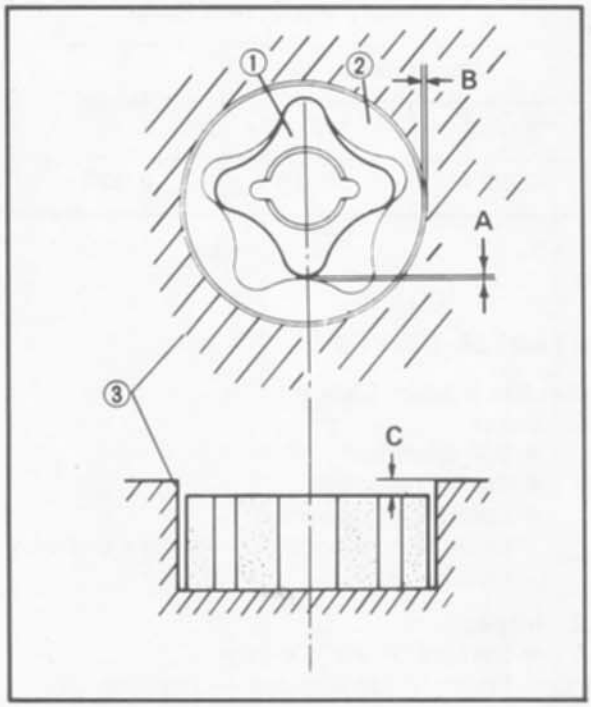
Example 1: Selection of the crankshaft main bearing; If the crankcase J1 and crankshaft J1 sizes are No. 4 and No. 1, respectively, the bearing size No. is:

Bearing size No. =
Crankcase No. – Crankshaft No. =
4 – 1 = 3 (Brown)

Example 2: Selection of the connecting rod bearing; If the connecting rod P1 and crankshaft P1 sizes are No. 4. and No. 1, repectively, the bearing size No. is:

Bearing size No. =
Connecting rod No. – crankshaft No. =
4 – 1 = 3 (Brown)





OIL PUMP

1. Remove:
   - Screw ①
   - Pump cover ②
   - Shaft ③
   - Pin ④
   - Inner rotor ⑤
   - Outer rotor ⑥
   - Pump housing ⑦
2. Measure:
   - Clearance "A" (between inner rotor ① and outer rotor ②)
   - Clearance "B" (between outer rotor ② and pump housing ③)
   - Clearance "C" (between pump housing ③ and rotors ①, ②)

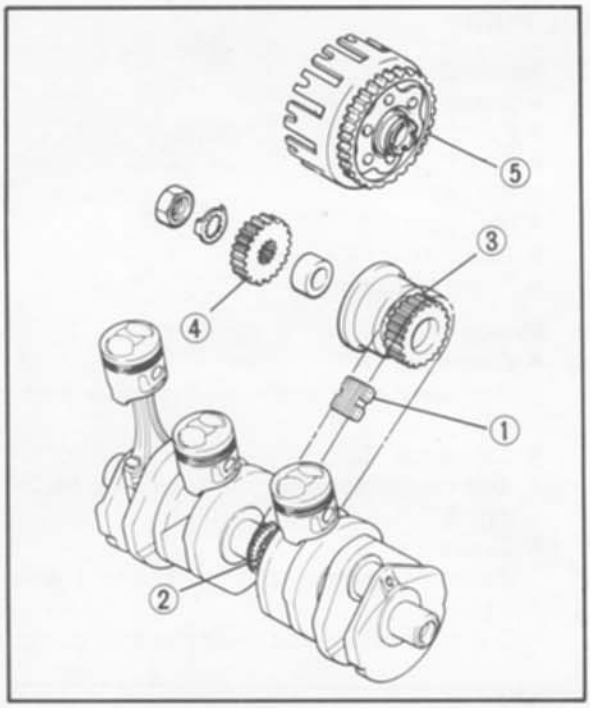
   Out of specification → Replace oil pump.

Oil Pump Clearance:	
Clearance "A"	0.03~0.09 mm (0.0012~0.0035 in)
Clearance "B"	0.03~0.08 mm (0.0012~0.0031 in)
Clearance "C"	0.03~0.09 mm (0.0012~0.0035 in)

3. Install:
   - Oil pump parts.
4. Tighten:
   - Screw

	7 Nm (0.7 m·kg, 5.1 ft·lb)

3



PRIMARY DRIVE

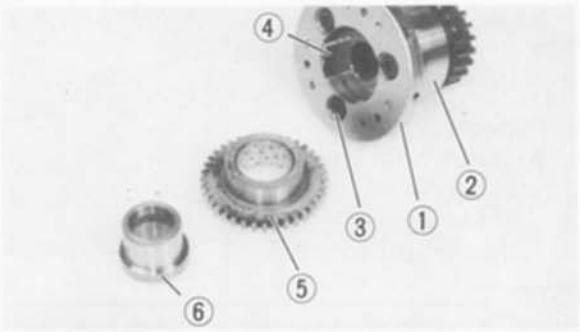
1. Inspect:
   - HY-VO chain ①
   - Crankshaft drive sprocket ②
   - Clutch damper driven sprocket ③
   - Primary drive gear ④
   - Primary driven gear ⑤
   Wear/Damage → Replace both gears.
   Excessive noises during operation → Replace both gears.

Primary Reduction Ratio:		
No. of teeth		Ratio
③ / ②	⑤ / ④	
22/21	65/25	2.432

STARTER DRIVES

Electric Starter Clutch

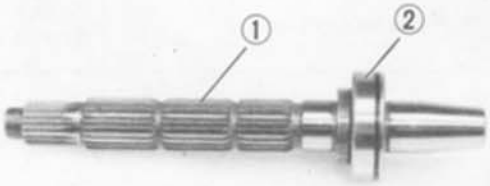
1. Check:
   - Ball operation
   - Spring operation
   - Spring cap operation
   Unsmooth operation → Replace one-way clutch.
2. Inspect:
   - Surface of the idle gear
   Pitting/Wear/Damage → Replace.



3. Installation
   a. Install:
      - Cover ①
      - Outer starter clutch ②
   b. Tighten:
      - Bolts ③

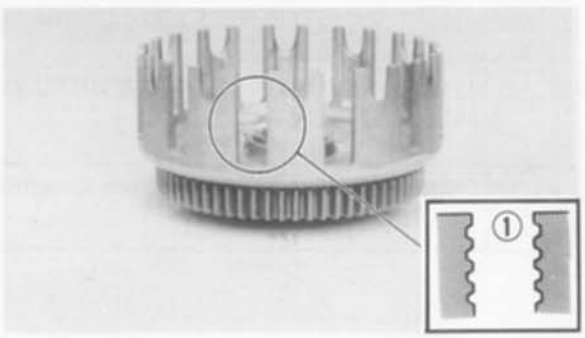
24 Nm (2.4 m·kg, 17 ft·lb)
LOCTITE®
Stake Over the End of the Bolt

   c. Install:
      - Spring
      - Spring cap
      - Ball ④
      - Idler gear ⑤
      - Collar ⑥



Starter Clutch Shaft

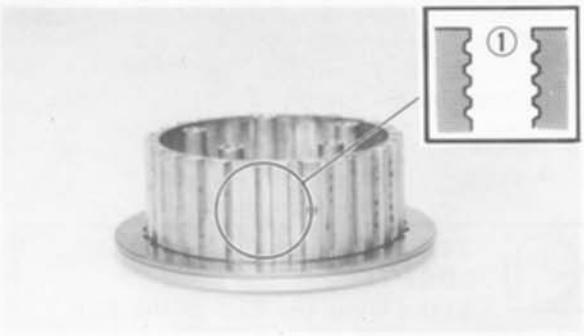
1. Check:
   - Shaft ①
     Wear/Damage → Replace
   - Bearing ②
     Unsmooth operation → Replace



CLUTCH

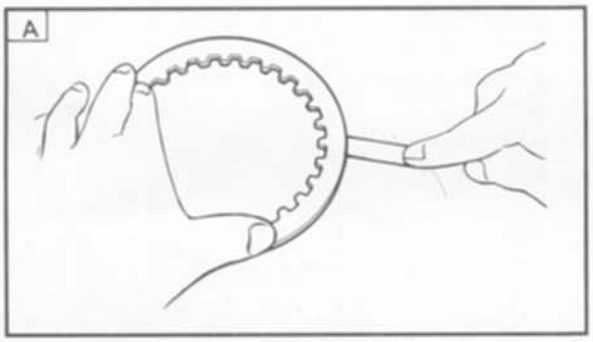
1. Inspect:
   - Clutch housing dogs ①
     Cracks/Pitting (edges):
     Moderate → Deburr.
     Severe → Replace clutch housing.

NOTE:
Pitting on friction plate dogs of clutch housing will cause erratic operation.



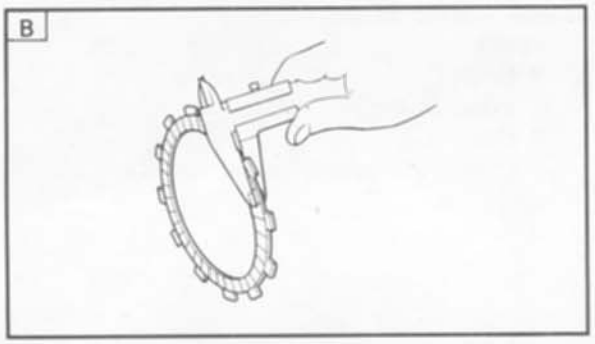
2. Inspect:
   - Clutch housing bearing
     Damage → Replace.
3. Inspect:
   - Clutch boss spline ①
     Pitting:
     Moderate → Deburr.
     Severe → Replace.

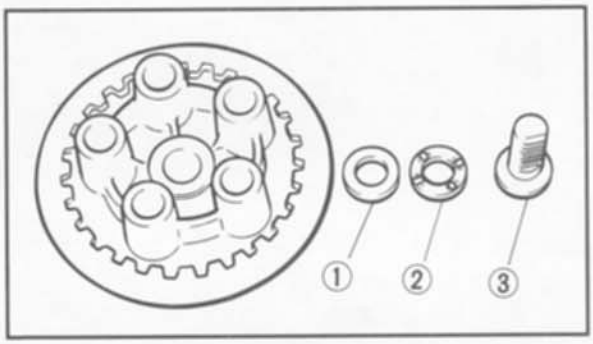
NOTE:
Pitting on clutch plate splines of clutch boss will cause erratic operation.



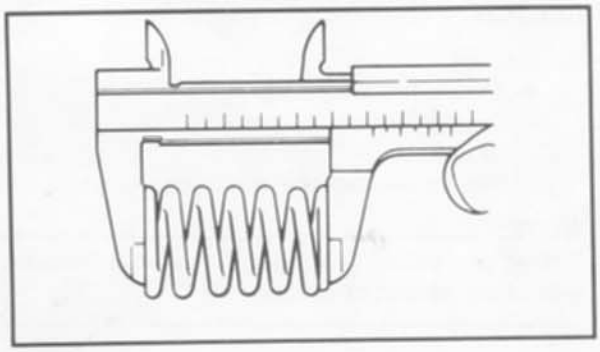
4. Measure:
   - Clutch plate warpage [A]
   - Friction plate thickness [B]
     Out of specification → Replace.
     Clutch or friction plate as a set.

	Standard	Wear limit
Friction Plate Thickness	3.0 mm (0.12 in)	2.8 mm (0.11 in)
Clutch Plate Warp Limit	—	0.1 (0.004 in)



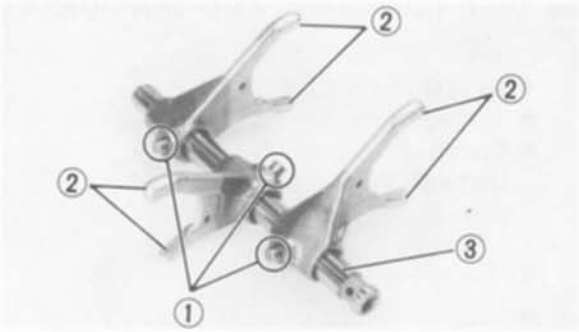


5. Inspect:
   - Washer ①
   - Thrust bearing ②
   - Pull rod ③
     Damage → Replace.



6. Measure:
   - Clutch spring free play
     Out of specification → Replace spring as a set.

	Clutch Spring Minimum Free Length: 40.2 mm (1.583 in)



TRANSMISSION

1. Inspect:
   - Shift fork cam follower ①
   - Shift fork pawl ②

   Scoring/Bends/Wear → Replace.
2. Check:
   - Guide bar ③

   Roll across a surface plate.
   Bends → Replace

3. Inspect:
   - Shift cam groove ①
   - Shift cam dowel ② and side plate
   - Shift cam stopper plate ③ circlip and stopper.

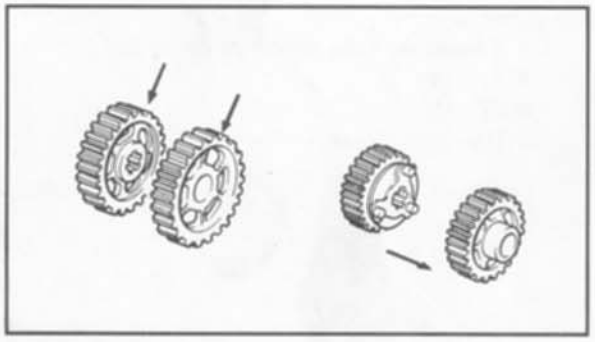
   Wear/Damage → Replace.

3

4. Measure:
   - Transmission shaft runout

   Use centering device and dial gauge.
   Out of specification → Replace bent shaft.

Maximum Runout:
0.08 mm (0.0031 in)



5. Inspect:
   - Gear teeth

   Blue discoloration/Pitting/Wear → Replace.
   - Mated dogs

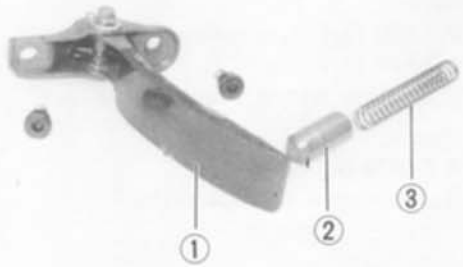
   Rounded edges/Cracks/Missing portions → Replace.

6. Check:
   - Proper gear engagement (Each gear) (to its counter part)

   Incorrect → Ressemble
   - Gear moverment

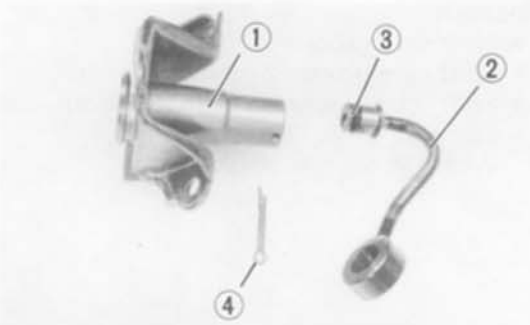
   Roughness → Replace.

HY-VO CHAIN GUIDE AND TENSIONER



1. Check:
   - HY-VO chain guide ①
   - Tensioner plunger ②
   - Spring ③

   Damage/Wear → Replace

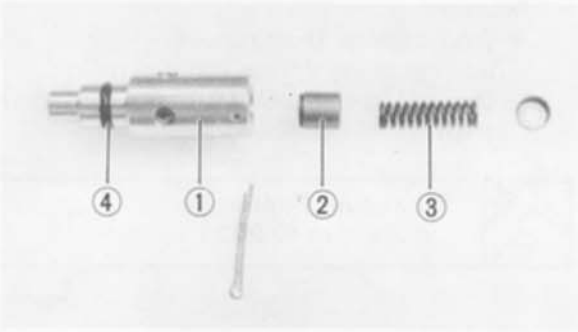


2. Check:
   - HY-VO chain tensioner ①
   - Oil delivery pipe ②
   - O-ring ③
   - Cotter pin ④

   Damage → Replace

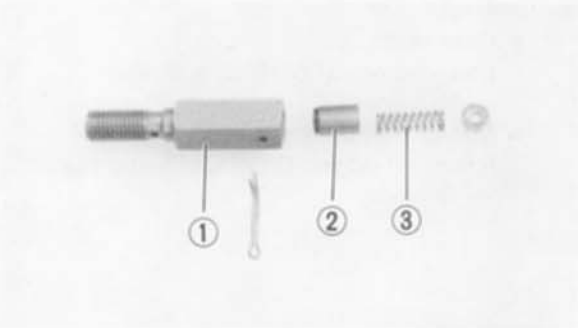
3

RELIEF VALVES



1. Check:
   - Relief valve body ①
   - Plunger ②
   - Spring ③
   - O-ring ④

   Damage/Wear → Replace



2. Check:
   - Tensioner side relief valve body ①
   - Plunger ②
   - Spring ③

   Damage/Wear → Replace

CRANKCASE

1. Inspect:
   - Case halves
   - Bearing seat
   - Fitting

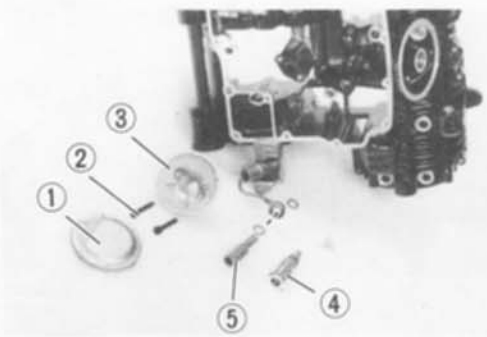
   Damage → Replace.

BEARINGS AND OIL SEALS

1. Inspect:
   - Bearing
     Clean and lubricate, then rotate inner race with finger.
     Roughness → Replace bearing (see Removal).
2. Inspect:
   - Oil seals
     Damage/Wear → Replace (see Removal).

CIRCLIPS AND WASHERS

1. Inspect:
   - Circlips
   - Washers
     Damage/Looseness/Bends → Replace.



ENGINE ASSEMBLY AND ADJUSTMENT

LOWER CRANK CASE

1. Install:
   - Tensioner side relief valve ⑤

	20 Nm (2.0 m·kg, 14 ft·lb)

   - Relief valve ④
   - Strainer housing ③
   - Screws ②

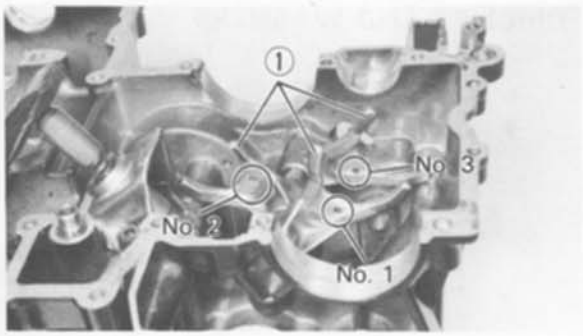
	10 Nm (1.0 m·kg, 7.2 ft·lb)

   - Oil strainer ①

2. Install:
   - HY-VO chain tensioner ②

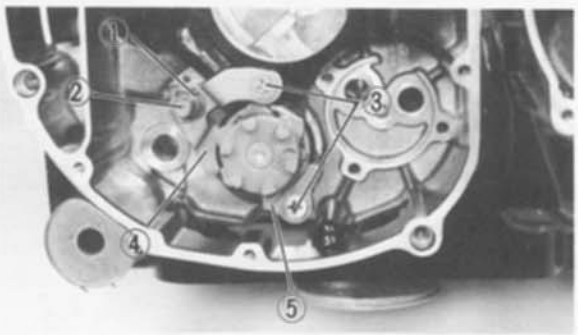
Screw:
10 Nm (1.0 m·kg, 7.2 ft·lb)
Apply LOCTITE®

   - HV-VO chain guide ①
   - Spring ④
   - Tensioner plunger ③



3. Install:
   - Shift cam assembly
   - Shift forks ①
   - Guide bar

NOTE:
All shift fork numbers shift should face the right side and be in sequence (1,2,3) begining from the right.



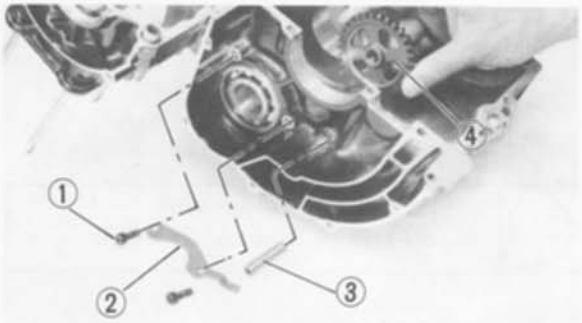
4. Install:
   - Bearing stopper ⑤
   - Guide bar stopper ④
   - Screws ③

10 Nm (1.0 m·kg, 7.2 ft·lb)

   - Stopper screw ②

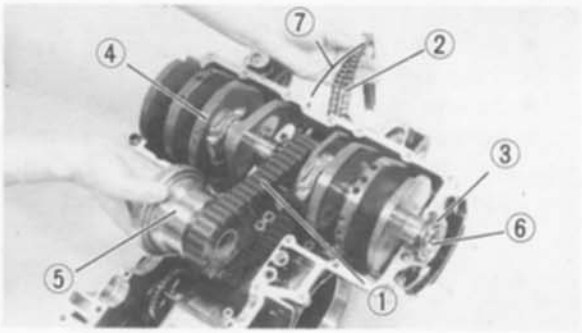
22 Nm (2.2 m·kg, 16 ft·lb)

   - Lock washer ①



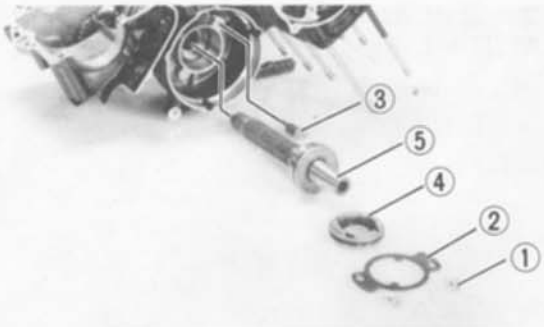
UPPER CRANKCASE

1. Install:
   - Starter idler gear ④
   - Shaft ③
   - Bearing stopper ②
   - Screws ①



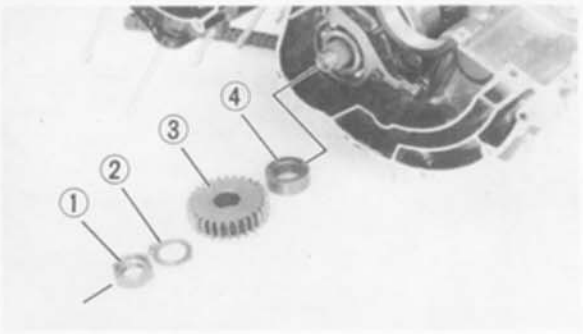
2. Install:
   - HY-VO chain ①
   - Cam chain ②
   - Oil seal ③
   - Plug (onto crankshaft)
   - Crankshaft assembly ④
   - Starter clutch damper assembly ⑤

NOTE:
- The crankshaft pin ⑥ (timing plate stopper pin) should face to the left.
- Pass the cam chain through the cam chain cavity. Be sure to attach a retaining wire ⑦ to the cam chain.



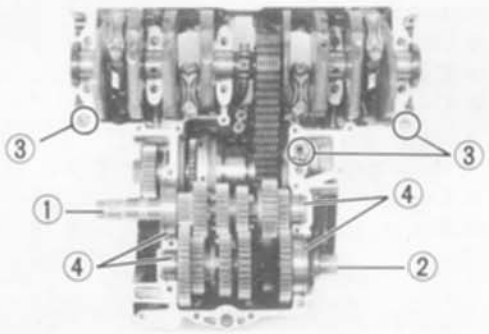
3. Install:
   - A.C.G shaft ⑤
   - Bearing housing ④
   - Oil sprag nozzle ③
   - Cover plate ②
   - Screw ①

10 Nm (1.0 m·kg, 7.2 ft·lb)
Apply LOCTITE®



4. Install:
   - Collar ④
   - Primary drive gear ③
   - Lock washer ②
   - Nut ①

Primary Drive Gear Nut:
50 Nm (5.0 m·kg, 36 ft·lb)



5. Install:
   - Main axle assembly ①
   - Drive axle assembly ②
   - Dowels ③
   - Circlip ④

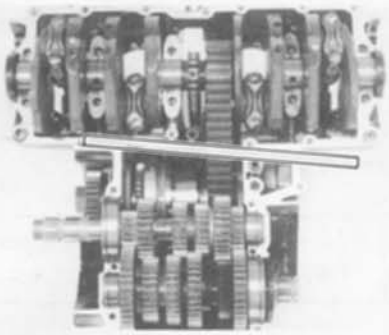
   Insert bearing circlips completely into upper crankcase positioning grooves.

3

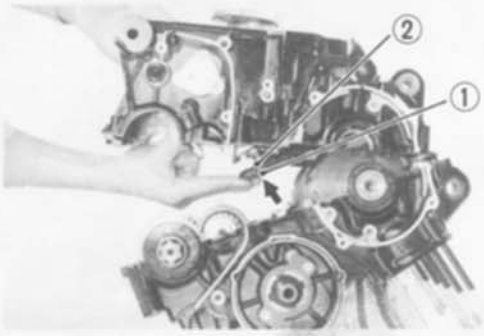
CRANKCASE ASSEMBLY

1. Apply Yamaha bond No. 5 to crankcase matching surfaces.

NOTE:
DO NOT ALLOW any sealant to come in contact with the oil gallery O-ring, or crankshaft bearings. Do not apply sealant to within 2 ~ 3 mm (0.08 ~ 0.12 in) of the bearings.

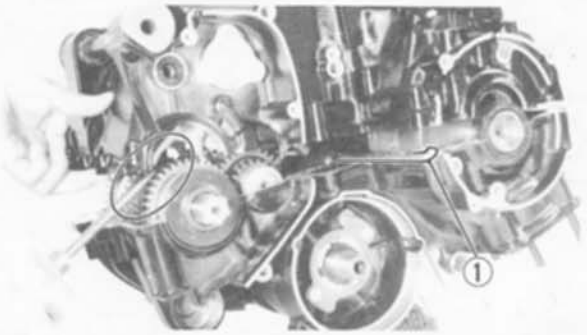


2. Set shift cam and transmission gears in NEUTRAL position.
3. Place suitable bar on the upper crankcase.



4. Place lower crankcase assembly on the upper crankcase assembly.

NOTE:
Push HY-VO chain damper ① to privent tensioner plunger ② from falling into crankcase cavity.



5. Install:
   - Lower crankcase
     Carefully guide shift forks so that they mash smoothly with transmission gears.

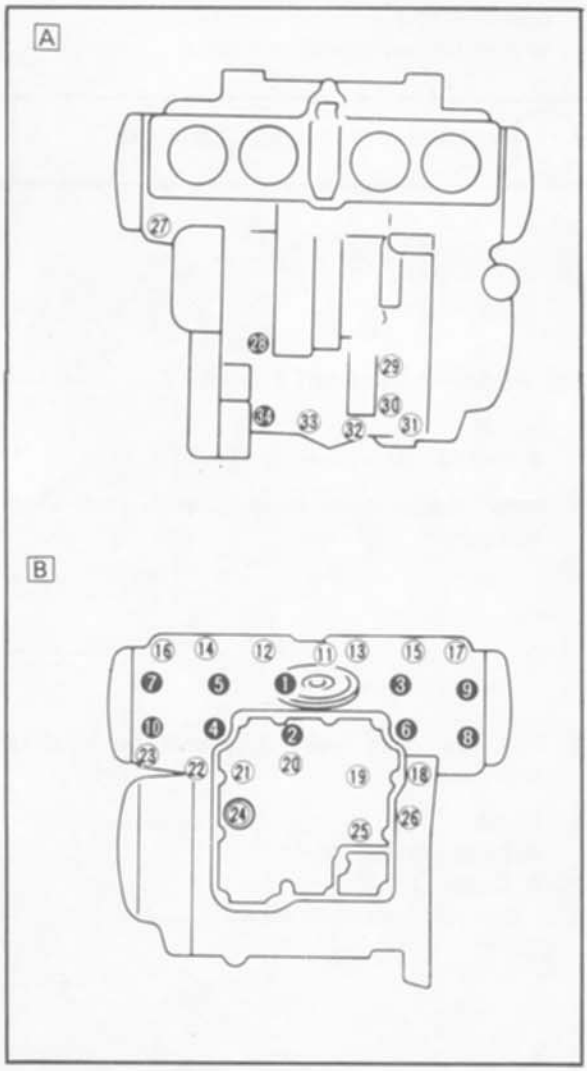
CAUTION:

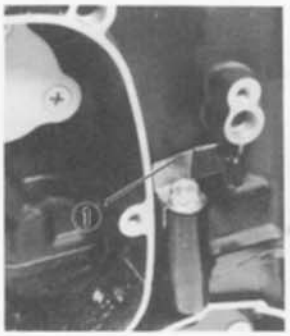
Before tightening the crankcase bolts, check the following points:

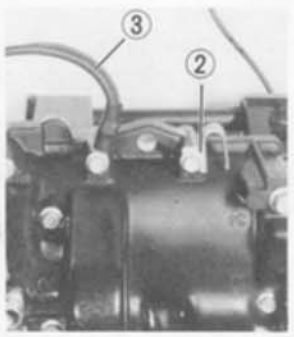
- **Remove bar ① after shift fork meshed.**
- **Be sure the gear shifts correctly while hand-turning the shift cam.**

6. Tighten:
   - Lower crankcase bolt B
   - Upper crankcase bolt A
     (Follow proper tightening sequence.)

○ 6 mm (0.24 in):
12 Nm (1.2 m·kg, 8.7 ft·lb)
● 8 mm (0.31 in):
24 Nm (2.4 m·kg, 17 ft·lb)

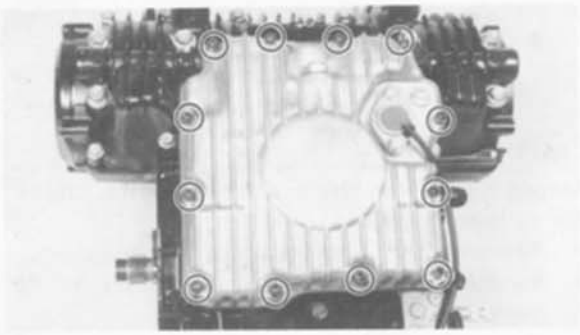






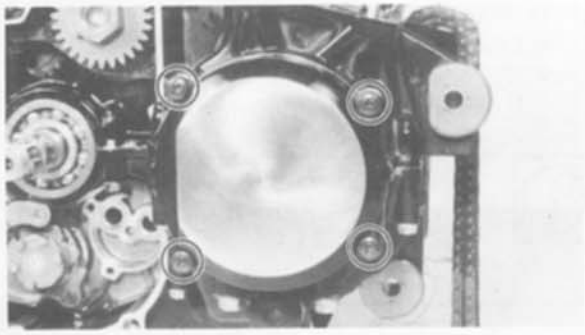
NOTE:

- Install the clamp ① on Bolt No. 26
- Install the clamp ② on Bolt No. 33 and ground lead ③ on Bolt No. 32.



7. Install:
   - Oil pan

	10 Nm (1.0 m·kg, 7.2 ft·lb)

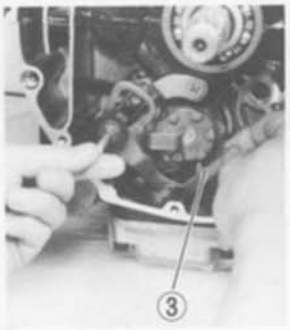


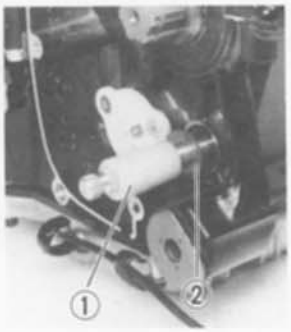
8. Install:
   - Right-front crankcase cover

	10 Nm (1.0 m·kg, 7.2 ft·lb)

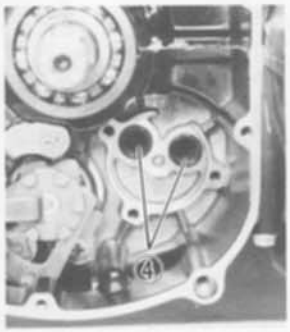
OIL PUMP AND SHIFT SHAFT

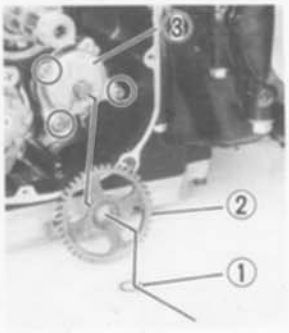
1. Install:
   - Shift shaft assembly ②
2. Mesh the stopper lever ① with shift cam stopper





3. Pull the shift lever 2 ③ and push shift shaft assembly
4. Install:
   - Plate washer ②
   - Collar ①
     (on left side shift shaft)





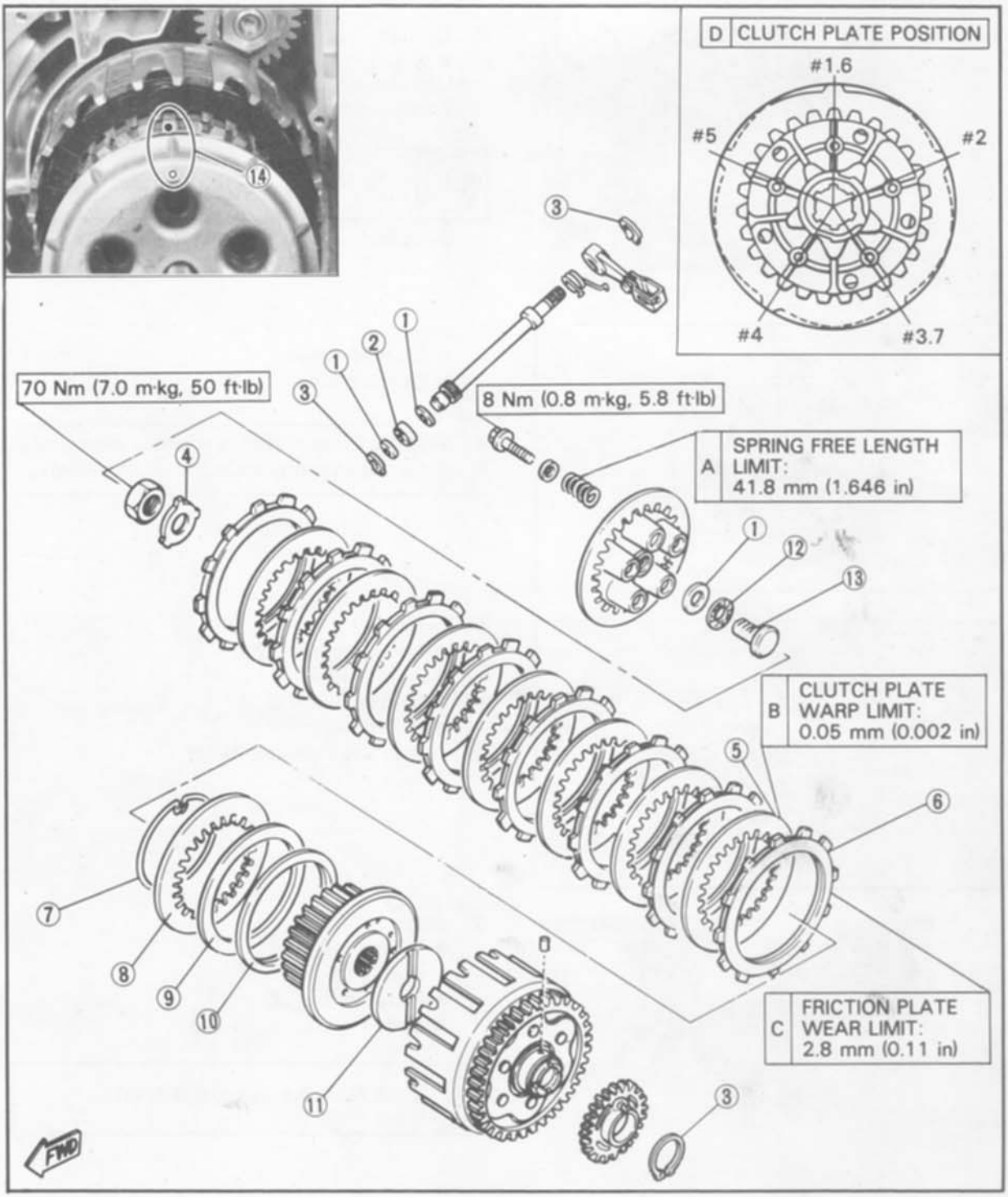
5. Install:
   - O-rings ④
   - Oil pump assembly ③

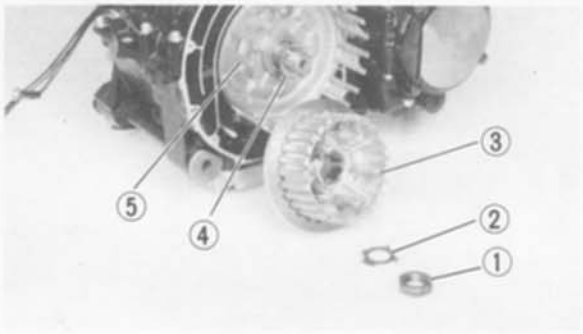
	7 Nm (0.7 m·kg, 5.1 ft·lb)

   - Oil pump driven gear ②
   - Circlip ①

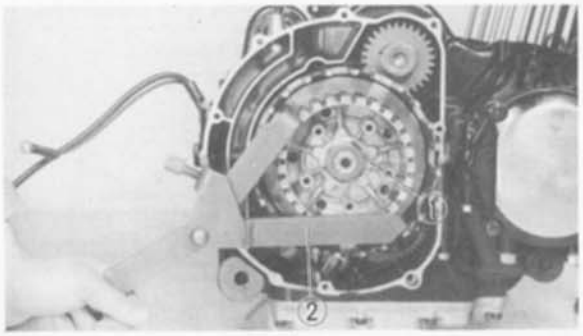
CLUTCH

1. Plate washer
2. Oil seal
3. Circlip
4. Lock washer
5. Clutch plate (#1)
6. Friction plate (#1)
7. Wire clip
8. Clutch plate
9. Clutch boss spring
10. Spring seat
11. Thrust plate
12. Bearing
13. Pull rod
14. Match mark





1. Install:
   - Clutch housing ⑤
   - Thrust washer ④
   - Clutch boss ③
   - Lock washer ②
   - Nut ①

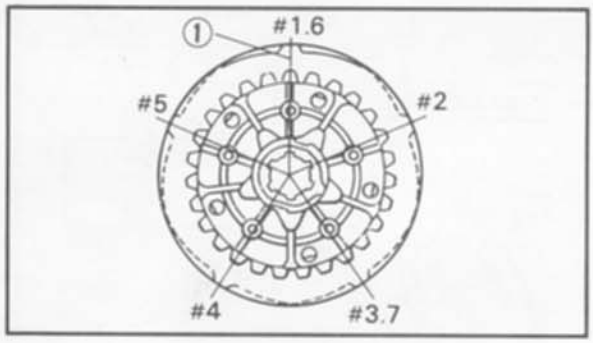


2. Tighten:
   - Nut ①

   Use Universal Clutch Holder ②
   (90890-04046)

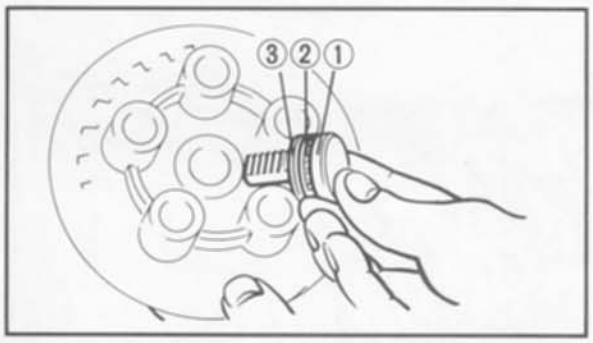
	70 Nm (7.0 m·kg, 50 ft·lb)

Bend lock washer tab against nut flat.

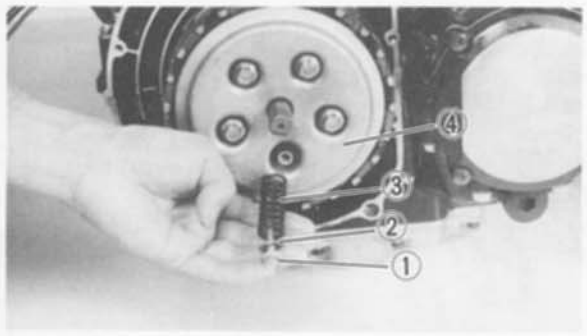


3. Install:
   - Friction plates
   - Clutch plates

NOTE:
- Mount friction and clutch plates alternately.
- Align the clutch plate mark ① as shown.

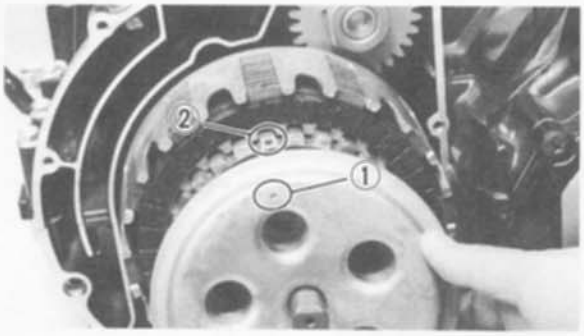


4. Install:
   - Thrust bearing ②
   - Plate washer ③
     (on the pull rod)
   - Pull rod ①
     (into the pressure plate)

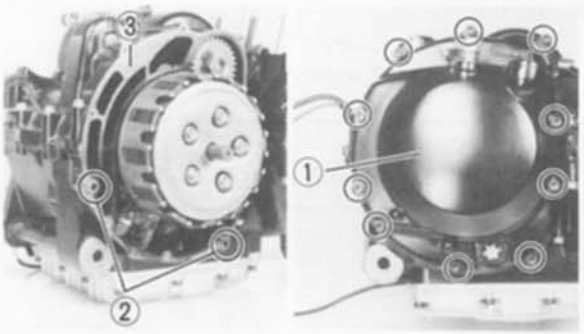


5. Install:
   - Pressure plate ④
   - Spring ③
   - Plate washer ②
   - Bolt ①

	8 Nm (0.8 m·kg, 5.8 ft·lb)

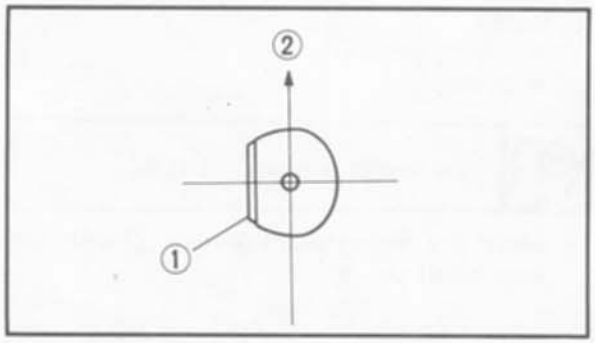


NOTE:
Align the pressure plate mark ① with the clutch boss mark ② .



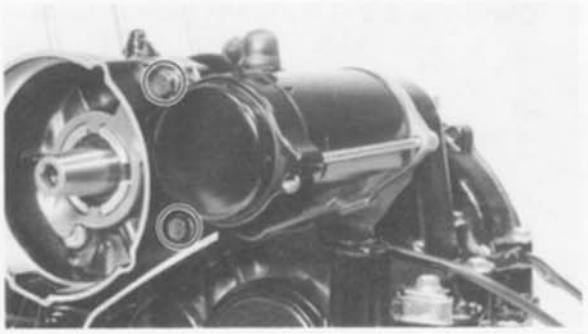
6. Install:
   - Gasket ③
   - Dowels ②
   - Right crankcase cover ①

	10 Nm (1.0 m·kg, 7.2 ft·lb)



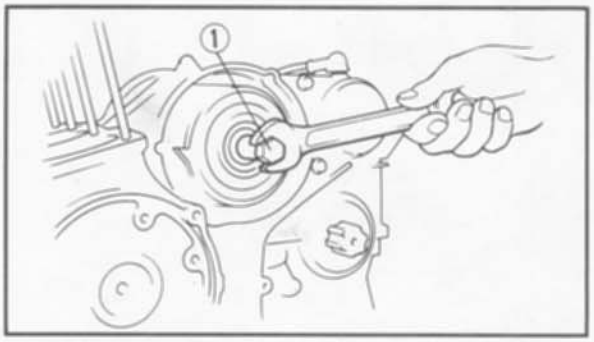
NOTE:
Be sure the pull rod gear ① face to rear of engine.

② upper



PICK UP COIL, GENERATOR AND STARTER MOTOR

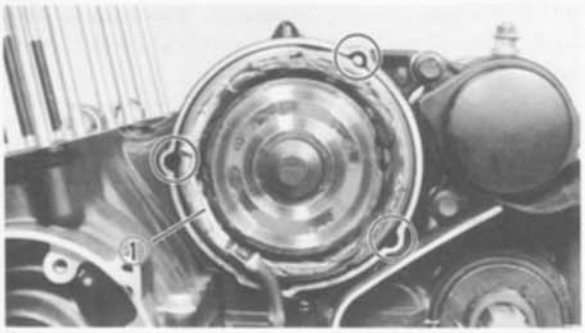
1. Install:
   - Starter motor



2. Install:
   - Rotor
   - Bolt ①

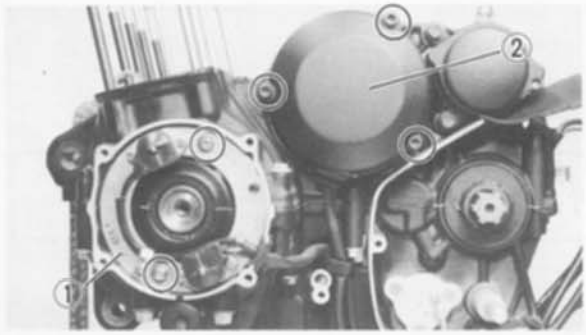
   Use Rotor Holding Tool (90890-04067) ②

	35 Nm (3.5 m·kg, 25 ft·lb)



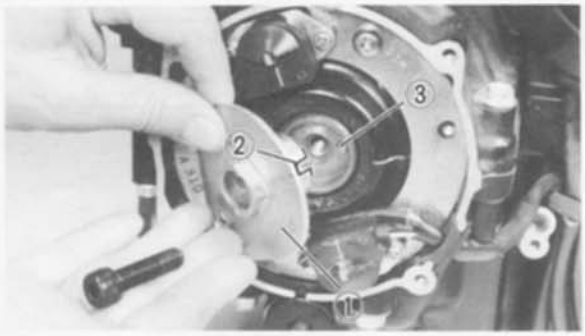
3. Install:
   - Stator coil ①

NOTE:
Align the stator core grooves with the bolt holes.



4. Install:
   - Generator cover ②
   - Pick up coil assembly ①

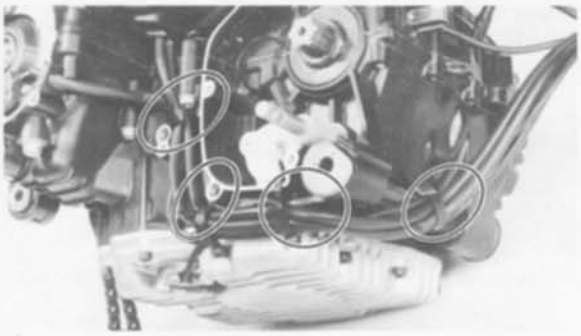
Coil screw:
8 Nm (0.8 m·kg, 5.8 ft·lb)



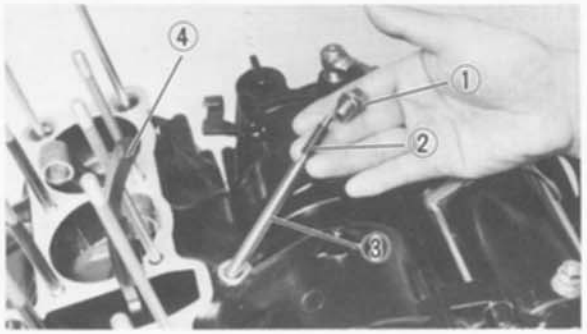
5. Install:
   - Timing plate ①
   - Screw

24 Nm (2.4 m·kg, 17 ft·lb)

Mesh the timing plate groove ② with the crankshaft pin ③.



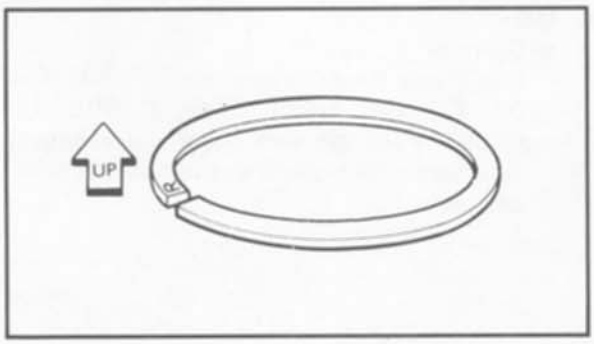
6. Clamp the A.C.G leads and pick up leads.



PISTON AND INTAKE SIDE CAM CHAIN GUIDE

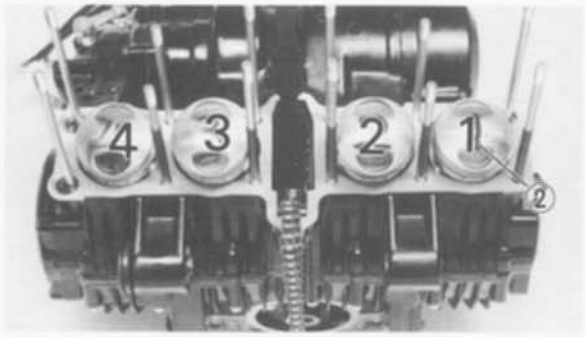
1. Install:
   - Intake side cam chain guide ④
   - Stopper shaft ③
   - Spring ②
   - Plate washer
   - Bolt ①

NOTE:
The lower and of chain quide must rest in the cam chain guide slot in the crankcase.



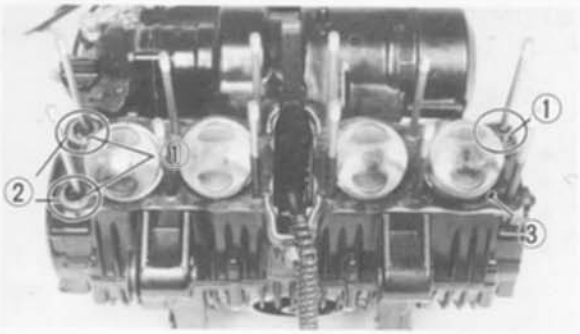
2. Install:
   - Piston rings

NOTE:
Be sure to install rings so that Manufacturer's marks or numbers are located on the top side of the rings. Oil the pistons and rings liberally.



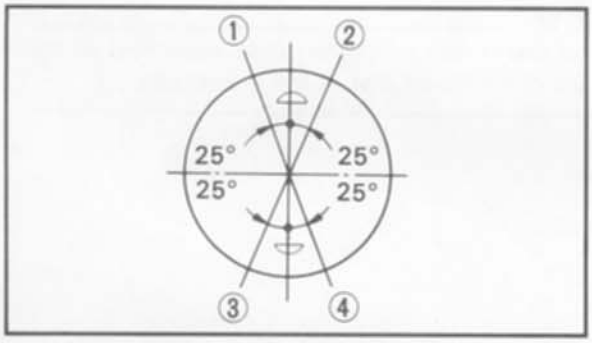
3. Install:
   - Piston pin
   - Piston
   - Piston pin Circlip (New)

NOTE:
- Be sure the piston arrow mark ① face to exhaust side.
- Before installing piston pin circlip, cover crankcase with a clean rag to prevent circlip from falling into crankcase cavity.
- Be sure the marked piston numbers ② should be in sequence (1,2,3,4) begining from the left.

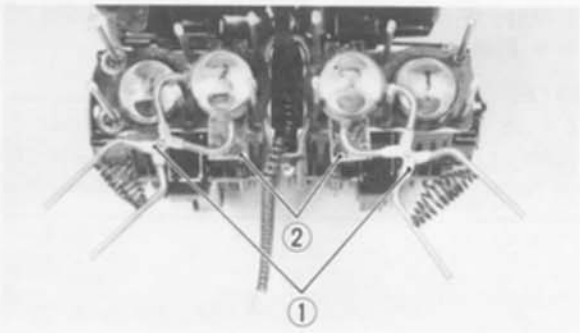


CYLINDER

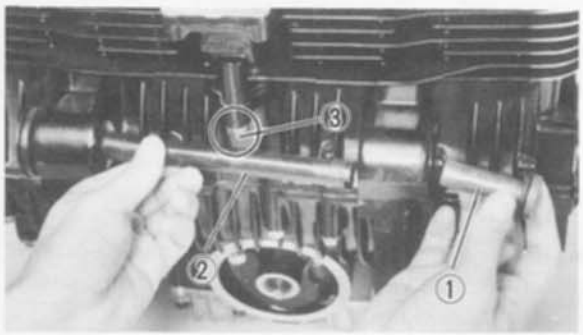
1. Install:
   - Dowels ①
   - O-rings ②
   - Cylinder gasket ③



2. Oil liberally:
   - Piston
   - Rings
   - Cylinders
3. Set:
   - Top ring end ①
   - Oil ring end (Lower) ②
   - Oil ring end (Upper) ③
   - 2nd ring end ④



4. Install:
   - Cylinder
     Use Piston Ring Compressor ① (90890-04047) and Piston Base ② (90890-01067) Pass the cam chain and exhaust side cam chain guide through cam chain cavity.



