
FZ
YAMAHA

General Spec.

Engine

Cylinder Head.....
Cylinder.....
Crankshaft - Piston.....

Valve.....

Camshaft - Chain.....

Water Pump, Piping.....

Raiator - Hose.....
Oil Pump.....
Oil Cleaner.....
Intake.....
Carburator.....
Exhaust.....
Crankcase.....
Crankcase Cover.....
Starter.....
Clutch.....
Transmission.....
Shift Cam - Fork.....
Shift Shaft.....

Chassis

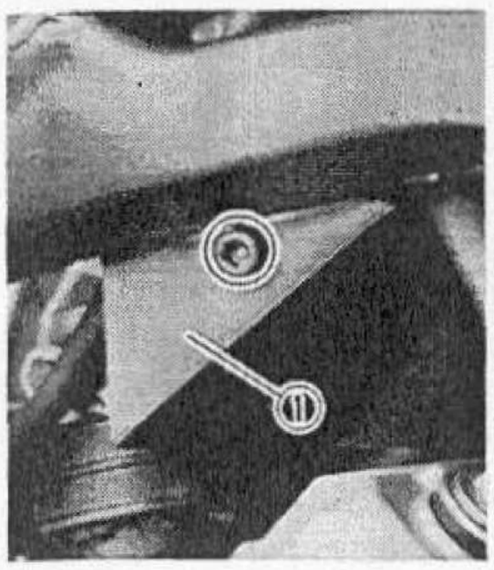
Frame.....
Fender.....
Side Cover.....

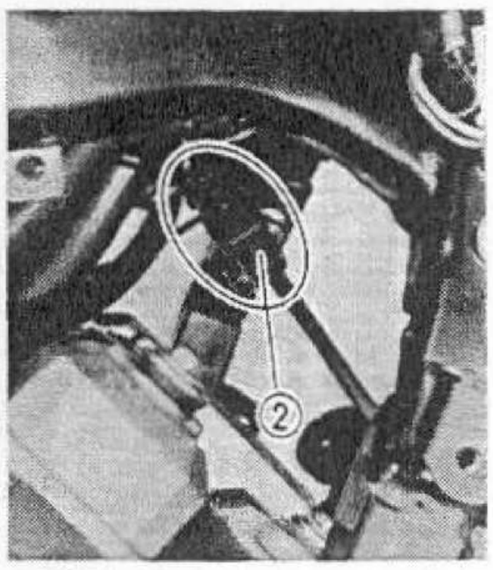
Rear Arm - Suspension.....

Steering.....

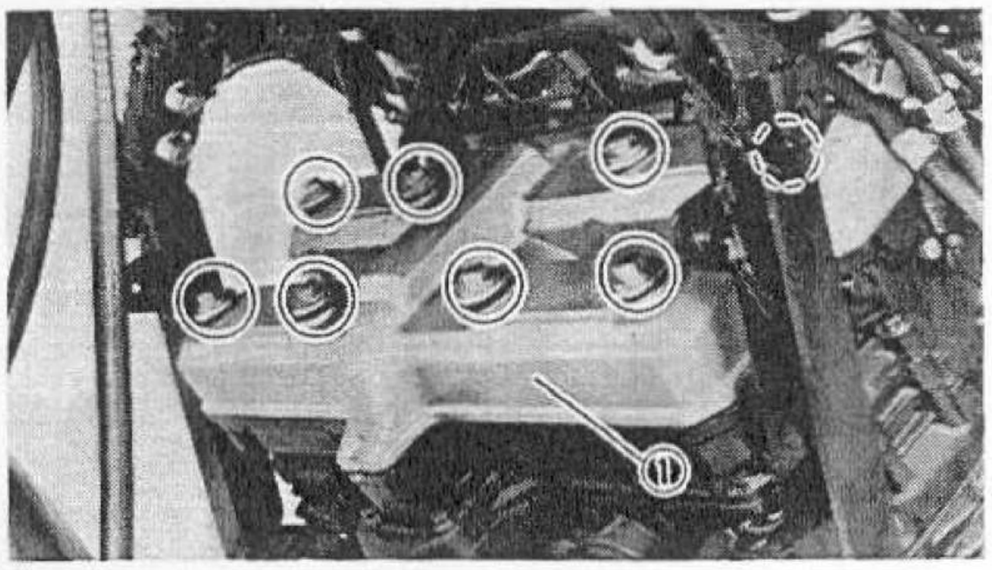
Front Fork.....

Fuel Tank.....
Seat.....
Front Wheel.....
Front Break Caliper.....
Rear Wheel.....
Rear Breake Caliper.....
Stearing Handle - Cable.....
Front Master Cylinder.....
Front Master Cylinder 2.....
Stand - Footrest.....
Rear Master Cylinder.....
Generator.....
Pick up Coll - Covernor.....
Starting Motor.....
Flasher Light.....
Meter.....
Headlight.....
Taillight.....
Handle Switch Lever.....
Electrical 1.....
Electrical.....

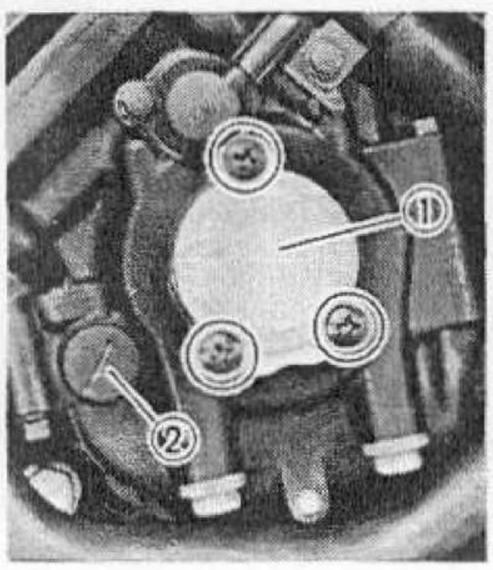


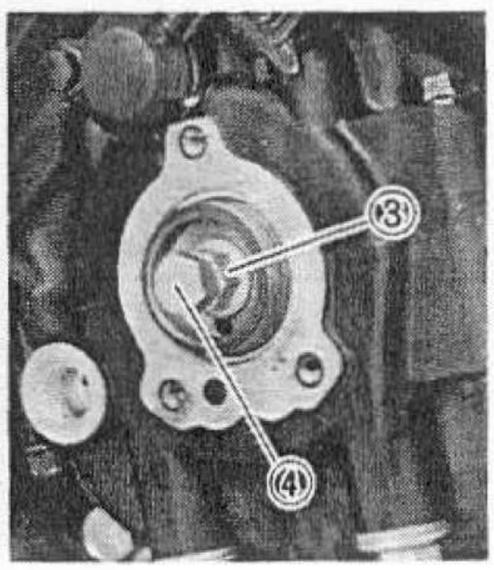


6. Remove:
   - Air baffle plates ①
7. Disconnect:
   - Electric fan motor coupler ②
8. Remove:
   - Radiator assembly



9. Remove:
   - Cylinder head cover ①





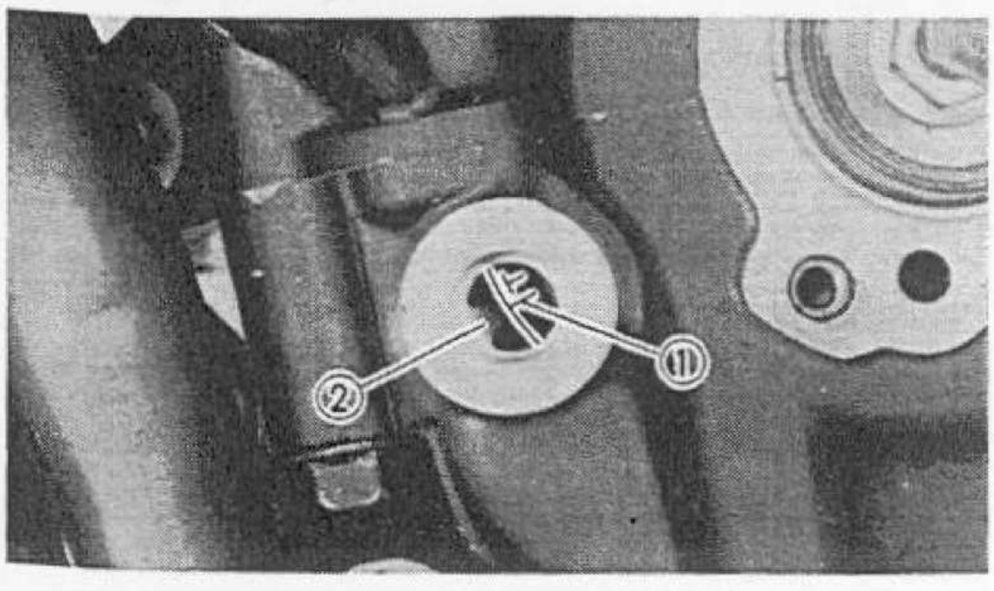
10. Remove:
    - Left crankshaft end cover ①
    - Plug screw ②
11. Install:
    - Locknut ③
    - Bolt (8 mm) ④
      (into left crankshaft end)
12. Lock:
    - Locknut

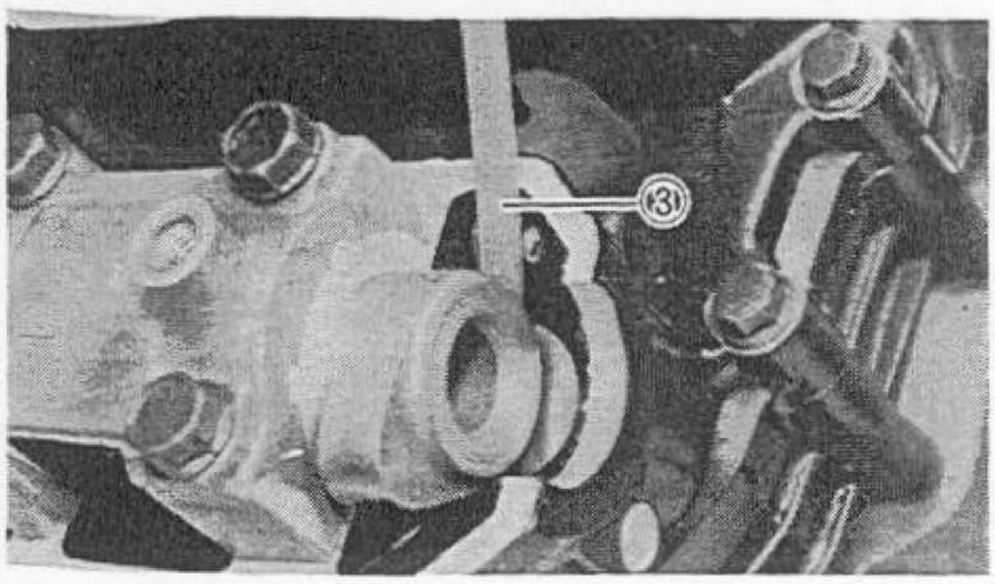
Valve Clearance Measurement

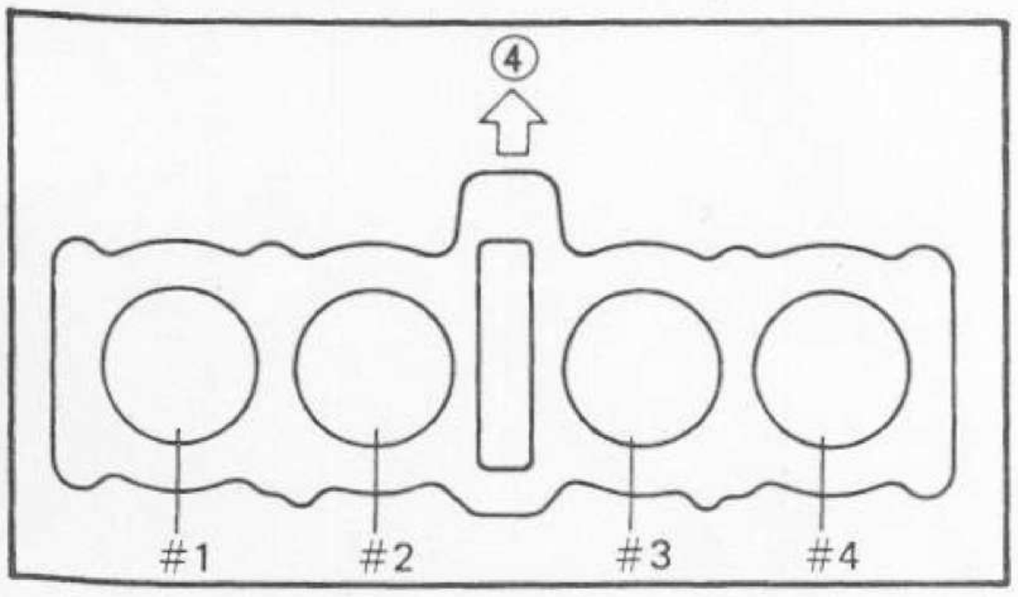
1. Measure:
   - Valve clearance

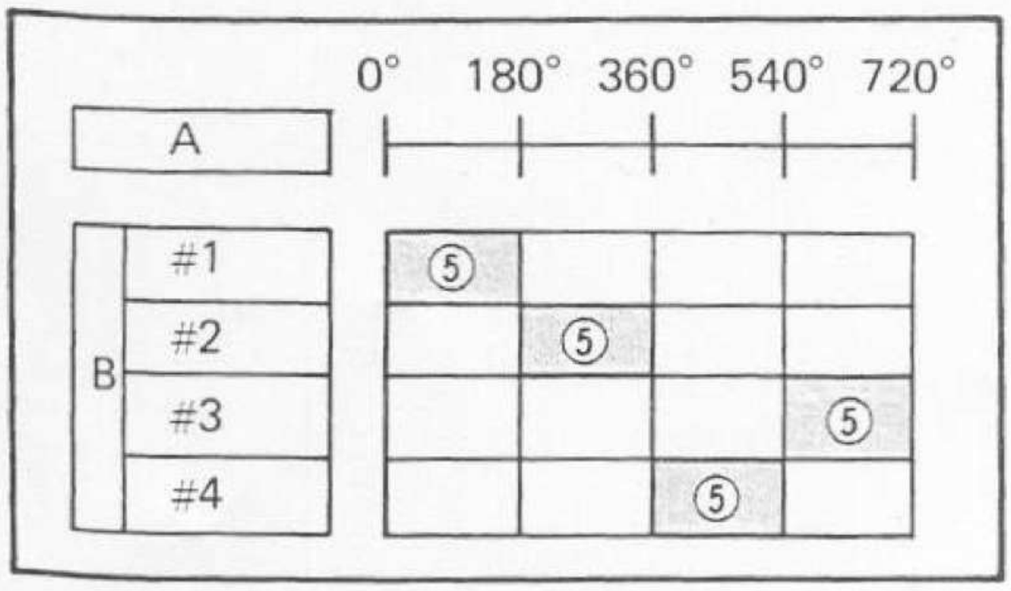
NOTE:
- Be sure piston is at Top Dead Center (TDC) on compression stroke when measuring clearance.
- Valve clearance must be measured when the engine is cool to the touch.

VALVE CLEARANCE ADJUSTMENT









Valve clearance measurement steps:

- Turn the crankshaft counterclockwise
- Align the "T" mark ① on the crankshaft web with the stationary pointer ② when #1 piston is at TDC on compression stroke.
- Measure the valve clearance using Feeler Gauge③.
- Record the measured amount if the clearance is incorrect.

Intake Valve (cold):
0.11 ~ 0.20 mm
(0.0043 ~ 0.0079 in)

Exhaust Valve (cold):
0.21 ~ 0.30 mm
(0.0083 ~ 0.0118 in)

- Measure valve clearance, in sequence, for #2, 4, and #3 cylinders.
  Out of specification → Adjust clearance.

Firing Sequence:
1 – 2 – 4 – 3

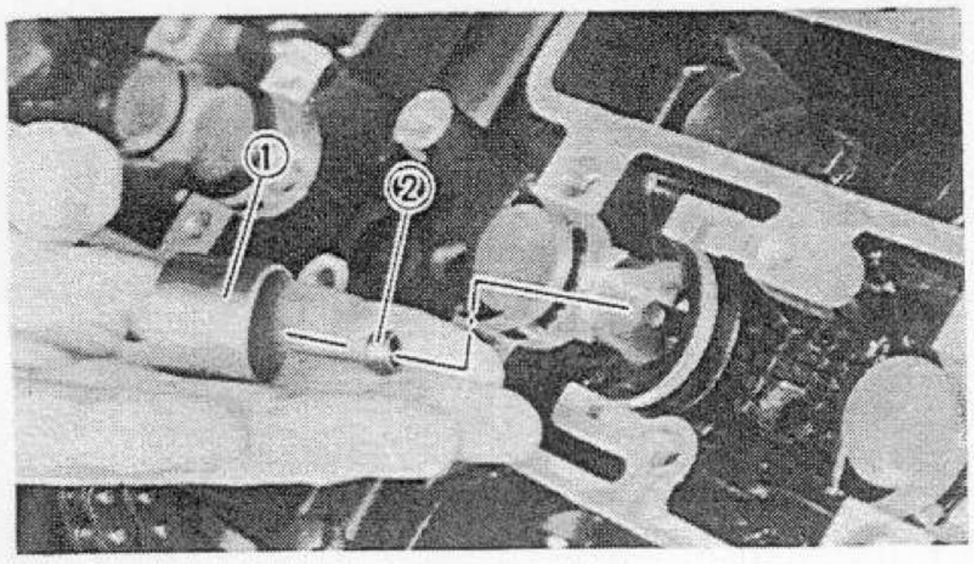
④ Front

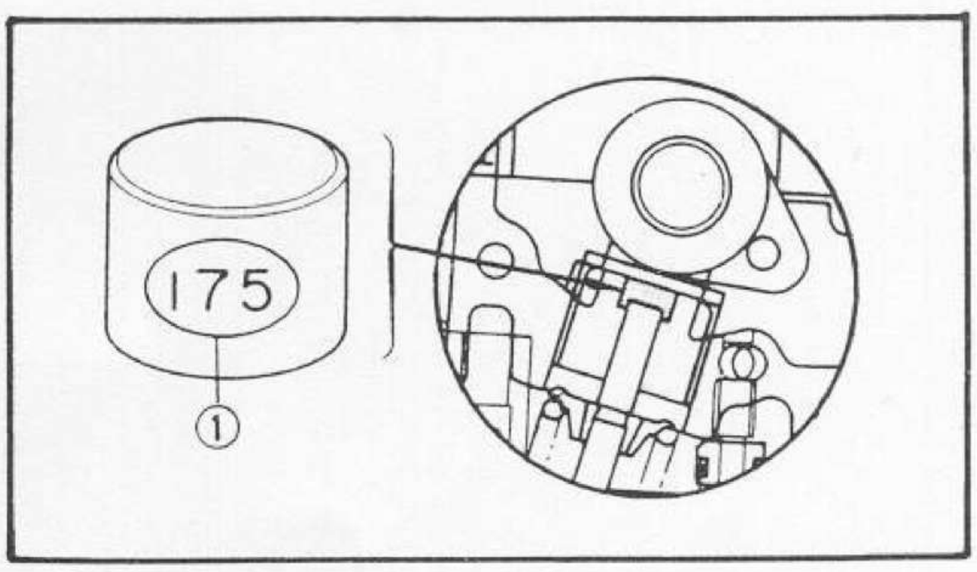
NOTE:
Turn crankshaft each degrees counterclockwise from #1 Cylinder TDC.

#2 Cylinder	180 degrees
#4 Cylinder	360 degrees
#3 Cylinder	540 degrees

Ⓐ Crankshaft counterclockwise turning angle.
Ⓑ Cylinder
⑤ Combustion

- If the clearance is correct, follow the Assembly steps.
- If the clearance is incorrect follow the Adjusting Pad Replacement steps.





Adjusting Pad Replacement

1. Remove:
   - Upper chain guide
   - Camshaft cap
   - Exhaust side chain guide
   - Tensioner assembly
   - Camshafts

NOTE:
Refer to CAMSHAFT AND CYLINDER HEAD step 4 to 10 of the ENGINE DISASSEMBLY (CHAPTER 3).

2. Remove:
   - Valve lifter ①
   - Pad ②

   (of the incorrect valve clearance)
   Note the installed pud number

3. Select:
   - Proper pad

Proper pad selection steps:
- Select the proper pad from the chart below:

Pad range		Pad Availability: 25 increments
No. 120 ~ No. 240	1.20 mm (0.047 in) 2.40 mm (0.094 in)	Pads stepped in 0.05 mm (0.002 in) increments

NOTE:
Thickness ① of each pad is marked on the pad side wall.

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

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

VALVE CLEARANCE ADJUSTMENT

INTAKE

B MEASURED CLEARANCE	A INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	**170**	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02				120	125	130	135	140	145	150	**155**	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.03 ~ 0.07			120	125	130	135	140	145	150	155	**160**	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.08 ~ 0.10		120	125	130	135	140	145	150	155	160	**165**	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.11 ~ 0.20	RECOMMENDED CLEARANCE																								
0.21 ~ 0.22	125	130	135	140	145	150	155	160	165	170	**175**	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.23 ~ 0.27	**130**	**135**	**140**	**145**	**150**	**155**	**160**	**165**	**170**	**175**	**180**	185	190	195	200	205	210	215	220	225	230	235	240		
0.28 ~ 0.32	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.33 ~ 0.37	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.38 ~ 0.42	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.43 ~ 0.47	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.48 ~ 0.52	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.53 ~ 0.57	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.58 ~ 0.62	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.63 ~ 0.67	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.68 ~ 0.72	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.73 ~ 0.77	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.78 ~ 0.82	185	190	195	200	205	210	215	220	225	230	235	240													
0.83 ~ 0.87	190	195	200	205	210	215	220	225	230	235	240														
0.88 ~ 0.92	195	200	205	210	215	220	225	230	235	240															
0.93 ~ 0.97	200	205	210	215	220	225	230	235	240																
0.98 ~ 1.02	205	210	215	220	225	230	235	240																	
1.03 ~ 1.07	210	215	220	225	230	235	240																		
1.08 ~ 1.12	215	220	225	230	235	240																			
1.13 ~ 1.17	220	225	230	235	240																				
1.18 ~ 1.22	225	230	235	240																					
1.23 ~ 1.27	230	235	240																						
1.28 ~ 1.32	235	240																							
1.33 ~ 1.37	240																								

VALVE CLEARANCE (cold):
0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in)
Example: Installed is 170
Measured clearance is 0.24 mm (0.009 in)
Replace 170 pad with 180 pad

EXHAUST

B MEASURED CLEARANCE	A INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	**175**	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02						120	125	130	135	140	145	**150**	155	160	165	170	175	180	185	190	195	200	205	210	215
0.03 ~ 0.07					120	125	130	135	140	145	150	**155**	160	165	170	175	180	185	190	195	200	205	210	215	220
0.08 ~ 0.12				120	125	130	135	140	145	150	155	**160**	165	170	175	180	185	190	195	200	205	210	215	220	225
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	**165**	170	175	180	185	190	195	200	205	210	215	220	225	230
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	**170**	175	180	185	190	195	200	205	210	215	220	225	230	235
0.21 ~ 0.30	RECOMMENDED CLEARANCE																								
0.31 ~ 0.32	125	130	135	140	145	150	155	160	165	170	175	**180**	185	190	195	200	205	210	215	220	225	230	235	240	
0.33 ~ 0.37	**130**	**135**	**140**	**145**	**150**	**155**	**160**	**165**	**170**	**175**	**180**	**185**	190	195	200	205	210	215	220	225	230	235	240		
0.38 ~ 0.42	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.43 ~ 0.47	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.48 ~ 0.52	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.53 ~ 0.57	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.58 ~ 0.62	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.63 ~ 0.67	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.68 ~ 0.72	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.73 ~ 0.77	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.78 ~ 0.82	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.83 ~ 0.87	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.88 ~ 0.92	185	190	195	200	205	210	215	220	225	230	235	240													
0.93 ~ 0.97	190	195	200	205	210	215	220	225	230	235	240														
0.98 ~ 1.02	195	200	205	210	215	220	225	230	235	240															
1.03 ~ 1.07	200	205	210	215	220	225	230	235	240																
1.08 ~ 1.12	205	210	215	220	225	230	235	240																	
1.13 ~ 1.17	210	215	220	225	230	235	240																		
1.18 ~ 1.22	215	220	225	230	235	240																			
1.23 ~ 1.27	220	225	230	235	240																				
1.28 ~ 1.32	225	230	235	240																					
1.33 ~ 1.37	230	235	240																						
1.38 ~ 1.42	235	240																							
1.43 ~ 1.47	240																								

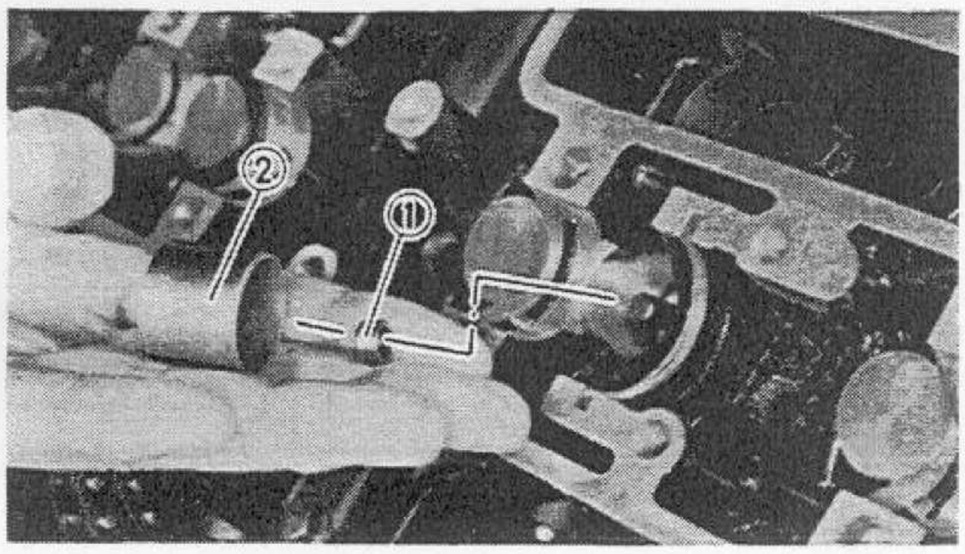
VALVE CLEARANCE (cold):
0.21 ~ 0.30 mm (0.0083 ~ 0.0118 in)
Example: Installed is 175
Measured clearance is 0.35 mm (0.014 in)
Replace 175 pad with 185 pad

EXAMPLE:
Installed pad number = 148 (1.48 mm)
Rounded off digit = 150

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

- Locate the "Rounded off 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.



4. Install:
   - New pad ①
   - Valve lifter ②

NOTE:
Apply molybdenum disulfide grease to the pad.

5. Install:
   - Camshafts
   - Cam chain sprockets
   - Camshaft caps

NOTE:
Refer to Camshaft step 1 to 3 and Cam Chain step 1 to 26 of the CYLINDER HEAD AND CAMSHAFT of ENGINE ASSEMBLY AND ADJUSTMENT (CHAPTER 3).

6. Measure:
   - Valve clearance

Valve clearance verification steps:
- Follow the valve clearance measurement steps.
- If the clearance is incorrect, repeat all Adjusting Pad Replacement steps until the proper clearance is obtained.

ENGINE ASSEMBLY AND ADJUSTMENT 3-42
LOWER CRANKCASE 3-42
UPPER CRANKCASE 3-44
CRANKCASE ASSEMBLY 3-47
OIL STRAINER AND OIL PAN 3-49
WATER PUMP 3-50
AC GENERATOR AND STARTER MOTOR 3-50
CHANGE LEVER AND OIL PUMP 3-51
CLUTCH 3-52
RIGHT CRANKCASE COVER 3-54
PISTON AND CYLINDER 3-55
CYLINDER HEAD AND CAMSHAFT 3-56
REMOUNTING ENGINE 3-65

ENGINE OVERHAUL

ENGINE REMOVAL

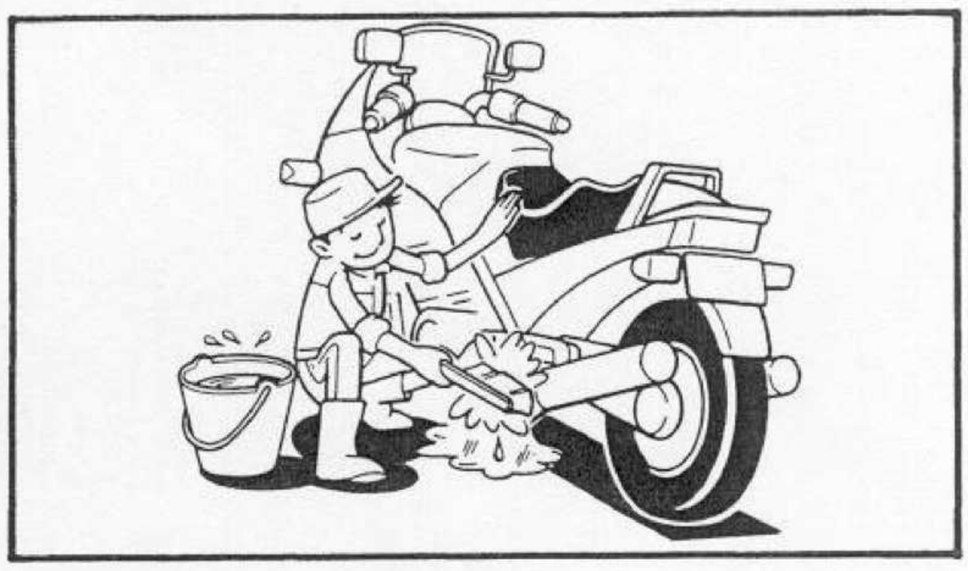
NOTE:

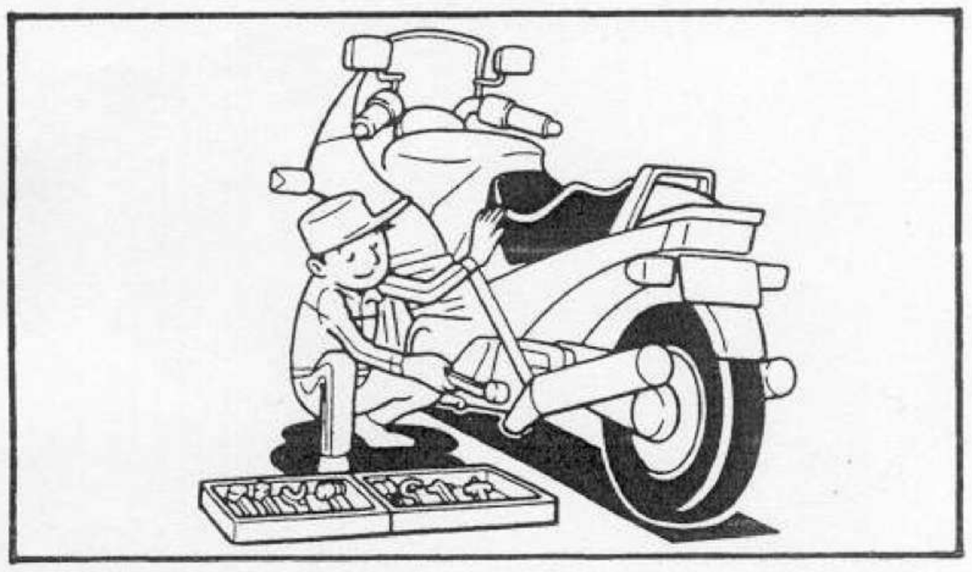
It is not necessary to remove the engine in order to remove the following components:

- Piston
- Clutch
- Carburetor
- AC Generator

PREPARATION FOR REMOVAL

1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.



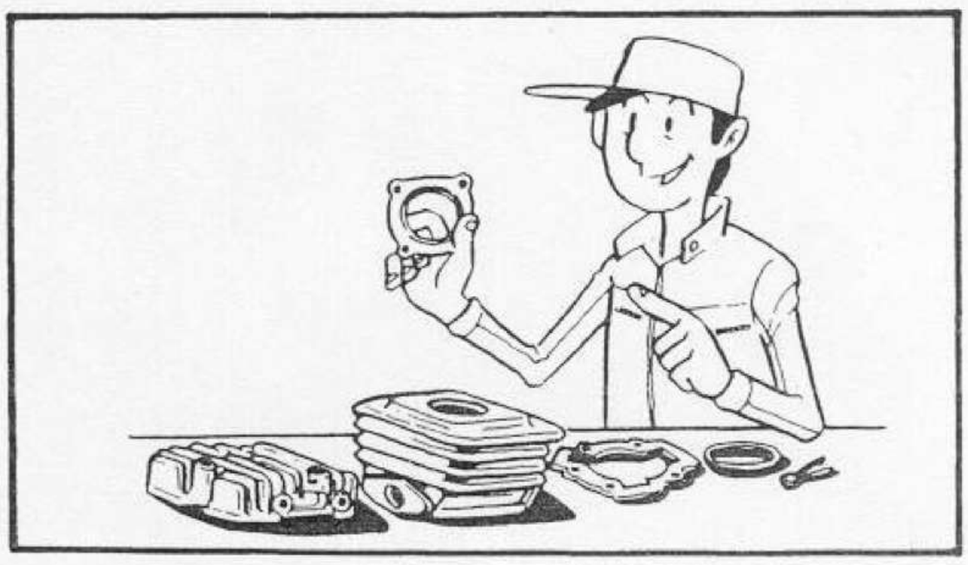


2. Use proper tools and cleaning equipment. Refer to CHAPTER 1, "SPECIAL TOOL".

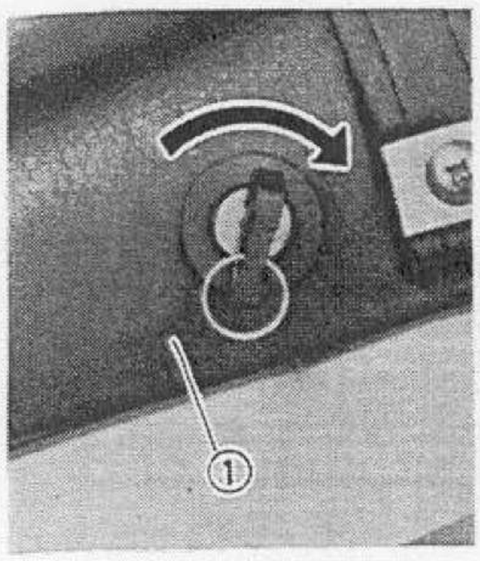


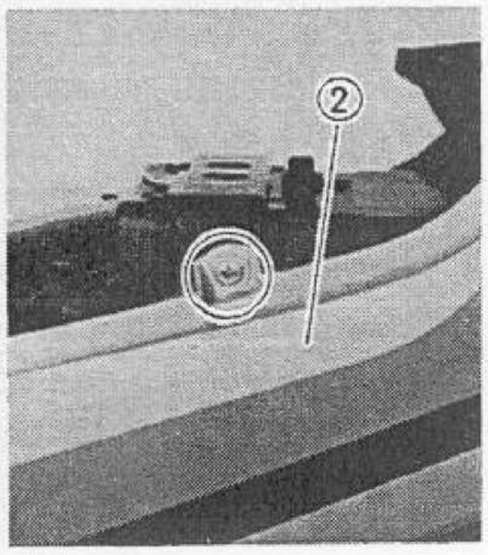
NOTE:

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.



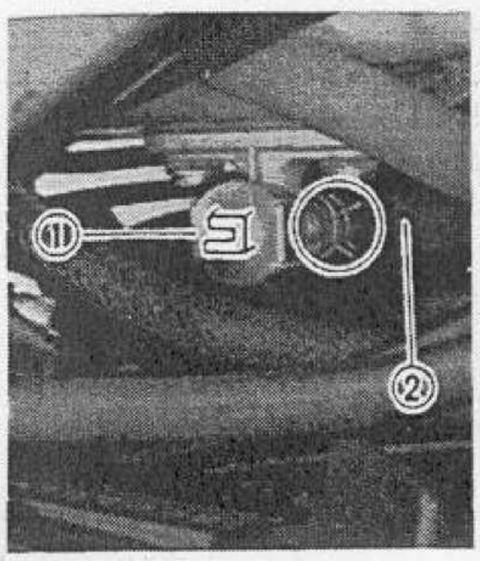
3. During the engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.
4. Drain engine oil completely.
5. Drain coolant completely.