5. Tighten:
   - Cylinder nut ③

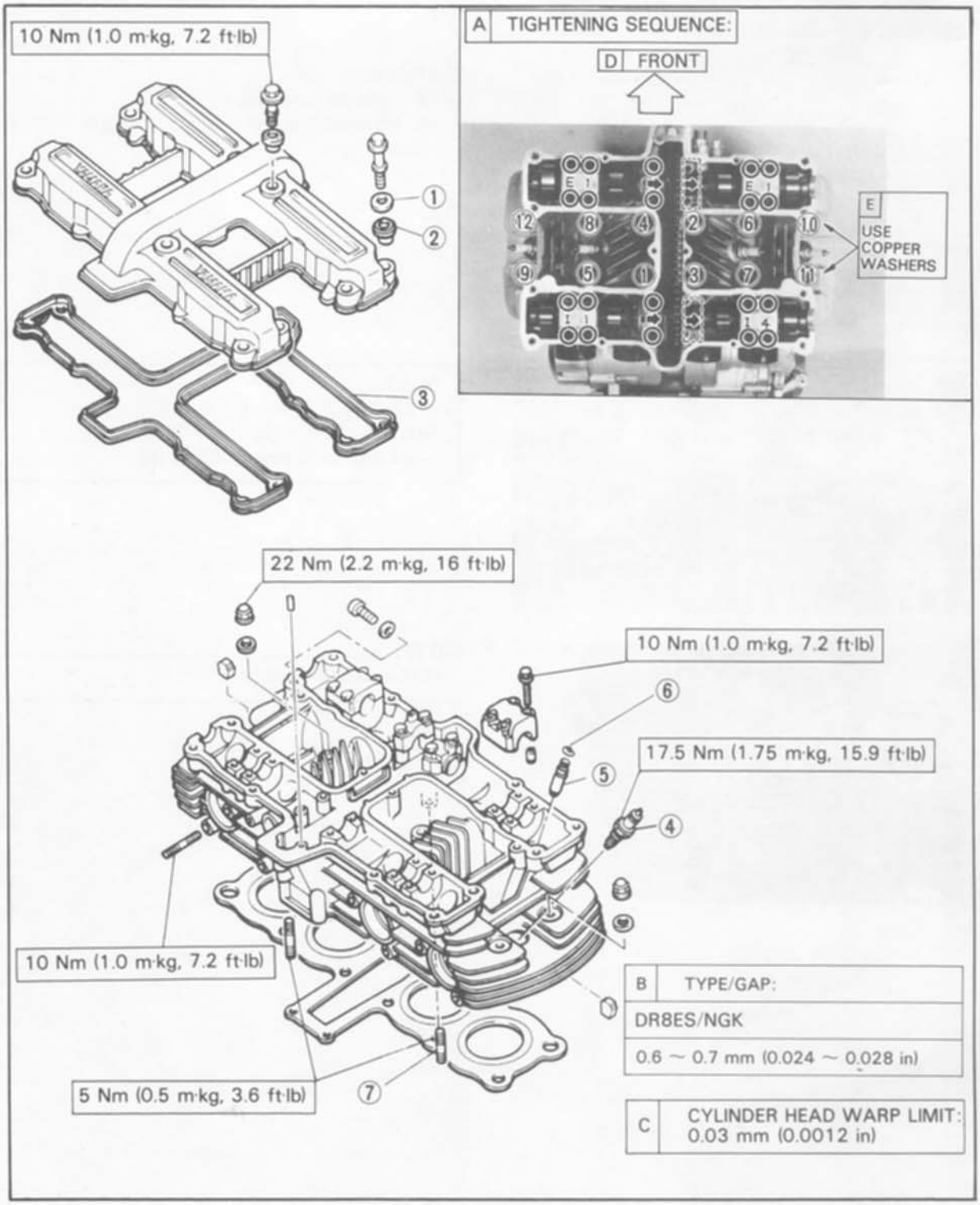
	20 Nm (2.0 m·kg, 14 ft·lb)

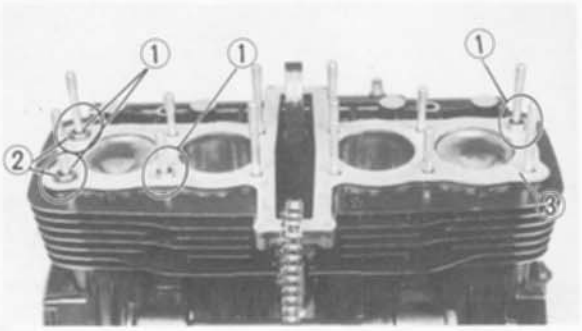
6. Install:
   - Front engine mount spacer ②
   - Damper ①

CYLINDER HEAD AND CAMSHAFT

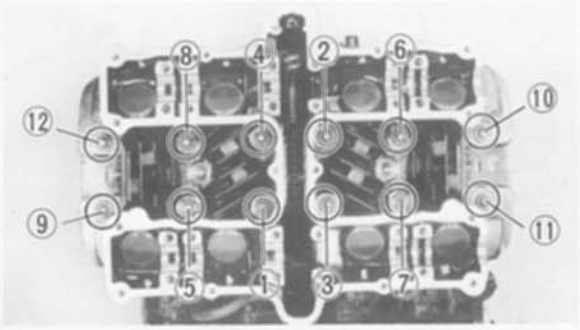
CYLINDER HEAD

1. Washer
2. Rubber washer
3. Gasket
4. Spark plug
5. Valve guide
6. Circlip
7. Stud bolt



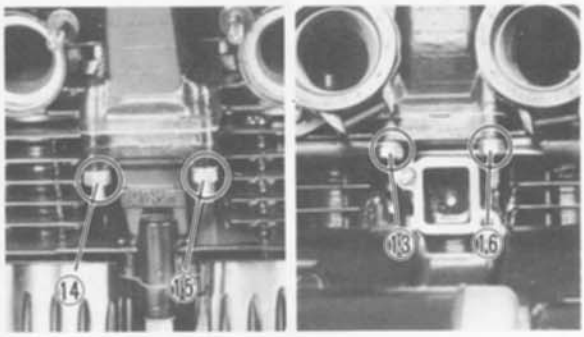


1. Install:
   - Dowels ①
   - O-rings ②
   - Head gasket ③ (New)
   - Cylinder head

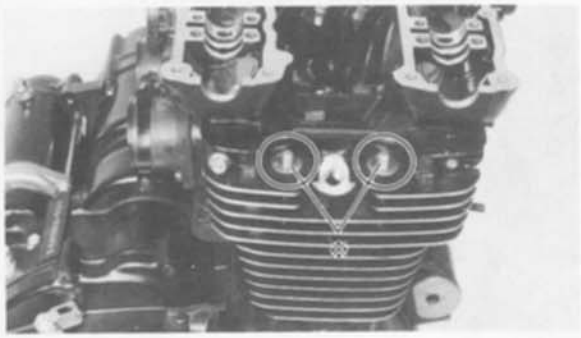


2. Tighten:
   - Cylinder head nuts

   In sequence as shown and torque nuts in two stages.



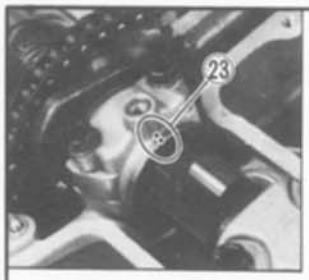
Nut No. ① ~ ⑫:
22 Nm (2.2 m·kg, 16 ft·lb)
Nut No. ⑬ ~ ⑯:
10 Nm (1.0 m·kg, 7.2 ft·lb)



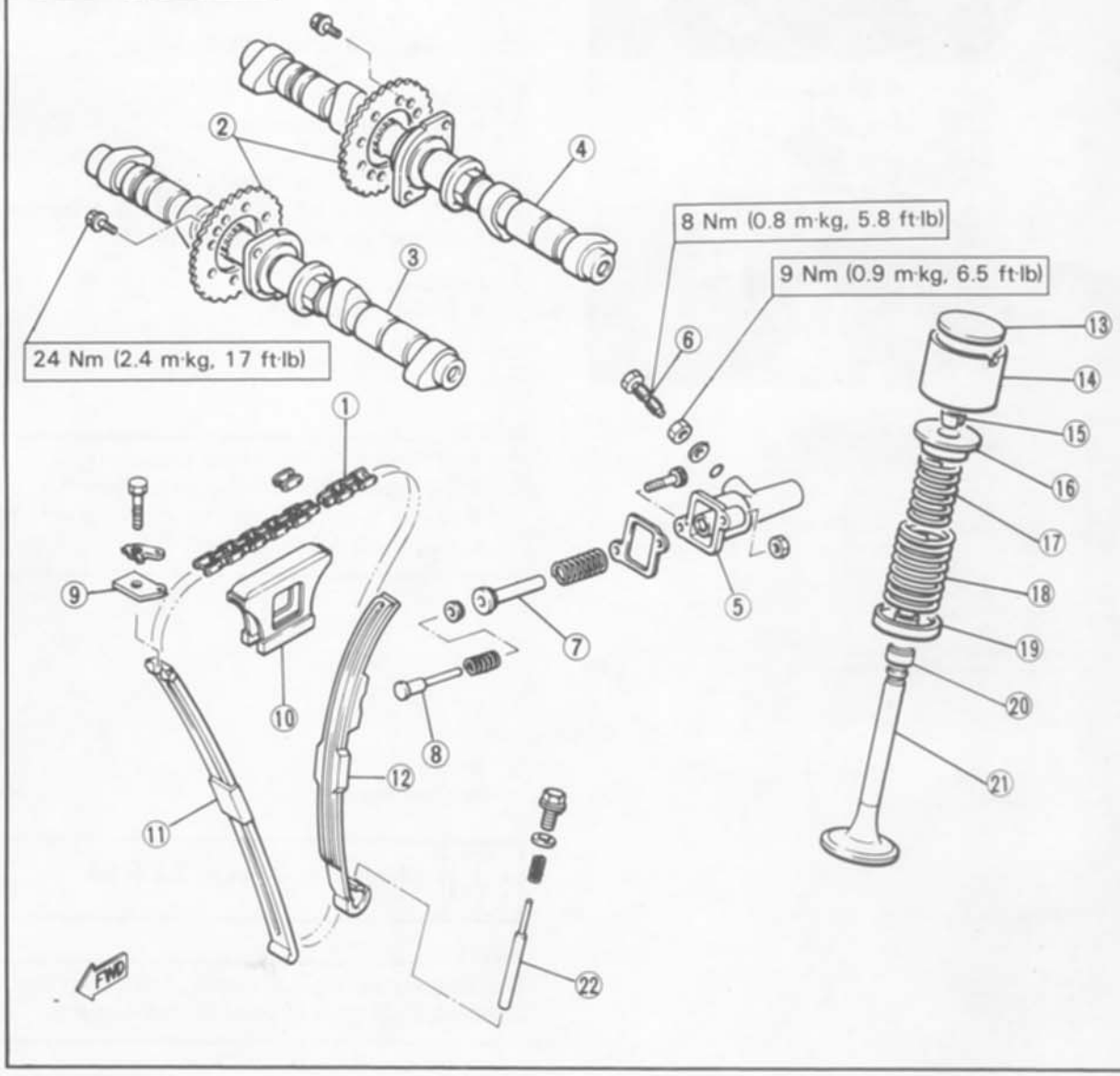
NOTE:
※ Use copper washers.

CAMSHAFT

1. Cam chain
2. Cam sprocket
3. Camshaft (Exhaust)
4. Camshaft (Intake)
5. Chain tensioner body
6. Tensioner lock bolt
7. Tensioner rod (Large)
8. Tensioner rod (Small)
9. Guide stopper plate
10. Upper chain guide
11. Exhaust side chain guide
12. Intake side chain guide
13. Adjusting pad
14. Valve lifter
15. Valve retainer
16. Spring seat
17. Inner spring
18. Outer spring
19. Spring seat
20. Oil seal
21. Valve
22. Chain guide stopper
23. Match mark

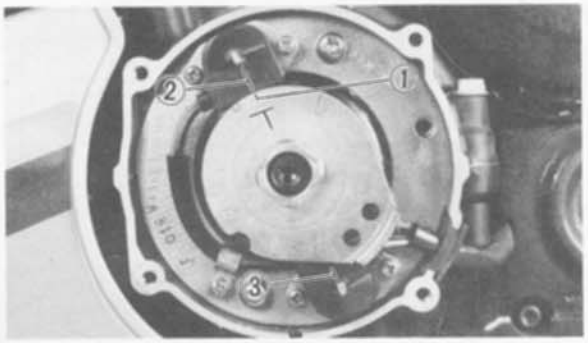


A	VALVE CLEARANCE (COLD):	
B	Intake	0.11 ~ 0.15 mm (0.004 ~ 0.006 in)
C	Exhaust	0.16 ~ 0.20 mm (0.006 ~ 0.008 in)



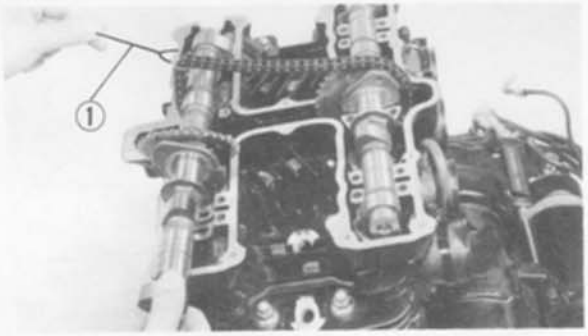
3

1. Rotate:
   - Crankshaft
     Counter clockwise.

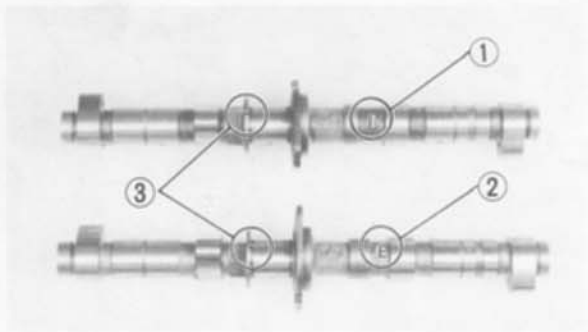


2. Align:
   - "T" mark ①
     On the timing plate with the upper pick up coil mark ② when No. 1 piston is at TDC on compression stroke.

③ Lower pickup coil mark



3. Install:
   - Cam chain sprockets
     (on the camshafts)
   - "I" and "E" camshafts
     Apply engine oil to camshaft bearing surfaces before installing camshafts.
4. Remove:
   - Retaining wire ①

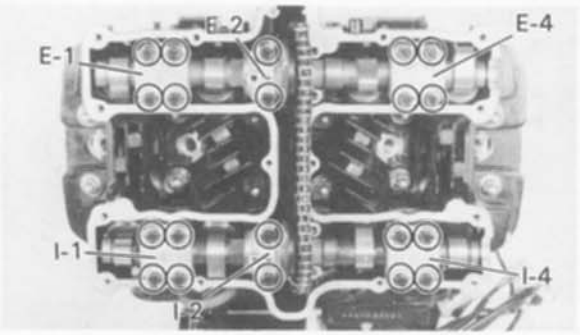


NOTE:
- "I" mark ① for intake camshaft
- "E" mark ② for exhaust camshaft
- Make sure the timing mark ③ on the camshaft faces upward.

5. Install:
   - Cam caps

	10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
Do not install No. 3 intake (I-3) and No. 3 exhaust (E-3) cam caps at in this stage.



CAUTION:

The cam caps must be tightened evenly or damage to the cylinder head, cam caps and cam will result. The spaces between the caps and cylinder head should be equal.

Cam Chain

1. Rotate:
   - Exhaust camshaft
2. Align:
   - Exhaust camshaft timing mark (with the "E-2" cam cap arrow mark)

CAUTION:

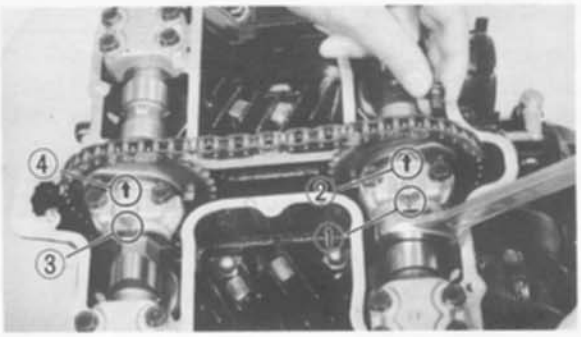
Do not rotate the camshaft over 1/2 turn or damage to the piston and valve will result.

3. Position:
   - Cam chain (onto sprockets)
4. Install:
   - Sprockets (onto camshafts)
5. Force the exhaust sprocket clockwise (viewing from left side engine) to remove all cam chain slack.
6. Align:
   - Sprocket, hole (with the exhaust camshaft thread hole)

NOTE:

If the sprocket hole do not align with the camshaft hole, Adjust chain links between crankshaft and exhaust camshaft.

7. Install:
   - Exhaust sprocket bolt (temporarily tighten)



8. Rotate:
   - Intake camshaft
9. Align:
   - Intake camshaft timing mark ①
     (with the "I-2" cam cap arrow mark ②)

③ Exhaust camshaft timing mark
④ "E-2" cam cap arrow mark

CAUTION:

Do not rotate the camshaft over 1/2 turn or damage to the piston and valve will result.

10. Force the intake sprocket clockwise (viewing from left side engine) to remove all cam chain slack.

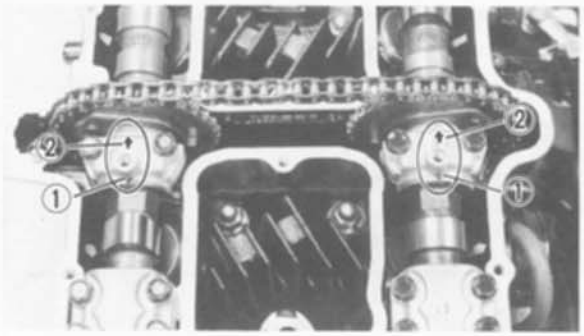
3

11. Align:
    - Intake sprocket hole
      (with the intake camshaft thread hole)

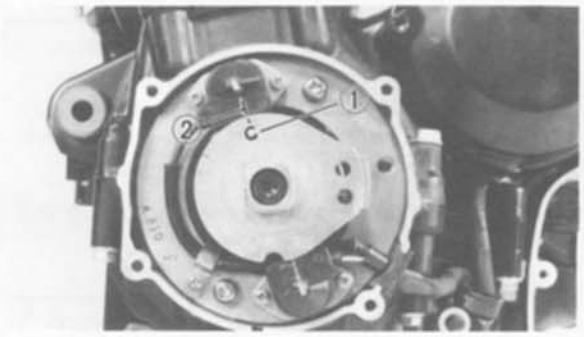
NOTE:

If the sprocket hole do not align with the camshaft thread hole, Adjust chain links between exhaust and intake camshafts.

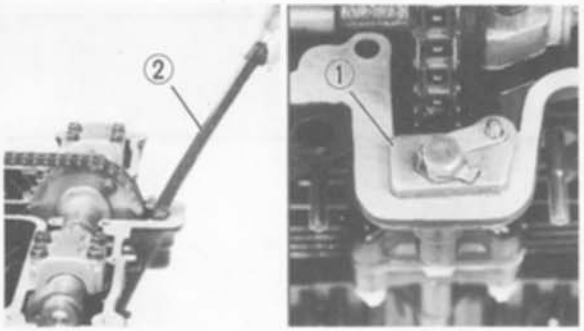
12. Install:
    - Intake sprocket bolt
      (temporarily tighten)



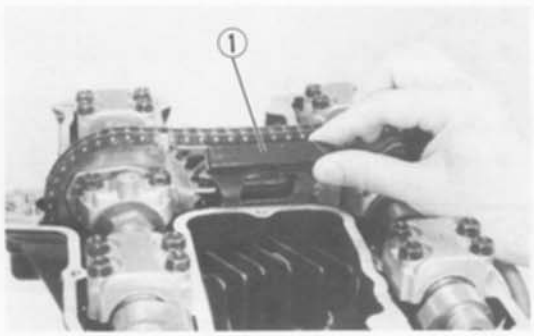
NOTE:
- Be sure the camshaft timing warks ① align with the cam cap arrow mark ②
- Be sure the "T" mark on the timing plate align with the upper pick up coil mark.



13. Rotate:
    - Crankshaft
      Counterclockwise
14. Align:
    - Timing plate "C" mark ①
      (with the upper pickup coil mark ②)



15. Install:
    - Exhaust side chain guide ②
    - Chain guide stopper ①
    - Bolt
    - Lock washer
16. Bend the lock washer tab against bolt flat.



17. Install:
    - Upper chain guide ①

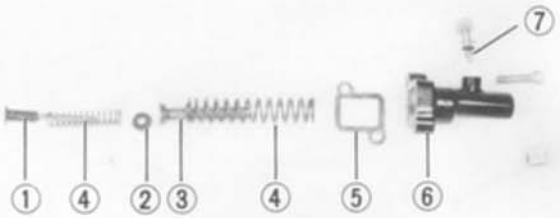
18. Install:
    - Cam chain tensioner ①

	10 Nm (1.0 m·kg, 7.2 ft·lb)

19. Loosen
    - Locknut ②
    - Tensioner lock bolt ③

20. Tighten:
- Tensioner lock bolt
- Locknut

Bolt:
8 Nm (0.8 m·kg, 5.8 ft·lb)
Locknut:
9 Nm (0.9 m·kg, 6.5 ft·lb)

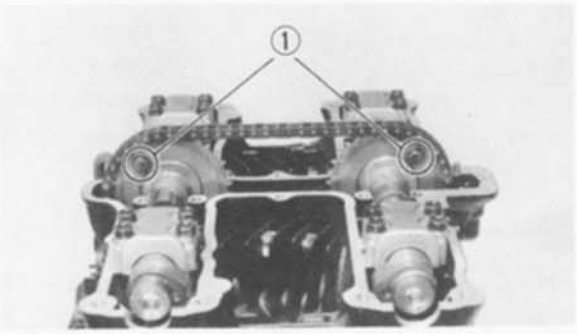


Cam Chain Tensioner Installation Steps:
- Install the spring ④, large tensioner rod ③, Damper ②, Small spring ④, and small tensioner rod ① into the tensioner body ⑥.
- Push the tensioner rod assembly into the body

NOTE:
Face the large rod flat serface to the lock bolt 7.

- Tighten lock bolt.
- Lock the locknut.

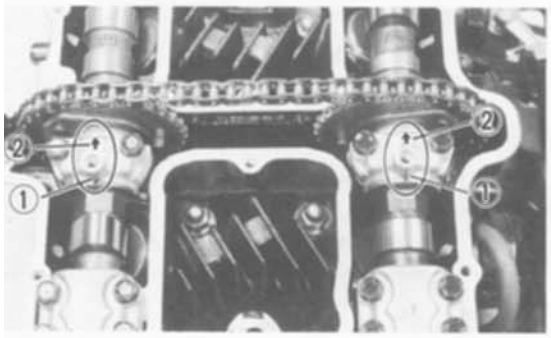
5. Gasket



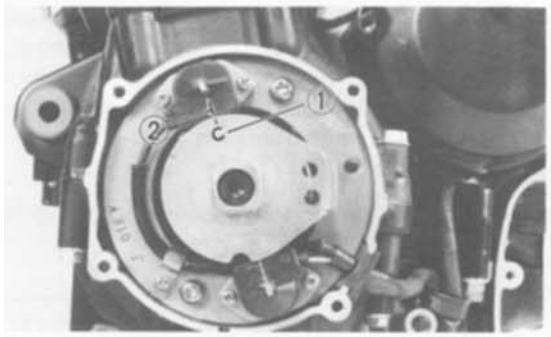
21. Rotate:
- Crankshaft
  Counterclockwise

22. Install:
- Sprocket bolts ① (all)

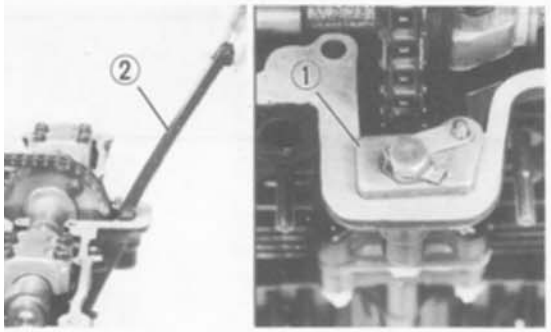
24 Nm (2.4 m·kg, 18 ft·lb)



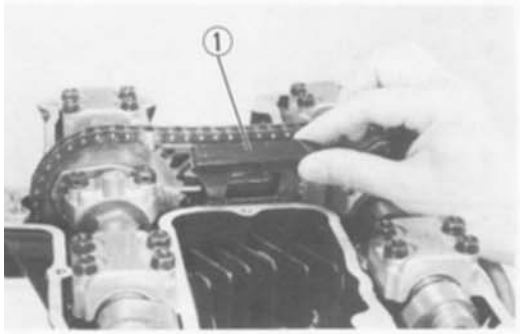
NOTE:
- Be sure the camshaft timing warks ① align with the cam cap arrow mark ②
- Be sure the "T" mark on the timing plate align with the upper pick up coil mark.



13. Rotate:
    - Crankshaft
      Counterclockwise
14. Align:
    - Timing plate "C" mark ①
      (with the upper pickup coil mark ②)



15. Install:
    - Exhaust side chain guide ②
    - Chain guide stopper ①
    - Bolt
    - Lock washer
16. Bend the lock washer tab against bolt flat.



17. Install:
    - Upper chain guide ①

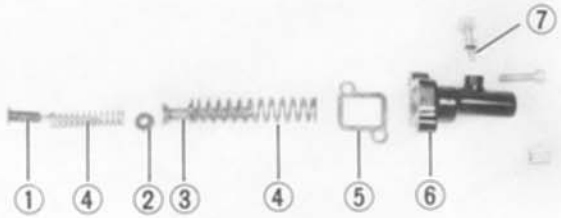
18. Install:
    - Cam chain tensioner ①

	10 Nm (1.0 m·kg, 7.2 ft·lb)

19. Loosen
    - Locknut ②
    - Tensioner lock bolt ③

20. Tighten:
- Tensioner lock bolt
- Locknut

Bolt:
8 Nm (0.8 m·kg, 5.8 ft·lb)
Locknut:
9 Nm (0.9 m·kg, 6.5 ft·lb)

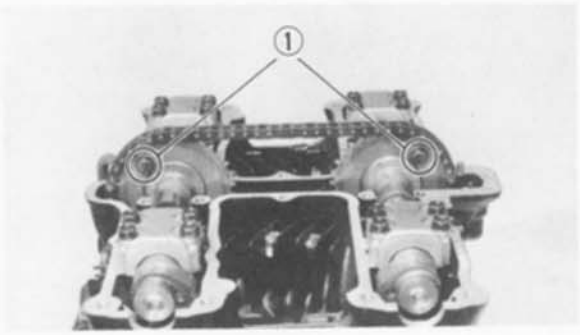


Cam Chain Tensioner Installation Steps:
- Install the spring ④, large tensioner rod ③, Damper ②, Small spring ④, and small tensioner rod ① into the tensioner body ⑥.
- Push the tensioner rod assembly into the body

NOTE:
Face the large rod flat serface to the lock bolt 7.

- Tighten lock bolt.
- Lock the locknut.

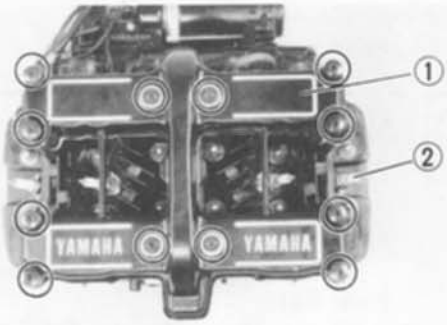
5. Gasket



21. Rotate:
- Crankshaft
  Counterclockwise

22. Install:
- Sprocket bolts ① (all)

24 Nm (2.4 m·kg, 18 ft·lb)



23. Install:
- No. 3 intake cam cap
- No. 3 exhaust cam cap

Cab Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)

24. Install:
- Left crankcase cover

Screw:
10 Nm (1.0 m·kg, 7.2 ft·lb)

25. Install:
- Spark plug ②

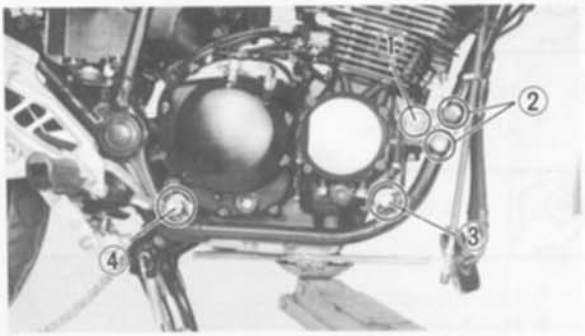
17.5 Nm (1.75 m·kg, 12.7 ft·lb)

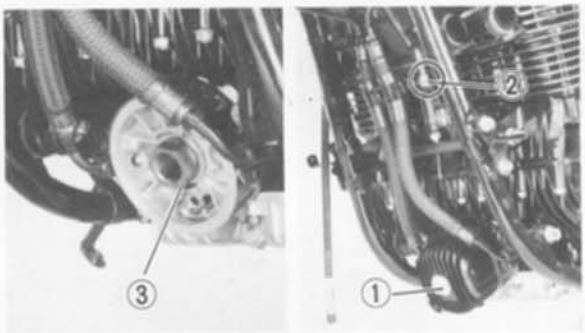
- Head cover gasket
- Head cover ①

Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)

REMOUNTING ENGINE

1. Refer to engine removal. Reverse those removal steps that apply.





2. Tighten:
   - Engine mounting bolts

Front Upper Bolts ① :
42 Nm (4.2 m·kg, 30 ft·lb)
Front Bracket Bolt ② :
32 Nm (3.2 m·kg, 23 ft·lb)
Front Lower Bolts ③ :
42 Nm (4.2 m·kg, 30 ft·lb)
Rear Bolts ④ :
90 Nm (9.0 m·kg, 65 ft·lb)

3. Tighten:

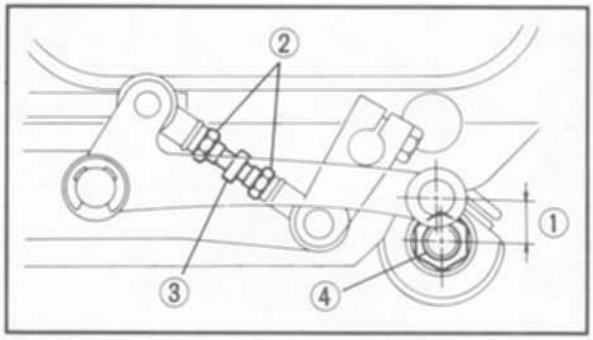
Spacer Nut ③ :
50 Nm (5.0 m·kg, 36 ft·lb)
Oil Filter Clamp Nut ② :
10 Nm (1.0 m·kg, 7.2 ft·lb)
Oil Filter Bolt ① :
15 Nm (1.5 m·kg, 11 ft·lb)

4. Tighten:

Drive Chain Sprocket Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)

5. Tighten:

Footrest Bracket Bolt:
25 Nm (2.5 m·kg, 18 ft·lb)
Exhaust Pipe Clamp Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)
Exhaust Pipe Nut:
10 Nm (1.0 m·kg, 7.2 ft·lb)

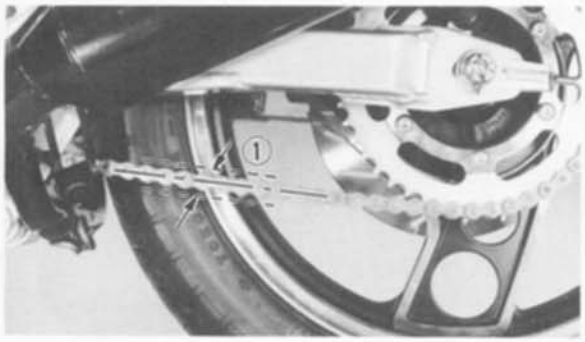


6. Mesure:
   - Change pedal height ①

Standard Change Pedal Height:
15 mm (0.6 in)
from the rear engine mounting bolt ④.

Adjustmemt steps:
- Loosen the locknut ② and turn the rod ③ in or out until proper pedal height is achieved.
- Lock the locknut

Locknut:
10 Nm (1.0 m·kg, 7.2 ft·lb)



7. Adjust:
   - Drive chain deflection

Standard Drive Chain Deflection ①:
20 ~ 30 mm (0.8 ~ 1.2 in)

8. Tighten:

Rear Axle Nut:
105 Nm (10.5 m·kg, 75 ft·lb)

9. Fill:
   - Crankcase

Engine Oil:
3.0 L (2.6 Imp qt, 3.2 US qt)

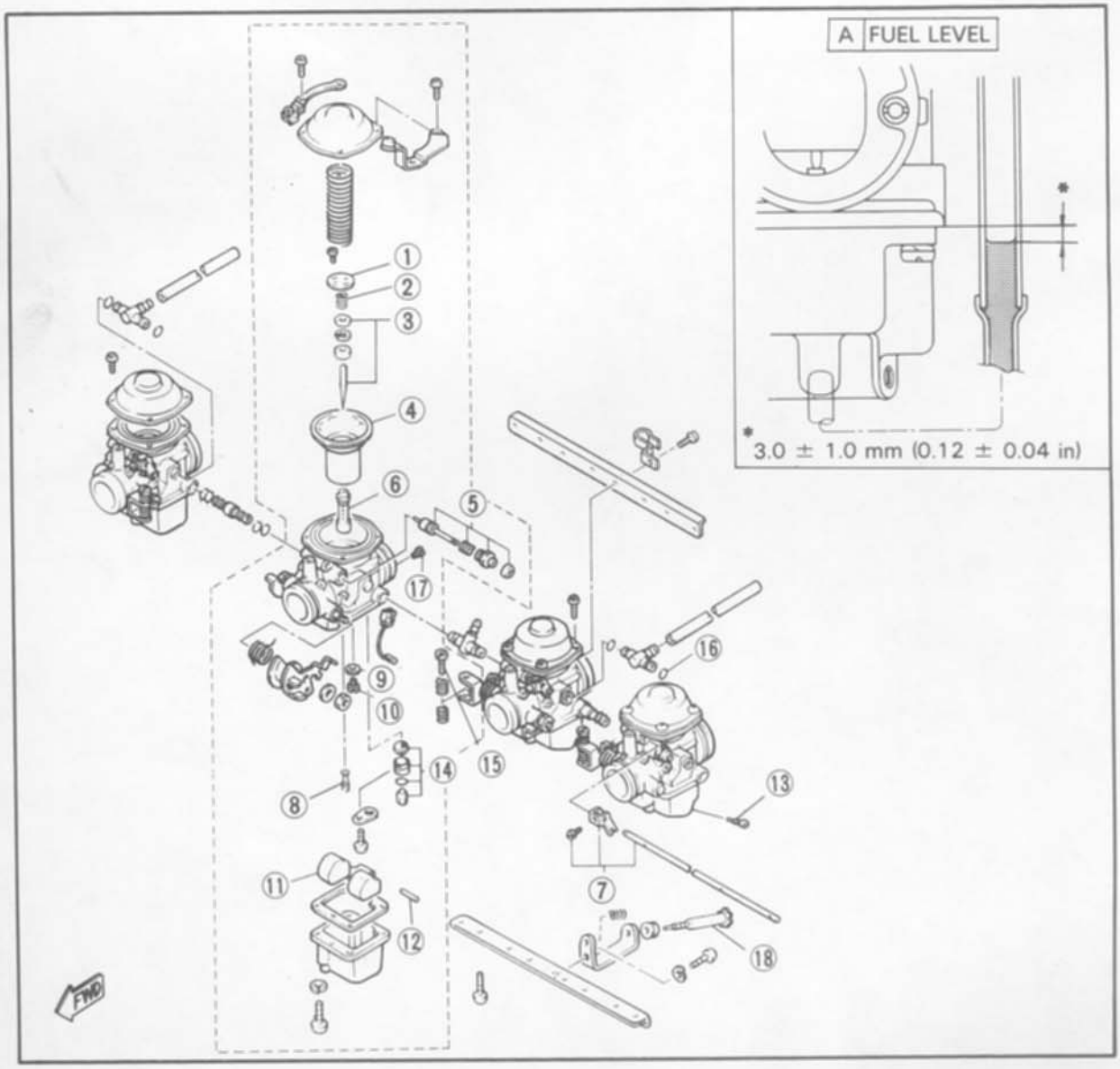
CARBURETOR

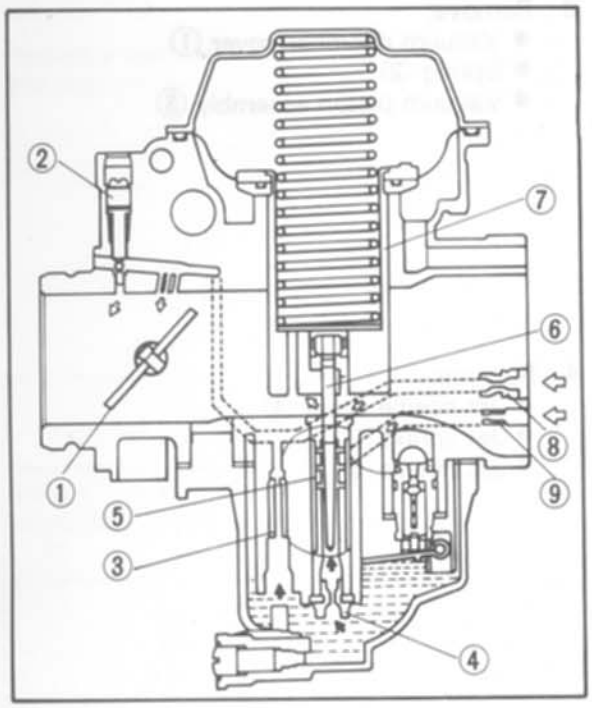
1. Jet needle cover
2. Set spring
3. Jet needle
4. Piston valve
5. Starter plunger
6. Main nozzle
7. Starter lever
8. Pilot jet
9. Main jet washer
10. Main jet
11. Float
12. Float plin
13. Drain screw
14. Float valve
15. Synchronizing screw
16. O-ring
17. Pilot air jet
18. Throttle stop screw

CAUTION:

The pilot screw settings are adjusted for maximum performance at the factory. Any attempt to change these settings will decrease engine performance.

SPECIFICATIONS	
Main jet	
For No. 1 and No. 2 Cylinder	# 105
For No. 3 and No. 4 Cylinder	# 102.5
Jet needle	
No. 1, 3 and 4 Cylinder	4CP3-3
No. 2 Cylinder	4CP7-3
Needle jet	N-8
Starter jet	# 42.5
Fuel level	3.0±1.0 mm (0.12±0.04 in)
Pilot screw	2-1/2 turns out
Float valve seat	ϕ2.0
Engine idle speed	1200±50 r/min





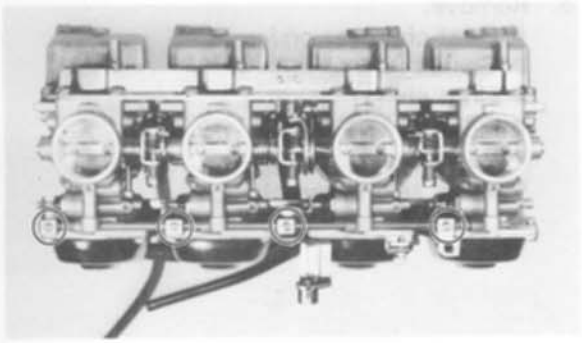
SECTION VIEW

① Throttle valve
② Pilot screw
③ Pilot jet
④ Main jet
⑤ Main nozzle
⑥ Jet needle
⑦ Vacuum piston
⑧ Pilot air jet
⑨ Main air jet

Removal

1. Remove:
   - Carburetor assembly

   Refer to engine removal section.



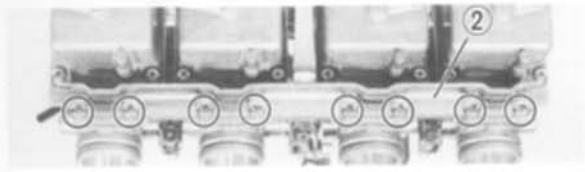
DISASSEMBLY

NOTE:

The following parts can be cleaned and inspected without carburetor separation.

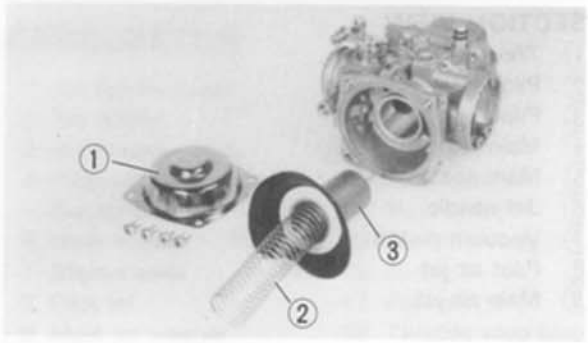
- Piston valve
- Starter plunger
- Float chamber components

1. Remove:
   - Starter lever shaft

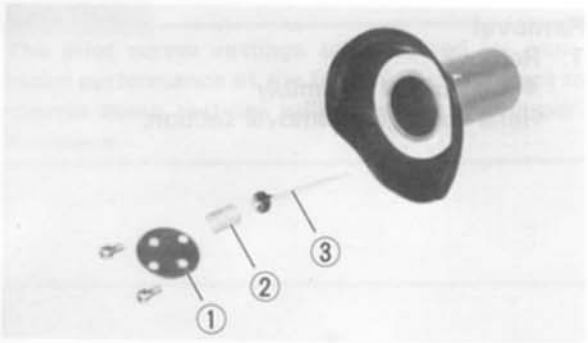


2. Remove:
   - Upper bracket ①
   - Lower bracket ②

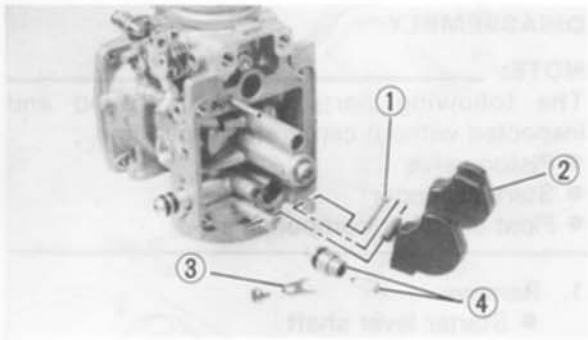
4



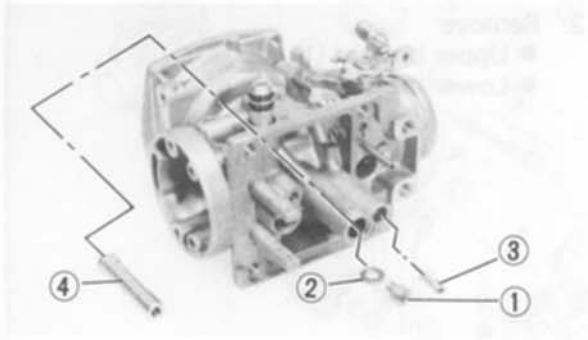
3 Remove:
- Vacuum chamber cover ①
- Spring ②
- Vacuum piston assembly ③



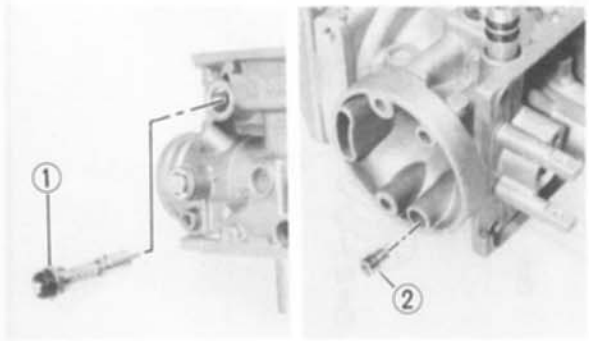
4. Remove:
- Jet needle cover ①
- Jet spring ②
- Jet needle ③



5. Remove:
- Float chamber cover
- Gasket
- Float pin ①
- Float ②
- Valve seat plate ③
- Valve seat assembly ④



6. Remove:
- Main jet ①
- Washer ②
- Pilot jet ③
- Main nozzle ④



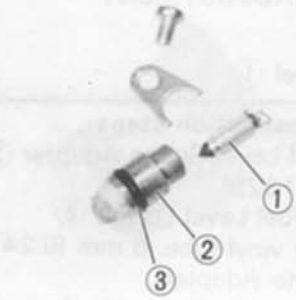
7. Remove:
- Starter plunger ①
- Pilot air jet ②

INSPECTION

1. Inspect:
   - Carburetor body
   - Fuel passage
   Contamination → Clean as indicated.

Carburetor cleaning steps:
- Wash carburetor in petroleum based solvent. (Do not use any caustic carburetor cleaning solution).
- Blow out all passages and jets with compressed air.

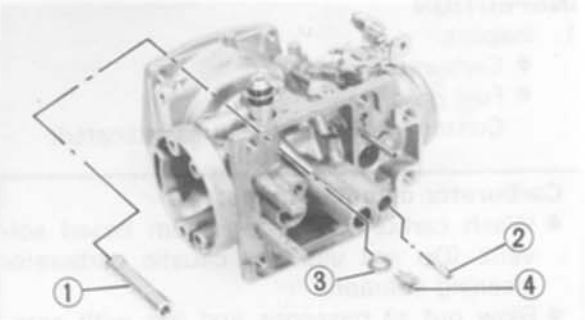
2. Inspect:
   - Floats
   Damage → Replace.

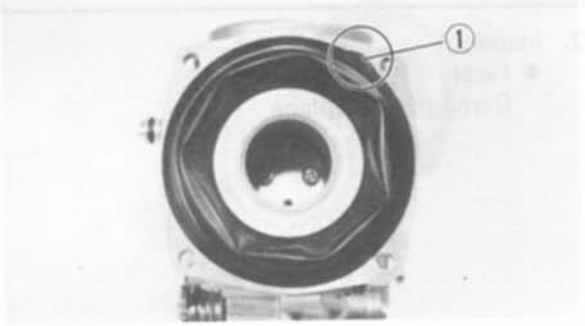


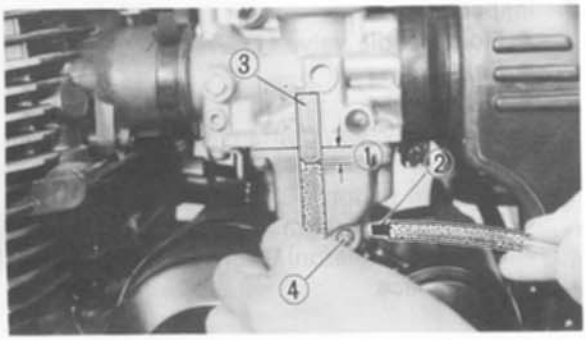
3. Inspect:
   - Float needle valve ①
   - Seat ②
   - O-ring ③
   Damage/Wear/Contamination → Replace as a set
   - Vacuum piston
   - Rubber diaphragm
   Scratches (piston)/Tears (diaphragm) → Replace.

4. Inspect:
   - Jet needle
   Bends/Wear → Replace.

5. Inspect:
   - Starter plunger
   Wear/Damage → Replace.







ASSEMBLY

Reverse disassembly steps. Pay close attention to installation of vacuum piston diaphragm and location of each jet.

1. Install:
   - Main nozzle ④
   - Pilot jet ③
   - Washer ②
   - Main jet ①

2. Install:
   - Vacuum piston

NOTE:
Note position of tab ① on diaphragm. This tab must be placed in the cavity of the carburetor body during reassembly.

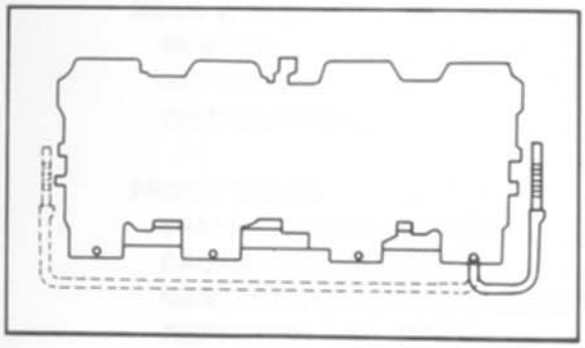
FUEL LEVEL ADJUSTMENT

1. Measure:
   - Fuel level ①

Fuel level inspection steps:
- Install Fuel Level Gauge Adapter ② (90890-01329).
- Connect Fuel Level Gauge ③ (90890-01312) or vinyl tube, 6 mm (0.24 in) inside diameter, to Adapter.
- Place tube vertically next to the center of the mating line of the mixing body and float chamber cover.
- Set fuel cock to "ON".
- Loosen the drain screw ④.
- Warm up the engine, then shut it off after a few minutes.
- Check the fuel level. It should be within the specified range.

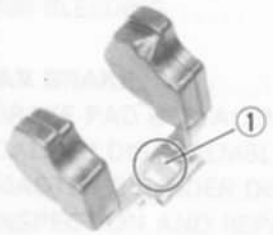
Fuel Level:
3.0 ± 1.0 mm (0.12 ± 0.04 in) above the carburetor body.

Out of range → Follow next steps.



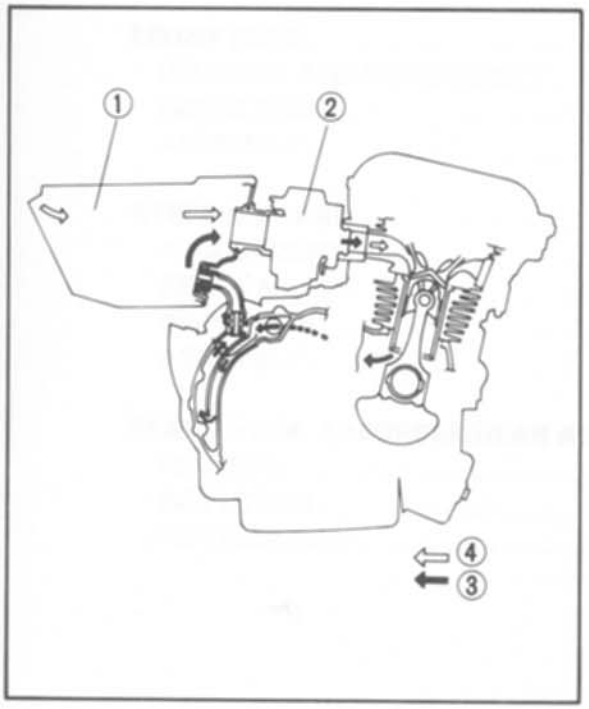
NOTE:
Fuel level readings of both side of carburetor line should be equal.

2. Remove:
   - Carburetors



3. Inspect:
   - Float valve assembly
   - Float

   Damage → Replace.
   Components OK → Adjust float height by bending float arm tang ① slightly.



4. Observe:
   - Fuel level

   Level should be within specified range.
5. Repeat these steps for the other carburetor.

AIR CLEANER AND CRANKCASE VENTILATION SYSTEM

REFER TO "CHAPTER 2, Air Cleaner Maintenance."

① Carburetor
② Air cleaner
③ Blow-by gas
④ Fresh air

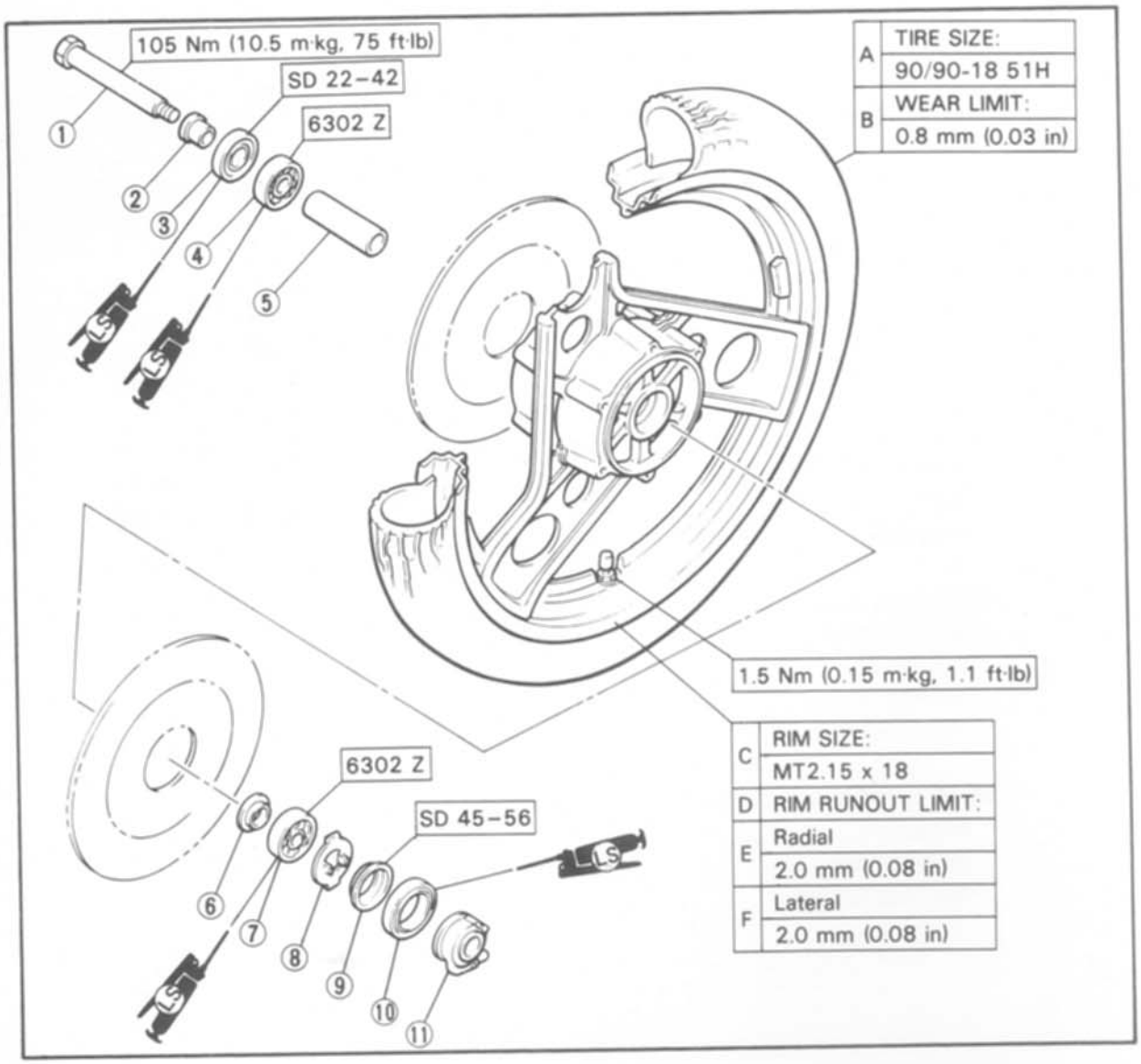
CHASIS

FRONT WHEEL

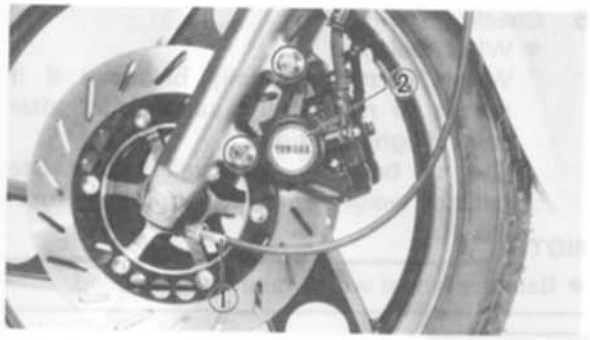
1. Front axle
2. Collar
3. Oil seal
4. Bearing
5. Spacer
6. Spacer flange
7. Bearing
8. Meter clutch
9. Clutch retainer
10. Oil seal
11. Gear unit assembly

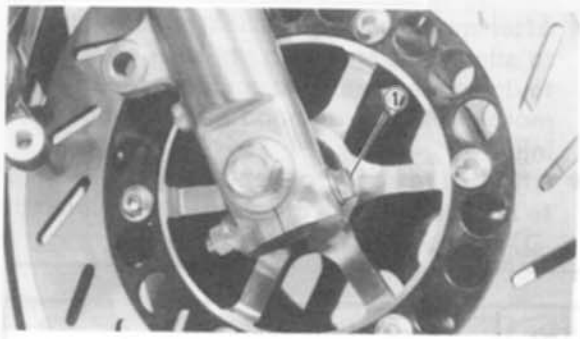
TIRE AIR PRESSURE (COLD):		
Basic weight: With oil and full fuel tank	208 kg (459 lb)	
Maximum load*	188 kg (414 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	177 kPa (1.8 kg/cm², 26 psi)	196 kPa (2.0 kg/cm², 28 psi)
90 kg (198 lb) ~ Maximum load*	196 kPa (2.0 kg/cm², 28 psi)	226 kPa (2.3 kg/cm², 32 psi)
High speed riding	196 kPa (2.0 kg/cm², 28 psi)	226 kPa (2.3 kg/cm², 32 psi)

* Load is the total weight of cargo, rider, passenger, and accessories.



5





REMOVAL

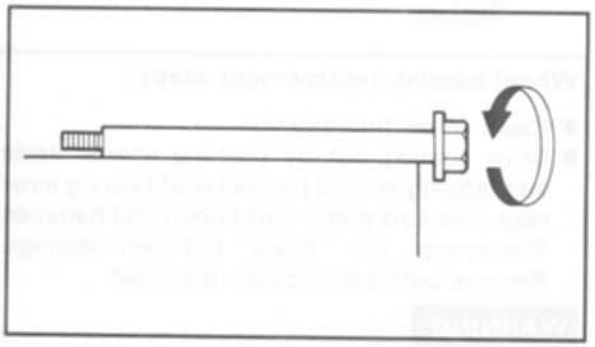
1. Place the motorcycle on its centerstand.
2. Remove:
   - Speedometer cable (1)
   - Brake caliper (2)
3. Loosen:
   - Pinch bolt (1)
4. Remove:
   - Axle
   - Front wheel

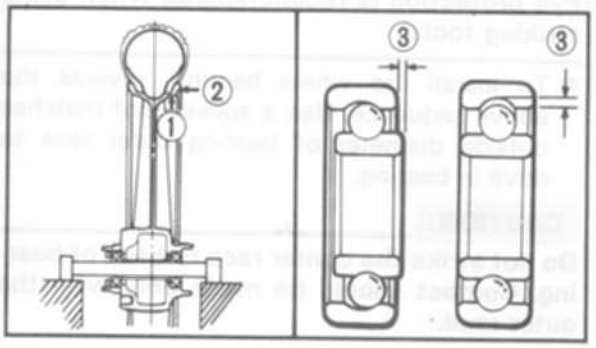
CAUTION:

Make sure the motorcycle is properly supported.

NOTE:

Do not depress the brake lever when the wheel is off the motorcycle otherwise the brake pads will be forced shut.





INSPECTION

1. Eliminate any corrosion from parts.
2. Inspect:
   - Front axle
     Roll the axle on a Flat Surface.
     Bends → Replace.

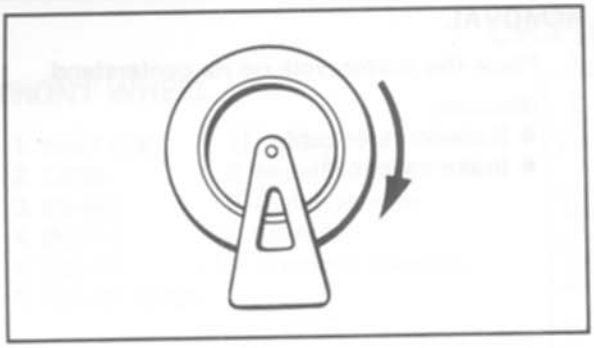
WARNING:

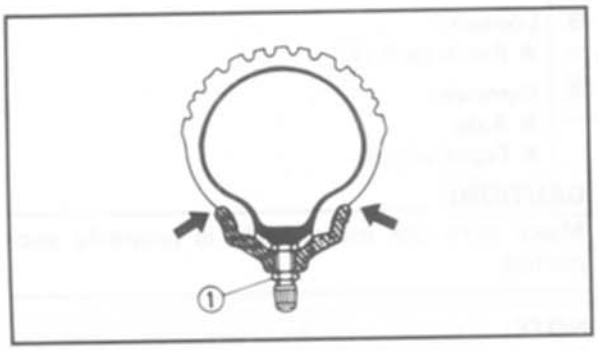
Do not attempt to straighten a dent axle.

3. Inspect:
   - Wheel
     Cracks/Bends/Warpage → Replace.
4. Measure:
   - Wheel runout
     Over specified limit → Replace, wheel or check bearing play (3).

Rim Runout Limits:
Radial (1) : 2.0 mm (0.08 in)
Lateral (2) : 2.0 mm (0.08 in)

5





5. Check:
   - Wheel balance
     Wheel is not statically balanced if it comes to rest at the same point after several light rotations.
     Out of balance → Install appropriate balance weight at lightest point (on top).

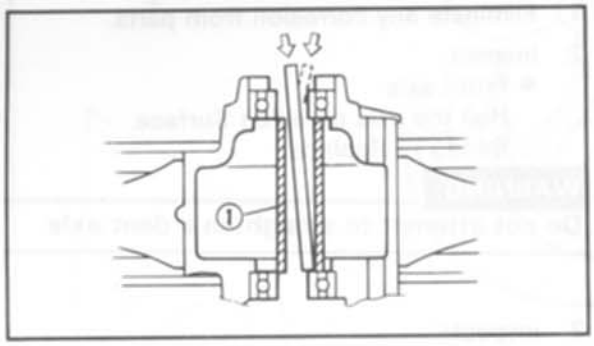
NOTE:
- Balance wheel with brake disc installed.

WARNING:
- **After mounting a tire, ride conservatively to allow proper tire to rim seating. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury.**
- **After a tire repair or replacement, be sure to torque tighten the valve stem locknut ① to specification.**

Valve-Stem Locknut:
1.5 Nm (0.15 m·kg, 1.1 ft·lb)

WHEEL BEARING REPLACEMENT

1. Inspect:
   - Wheel bearings
     Wheel hub play/Wheel turns roughly → Replace.



Wheel bearing replacement steps:
- Clean wheel hub exterior.
- Drive bearing out by pushing spacer aside and tapping around perimeter of bearing inner race. Use soft metal drift punch and hammer. The spacer ① "floats" between bearings. Remove both bearings as described.

WARNING:
Eye protection is recommended when using striking tools.

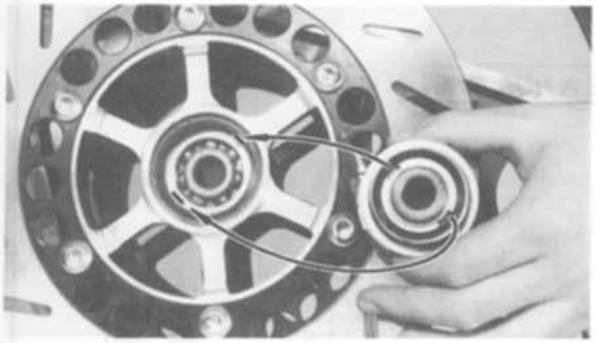
- To install the wheel bearing, reverse the above sequence. Use a socket that matches outside diameter of bearing outer race to drive in bearing.

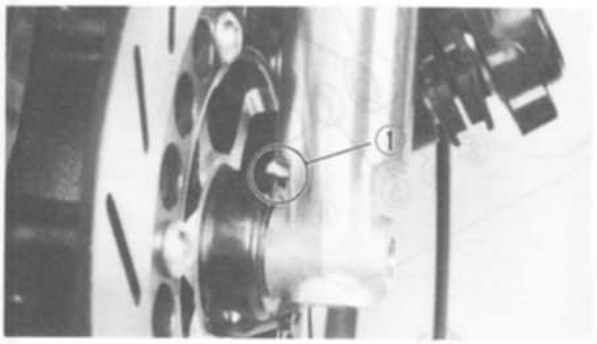
CAUTION:
Do not strike the center race or balls of bearing. Contact should be made only with the outer race.

INSTALLATION

1. Install
   - Front wheel

   Reverse removal procedure.





Front wheel installation points:

- Lightly grease lips of front wheel oil seals and gear teeth of speedometer drive and driven gears.
- Install speedometer cable holder securing bolt.
- Be sure the two projections inside the wheel hub are meshed with the two slots in the speedometer housing.
- Be sure that the projecting portion (torque stopper ①) of the speedometer housing is positioned correctly.
- Tighten the axle.

Axle:
105 Nm (10.5 m·kg, 75 ft·lb)

- Tighten the axle pinch bolt.

Axle Pinch Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)

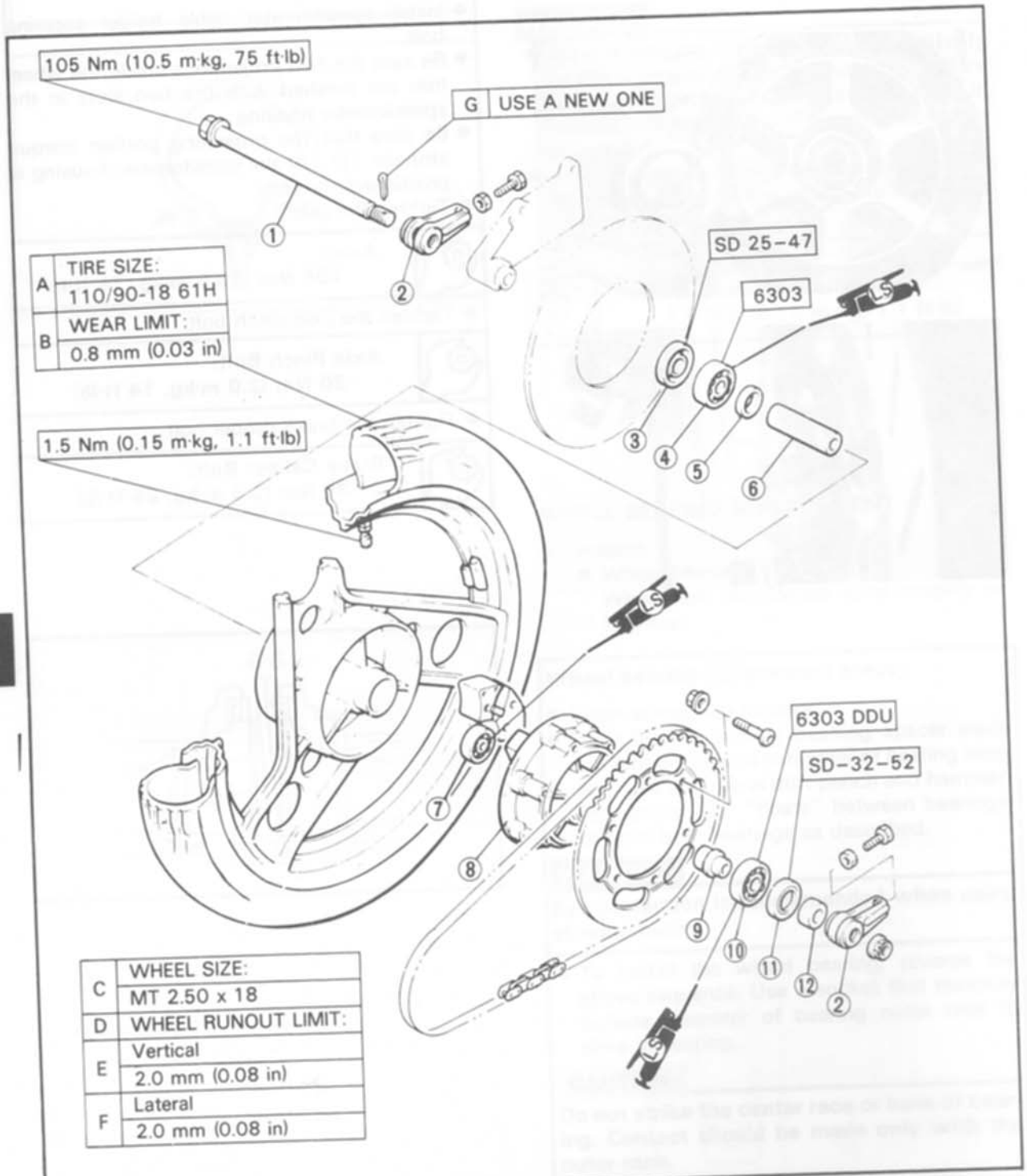
- Tighten the brake caliper bolt.

Brake Caliper Bolt:
35 Nm (3.5 m·kg, 25 ft·lb)

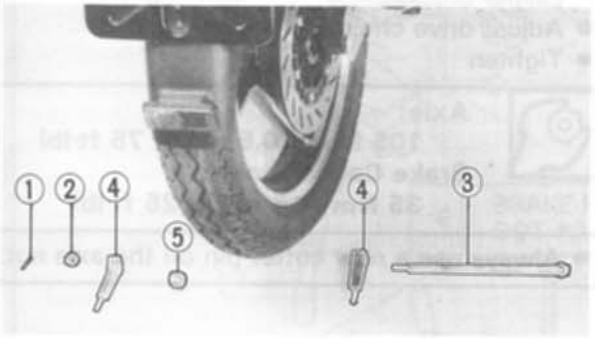
5

REAR WHEEL

1. Axle
2. Chain puller
3. Oil seal
4. Bearing
5. Spacer flange
6. Spacer
7. Bearing
8. Clutch hub
9. Collar
10. Bearing
11. Oil seal
12. Collar



5



REMOVAL

1. Place the motorcycle on its centerstand.
2. Remove:
   - Brake caliper
3. Remove:
   - Cotter pin ①
   - Axle nut ②
   - Axle ③
   - Chain puller ④
   - Collar ⑤
   - Drive chain
   - Rear wheel

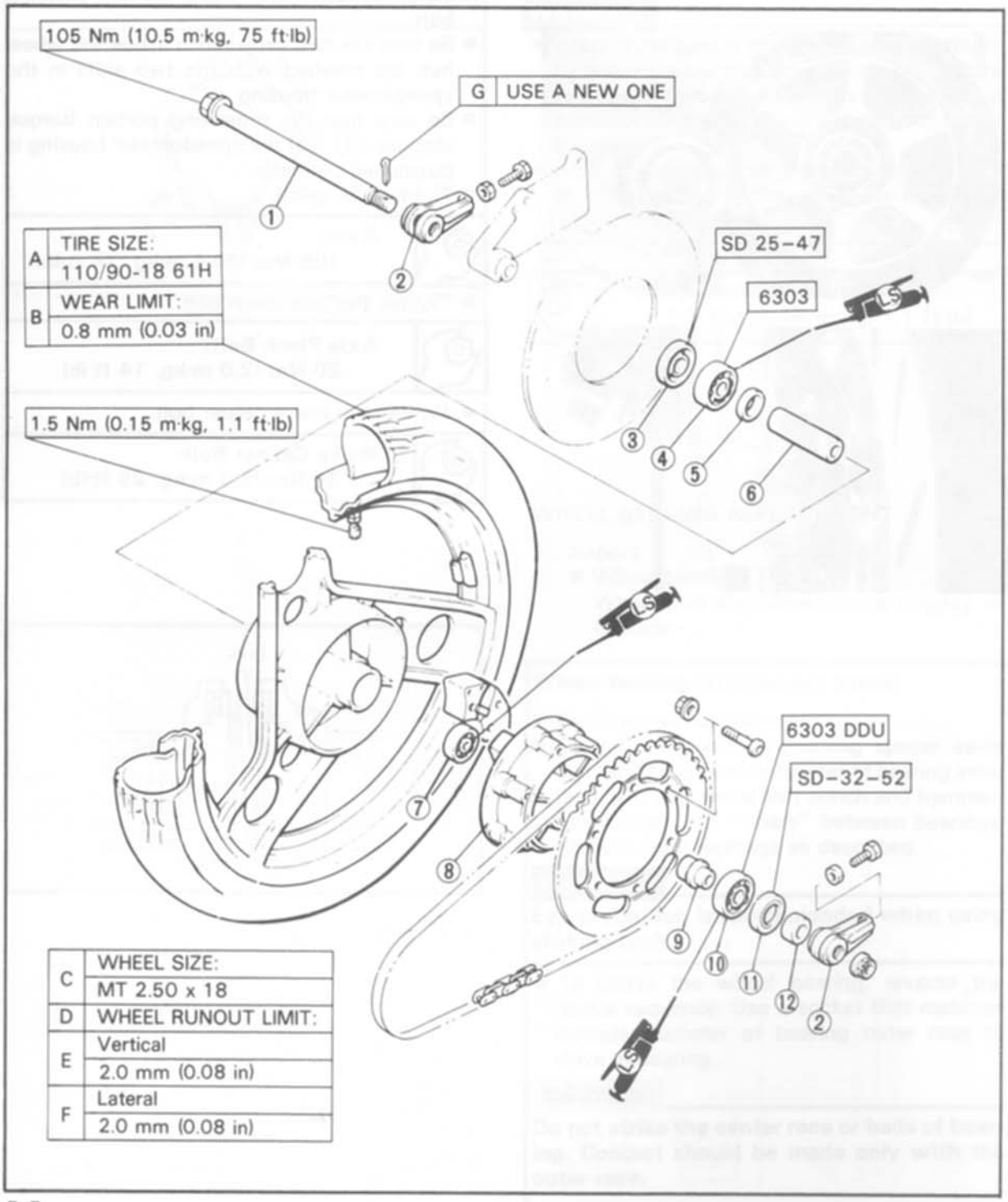
INSPECTION

1. Rear Axle
   Refer to "Front Axle Inspection"
2. Wheel Runout
   Refer to "Front Wheel Runout"
3. Wheel Balance
   Refer to "Front Wheel Balance"
4. Wheel Bearing Replacement
   Refer to "Front Wheel Braring Replacement"

5

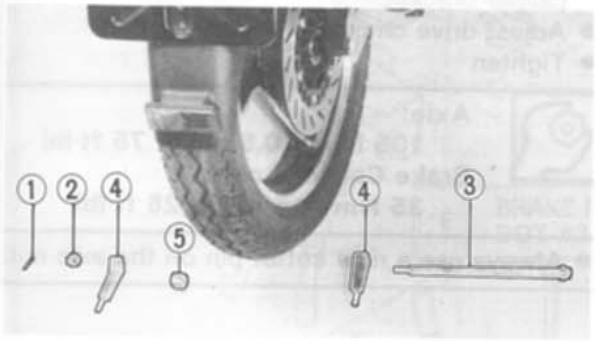
REAR WHEEL

1. Axle
2. Chain puller
3. Oil seal
4. Bearing
5. Spacer flange
6. Spacer
7. Bearing
8. Clutch hub
9. Collar
10. Bearing
11. Oil seal
12. Collar



REMOVAL

1. Place the motorcycle on its centerstand.
2. Remove:
   - Brake caliper

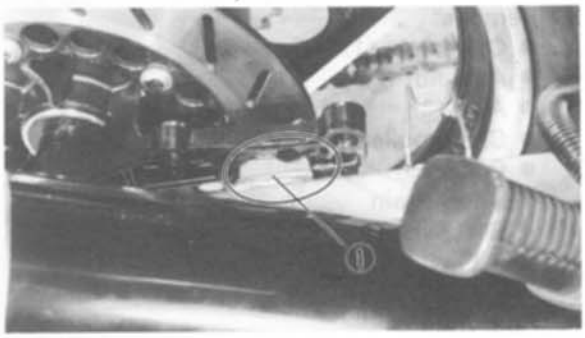


3. Remove:
   - Cotter pin ①
   - Axle nut ②
   - Axle ③
   - Chain puller ④
   - Collar ⑤
   - Drive chain
   - Rear wheel

INSPECTION

1. Rear Axle
   Refer to "Front Axle Inspection"
2. Wheel Runout
   Refer to "Front Wheel Runout"
3. Wheel Balance
   Refer to "Front Wheel Balance"
4. Wheel Bearing Replacement
   Refer to "Front Wheel Braring Replacement"

5



INSTALLATION

1. Install:
   - Rear wheel
     Reverse removal proeedure.

Rear wheel installation points:

- Lightly grease lips of rear wheel oil seals and bearings.
- Be sure that the projecting portion (torque stopper ①) of rear arm is meshed with caliper bracket.
- Adjust drive chain.
- Tighten

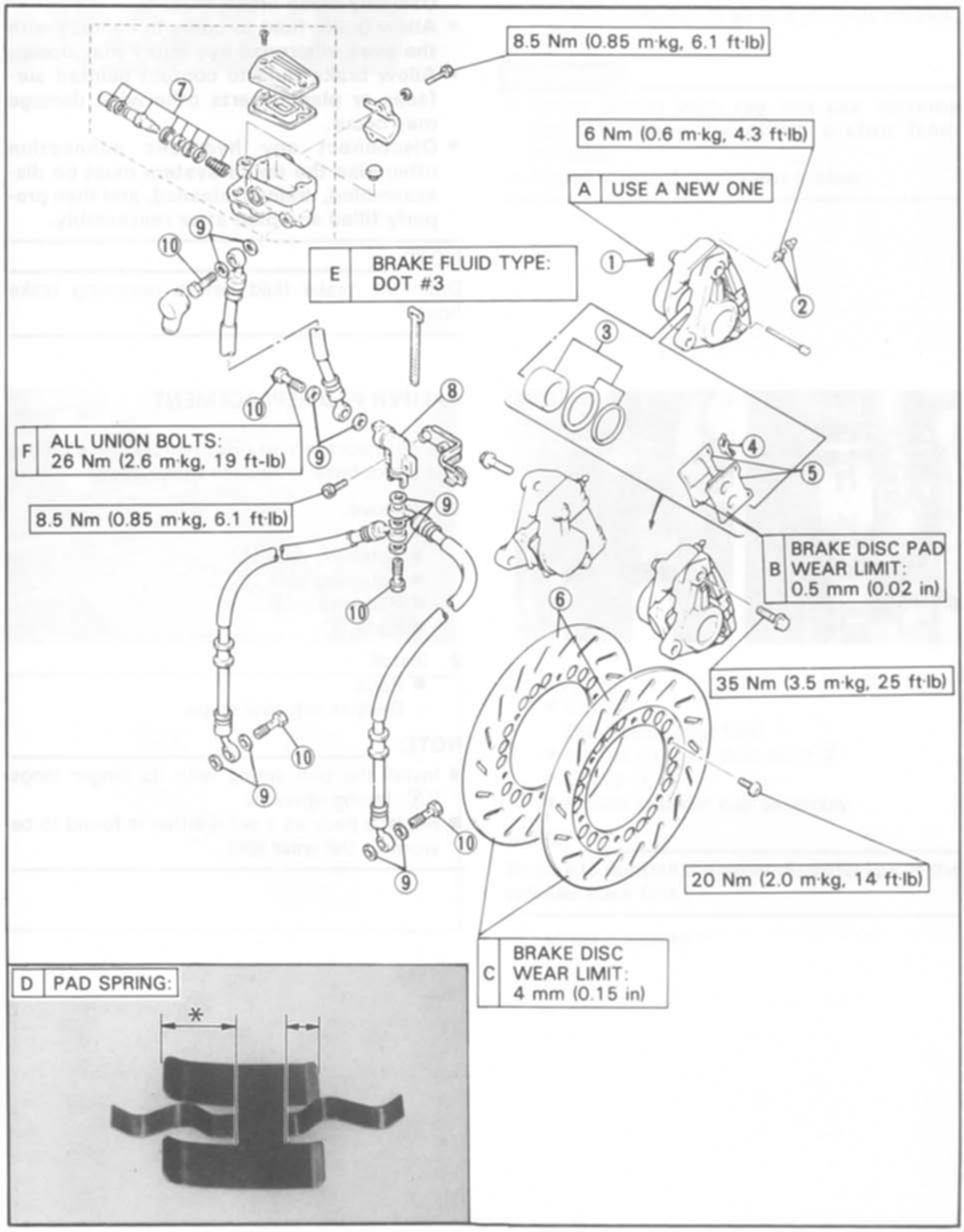
Axle:
105 Nm (10.5 m·kg, 75 ft·lb)
Brake Caliper Bolts:
35 Nm (3.5 m·kg, 25 ft·lb)

- Always use a new cotter pin on the axle nut.

FRONT BRAKE

1. Retaining clips
2. Air bleed screw
3. Caliper piston assembly
4. Pad spring
5. Brake pad
6. Brake disc
7. Master cylinder kit
8. Joint
9. Copper washer
10. Union bolt

* Install the pad spring with its longer tangs in the disc rotation direction.



5

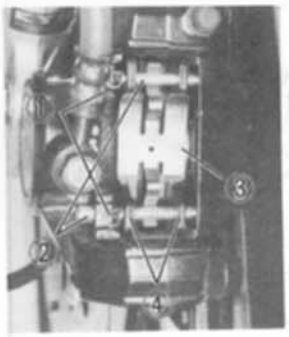
CAUTION:

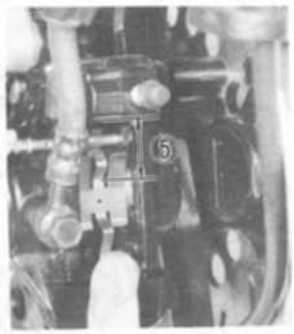
Disc brake components rarely require disassembly. DO NOT:

- **Disassembly components unless absolutely necessary.**
- **Use solvents on internal brake component.**
- **Use contaminated brake fluid for cleaning. Use only clean brake fluid.**
- **Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.**
- **Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.**
- **Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.**

NOTE:

Drain the brake fluid before removing brake hose.





CALIPER PAD REPLACEMENT

It is not necessary to disassemble brake caliper and brake hose to replace brake pads.

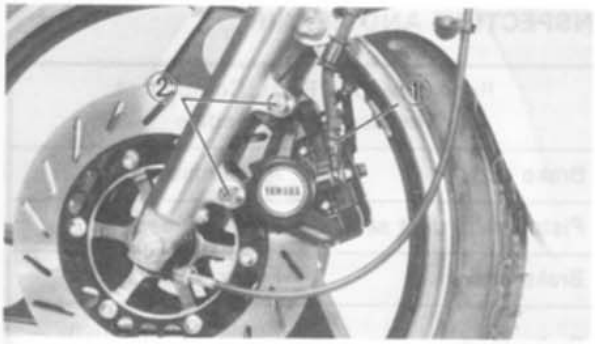
1. Remove:
   - Cover
   - Retaining clips ①
   - Retaining pins ②
   - Pad spring ③
   - Pads ④
2. Install:
   - Pads

   Reverse removal steps.

NOTE:

- Install the pad spring with its longer tangs ⑤ facing upwards.
- Replace pads as a set if either is found to be worn to the wear limit.

5

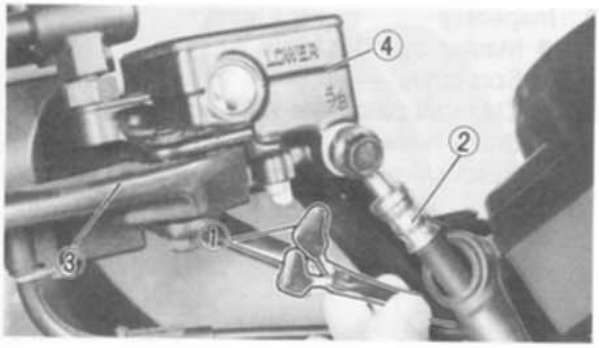


CALIPER DISASSEMBLY

1. Remove:
   - Brake hose ①
   - Caliper securing bolts ②
   - Brake pads
2. Remove:
   - Caliper piston assembly
     Use compressed air and procede carefully.

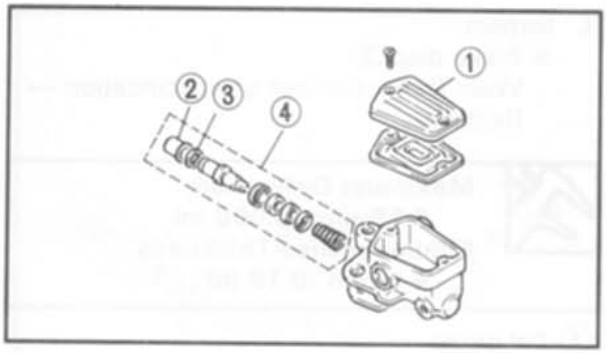
WARNING:

- **Cover piston with rag and use entreme caution when expelling piston from cylinder.**
- **Never attempt to pry out piston.**



MASTER CYLINDER DISASSEMBLY

1. Remove:
   - Brake light leads ①
   - Brake hose ②
   - Brake lever ③ and spring
   - Master cylinder assembly ④



2. Remove:
   - Cap ①
     Drain remaining fluid
   - Master cylinder dust boot ②
   - Circlip ③
   - Master cylinder cup assembly.

NOTE:

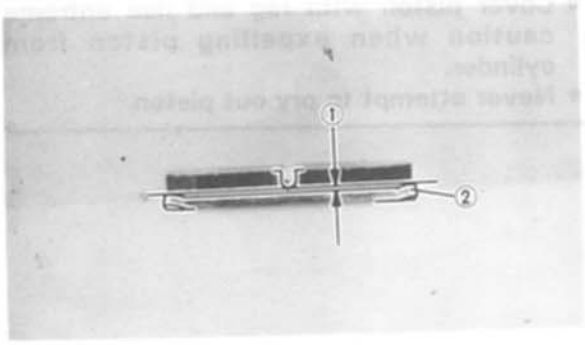
Be sure to reinstall the larger diameter lips of the cylinder cups first.

④ Master cylinder kit

5

INSPECTION AND REPAIR

Recommended Brake Component Replacement Schedule	
Brake pads	As required
Piston seal, dust seal	Every 2 years
Brake hoses	Every 4 years
Brake fluid	Replace only when brakes disassembled

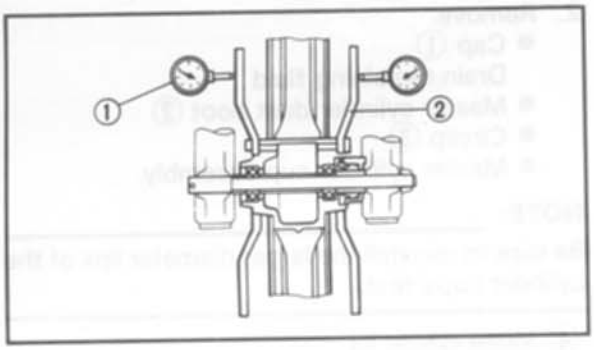


1. Inspect:
   - Caliper piston assembly
     Damage/Scratches → Replace.
   - Brake pad
     Over wear limit ① → Replace as a set.

Brake Pad Wear Limit:
0.5 mm (0.02 in)

② Wear indicator

2. Inspect:
   - Master cylinder body
     Scratches → Replace.
     Clean all passages with new brake fluid.
   - Brake hoses
     Cracks/Frayed/Damage → Replace.



3. Inspect:
   - Brake disc ②
     Wear/Deflection out of specification → Replace.

Maximum Deflection:
0.15 mm (0.006 in)
Minimum Disc Thickness:
4.0 mm (0.16 in)

① Dial gauge

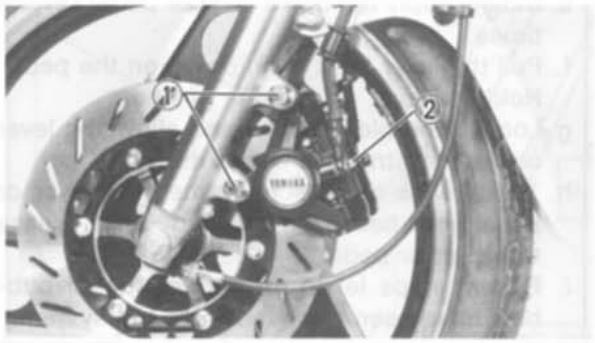
ASSEMBLY

Caliper

NOTE:

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.
- Replace the piston and dust seals whenever the caliper is disassembled.

1. Install:
   - Caliper piston assembly
   - Brake pads
   - Caliper assembly



2. Tighten:
   - Caliper securing bolts ①

35 Nm (3.5 m·kg, 25 ft·lb)

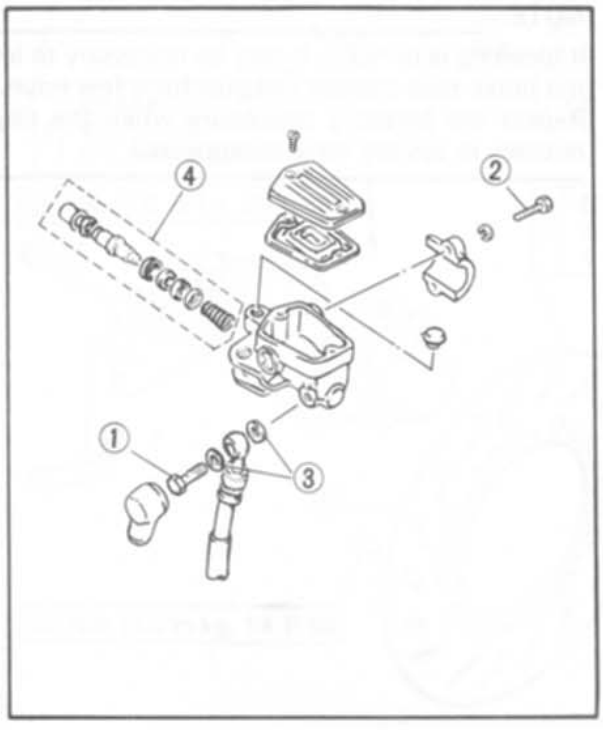
   - Brake hose ② union bolts

26 Nm (2.6 m·kg, 19 ft·lb)

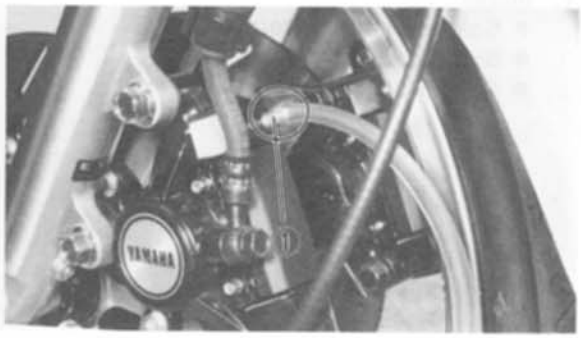
Master Cylinder

1. Assemble:
   - Master cylinder

Union Bolt ① :
26 Nm (2.6 m·kg, 19 ft·lb)
Master Cylinder Holding Bolt ② :
8.5 Nm (0.85 m·kg, 6.1ft·lb)



③ Copper washer
④ Master cylinder kit



AIR BLEEDING

WARNING:

Bleed the brake system if:
- **The system has been disassembled.**
- **A brake hose has been loosened or removed.**
- **The brake fluid is very low.**
- **The brake operation is faulty.**

A dangerous loss of braking performance may occur if the brake system is not properly bled.

Air bleeding steps:
a. Add proper brake fluid to the reservoir.
b. Install diaphragm.
   Be careful not to spill any fluid or allow the reservoir to over flow.
c. Connect the clear plastic tube (4.5 mm, 3/16 in inside dia.) tightly to the caliper bleed screw ①.
d. Place the other end of the tube into a container.
e. Slowly apply the brake lever or pedal several times.
f. Pull the lever in or push down on the pedal. Hold the lever or pedal in position.
g. Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
h. Tighten the bleed screw when the lever or pedal limit has been reached; then release the lever or pedal.
i. Repeat steps (e) to (h) until of the air bubbles have been removed from the system.

NOTE:

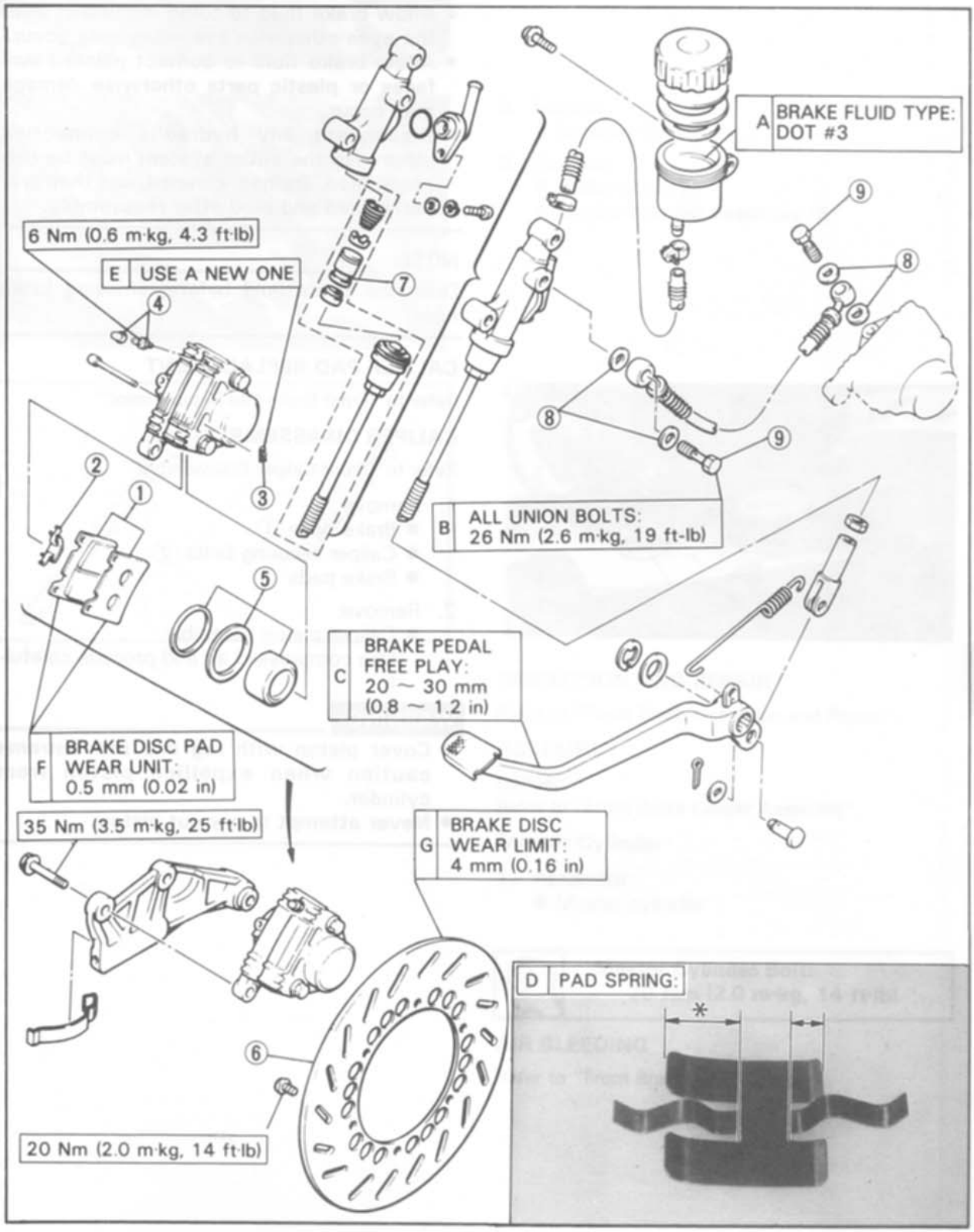
If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in system have disappeared.

5

REAR BRAKE

1. Brake pad
2. Pad spring
3. Retaining clips
4. Bleed screw
5. Caliper piston assembly
6. Brake disc
7. Master cylinder kit
8. Copper washer
9. Union bolt

* Install the pad spring with its longer tangs in the disc rotation direction.



5

CAUTION:

Disc brake components rarely require disassembly. DO NOT:

- **Disassembly components unless absolutely necessary.**
- **Use solvents on internal brake component.**
- **Use contaminated brake fluid for cleaning. Use only clean brake fluid.**
- **Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.**
- **Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.**
- **Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.**

NOTE:

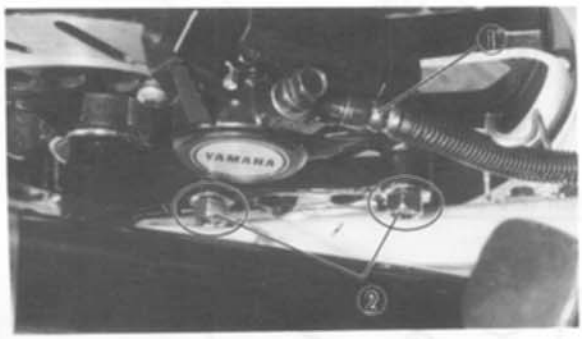
Drain the brake fluid before removing brake hose.

CALIPER PAD REPLACEMENT

Refer to "Front Brake Pad Replacement"

CALIPER DISASSEMBLY

Refer to "Front Caliper Disassembly"



1. Remove:
   - Brake hose ①
   - Caliper securing bolts ②
   - Brake pads
2. Remove:
   - Caliper piston assembly
     Use compressed air and procede carefully.

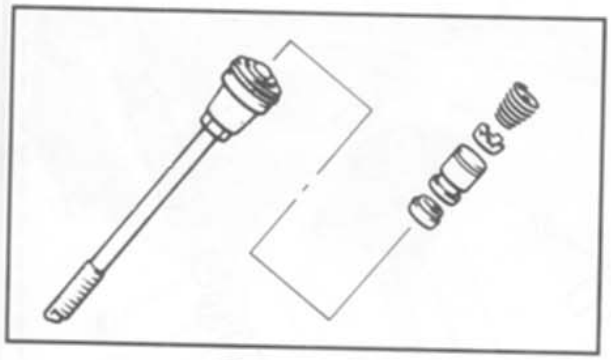
WARNING:

- **Cover piston with rag and use entreme caution when expelling piston from cylinder.**
- **Never attempt to pry out piston.**

MASTER CYLINDER DISASSEMBLY

1. Remove:
   - Footrest bracket

2. Loosen:
   - Locknut ①
3. Remove
   - Brake hose ②
   - Master cylinder assembly ③



4. Remove:
   - Master cylinder kit (from master cylinder body)

INSPECTION AND REPAIR

Refer to "Front Brake Inspection and Repair".

ASSEMBLY

Caliper

Refer to "Front Brake Caliper Assembly".

Master Cylinder

1. Assemble:
   - Master cylinder

	Master Cylinder Bolt: 20 Nm (2.0 m·kg, 14 ft·lb)

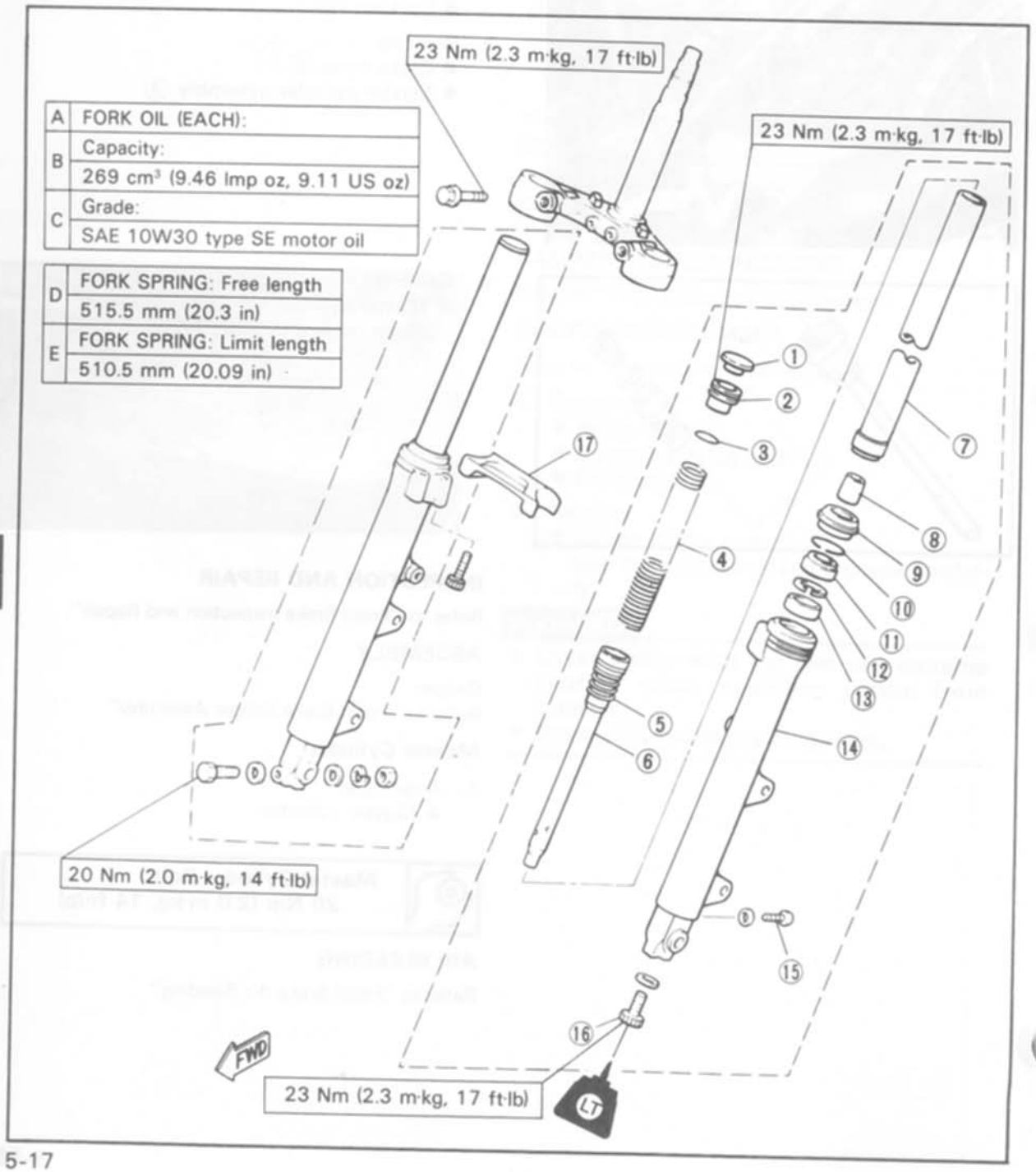
AIR BLEEDING

Refer to "Front Brake Air Bleeding"

5

FRONT FORK

1. Rubber cap
2. Cap bolt
3. O-ring
4. Frok spring
5. Damper rod spring
6. Damper rod
7. Inner fork tube
8. Taper spindle
9. Dust cover
10. Retaining clip
11. Oil seal
12. Washer
13. Bushing
14. Outer fork tube
15. Drain bolt
16. Damper rod securing bolt
17. Front fork brace



REMOVAL AND DISASSEMBLY

WARNING:

Support the motorcycle securely so there is no danger of it falling over.

1. Remove:
   - Brake caliper
   - Front wheel
2. Remove:
   - Front fender
   - Front fork brace
   - Rubber cap
3. Loosen:
   - Upper front fork pinch bolts ①
   - Lower front pinch bolts ②

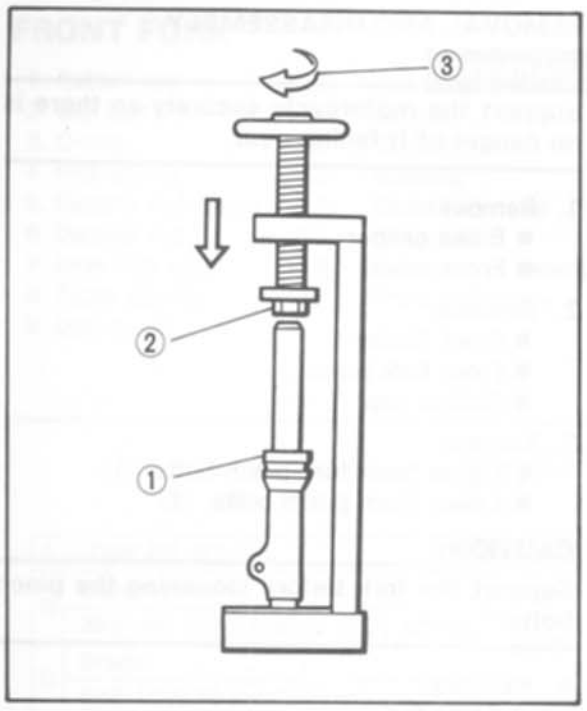
CAUTION:

Support the fork before loosening the pinch bolts.