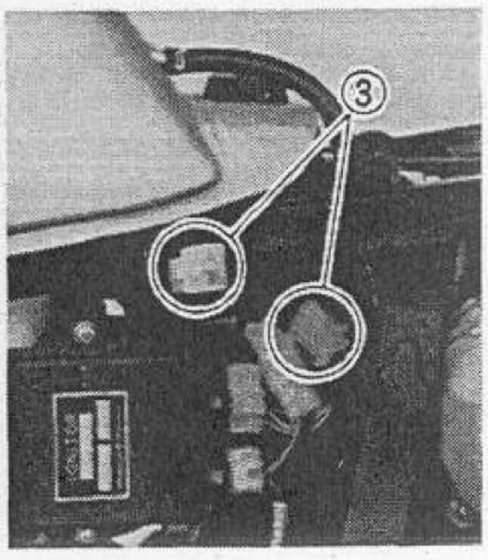




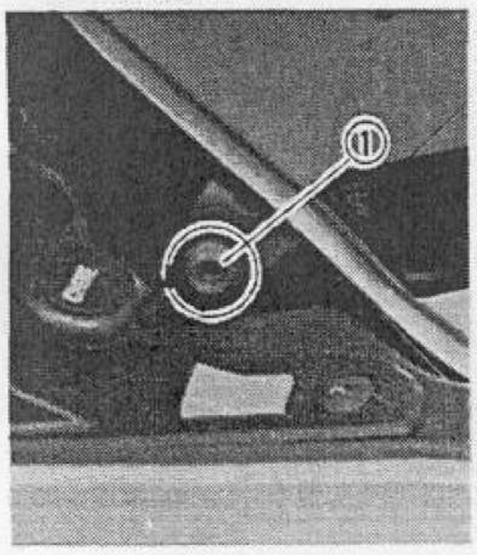
SEAT AND FUEL TANK

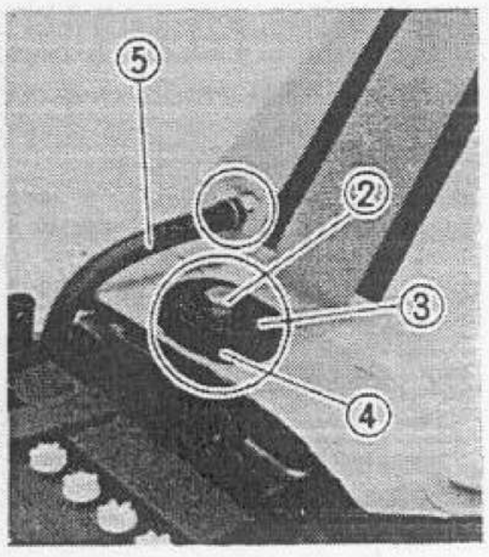
1. Remove:
   - Seat ①
   - Side covers (Left/Right) ②





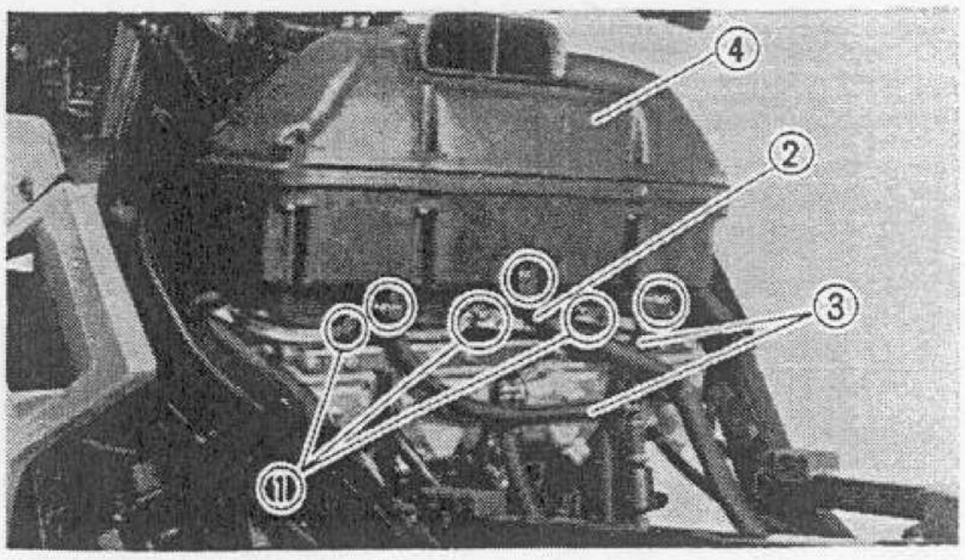
2. Turn the fuel cock to the "OFF" ① position.
3. Disconnect:
   - Fuel pipe ②
   - Fuel sender lead coupler ③



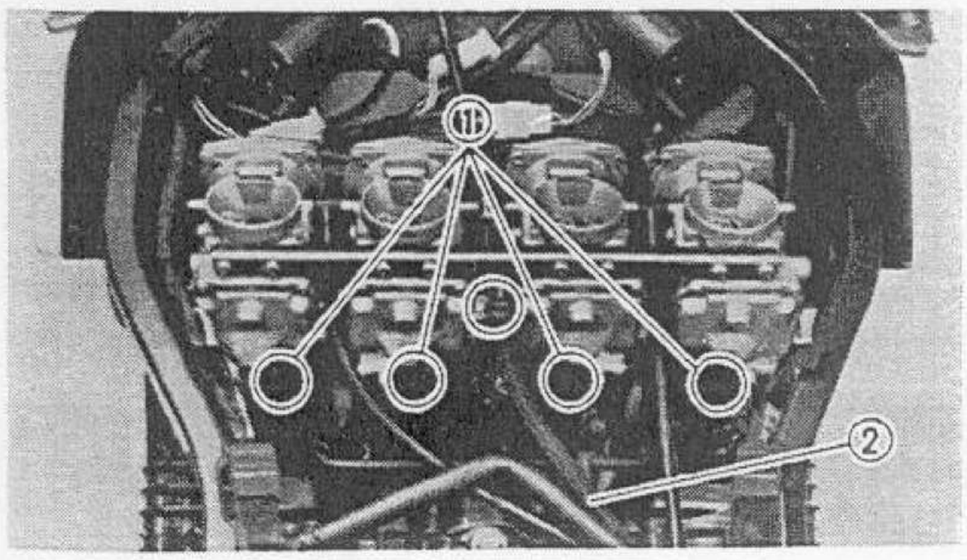


4. Remove:
   - Front fuel tank mounting screws ①
   - Rear fuel tank mounting bolt ②
   - Plate ③
   - Mounting rubber ④
   - Hose ⑤
   - Fuel tank

AIR CLEANER AND CARBURETOR

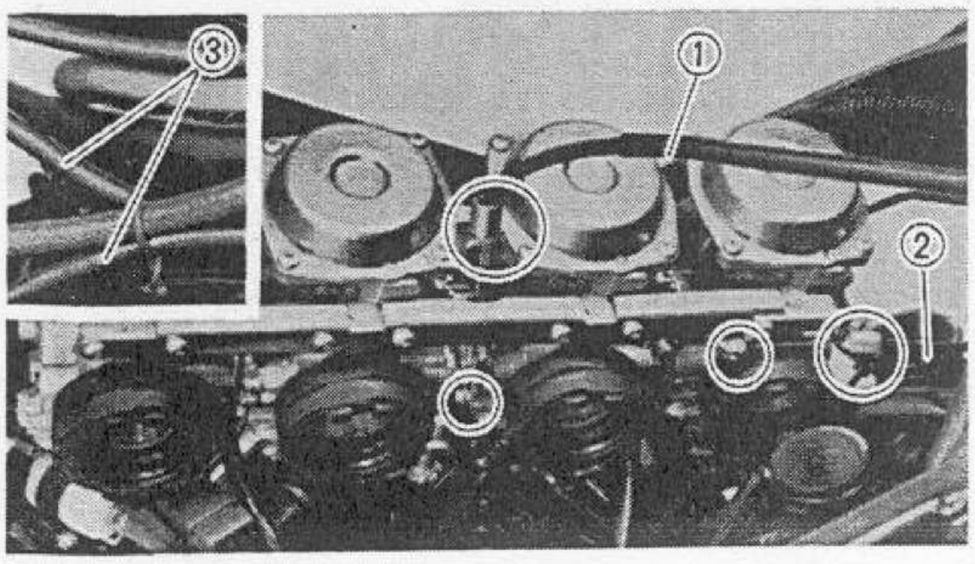


1. Loosen:
   - Air cleaner joint clamp screw ①
2. Disconnect:
   - Crankcase ventilation hose ②
   - Air vent hose ③
3. Remove:
   - Air cleaner assembly ④

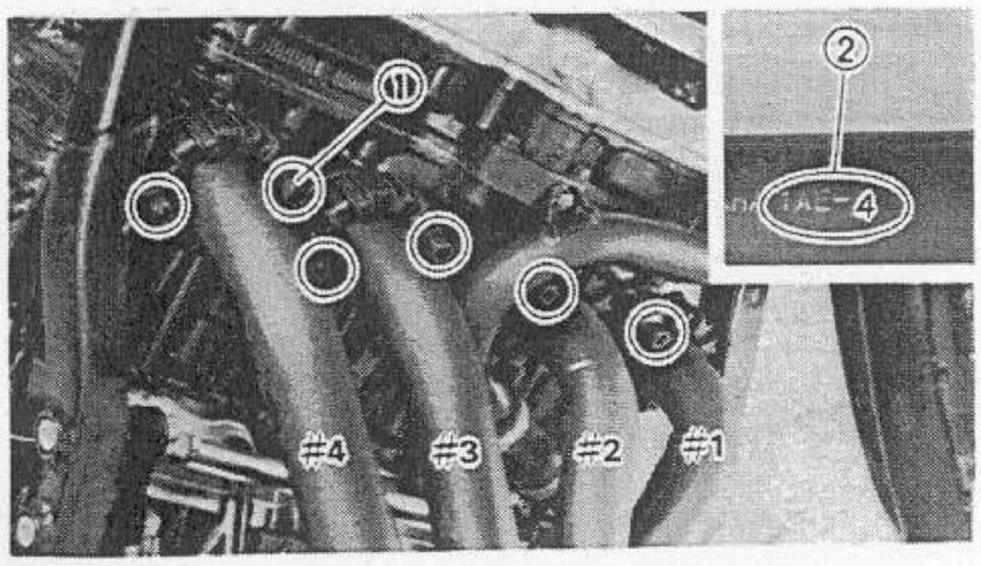


4. Loosen:
   - Carburetor joint clamp screw ①
5. Disconnect:
   - Fuel hose ②

ENGINE REMOVAL



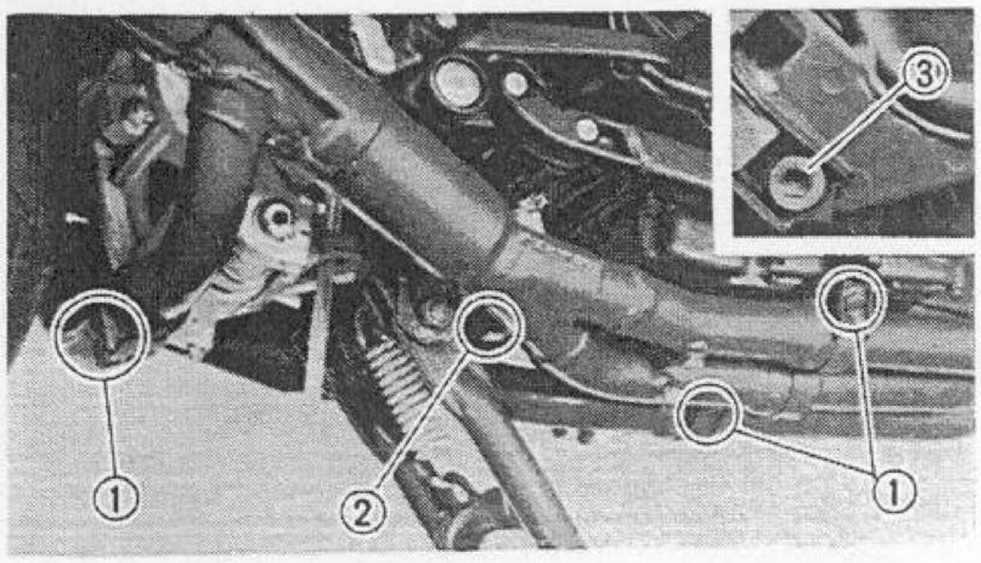
6. Disconnect:
   - Throttle cable ①
   - Choke cable ②
7. Remove:
   - Carbure air vent hose ③
   - Carburetor assembly



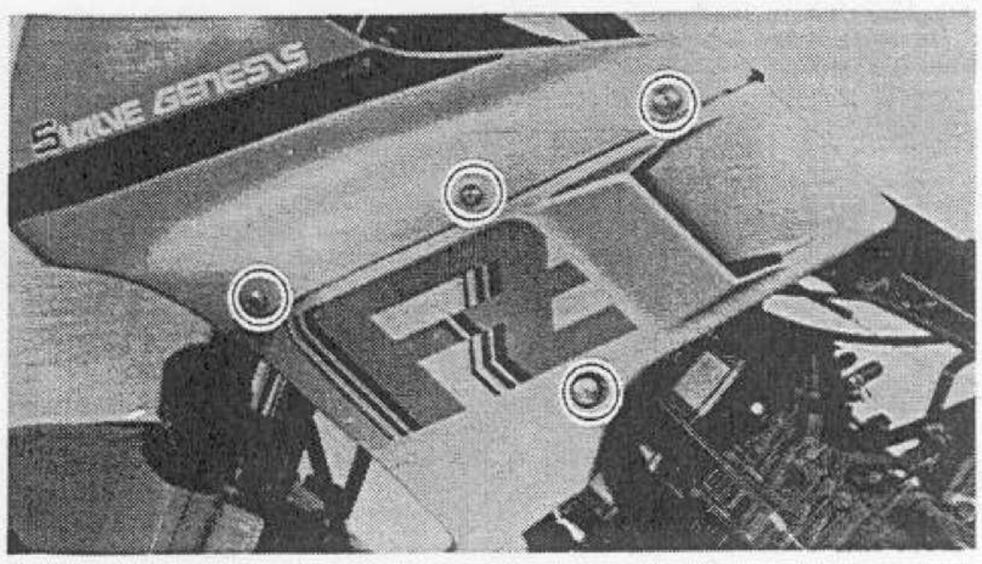
EXHAUST PIPE AND MUFFLER

1. Remove:
   - Exhaust pipe flange bolts ①

NOTE:
- Remove the #2 and #3 exhaust pipe before #1.
- Exhaust pipe number ② is mentioned at it's tail.

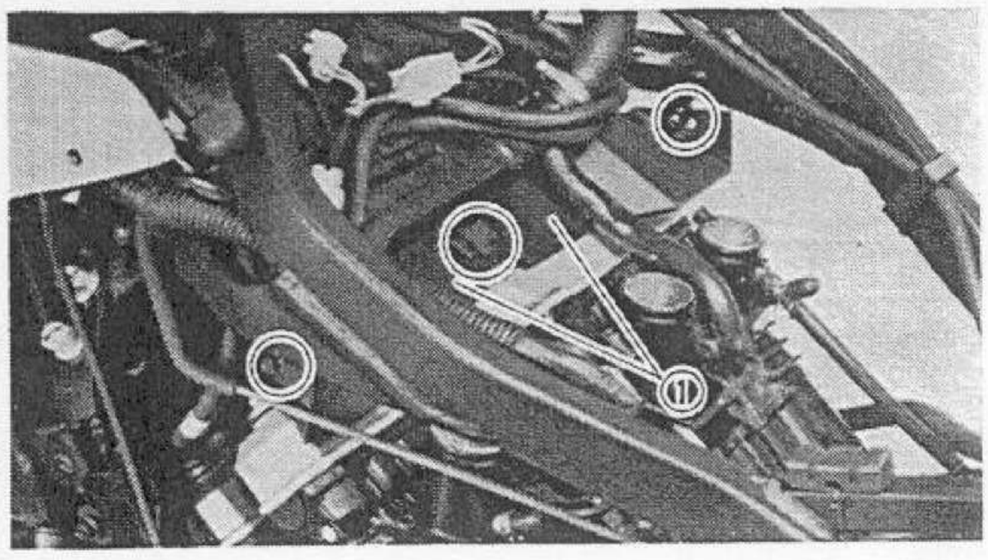


2. Loosen:
   - Muffler clamp bolts ①
3. Remove:
   - Muffler stay bolt ②
   - Muffler/Footrest bolt ③
   - Exhaust pipe
   - Muffler

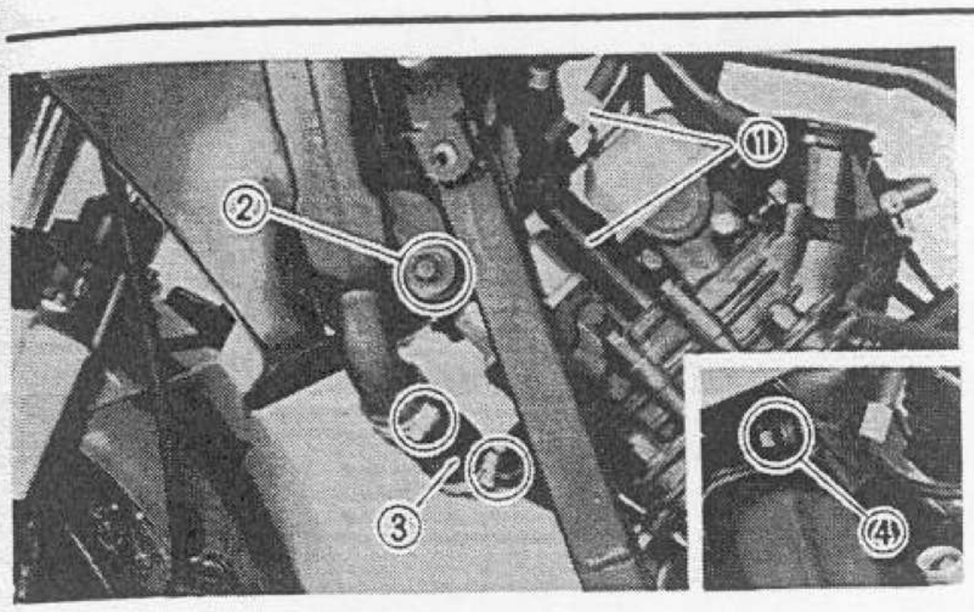


RADIATOR HOSE AND SPARK PLUG LEAD

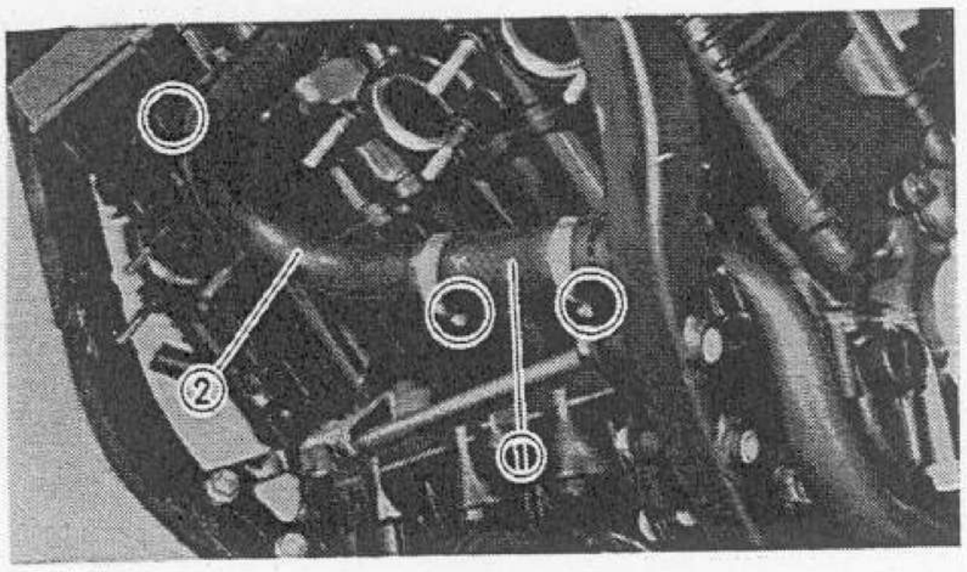
1. Remove:
   - Lower cowling



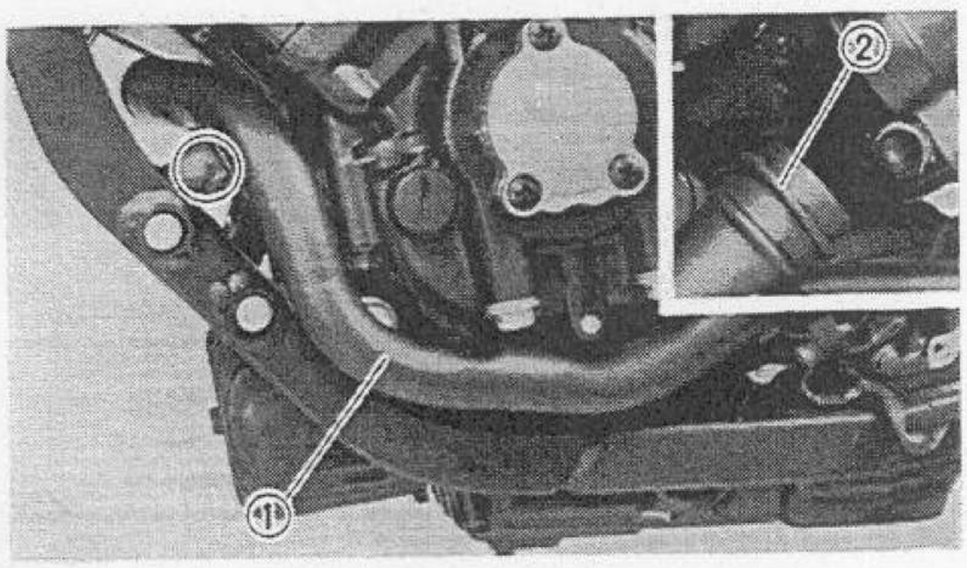
2. Remove:
   - Air baffle plates ①



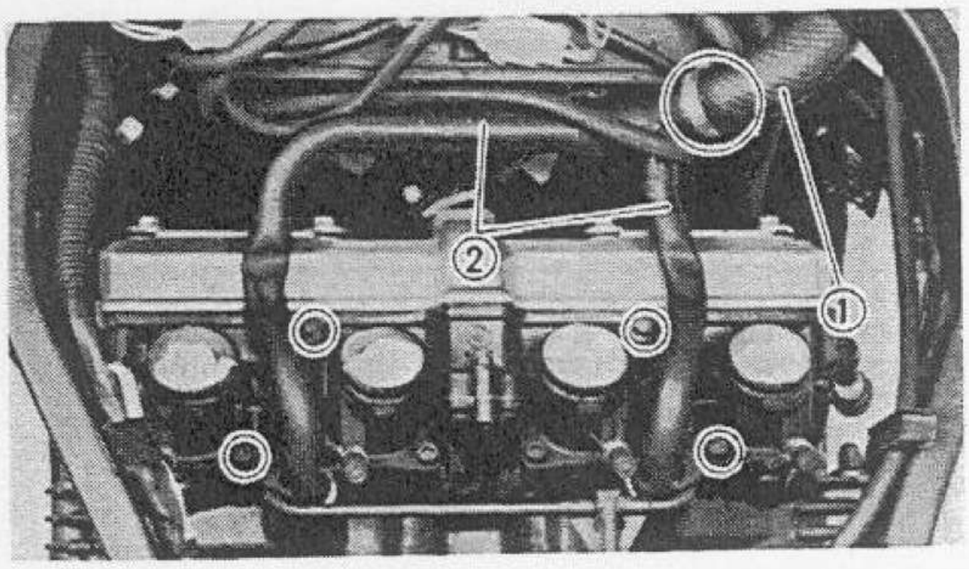
3. Remove:
   - Spark plug leads ①
   - Radiator lower bolts ②
   - Radiator hose ③
4. Loosen:
   - Radiator upper bolts ④



5. Remove:
   - Radiator hose ①
   - Middle radiator pipe ②

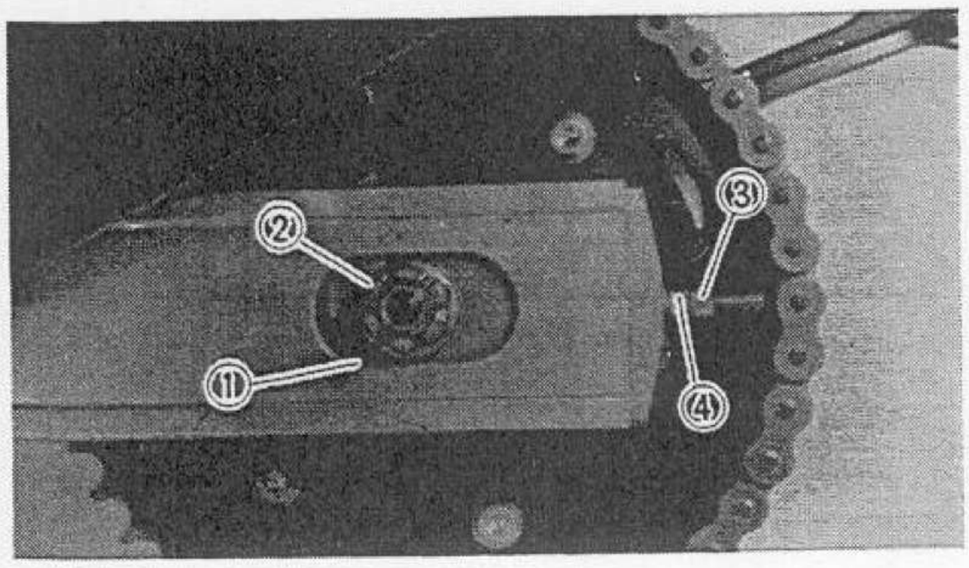


6. Remove:
   - Lower radiator pipe ①
   - O-ring ②



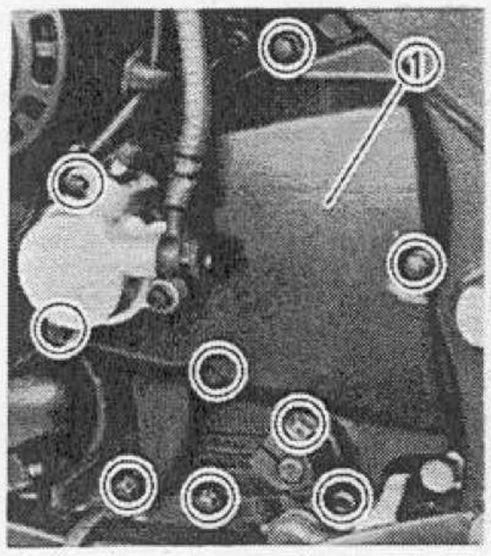
7. Disconnect:
   - Upper radiator hose ①
8. Remove:
   - Upper radiator pipe ②

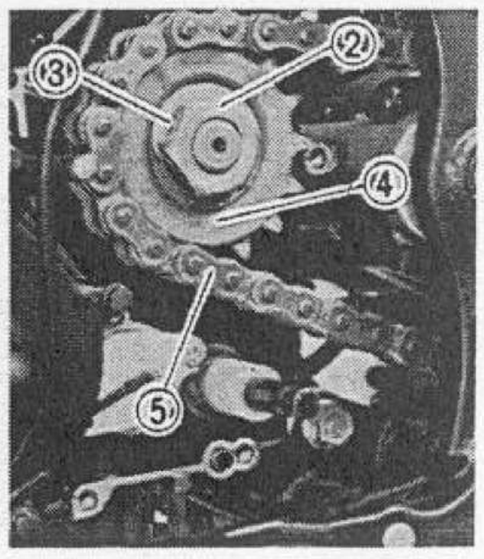
DRIVE CHAIN SPROCKET



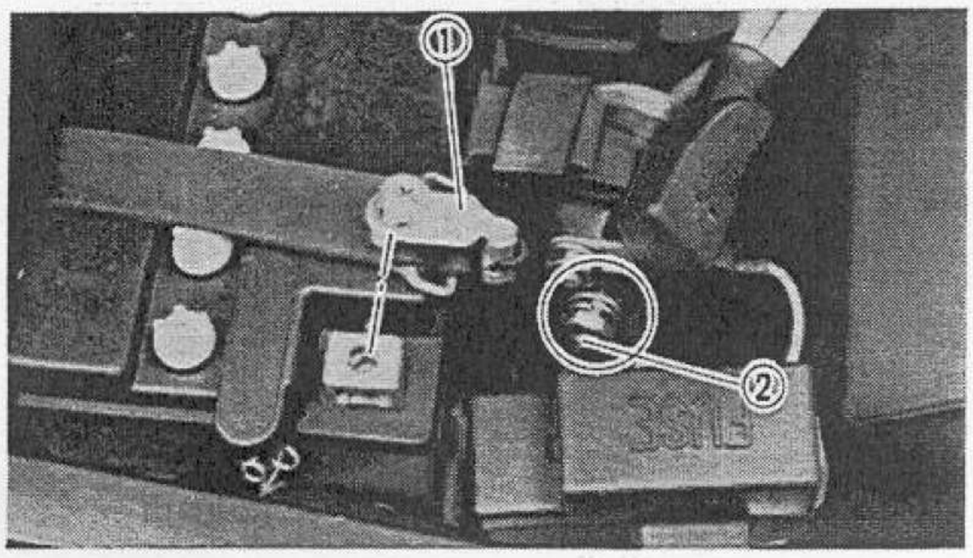
1. Remove:
   - Cotter pin ①
2. Loosen:
   - Rear axle nut ②
   - Locknut ③
   - Adjuster ④
   - Drive chain

ENGINE REMOVAL



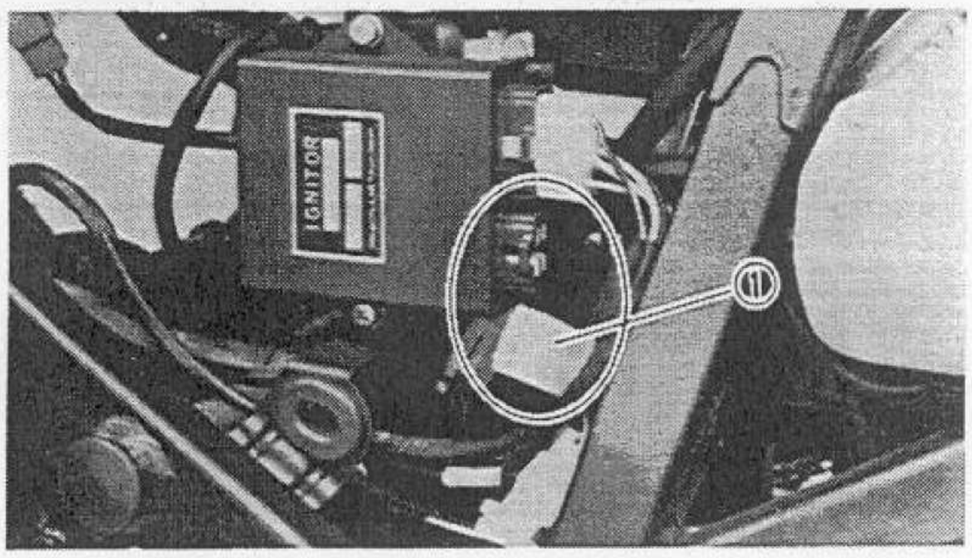


3. Remove:
   - Left crankcase cover ①
   - Nut ②
   - Lock washer ③
   - Drive sprocket ④
   - Drive chain ⑤

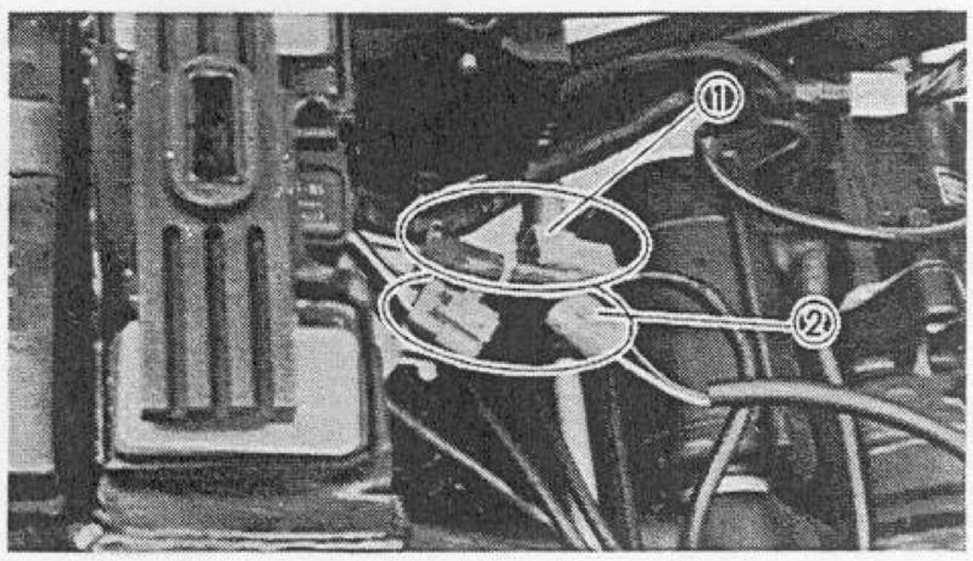


LEADS

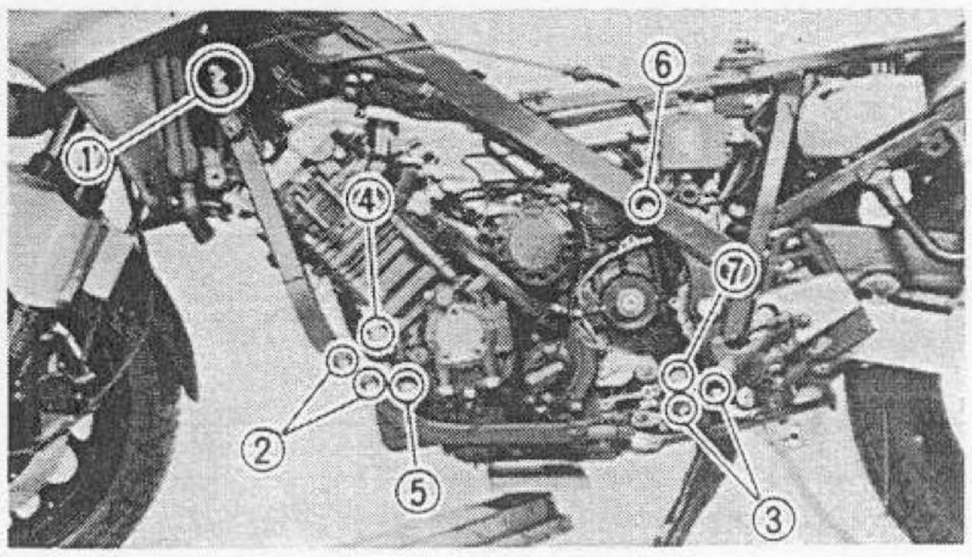
1. Disconnect:
   - Battery ground lead ①
   - Starter motor lead ②



2. Disconnect:
   - Pick up coil coupler ①

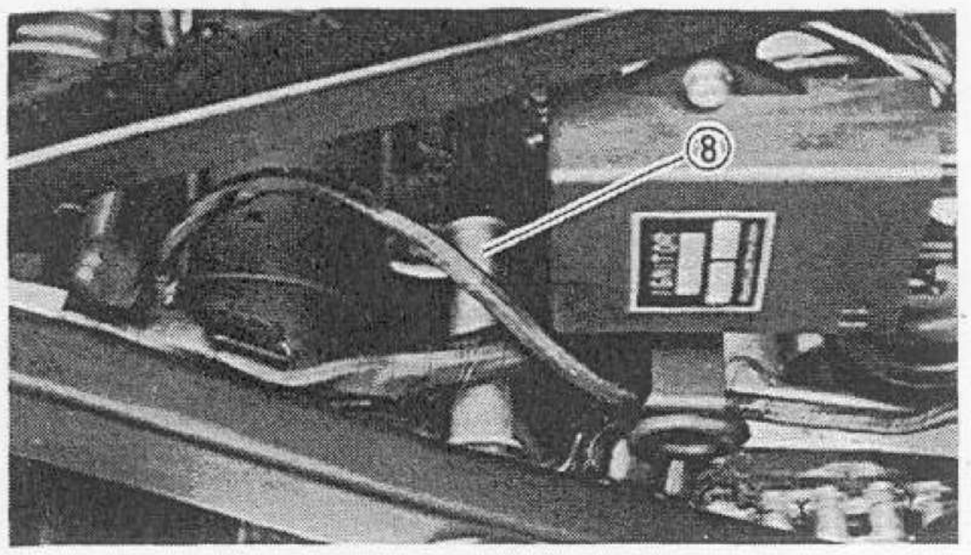


3. Disconnect:
   - AC Generator coupler ①
   - Neutral/Oil level switch coupler ②

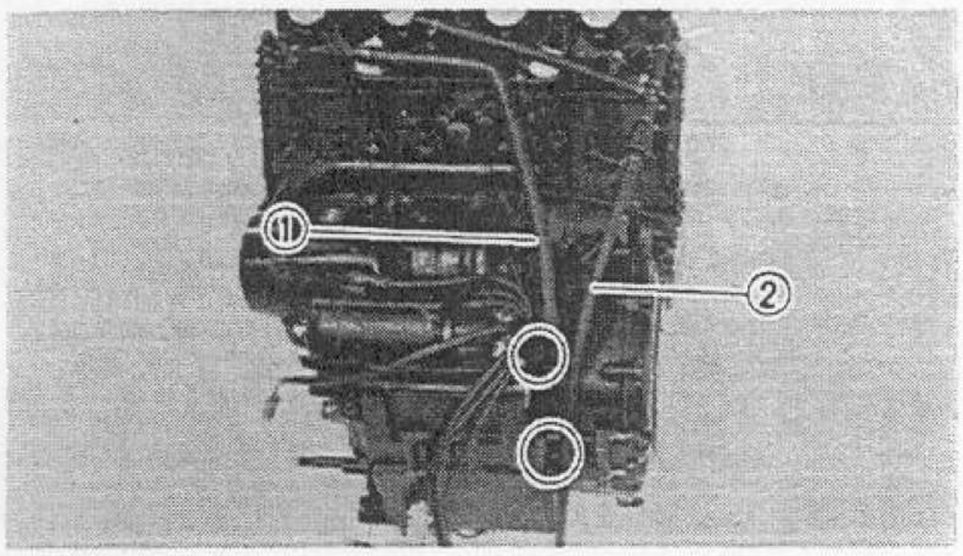


ENGINE REMOVAL

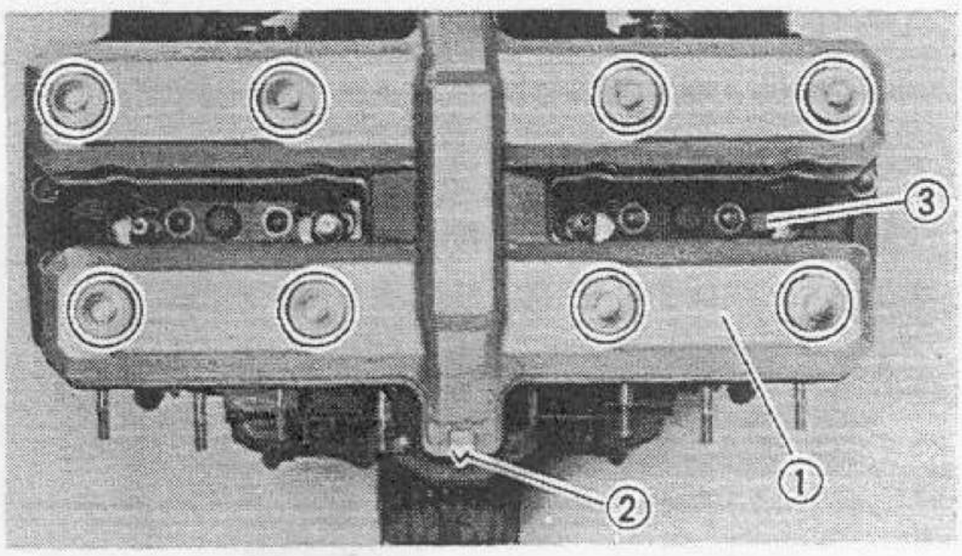
1. Place a suitable stand under the engine.
2. Remove:
   - Front down tube bolts ①
   - Middle down tube bolts ②
   - Rear down tube bolts ③
   - Front upper mounting bolt ④
   - Front lower mounting bolt ⑤