4. Remove:
   - Front fork
     (from steering crown)
5. Tighten
   - Lower front fork pinch bolt
6. Loosen:
   - Cap bolt ①
     Use Front Fork Cap Socket (90890-01104).
   - Lower front fork pinch bolt

7. Remove:
   - Front fork assembly
     (from the underbracket)
8. Remove:
   - Cap bolt
   - Fork spring
   - Dust cover
   - Retaining clip
9. Fill:
   - Fork inner tube
     (with fork oil)
     Stretch the inner tube before filling.
10. Install:
    - Cap bolt

5



11. Remove:
    - Oil seal
      (from outer tube.)
      Press the inner tube to facilitate removal.

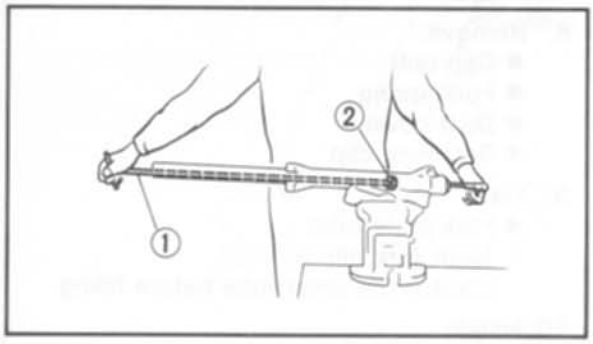
CAUTION:

- **If air enters the inner tube or it is compressed abruptly oil may spurt out or the oil seal may be ejected.**
- **Never touch the inner tube during a disassembly operation.**
- **Be sure to warp the oil seal with a rag for safety.**

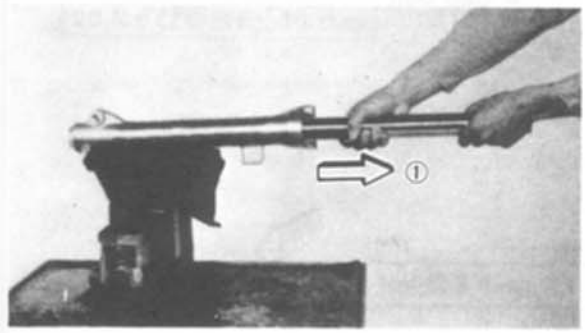
① Wrap with rag
② Spacer
③ Turn slowly

12. Remove:
    - Oil seal
    - Washer
    - Cap bolt
13. Drain:
    - Fork

5



14. Remove:
    - Damper rod securing bolt
      Use T-handle ① (90890-01326) and Front Fork Cylinder Holder (90890-01300) ② to lock the damper rod.



15. Remove:
    - Damper rod
    - Damper rod spring
    - Inner fork tube
    - Guide bushing
      (from outer tube)
    - Taper spindle

① Pull inner tube from outer tube.

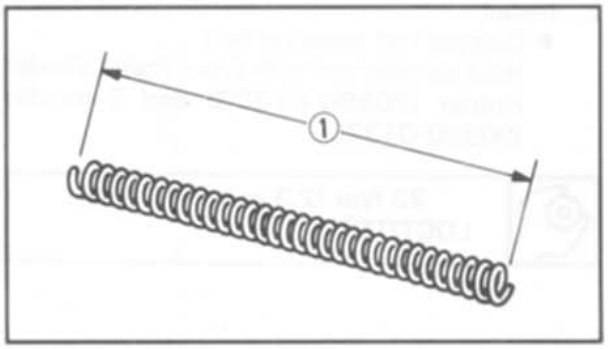
INSPECTION

1. Inspect:
   - Inner fork tube
     Severe scratches/Bends → Replace.
     Damaged oil lock valve → Replace.

WARNING:

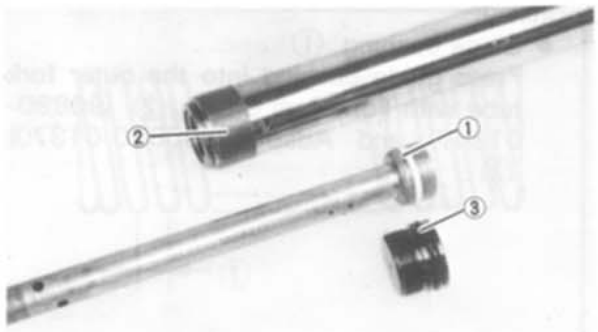
Do not attempt to straighten a bent fork tube as this may dangerously weaken the tube.

2. Inspect:
   - Outer fork tube
     Bends → Replace.
     Damaged fork seal seat → Replace.
   - Fork oil seal
     Lip damage → Replace.
     Outer surface damage → Replace.



3. Inspect:
   - Fork spring ①
     Over specified limit → Replace.

Fork Spring Free Length Limit:
510.5 mm (20.1 in)



4. Inspect:
   - Damper rod
     Worn damper rod seal ① → Replace.
     Contamination → Wash and blow out all passages.
   - Inner fork tube
     Worn inner fork slide bushing ② → Replace.
   - Cap bolt O-ring ③
     Damage → Replace.

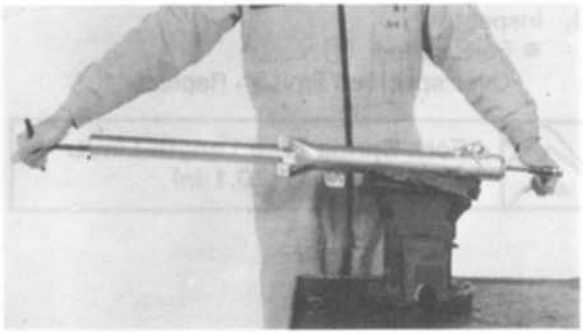
5

ASSEMBLY

NOTE:

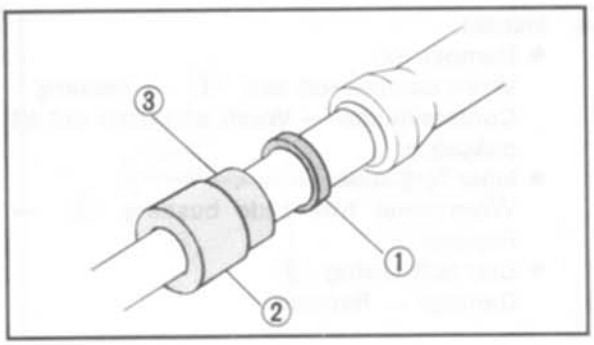
Be sure all components are clean before assembly.

1. Install:
   - Damper rod spring
   - Damper rod
     Allow rod to slide slowly down the inner fork tube until it protrudes from the bottom.
   - Taper spindle
   - Inner fork tube

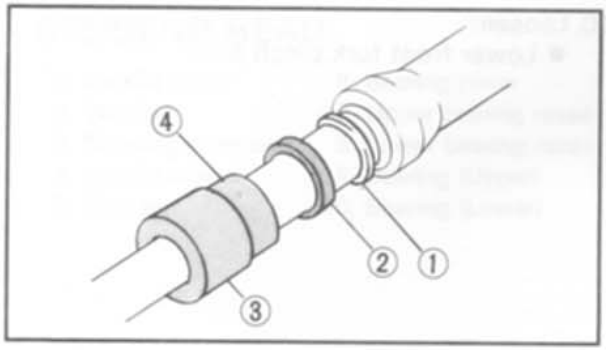


2. Install:
   - Damper rod securing bolt
     Hold damper rod with Front Fork Cylinder Holder (90890-01300) and T-handle (90890-01326).

23 Nm (2.3 m·kg, 17 ft·lb)
LOCTITE®

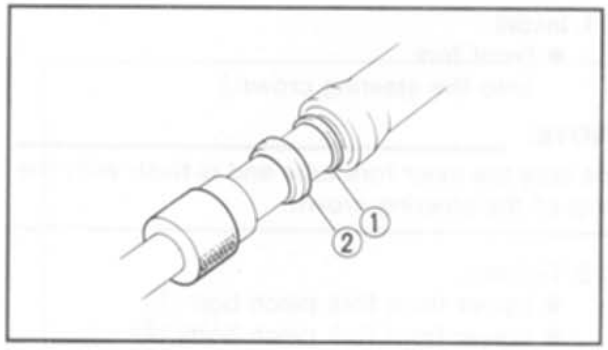


3. Install:
   - Guide bushing ①
     Press guide bushing into the outer fork tube with Fork Seal Driver ② (90890-01367) and Adapter (90890-01370) ③.



4. Install:
   - Washer ①
   - Fork oil seal ②
     Press fork oil seal into the outer fork tube with Fork Seal Driver ③ (90890-01367) and Adapter (90890-01370) ④

CAUTION:
Be sure oil seal numbered side face upward.

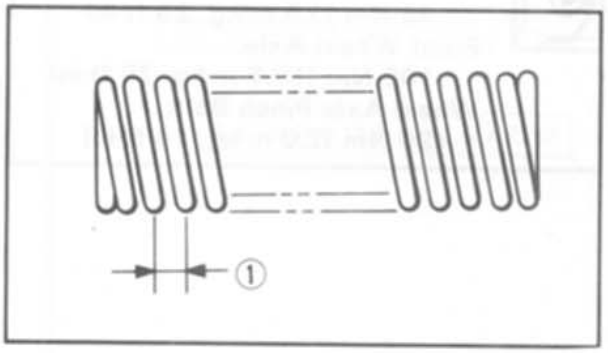


5. Install:
   - Circlip ①
   - Dust seal ②
     Use Fork Seal Driver (90890-01367) and Adapter (90890-01370).

6. Fill:
   - Inner tube
     (with fork oil)

Capacity (each):
269 cm³ (9.46 Imp oz, 9.11 US oz)
Type:
SAE 10W30 Type SE Motor Oil

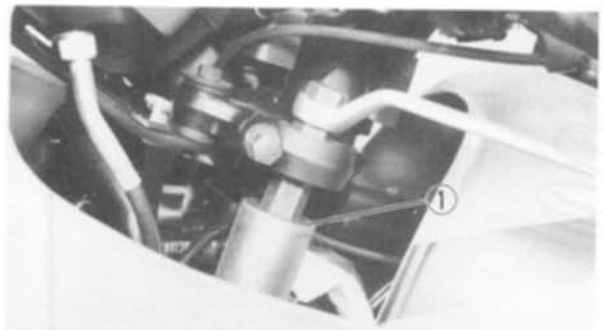
NOTE:
After filling, slowly pump the fork up and down to distribute oil.



7. Install:
   - Fork spring

NOTE:
Be sure the short pitch ① side face upward.

   - Cap bolt
     (into the inner fork tube)



8. Install:
   - Front fork assembly
     (into the underbracket)
9. Tighten:
   - Lower front fork pinch bolts
   - Cap bolt ①

Cap Bolt:
23 Nm (2.3 m·kg, 17 ft·lb)

10. Loosen:
    - Lower front fork pinch bolt

11. Install:
    - Front fork
      (into the steering crown.)

NOTE:

Be sure the inner fork tube end is flush with the top of the steering crown.

12. Tighten:
    - Upper front fork pinch bolt ①
    - Lower front fork pinch bolts ②

Upper Pinch Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)
Lower Pinch Bolts:
23 Nm (2.3 m·kg, 17 ft·lb)

13. Continue assembly by reversing of Removal and Disassembly sequence.
    Install and torque tighten each component as specified.

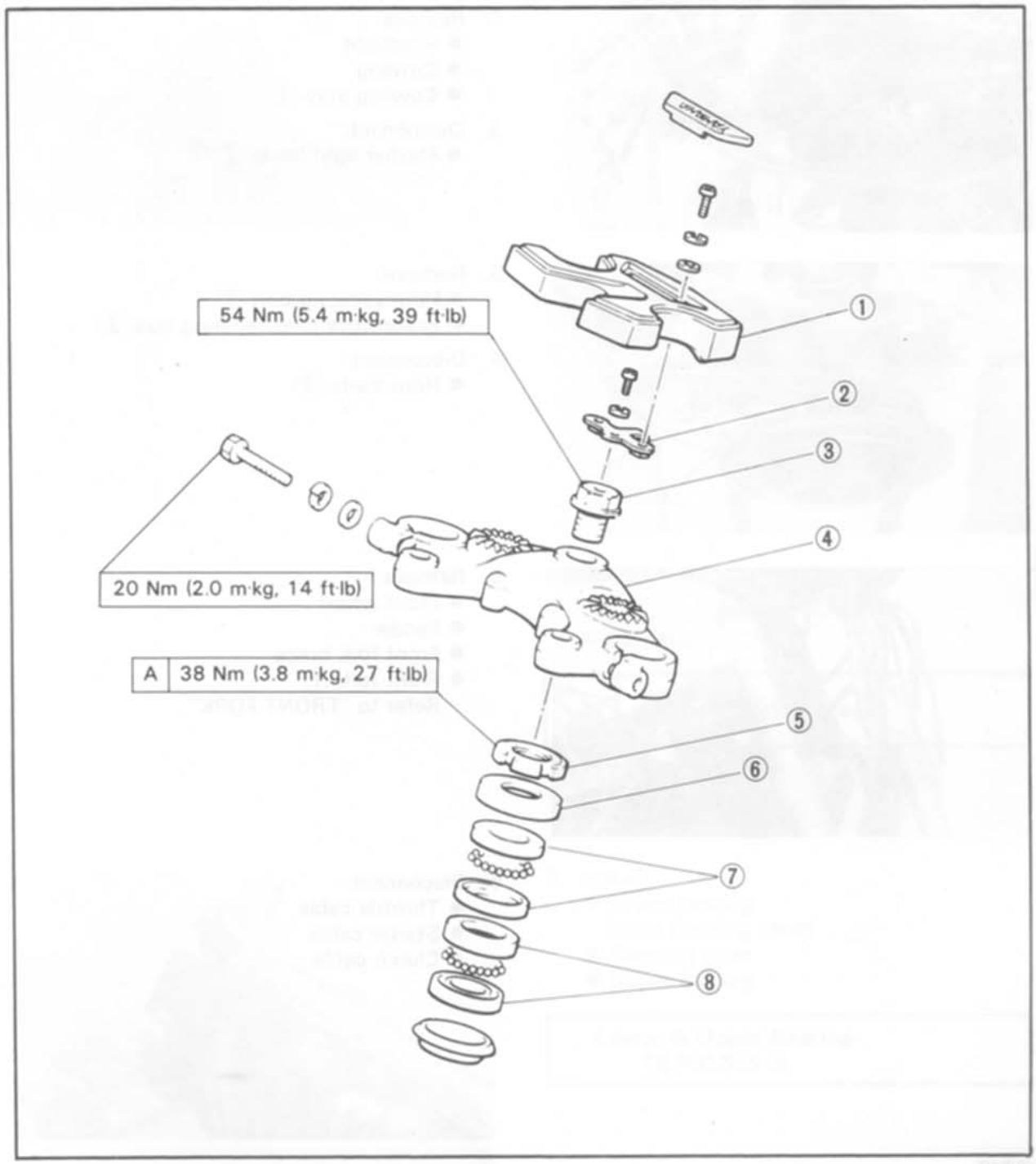
Disc Brake Caliper:
35 Nm (3.5 m·kg, 25 ft·lb)
Front Wheel Axle:
105 Nm (10.5 m·kg, 75 ft·lb)
Wheel Axle Pinch Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)

5

STEERING HEAD

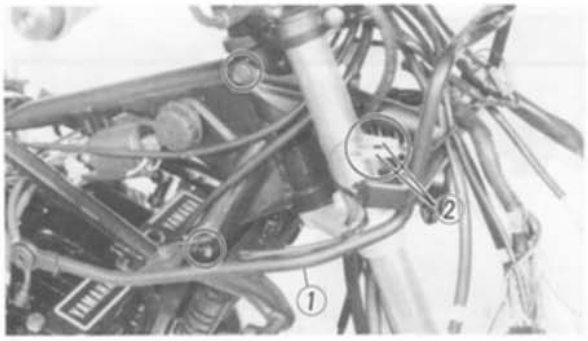
1. Handle cover
2. Washer
3. Steering stem bolt
4. Handle crown
5. Ring nut
6. Bearing cover
7. Upper bearing races
8. Lower bearing races
9. Bearing (Upper)
10. Bearing (Lower)

A	• Tighten to specified torque. • If steering is binded, loosen the ring nut so that there is no free play on bearing.



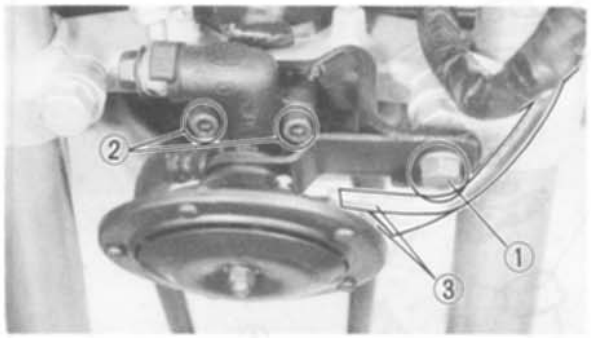
ADJUSTMENT

Refer to Chapter 2. "STEERING HEAD ADJUSTMENT".



REMOVAL

1. Remove:
   - Headlight
   - Cowling
   - Cowling stay ①
2. Disconnect:
   - Flasher light leads ②



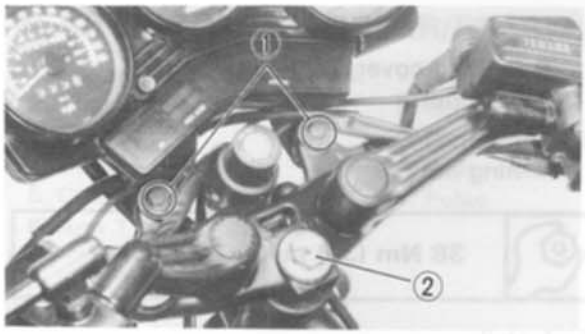
3. Remove:
   - Horn securing bolt ①
   - Brake hose joint securing bolt ②
4. Disconnect:
   - Horn leads ③

5

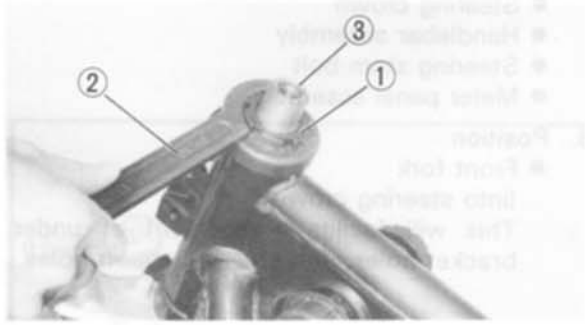
5. Remove:
   - Front wheel
   - Fender
   - Front fork brace
   - Front fork ①

   Refer to "FRONT FORK".

6. Disconnect:
   - Throttle cable
   - Starter cable
   - Clutch cable



7. Remove:
   - Meter panel securing bolts ①
   - Steering stem bolt ②
   - Handlebar and steering crown assembly



8. Remove:
   - Ring nut ①
     Use Ring Nut Wrench ② (90890-01268)
   - Bearing cover
   - Bearing
   - Steering stem ③

INSPECTION

1. Check:
   - Bearing
     Pitting/Damage → Replace races and bearing.

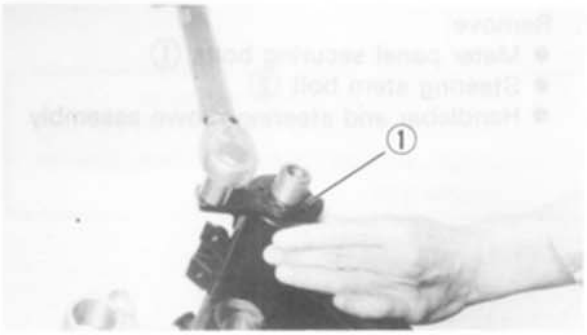
ASSEMBLY

1. Lubricate:
   - Bearings

	Wheel Bearing Grease

2. Install:
   - Lower bearing
     (onto steering stem)
   - Steering stem
   - Upper bearing

Lower & Upper Bearing **19 P.C.S/¼ in**



3. Install:
   - Bearing cover
   - Ring nut
4. Tighten:
   - Ring nut ①

38 Nm (3.8 m·kg, 27 ft·lb)

5. Install:
   - Steering crown
   - Handlebar assembly
   - Steering stem bolt
   - Meter panel assembly
6. Position:
   - Front fork
     (into steering crown)
     This will facilitate alignment of under bracket holes with steering crown holes.

7. Tighten:
   - Steering stem nut ①

54 Nm (5.4 m·kg, 39 ft·lb)

8. Continue assembly by reversing removal sequence.

9. Check:
   - Steering head operation
     Turn it from lock to lock.
     Looseness/Binding → Readjust tightness of steering stem.

REAR SHOCK ABSORBER/REAR ARMS

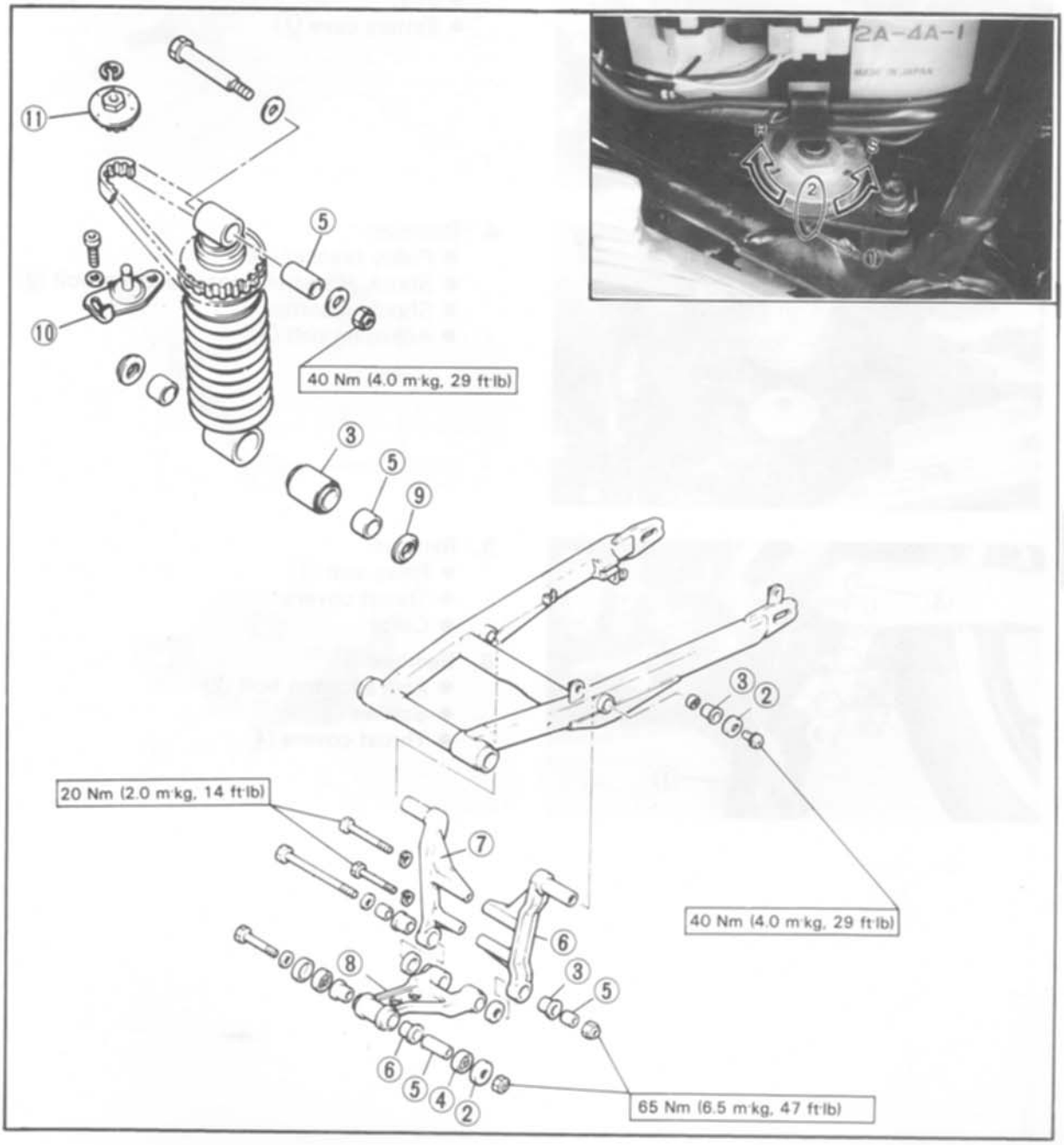
1. Spring preload match mark
2. Thrust cover
3. Bushing
4. Oil seal
5. Collar
6. Arm 1
7. Arm 2
8. Relay arm
9. Dust cover
10. Pulley bracket
11. Pulley

SPRING PRELOAD ADJUSTMENT:

	H			STD	S
Adjusting position	5	4	3	2	1

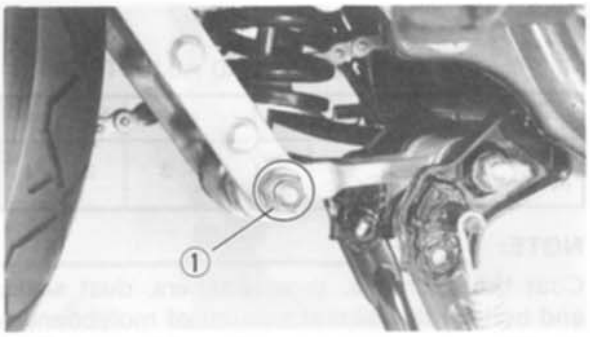
NOTE:

Coat the bushings, thrustwashers, dust seals, and bolts with a liberal amount of molybdenum disulfite grease before installing. After installing, thoroughly wipe off excess grease.



5

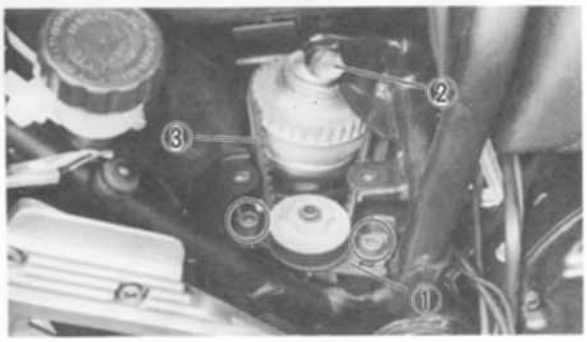
REAR SHOCK ABSORBER/REAR ARMS



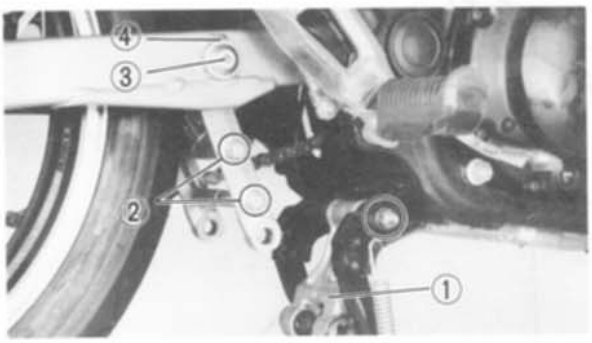
REMOVAL

1. Remove:
   - Mufflers (Left and right)
2. Remove:
   - Shock absorber lower securing bolt ①
   - Thrust covers
   - Collars

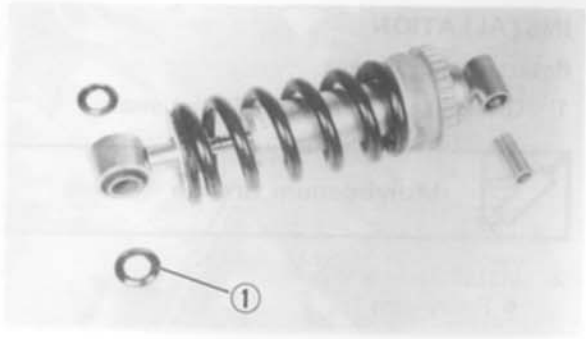
3. Remove:
   - Battery
     (Refer to "ENGINE REMOVAL")
   - Seat
   - Battery case ①



4. Remove:
   - Pulley bracket ①
   - Shock absorber upper securing bolt ②
   - Shock absorber
   - Adjusting belt ③

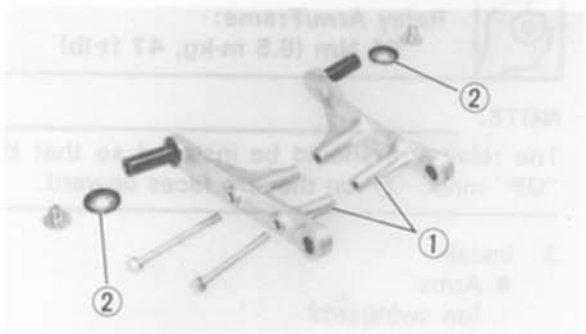


5. Remove:
   - Relay arm ①
   - Thrust covers
   - Collar
6. Remove:
   - Arm securing bolt ②
   - Screws ③
   - Thrust covers ④

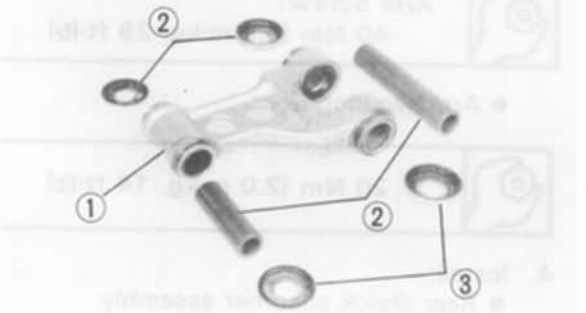


INSPECTION

1. Inspect:
   - Rear shock absorber
     Oil leaks/Damage → Replace.
   - Dust cover ①
     Damage → Replace.



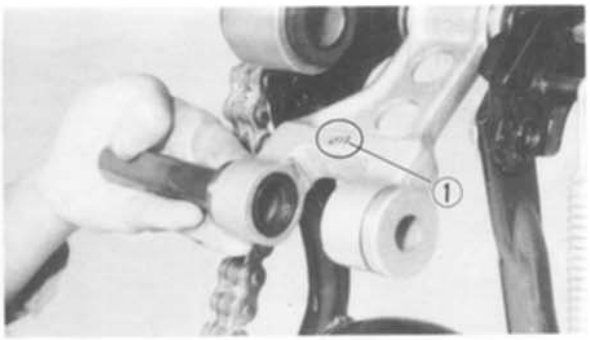
2. Inspect:
   - Arm ①
   - Thrust cover ②
     Damage/Wear → Replace



3. Inspect:
   - Relay arm ①
   - Collar ②
   - Thrust cover ③
     Damage/Wear → Replace.

4. Inspect:
   - Adjusting belt
   - Adjusting belt pulley ①
     Wear/Damage → Replace

5



INSTALLATION

Reverse removal steps.

1. Grease the bushing and dust seals.

	Molybdenum Grease

2. Install:
   - Relay arm

	Relay Arm/Frame: 65 Nm (6.5 m·kg, 47 ft·lb)

NOTE:

The relay arm should be installed so that the "UP" mark ① on the arm faces upward.

3. Install:
   - Arms
     (on swingarm)

	Arm Screw: 40 Nm (4.0 m·kg, 29 ft·lb)

   - Arm securing bolts

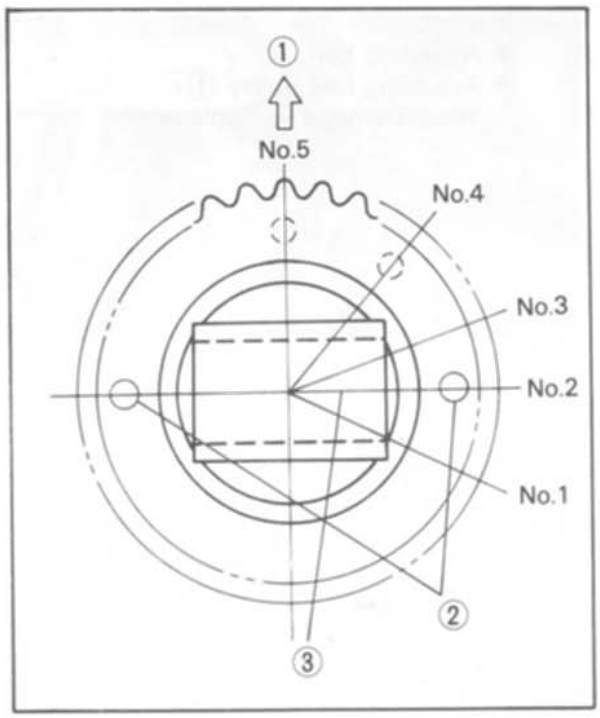
	20 Nm (2.0 m·kg, 14 ft·lb)

4. Install:
   - Rear shock absorber assembly

	Upper: 40 Nm (4.0 m·kg, 29 ft·lb) **Lower: 65 Nm (6.5 m·kg, 47 ft·lb)**

NOTE:

Be sure the "YAMAHA" mark ② faces shock absorber upper boss center ③ .

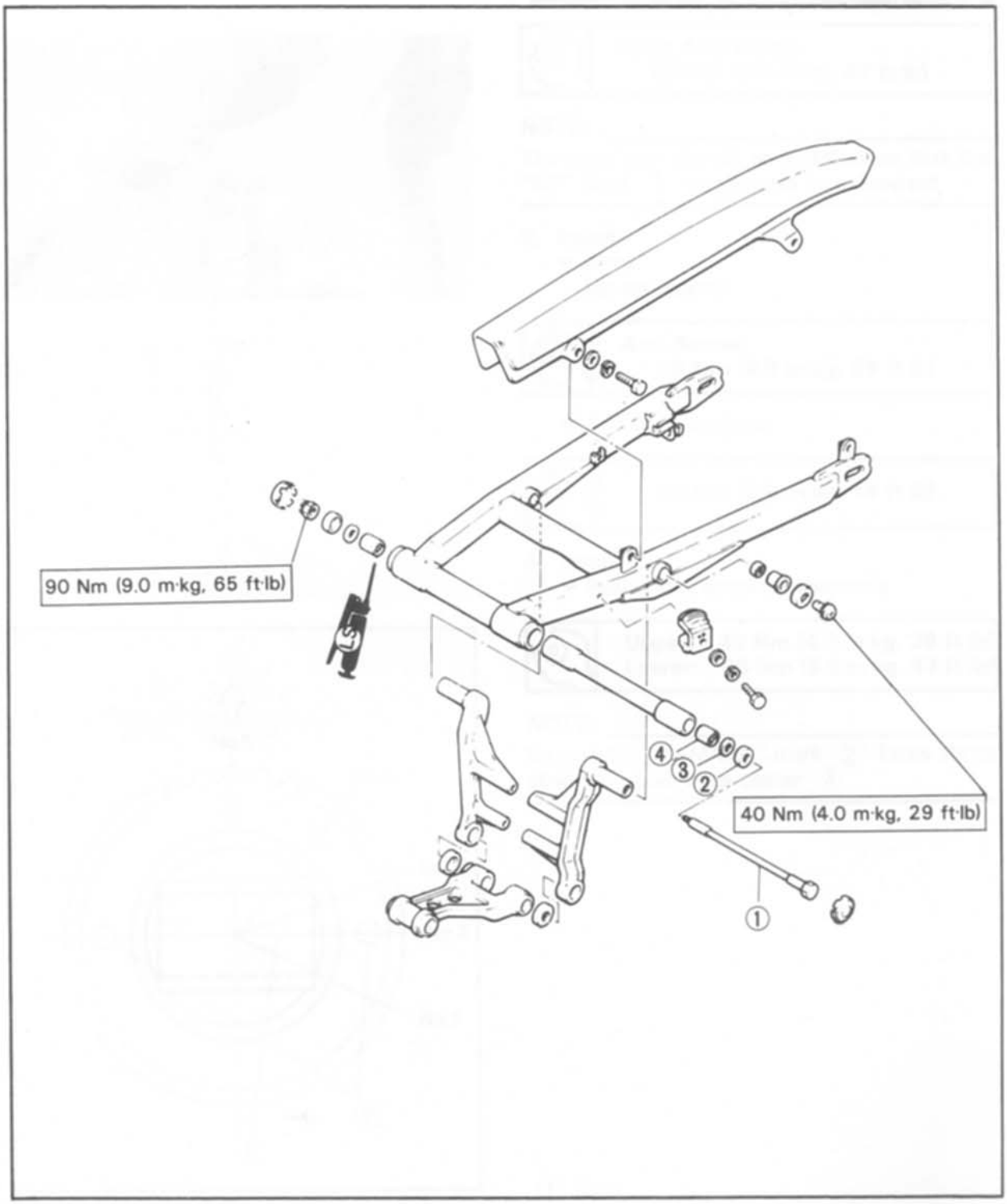


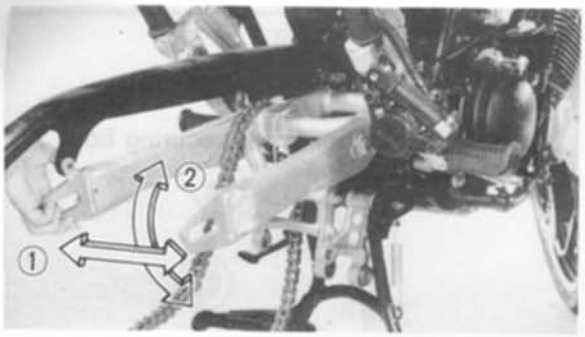
① Front

5. Pull the pulley ① by a force of 20 kg (44 lb) using a spring scale.
6. Tighten:
   - Pulley bracket bolt ②

SWINGARM AND DRIVE CHAIN

1. Pivot shaft
2. Thrust cover
3. Shim
4. Bearing





FREE PLAY INSPECTION

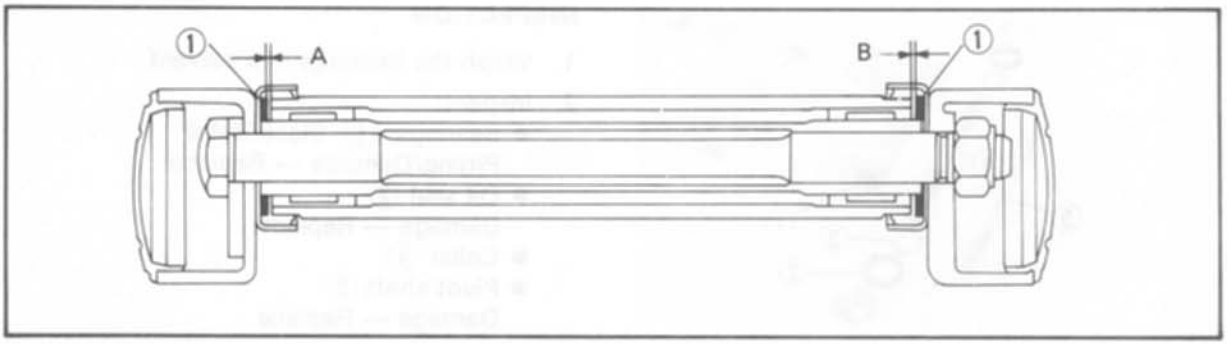
1. Check:
   - Swingarm side play ①
     Side play → Adjust shim thickness.
   - Swingarm up and down movement ②
     Tightness/Binding/Rough spots → Replace bearings.

Free Play Inspection Step:
- Remove the rear wheel.
- Remove the shock absorber lower securing bolt.
- Inspect swingarm side play by moving it frame side to side. (There should be no noticeable side play)
- Inspect swingarm up and down movement by moving it up and down.

2. Select the proper shim ① thickness to obtain standard swingarm side play (A+B).

Standard Side Play (A+B):
0.2 ~ 0.4 mm
(0.008 ~ 0.016 in)

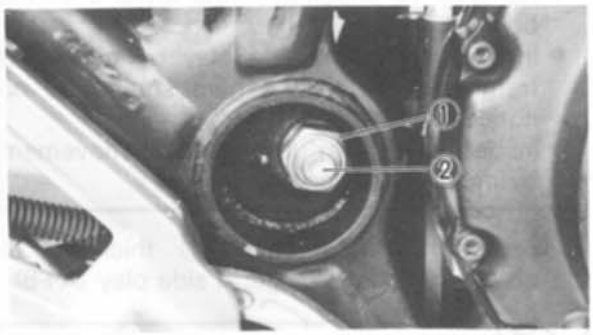
Available Shim Thickness:
1.95 mm (0.75 in), 2.05 mm (0.0815 in), 2.15 mm (0.084 in)



5

REMOVAL

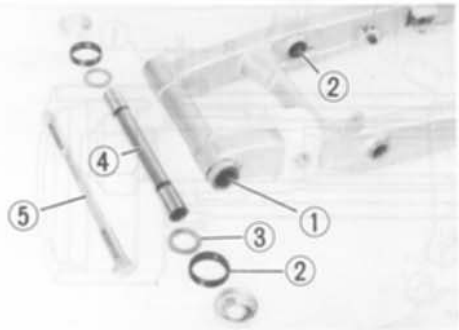
1. Remove:
   - Rear wheel
   - Shock absorber lower securing bolt
   - Pivot shaft caps



2. Remove:
   - Pivot shaft nut ①
   - Pivot shaft ②
   - Swingarm assembly
   - Arm 1 and 2

3. Remove:
   - Change pedal assembly
   - Crankcase cover
     Refer to ENGINE REMOVAL.
   - Drive chain

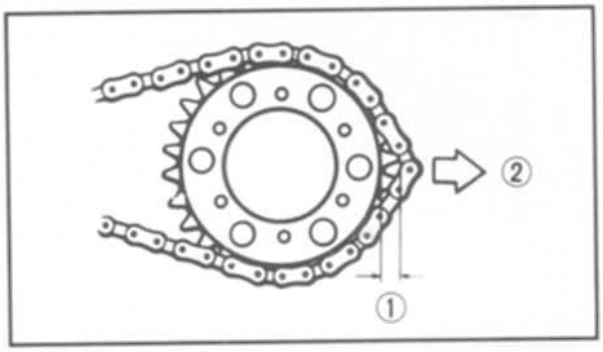
5



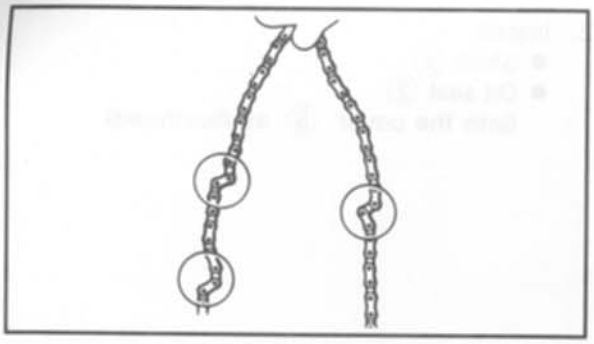
INSPECTION

1. Wash the bearings in a solvent.
2. Inspect:
   - Bearings ① (Race/Balls)
     Pitting/Damage → Replace.
   - Oil seal ②
     Damage → Replace.
   - Collar ④
   - Pivot shaft ⑤
     Damage → Replace

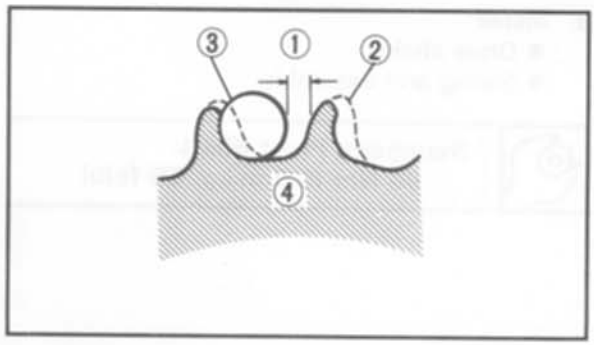
③ Shim



3. Check:
   - Drive chain wear
     Pull ② the chain away from the driven sprocket.
     Distance chain/sprocket higher than 1/2 tooth ① → Replace drive chain

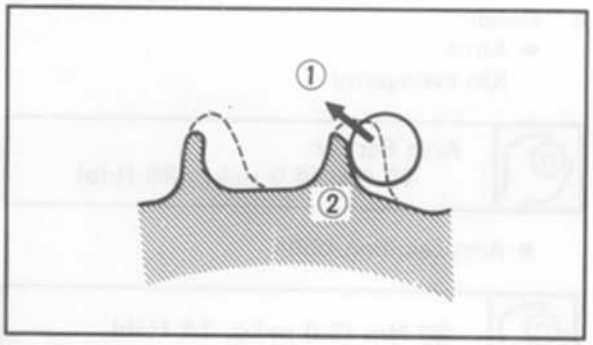


4. Check:
   - Drive chain stiffness
     Clean and oil the chain and hold as illustrated
     Stiff → Replace drive chain



5. Inspect:
   - Drive sprocket
     More than 1/4 teeth ① wear → Replace Sprocket.

② Correct
③ Roller
④ Sprocket



6. Inspect:
   - Drive Sprocket
     Bent teeth ② → Replace sprocket

① Slip off

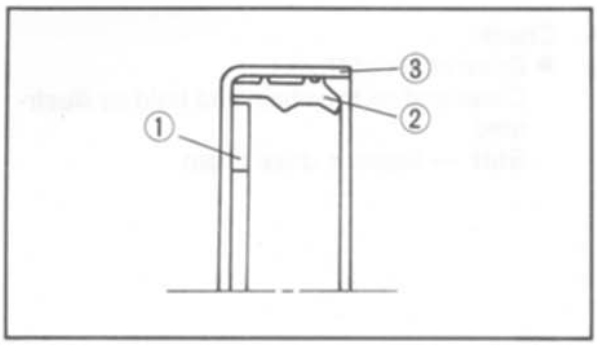
5

INSTALLATION

Reverse removal steps

1. Grease the bearings oil seal and collar.

Lithium Base Waterproof Wheel Bearing Grease



2. Install:
   - Shim ①
   - Oil seal ②
     (into the cover ③ as illustrated)

3. Install:
   - Drive chain
   - Swing arm assembly

	Swingarm Pivot Shaft: **90 Nm (9.0 m·kg, 65 ft·lb)**

4. Install:
   - Arms
     (On swingarm)

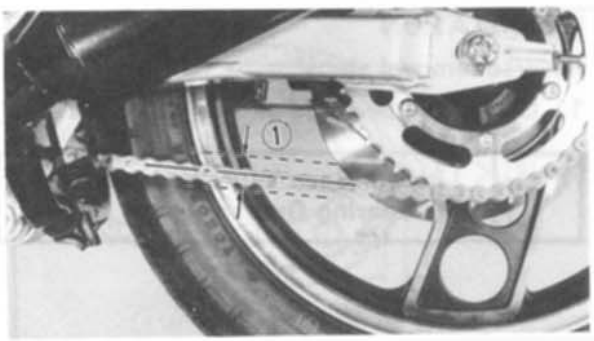
	Arm Screw: **40 Nm (4.0 m·kg, 29 ft·lb)**

   - Arm securing bolts

	20 Nm (2.0 m·kg, 14 ft·lb)

5. Install:
   - Shock absorber lower securing bolt

	65 Nm (6.5 m·kg, 47 ft·lb)

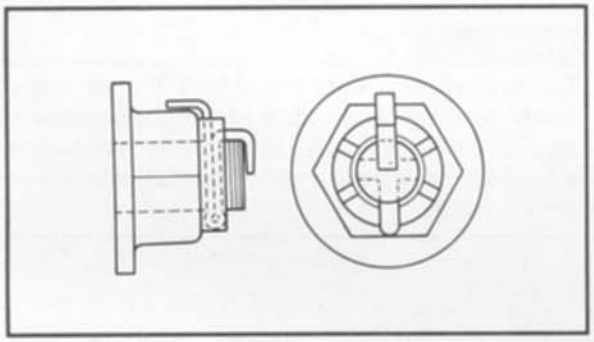


6. Install:
   - Rear wheel
7. Adjust:
   - Drive chain tension

	Chain Deflection ① : **20 ~ 30 mm (0.8 ~ 1.2 in)**

8. Tighten:
   - Axle nut
   - Brake caliper bolts

Axle Nut:
105 Nm (10.5 m·kg, 75 ft·lb)
Brake Caliper Bolts:
35 Nm (3.5 m·kg, 25 ft·lb)



9. Install:
   - Cotter pin (New)

NOTE:

Do not loosen the axle nut after torque tightening.
If the axle nut groove is not aligned with the wheel shaft cotter pin hole, align groove to hole by tightening up on the axle nut.

CABLES AND FITTINGS

CABLE MAINTENANCE

NOTE:

See "Maintenance and Lubrication" intervals charts. Cable maintenance is primarily concerned with preventing deterioration and providing proper lubrication to allow the cable to move freely within its housing. Cable removal is straightforward and uncomplicated. Removal is not discussed within this section.

WARNING:

Cable routing is very important. For details of cable routing, see cable routing diagrams at end of this manual. Improperly routed or adjusted cables may make motorcycle operation unsafe.

1. Remove:
   - Cable
2. Check:
   - Cable free movement
     Obstruction → Inspect for Wear/Damage.
     Kinking/Frayed strands/Damage → Replace.
3. Lubricate the cable.

Cable Lubrication Steps:

- Hold the cable in a vertical position.
- Apply lubricant to the uppermost end of the cable.
- Leave in a vertical position until the lubricant appears at the bottom.
- Allow excess to drain, then reinstall the cable.

NOTE:

Choice of lubricant depends upon conditions and preferences; however, a semi-drying chain and cable lubricant will perform adequately under most conditions.

THROTTLE MAINTENACE

1. Remove:
   - Philips head screws
     (from throttle housing assembly)
     Separate the housing halves.
2. Disconnect:
   - Cable
     (from throttle grip assembly)
3. Remove:
   - Throttle grip assembly
4. Clean:
   - All parts
     Use mild solvent.
   - Right-hand end of handlebar
5. Inspect:
   - Contact surfaces
     Burrs/Damage → Deburr or replace.
   - Right-hand end of handlebar
6. Lubricate all contact surfaces with a light coat of lithium-soap base grease and reassemble.

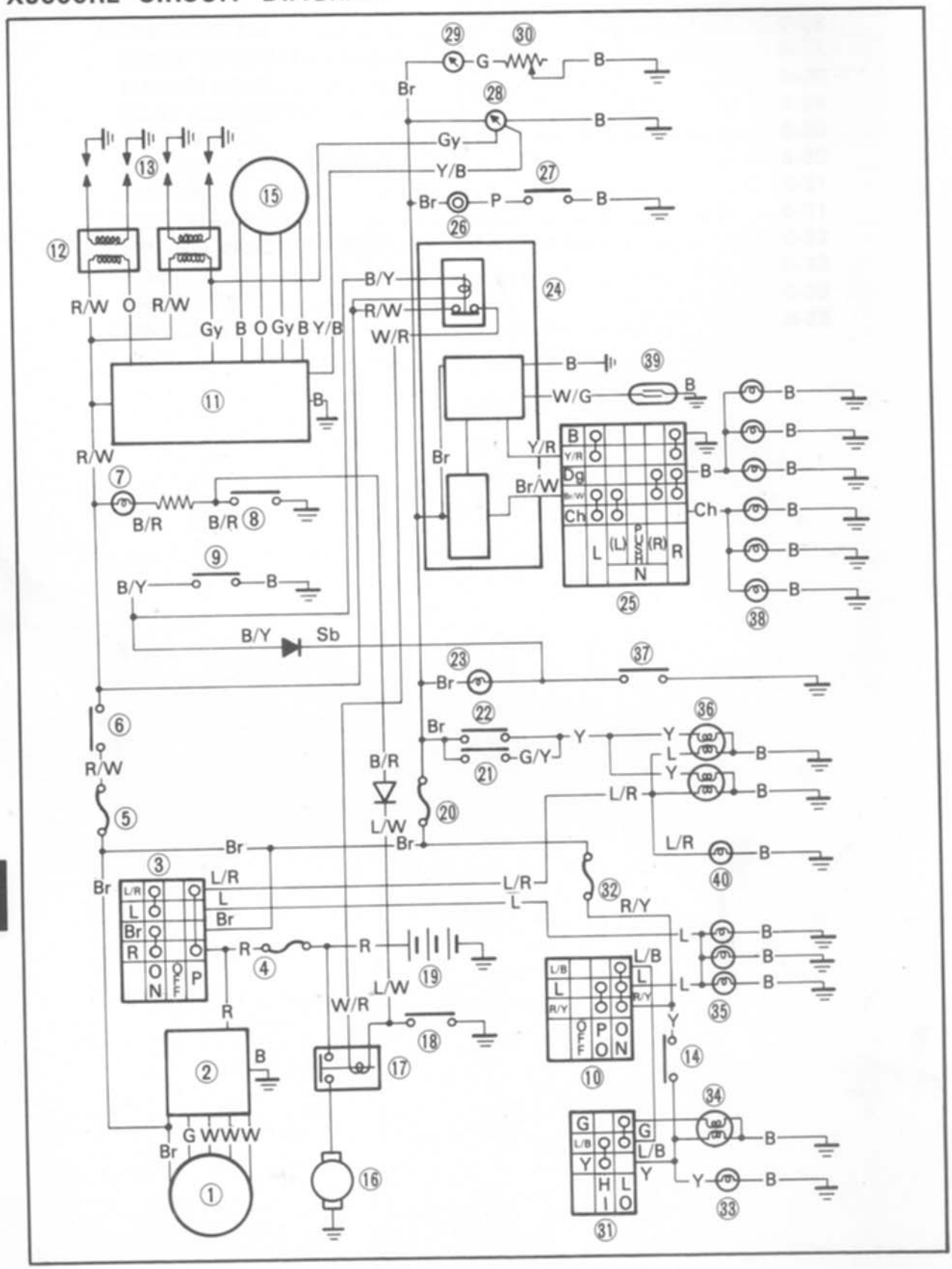
NOTE:

Tighten the housing screws evenly to maintain an even gap between housing halves.

7. Check:
   - Throttle (For smooth operation)
     Un smooth operation → Lubricate
   - Spring (For quick return)
     Sluggish operation → Replace
   - Housing (For tightness)
     Looseness → Replace

ELECTRICAL

XJ600RL CIRCUIT DIAGRAM



1. AC Magneto
2. Rectifier/Regulator
3. Main switch
4. Main fuse
5. Ignition fuse
6. "ENGINE STOP" switch
7. "OIL LEVEL" indicator light
8. Oil level switch
9. Clutch switch
10. "LIGHTS" switch
11. Ignitor unit
12. Ignition coil
13. Spark plug
14. "PASS" switch
15. Pickup coil
16. Starter motor
17. Starter relay
18. "START" switch
19. Battery
20. Signal fuse
21. Front brake switch
22. Rear brake switch
23. "NEUTRAL" indicator light
24. Relay assembly
25. "TURN" switch
26. Horn
27. "HORN" switch
28. Tachometer
29. Fuel meter
30. Fuel sender
31. "LIGHTS" (Dimmer) switch
32. Head fuse
33. "HIGH BEAM" indicator light
34. Headlight
35. Meter illumination light
36. Brake/Tail light
37. Neutral switch
38. Flasher/Indicator light
39. Reed switch
40. Auxiliary light

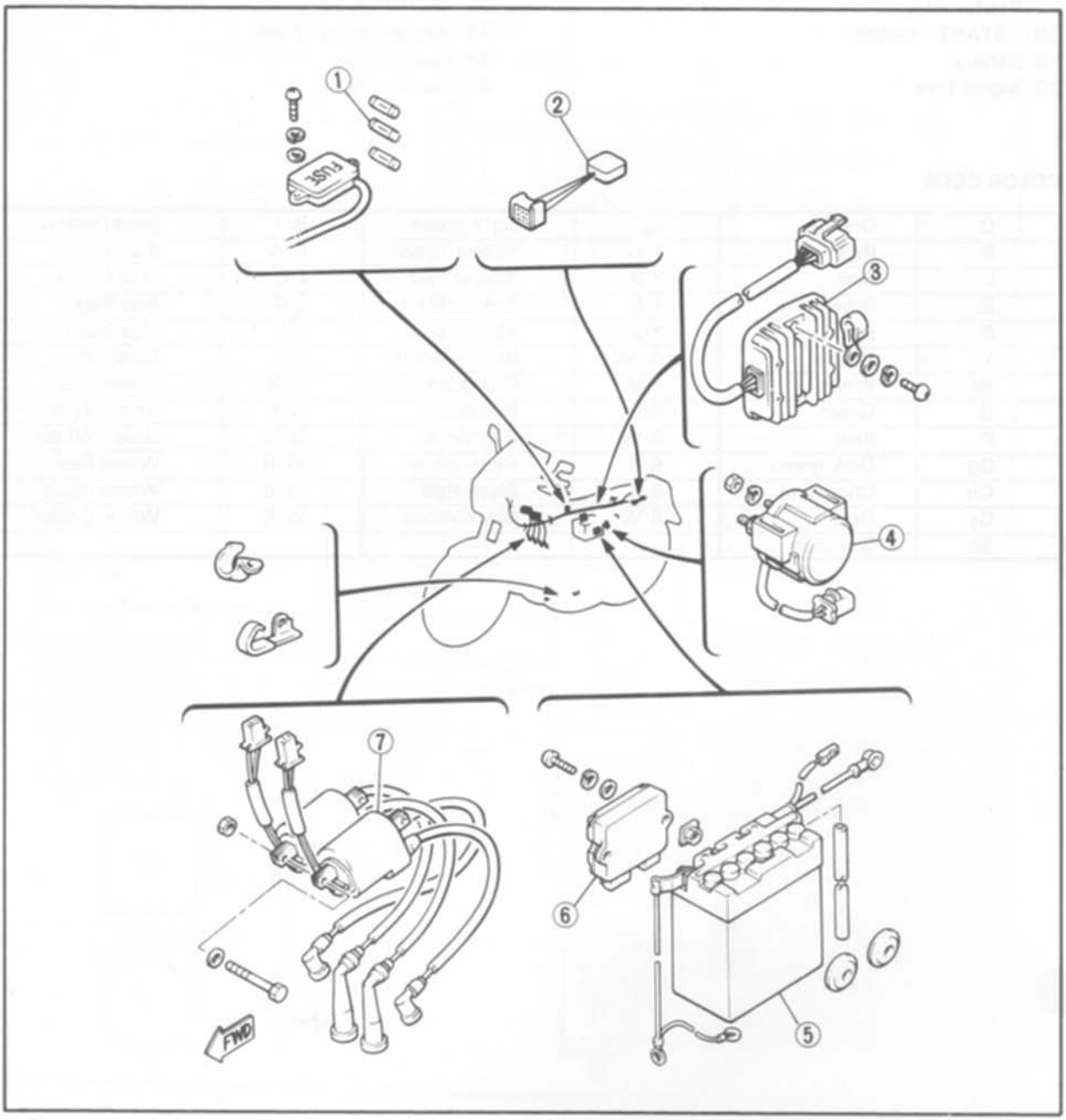
COLOR CODE

O	Orange	Lg	Light green	B/Y	Black/Yellow
R	Red	Y/G	Yellow/Green	L/W	Blue/White
L	Blue	Y/R	Yellow/Red	L/G	Blue/Green
Br	Brown	Y/B	Yellow/Black	L/R	Blue/Red
B	Black	Y/L	Yellow/Blue	L/B	Blue/Black
Y	Yellow	Br/W	Brown/White	G/L	Green/Blue
W	White	R/B	Red/Black	G/R	Green/Red
G	Green	R/L	Red/Blue	G/Y	Green/Yellow
P	Pink	R/W	Red/White	G/W	Green/White
Dg	Dark green	R/Y	Red/Yellow	W/R	White/Red
Ch	Chocolate	B/R	Black/Red	W/B	White/Black
Gy	Gray	B/W	Black/White	W/G	White/Green
Sb	Sky blue				

ELECTRICAL COMPONENTS 1

1. Fuse
2. Diode
3. Rectifier/Regulator
4. Starter relay
5. Battery
6. Ignitor unit
7. Ignition coil assembly

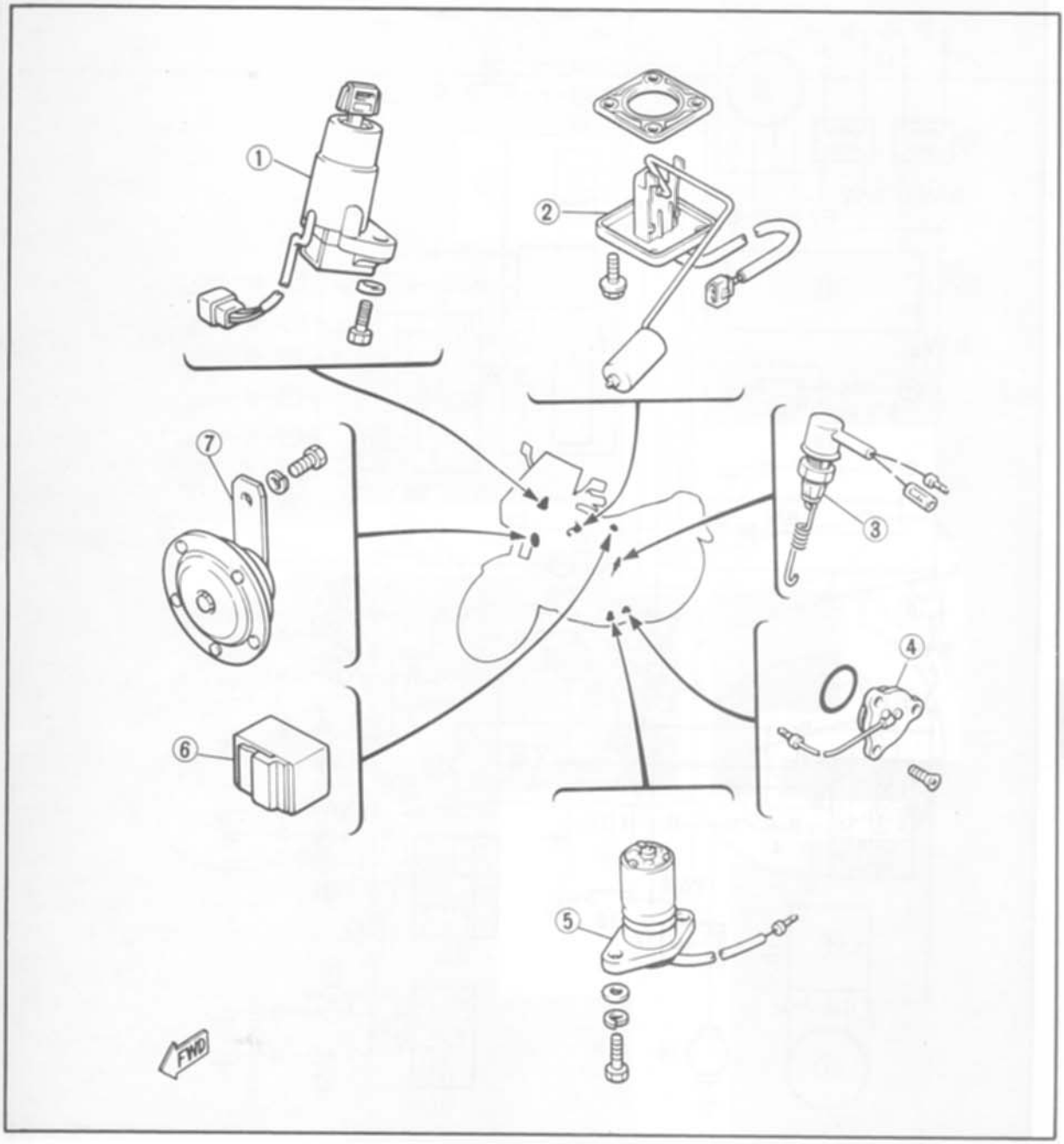
SPECIFICATIONS:	RESISTANCE:
Pickup coil:	120Ω ± 20%
Ignition coil: (Primary)	2.7Ω ± 10%
(Secondary)	12 kΩ ± 20%
Stator coil:	0.55Ω ± 10%



ELECTRICAL COMPONENTS 2

1. Main switch
2. Fuel sendor
3. Rear brake switch
4. Neutral switch
5. Oil level switch
6. Relay assembly
7. Horn

SPECIFICATIONS:	RESISTANCE:
Fuel gauge: (Full)	7 Ω ± 5%
(Empty)	95 Ω ± 7.5%
Starter switch:	3.5 Ω ± 10%

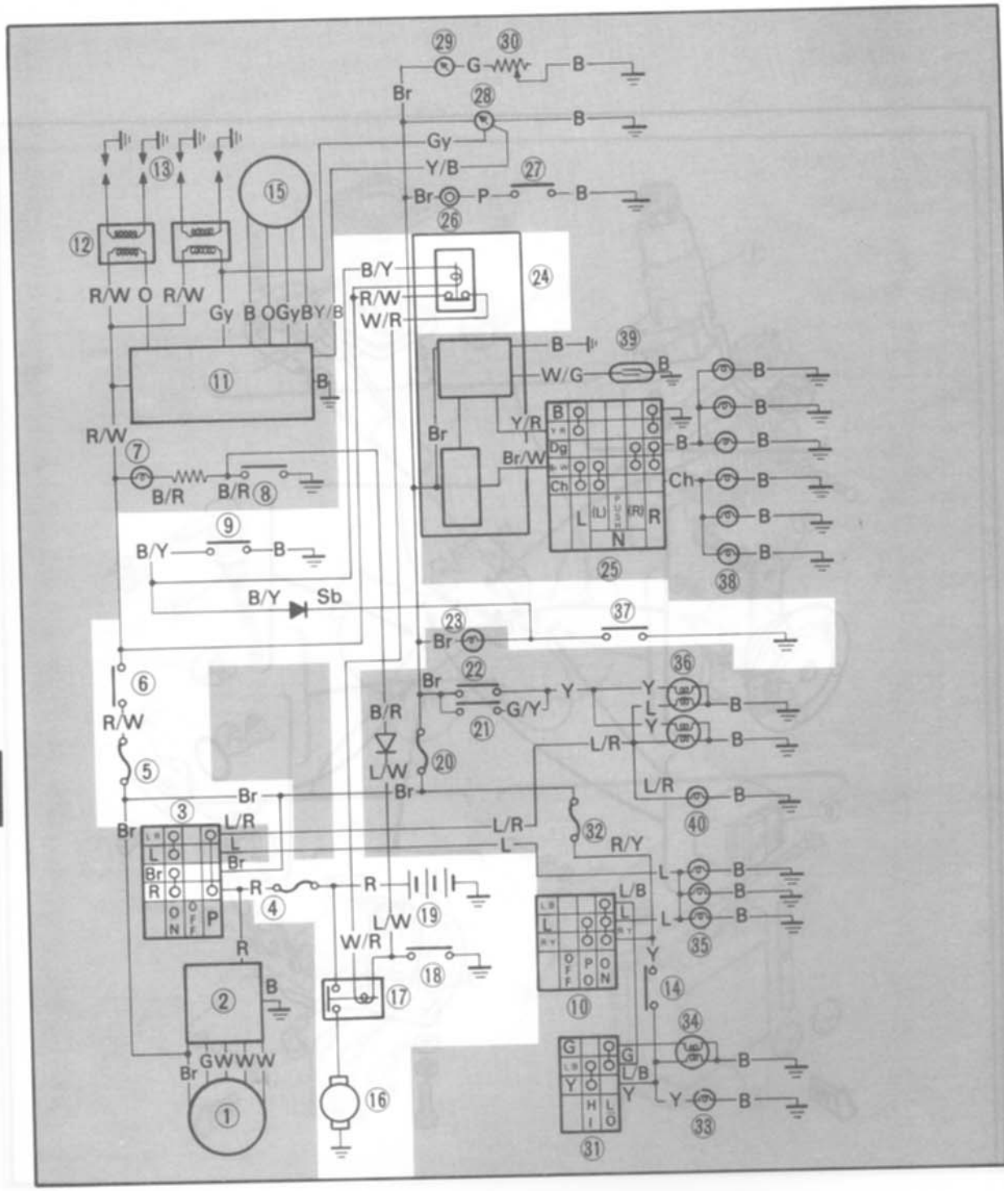


ELECTRIC STARTING SYSTEM

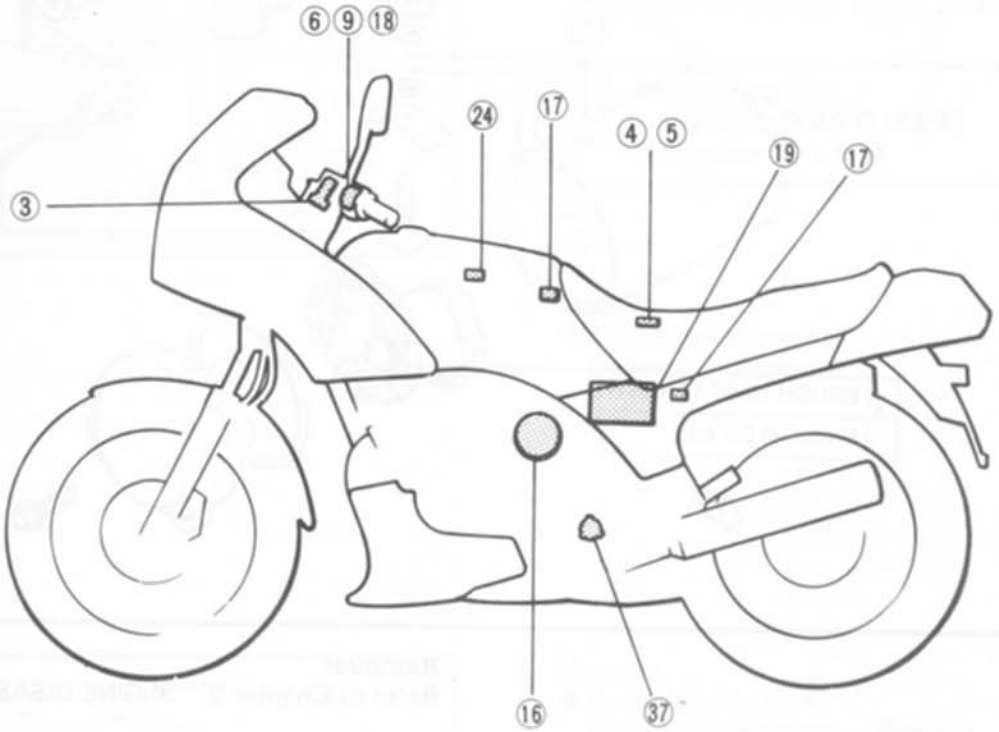
CIRCUIT DIAGRAM

Below circuit diagram shows starter circuit in wiring diagram.

NOTE:
For the encircled numbers and color cords, see page 6-2.

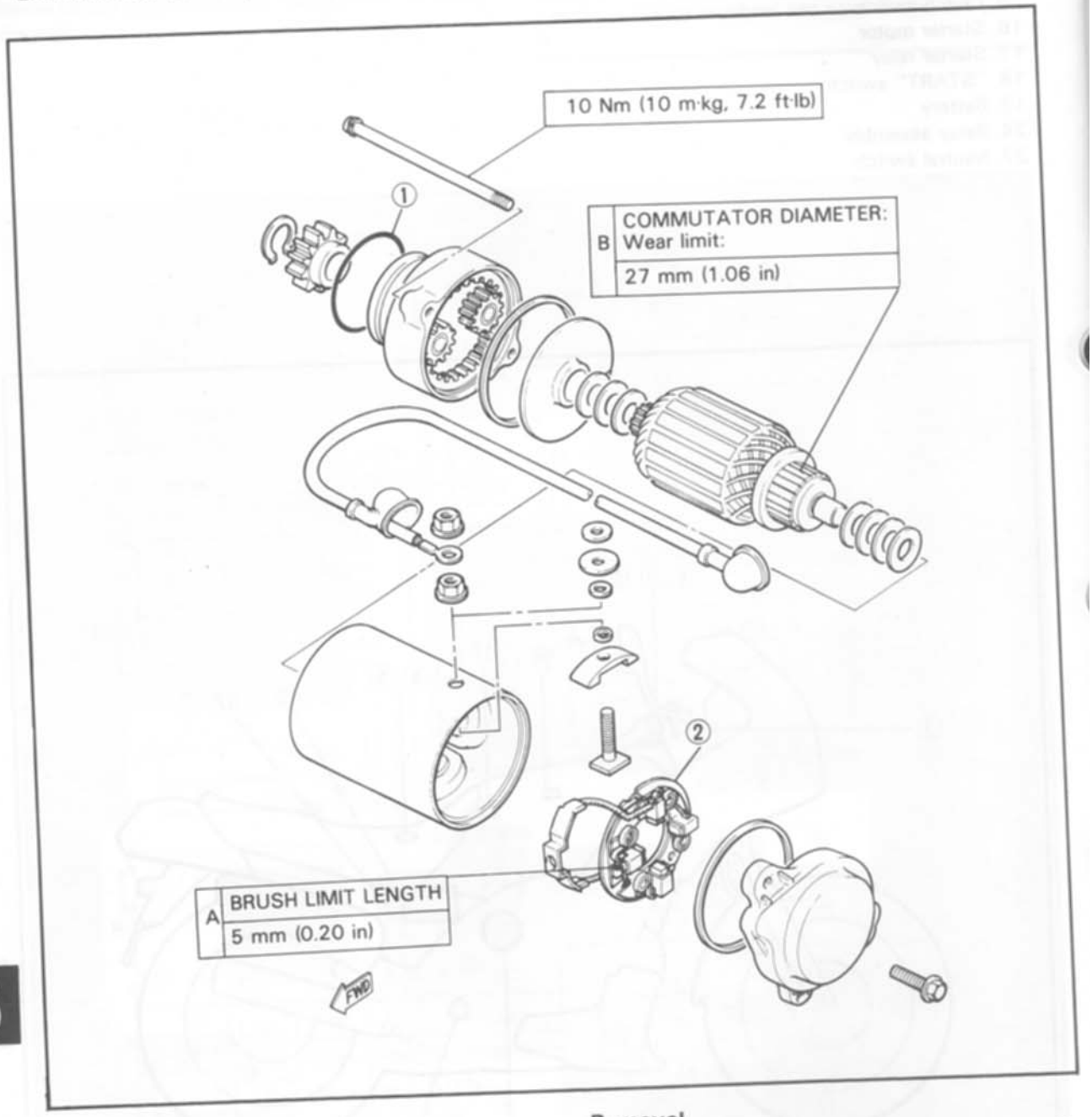


3. Main switch
4. Main fuse
5. Ignition fuse
6. "ENGINE STOP switch
9. Clutch switch
16. Starter motor
17. Starter relay
18. "START" switch
19. Battery
24. Relay assembly
37. Neutral switch

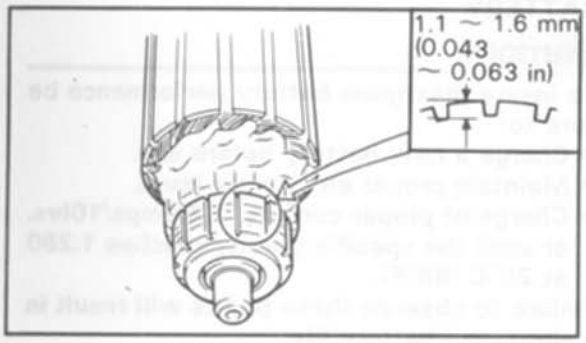


STARTER MOTOR

1. O-ring
2. Brush holder assembly



Removal
Refer to Chapter 3. "ENGINE DISASSEMBLY."

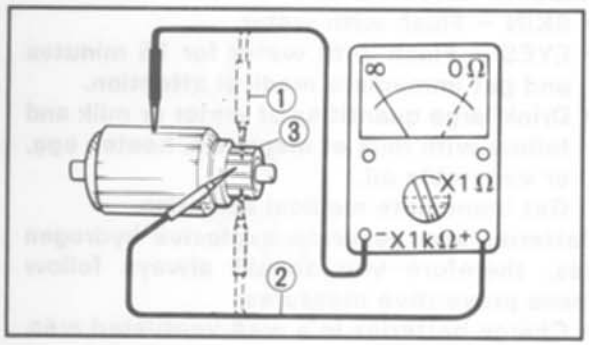


Inspection and Repair

1. Inspect:
   - Commutator (Outer surface)
     Dirty → Clean with #600 grit sandpaper.
2. Inspect:
   - Mica insulation
     (between commutator segments)
     Out of specification → Scrape mica to proper.
     Use a hacksaw blade that is ground to fit.

Depth of Insulator:
1.1 ~ 1.6 mm (0.043 ~ 0.063 in)

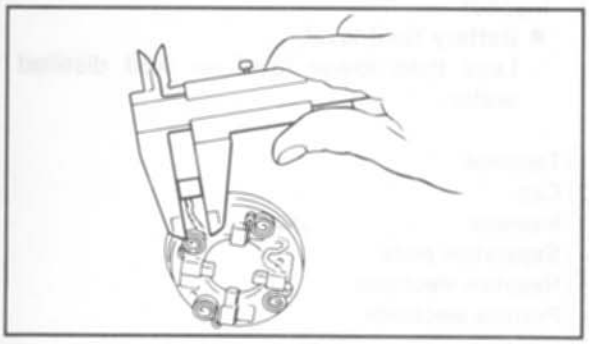
NOTE:
The mica insulation of the commutator must be undercut to ensure proper operation of the commutator.



3. Measure:
   - Armature coil ③ resistance/insulation
     Defect(s) → Replace starter motor.

Resistance ① :
0.012Ω at 20°C (68°F)
Insulation ② : ∞Ω

4. Inspect:
   - Commutator brushes
     Damage → Replace.



5. Measure:
   - Brush length (Each)
     Out of specification → Replace.

Minimum Brush Length:
5.0 mm (0.02 in)

6. Inspect
   - Brush springs
     Compare with new spring.
     Wear/Damage → Replace.

BATTERY

CAUTION:

To insure maximum battery performance be sure to:

- Charge a new battery before use.
- Maintain proper electrolyte level.
- Charge at proper current; 1.2 amps/10hrs. or until the specific gravity reaches 1.280 at 20°C (68°F).

Failure to observe these points will result in a shortened battery life.

WARNING:

Battery electrolyte is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.
- Wear protective eye gear when handling or working near batteries.

Antidote (EXTERNAL):

- SKIN – Flush with water.
- EYES – Flush with water for 15 minutes and get immediate medical attention.
- Drink large quantities of water or milk and follow with milk of magnesia, beaten egg, or vegetable oil.
  Get immediate medical attention.

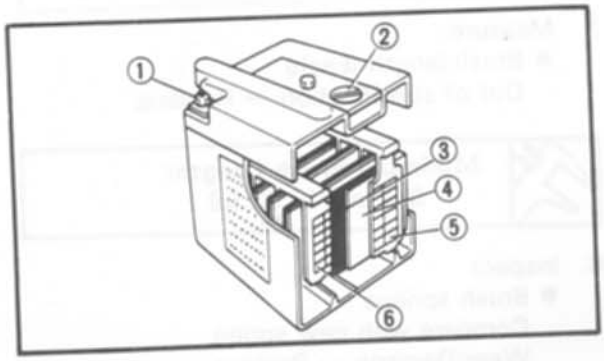
Batteries also generate explosive hydrogen gas, therefore you should always follow these preventive measures:

- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.)
- DO NOT SMOKE when charging or handling batteries.

KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.

Battery Inspection

1. Remove:
   - Battery
     Disconnect negative lead first.
2. Inspect:
   - Battery fluid level
     Less than lower level → Add distilled water.



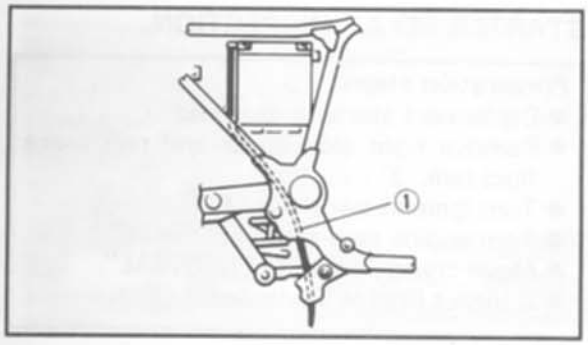
① Terminal
② Cap
③ Insulator
④ Separation plate
⑤ Negative electrode
⑥ Positive electrode

NOTE:

Replace the battery if:

- Battery voltage will not rise to a specific value or bubbles fail to rise even after many hours of charging.
- Sulfation of one or more cells occurs, as indicated by the plates turning white, or an accumolation of material exists in the bottom of the cell.
- Specific gravity readings after a long, slow charge indicate one cell to be lower than the rest.
- Warpage or buckling of plates or insulators is evident.

3. Measure:
   - Specific Gravity:
     Less than 1.280 → Recharge battery.
4. Install:
   - Battery
     Connect positive lead first.



5. Check:
   - Breather pipe (1)
     Improper routing → Correct.
     Obstruction/Damage → Replace.

Battery Storage

The battery should be stored if the motorcycle is not to be used for a long period.

1. Remove:
   - Battery

Battery Storage and Maintenance Tips:
- Recharge the battery periodically.
- Store the battery in a cool, dry place.
- Recharge the battery before reinstalling.

Battery	12N12A-4A
Electrolyte	Specific gravity: 1.280
Initial charging rate	1.2 amp for 10 hours (new battery)
Recharging rate	10 hours (or until specific gravity reaches 1.280)
Refill fluid	Distilled water (to maximum level line)
Refill period	Check once per month (or more often as required)

Replenishing Battery Fluid

1. Remove:
   - Right side cover

2. Check:
   - Fluid level
     Level should be between the upper ① and lower level ② marks.

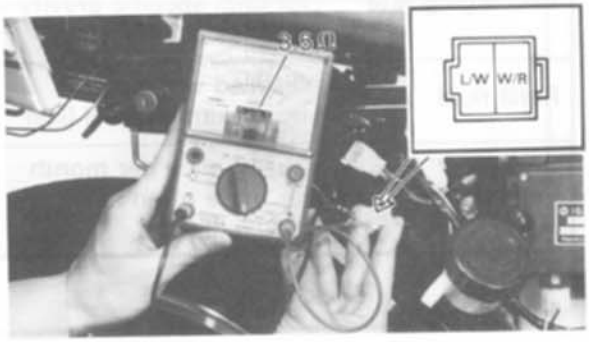
CAUTION:

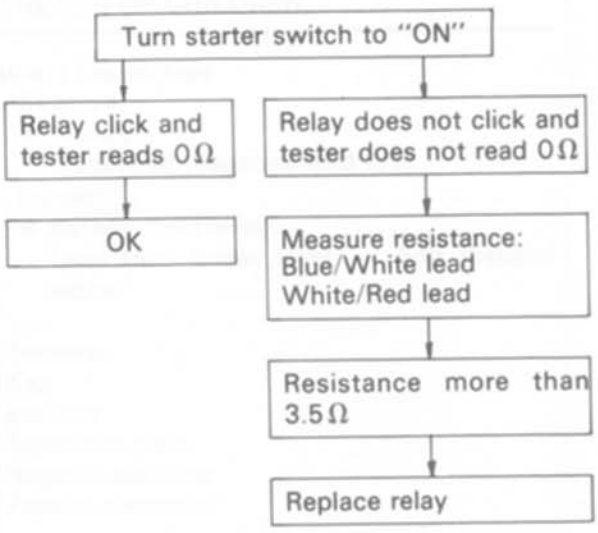
Use only distilled water for the battery, never tap water.

3. Install:
   - Right side cover

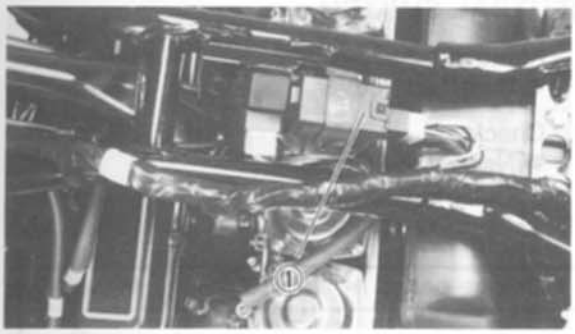
STARTER RELAY INSPECTION

Preparation steps:
- Disconnect starter motor lead ①.
- Remove right side cover and rear brake fluid tank ②.
- Turn ignition switch to "ON".
- Turn engine stop switch to "RUN".
- Move change pedal to "NEUTRAL".
- Connect Pocket Tester leads ③.



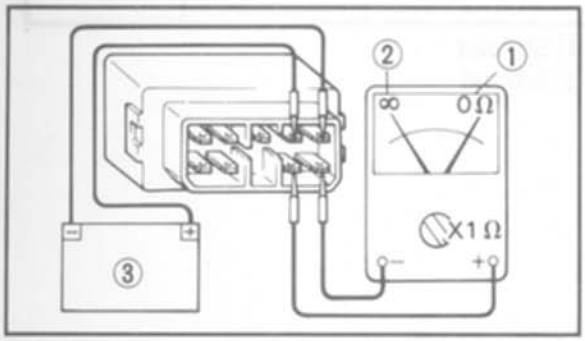


6



RELAY ASSEMBLY

1. Remove:
   - Seat
   - Fuel tank
   - Relay assembly ①

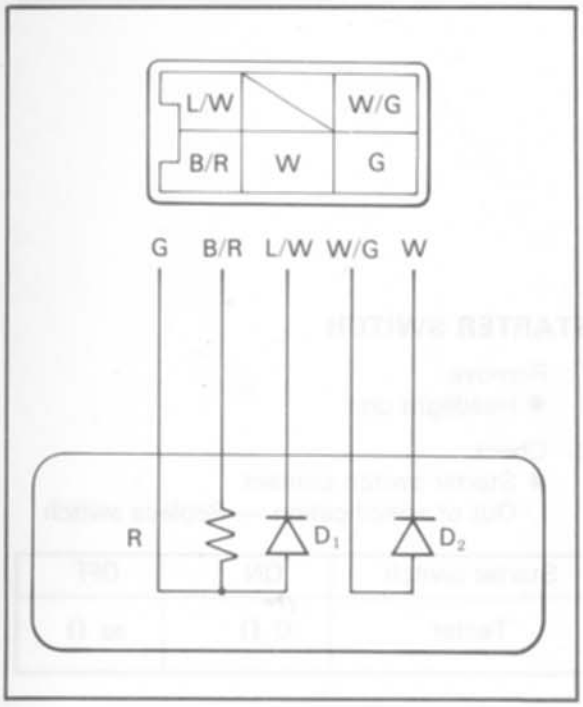


2. Check:
   - Relay contacts
     Use 12V battery ③ and Pocket Tester
     Out of specification → Replace relay.

Battery Connected: 0Ω ①
Battery Disconnected: ∞ ②

DIODE

1. Remove:
   - Seat
   - Diode ①



2. Check:
   - Diode continuity/discontinuity

Checking element	Pocket tester connecting point (+) (red)	Pocket tester connecting point (–) (black)	Good	Replace (element shorted)	Replace (element opened)
D_1	G	L/W	○	○	x
	L/W	G	x	○	x
D_2	W/G	W	○	○	x
	W	W/G	x	○	x
R	G	B/R	8.2Ω	Out of specification	

○ : Continuity (0Ω)
x : Discontinuity (∞)

NOTE:
The results "O" or "X" should be reversed according to the Pocket Tester polarity.

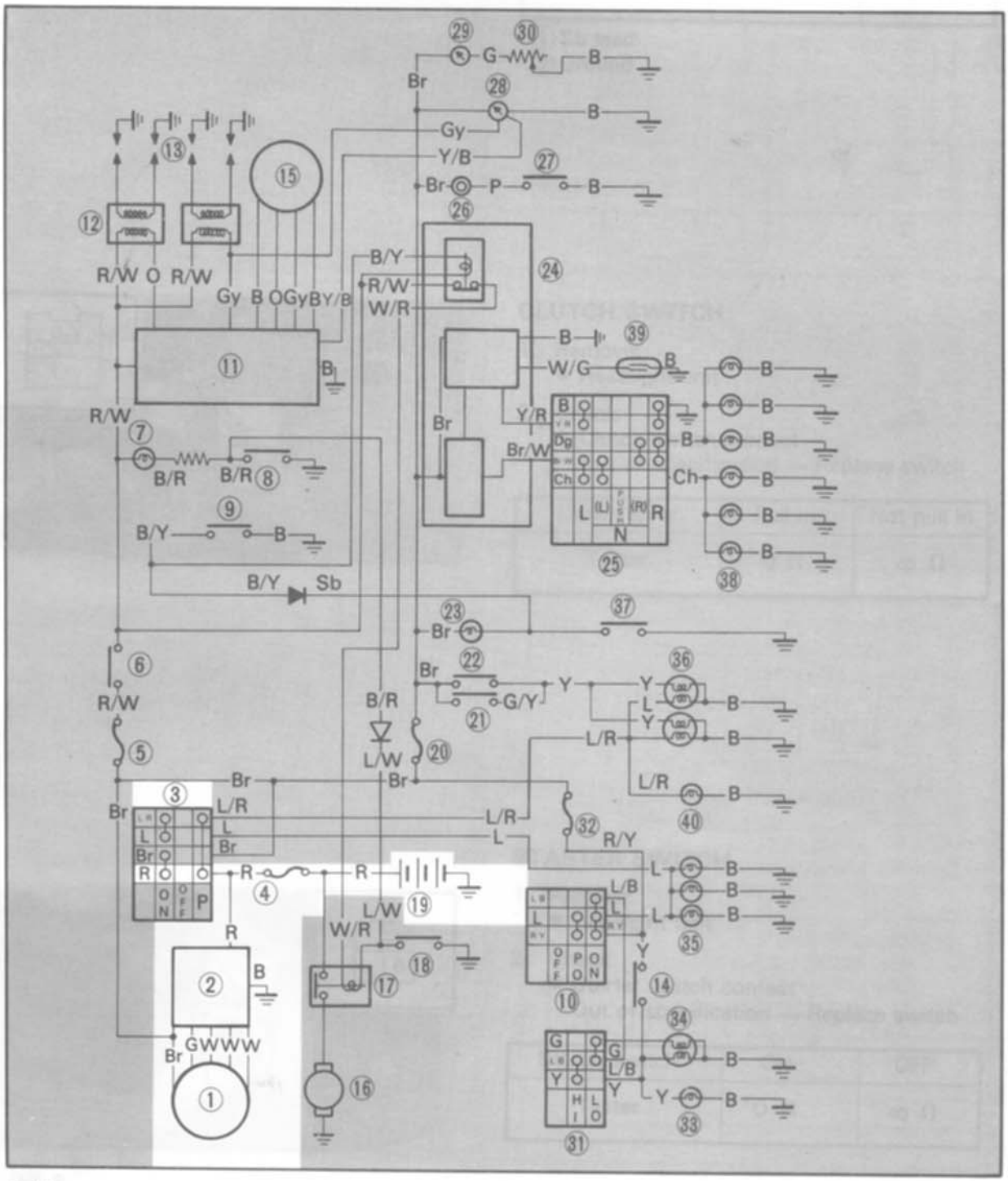
6

CHARGING SYSTEM

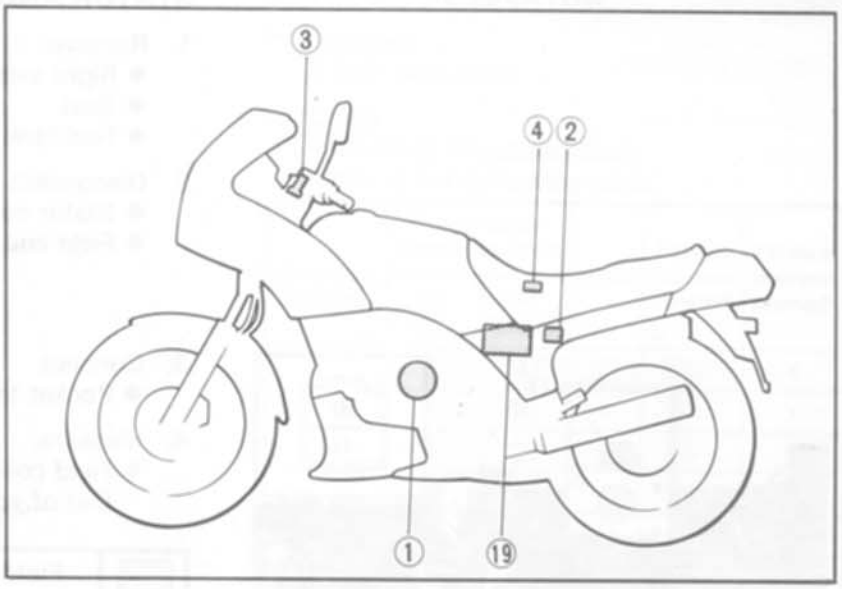
CIRCUIT DIAGRAM

Below circuit diagram shows charging circuit in wiring diagram.

NOTE:
For the encircled numbers and color cords, see page 6-2.



1. AC Magneto
2. Rectifier/Regulator
3. Main switch
4. Main fuse
19. Battery



GENERATOR VOLTAGE INSPECTION

1. Remove:
   - Right side cover
2. Connect:
   - Pocket tester
     (to battery terminals)
3. Start the engine and accelerate to about 2,000 rpm or more.
4. Measure:
   - Generator voltage

	Generator Voltage: 14.5 ± 0.5V

Out of specification → Check battery, stator coil, and rectifier/Regulator.

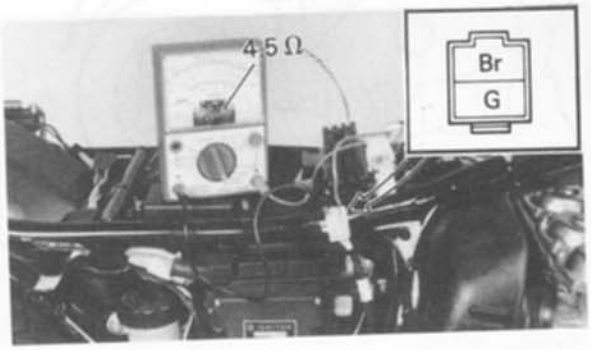
CAUTION:

Never disconnect the leads from the battery while the generator is operating, otherwise the voltage across the generator terminals will increase and damage the semiconductors.

6

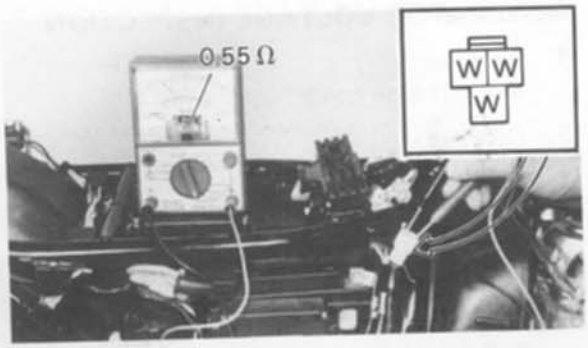
STATOR AND FIELD COIL INSPECTION

1. Remove:
   - Right side cover
   - Seat
   - Fuel tank
2. Disconnect
   - Stator coil lead
   - Field coil lead



3. Connect:
   - Pocket tester
4. Measure:
   - Field coil resistance
     Out of specification → Replace rotor

Field Coil Resistance:
4.5 Ω ± 10% at 20°C (68°F)



5. Measure
   - Coil resistance
     Out of specification → Replace stator coils.

Stator Coil Resistance:
0.55 Ω ± 10% of 20°C (68°F)

6

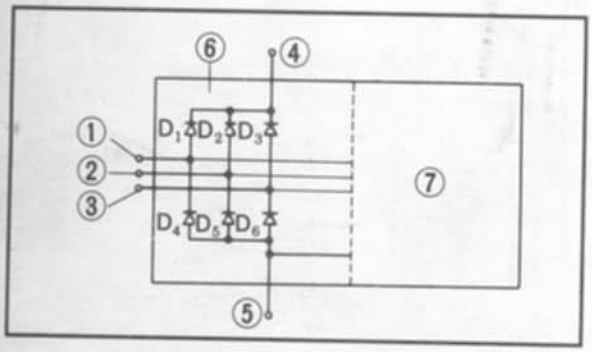
RECTIFIER/REGULATOR

1. Remove:
   - Left side cover
2. Check:
   - Rectifier/Regulator diode

   Refer to the folllowing table.

Checking element	Pocket tester connecting point (+) (red)	Pocket tester connecting point (–) (black)	Good	Replace (element shorted)	Replace (element opened)
D_1	④	①	○	○	x
	①	④	x	○	x
D_2	④	②	○	○	x
	②	④	x	○	x
D_3	④	③	○	○	x
	③	④	x	○	x
D_4	①	⑤	○	○	x
	⑤	①	x	○	x
D_5	②	⑤	○	○	x
	⑤	②	x	○	x
D_6	③	⑤	○	○	x
	⑤	③	x	○	x

○ : Continuity (0Ω) x : Discontinuity (∞)



White lead ①
White lead ②
White lead ③
Red lead ④
Black lead ⑤
Rectifier ⑥
Regulator ⑦

Defective element → Replace rectifier.

CAUTION:

Do not overcharge rectifier or damage may result.
Avoid:
- **A short circuit**
- **Inverting + and – battery leads**
- **Direct connection of rectifier to battery**

NOTE:

The results "O" or "X" should be reversed according to the Pocket Tester polarity.

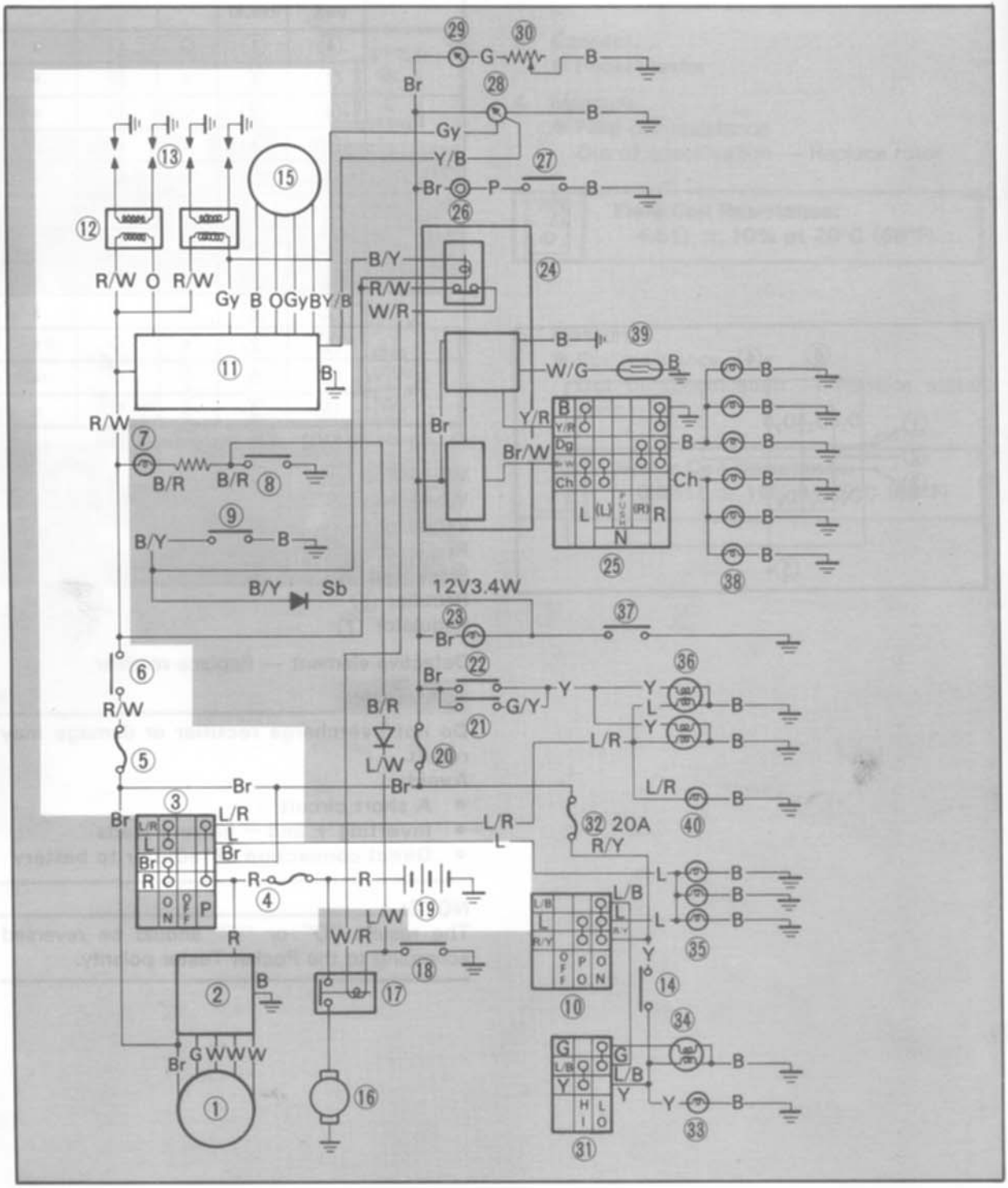
6

IGNITION SYSTEM

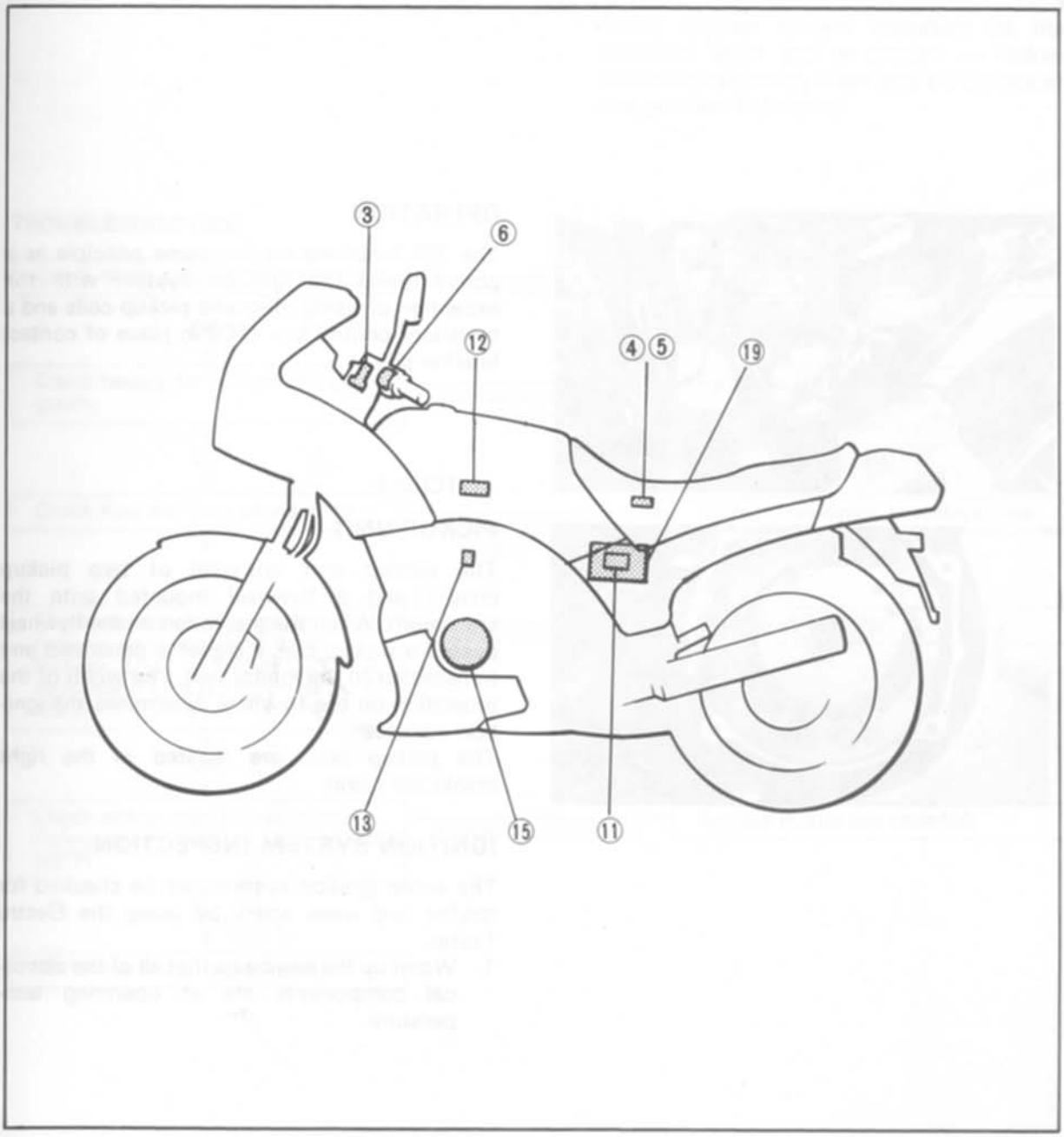
CIRCUIT DIAGRAM

Below circuit diagram shows ignition circuit in wiring diagram.

NOTE:
For the encircled numbers and color cords, see page 6-2.

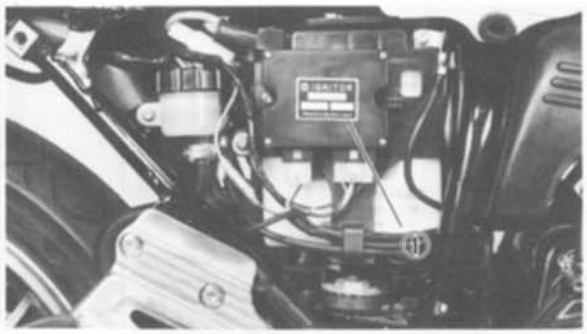


3. Main switch
4. Main fuse
5. Ignition fuse
6. "ENGINE STOP" switch
11. Ignitor unit
12. Ignition coil
13. Spark plug
15. Pickup coil
19. Battery



DESCRIPTION

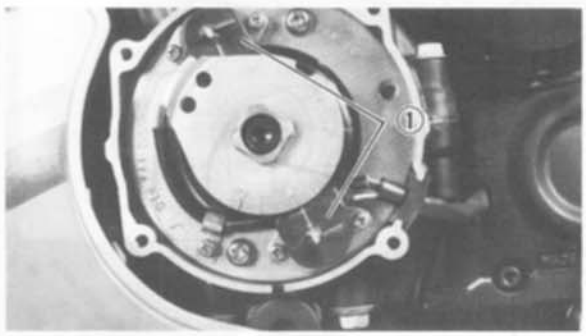
This model is equipped with a battery operated, fully transistorized, breakerless ignition system. By using magnetic pickup coils, the need for contact breaker points is eliminated. This adds to the dependability of the system by eliminating frequent cleaning and adjustment of points and ignition timing. The TCI (Transistor Control Ignition) unit incorporates an automatic advance circuit controlled by signals generated by the pickup coil. This adds to the dependability of the system by eliminating the mechanical advancer. This TCI system consists of two units; a pickup unit and an ignitor unit.



OPERATION

The TCI functions on the same principle as a conventional DC ignition system with the exception of using magnetic pickup coils and a transistor control box (TCI) in place of contact breaker points.