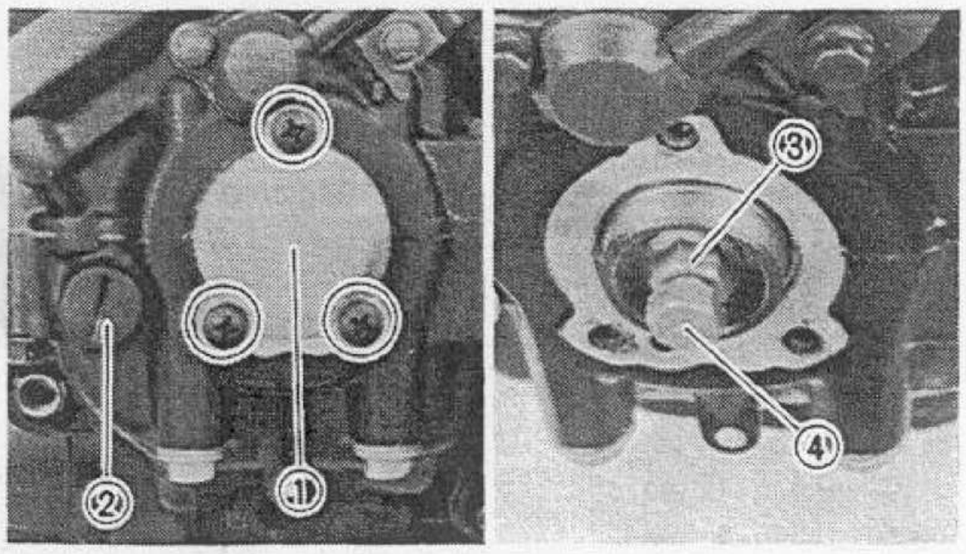


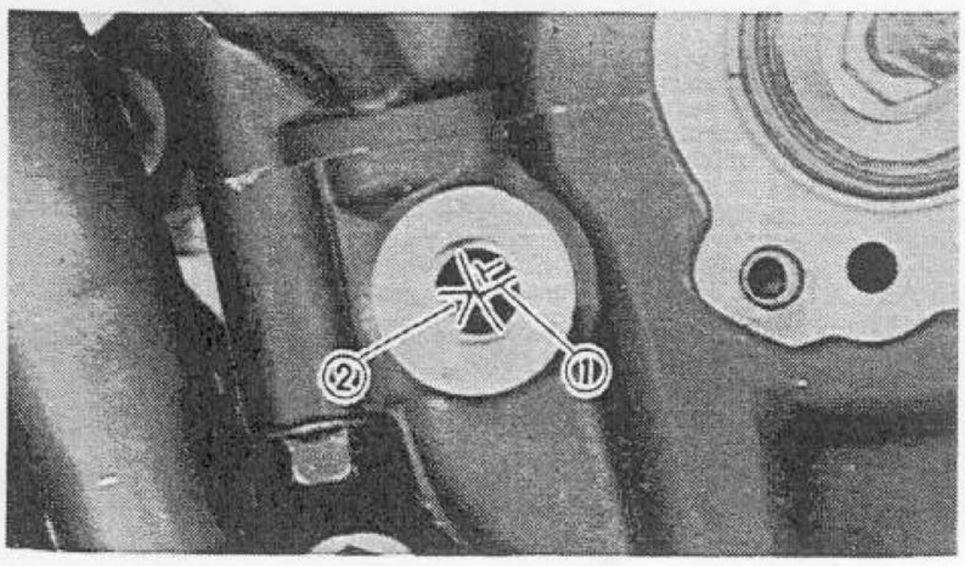
3. Remove:
   - Rear upper mounting bolt ⑥
   - Rear lower mounting bolt ⑦
   - Rear upper mounting collar ⑧
   - Engine assembly
     (from right chassis)



4. Remove:
   - Crankcase ventilation hose ①
   - Air vent hose ②







3

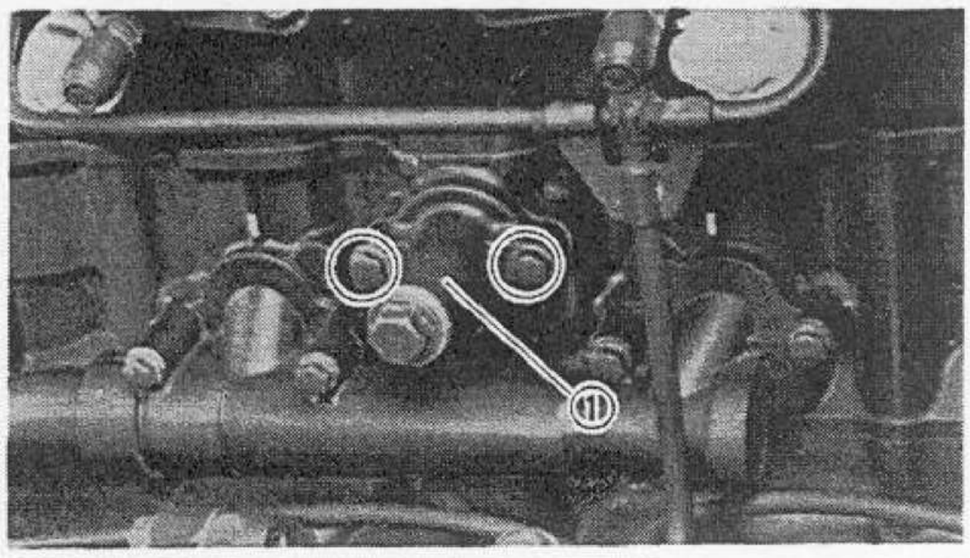
ENGINE DISASSEMBLY

CAMSHAFT AND CYLINDER HEAD

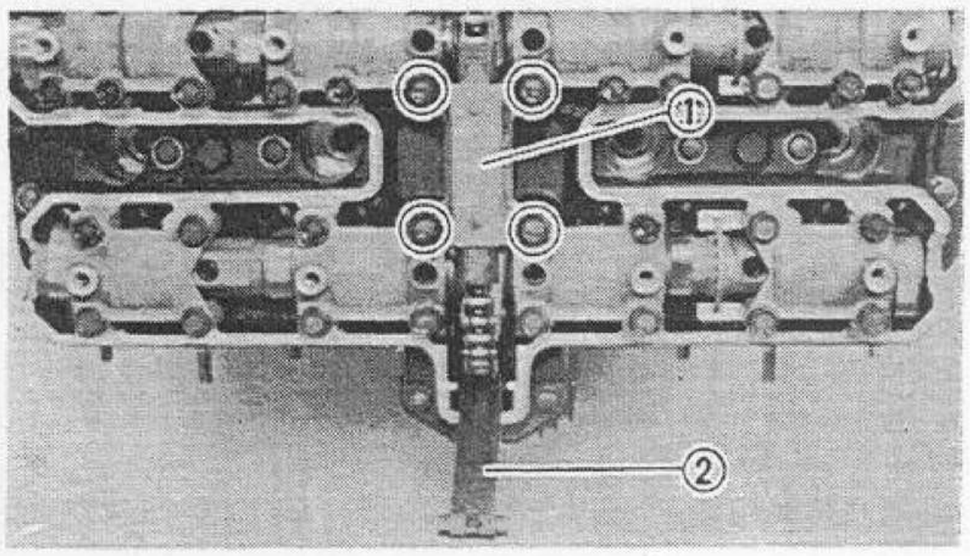
1. Remove:
   - Cylinder head cover ①
   - Cylinder head gasket ②
   - Spark plug ③

2. Remove:
   - Left crankshaft end cover ①
   - Plug screw ②
3. Install:
   - Locknut ③
   - Bolt (8 mm) ④
     (into left crankshaft end)

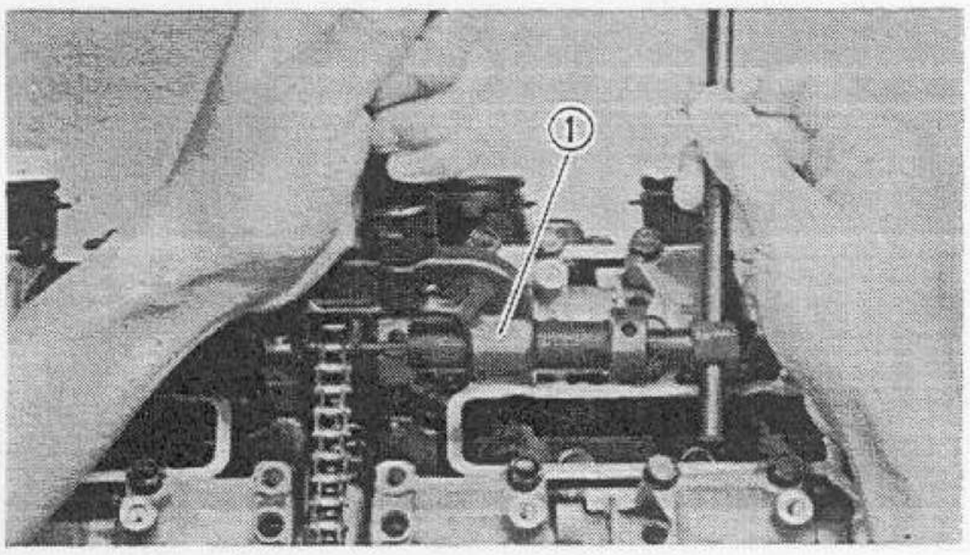
4. Turn:
   - Crankshaft
     (Counterclockwise)
5. Align:
   - Crankshaft web "T" mark ①
     (With the stationary pointer ② when #1 piston is at TDC on compression stroke.)



6. Remove:
   - Tensioner assembly ①



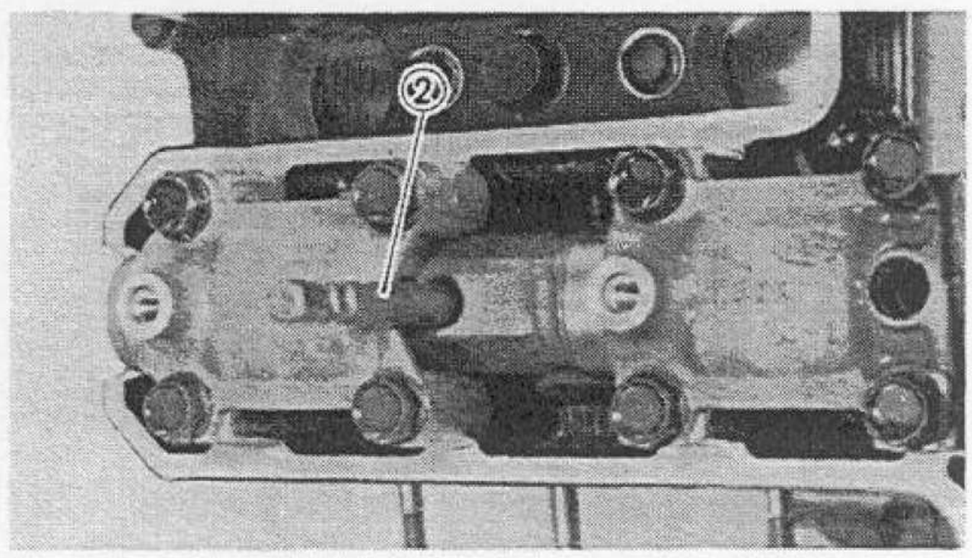
7. Remove:
   - Upper chain guide ①
   - Exhaust side chain guide ②



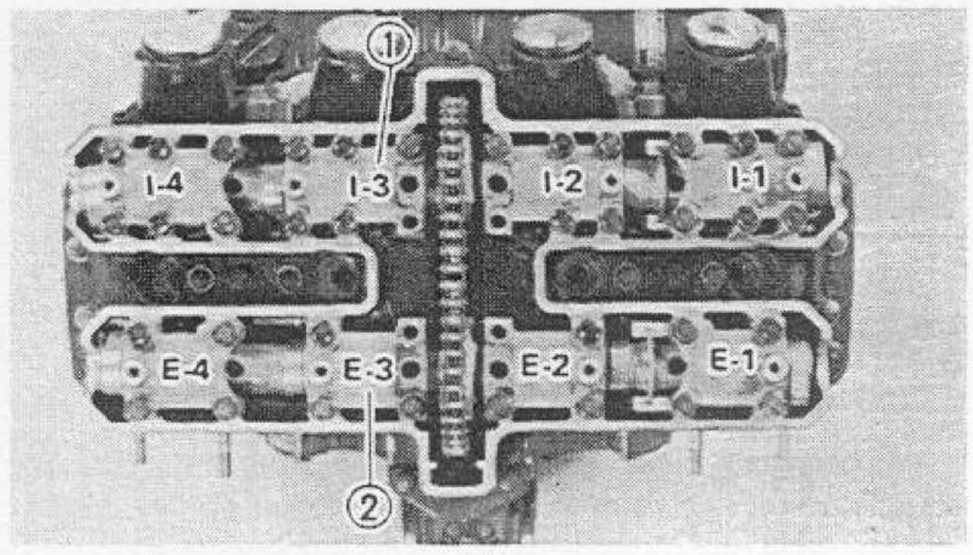
NOTE:

Piston and cylinder can be removed, when necessary, without removing the camshaft. The main steps are as follows.

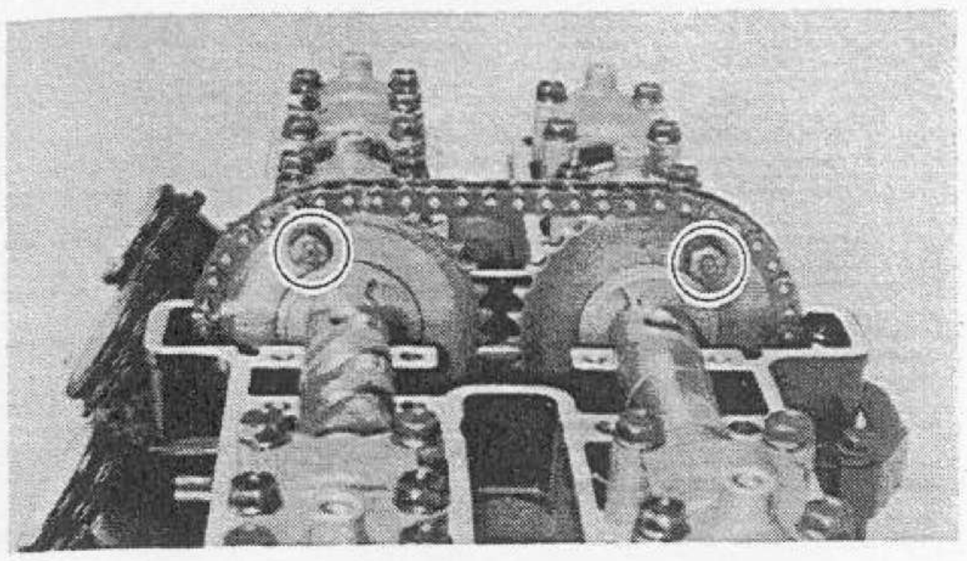
- Disconnect the cam chain using Cam Chain Cutter ① (YM-01112)



- Remove the cylinder head nuts in the comshaft case using Hexagon Wrench ② (YM-3448)
- Remove the camshaft, camshaft case and cylinder head assembly.

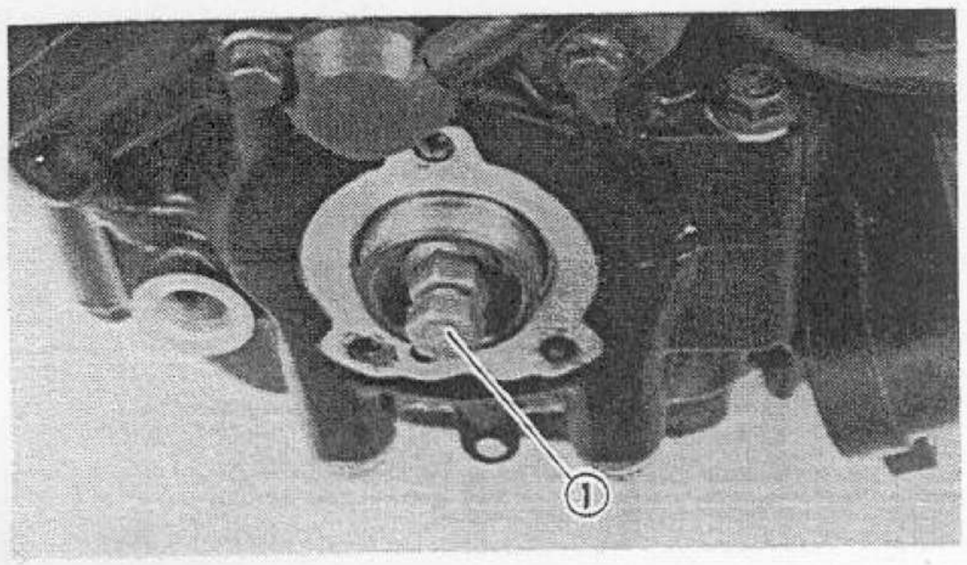


8. Remove:
   - No. 3 intake (I-3) camshaft cap ①
   - No. 3 exhaust (E-3) camshaft cap ②

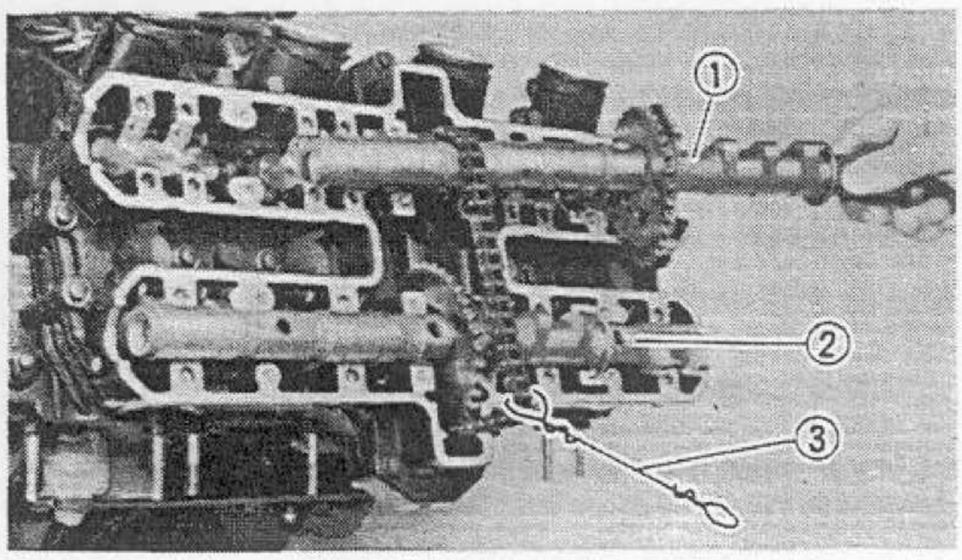


9. Remove:
   - Sprocket bolts (all)

   Turn the crankshaft counterclockwise to remove opposite side sprocket bolt.



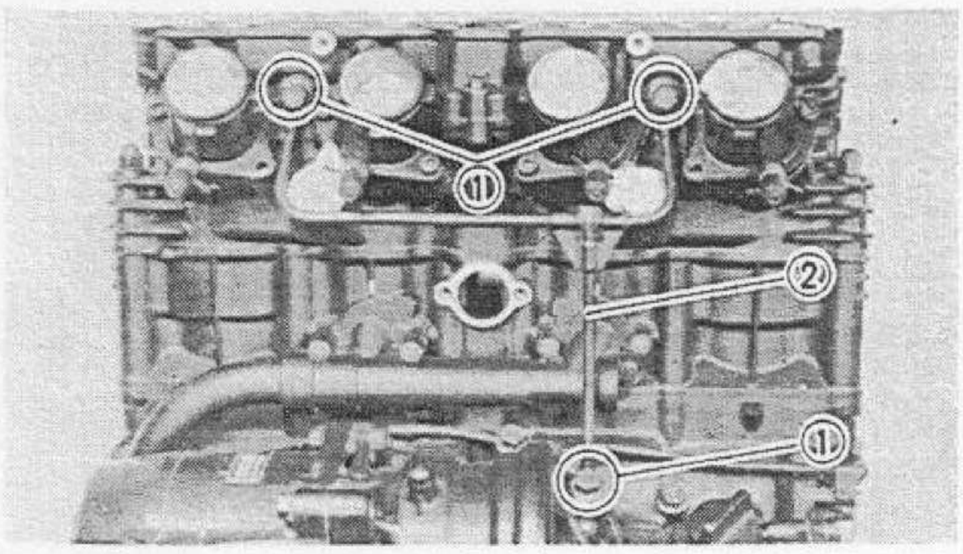
NOTE:
If difficult to loosen the cam sprocket securing bolts; hold the 8 mm bolt ① on the left crankshaft end.



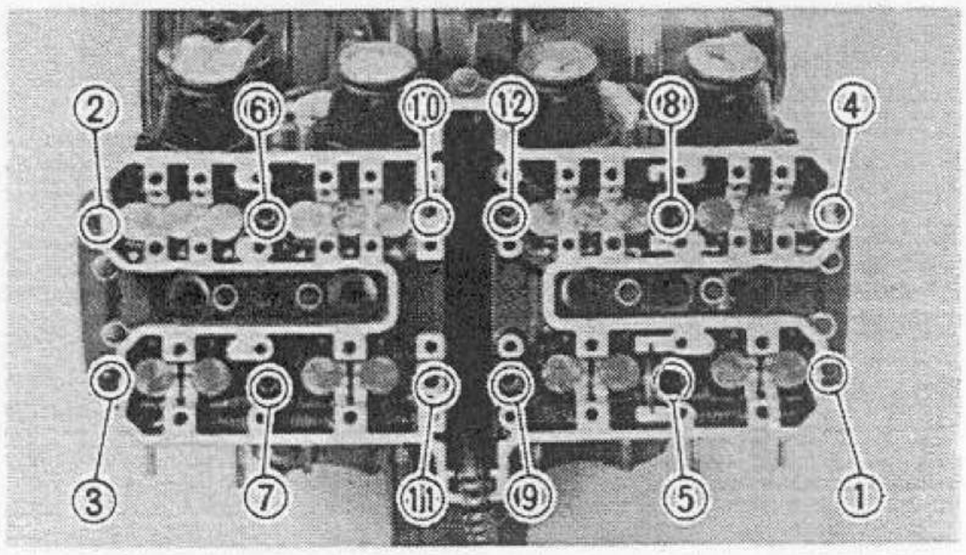
10. Remove:
    - Camshaft caps (all)
    - Intake camshaft ①
    - Exhause camshaft ②

NOTE:
Fasten safety wire ③ to the cam chain to prevent it from falling into the crankcase.

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

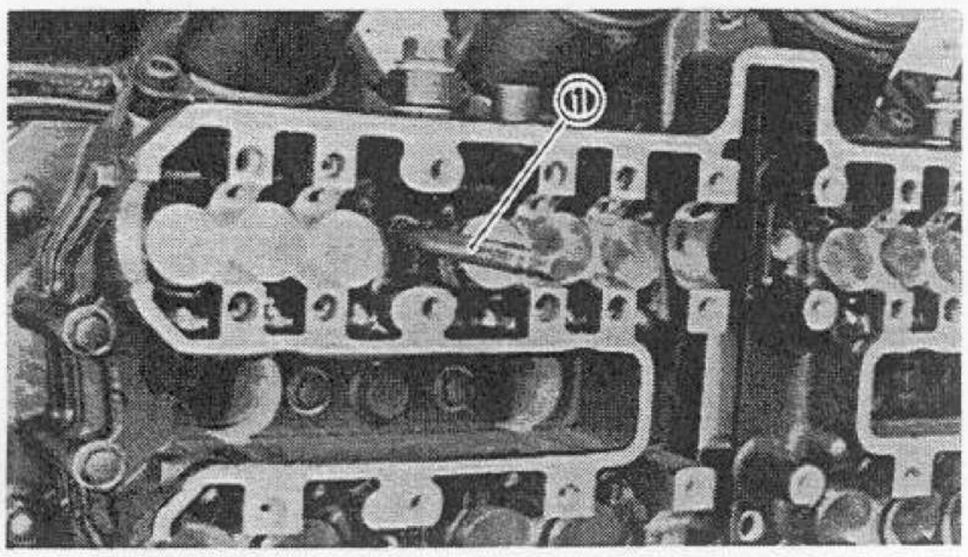


11. Remove:
    - Oil pipe union bolts ①
    - Oil pipe 1 ②

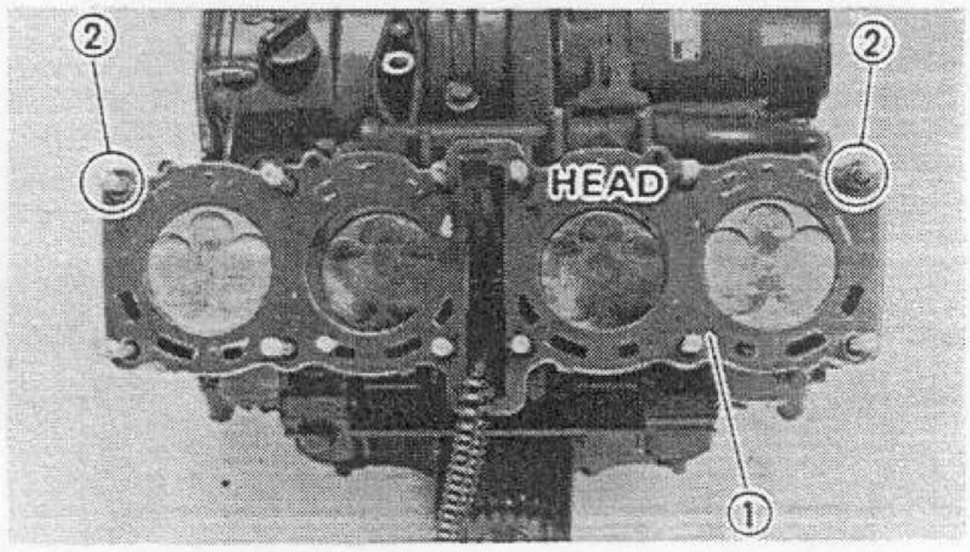


12. Remove:
    - Camshaft case and cylinder head assembly.

NOTE:
Loosen the nuts in their proper loosening sequence.

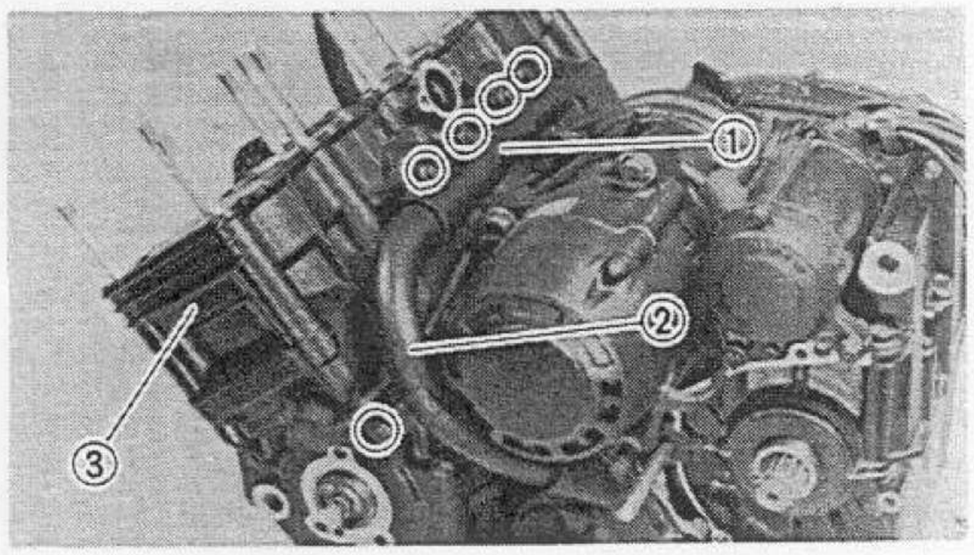


NOTE:
Remove the cylinder head nuts in the camshaft case using Hexagon Wrench ① (YM-3448)

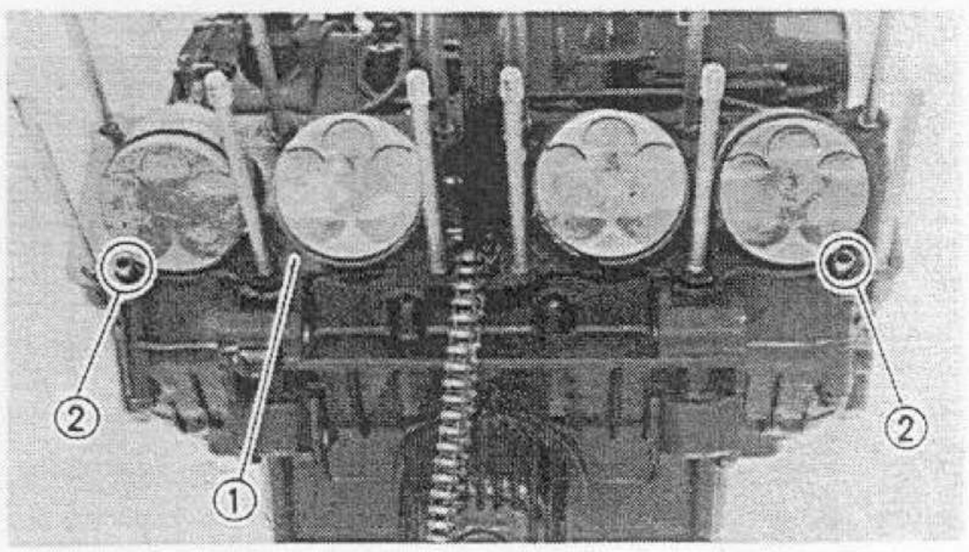


13. Remove:
    - Cylinder head gasket ①
    - Dowels ②

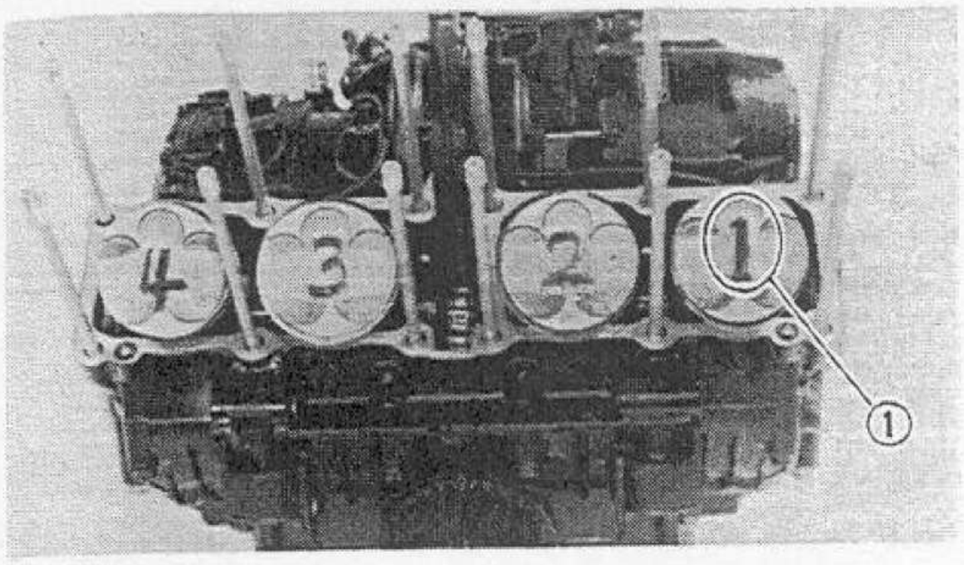
CYLINDER AND PISTON



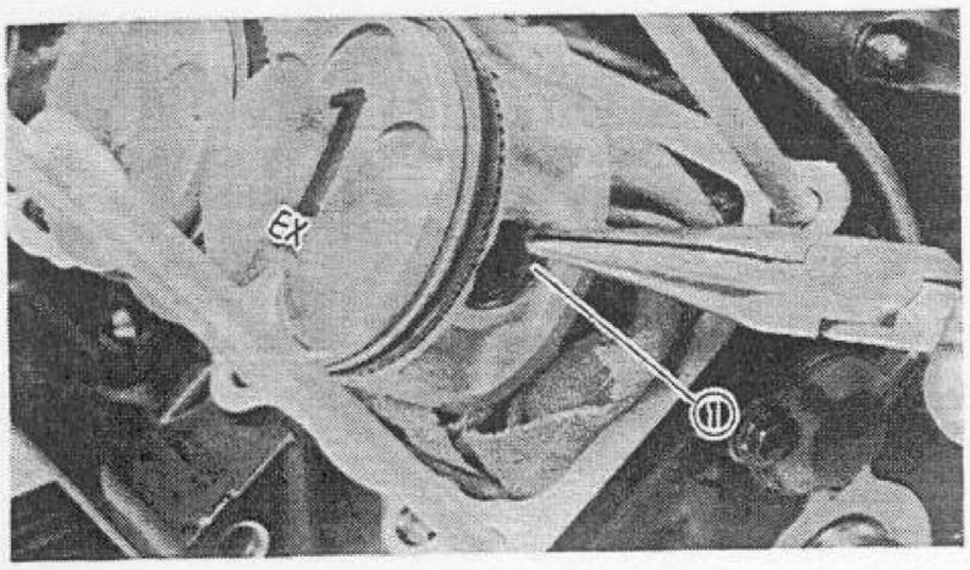
1. Remove:
    - Water jacket joint ①
    - Coolant feed pipe ②
    - Cylinder ③



2. Remove:
    - Cylinder gasket ①
    - Dowels ②

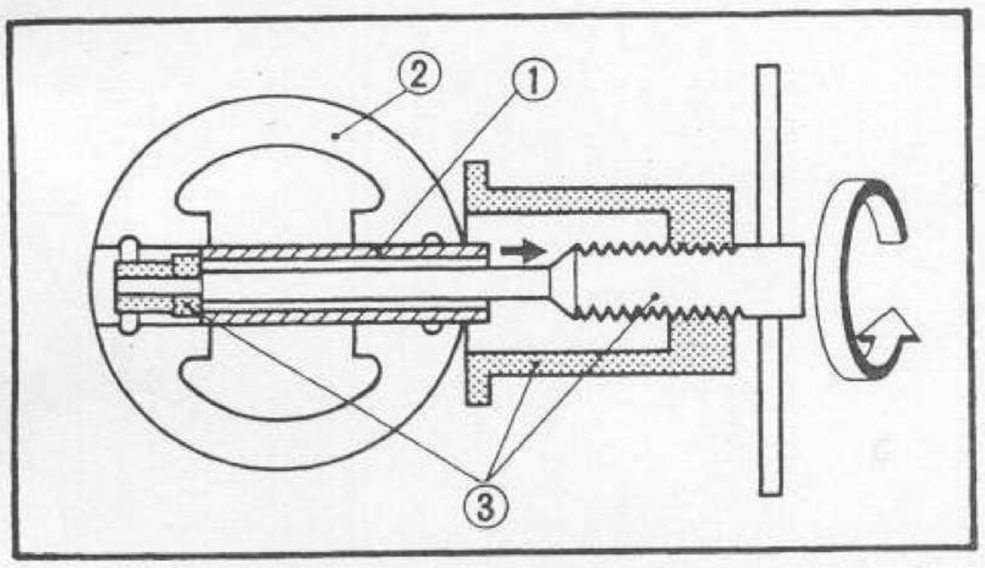


3. Mark:
   - Pistons
     (with piston number ① designations as shown)



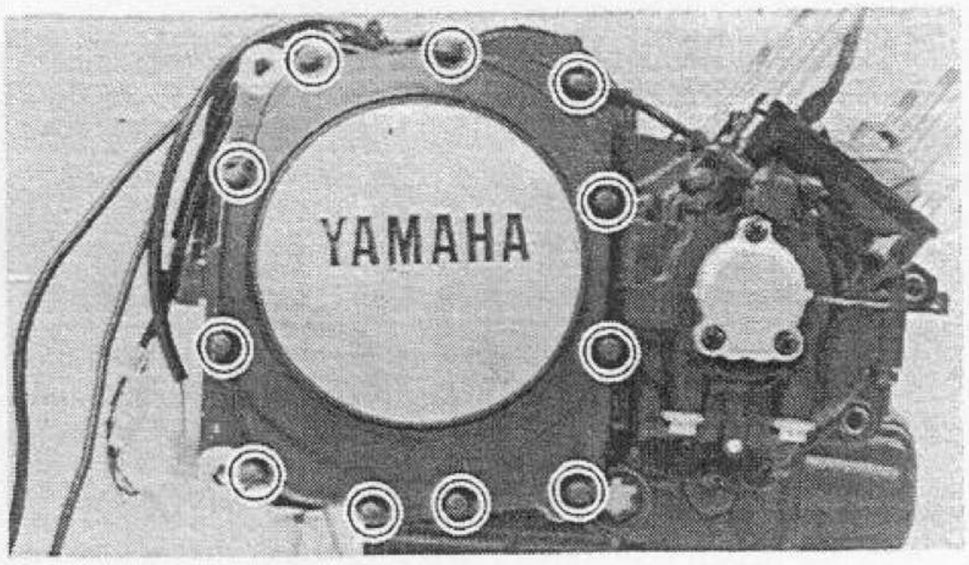
4. Remove:
   - Piston pin circlips ①

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



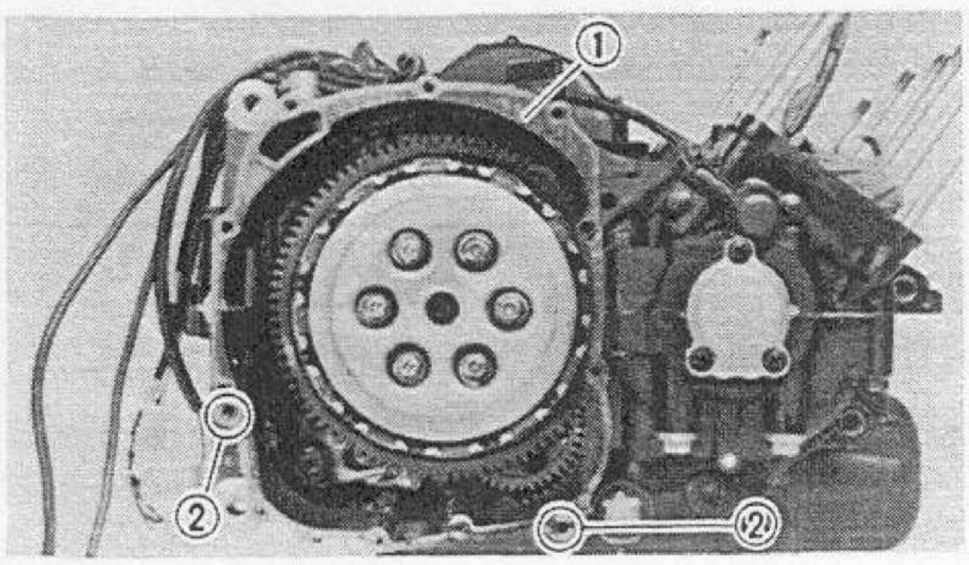
5. Remove:
   - Piston pins ①
   - Pistons ②

NOTE:
Remove the piston pin using Piston Pin Puller ③ (YU-01304)

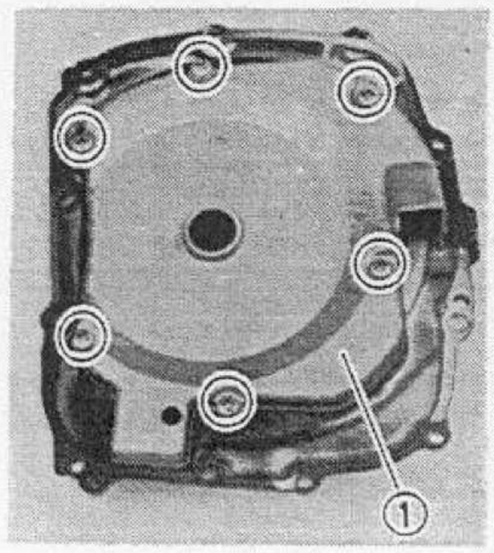


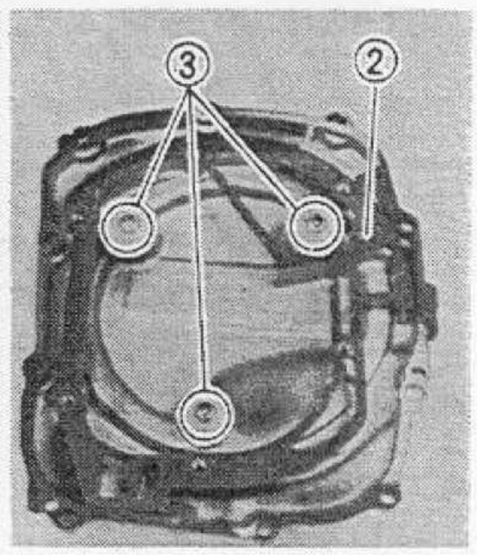
RIGHT CRANKCASE COVER

1. Remove:
   - Right crankcase cover assembly.

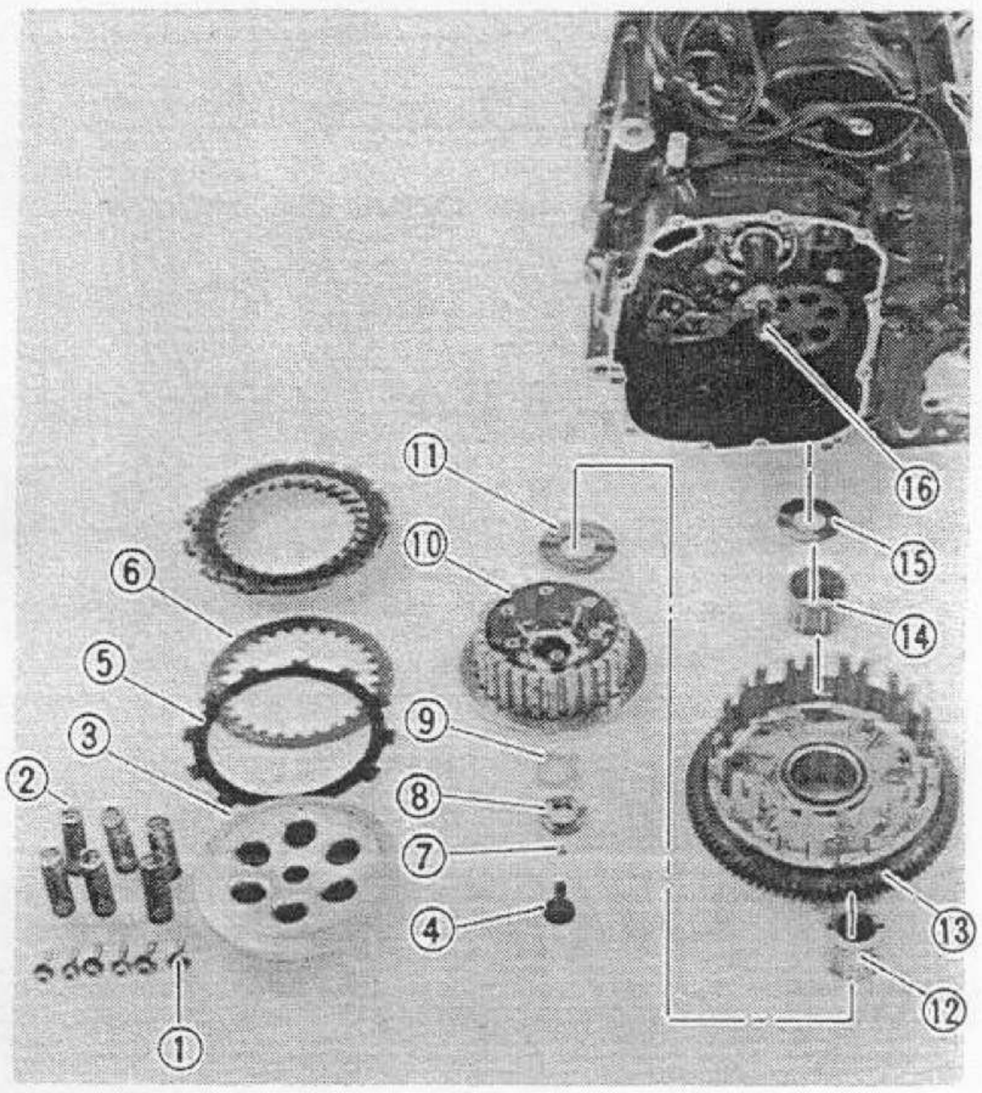


2. Remove:
   - Gasket ①
   - Dowels ②



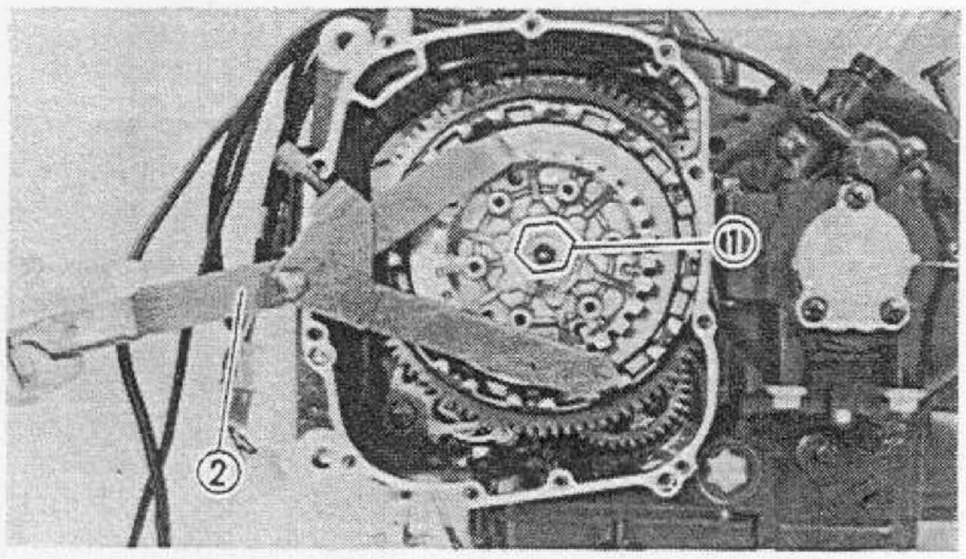


3. Remove:
   - Breather ①
   - Gasket ②
   - Washer ③
   - Rubber ring
   - Cover

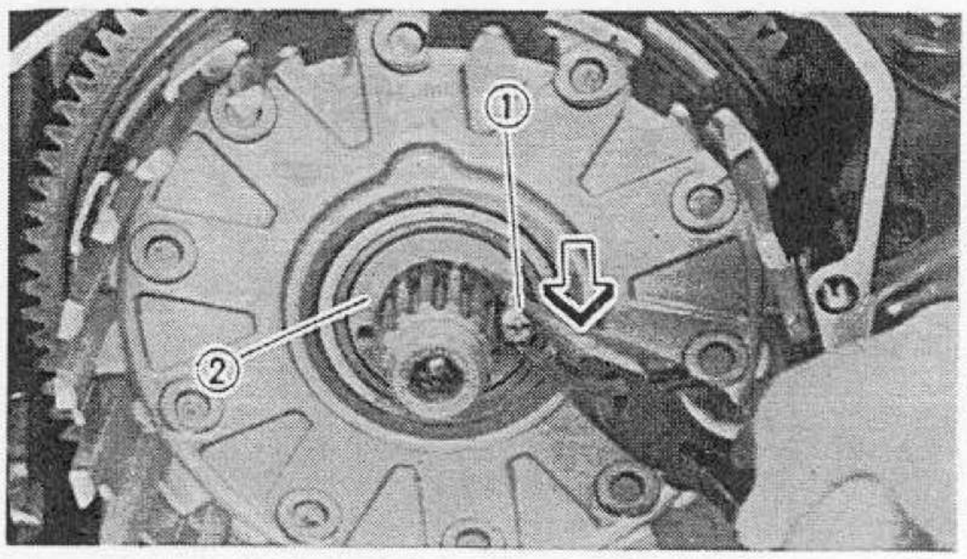


CLUTCH

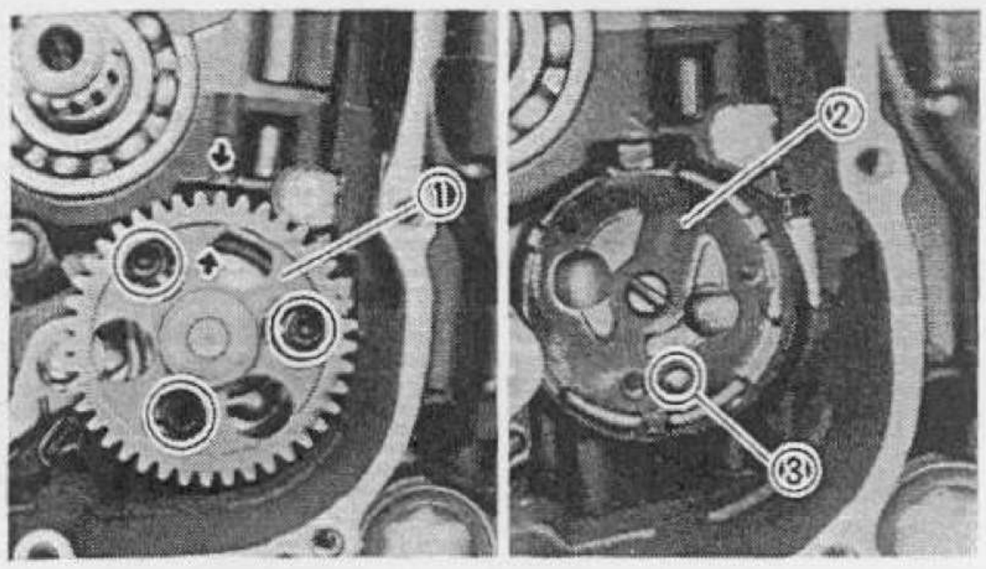
1. Remove:
   - Clutch spring holding screws ①
   - Clutch springs ②
   - Pressure plate ③
   - Push rod #1 ④
   - Friction plates ⑤
   - Clutch plates ⑥
   - Push rod ball ⑦
   - Clutch boss securing nut ⑧
   - Lock washer ⑨
   - Clutch boss ⑩
   - Washer ⑪
   - Spacer ⑫
   - Primary driven gear ⑬
   - Bearing ⑭
   - Thrust washer ⑮
   - Push rod #2 ⑯



NOTE:
Remove the clutch boss securing nut ① using Universal Clutch Holder ② (YM-91042)

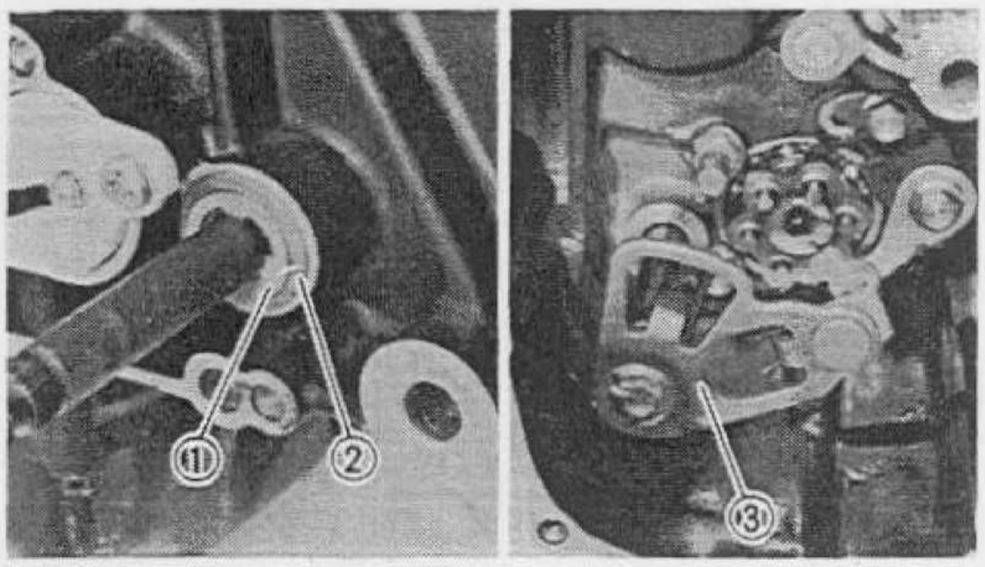


NOTE:
Install the 5 mm screw ① on the spacer ② then remove the spacer with pulling out screw.

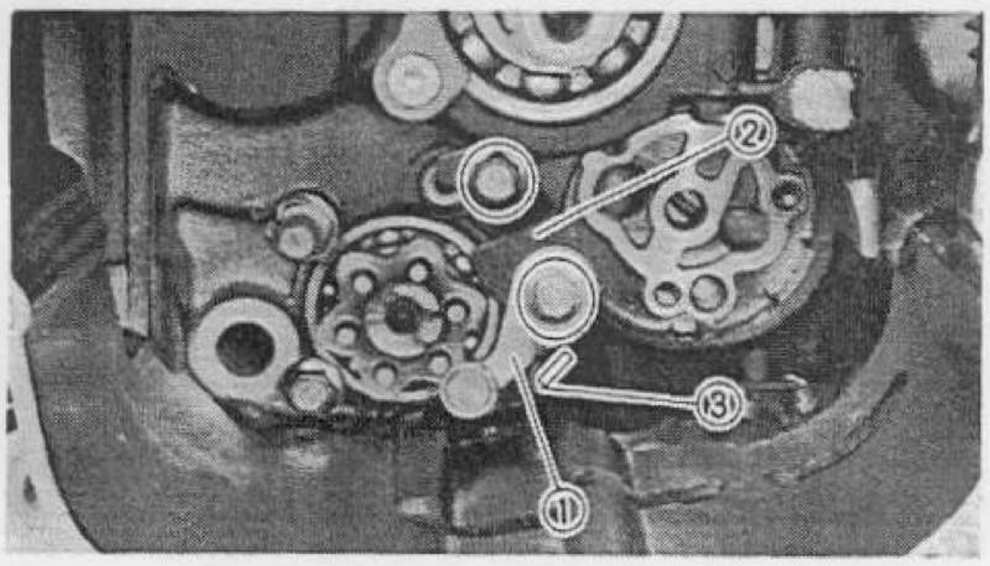


OIL PUMP AND CHANGE LEVER

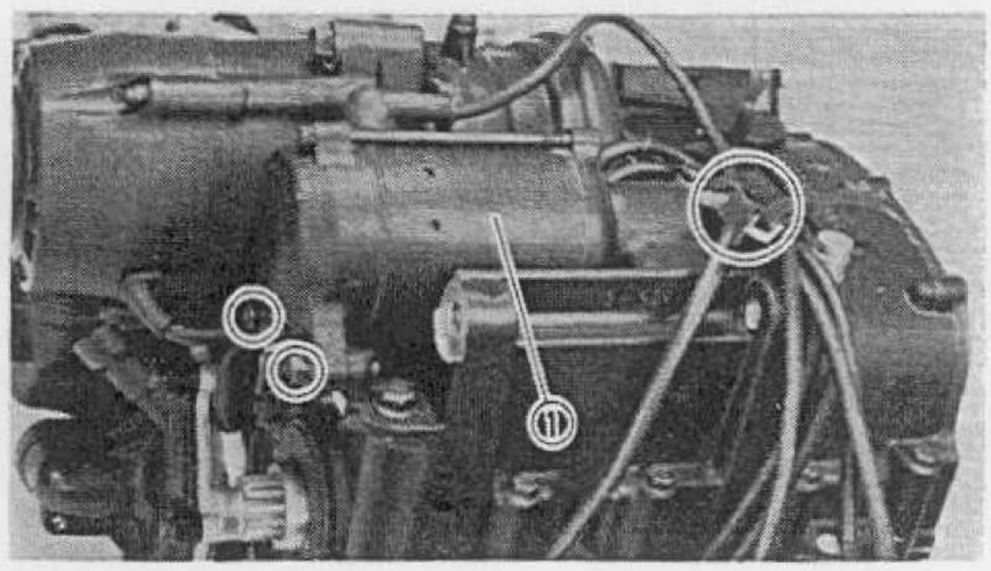
1. Remove:
   - Oil pump assembly ①
   - Gasket ②
   - Dowel ③



2. Remove:
   - Circlip ①
   - Washer ②
   - Change lever assembly ③

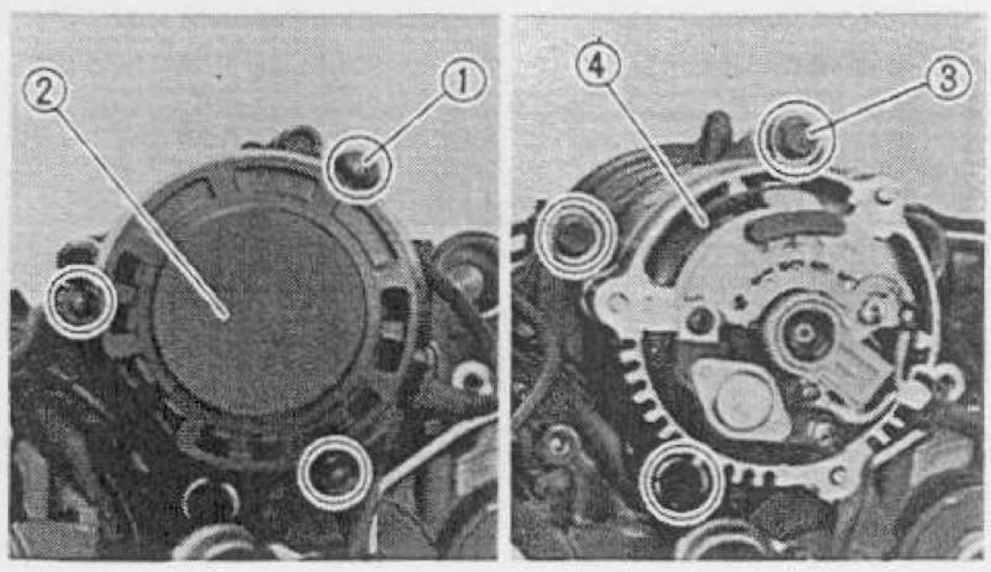


3. Remove:
   - Stopper lever ①
   - Shift fork guide bar stopper ②
   - Spring ③

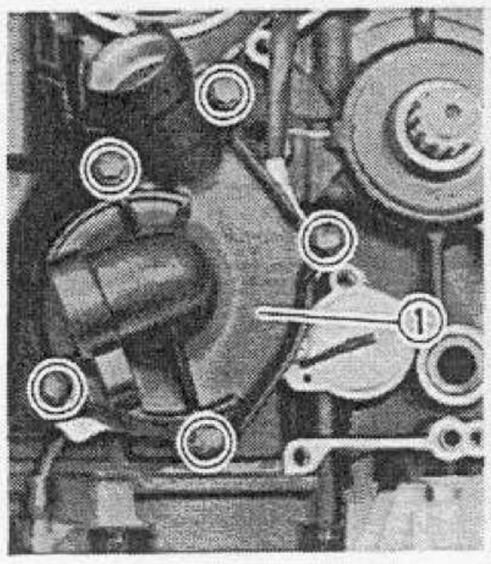


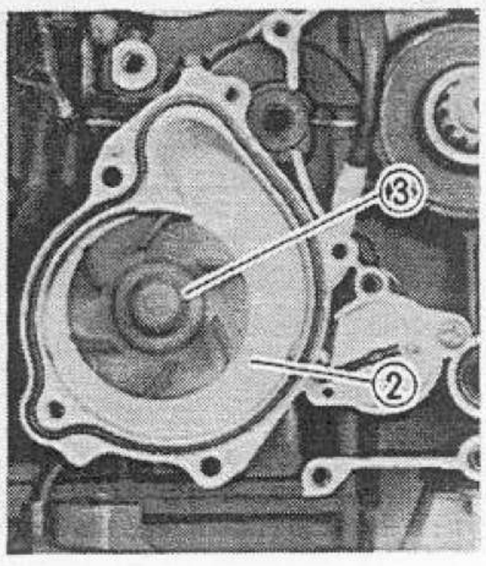
STARTER MOTOR AND AC GENERATOR

1. Remove:
   - Starter motor ①



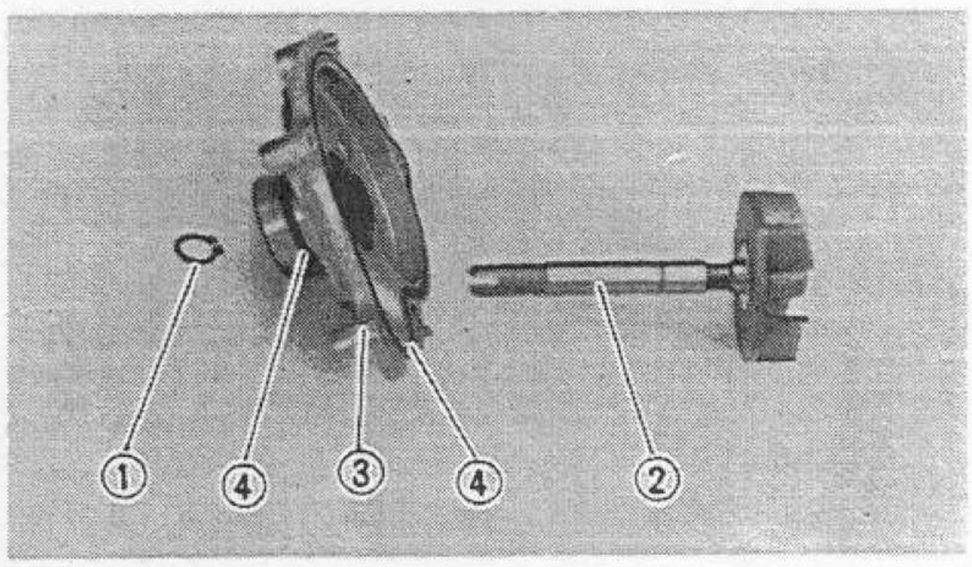
2. Remove:
   - Nuts ①
   - Generator cover ②
   - Bolts ③
   - Generator ④



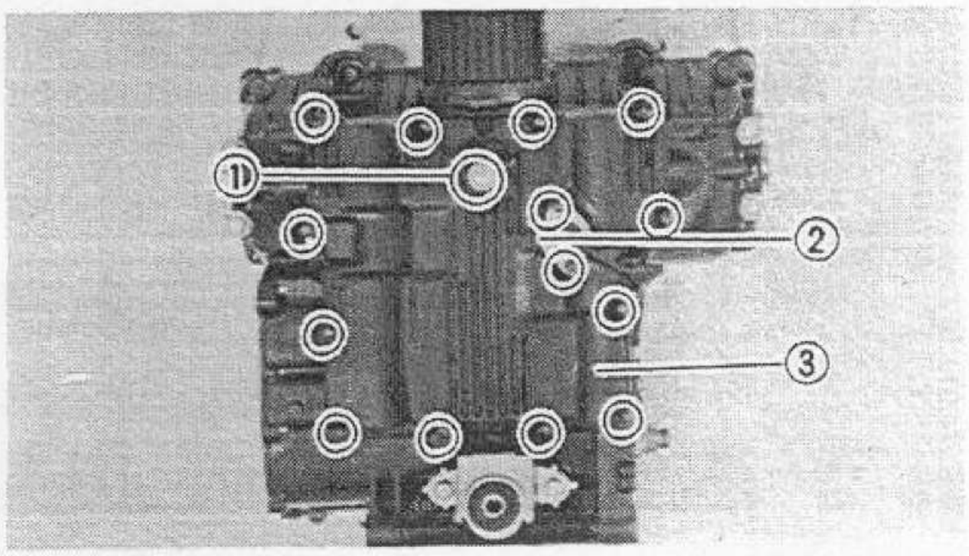


WATER PUMP

1. Remove:
   - Water pump cover ①
   - Housing ② and impeller ③ assembly

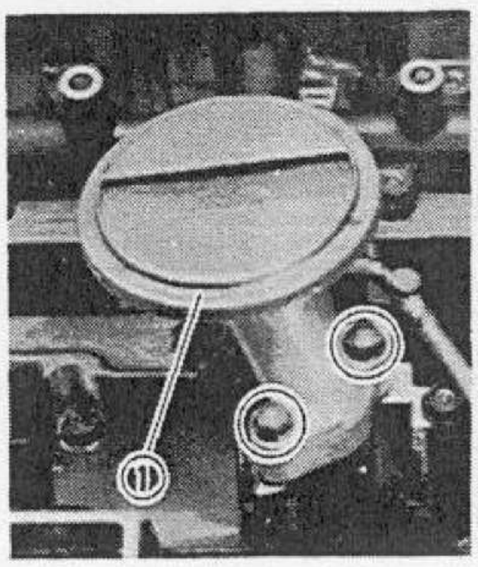


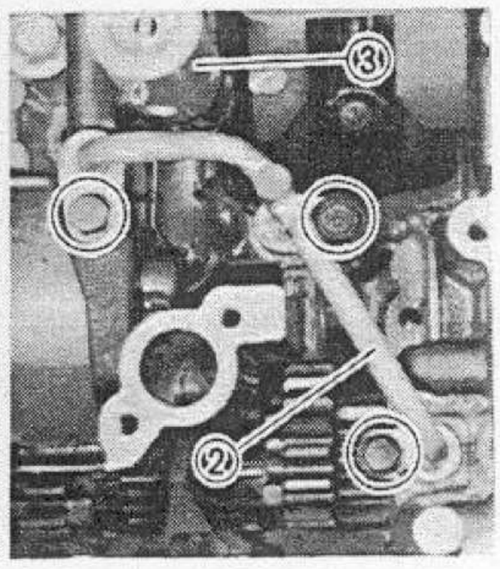
2. Remove:
   - Circlip ①
   - Impeller ②
   - Housing ③
   - O-rings ④



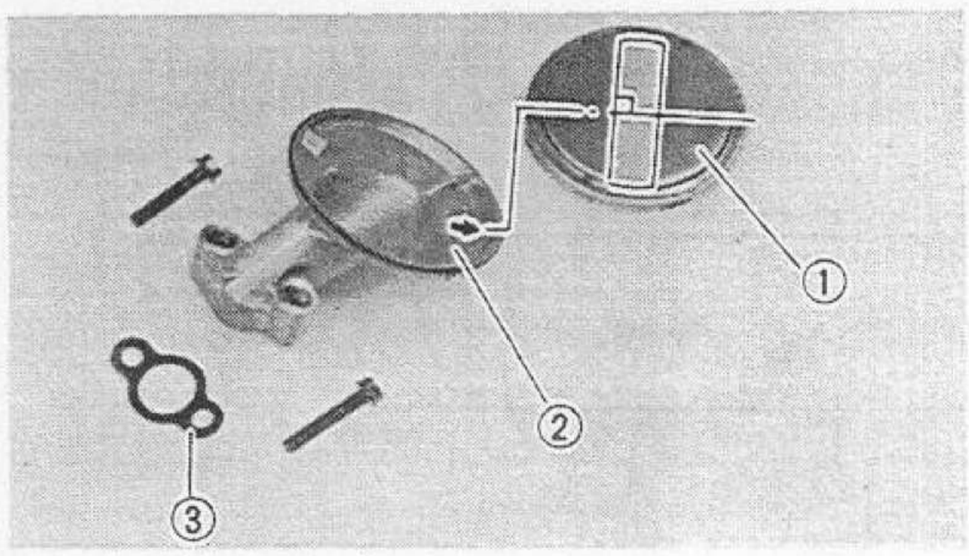
OIL PAN AND OIL STRAINER

1. Remove:
   - Drian plug ①
   - Oil level switch ②
   - Oil pan ③

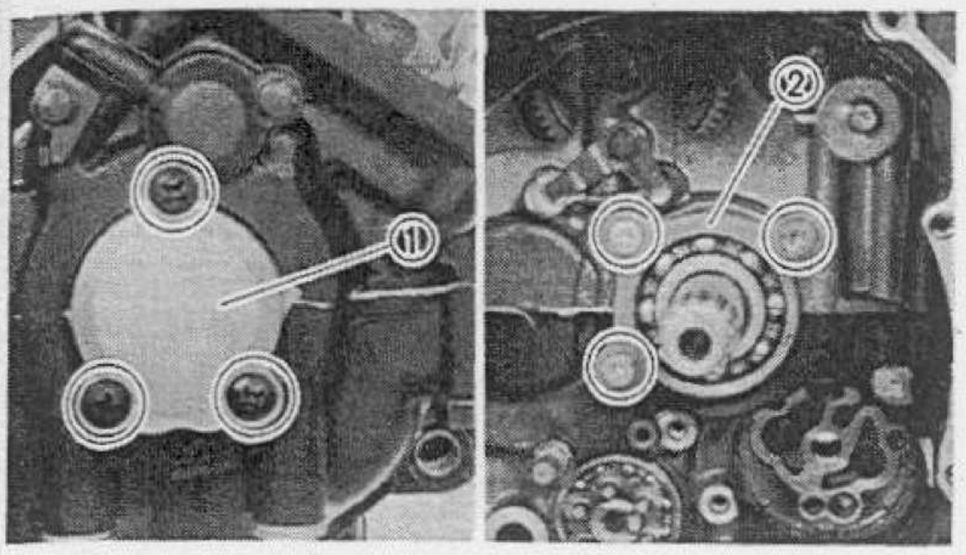




2. Remove:
   - Oil strainer assembly ①
   - Oil pipe 5 ②
   - Relief valve ③



3. Remove:
   - Oil strainer element ①
   - Housing ②
   - Gasket ③

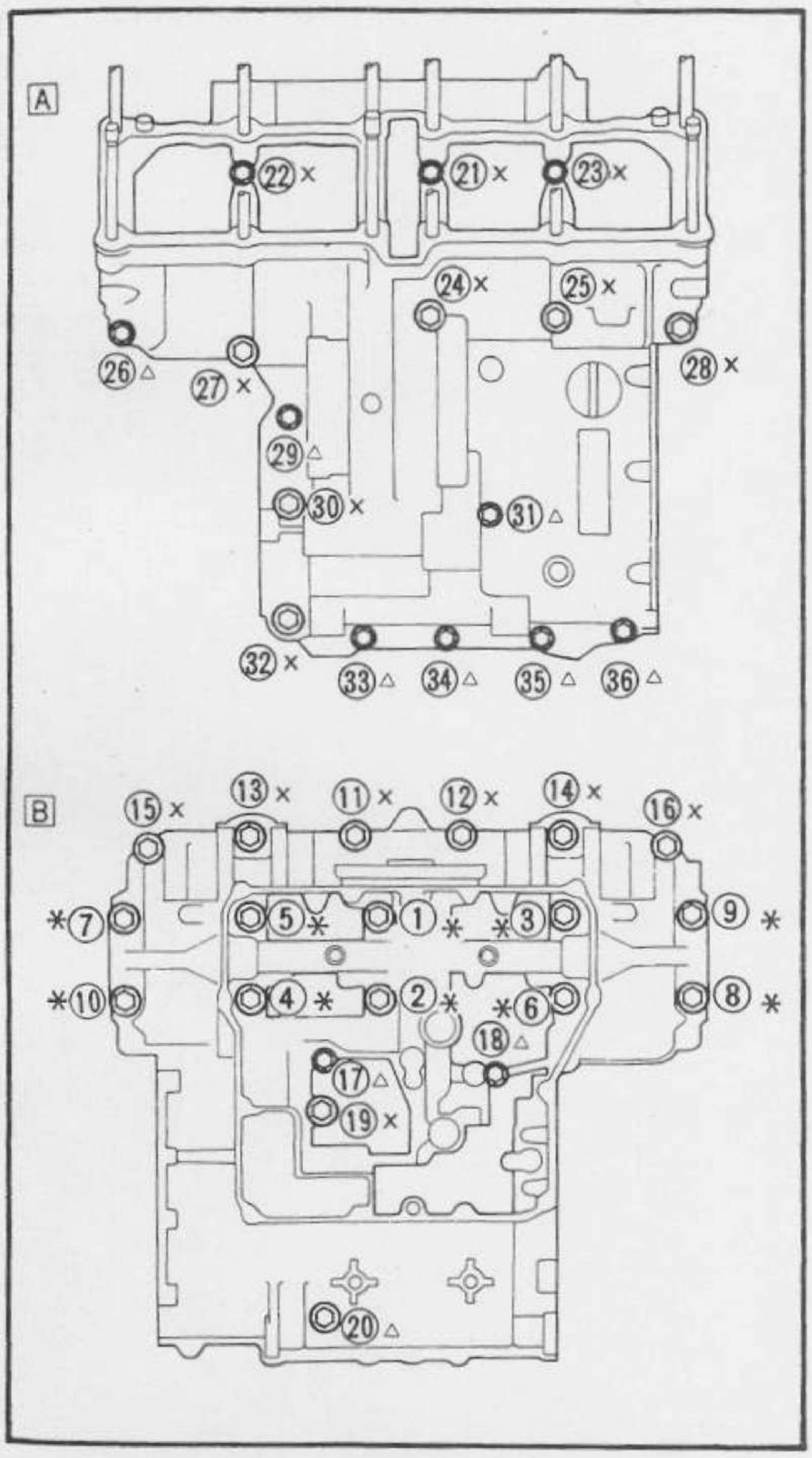


CRANKCASE DISASSEMBLY

1. Remove:
   - Right crankshaft end cover ①
   - Main axle bearing stopper ②

NOTE:

Use #30 Torx Driver (YU-29843-6).



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

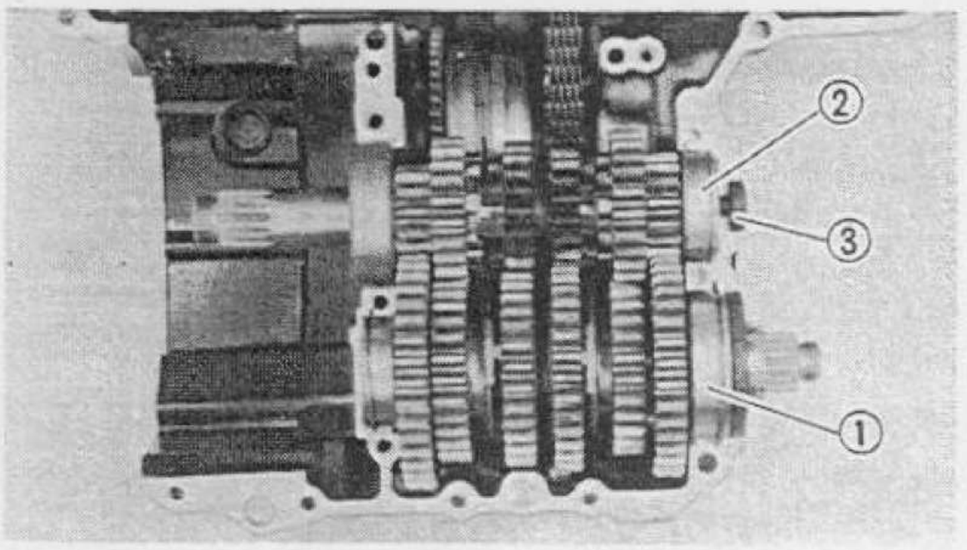
NOTE:

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

3. Remove:
   - Lower crankcase

   Use a rubber hammer.