① TCI unit



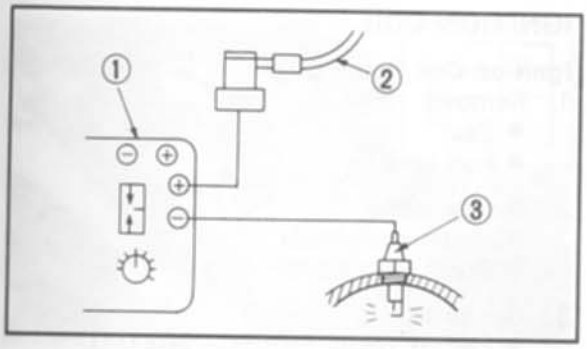
PICKUP UNIT

The pickup unit consists of two pickup coils ① and a flywheel mounted onto the crankshaft. When the projection on the flywheel passes a pickup coil, a signal is generated and transmitted to the ignitor unit. The width of the projection on the flywheel determines the ignition advance.
The pickup coils are located in the right crankcase cover.

IGNITION SYSTEM INSPECTION

The entire ignition system can be checked for misfire and weak spark by using the Electro Tester.

1. Warm up the engine so that all of the electrical components are at operating temperature.



2. Connect:
   - Electro Tester (90890-03021) ①
3. Start the engine, and increase the spark gap until misfire occurs. (Test at various r/min between idle and red line.)

② Spark plug laed
③ Spark plug

CAUTION:

Do not run the engine in neutral above 6,000 r/min for more than 1 or 2 seconds.

Minimum Spark Gap: 6 mm (0.24 in)

Faulty ignition system operation (at the minimum spark gap or smaller) → Follow the troubleshooting chart until the source of the problem is located.

TROUBLESHOOTING

Check entire ignition for connections.
→ Poor coonection → Correct.
↓ OK

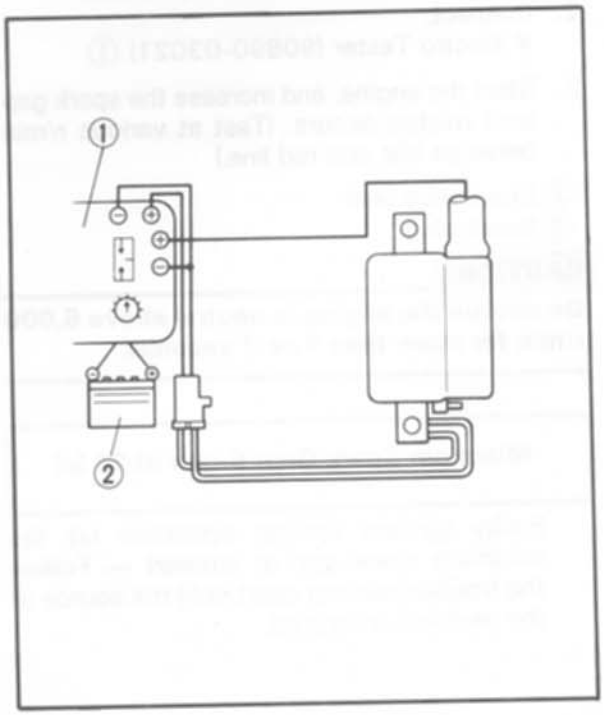
Check battery for voltage and specific gravity.
→ Low voltage specific gravity → Recharge battery.
↓ OK

Check fuse and fuse connections.
→ Weak connection or open circuit → Correct connection or replace fuse.
↓ OK

Check resistance of ignition coil (primary and secondary).
Primary: 2.7 Ω ± 10% at 20°C (68°F)
Secondary: 12 kΩ ± 20% at 20°C (68°F)
→ If other than specified → Replace ignition coil.
↓ OK

Check pickup coils for resistance.
Pickup coil: 120 Ω ± 20% at 20°C (68°F)
→ If other than specified → Replace pickup coil assembly.
↓ OK

TCI unit is faulty, replace unit.



IGNITION COIL

Ignition Coil Spark Gap

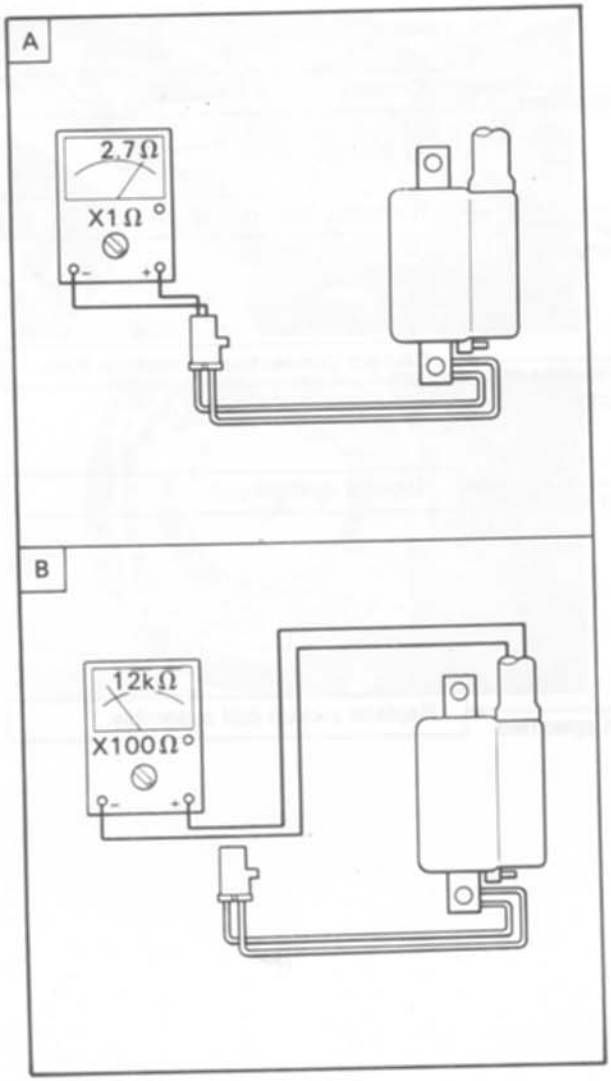
1. Remove:
   - Seat
   - Fuel tank
2. Disconnect:
   - Ignition coil leads
   - Spark plug leads
3. Connect:
   - Electro Tester (90890-03021) ①

NOTE:
Be sure to use a fully charged battery.

4. Turn the spark plug gap adjuster and increase the gap to the maximum limit unless misfire occurs first.

Minimum Spark Gap: 6 mm (0.24 in)

② Battery (12V)

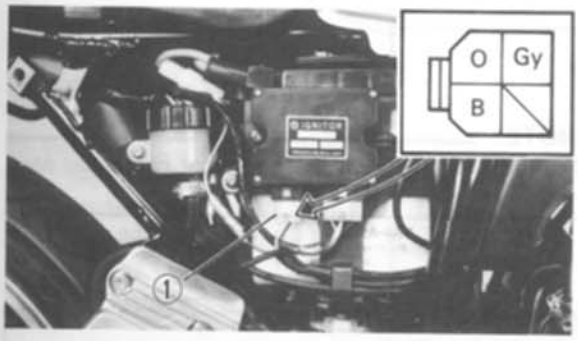


Ignition Coil Resistance

1. Connect:
   - Pocket Tester (90890-03112) ①
2. Measure:
   - Primary coil resistance [A]
   - Secondary coil resistance [B]

   Out of specification → Replace.

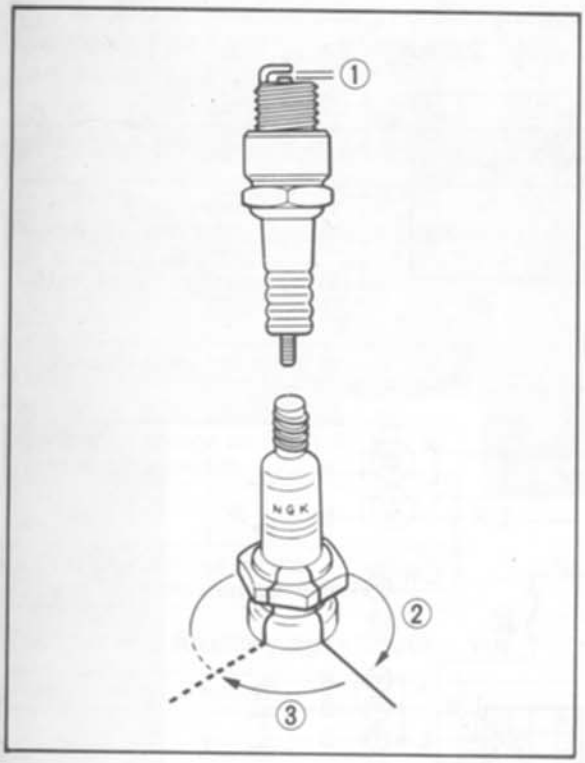
Primary Coil Resistance:
2.7Ω ± 10% at 20°C (68°F)
Secondary Coil Resistance:
12 kΩ ± 20% at 20°C (68°F)
Spark Plug Cap:
10 kΩ ± 10%



PICKUP COIL RESISTANCE

1. Remove:
   - Right side panel
2. Disconnect:
   - Pickup coil connector ①
3. Measure:
   - Pickup coil resistance
     Use a Pocket Tester. (YU-03112)
     Out of specification → Replace.

Pickup Coil Resistance:
120Ω ± 10% at 20°C (68°F)
No.1 and No.4 cylinder (O-B)
No.2 and No.3 cylinder (Gy-B)



SPARK PLUG

1. Inspect:
   - Plug
     Burns/Fouling/Wear → Replace.
2. Measure:
   - Electrode gap
     Out of specification → Clean off carbon and regap.

Type:
DR8ES-L (NGK)

Electrode Gap ① :
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

17.5 Nm (1.75 m·kg, 12.5 ft·lb)

②Finger tighten
③Plug wrench

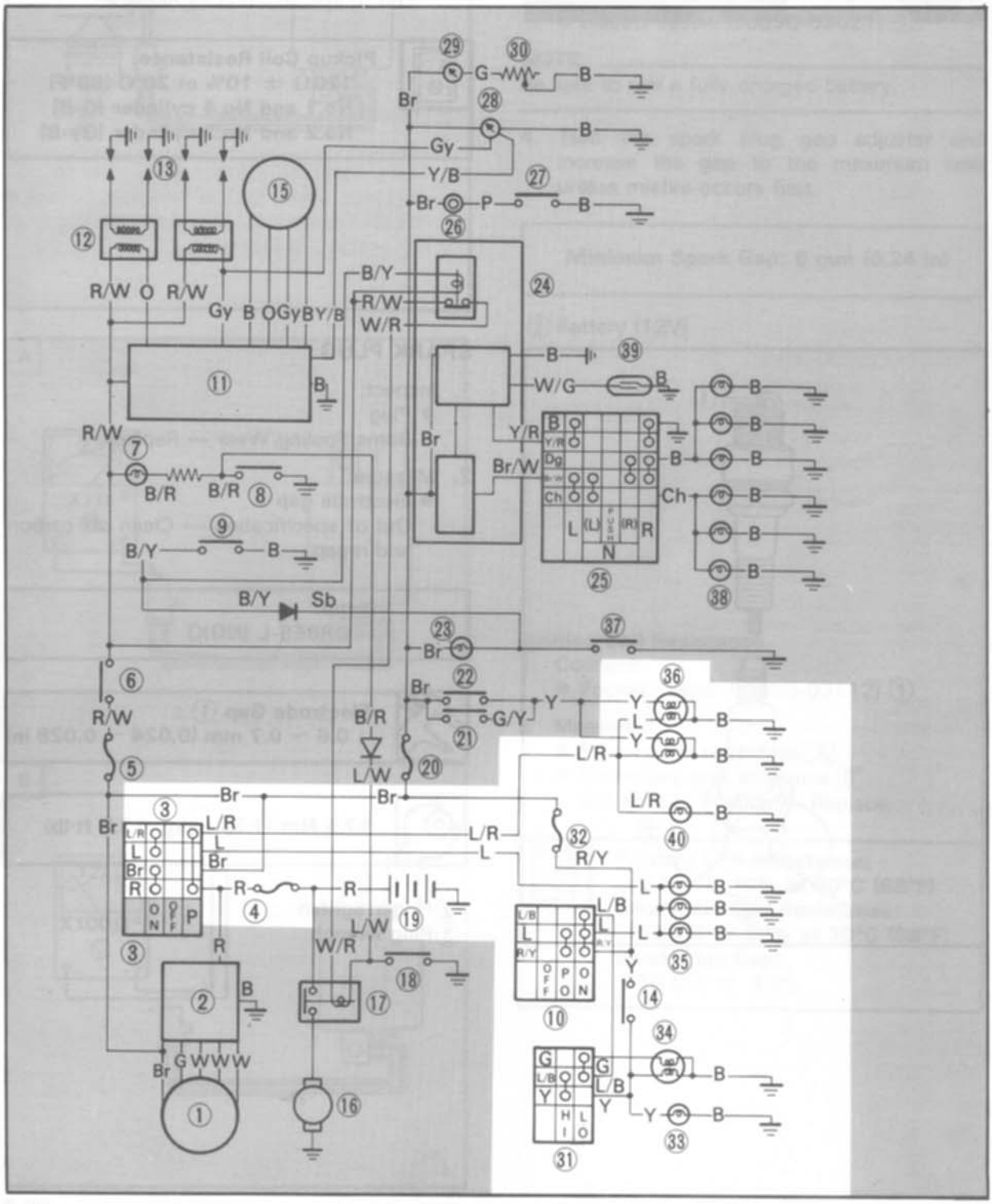
6

LIGHTING SYSTEM

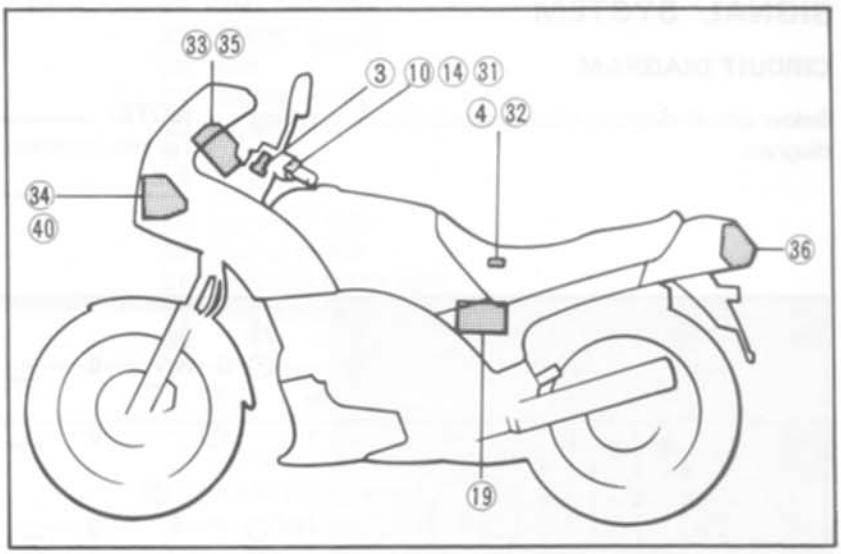
CIRCUIT DIAGRAM

Below circuit diagram shows lighting circuit in wiring diagram.

NOTE:
For the encircled numbers and color cords, see page 6-2.



3. Main switch
4. Main fuse
10. "LIGHTS" switch
14. "PASS" switch
19. Battery
31. "LIGHTS" (Dimmer) switch
32. Head fuse
33. "HIGH BEAM" indicator light
34. Headlight
35. Meter illumination light
36. Brake/Tail light
40. Auxiliary light



LIGHTING TESTS AND CHECK

The battery provides power for operation of the headlight, taillight, and meter lights. If none of the above fail to operate proceed further. Low battery voltage indicates either a faulty battery, low battery fluid level, or a defective charging system.
Also check fuse condition. Replace any "open" fuses. There are individual fuses for various circuits (see complete Circuit Diagram).

NOTE:
Check each bulb first before performing the following check.

Headlight and High beam light Check

Main switch is turned to "ON". → Headlight comes on.

Headlight does not come on.

Check for voltage on the "L/B" lead at the dimmer switch. — No voltage → Check the lighting switch, head fuse, main switch, and the wiring circuit.

OK

Check for voltage on the "Y" and "G" leads from the dimmer switch. — No voltage → Check the dimmer switch, passing switch and the wiring circuit.

Taillight and Auxilary light Check

Main switch is turned to "ON" → Taillight and auxiliary light come on

Taillight and auxiliary light do not come on

Check for voltage (12V) on "L" lead to the tail/brake light and "L/R" lead to the auxiliary light — No voltage → Check the main switch, and the wiring circuit.

OK

Check for Ground on black lead from tail/brake light and auxiliary light. — Defective → Repair the Ground circuit.

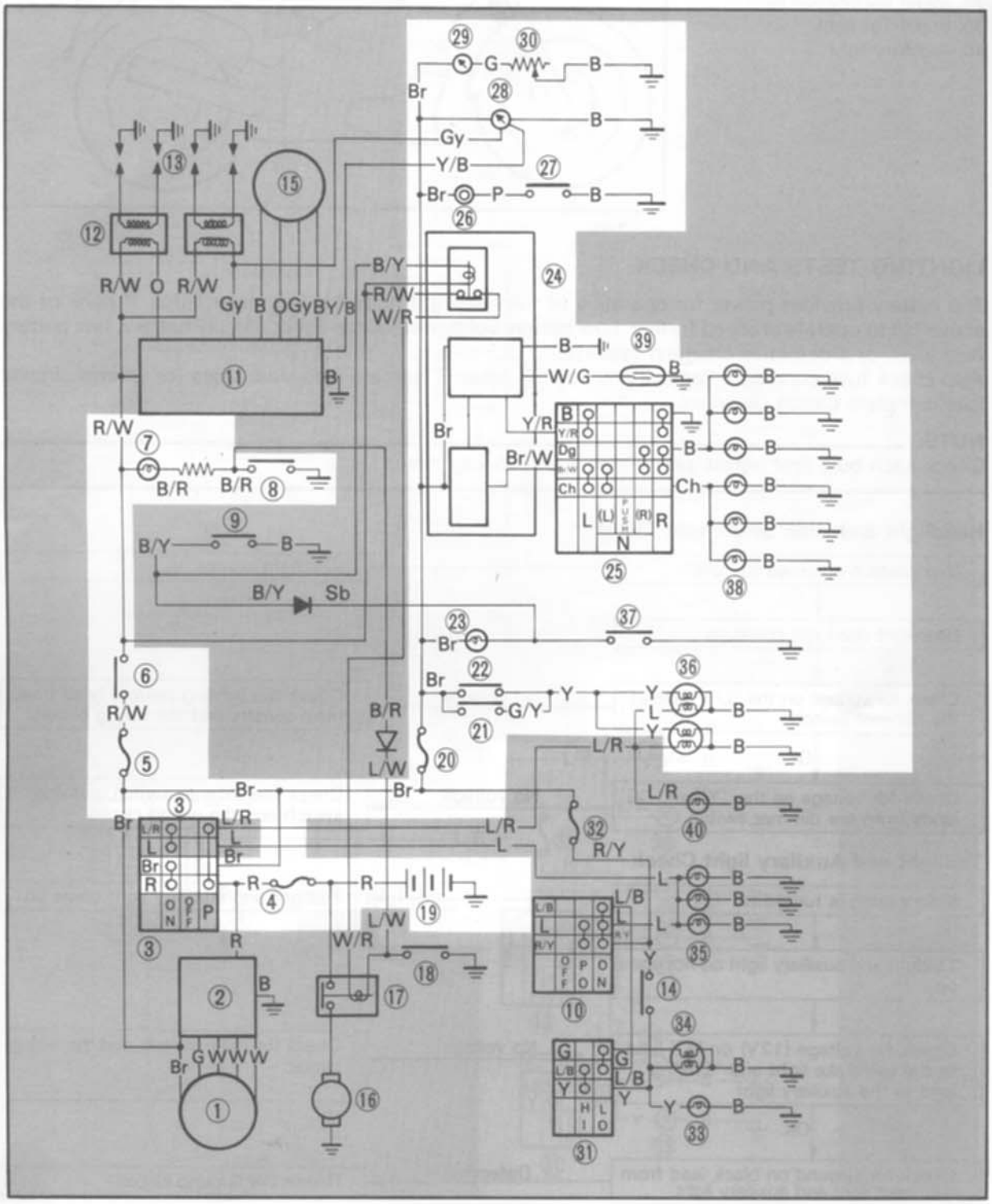
6

SIGNAL SYSTEM

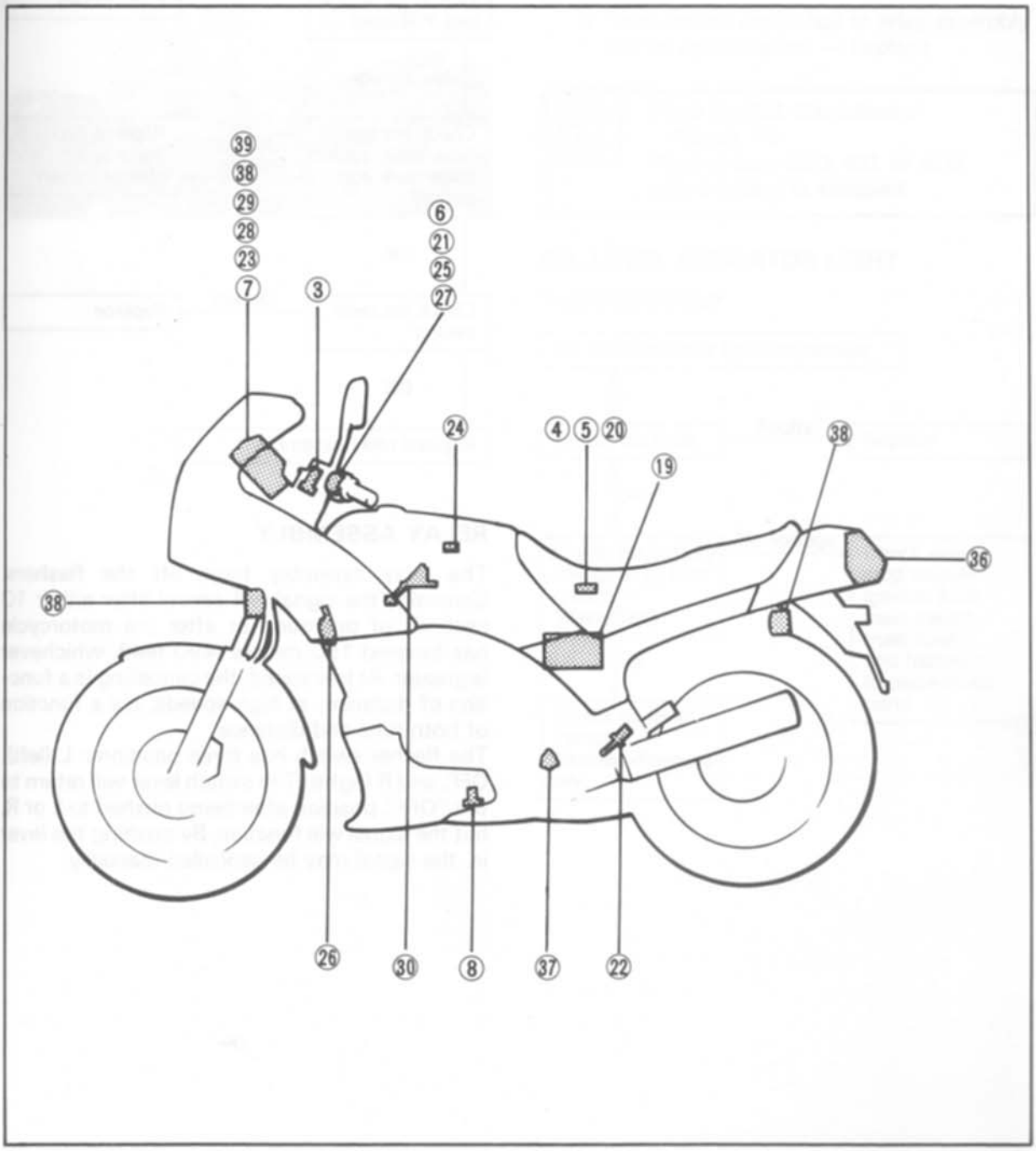
CIRCUIT DIAGRAM

Below circuit diagram shows signal circuit in wiring diagram.

NOTE:
For the encircled numbers and color cords, see page 6-2.



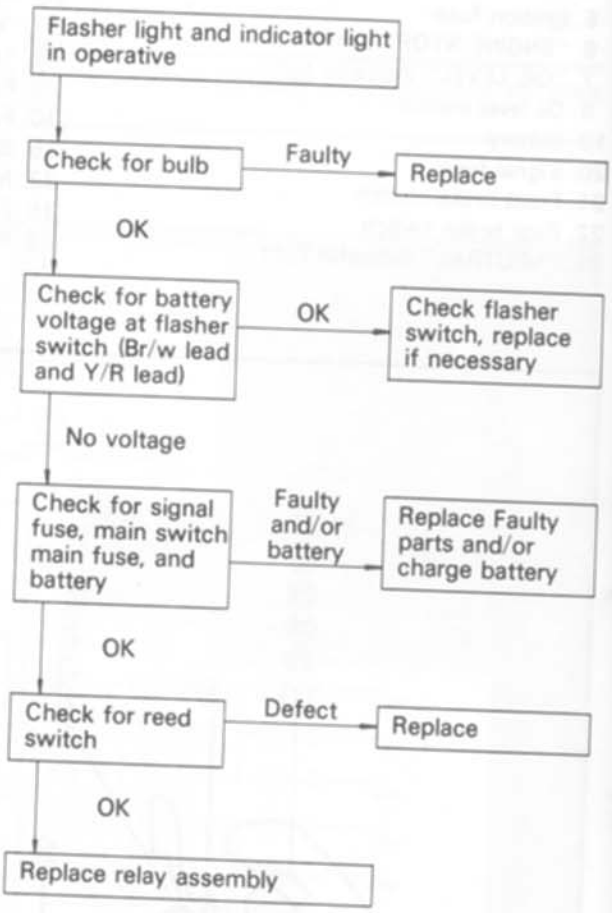
3. Main switch
4. Main fuse
5. Ignition fuse
6. "ENGINE STOP" switch
7. "OIL LEVEL" indicator light
8. Oil level switch
19. Battery
20. Signal fuse
21. Front brake switch
22. Rear brake switch
23. "NEUTRAL" indicator light
24. Relay assembly
25. "TURN" switch
26. Horn
27. "HORN" switch
28. Tachometer
29. Fuel meter
30. Fuel sender
36. Brake/Tail light
37. Neutral switch
38. Flasher/Indicator light
39. Reed switch



6

FLASHER LIGHT

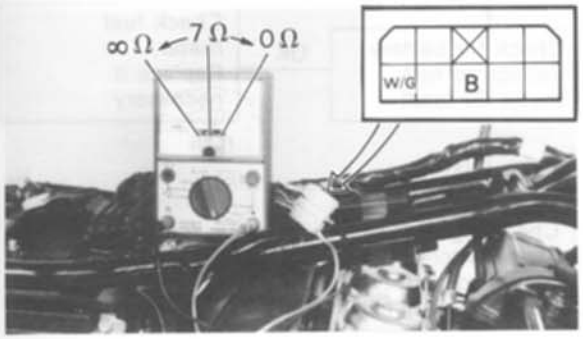
Troubleshooting



RELAY ASSEMBLY

The relay assembly turns off the flashers. Generally, the signal will cancel after either 10 seconds of operation or after the motorcycle has traveled 150 meters (490 feet), whichever is greater. At low speed, the cancelling is a function of distance; at high speeds, it's a function of both time and distance.

The flasher switch has three positions: L (left), OFF, and R (right). The switch lever will return to the "OFF" position after being pushed to L or R, but the signal will function. By pushing the lever in, the signal may be cancelled manually.



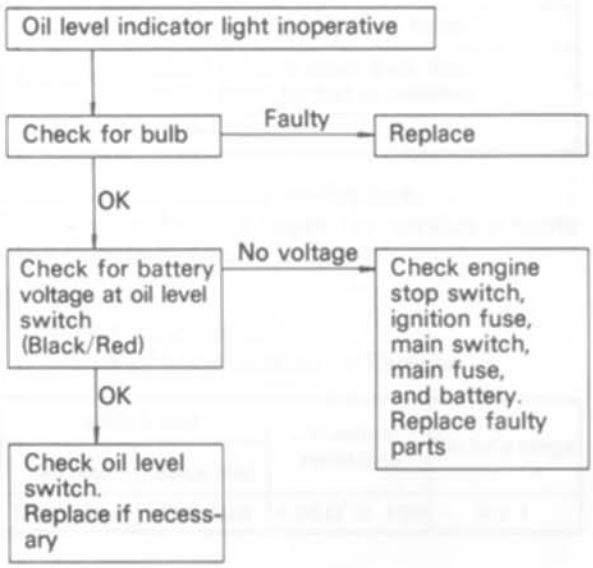
REED SWITCH

1. Remove:
   - Seat
   - Fuel tank
2. Disconnect:
   - Relay assembly coupler
3. Connect:
   - Pocket tester
   - Reed switch lead
4. Lift the front wheel and rotate the wheel by hand
5. Measure:
   - Reed switch resistance to relay assembly
     Out of specification → Replace

Reed Switch Resistance:
About 7Ω
Then return back 0Ω or ∞Ω when wheel is stopped

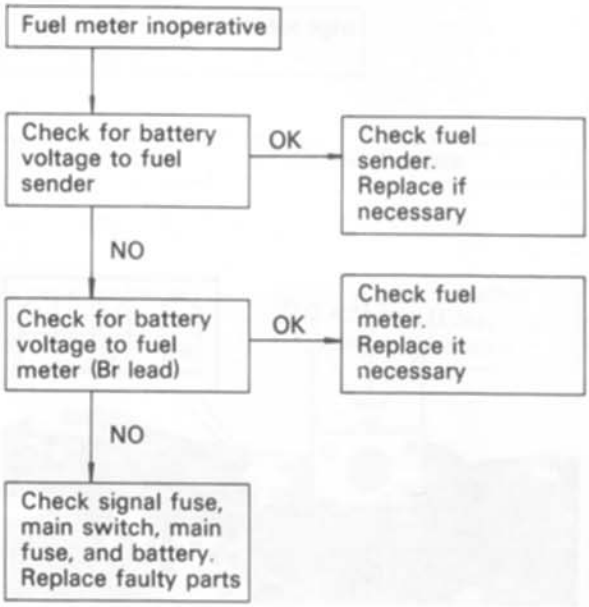
OIL LEVEL INDICATOR LIGHT

Troubleshooting



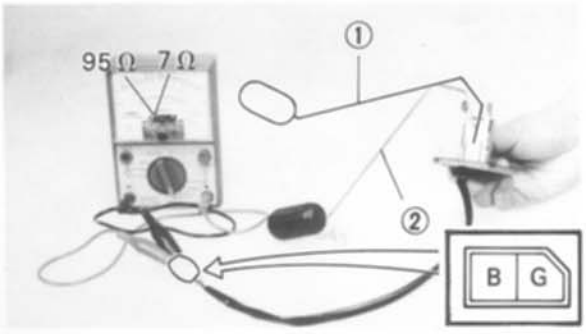
FUEL METER

Troubleshooting



FUEL SENDER UNIT

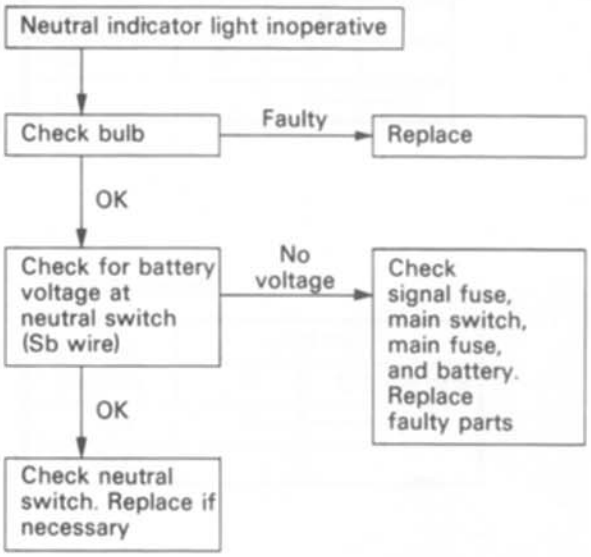
1. Remove:
   - Seat
   - Fuel tank
   - Fuel sender unit
2. Measure:
   - Fuel sender unit resistance.
     Out of specification → Replace



Fuel Sender Unit Resistance:
(Black – Green)
"Full" Position ① :
7Ω ±5% at 20°C (68°F)
"Empty" Position ② :
95Ω ± 7.5% at 20°C (68°F)

NEUTRAL INDICATOR LIGHT

Troubleshooting



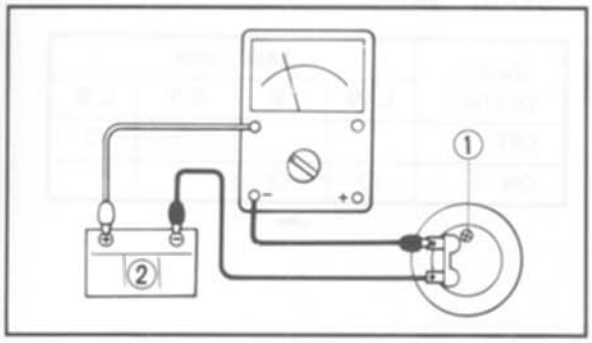
HORN

Horn inoperative	
Check for:	12V on brown lead to horn
	Good ground (horn/pink lead) when horn button is pressed
	Faulty fuse

Defective components → Replace.
There are individual fuses for various circuits (See Complete Circuit Diagram)

2. Measure:
   - Horn resistance
     Out of specification → Replace

Tester's lead		Standard resistance	Tester's range
Red lead	Black lead		
Brown lead	Pink lead	1.05Ω ± 10%	R x 1



3. Adjust:
   - Volume
     Turn the adjuster ① in and out so that the volume is maximum at the maximum amperage.

② Battery (12V)

Tester's lead		Maximum Amperage	Tester's range
Red lead	Black lead		
Battery (+) lead	Horn lead and Battery (−) lead	2.5A	DC 5A

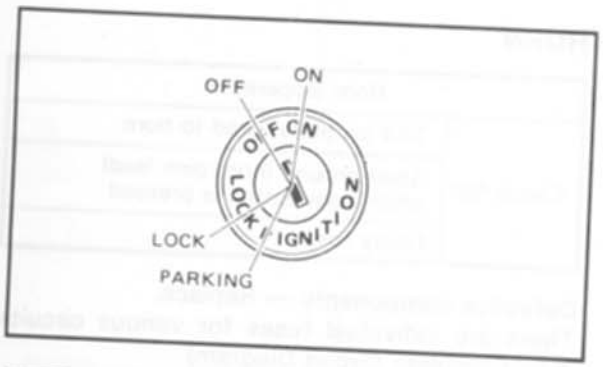
BRAKE LIGHT

Brake light inoperative	
Check for:	Defective bulb
	12V on yellow lead to brake light
	12V on brown lead to each brake light switch (Front and rear brake switch)

SWITCHES

Check:

- Switches (all)
  Use pocket tester on "Ohm x 1" scale.
  Infinite resistance/Short circuit → Replace.



Main switch

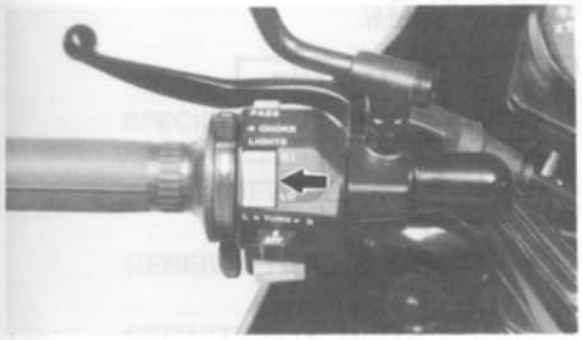
Switch position	Lead color		
	R	Br	L
ON	○	○	○
OFF			
P	○		○

"ENGINE STOP" switch

Switch position	Lead color	
	R/W	R/W
RUN	○	○
OFF		

"START" switch

Switch position	Lead color			
	L/W	B	R/Y	L/B
OFF			○	○
ON	○	○		



"LIGHTS" (Dimmer) switch

Switch position	Lead color		
	Y	L/B	G
HI	○	○	
LO		○	○

"HORN" switch

Switch position	Lead color	
	P	Ground or B
ON	○	○
OFF		

"TURN" switch

Switch position		Lead color				
		Dg	Br/w	Ch	Y/R	B
R		○	○		○	○
N	R	○	○			
	N					
	L		○	○		
L			○	○	○	○

Oil level switch

Switch position	Lead color	
	B/R	Ground
ON	○	○
OFF		

Front brake switch

Switch position	Lead color	
	Br	G/Y
ON	○	○
OFF		

Rear brake switch

Switch position	Lead color	
	Y	Br
ON	○	○
OFF		

6

""PASS" switch

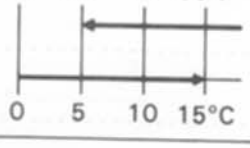
Switch position	Lead color	
	R/Y	Y
ON		
OFF	○	○

"LIGHTS" switch

Switch position	Lead color		
	R/Y	L	L/B
OFF			
PO	○	○	
ON	○	○	○

SPECIFICATIONS

GENERAL SPECIFICATIONS

Item \ Model	XJ600RL
Model:	
Code Number	49F
Frame Starting Number	49F-000101
Engine Starting Number	49F-000101
Dimensions:	
Overall Length	2,115 mm (83.4 in)
Overall Width	735 mm (28.9 in)
Overall Height	1,225 mm (48.2 in)
Seat Height	790 mm (31.1 in)
Wheelbase	1,430 mm (56.3 in)
Minimum Ground Clearance	160 mm (6.3 in)
Basic Weight:	
With Oil and Full Fuel Tank	208 kg (459 lb)
Minimum Turning Radius:	2,800 mm (110.2 in)
Engine:	
Engine Type	Air cooled 4-stroke, gasoline, DOHC
Cylinder Arrangement	4-cylinder parallel
Displacement	598 cm^3
Bore x Stroke	58.5 x 55.7 mm (2.3 x 2.19 in)
Compression Ratio	10.0 : 1
Compression Pressure	1078.8 kPa (11 k/cm^2, 156.4 psi)
Starting System	Electric starter
Lubrication System:	Pressure lubricated, wet sump
Engine Oil Type or Grade	 SAE 20W40 type SE motor oil SAE 10W30 type SE motor oil
Engine Oil Capacity:	
Engine Oil:	
Periodic Oil Change:	2.3 L (2.0 Imp qt, 2.4 US qt)
With Oil Filter Replacement	2.6 L (2.3 Imp qt, 2.7 US qt)
Total Amount	3.0 L (2.6 Imp qt, 3.2 US qt)
Air Filter	Dry type element
Fuel:	
Type	Regular gasoline
Tank Capacity	19.0 L (4.18 Imp gal, 5.02 US gal)
Reserve Amount	2.5 L (0.55 Imp gal, 0.66 US gal)
Carburetor:	
Type	BS32X4, Constant velocity
Manufacturer	MIKUNI

Item \ Model	XJ600RL
Spark plug:	
Type/Manufacture	DR8ES-L/NGK
Gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Clutch Type:	Wet, multiple-disc
Transmission:	
Primary Reduction System	Spur gear, HY-VO chain
Primary Reduction Ratio	22/21 x 65/28 = 2.432
Secondary Reduction System	Chain drive
Secondary Reduction Ratio	44/16 (2.750)
Transmission Type	Constant-mesh, 6-speed
Operation	Left foot operation
Gear Ratio 1st	41/15 (2.733)
2nd	37/19 (1.947)
3rd	34/22 (1.545)
4th	31/25 (1.240)
5th	29/28 (1.036)
6th	27/30 (0.900)
Chassis:	
Frame Type	Tubular steel, double cradle
Caster Angle	26°
Trail	106 mm (4.17 in)
Tire: Type	Tubeless
Size (Front)	90/90-18 51H YOKOHAMA F202 / MICHELIN A48TL
Size (Rear)	110/90-18 61H YOKOHAMA R202 / MICHELIN M48TL
Wear limit	0.8 mm (0.03 in)
Tire Pressure (Cold tire):	
Front Tire Pressure	177 kPa (1.8 kg/cm², 26 psi)
Rear Tire Pressure	196 kPa (2.0 kg/cm² 28 psi)
Brake:	
Front Brake Type	Dual disc brake
Operation	Right hand operation
Rear Brake Type	Single disc operation
Operation	Right foot operation
Suspension:	
Front Suspension	Telescopic fork
Rear Suspension	Swingarm (New Monocross)
Shock Absorber:	
Front Shock Absorber	Coil spring, oil dmaper
Rear Shock Absorber	Coil spring, oil damper
Wheel Travel:	
Front Wheel Travel	150 mm (5.91 in)
Rear Wheel Travel	100 mm (3.94 in)
Electrical:	
Ignition System	T.C.I (Full Transistor ignition)
Generator System	A.C. generator
Battery Type or Model	12N12A-4A
Battery Capacity	12V 12AH

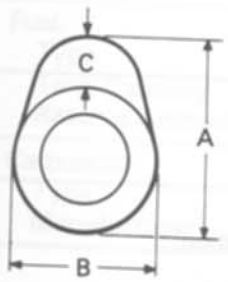
MAINTENANCE SPECIFICATIONS

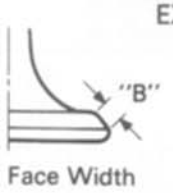
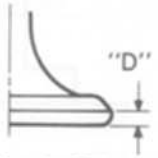
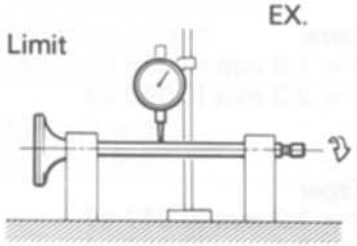
Item \ Model	XJ600RL
Headlight Type:	Bulb (Quartz bulb)
Bulb Wattage/Quantity:	
Headlight	60W/55W
Tail/Brake Light	8W/27W x 2
Flasher Light	27W x 4
License Light	8W x 2
Meter Light	3.4W x 6
Auxiliary light	3.4W x 1
Indicator Light:	
Wattage/Quantity: "NEUTRAL"	3.4W x 1
"HIGH BEAM"	3.4W x 1
"TURN"	3.4W x 2
"OIL LEVEL"	3.4W x 1

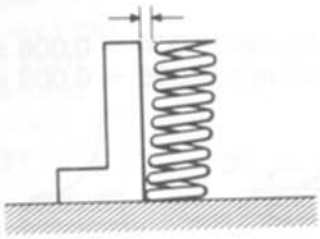
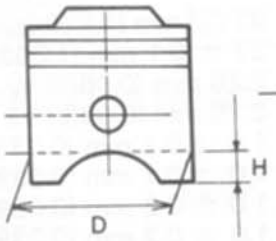
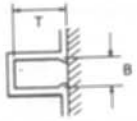
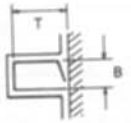
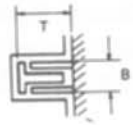
MAINTENANCE SPECIFICATIONS

Engine

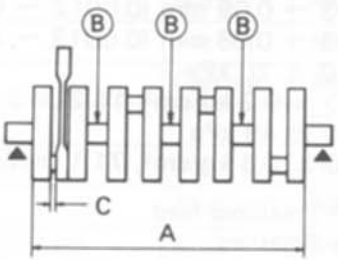
Item \ Model	XJ600RL
Cylinder Head:	
Warp Limit	0.03 mm (0.001 in)
	*Lines indicate straightedge measurement.
Cylinder:	
Bore Size	58.50 mm (2.303 in)
Taper Limit	0.05 mm (0.002 in)
Out-of-round Limit	0.01 mm (0.0004 in)
Camshaft:	
Drive Method	Chain drive (Center)
Cam Cap Inside Diameter (Cylinder head direct support)	25 $^{+0.021}_{0}$ mm (0.9449 $^{+0.0008}_{0}$ in)
Camshaft Outside Diameter	25 $^{-0.020}_{-0.033}$ mm (0.9448 $^{-0.0008}_{-0.0013}$ in)
Shaft-to-cap Clearance	0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)
Cam Dimensions: Intake "A"	36.25 ~ 36.35 mm (1.427 ~ 1.431 in)
<Limit>	36.2 mm (1.43 in)
"B"	28.1 ~ 28.2 mm (1.106 ~ 1.11 in)
<Limit>	28.05 mm (1.1 in)
"C"	8.3 mm (0.327 in)
Exhaust "A"	35.75 ~ 35.85 mm (1.408 ~ 1.411 in)
<Limit>	35.7 mm (1.41 in)
"B"	28.05 ~ 28.15 mm (1.104 ~ 1.108 in)
<Limit>	28 mm (1.1 in)
"C"	7.8 mm (0.307 in)
<Limit>	7.6 mm (0.299 in)



Item	Model	XJ600RL
Camshaft Runout Limit		0.03 mm (0.0012 in)
Cam Chain Type/Number of Links		Bush-chain/114
Cam Chain Adjustment Method		Manual
Valve, Valve Seat, Valve Guide:		
Valve Clearance (Cold)	IN.	0.11 ~ 0.15 mm (0.004 ~ 0.006 in)
	EX.	0.16 ~ 0.20 mm (0.006 ~ 0.008 in)
  Face Width		 Seat Width  Margin Thickness
"A" Head Dia.	IN.	31 $^{+0.6}_{+0.4}$ mm (1.220 $^{+0.0236}_{+0.0157}$ in)
	EX.	27 ± 0.1 mm (1.063 ± 0.004 in)
"B" Face Width	IN.	2.26 mm (0.0889 in)
	EX.	2.26 mm (0.0889 in)
"C" Seat Limit Width	IN.	1.0 ± 0.1 mm (0.0394 ± 0.004 in)
	EX.	1.0 ± 0.1 mm (0.0394 ± 0.004 in)
"D" Margin Thickness Limit	IN.	1.0 ± 0.2 mm (0.0394 ± 0.008 in)
	EX.	1.0 ± 0.2 mm (0.0394 ± 0.008 in)
Stem Outside Diameter	IN.	5.975 ~ 5.990 mm (2.2352 ~ 0.2358 in)
	EX.	5.960 ~ 5.975 mm (0.2346 ~ 0.2352 in)
Guide Inside Diameter	IN.	6.0 ~ 6.012 mm (0.2362 ~ 0.2367 in)
	EX.	6.0 ~ 6.012 mm (0.2362 ~ 0.2367 in)
Stem-to-guide Clearance	IN.	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
	EX.	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)
Stem Runout Limit		0.03 mm (0.001 in)
		
Valve Spring:		
Free Length		
Inner Spring	IN.	35.5 mm (1.398 in)
	EX.	35.5 mm (1.398 in)
Outer Spring	IN.	37.2 mm (1.465 in)
	EX.	37.2 mm (1.465 in)
Installed Length (Valve Closed)		
Inner Spring	IN.	30.5 mm (1.201 in)
	EX.	30.5 mm (1.201 in)
Outer Spring	IN.	32.0 mm (1.260 in)
	EX.	32.0 mm (1.260 in)

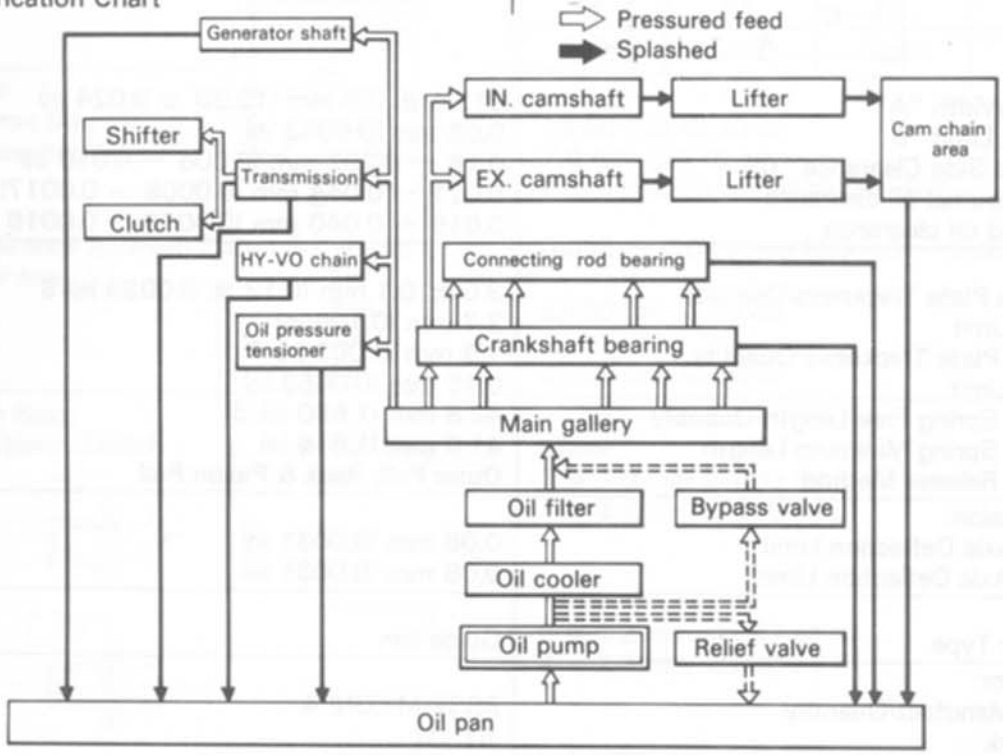
Item	Model	XJ600RL
Tilt Limit		
Inner Spring	IN. & EX.	2.5°/1.5 mm (0.063 in)
Outer Spring	IN. & EX.	2.5°/1.6 mm (0.063 in)
		
Direction of Winding		Inner spring: IN — Left; EX — Left. Outer Spring: IN — Right; EX — Right
		
Piston:		
Piston Size "D"		58.50 mm (2.30 in)
Measuring Point "H"		7.0 mm (0.276 in) (From bottom line of piston skirt)
Clearance Between Piston & Cylinder		0.025 ~ 0.045 mm (0.0010 ~ 0.0018 in)
Oversize:	1st	—
	2nd	59.00 mm (2.32 in)
	3rd	—
	4th	60.00 mm (2.36 in)
Piston Ring:		
Sectional Sketch	Top Ring	Barrel B = 1.0 mm (0.039 in) T = 2.3 mm (0.090 in)
	2nd Ring	Taper B = 1.2 mm (0.047 in) T = 2.3 mm (0.090 in)
	Oil Ring	Expander B = 2.5 mm (0.10 in) T = 2.8 mm (0.11 in)
		
End Gap (Installed):	Top Ring	0.15 ~ 0.30 mm (0.0059 ~ 0.0118 in)
	<Limit>	0.7 mm (0.0276 in)
	2nd Ring	0.15 ~ 0.30 mm (0.0059 ~ 0.0118 in)
	<Limit>	0.7 mm (0.0276 in)
	Oil Ring	0.2 ~ 0.7 mm (0.0079 ~ 0.0276 in)
Side Clearance:	Top Ring	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
	<Limit>	0.15 mm (0.0059 in)
	2nd Ring	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)
	<Limit>	0.15 mm (0.0059 in)
	Oil Ring	—

7

Item \ Model	XJ600RL
Connecting Rod:	
Oil Clearance	0.016 ~ 0.040 mm (0.0006 ~ 0.0016 in)
Color code (Corresponding Size)	
1. Blue	1.5 $^{+0.004}_{0}$ mm (0.0591 $^{+0.00016}_{0}$ in)
2. Black	1.5 $^{0}_{-0.004}$ mm (0.0591 $^{0}_{-0.00016}$ in)
3. Brown	1.5 $^{-0.004}_{-0.008}$ mm (0.0591 $^{-0.00016}_{-0.00031}$ in)
4. Green	1.5 $^{-0.008}_{-0.012}$ mm (0.0591 $^{-0.00031}_{-0.00047}$ in)
Crankshaft: 	
Crank Width "A"	312.4 ± 0.6 mm (12.30 ± 0.024 in)
Runout Limit "B"	0.03 mm (0.0012 in)
Big End Side Clearance "C"	0.16 ~ 0.262 mm (0.006 ~ 0.010 in)
Crank journal oil clearance	0.021 ~ 0.044 mm (0.0008 ~ 0.0017)
Con-rod oil clearance	0.016 ~ 0.040 mm (0.0006 ~ 0.0016 in)
Clutch:	
Friction Plate Thickness/Quantity	3.0 ± 0.1 mm (0.12 ± 0.0039 in)/8
Wear Limit	2.7 mm (0.106 in)
Clutch Plate Thickness/Quantity	1.6 mm (0.063 in)/7
Warp Limit	0.15 mm (0.0059 in)
Clutch Spring Free Length/Quantity	42.8 mm (1.690 in)/5
Clutch Spring Minimum Length	41.8 mm (1.646 in)
Clutch Release Method	Outer Pull, Rack & Pinion Pull
Transmission:	
Main Axle Deflection Limit	0.08 mm (0.0031 in)
Drive Axle Deflection Limit	0.08 mm (0.0031 in)
Shifter:	
Shifter Type	Guide bar
Carburetor:	
Type/Manufact/Quantity	BS32/MIKUNI/4
I.D.Mark	51J01
Main Jet (M.J.) (For No.1 and No.2 Cylinder)	#105
(For No.3 and No.4 Cylinder)	#102.5
Main Air Jet (M.A.J)	#70
Jet Needle-clip Position	
(J.N) (For No.1, 3,4 Cylinder)	4CP3-3
(For No.2 Cylinder)	4CP7-3
Needle Jet (N.J.)	N-8
Pilot Jet (P.J)	#40
Pilot Outlet Size (P.O.)	ϕ0.80
Pilot Air Jet (P.A.J)	#155
Pilot Screw (P.S.)	2-1/2 turns out
Valve Seat Size (V.S)	ϕ2.0
Starter Jet (G.S)	#42.5 (ϕ0.6)
Bypath Size (B.P)	ϕ0.8 x 3
Fuel Level (F.L)	3.0 ± 1.0 mm (0.12 ± 0.04 in) Below from the carburetor mixing chamber body edge