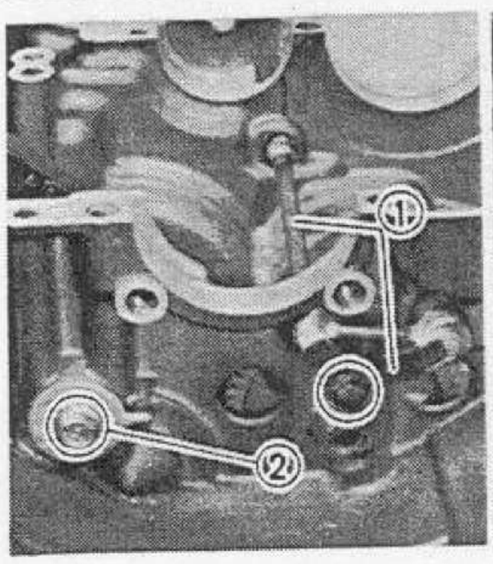
△: 6 mm bolts
x: 8 mm bolts
*: 9 mm bolts

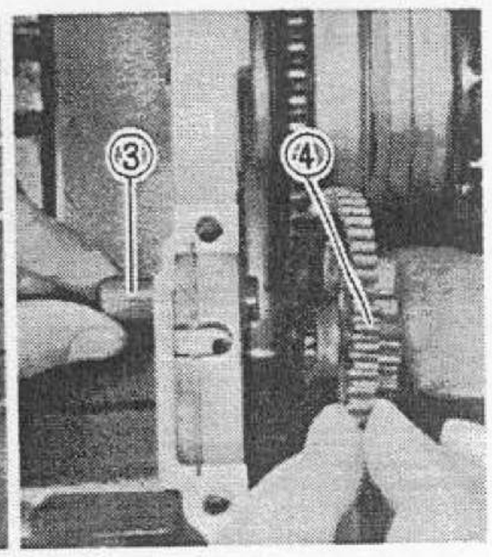


UPPER CRANKCASE

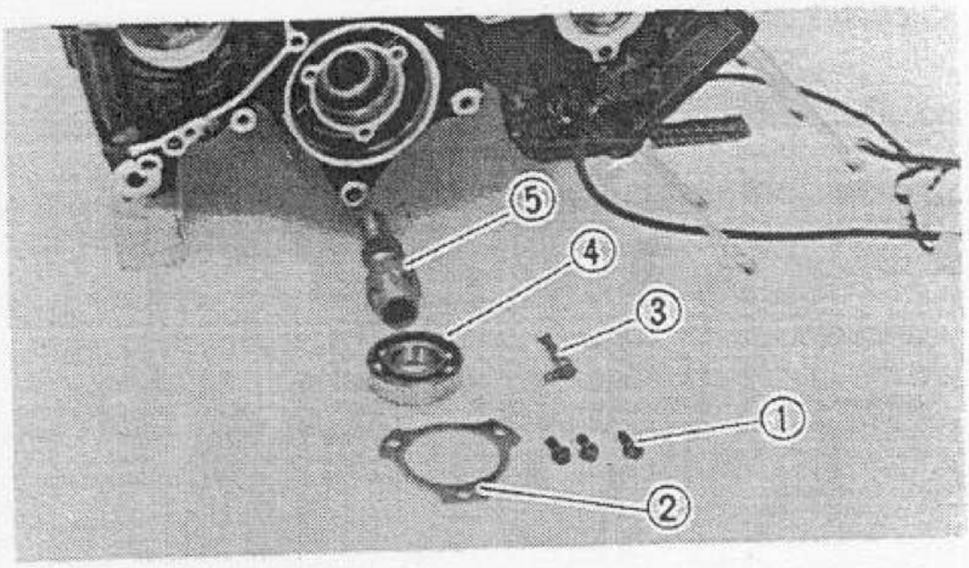
1. Remove:
   - Drive axle assembly ①
   - Main axle assembly ②
   - Oil seal ③

ENGINE DISASSEMBLY



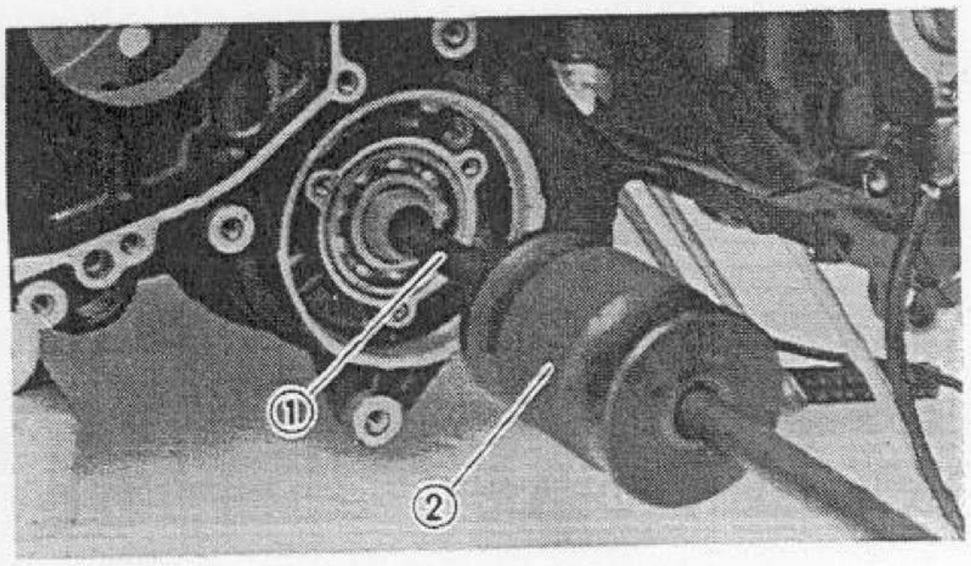


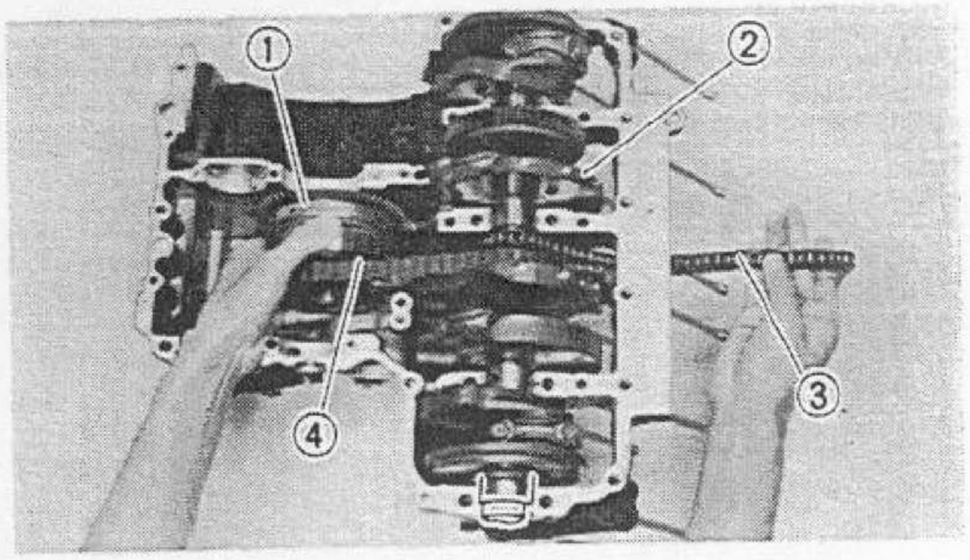
2. Remove:
- Oil pipe 2 ①
- Oil plug plate ②
- Gasket
- Shaft ③
- Starter idle gear ④



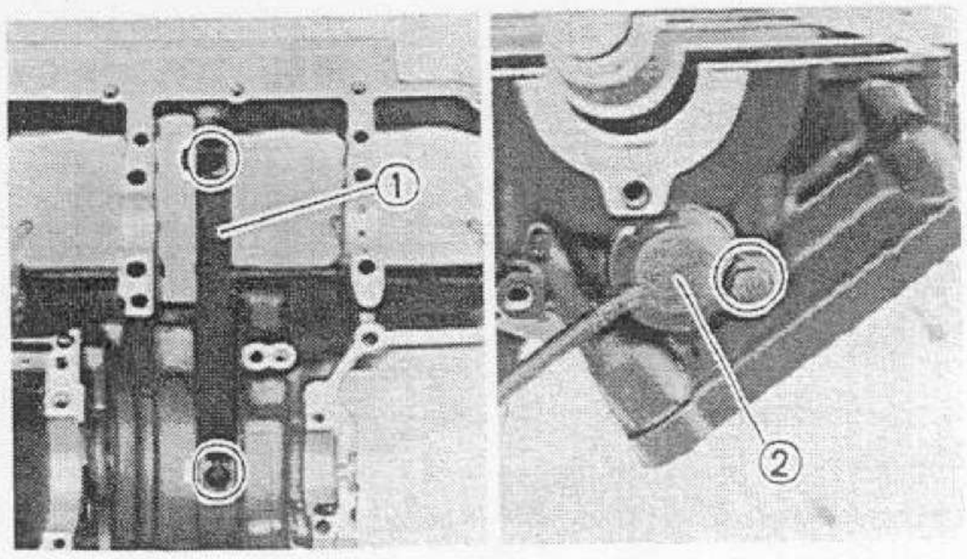
3. Remove:
- Bolts ①
- Cover plate ②
- Oil spray nozzle ③
- Bearing ④
- A.C.G. shaft ⑤

NOTE:
Remove A.C.G. shaft Using Armature Shock Puller ① (YU-01047-3) and Weight ② (YU-01047-4)

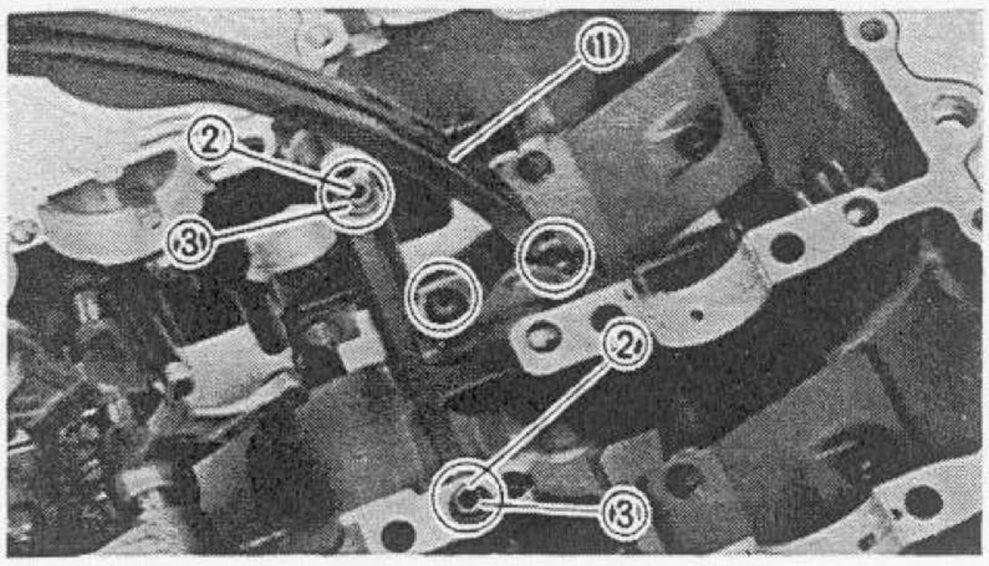




4. Remove:
- Starter clutch damper assembly ①
- Crankshaft assembly ②
- Cam chain ③
- HY-VO chain ④

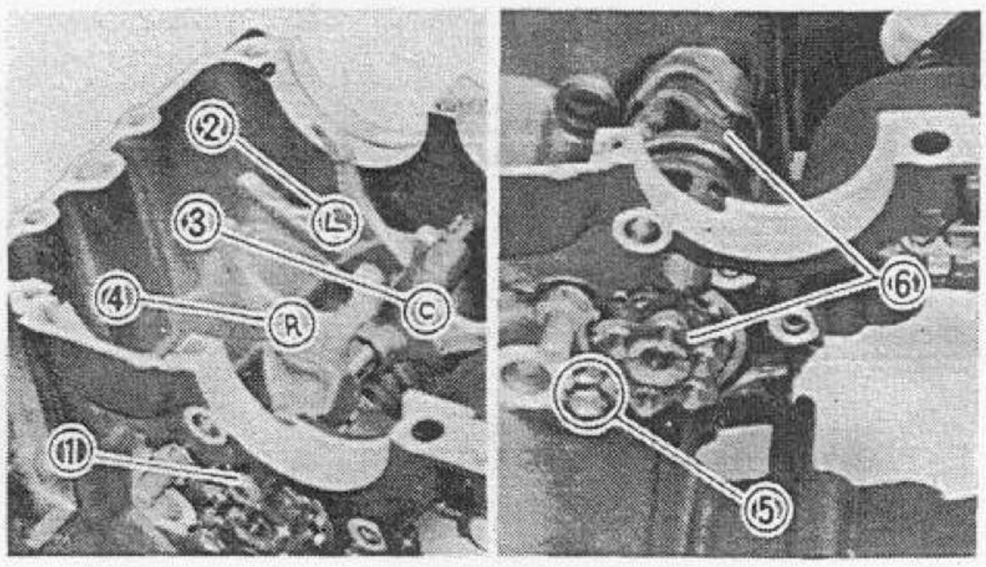


5. Remove:
- HY-VO chain guide ①
- Pick up coils ②

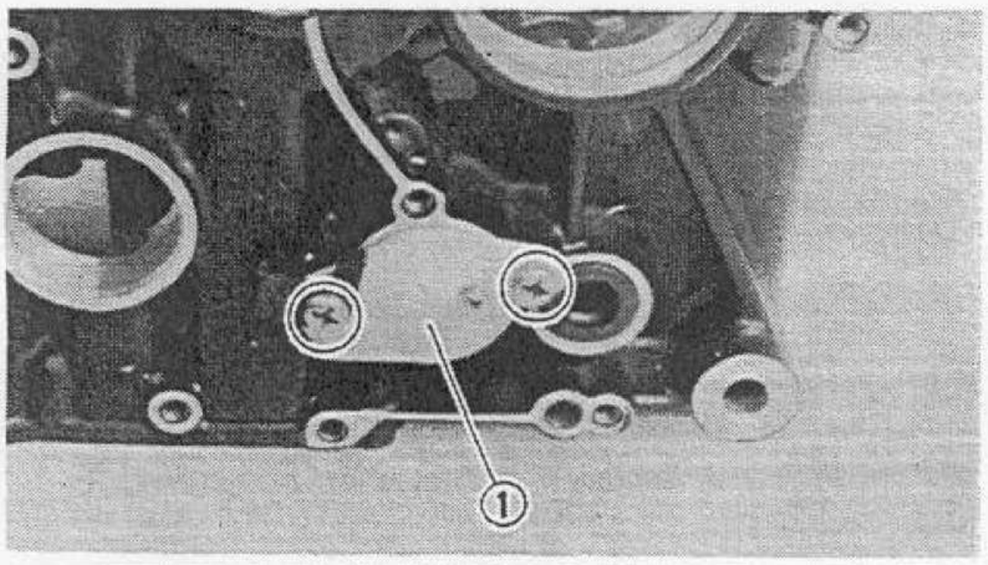


LOWER CRANKCASE

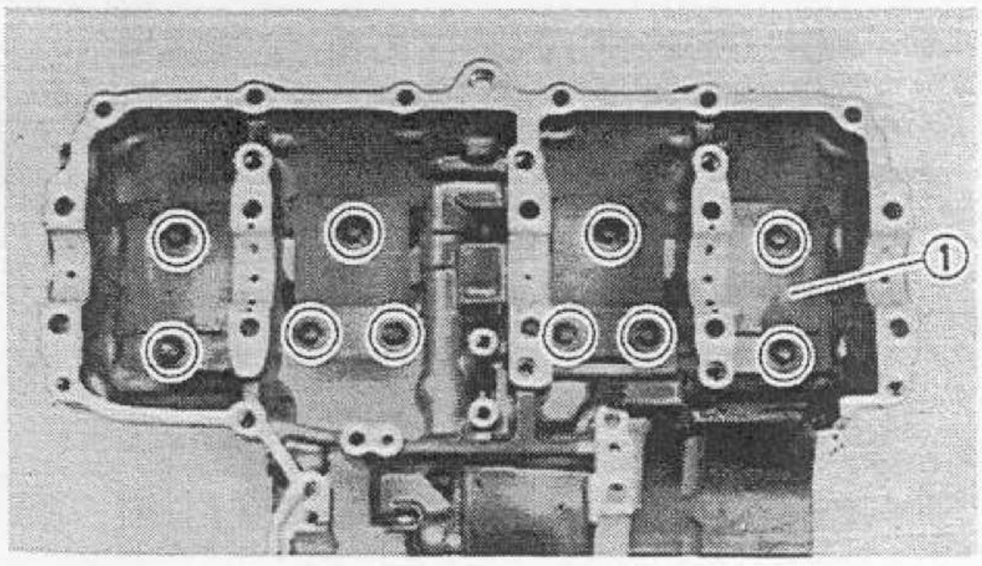
1. Remove:
   - Intake side cam chain guide ①
   - Dowels ②
   - O-rings ③



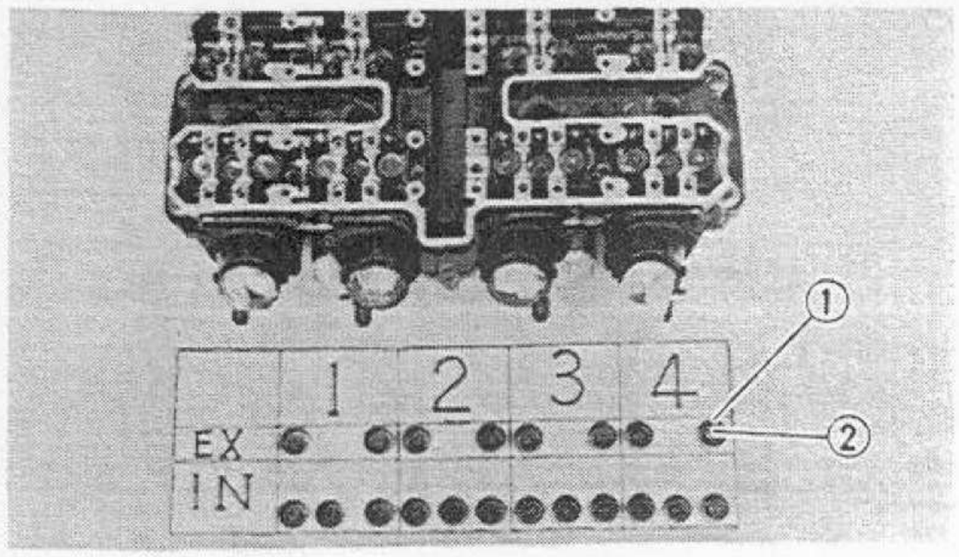
2. Remove:
   - Guide bar ①
   - "L" shift fork ②
   - "C" shift fork ③
   - "R" shift fork ④
   - Bolt ⑤
   - Shift cam assembly ⑥



3. Remove:
   - Neutral switch assembly ①



4. Remove:
   - Oil baffle plates ①

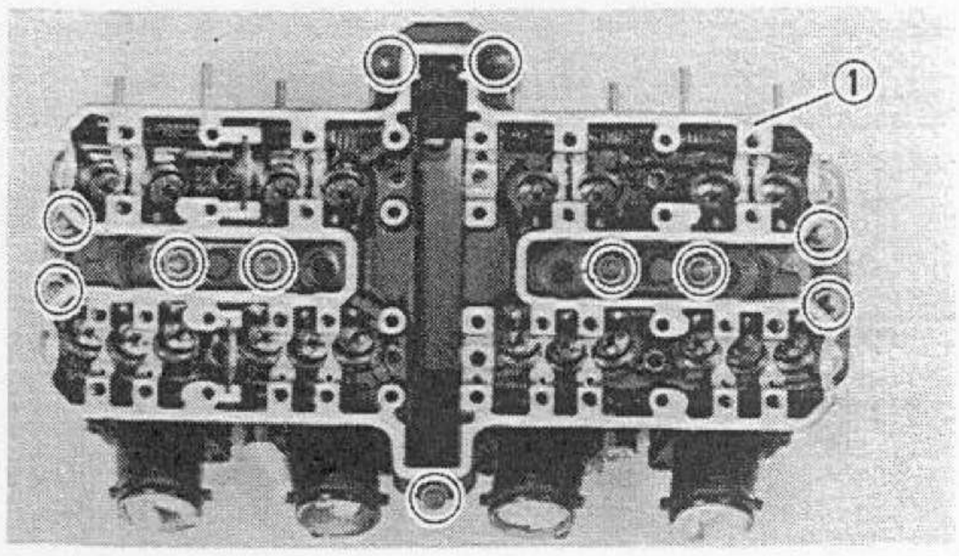


INSPECTION AND REPAIR

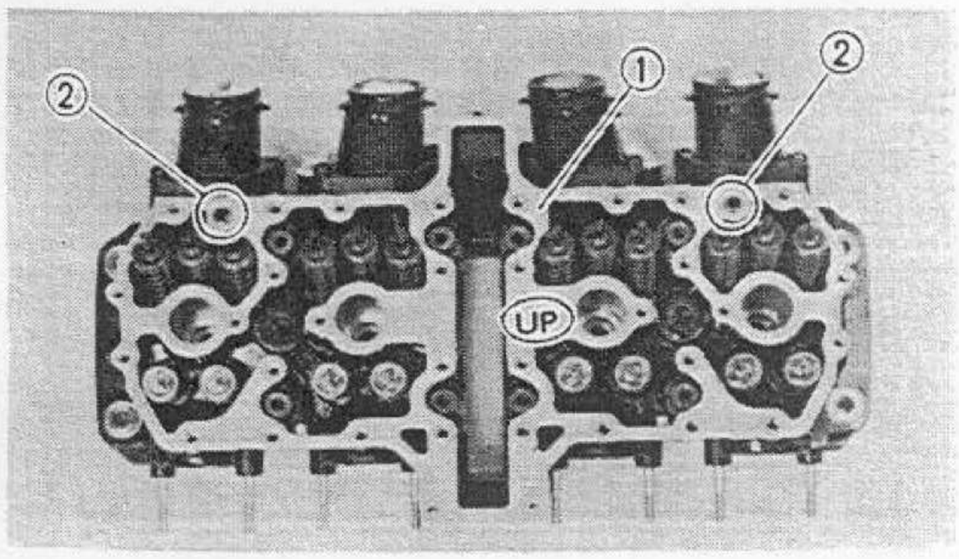
CYLINDER HEAD AND CAMSHAFT CASE

1. Remove:
   - Lifers ①
   - Valve pads ②

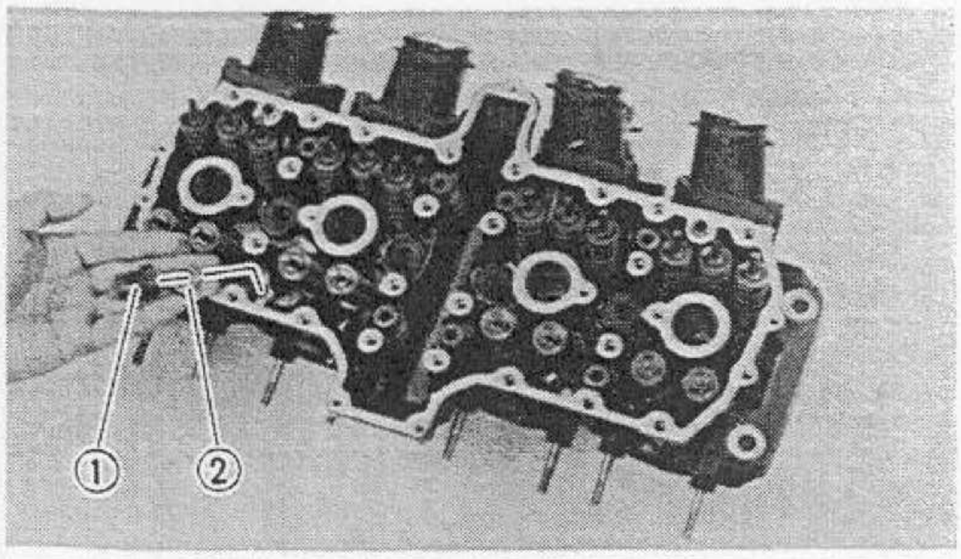
NOTE:
Identify each lifter and pad position very carefully so that it can be reinstalled in its original place.



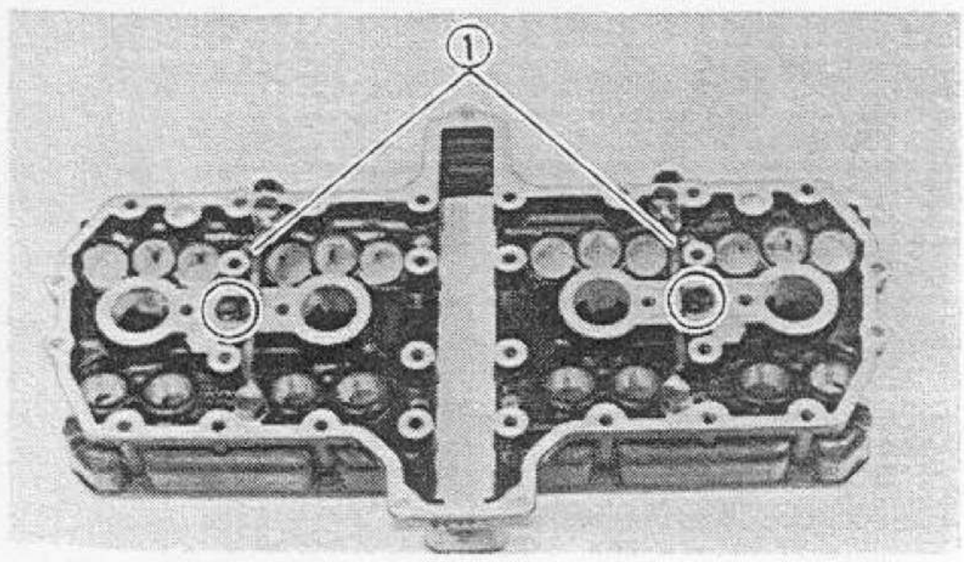
2. Remove:
   - Camshaft case ①



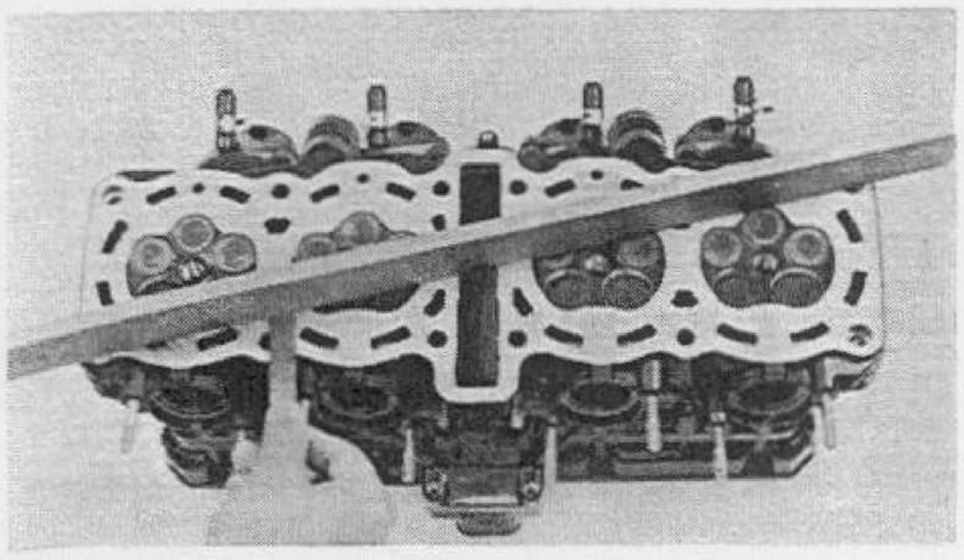
3. Remove:
   - Camshaft case gasket ①
   - Dowels ②



4. Remove:
   - Cylinder head nuts ①
   - Plain washers ②



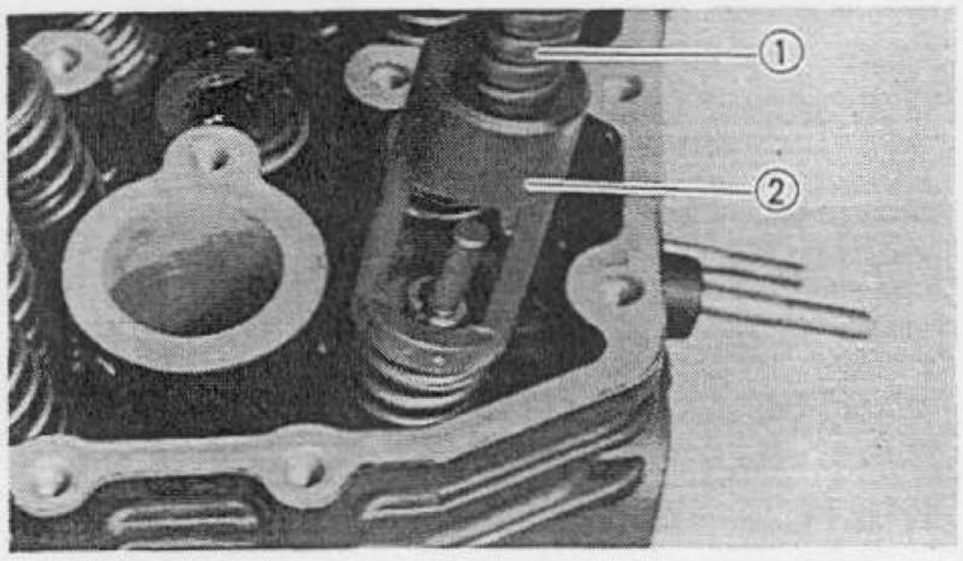
5. Remove:
   - Oil pipes 3 and 4 ①
     (from the camshaft case)



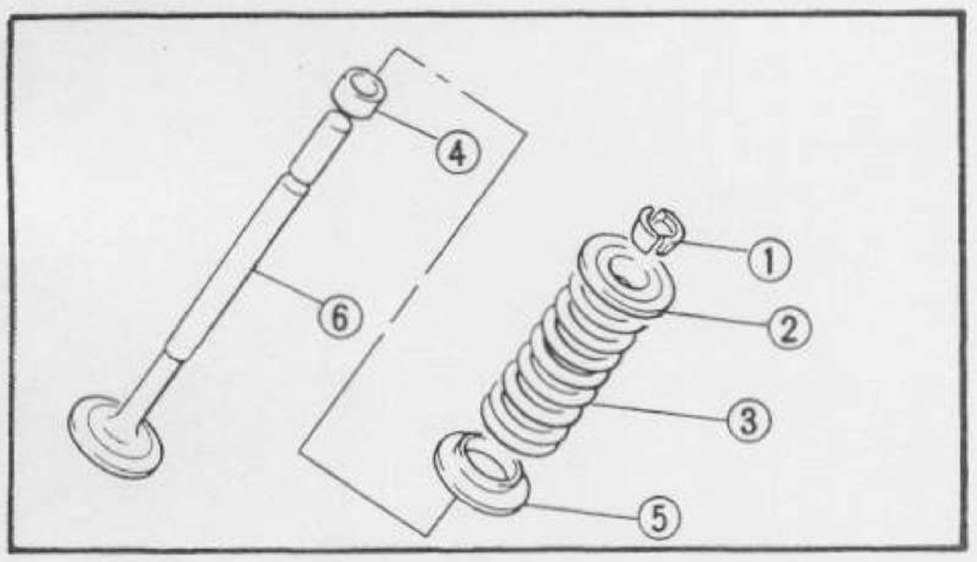
6. Measure:
   - Warpage

   Exceeds allowable limit → Resurface.

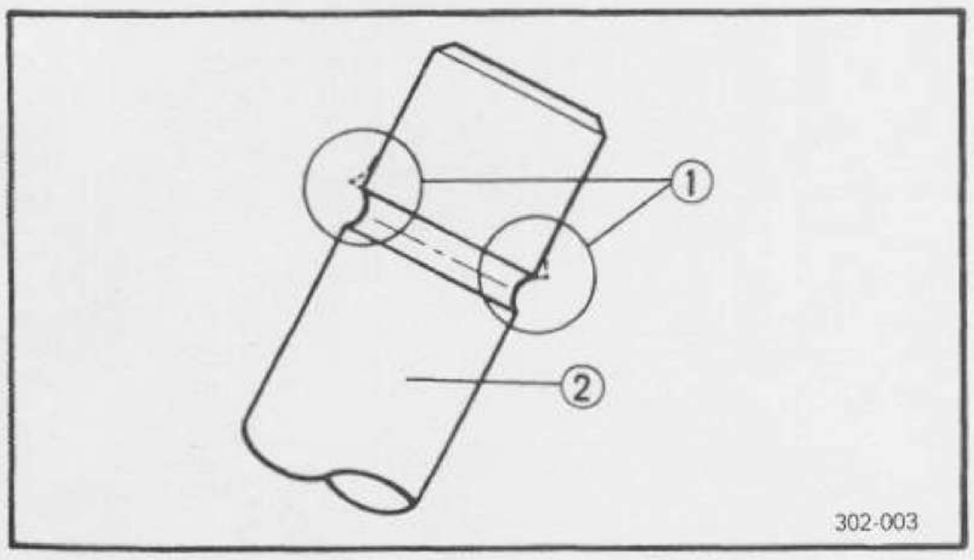
Cylinder Head Warpage:
Less than 0.03 mm (0.0012 in)



7. Attach:
   - Valve Spring Compressor (YM-04019) ①
   - Attachment (YM-04108) ②



8. Remove:
   - Valve retainers ①
   - Valve spring seat ②
   - Valve spring 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.

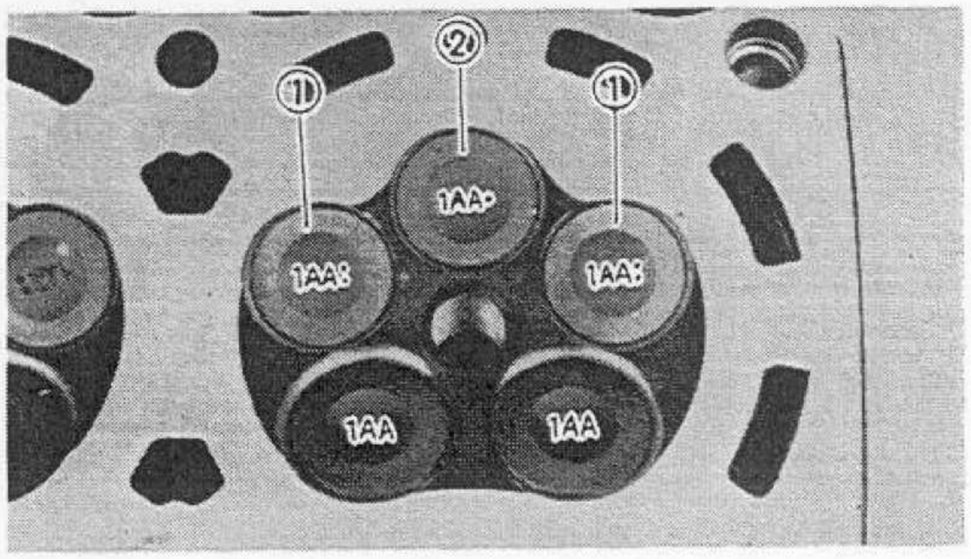
① Deburr
② Valve stem

9. Eliminate:
   - Carbon deposit

   (from combustion chamber)

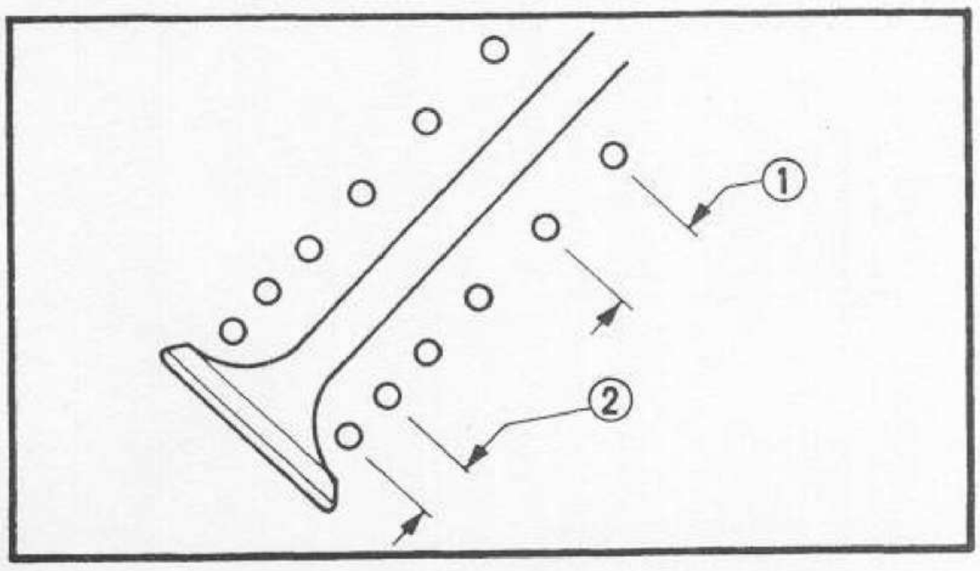
   Use rounded scraper.

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



10. Install:
    - Valves

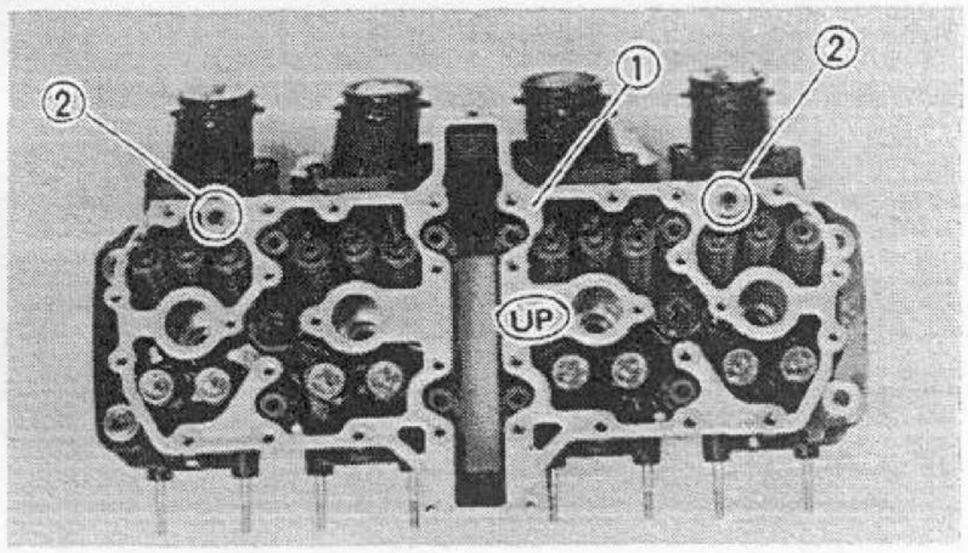
NOTE:
Be sure the "1AA:" mark ① valves are for intake left, and right and "1AA·" mark ② for intake center.



11. Install:
    - Valve springs

② Smaller pitch

NOTE:
- All valve springs must be installed with the larger pitch ① upward as shown.
- Be sure the "Blue" spring is for intake and "Red" for exhaust.

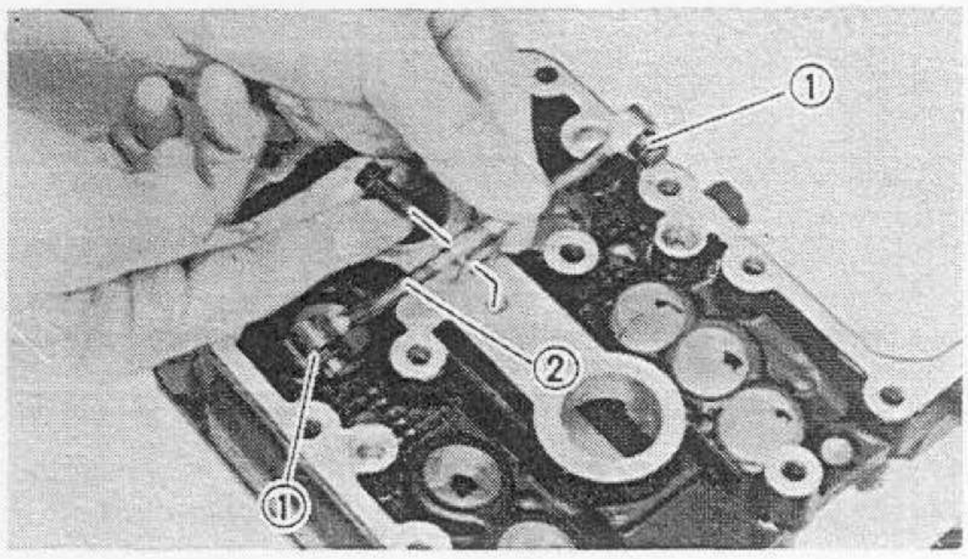


12. Install:
    - Dowels ②
    - Camshaft case gasket ①

NOTE:
Be sure the "UP" mark face to upward.

13. Check:
    - O-ring
    - Oil pipe 3 and 4

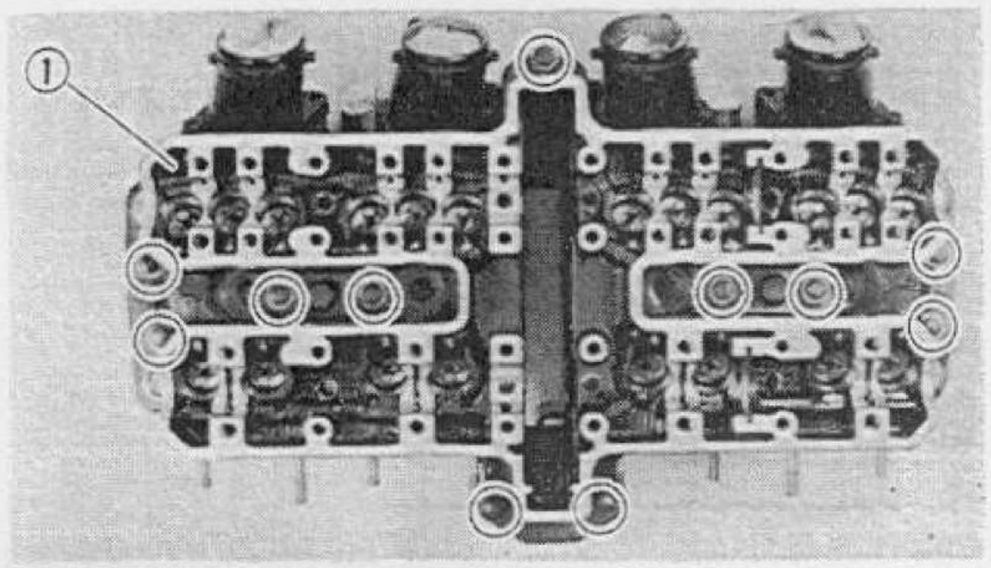
    Damage → Replace.
    Comtamination → Wash and blow out passage.

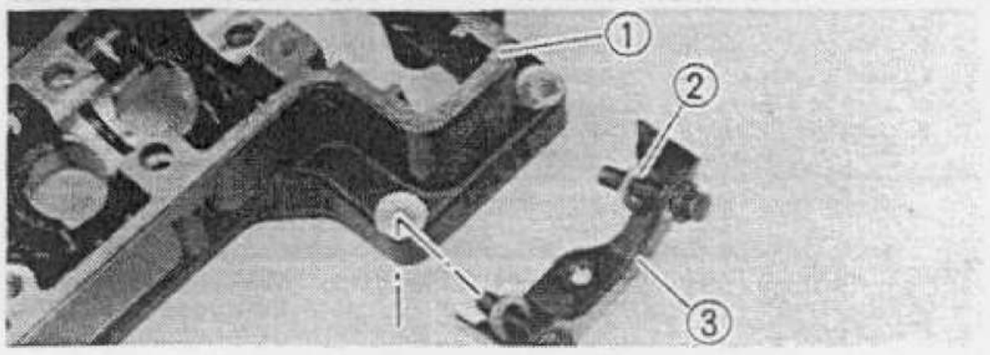


14. Install:
    - O-rings ①
    - Oil pipe 3 and 4 ②
    - Bolts

    (on the camshaft case)

	Oil pipe 3 and 4 Bolts: 10 Nm (1.0 m·kg, 7.2 ft·lb)





15. Install:
    - Camshaft case ①
    - Washers ②
    - Brakcet ③

	Camshaft Case Bolts: 10 Nm (1.0 m·kg, 7.2 ft·lb)

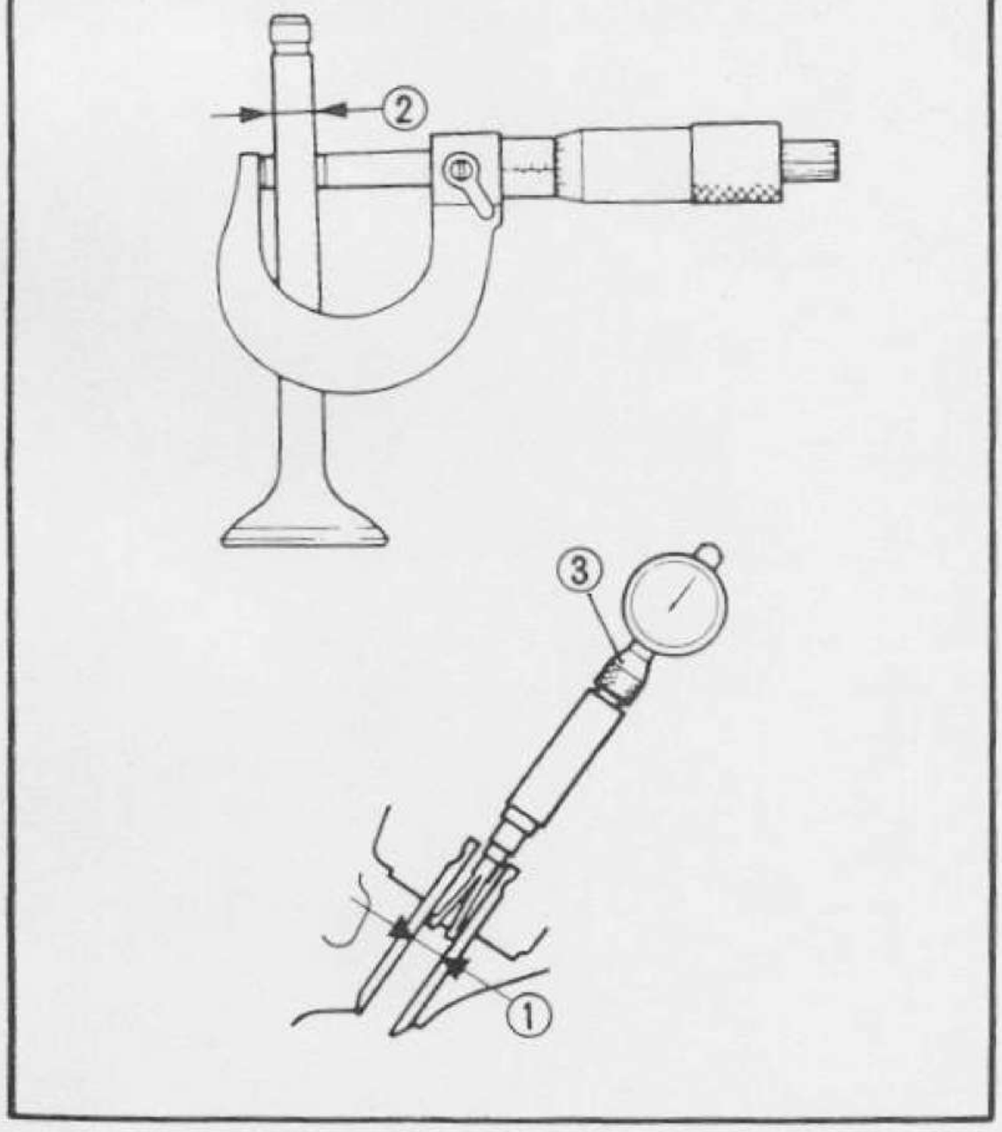
VALVE, VALVE GUIDE, VALVE SEATS AND VALVE SPRING

1. Measure:
    - Valve stem clearance

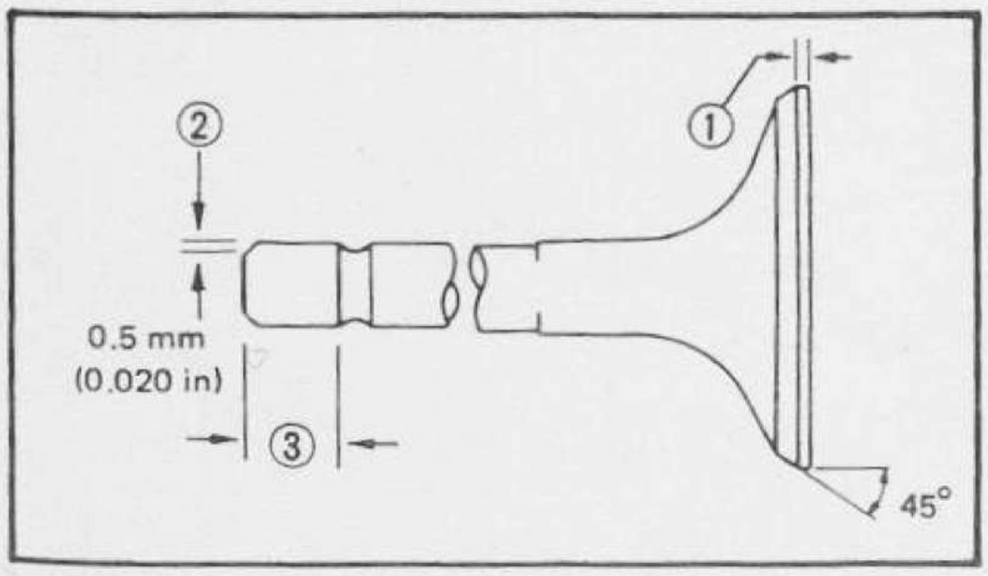
Valve stem clearance =
Valve guide inside diameter ① − Valve stem diameter ②

Out of specification → Replace valve or guide.

	Valve Stem Clearance Limit:	
Intake	0.08 mm (0.0031 in)	
Exhaust	0.10 mm (0.0039 in)	



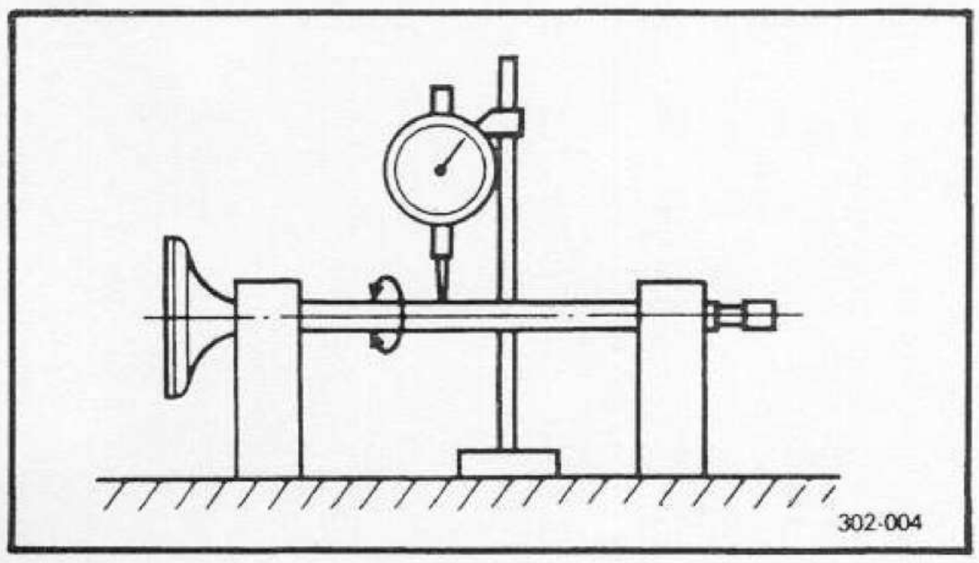
③ Bore gauge

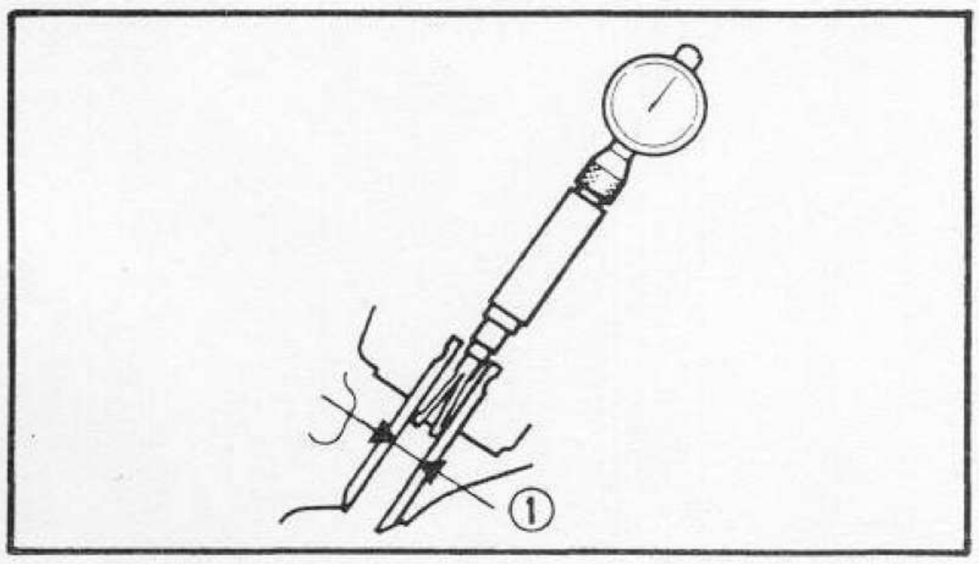


2. Measure:
    - Valve face:

    Pitting/Wear → Regrind.
    Out of specification → Raplace.

Minimum Thickness (Service limit) ① :
0.7 mm (0.0276 in)
Beveled ② :
0.35 mm (0.0138 in)
Minimum Length (Service limit) ③ :
14.5 mm (0.571 in)





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

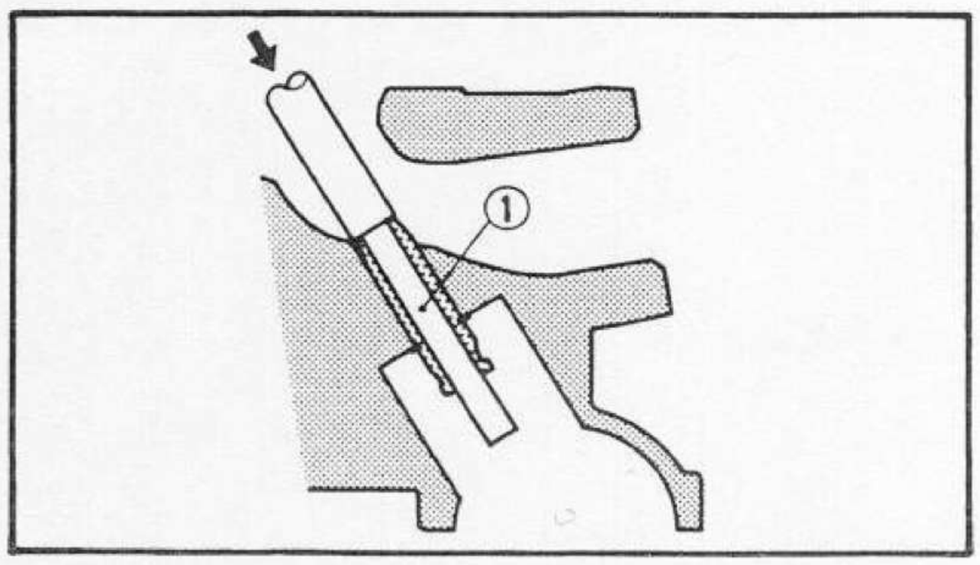
Maximum Valve Stem Runout:
0.01 mm (0.0004 in)

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

Valve Guide Inside Diameter Limit:
5.05 mm (0.1988 in)

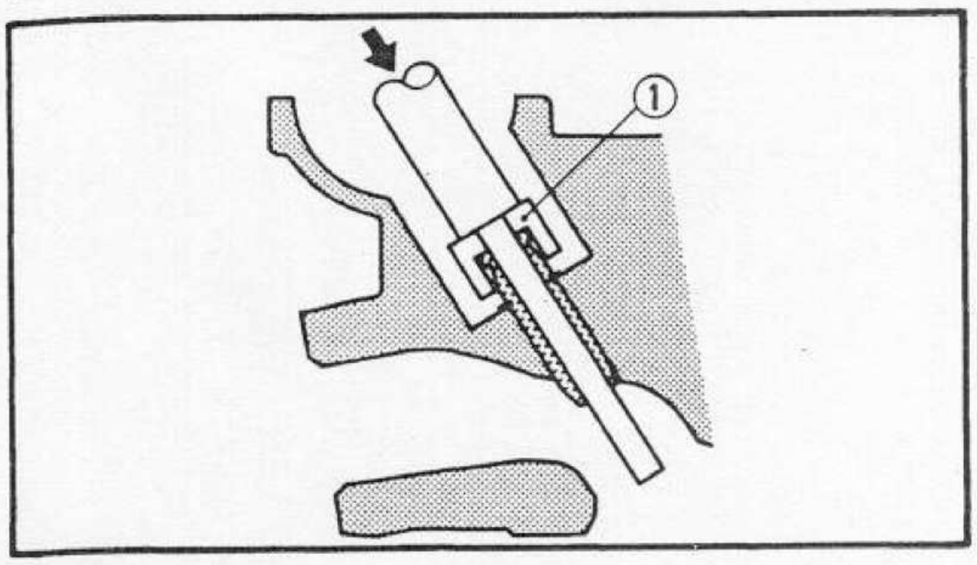
5. Inspect:
- Valve guide
  Wear/Oil leakage → Replace.

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.

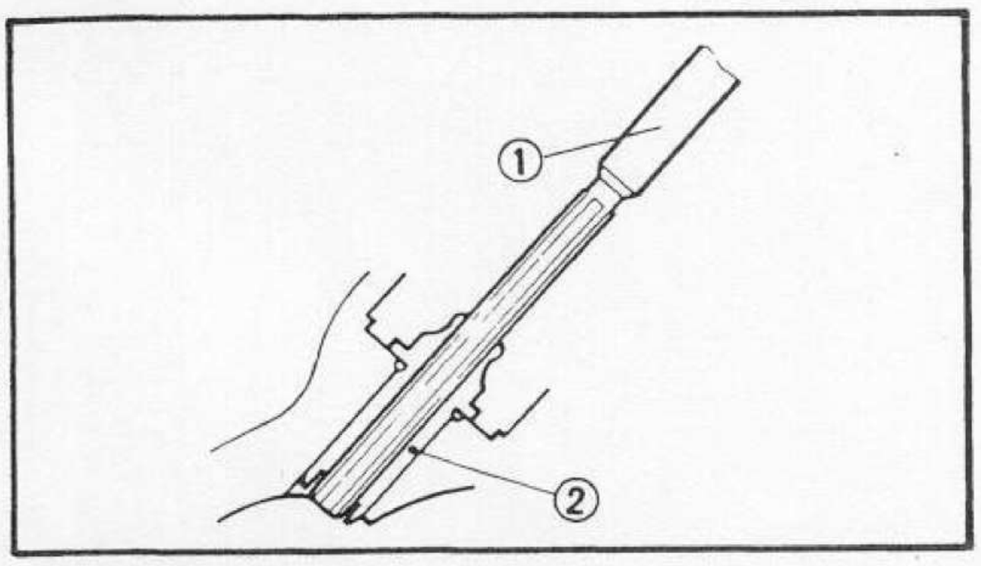


Valve Guide Replacement
1. Remove:
- Valve guide
  Use Valve Guide remove (YM-04097) ①

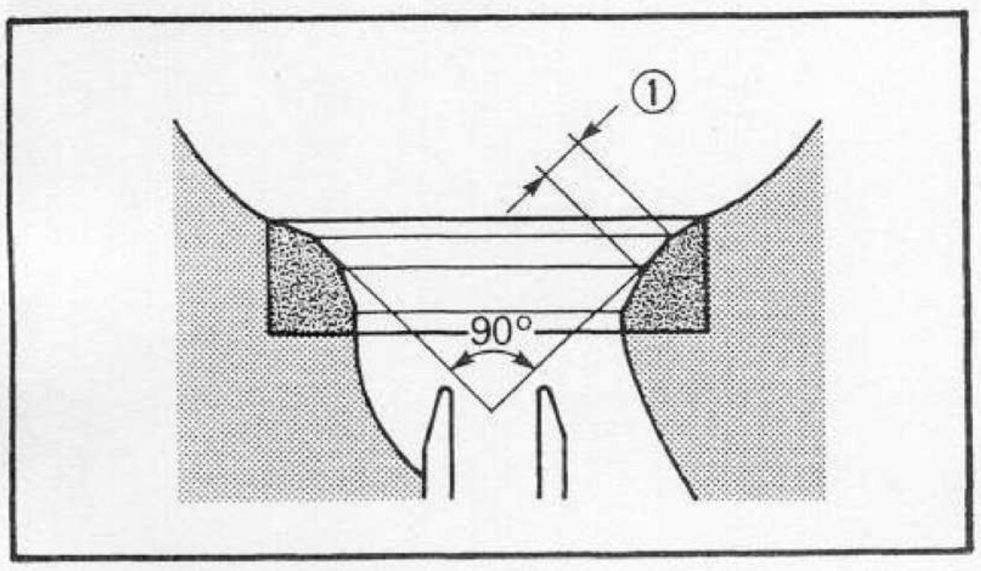
NOTE:
- Always replace valve guide if valve is replaced.
- Always replace oil seal if valve is removed.



2. Install:
   - Valve guide (new)
     Use-Valve Guide Installer (YM-04098) ①.



3. Bore valve guide ② to obtain proper valve stem clearance.
   Use 5.0 mm Reamer (YM-04099) ①.

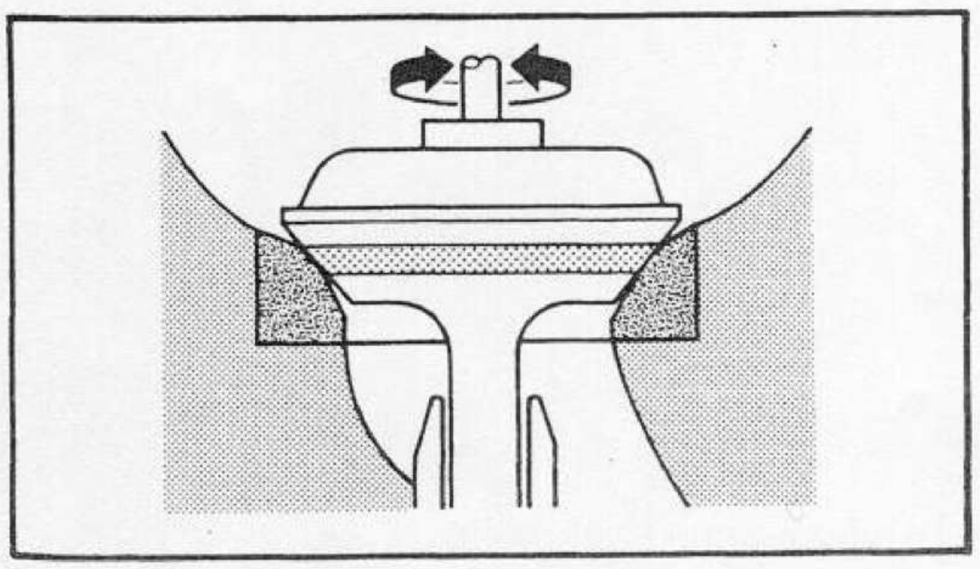


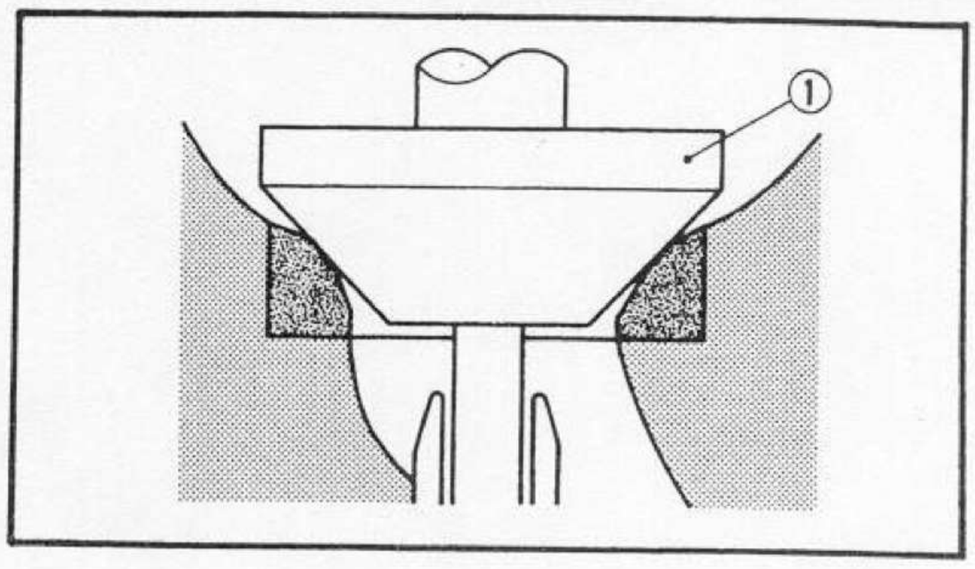
Valve Seat

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 ± 0.004 in)	1.8 mm (0.07 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

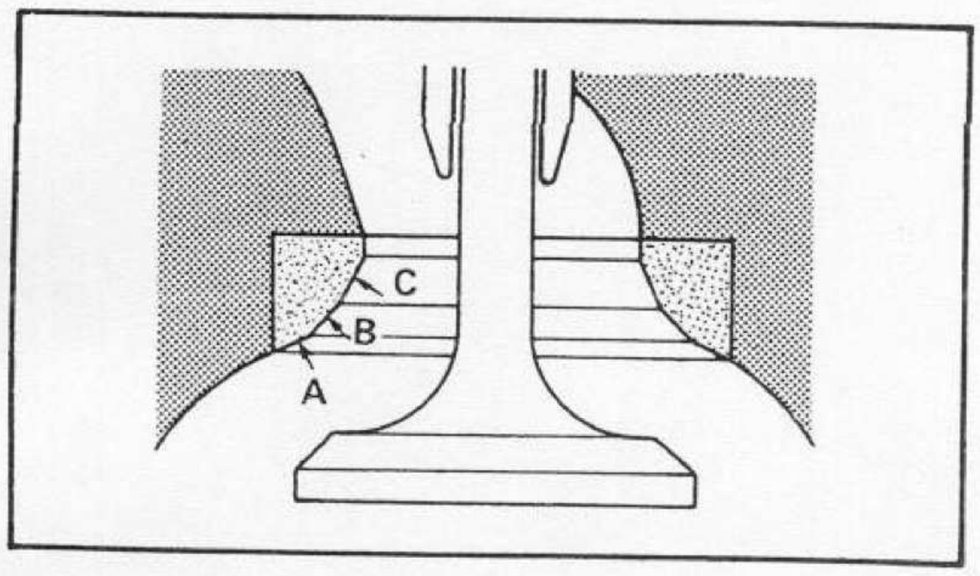
   Valve seat width must be uniform in contact area.
   Out of specification → Cut.
8. Cut valve seat.

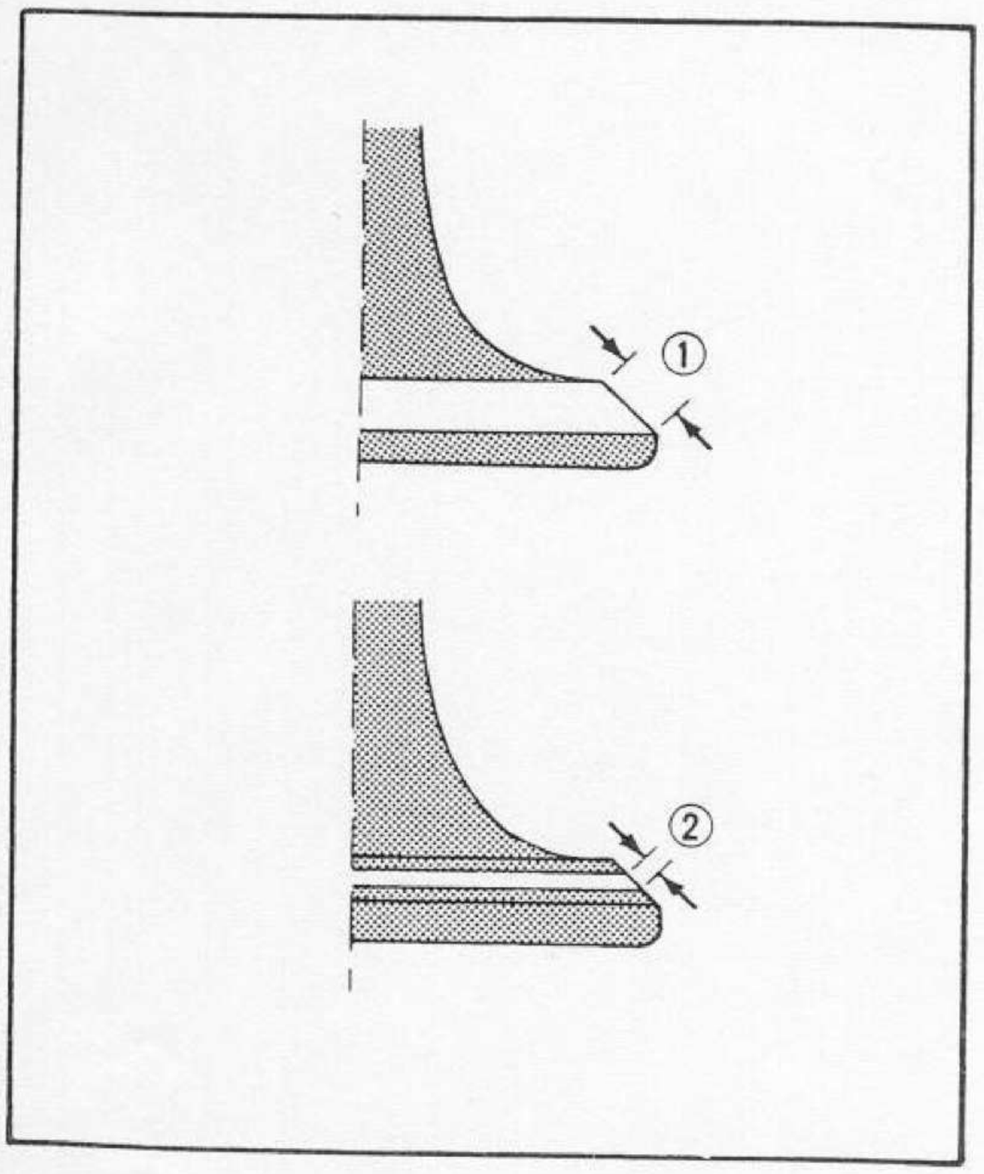
NOTE:

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 and 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 desired position on valve face.

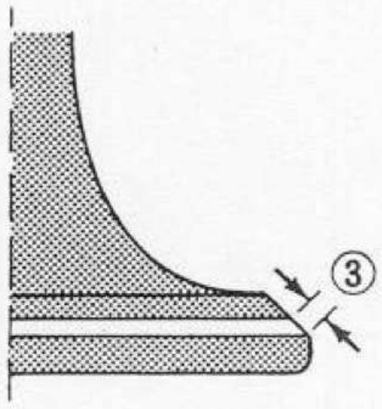
Cut vlave seat as follows:	
Section A	20° Cutter
Section B	45° Cutter
Section C	60° Cutter

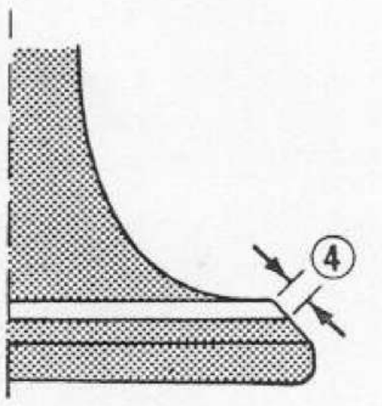
- Valve face indicates that valve seat is desired position but too wide ① .

Valve seat cutter set		Desired result
Use	20° Cutter	to reduce valve seat width.
	60° Cutter	

- Valve seat is desired position but too narrow ② .

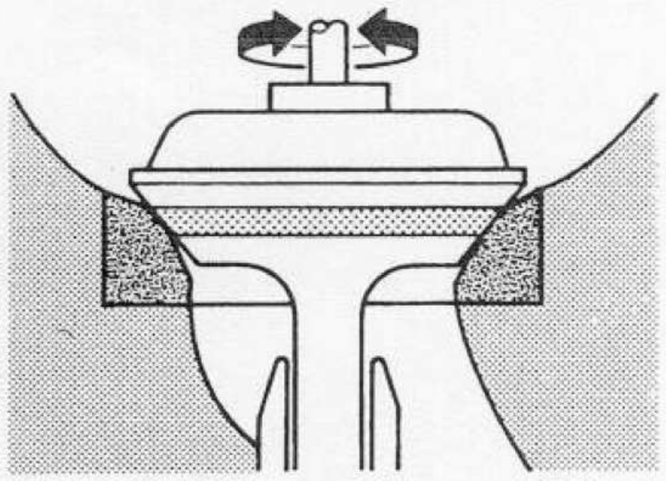
Valve seat cutter set		Desired result
Use	45° Cutter	to achieve a uniform valve seat width (Standard specifications).