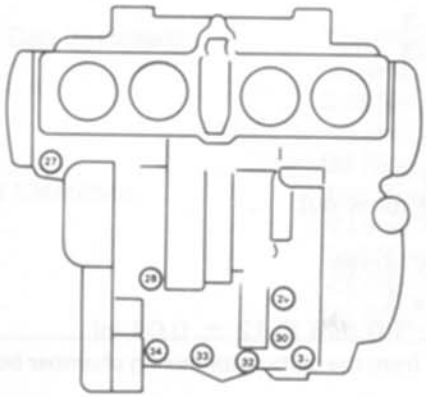
Item \ Model	XJ600RL
Engine Idling speed	1,200 ± 50 r/min
Vacuum Pressure at Idling Speed	23.3 ± 0.667 kPa (175 ± 5 mmHg, 6.890 ± 0.1969 inHg)
Vacuum Synchronous Difference	Below 10 kPa (10 mmHg, 0.4 inHg)
Lubrication System:	
Oil Filter Type	Paper
Oil Pump Type	Trochoid pump
Tip Clearance <Limit>	0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in)
Side Clearance <Limit>	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)
Bypass Valve Setting Pressure	98.0 ± 20 kPa (1.0 ± 0.2 kg/cm², 14.2 ± 2.8 psi)
Relief Valve Operating Pressure	490 ± 49 kPa (5.0 ± 0.5 kg/cm², 71.1 ± 7.1 psi)

Lubrication Chart

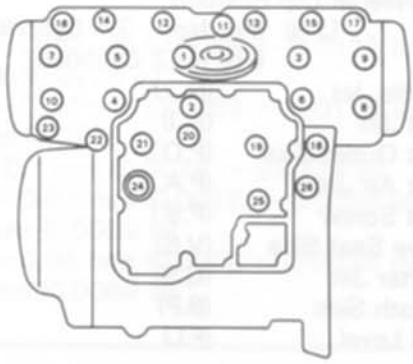


Crankcase Tightening Sequence:

Upper case



Lower case



Tightening torque
ENGINE:

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Cam shaft cap	Bolt	M6 P1.0	24	10	1.0	7.2	Tighten in 3-stages
Cylinder (cam chain)	Stud bolt	M6 P1.0	4	5	0.5	3.6	Apply oil
Cylinder head (Exhaust pipe)	Stud bolt	M6 P1.0	8	10	1.0	7.2	Apply oil
Cylinder head	Stud bolt	M6 P1.0	4	5	0.5	3.6	Apply oil
Cylinder	Nut	M8 P1.25	1	20	2.0	14	
Cylinder	Nut	M6 P1.0	1	10	1.0	7.2	
Cylinder head	Cap nut	M8 P1.25	12	22	2.2	16	Apply oil
Spark plug		M12 P1.25	4	17.5	1.75	13	
Cylinder head cover	Bolt	M6 P1.0	12	10	1.0	7.2	
Cylinder	Stud bolt	M8 P1.25	1	15	1.5	11	Apply oil
Cylinder and crank case	Nut	M8 P1.25	1	20	2.0	14	
Connecting rod and rod cap	Nut	M7 P0.75	8	25	2.5	18	
Camshaft and sprocket	Bolt	M7 P1.0	4	24	2.4	17	
Cam chain tensioner stopper bolt	Bolt	M8 P1.0	1	8	0.8	5.7	
Cam chain tensioner case and cylinder	Bolt	M6 P1.0	1	10	1.0	7.2	
Cam chain tensioner case and cylinder	Nut	M6 P1.0	1	10	1.0	7.2	
Cam chain tensioner lock nut	Nut	M8 P1.25	1	9	0.9	6.5	
Crankcase	Plug	M10 P1.25	1	10	1.0	7.2	
Rotor housing and pump cover	Screw	M6 P1.0	1	7	0.7	5.1	
Oil pump ass'y and crankcase	Screw	M6 P1.0	3	7	0.7	5.1	
Strainer housing and crankcase	Bolt	M6 P1.0	2	10	1.0	7.2	
Strainer cover and crankcase	Bolt	M6 P1.0	12	10	1.0	7.2	
Filter cover and crankcase	Union bolt	M20 P1.5	1	15	1.5	11	
Drain bolt	Plug	M14 P1.5	1	43	4.3	31	
Carburetor joint and Cylinder head	Bolt	M6 P1.0	8	10	1.0	7.2	
Air filter cover	Screw	M5 P0.8	4	5	0.5	3.6	
Air filter	Bolt	M6 P1.0	3	7	0.7	5.1	
Exhaust pipe and cylinder head	Nut	M6 P1.0	8	10	1.0	7.2	
Exhaust pipe joint	Bolt	M8 P1.25	6	20	2.0	14	
Muffler	Bolt	M10 P1.25	2	25	2.5	18	
Adaptor plate and crankcase	Union bolt	M20 P1.5	1	50	5.0	36	
Oil cooler and hose	Nut	M18 P	2	32	3.2	23	
Adaptor plate and hose	Bolt	M6 P1.0	4	12	1.2	8.6	
Oil cooler and frame	Bolt	M6 P1.0	2	10	1.0	7.2	
Hose clamp	Bolt	M6 P1.0	1	12	1.2	8.6	
Hose clamp and engine	Nut	M6 P1.0	2	10	1.0	7.2	

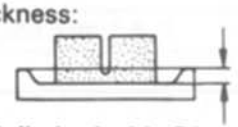
MAINTENANCE SPECIFICATIONS

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Crankcase	Stud bolt	M8 P1.25	12	13	1.3	9.4	Apply oil
Crankcase (upper and lower)	Bolt	M8 P1.25	11	24	2.4	17	Apply oil
Crankcase (upper and lower)	Bolt	M6 P1.0	23	12	1.2	8.7	Apply oil
Generator cover and crankcase	Bolt	M6 P1.0	3	10	1.0	7.2	
Bearing cover plate (crankcase right)	Screw	M6 P1.0	4	8	0.8	5.7	
Bearing cover plate (crankcase left)	Screw	M6 P1.0	4	8	0.8	5.7	Use LOCTITE®
Clutch cable holder	Screw	M6 P1.0	1	10	1.0	7.2	
Crankcase cover	Bolt	M6 P1.0	13	10	1.0	7.2	
Crankcase (Main gallary blind plug)	Plug	M20 P1.5	2	12	1.2	8.7	Apply oil
Clutch pressure plate	Bolt	M6 P1.0	5	8	0.8	5.8	
Clutch boss	Nut	M20 P1.0	1	70	7.0	50	
Drive sprocket	Bolt	M6 P1.0	2	10	1.0	7.2	
Stopper plate	Screw	M5 P0.8	1	7	0.7	5.1	Use LOCTITE®
Cam segment	Bolt	M6 P1.0	1	10	1.0	7.2	Use LOCTITE®
Change pedal	Bolt	M6 P1.0	1	10	1.0	7.2	
A.C. Generator	Bolt	M10 P1.25	1	35	3.5	25	
A.C. Generator (brush)	Screw	M6 P1.0	2	8	0.8	5.8	
Pick up coil base	Screw	M6 P1.0	2	8	0.8	5.8	
Timing plate	Screw	M8 P1.25	1	24	2.4	17	
Starter motor	Bolt	M6 P1.0	2	10	1.0	7.2	
Neutral switch	Screw	M5 P0.8	3	3.5	0.35	2.5	Use LOCTITE®
Oil level gauge switch	Bolt	M6 P1.0	2	7	0.7	5.1	
Reliet valve and crankcase	—		1	20	2.0	14	
Hivo chain tensioner	Bolt	M6 P1.0	2	10	1.0	7.2	Use LOCTITE®
Primary drive gear	Nut	M16 P	1	50	5.0	36	
Bearing cover plate	Screw	M6 P1.0	2	10	1.0	7.2	Use LOCTITE®
Starter clutch	Bolt	M8 P1.25	3	25	2.5	18	Use LOCTITE®
Shift shaft stopper	Screw	M8 P1.25	1	22	2.2	16	
Shift cam bearing plate	Screw	M6 P1.0	1	10	1.0	7.2	

Chassis

Item	Model	XJ600RL
Steering System:		
Steering Bearing Type		Ball Bearing
No./Size of Steel Balls:	Upper	19 pcs/1/4 in
	Lower	19 pcs/1/4 in
Front Suspension:		
Front Fork Travel		150 mm (5.9 in)
Frok Spring Free Length		515.5 mm (20.29 in)
Spring Rate/Stroke		K_1 = 40 N/mm (0.4 kg/mm, 22.4 lb/in) 0 ~ 80 mm (0 ~ 3.14 in) K_2 = 57.5 N/mm (0.575 kg/mm, 32.2 lb/in)/ 80 ~ 150 mm (3.14 ~ 5.91 in)
Optional Spring		No
Oil Capacity		269 cm³ (9.47 Imp oz, 9.03 US oz)
Oil Grade		SAE 10W30 type SE motor oil
Rear Suspension:		
Shock Absorber Travel		40 mm (1.5 in)
Spring Free Length		184 mm (7.24 in)
Spring Rate/Stroke		K_1 = 110 N/mm (11 kg/mm, 616 lb/in) 0 ~ 40 mm (0 ~ 1.57 in)
Optional Spring		No

Adjustment	Spring Position	← Stiffer			Std.	Softer
		5	4	3	2	1

Rear Arm:		
Swingarm Free Play Limit:	End	1.0 mm (0.039 in)
	Side	1.0 mm (0.039 in)
Wheel:		
Front Wheel Type		Cast Wheel
Rear Wheel Type		Cast Wheel
Front Rim Size/Material		MT2.15 x 18/Aluminum
Rear Rim Size/Material		MT2.50 x 18/Aluminum
Rim Runout Limit	Vertical	2.0 mm (0.08 in)
	Lateral	2.0 mm (0.08 in)
Drive Chain:		
Type/Manufacturer		50HDL2/DAIDO
No. of Links		106
Chain Free Play		20 ~ 30 mm (0.78 ~ 1.18 in)
Front Disc Brake:		
Type		Dual disc
Outside Dia. x Thickness		267 x 5 mm (10.5 x 0.2 in)
Pad Thickness:	Inner	5.5 mm (0.21 in)
	<Limit>*	0.5 mm (0.019 in)
	Outer	5.5 mm (0.21 in)
	<Limit>*	0.5 mm (0.019 in)
Master Cylinder Inside Dia.		15.87 mm (0.62 in)
Caliper Cylinder Inside Dia.		42.8 mm (1.50 in)
Brake Fluid Type		DOT #3

7

MAINTENANCE SPECIFICATIONS

Chassis

Item \ Model	XJ600RL
Rear Disc Brake:	
Type	Dual disc
Disc Outside Dia. x Thickness	267 mm (10.6 in) x 5 mm (0.19 in)
Pad Thickness	
Inner <Limit> *	5.5 mm (0.21 in)
* Outer <Limit> *	0.5 mm (0.019 in)
	5.5 mm (0.21 in)
	0.5 mm (0.019 in)
Master Cylinder Inside Dia.	14 mm (0.55 in)
Caliper Cylinder Inside Dia.	38.1 mm (1.49 in)
Brake Fluid Type	DOT #3
Brake Lever & Brake Pedal:	
Brake Lever Free Play	5 ~ 8 mm (0.02 ~ 0.03 in)
Brake Pedal Free Play	20 ~ 30 mm (0.8 ~ 0.12 in)
Brake Pedal Position	30 mm (1.2 in) (Vertical height below footrest top)
Clutch Lever Free Play:	2 ~ 3 mm (0.08 ~ 0.12 in)

Tightening torque

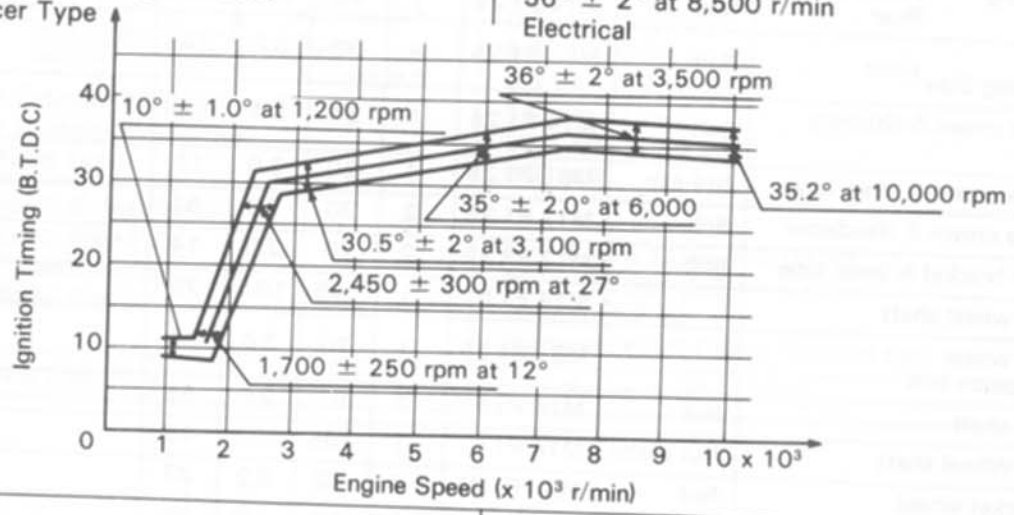
CHASSIS:

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Engine Front, upper	Nut	M10 P1.25	1	42	4.2	30	
Mounting Front, under	Bolt	M10 P1.25	2	42	4.2	30	
Bolt Rear	Nut	M12 P1.25	1	90	9.0	65	
Engine Mounting Stay Front	Bolt	M8 P1.25	4	32	3.2	14	
Handle crown & Steering shaft	Bolt	M14 P1.25	1	54	5.4	39	
Handle crown & Inner tube	Nut cap	M8 P1.25	1	20	2.0	14	
Handle crown & Handlebar	Bolt	M12 P1.25	2	70	7.0	51	
Under bracket & Inner tube	Bolt	M12 P1.25	2	20	2.0	14	
Front wheel shaft		M14 P1.5	1	105	10.5	75	
Front wheel Axle pinch bolt		M8 P1.25	1	20	2.0	14	
Pivot shaft	Nut	M14 P1.5	1	90	9.0	85	
Rear Wheel shaft	Nut castle	M14 P1.5	1	105	10.5	75	
Sprocket wheel	Nut	M8 P1.25	6	32	3.2	23	
Rear shock absorber (Upper)	Nut cap	M10 P1.25	1	40	4.0	29	
Footrest	Bolt	M10 P1.25	2	64	6.4	46	
Brake disc & Hub	Bolt	M8 P1.25	12	20	2.0	14	
Master cylinder & Brake hose (Front)	Bolt union	M10 P1.25	1	26	2.6	19	
Brake hose & Joint	Bolt Union	M10 P1.25	1	26	2.6	19	
Caliper & Brake hose	Bolt union	M10 P1.25	1	26	2.6	19	
Caliper bleed screw		M8 P1.25	1	6	0.6	4.3	
Front fender	Bolt	M8 P1.25	4	10	1.0	7.2	
Master cylinder cap	Screw	M5 P0.8	2	1.8	0.18	1.3	
Muffler bracket & Frame	Bolt	M8 P1.25	2	20	2.0	14	
Master cylinder & Master cylinder bracket	Bolt	M6 P1.0	2	8.5	0.85	6.1	
Steering shaft & Ring nut	Nut	M25 P1.0	1	54	5.4	39	
Sender & Fuel tank	Bolt	M5 P0.8	4	4.3	0.43	2.4	
Relay Arm and Frame	Bolt	M14 P1.25	1	65	6.5	47	
Relay Arm and Arm 1 & 2	Bolt	M12 P1.25	1	65	6.5	47	
Arm 1 and 2	Bolt	M12 P1.25	2	20	2.0	14	
Rear Arm and Arm 1 & 2	Bolt	M10 P1.25	2	40	4.0	29	
Caliper	Bolt	M10 P1.25	2	35	3.5	25	

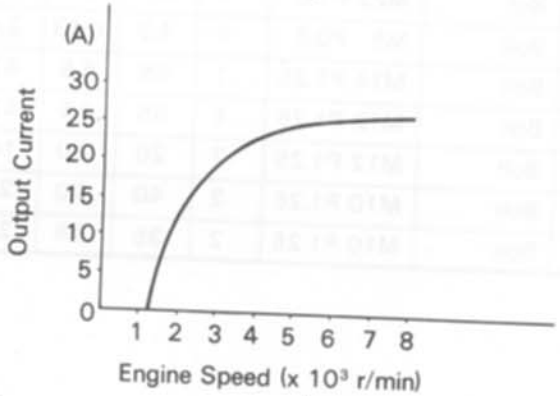
MAINTENANCE SPECIFICATIONS

Electrical

Item \ Model	XJ600RL
Voltage	12V
Ignition System:	
Ignition Timing (B.T.D.C.)	10° ± 1° at 1,200 r/min
Advanced Timing (B.T.D.C.)	36° ± 2° at 8,500 r/min
Advancer Type	Electrical



T.C.I:	
Pickup Coil Resistance (Color)	120Ω ± 20% at 20°C (68°F) (Black – Gray) (Black – Orange)
T.C.I. Unit–Manufacturer	TID14-31/HITACHI
Ignition Coil.	
Model/Manufacturer	CM12-23/HITACHI
Minimum Spark Gap	6 mm (0.24 in) or more at 500 r/min
Primary Winding Resistance	2.7Ω ± 10% at 20°C (68°F)
Secondary Winding Resistance	12 kΩ ± 20% at 20°C (68°F)
Spark Plug Cap Resistance	10KΩ
Charging System:	
Type	A.C. Generator
A.C. Generatory:	
Model/Manufacturer	LD117-03/HITACHI
Nominal Output	14V, 17A at 5,000 r/min



Field Coil Resistance	4.5Ω ± 10% at 20°C (68°F) (Br – G)
Starter Coil Resistance	0.55Ω ± 10% at 20°C (68°F) (W – W)

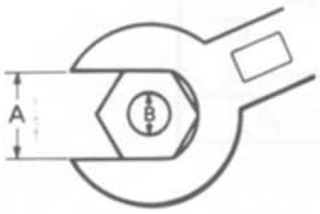
Item \ Model	XJ600RL
Brush –Overall Length	17 mm (0.669 in)
<Limit>	10 mm (0.394 in)
–Spring Force	170 ~ 380 gr (5.996 ~ 13.403 oz)
Voltage Regulator:	
Type	Field control
Model/Manufacturer	SH233-12/SHINDENGEN
No Load Regulated Voltage	14.2 ~ 14.8V
Rectifier:	
Model/Manufacturer	SH233-12/SHINDENGEN
Capacity	15A
Withstand Voltage	300V
Battery:	
Capacity	12V 12AH
Specific Gravity	1.280
Electroc Starter System:	
Type	Constant mesh type
Starter Motor:	
Model/Manufacturer	SM8204/MITSUBA
Output	0.5 kw
Armature Coil Resistance	0.012Ω ± 10% at 20°C (68°F)
Brush –Overall Length	12 mm (0.47 in)
– <Limit>	5 mm (0.20 in)
–Spring Force	340 ~ 460 g (12.0 ~ 16.2 oz)
Commutator Dia.	28 mm (1.10 in)
Wear Limit	27 mm (1.06 in)
Mic Undercut	0.8 mm (0.031 in)
Starter Relay:	
Model/Manufacturer	22U-00/HITACHI
Amperage Rating	100A
Horn:	
Type/Quantity	Plane type x 2
Model/Manufacturer	CF-12./NIKKO
Maximum Amperage	2.5 A
Flasher Relay (Relay Assembly):	
Type	Semi transistor type
Model/Manufacturer	FX257N/ND
Self Cancelling Device	Yes
Flasher Frequency	85 ± 10 cycle/min
Wattage	27W x 2 pcs + 3.4W
Safty relay (Relay Assembly):	
Model/Manufacturer	FX257N/ND
Diode	No
Oil Level Switch:	
Model/Manufacturer	4U8-00/ND
Fuel Gauge:	
Model/Manufacturer	33M/NIPPON SEIKI
Sender Unit Risistance Full	7Ω ± 5% at 20°C (68°F)
Empty	95Ω ± 7.5% at 20°C (68°F)

MAINTENANCE SPECIFICATIONS

Item \ Model	XJ600RL
Circuit Breaker:	
Type	Fuse
Amperage for individual Circuit x Quantity:	
MAIN	30A x 1
HEADLIGHT	20A x 1
SIGNAL	10A x 1
IGNITION	10A x 1
RESERVE	30A x 1, 20A x 1

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.



A: Distance across flats
B: Outside thred diameter

A (Nut)	B (Bolt)	General torque specifications		
		Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	6.1
22 mm	16 mm	130	13.0	94

APPX DEFINITION OF UNITS, CONVERSION TABLES

DEFINITION OF UNITS

Unit	Read	Definition	Measure
mm cm	millimeter centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	kilogram	10^{3} gram	Weight
N	Newton	1 kg x m/sec^2	Force
Nm m·kg	Newton meter Meter kilogram	N x m m x kg	Torque Torque
Pa N/mm	Pascal Newton per millimeter	N/m^2 N/mm	Pressure Spring rate
L cm^3	Liter Cubic centimeter		Volume or Capacity
r/min	Rotation per minute		Engine Speed

CONVERSION TABLES

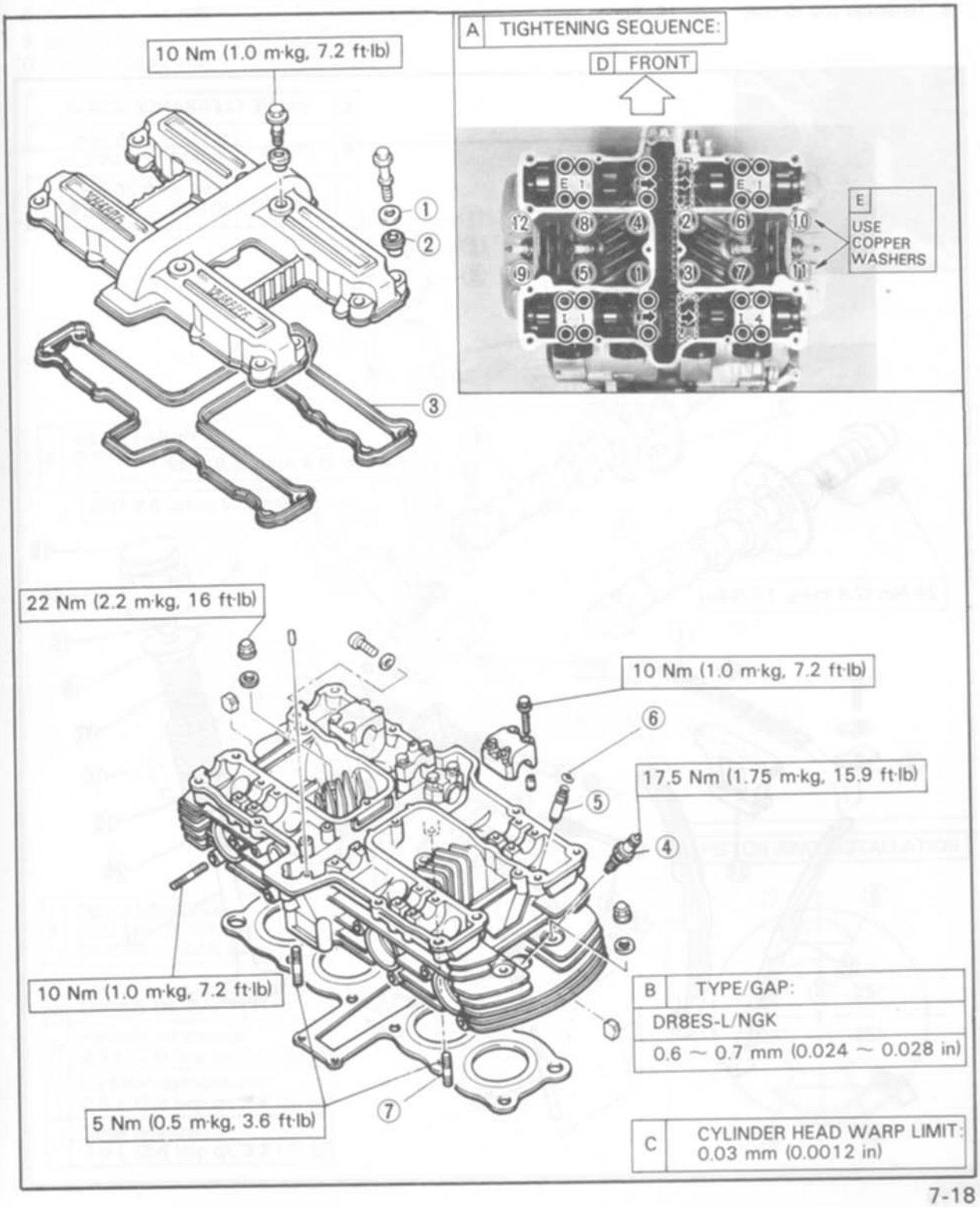
Metric to inch system		
Known	Multiplier	Result
m·kg	7.233	ft·lb
m·kg	86.80	in·lb
cm·kg	0.0723	ft·lb
cm·kg	0.8680	in·lb
kg	2.205	lb
g	0.03527	oz
km/lit	2.352	mpg
km/hr	0.6214	mph
km	0.6214	mi
m	3.281	ft
m	1.094	yd
cm	0.3937	in
mm	0.03937	in
cc (cm^3)	0.03382	oz (US liq)
cc (cm^3)	0.06102	cu in
lit (liter)	2.1134	pt (US liq)
lit (liter)	1.057	qt (US liq)
lit (liter)	0.2642	gal (US liq)
kg/mm	56.007	lb/in
kg/cm	14.2234	psi (lb/in)
centigrade (°C)	9/5 (°C) + 32	Fahrenheit (°F)

Inch to metric system		
Known	Multiplier	Result
ft·lb	0.13826	m·kg
in·lb	0.01152	m·kg
ft·lb	13.831	cm·kg
in·lb	1.1521	cm·kg
lb	0.4535	kg
oz	28.352	g
mpg	0.4252	km/lit
mph	1.609	km/hr
mi	1.609	km
ft	0.3048	m
yd	0.9141	m
in	2.54	cm
in	25.4	mm
oz (US liq)	29.57	cc (cm^3)
cu in	16.387	cc (cm^3)
pt (US liq)	0.4732	lit (liter)
qt (US liq)	0.9461	lit (liter)
gal (US liq)	3.785	lit (liter)
lb/in	0.017855	kg/mm
psi (lb/in)	0.07031	kg/cm
Fahrenheit (°C)	5/9(°F−32)	Centigrade (°F)

EXPLODED DIAGRAMS

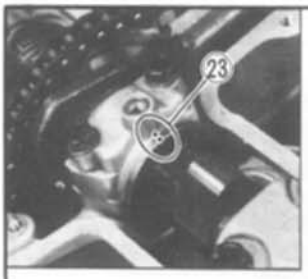
CYLINDER HEAD

1. Washer
2. Rubber washer
3. Gasket
4. Spark plug
5. Valve guide
6. Circlip
7. Stud bolt

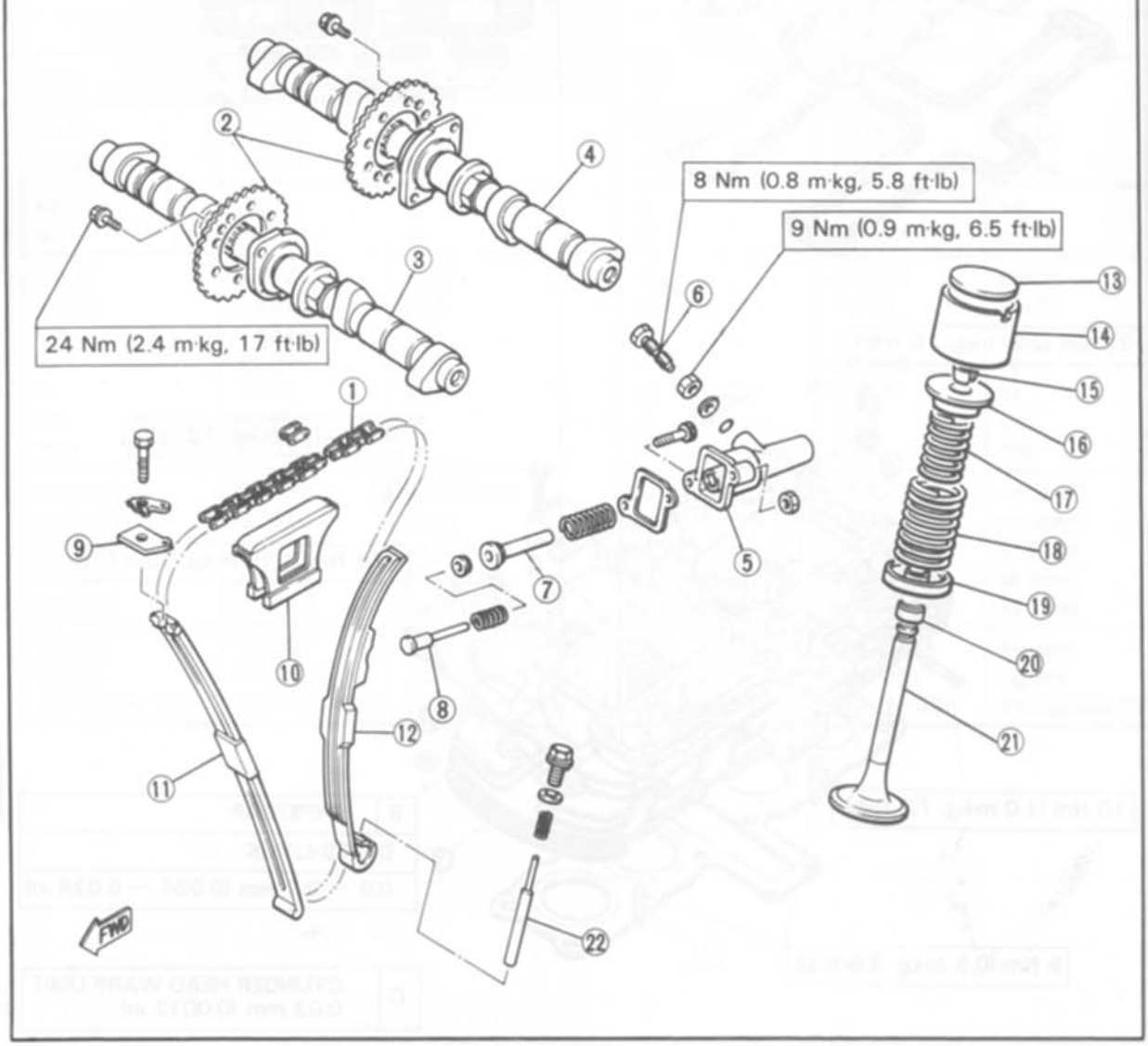


VALVE/CAM CHAIN

1. Cam chain
2. Cam sprocket
3. Camshaft (Exhaust)
4. Camshaft (Intake)
5. Chain tensioner body
6. Tensioner lock bolt
7. Tensioner rod (Large)
8. Tensioner rod (Small)
9. Guide stopper plate
10. Upper chain guide
11. Exhaust side chain guide
12. Intake side chain guide
13. Adjusting pad
14. Valve lifter
15. Valve retainer
16. Spring seat
17. Inner spring
18. Outer spring
19. Spring seat
20. Oil seal
21. Valve
22. Chain guide stopper
23. Match mark



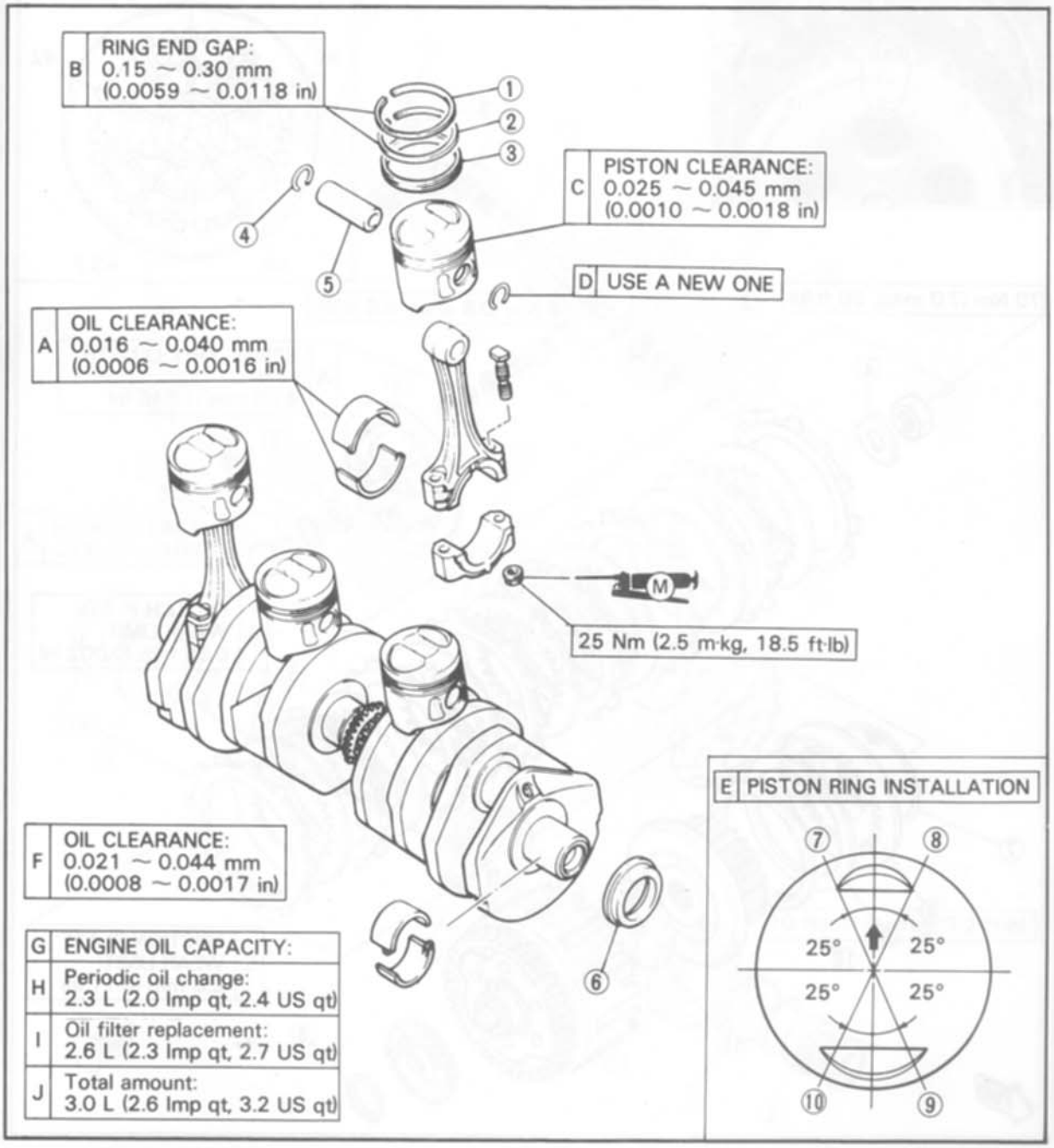
A	VALVE CLEARANCE (COLD):	
B	Intake	0.11 ~ 0.15 mm (0.004 ~ 0.006 in)
C	Exhaust	0.16 ~ 0.20 mm (0.006 ~ 0.008 in)



7

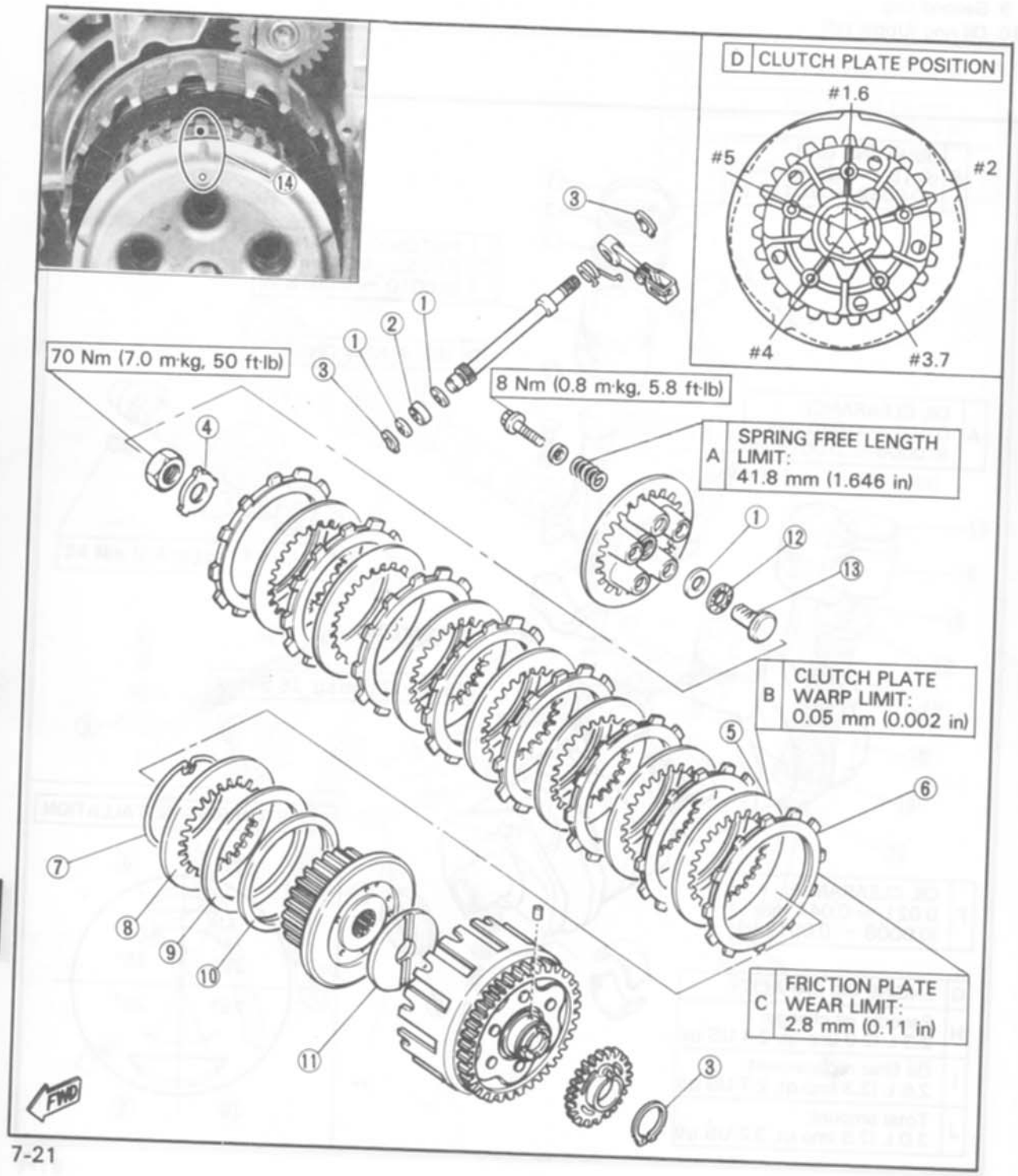
CRANKSHAFT/PISTON

1. Top ring
2. Second ring
3. Oil ring
4. Circlip
5. Piston pin
6. Oil seal
7. Top ring
8. Oil ring (Lower rail)
9. Second ring
10. Oil ring (Upper rail)



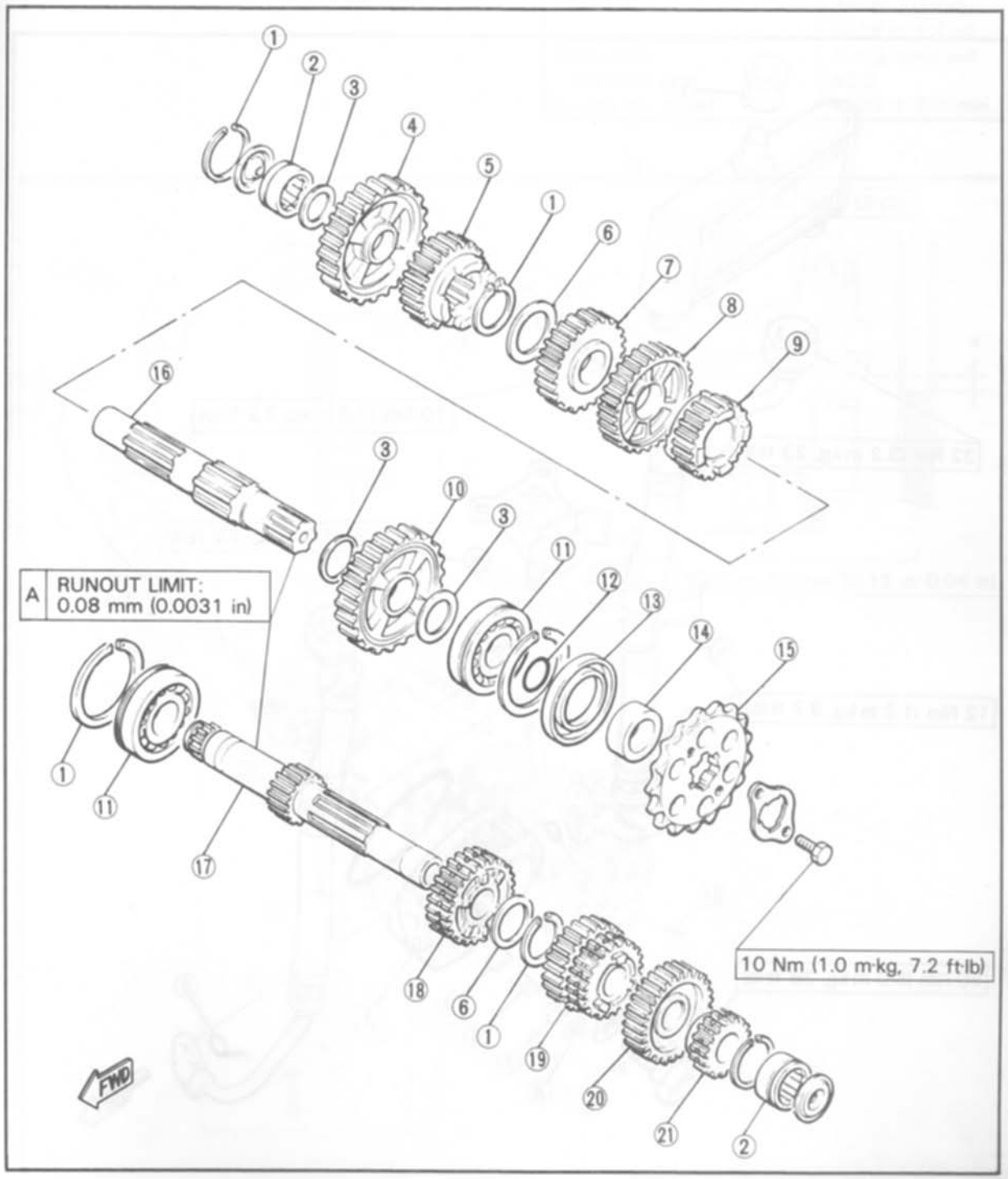
CLUTCH

1. Plate washer
2. Oil seal
3. Circlip
4. Lock washer
5. Clutch plate (#1)
6. Friction plate (#1)
7. Wire clip
8. Clutch plate
9. Clutch boss spring
10. Spring seat
11. Thrust plate
12. Bearing
13. Pull rod
14. Match mark



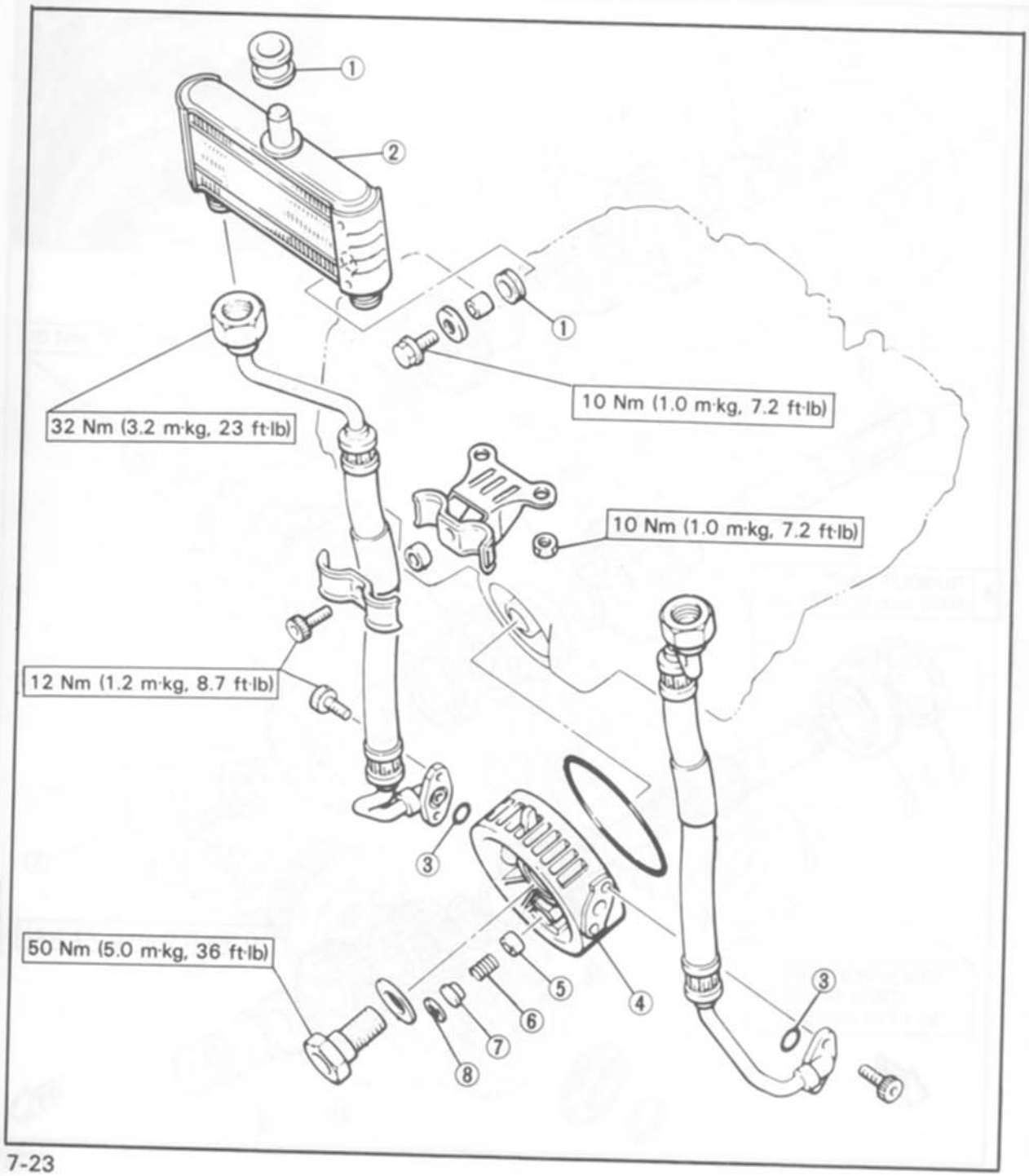
TRANSMISSION

1. Circlip
2. Cylindrical bearing
3. Plate washer
4. 1st wheel gear
5. 5th gear
6. Washer
7. 4th wheel gear
8. 3rd wheel gear
9. 6th wheel gear
10. 2nd wheel gear
11. Bearing
12. O-ring
13. Oil seal
14. Collar
15. Drive sprocket
16. Drive axle
17. Main axle
18. 5th pinion gear
19. 3rd/4th pinion gear
20. 6th pinion gear
21. 2nd pinion gear



OIL COOLER

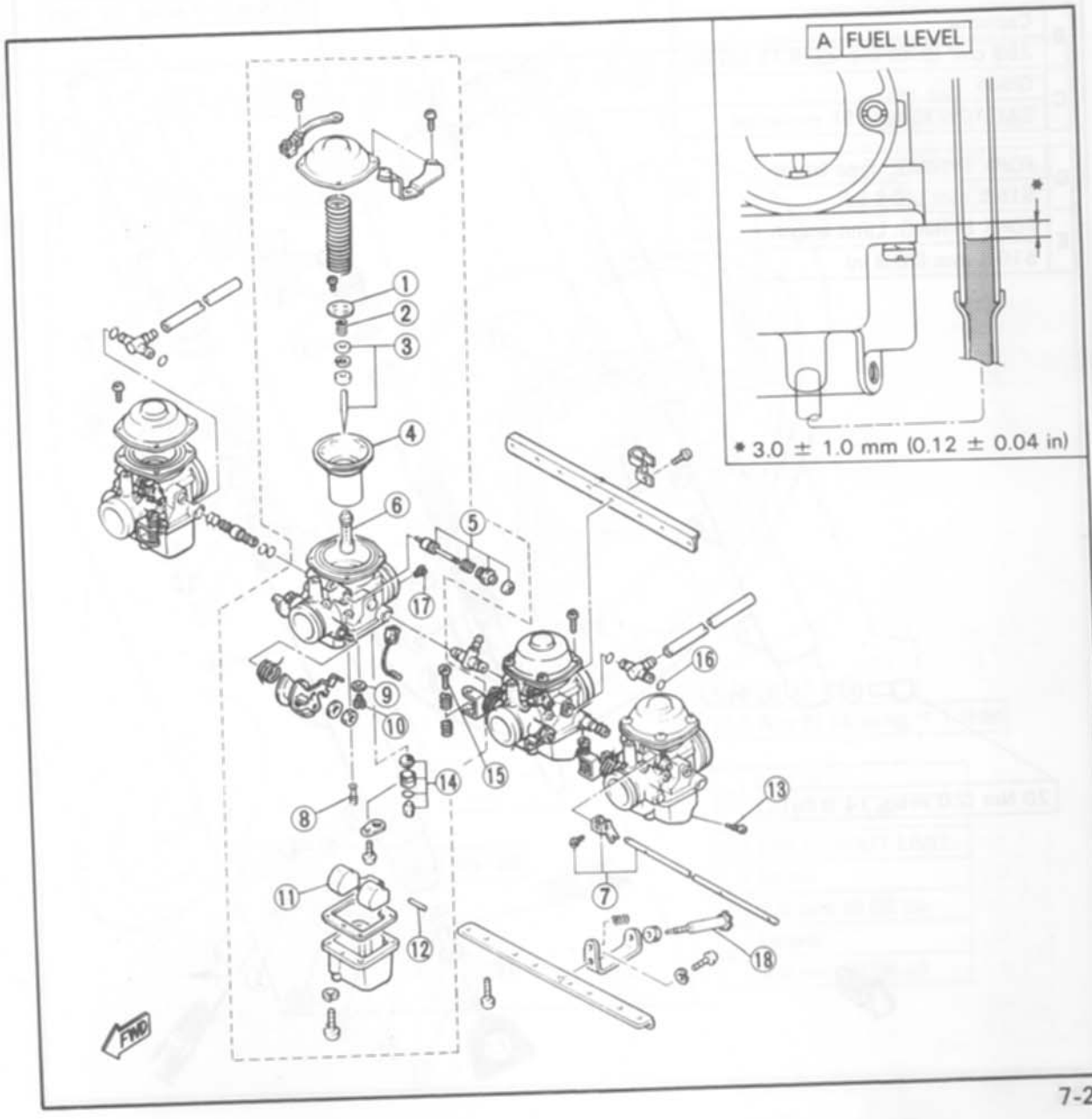
1. Grommet
2. Oil cooler assembly
3. O-ring
4. Spacer
5. Plunger
6. Spring
7. Washer
8. Circlip