• Valve seat is too narrow and touching the valve margin ③ .		
Valve seat cutter set		**Desired result**
Use	20° Cutter, first	to obtain correct seat width.
	45° Cutter	

• Valve seat is too narrow and touching the bottom edge of the valve face ④ .		
Valve seat cutter set		**Desired result**
Use	60° Cutter, first	to obtain correct seat width.
	45° Cutter	



NOTE:

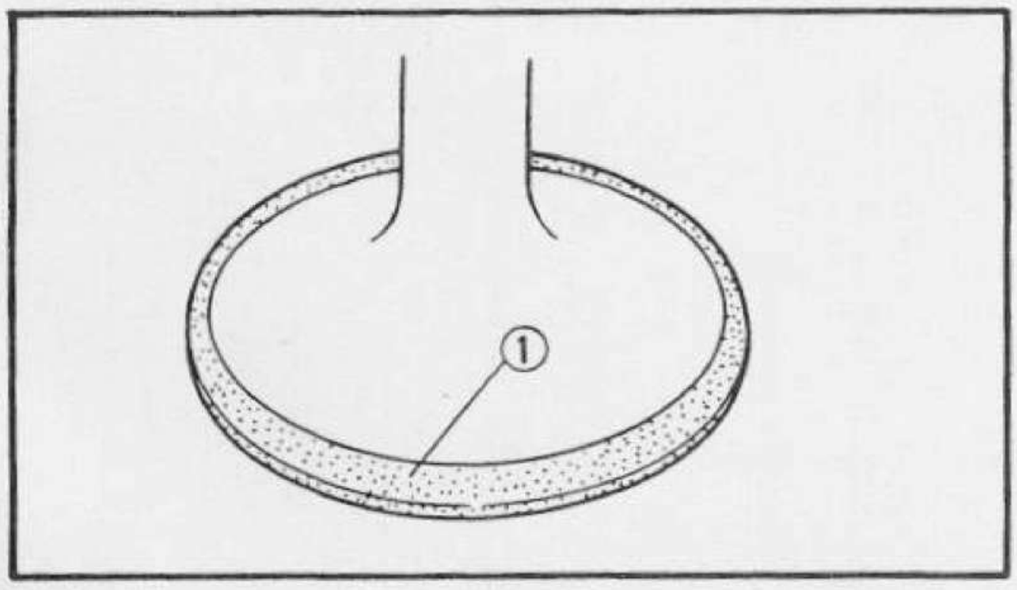
Lap valve/valve seat assembly if:
- Valve face/valve seat are used or severely worn.
- Valve and valve guide has been replaced.
- Valve seat has been cut.

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

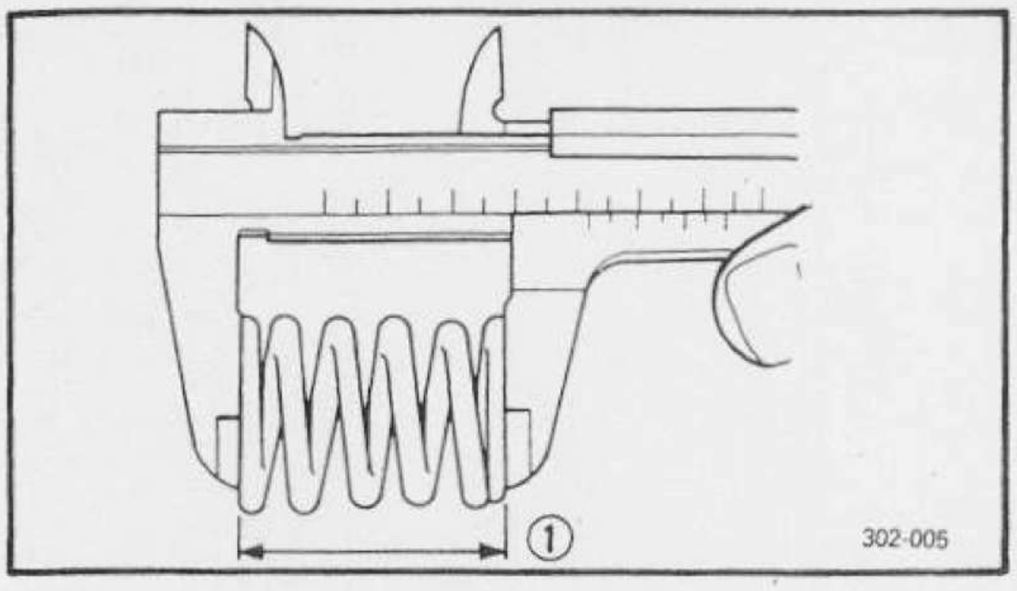
   Valve must make full seat contact indicated by grey surface all around valve face where bluing was removed.
8. Apply:
   - Solvent

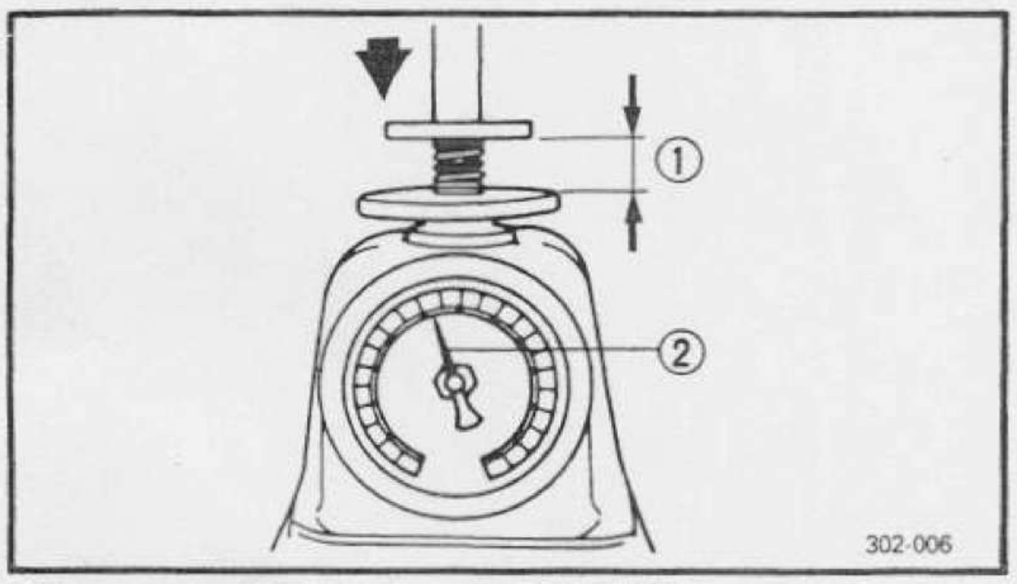
   (into each intake and exhaust port)

   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 satifactory seal.





Valve Spring Measurement

1. Measure:
   - Valve spring free length ①

   Out of specification → Replace.

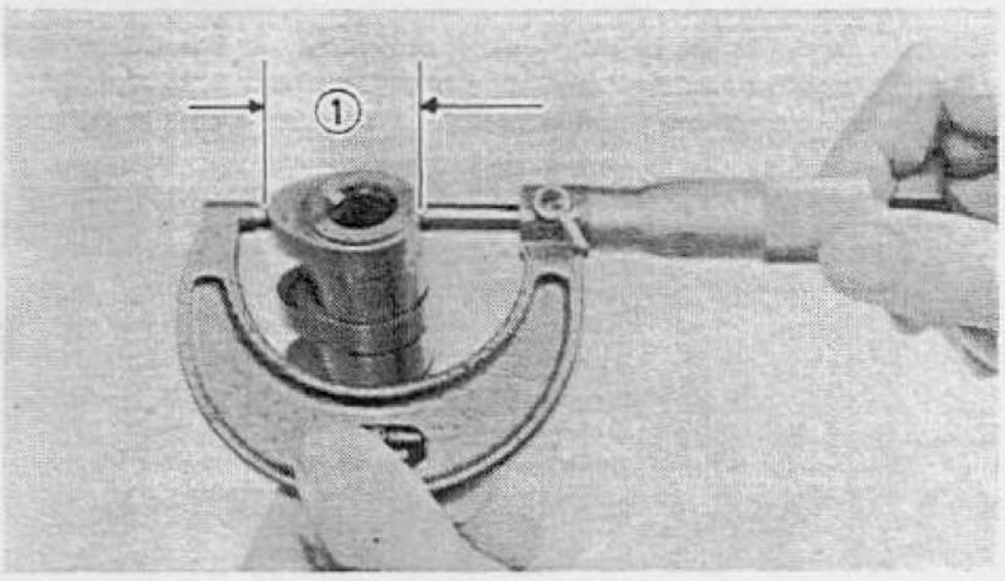
Valve spring free length	
Intake spring	Exhaust spring
39.76 mm (1.565 in)	39.96 mm (1.573 in)

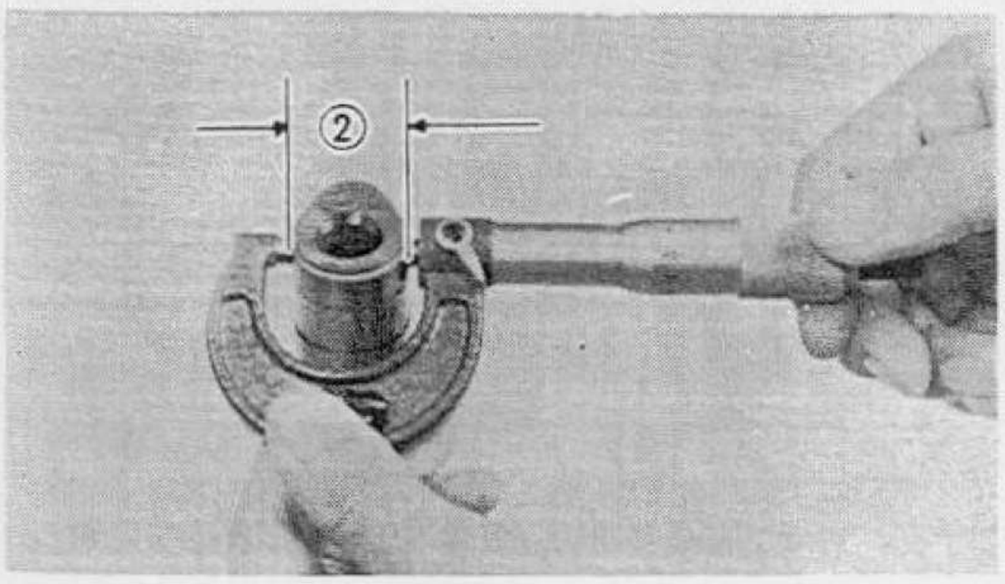
2. Measure:
   - Valve spring installed force ②

   Out of specification → Replace.

① Installed length

Valve spring installed force			
Intake spring		Exhaust spring	
①	②	①	②
35.0 mm (1.378 in)	7.3 ~ 8.7 kg (16.1 ~ 19.2 lb)	35.0 mm (1.378 in)	11.0 ~ 13.0 kg (24.3 ~ 28.7 lb)





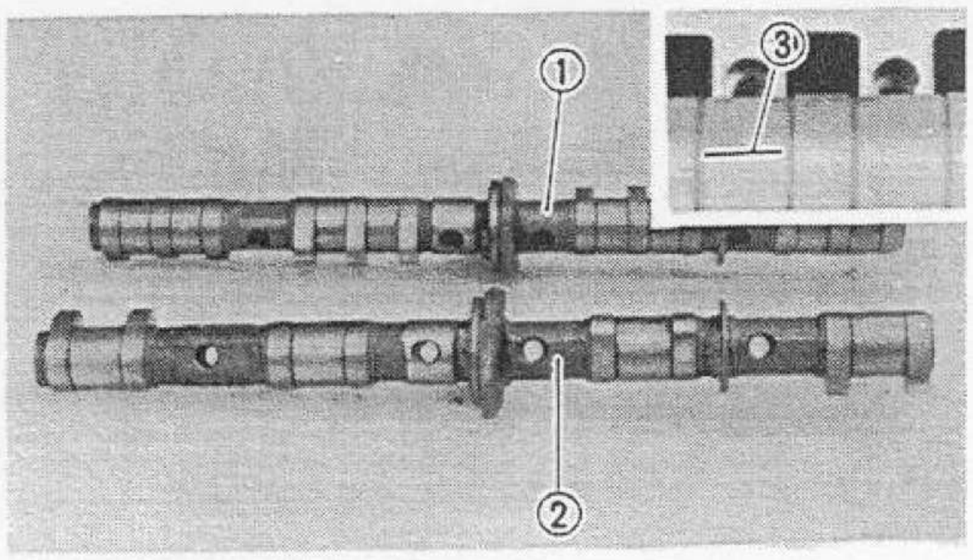
CAMSHAFT, CAM CHAIN AND CAM SPROCKET

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

   Use a micrometer.

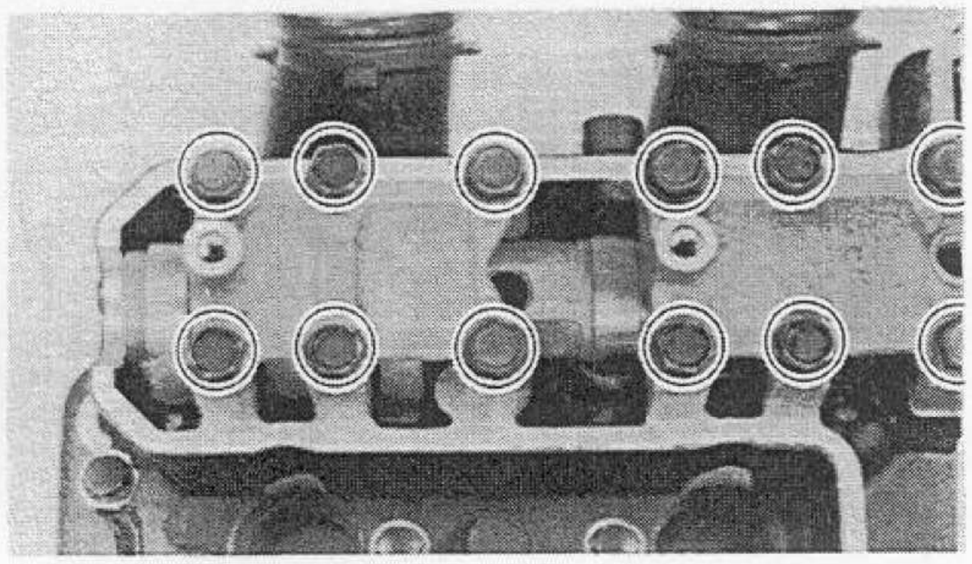
   Out of specification → Replace.

	Intake	Exhaust
①	32.55 ~ 32.65 mm (1.2815 ~ 1.2854 in)	32.4 ~ 32.5 mm (1.2756 ~ 1.2795 in)
②	24.95 ~ 25.05 mm (0.9823 ~ 0.9862 in)	24.95 ~ 25.05 mm (0.9823 ~ 0.9862 in)



Camshaft/Cap Clearance Measurement

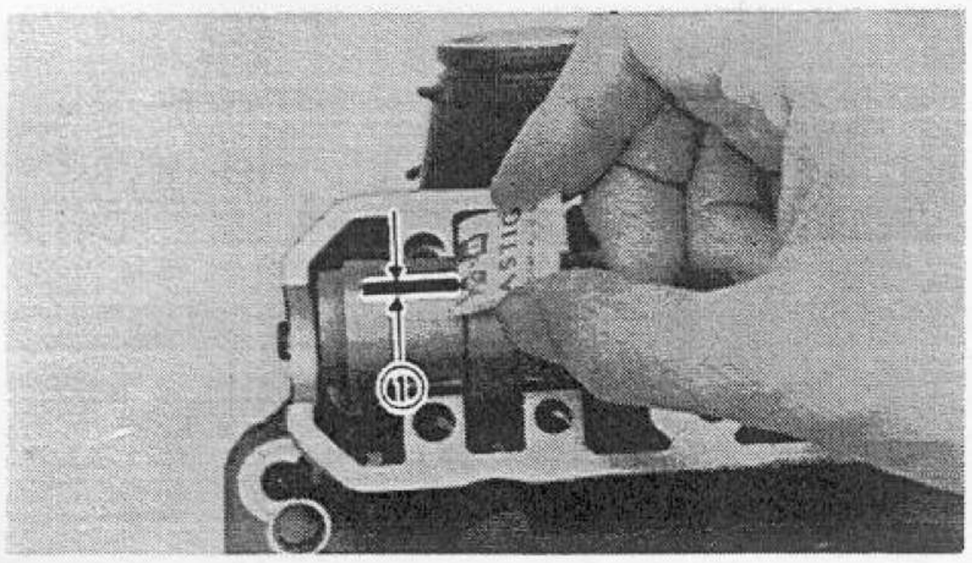
1. Install:
   - Intake camshaft ①
   - Exhaust camshaft ②
2. Position:
   - Strip of Plastigage® ③ (YU-33210) (onto camshaft)



3. Install:
   - Camshaft caps
4. Tighten:
   - Camshaft cap bolts ①

Camshaft Cap Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)

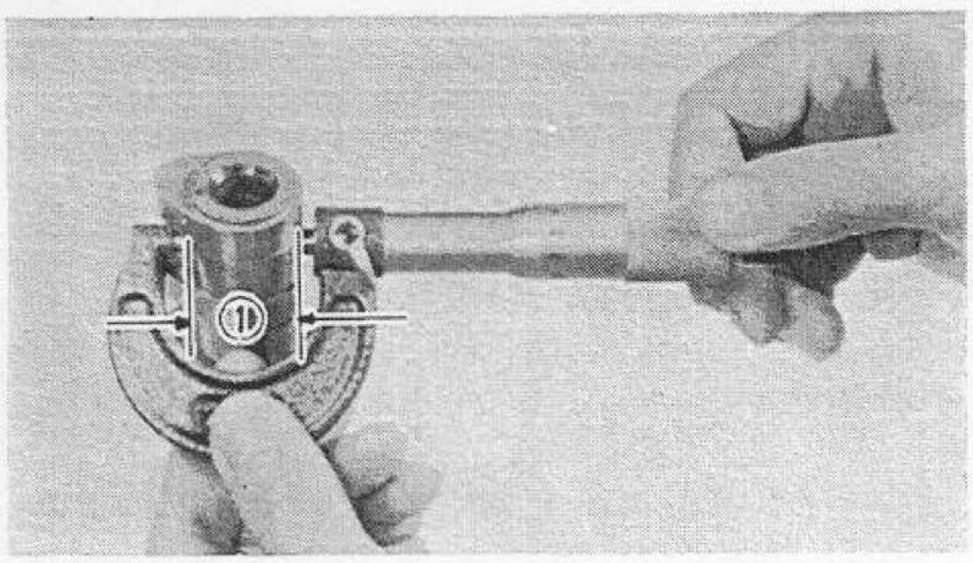
NOTE:
Do not turn the camshaft when measuring clearance with Plastigage.



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

   Out of specification → Follow step 7.

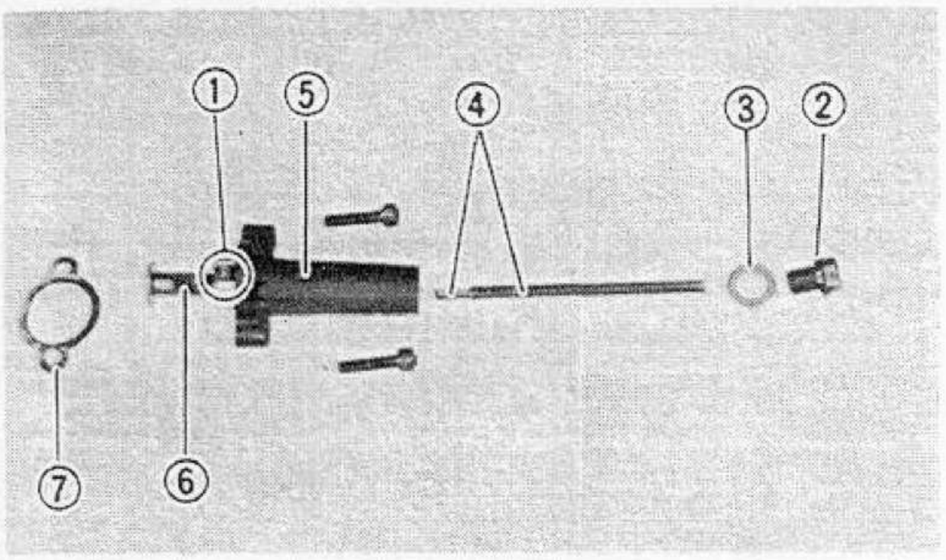
Camshaft-to-cap Clearance:
0.050 ~ 0.084 mm
(0.00197 ~ 0.00331 in)



7. Measure
   - Camshaft bearing surface diameter ①

   Use a micrometer.
   Out of specification → Replace camshaft.
   Within specification → Replace cylinder head.

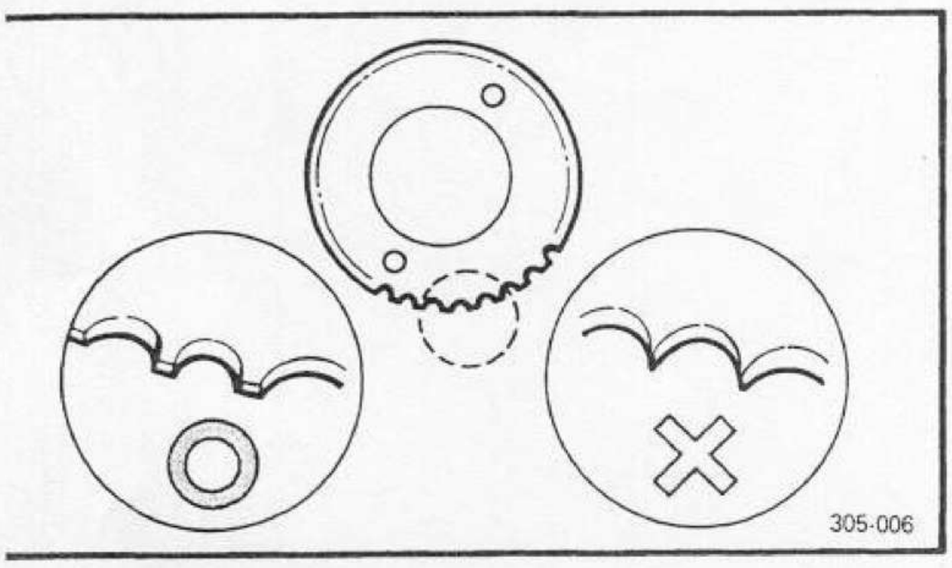
Camshaft Bearing Surface Diameter:
Standard: 24.437 ~ 24.450 mm
(0.9621 ~ 0.9626 in)
Cam Cap Inside Diameter:
Standard: 24.500 ~ 24.521 mm
(0.9646 ~ 0.9654 in)



Cam Chain Tensioner

1. Check:
   - One-way cam ① operation
     Unsmooth operation → Replace.
2. Inspect:
   - All parts
     Damage/Wear → Replace.

② End plug
③ Washer
④ Spring
⑤ Tensioner body
⑥ Tensioner rod
⑦ Gasket

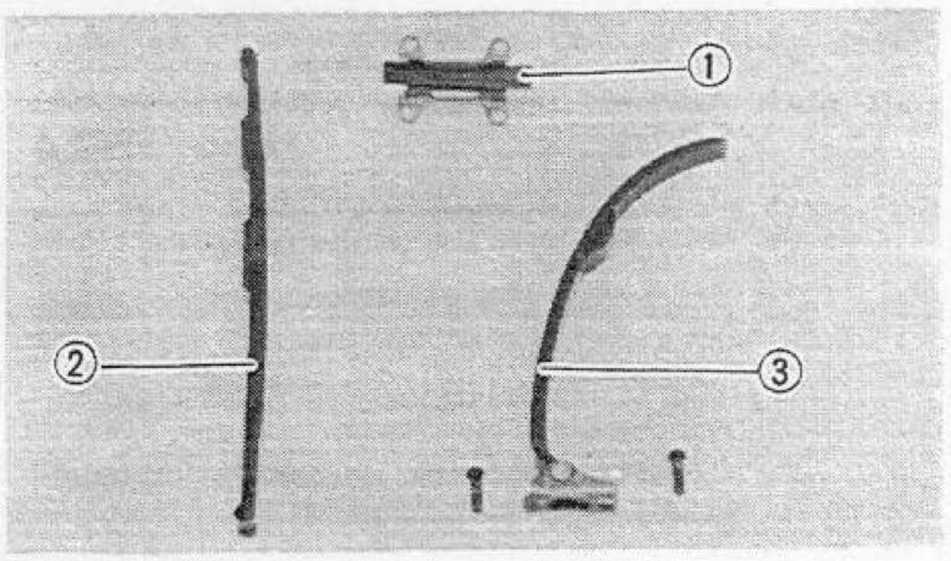


Cam Chain

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

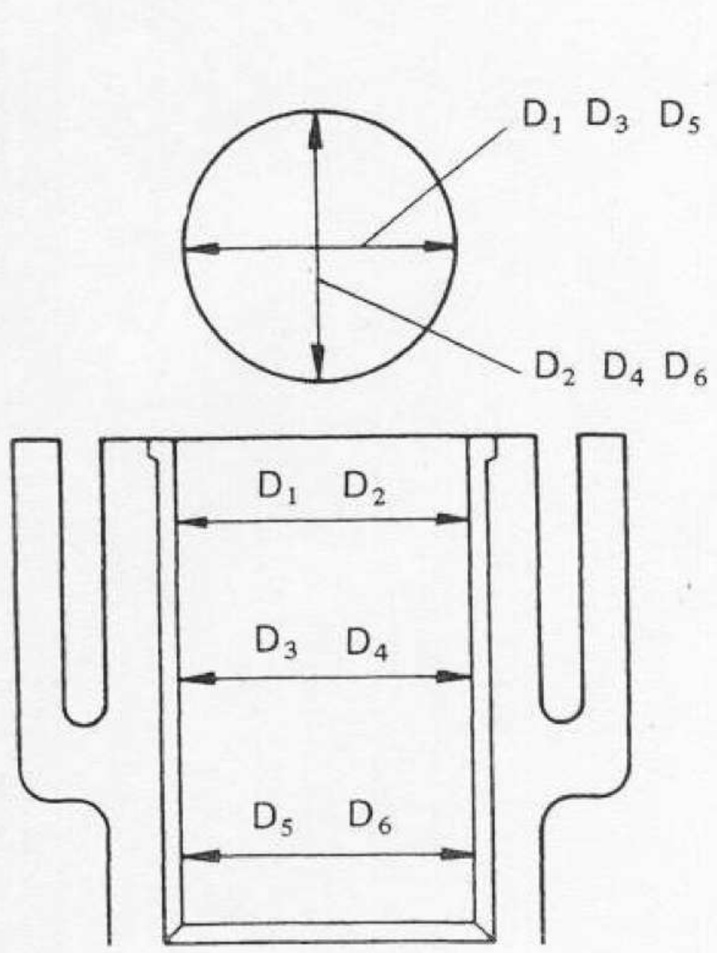
Cam Sprockets

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



Chain Guide

1. Inspect:
   - Upper chain guide ①
   - Exhaust side chain guide ②
   - Intake side chain guide ③
     Wear → Replace.



CYLINDER

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

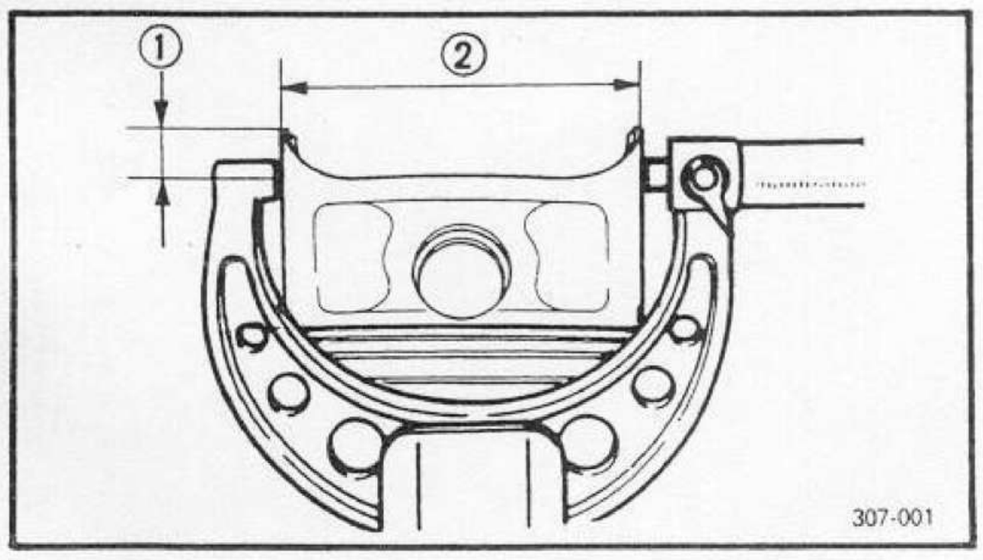
NOTE:
Obtain measurements at three depths by placing measuring instrument parallel to and at right angles to crankshaft.

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

	Standard	Wear Limit
Cylinder bore: C	68.000 ~ 68.005 mm (2.67717 ~ 2.67736 in)	68.1 mm (2.68110 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" ②

NOTE:

Measure the piston skirt diameter where the distance 5.0 mm (0.197 in) ① from the piston bottom edge.

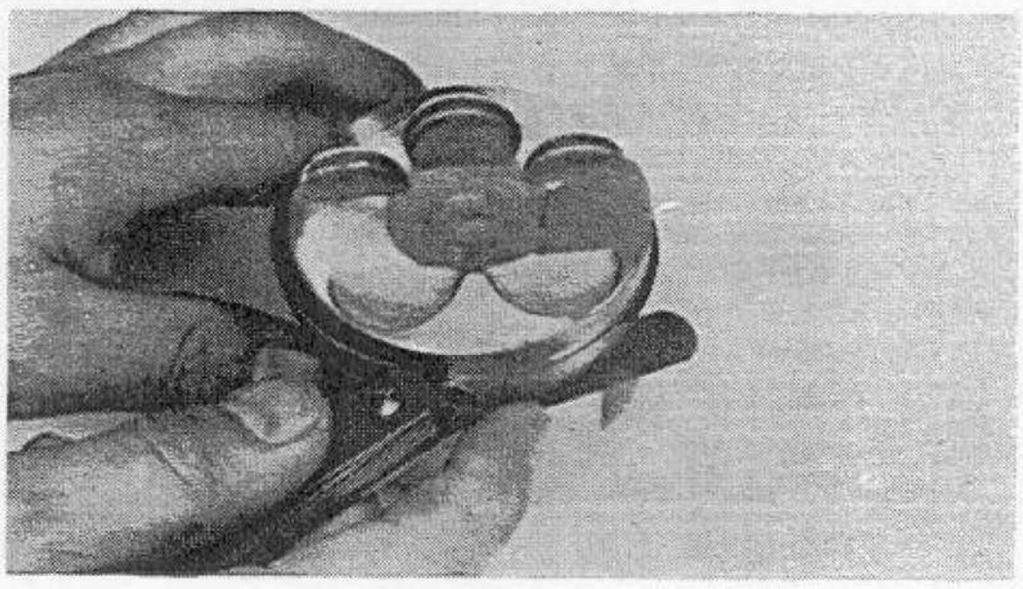
	Piston size P
Standard	68.00 mm (2.6772 in)
Oversize 2	68.50 mm (2.6969 in)
Oversize 4	69.00 mm (2.7165 in)

2. Measure:
   - Piston clearance

Piston Clearance =
Cylinder inside diameter "C" — Piston skirt diameter "P"

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

Piston Clearance:
0.06 ~ 0.08 mm
(0.00236 ~ 0.00315 in)



Piston Ring

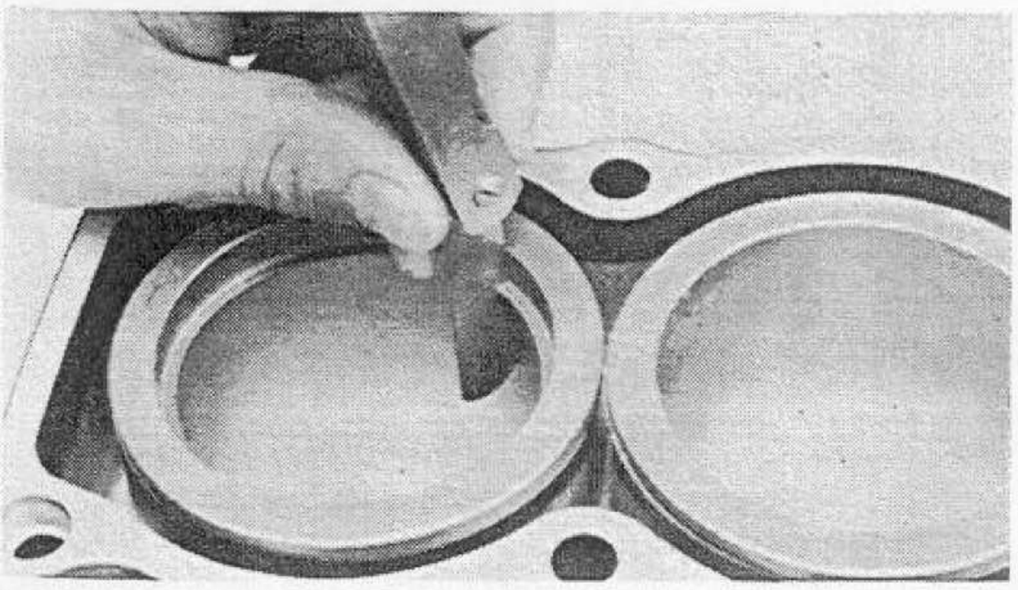
1. Measure:
   - Ring side clearance
     Use a feeler gauge.
     Out of specification → Replace piston.

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	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)

2. Position:
   - Piston ring
     (in cylinder)

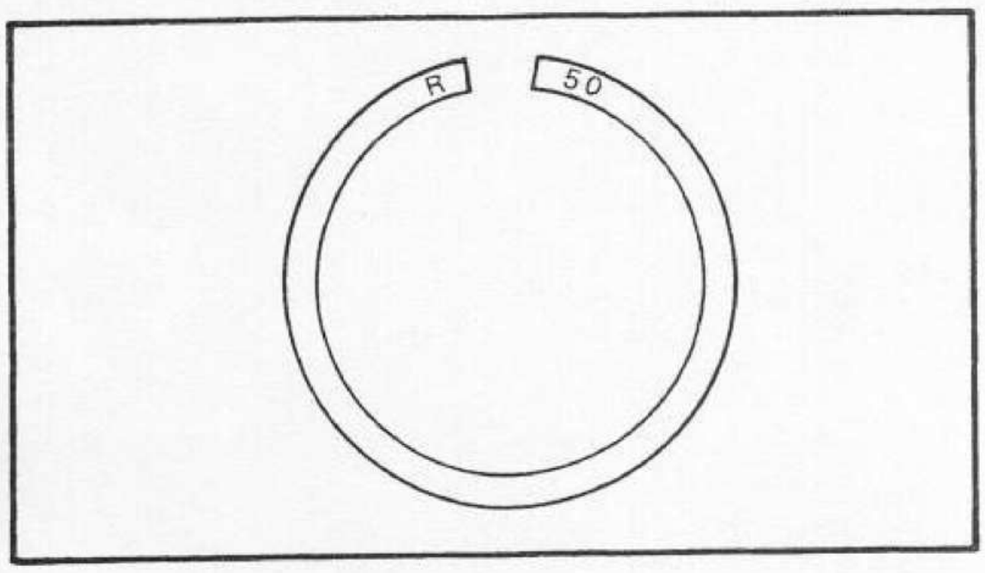
NOTE:
Insert a ring into cylinder, and push it approximarely 20 mm (0.8 in) into cylinder. Push ring with piston crown so that ring will be at a right angle to cylinder bore.

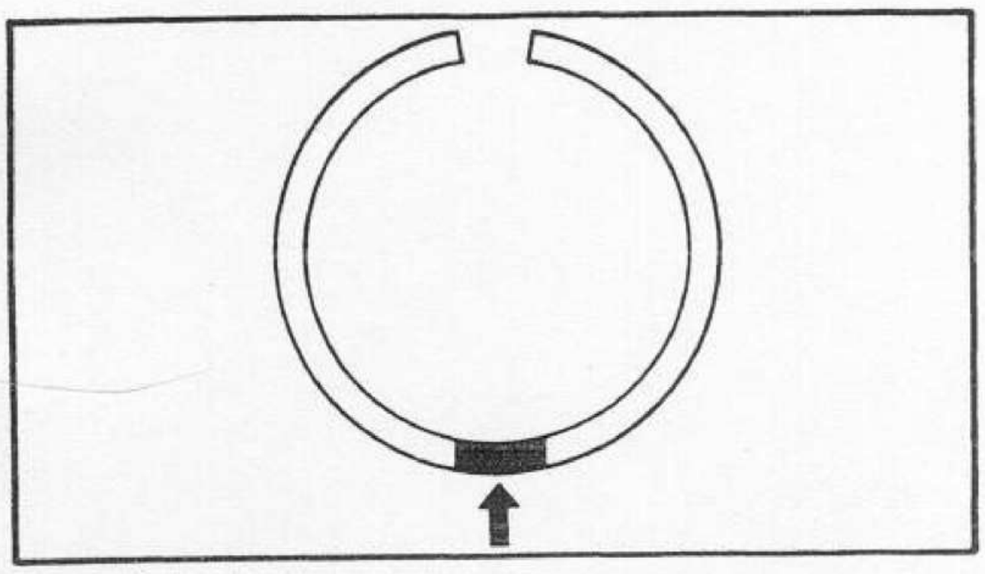


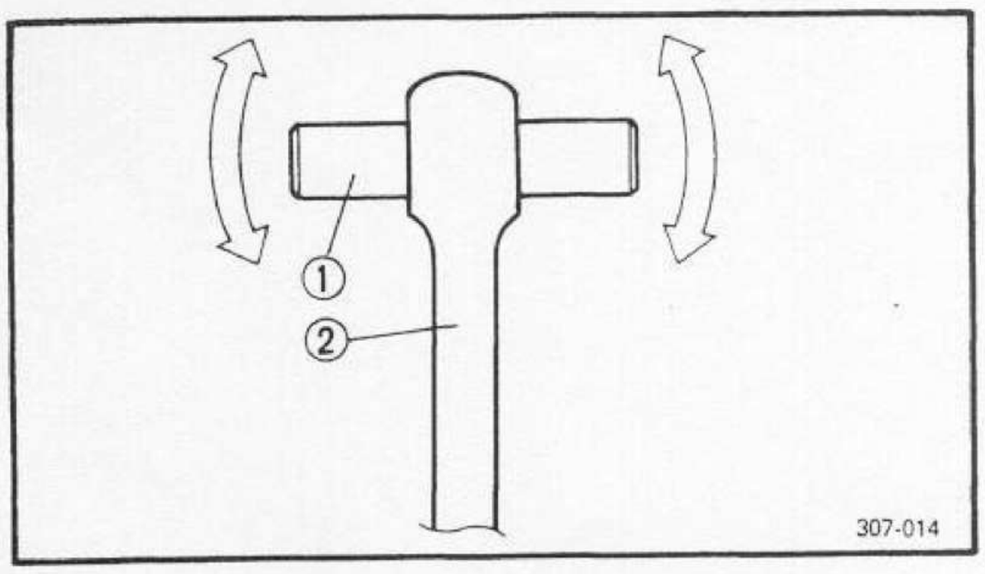
3. Measure:
   - Ring end gap
     Out of specification → Replace.