CARBURETOR

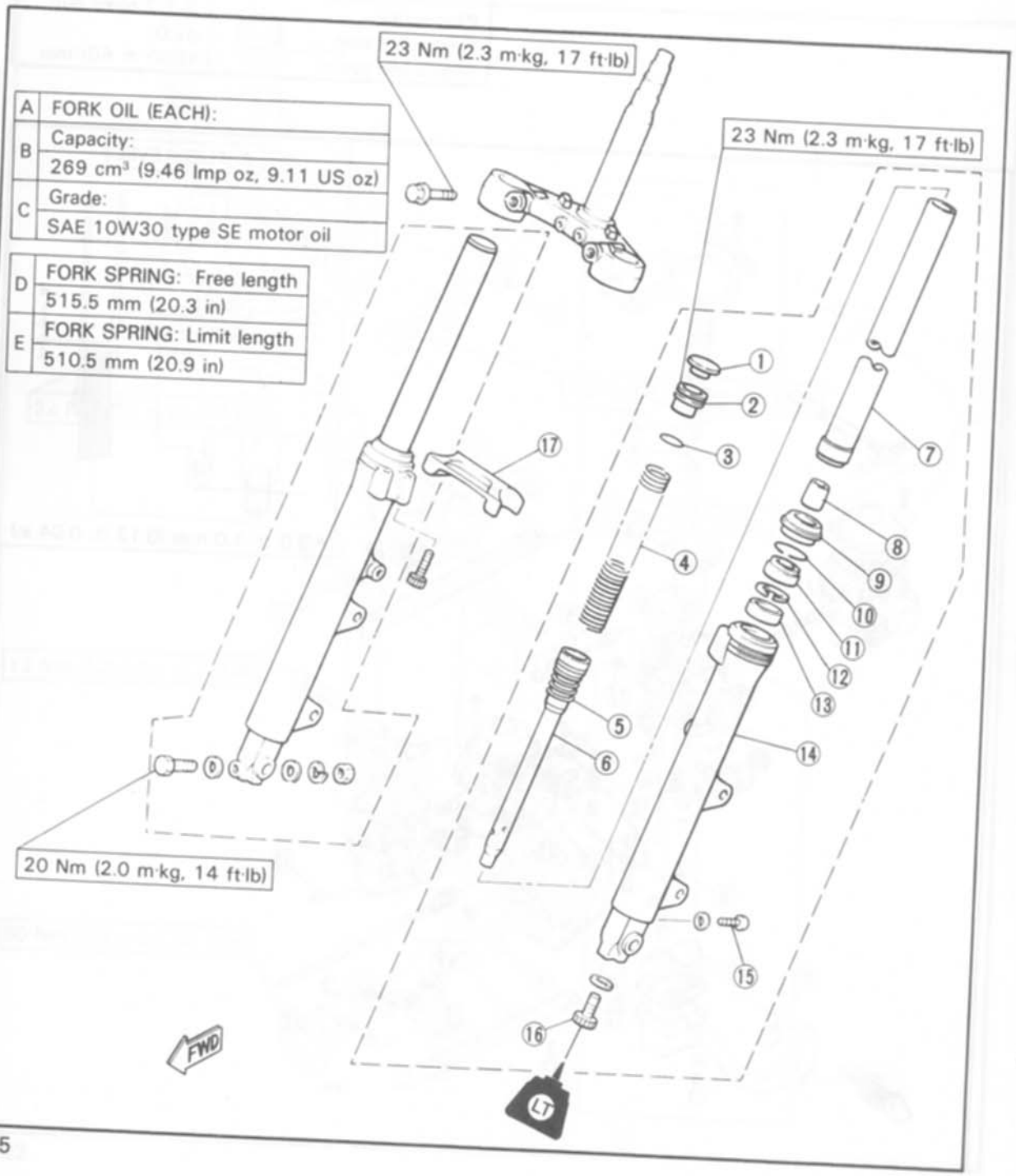
1. Jet needle cover
2. Set spring
3. Jet needle
4. Piston valve
5. Starter plunger
6. Main nozzle
7. Starter lever
8. Pilot jet
9. Main jet washer
10. Main jet
11. Float
12. Float plin
13. Drain screw
14. Float valve
15. Synchronizing screw
16. O-ring
17. Pilot air jet
18. Throttle stop screw

SPECIFICATIONS	
Main jet	
For No.1 and No.2 cylinder	#105
For No.3 and No.4 cylinder	#102.5
Jet needle	
No.1, 3 and 4 cylinder	4CP3-3
No.2 cylinder	4CP7-3
Needle jet	N-8
Starter jet	#42.5
Fuel level	3.0 ± 1.0 mm (0.12 ± 0.4 in)
Pilot screw	2-1/2 turns out
Float valve seat	ϕ2.0
Engine idle speed	1200 ± 50r/min



FRONT FORK

1. Rubber cap
2. Cap bolt
3. O-ring
4. Fork spring
5. Damper rod spring
6. Damper rod
7. Inner fork tube
8. Taper spindle
9. Dust cover
10. Retaining clip
11. Oil seal
12. Washer
13. Bushing
14. Outer fork tube
15. Drain bolt
16. Damper rod securing bolt
17. Front fork brace

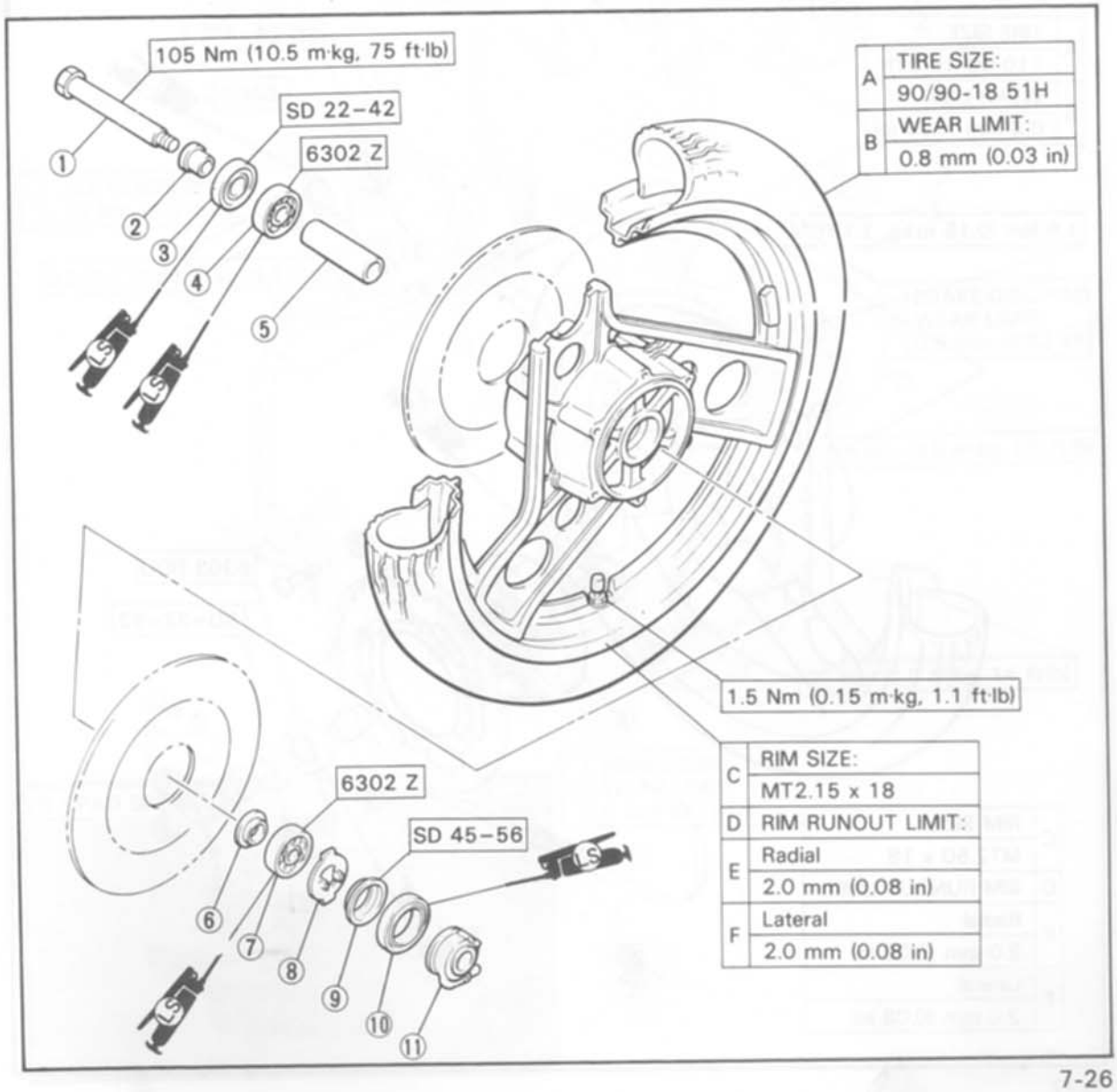


FRONT WHEEL

1. Front axle
2. Collar
3. Oil seal
4. Bearing
5. Spacer
6. Spacer flange
7. Bearing
8. Meter clutch
9. Clutch retainer
10. Oil seal
11. Gear unit assembly

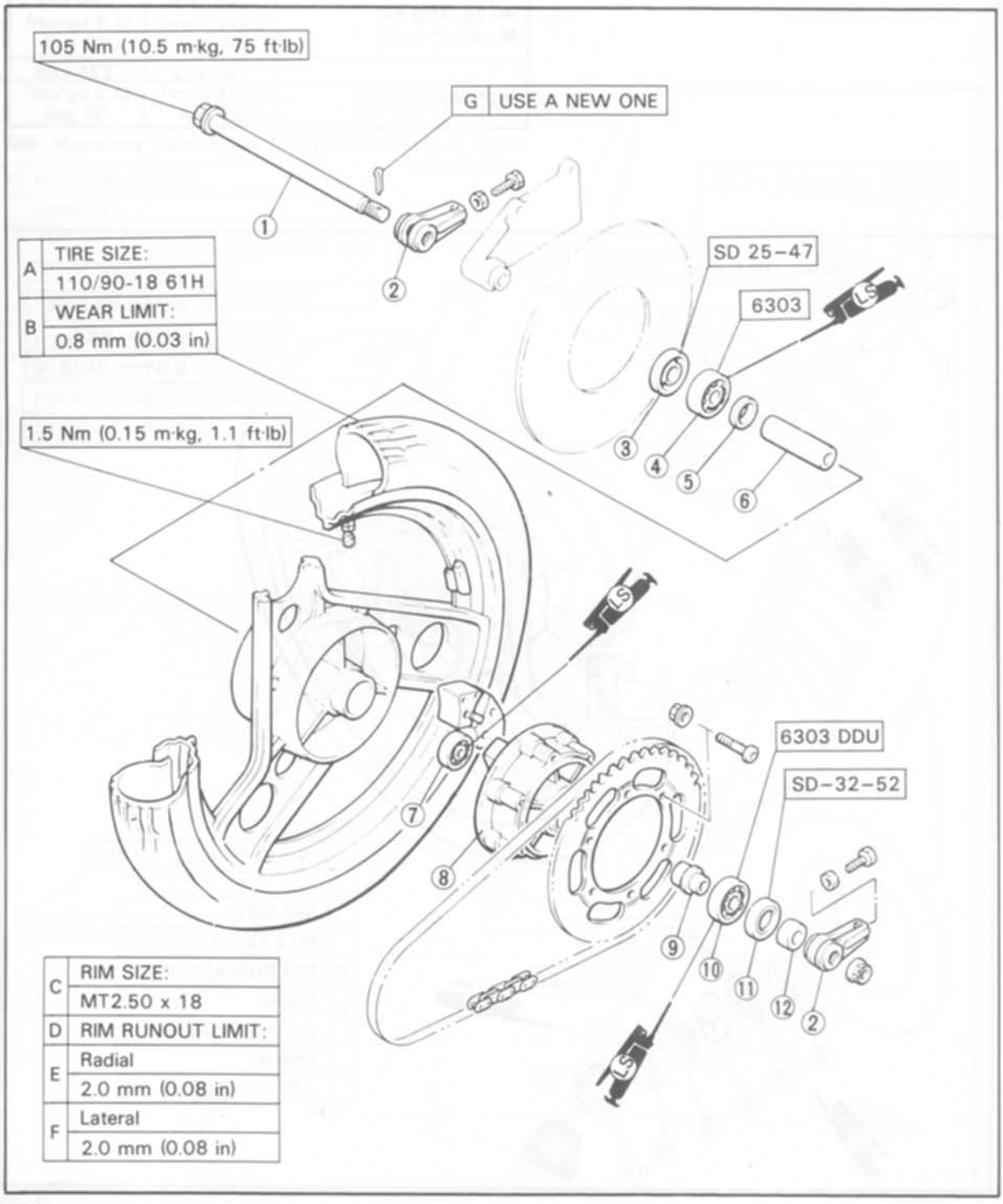
TIRE AIR PRESSURE (COLD):		
Basic weight: With oil and full fuel tank	208 kg (459 lb)	
Maximum load*	188 kg (414 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	177 kPa (1.8 kg/cm², 26 psi)	196 kPa 2.0 kg/cm² 28 psi)
90 kg (198 lb)~ Maximum load*	196 kPa (2.0 kg/cm², 28 psi)	226 kPa (2.3 kg/cm², 32 psi)
High speed riding	196 kPa (2.0 kg/cm², 28 psi)	226 kPa (2.3 kg/cm², 32 psi)

* Load is the total weight of cargo, rider, passenger, and accessories.



REAR WHEEL

1. Rear axle
2. Chain puller
3. Oil seal
4. Bearing
5. Spacer flange
6. Spacer
7. Bearing
8. Clutch hub
9. Collar
10. Bearing
11. Oil seal
12. Collar

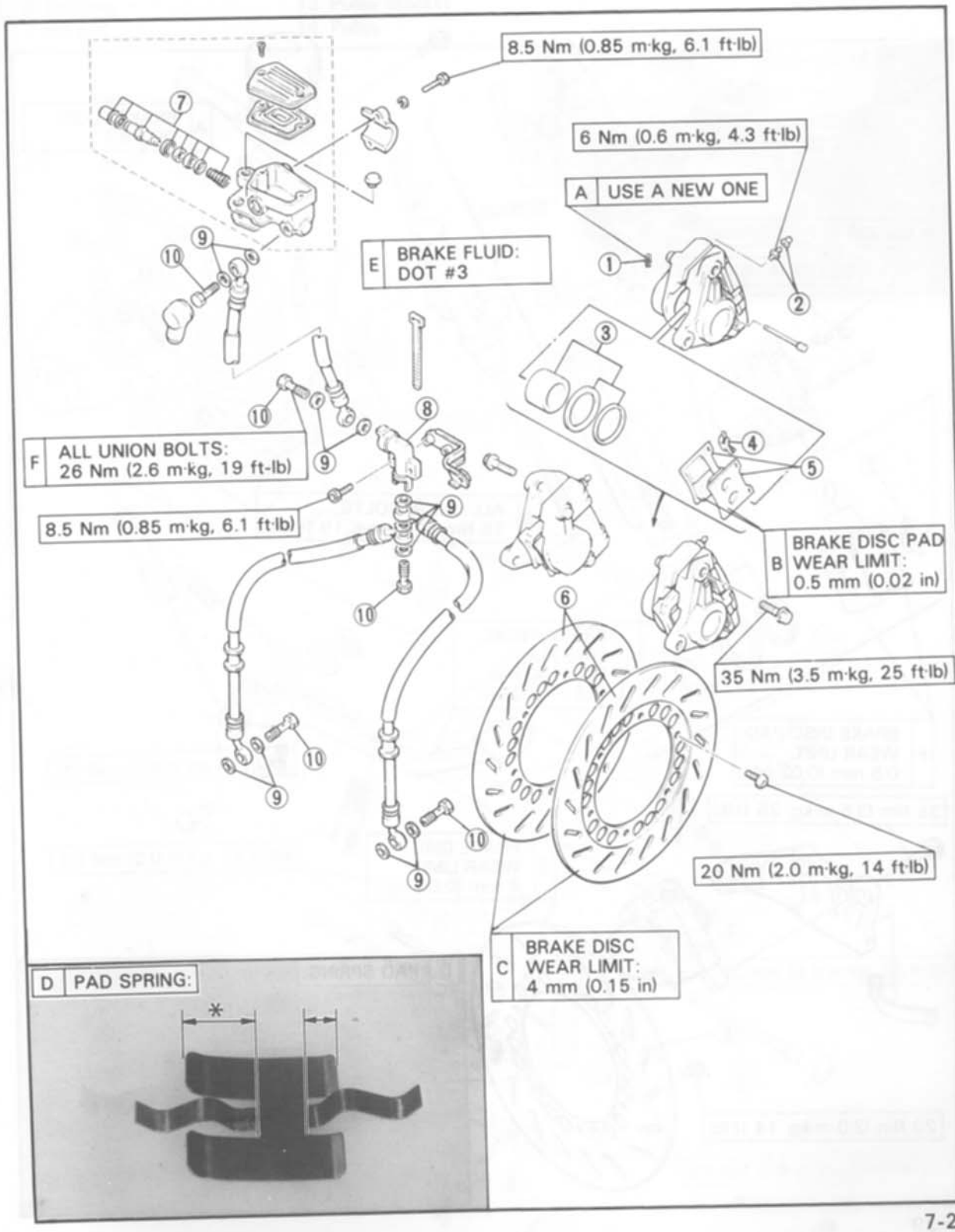


7

FRONT BRAKE

1. Circlip
2. Bleed screw
3. Caliper piston assembly
4. Pad spring
5. Front brake pad
6. Brake disc
7. Master cylinder kit
8. Brake joint
9. Copper washer
10. Union bolt

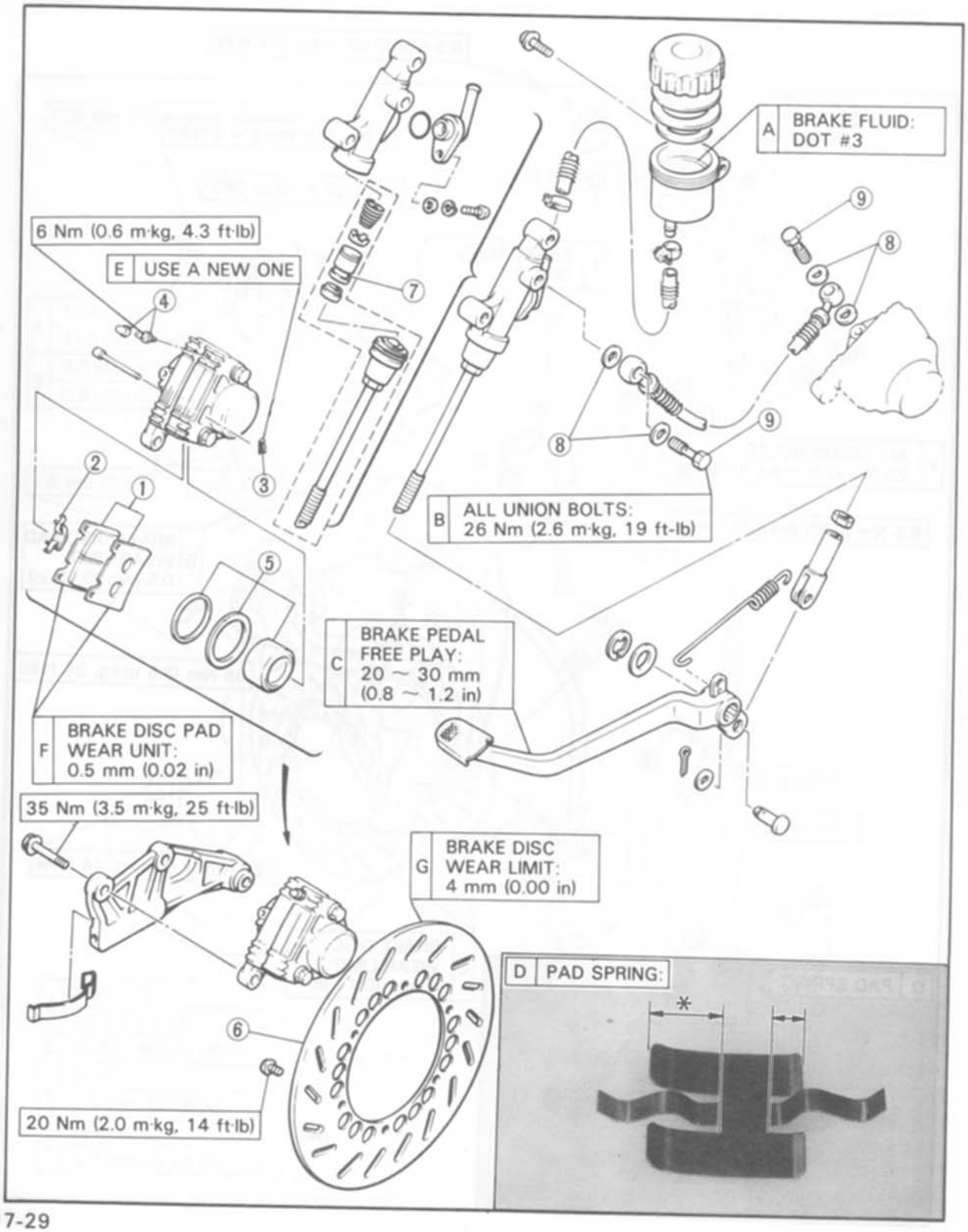
* Install the pad spring with its longer tangs in the disc rotation direction.



REAR BRAKE

1. Rear brake pad
2. Pad spring
3. Circlip
4. Bleed screw
5. Caliper piston assembly
6. Brake disc
7. Master cylinder kit
8. Copper washer
9. Union bolt

* Install the pad spring with its longer tangs in the disc rotation direction.

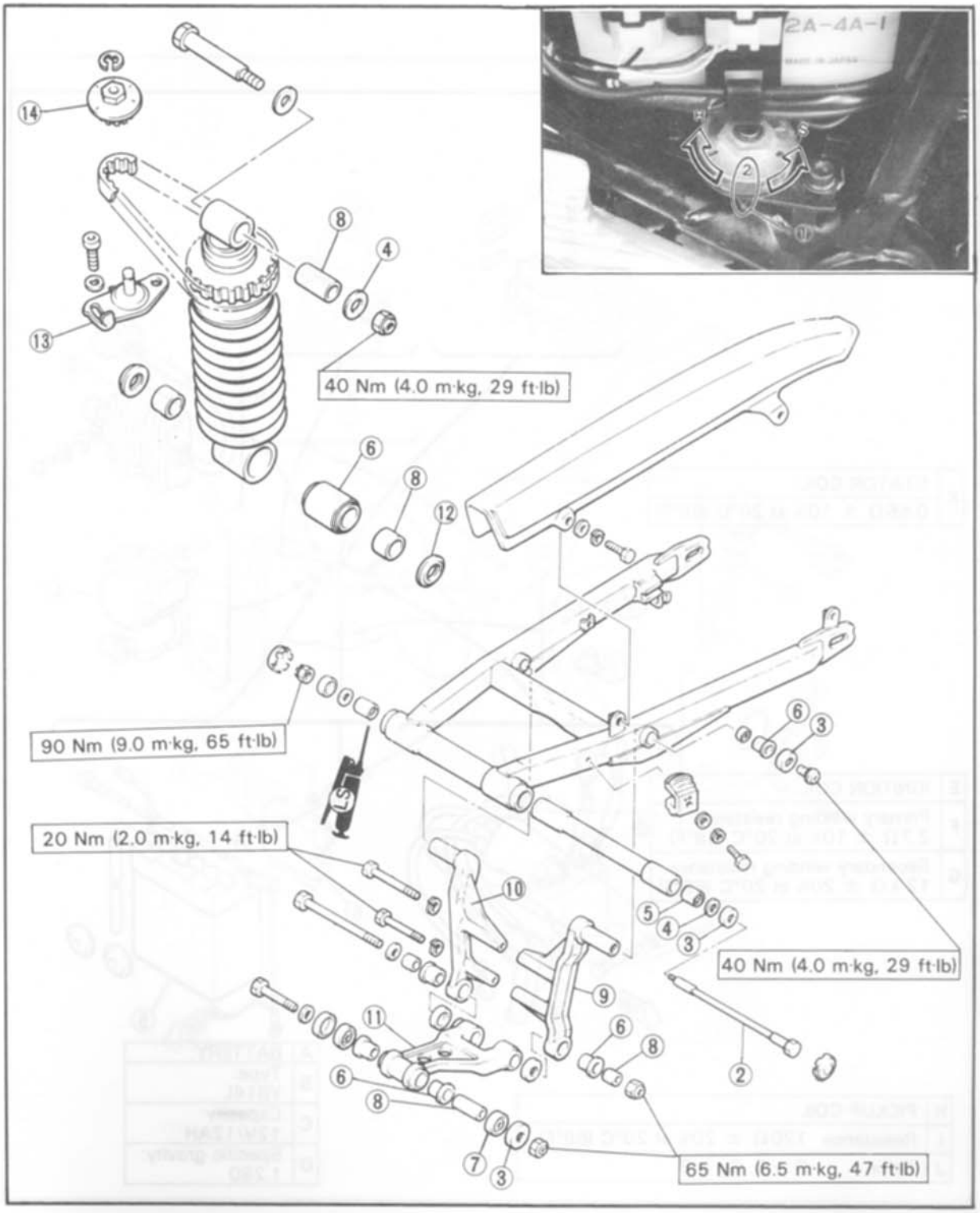


SWINGARM/REAR SHOCK ABSORBER

1. Spring preload match mark
2. Pivot shaft
3. Thrust cover
4. Plate washer
5. Bearing
6. Bushing
7. Oil seal
8. Collar
9. Arm 1
10. Arm 2
11. Relay arm
12. Dust cover
13. Pulley bracket
14. Pulley

SPRING PRELOAD ADJUSTMENT:

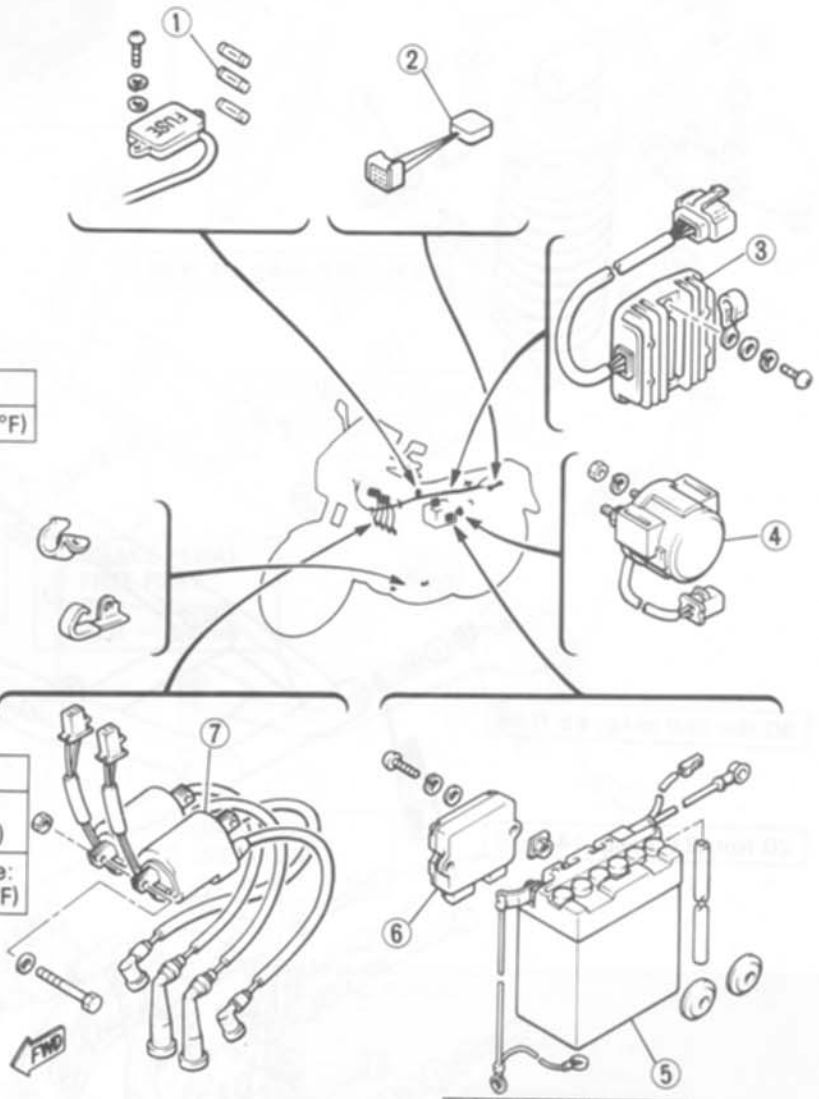
	H			STD	S
Adjusting position	5	4	3	2	1



7

ELECTRICAL COMPONENTS 1

1. Fuse
2. Diode
3. Rectifier/Regulator
4. Starter relay
5. Battery
6. Igniter unit
7. Ignition coil assembly



K	STATOR COIL:
	0.55 Ω ± 10% at 20°C (68°F)

E	IGNITION COIL:
F	Primary winding resistance: 2.7 Ω ± 10% at 20°C (68°F)
G	Secondary winding resistance: 12 kΩ ± 20% at 20°C (68°F)

H	PICKUP COIL:
I	Resistance 120 Ω ± 20% at 20°C (68°F)
J	Color O – B, Gy – B

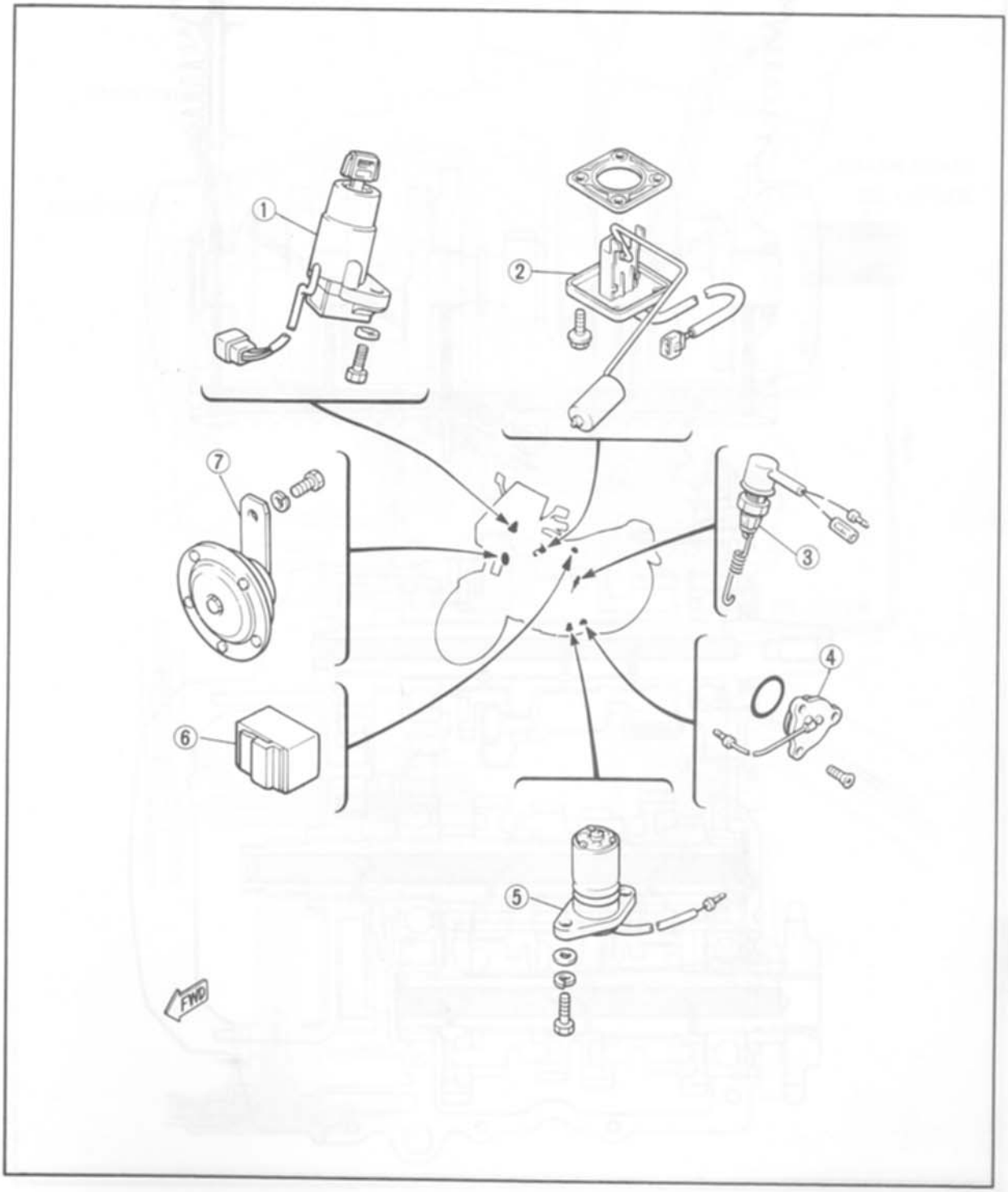
A	BATTERY:
B	Type: YB14L
C	Capacity: 12V/12AH
D	Specific gravity: 1.280

7

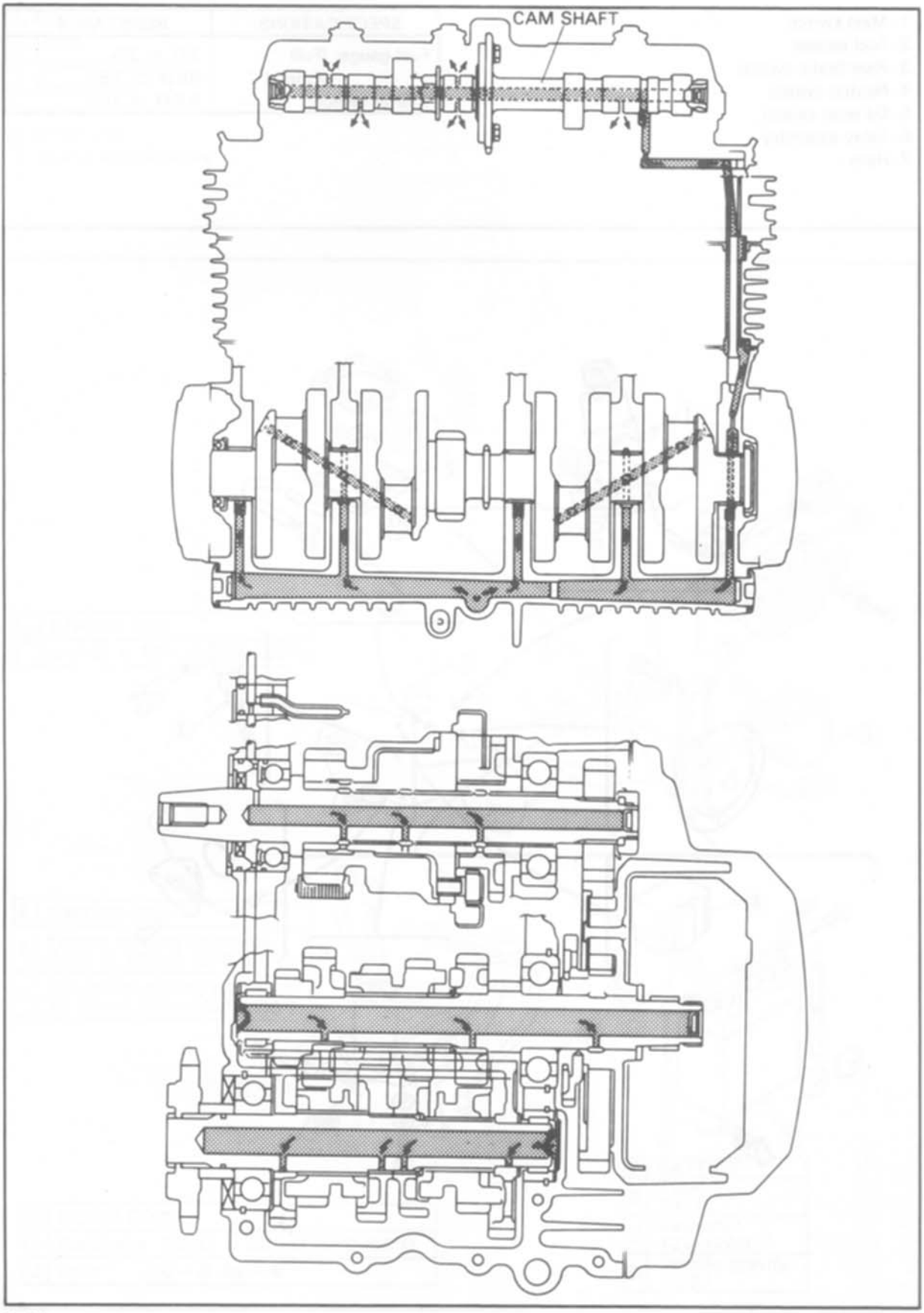
ELECTRICAL COMPONENTS 2

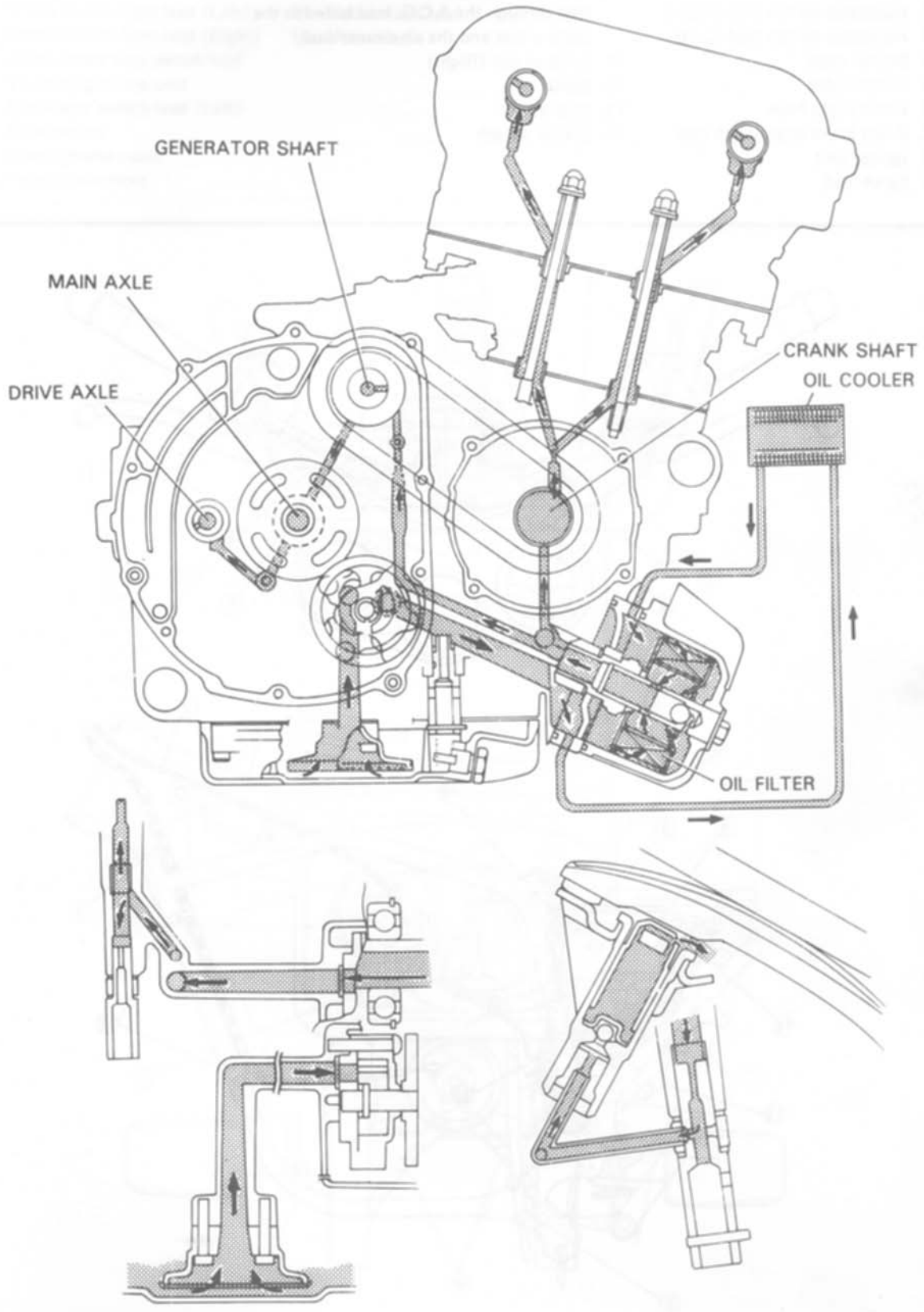
1. Main switch
2. Fuel sendor
3. Rear brake switch
4. Neutral switch
5. Oil level switch
6. Relay assembly
7. Horn

SPECIFICATIONS:	RESISTANCE:
Fuel gauge: (Full)	7Ω ± 5%
(Empty)	95Ω ± 7.5%
Starter switch:	9.5Ω ± 10%



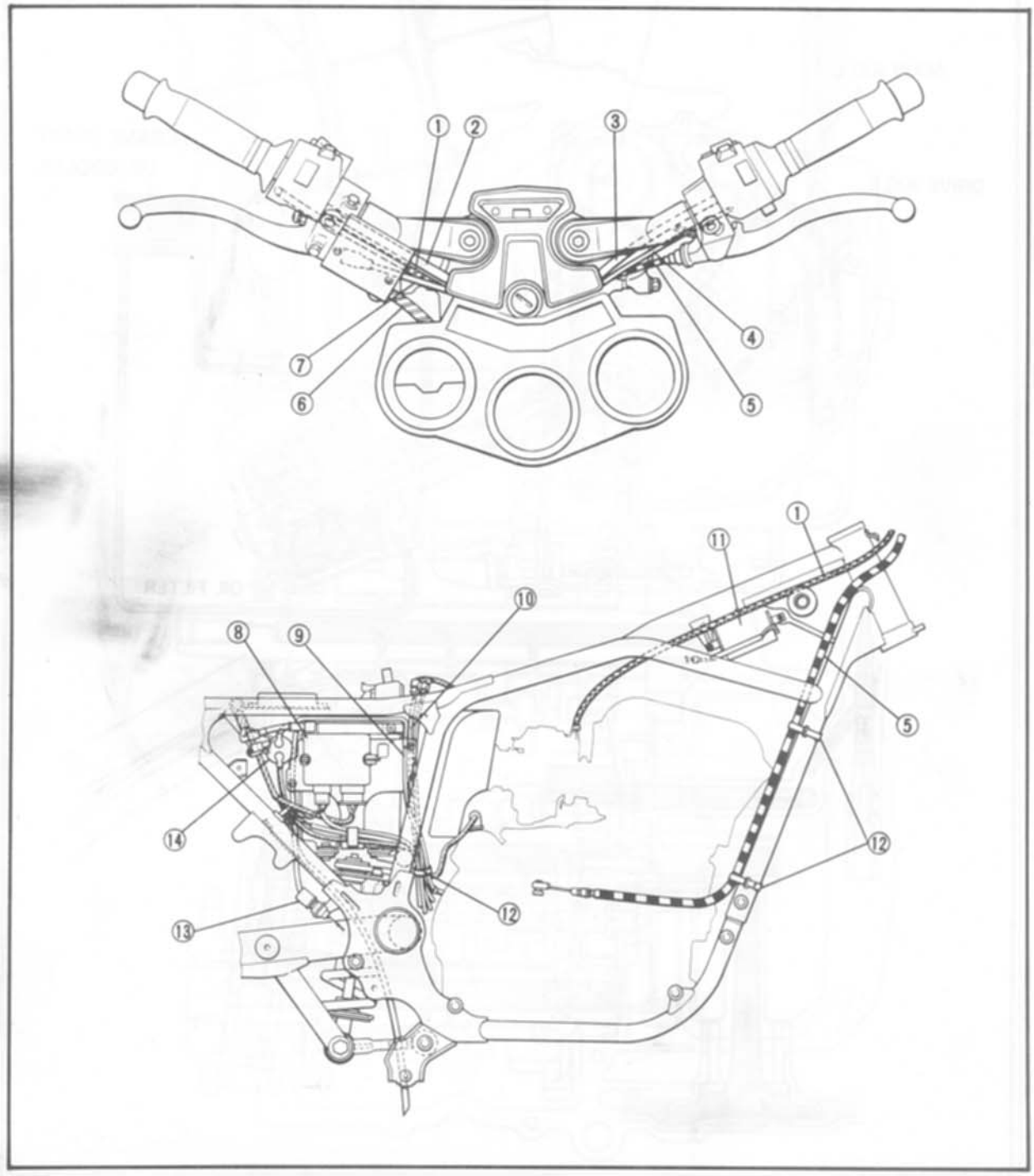
LUBRICATION DIAGRAM




GENERATOR SHAFT
MAIN AXLE
DRIVE AXLE
CRANK SHAFT
OIL COOLER
OIL FILTER

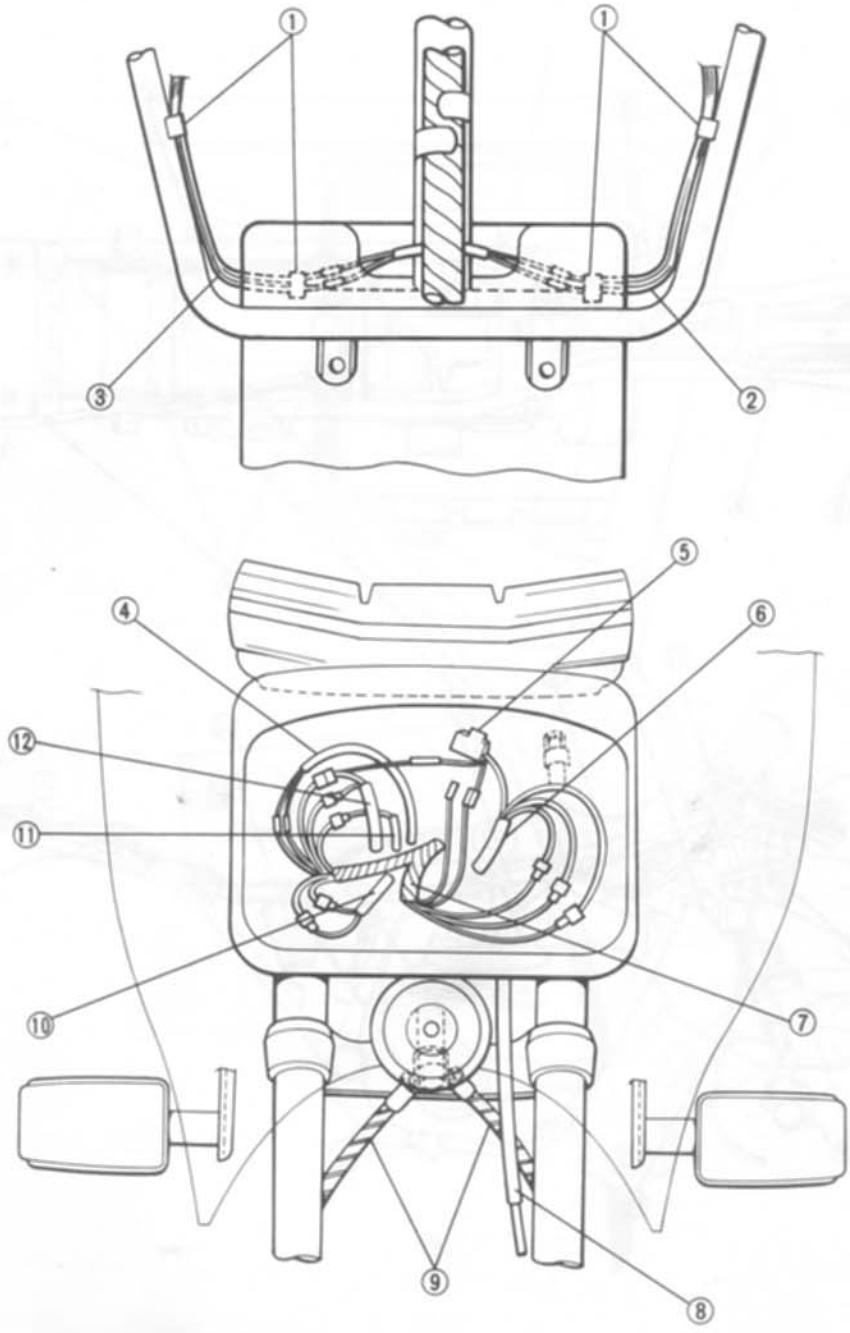
CABLE ROUTING (1)

1. Throttle cable
2. Handlebar switch lead (Right)
3. Handlebar switch lead (Left)
4. Starter cable
5. Clutch cable
6. Front brake hose
7. Front brake stop switch lead
8. Ignitor unit
9. Earth lead
10. A.C.G. lead:
    Pass through the A.C.G. lead between the battery box and the air cleaner case.
11. Ignition coil (Right)
12. Band
13. Stop switch
14. Starter switch



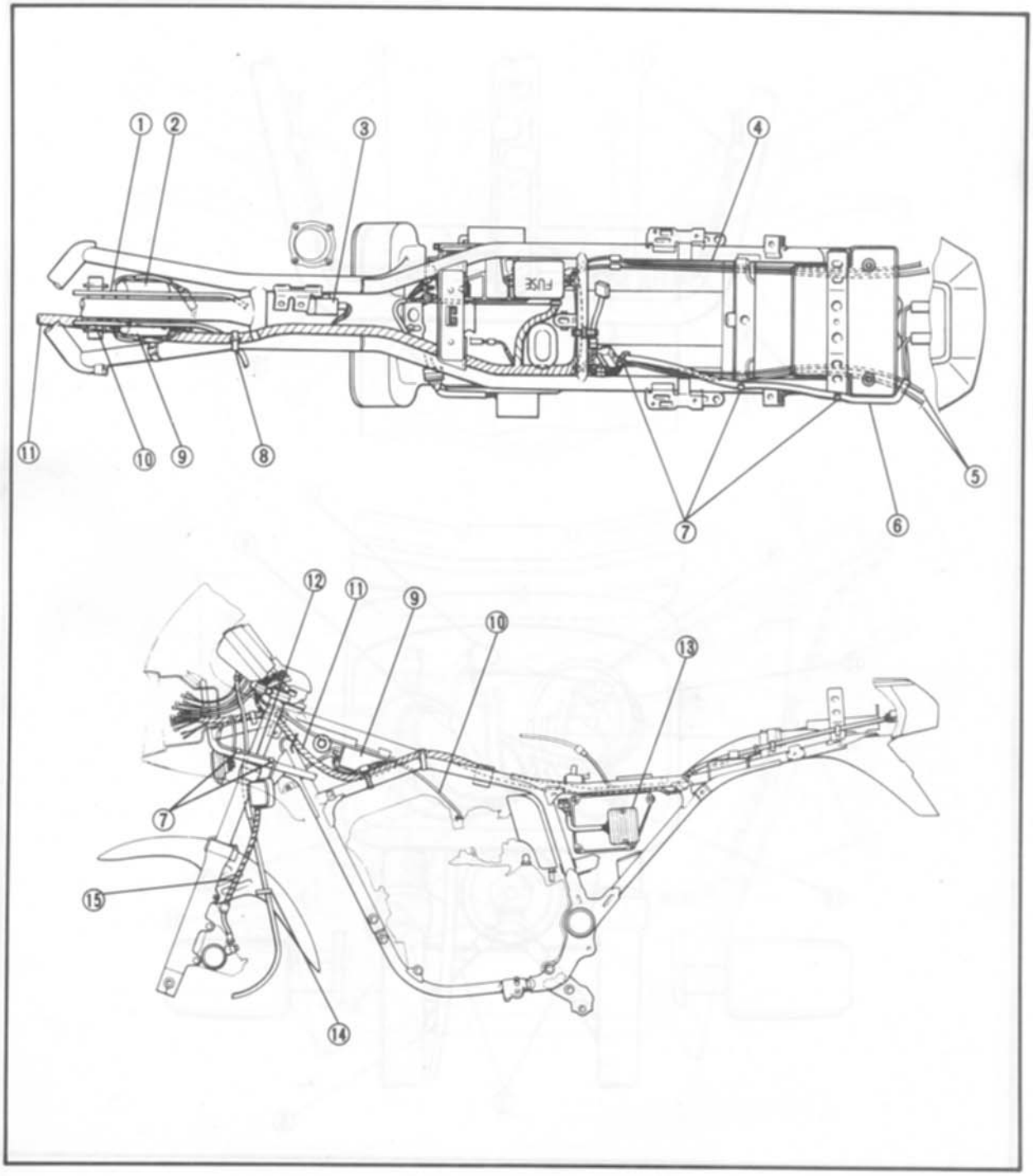
CABLE ROUTING (2)

1. Clamp
2. Front flasher light lead (Left)
3. Front flasher light lead (Right)
4. Front brake stop switch lead
5. To headlight lens unit
6. Handlebar switch lead (Left)
7. Wireharness
8. Speedometer cable
9. Front brake hose
10. Handlebar switch lead (Right)
11. Main switch lead
12. Meter lead



CABLE ROUTING (3)

1. Throttle cable
2. Ignition coil (Right)
3. Flasher light relay
4. Rear flasher light lead (Right)
5. Rear flasher light lead (Left)
6. Taillight lead
7. Clamp
8. Clamp the wireharness only with the band.
9. Ignition coil (Left)
10. Starter cable
11. Wireharness
12. Front flasher light lead (Left)
13. Rectifier with regulator
14. Pass the speedometer cable through the cable guide.
15. Front brake hose



CABLE ROUTING (4)

1. Battery breather pipe
2. Battery
3. Pass the battery breather pipe through the front hole on the relay arm.