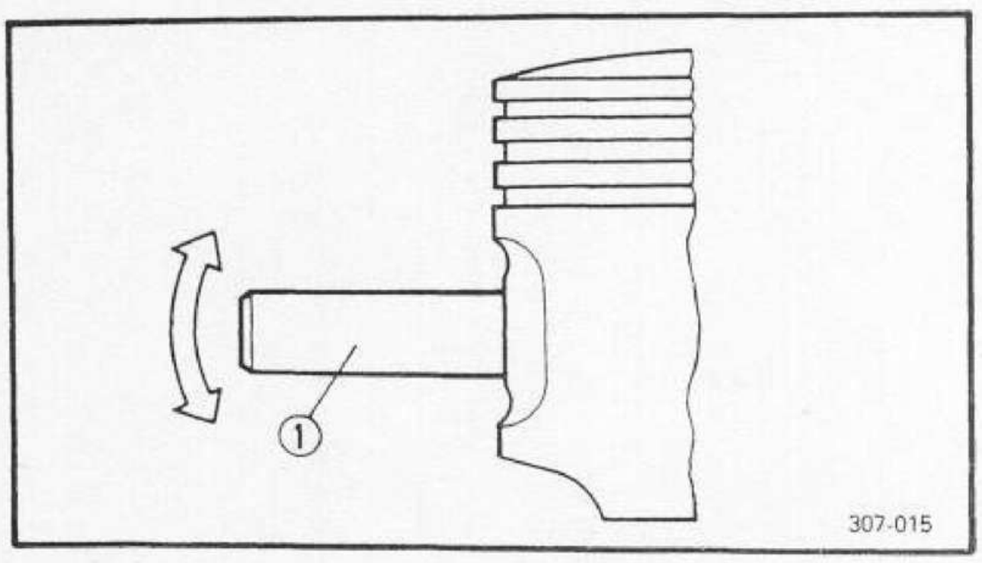
NOTE:
You cannot measure end gap on expander spacer of oil control ring. If oil control ring rails show excessive gap, replace all three rigns.

	Piston ring end gap (Installed)
Top ring	0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in)
2nd ring	0.20 ~ 0.35 mm (0.0079 ~ 0.0138 in)
Oil ring	0.20 ~ 0.70 mm (0.0079 ~ 0.0276 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.

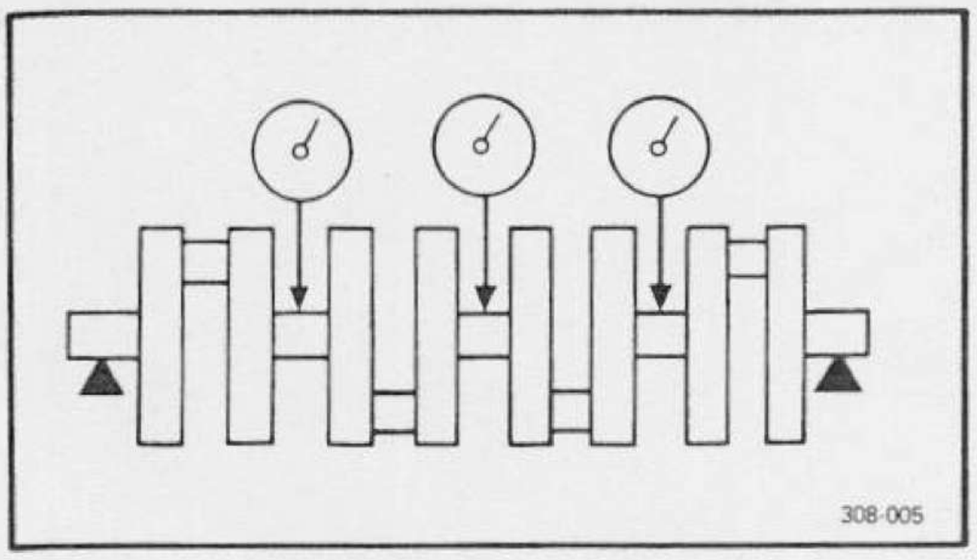
Size	Color
Oversize 2	Red
Oversize 4	Yellow

Piston Pin

1. Lubricate:
   - Piston pin (Lightly)
2. Install:
   - Piston pin ①
     (into small end of connecting rod ②)
3. Check:
   - Free play

   Free play → Inspect connecting rod for wear.
   Wear → Replace connecting rod and piston pin.
4. Position:
   - Piston pin ①
     (into piston)
5. Check:
   - Free play
     (into piston)

   Free play → Replace piston pin and/or piston.



CRANKSHAFT AND CONNECTION 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 (YU-03097).

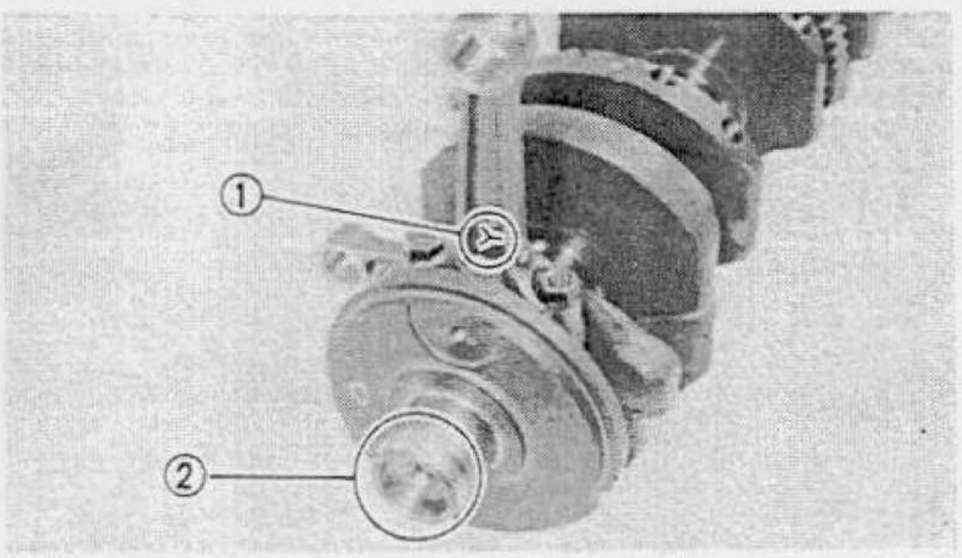
Maximum Crankshaft Runout:
0.03 mm (0.0012 in)

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



NOTE:
- Be sure the "Y" marks ① on the connecting rods face toward left crankshaft end ②
- Be sure the letters on both components align to form a perfect character.

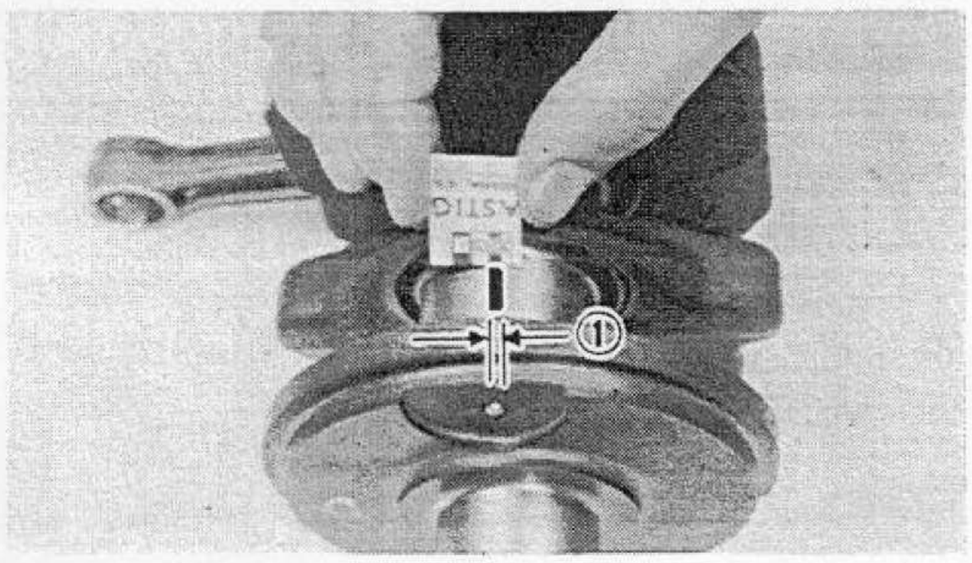
5. Apply:
   - Molybdenum disulfide grease
     (to bolt threads)
     Torque both ends of rod cap evenly.

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 3.6 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 3.6 m·kg, loosen nut to less than 2.0 m·kg and start again.

	36 Nm (3.6 m·kg, 25 ft·lb)



6. Remove:
   - Connecting rod cap
     Remove carefully.
7. Measure:
   - Plastigage width ①
     Out of specification → Replace connecting rod bearing.

	Connecting Rod Bearing Clearance: **0.032 ~ 0.056 mm** **(0.00126 ~ 0.00220 in)**

Crankshaft Main Bearing Clearance Measurement

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

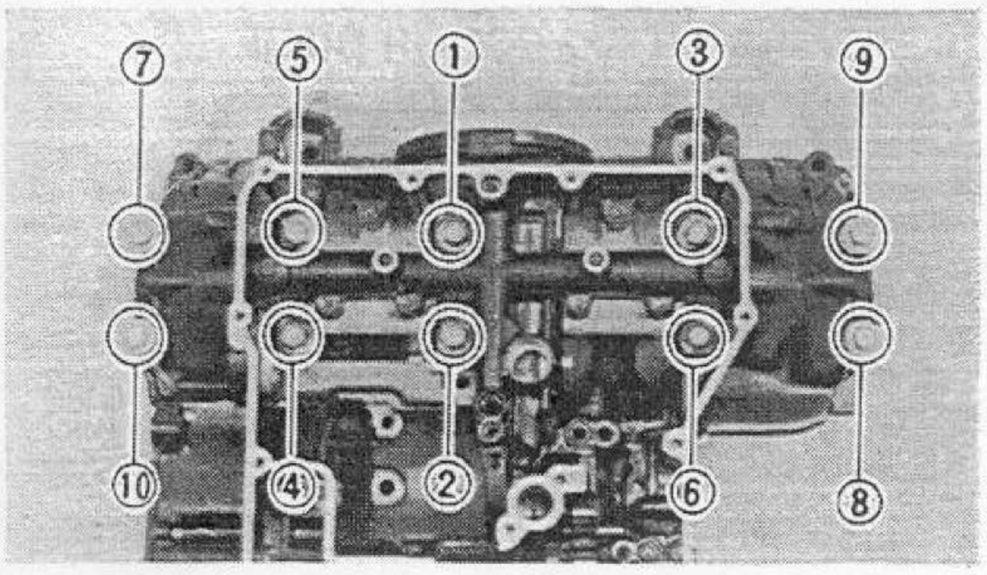
NOTE:

Do not move crankshaft until clearance measurement has been completed.

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

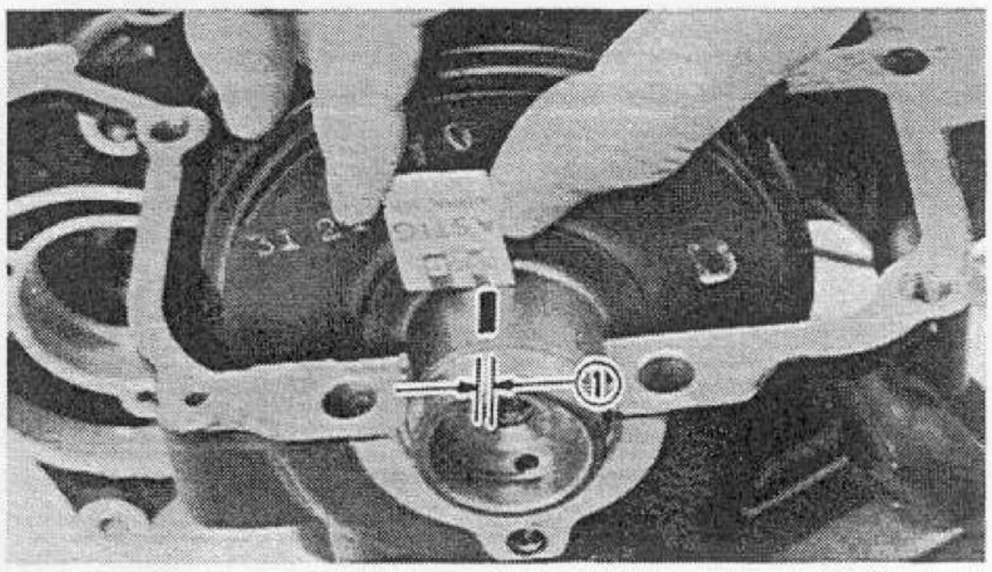
CAUTION:

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

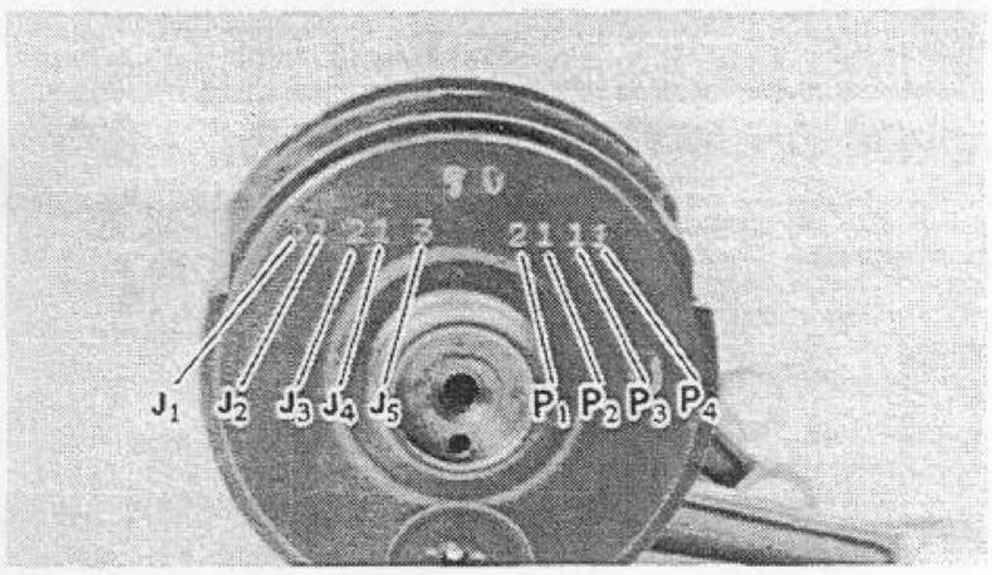


9 mm (0.35 in) Bolt:
32 Nm (3.2 m·kg, 23 ft·lb)

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.

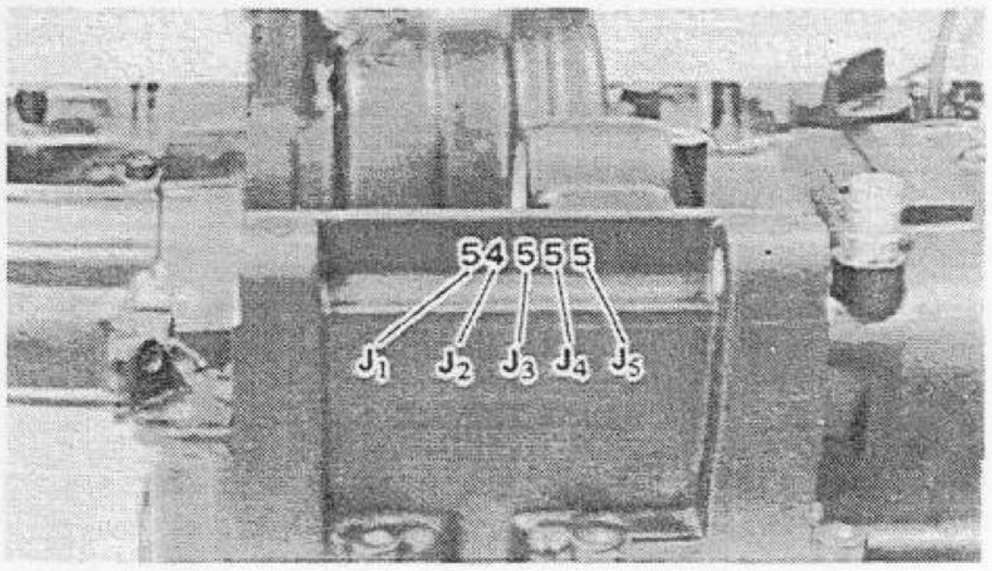


Main Bearing Oil Clearance:
0.020 ~ 0.044 mm
(0.0008 ~ 0.0017 in)

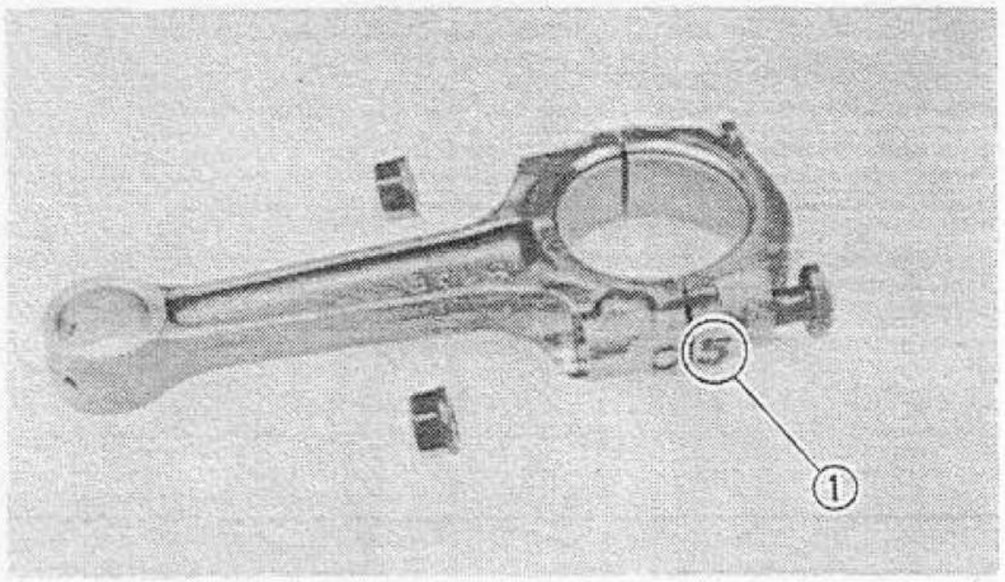


Crankshaft Main and Connecting Rod Bearing Selection

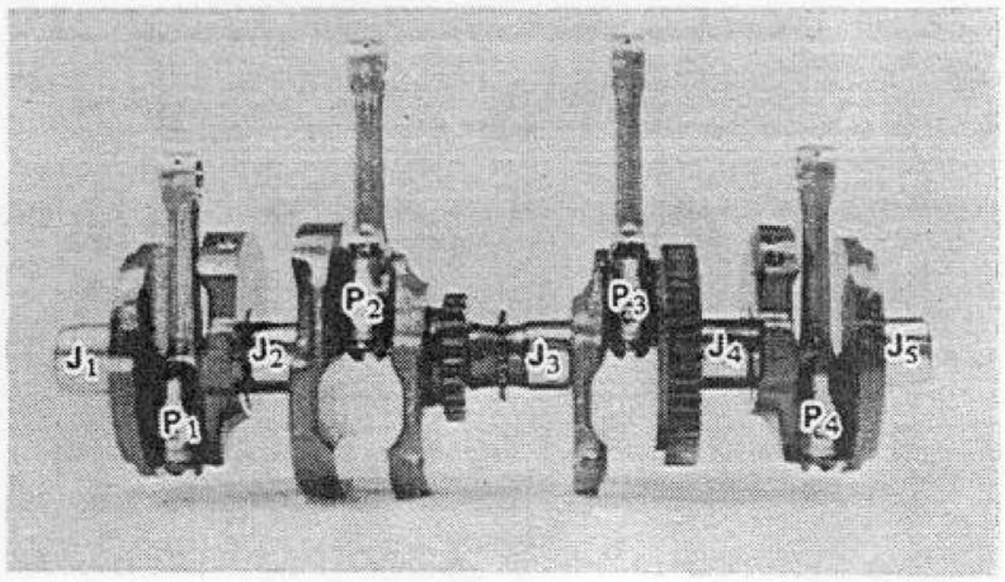
- Numbers used to indicate crankshaft journal sizes are stamped on the LH crankweb. The first five (5) are main bearing joumal numbers, starting with the left journal. The four (4) rod bearing journal numbers follow in the same sequence.



- 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 unmbers 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

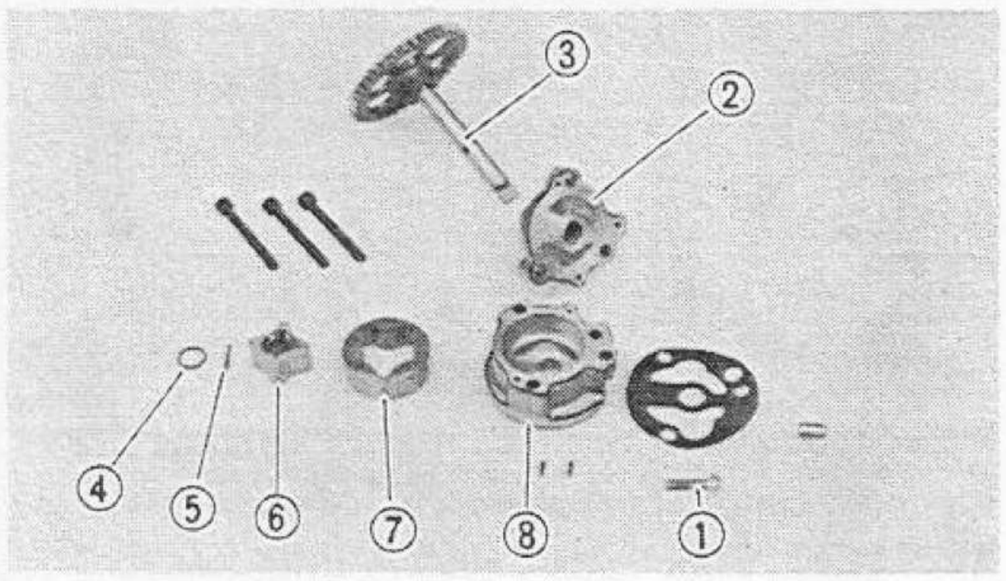
*No. 5 applies only to the crankshaft main bearing selection.

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)

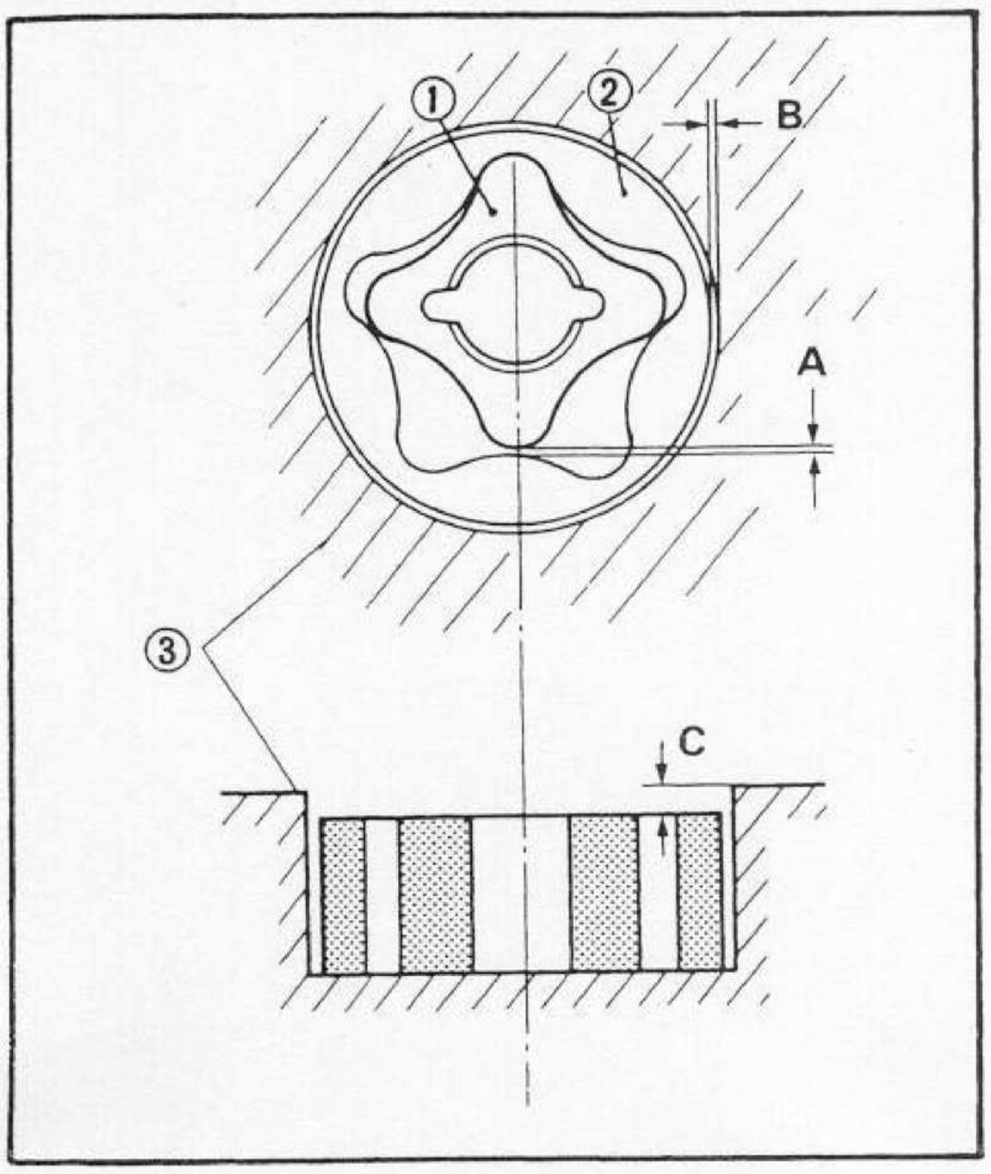
Example 2: Selection of the connecting rod bearing; If the connecting rod P1 and crankshaft P1 sizes are No. 4 and No. 1, repectively, the bearing size No. is:

Bearing size No. =
Connecting rod No. — Crankshaft No. =
4 — 1 = 3 (Brown)



OIL PUMP

1. Remove:
   - Screw ①
   - Pump cover ②
   - Pump shaft ③
   - Washer ④
   - Pin ⑤
   - Inner rotor ⑥
   - Outer rotor ⑦
   - Pump housing ⑧

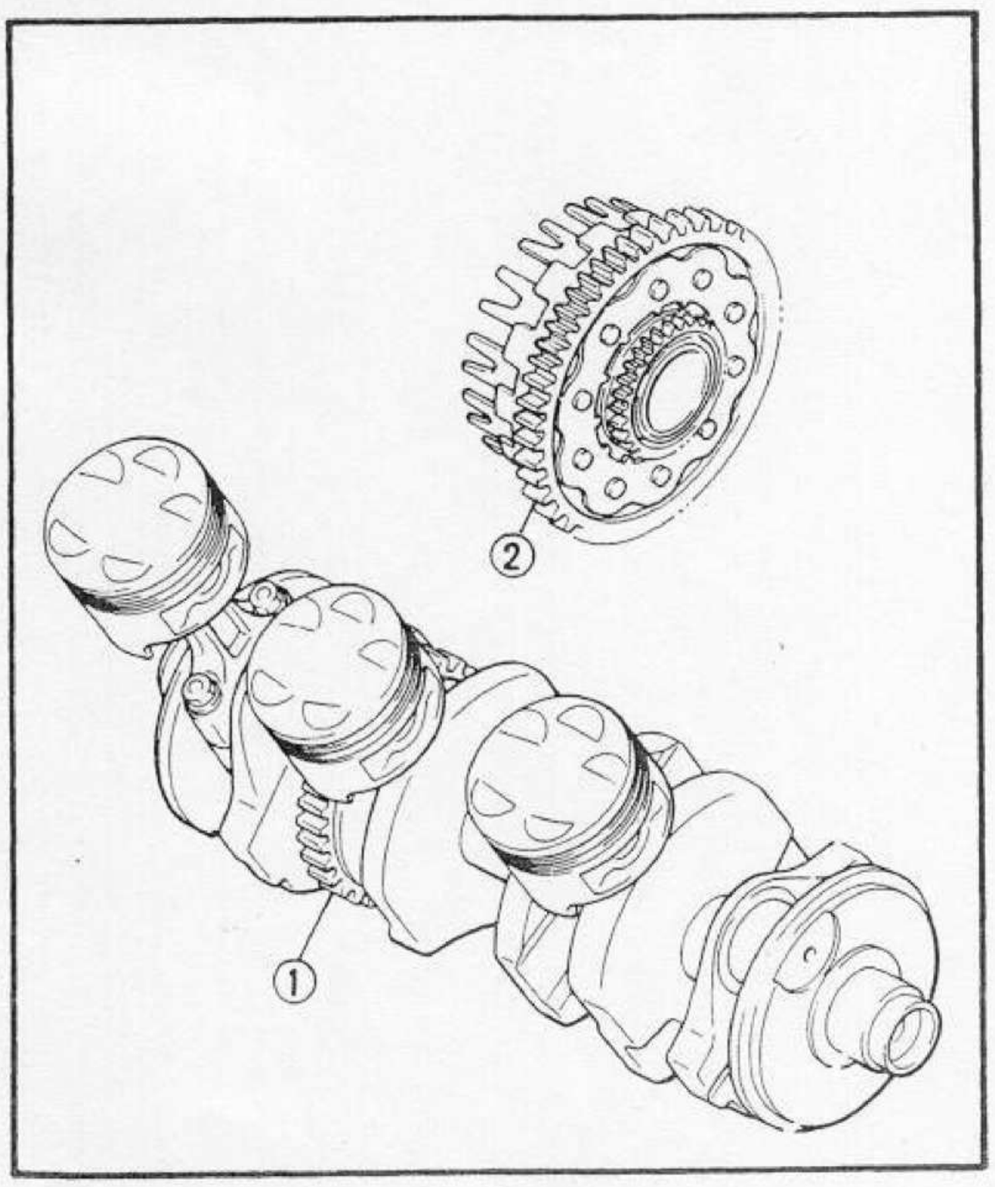


2. Measure:
   - Clearance "A"
     (between inner rotor ① and outer rotor ②)
   - Cearance "B"
     (between outer rotor ② and pump housing ③)
   - Clearance "C"
     (between pump housing ③ and rotors ① , ②)

   Out of specification → Replace oil pump.

	Oil pump clearance:
Clearance A	0.09 ~ 0.15 mm (0.00354 ~ 0.00591 in)
Clearance B	0.09 ~ 0.15 mm (0.00354 ~ 0.00591 in)
Clearance C	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)

3

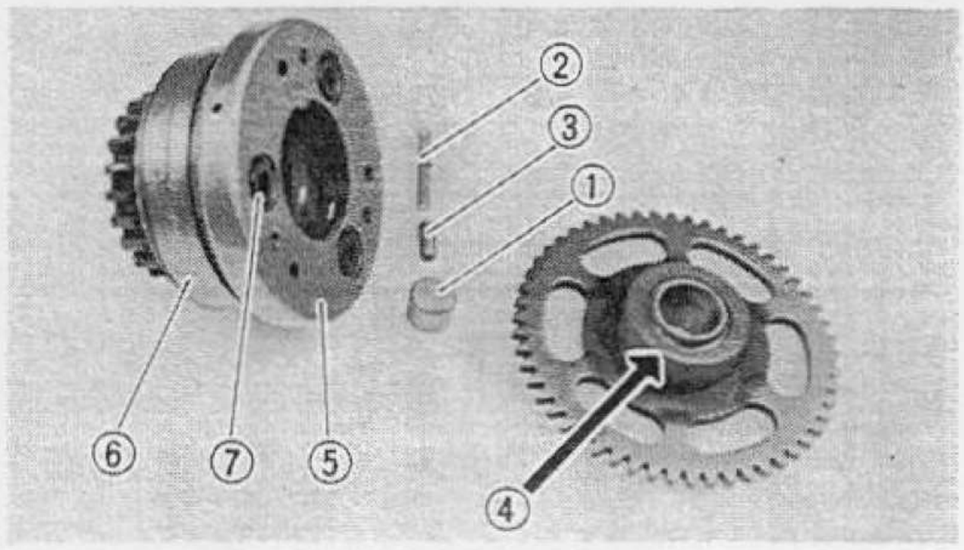


PRIMARY DRIVE

1. Inspect:
   - Primary drive gear ①
   - Primary driven gear ②

   Wear/Damage → Replace both gears.
   Excessive noises during operation → Replace both gears.

Primary reduction ratio:		
No. of teeth		Ratio
Drive	Driven	
48	91	1.896



STARTER DRIVES

Electric Starter Clutch

1. Check:
   - Ball ① operation
   - Spring ② operation
   - Spring cap ③ operation

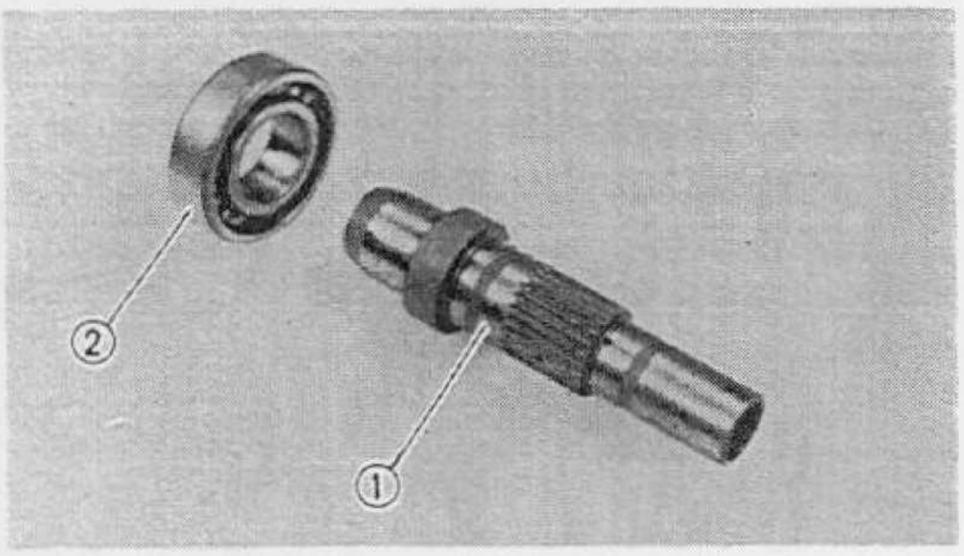
   Unsmooth operation → Replace one-way clutch.
2. Inspect:
   - Surface ④ of the idle gear

   Pitting/Wear/Damage → Replace.
3. Installation
   a. Install:
      - Cover ⑤
      - Outer starter clutch ⑥

   b. Tighten:
      - Bolts ⑦

25 Nm (2.5 m·kg, 18 ft·lb)
LOCTITE®
Stake Over the End of the Bolt

   c. Install:
      - Spring
      - Spring cap
      - Ball
      - Idle gear
      - Collar

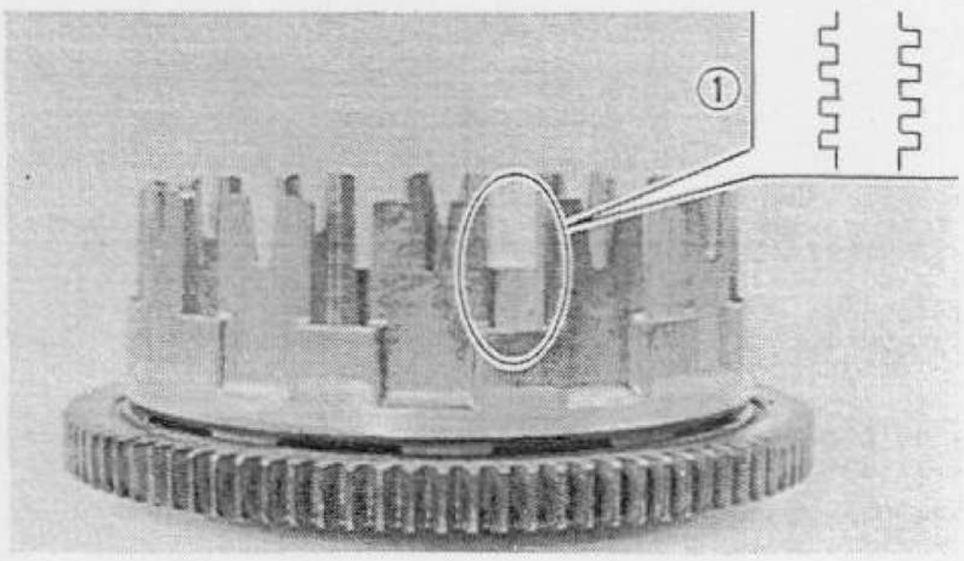


AC Generator Shaft

1. Check:
   - Shaft ①

   Wear/Damage → Replace
   - Bearing ②

   Unsmooth operation → Replace

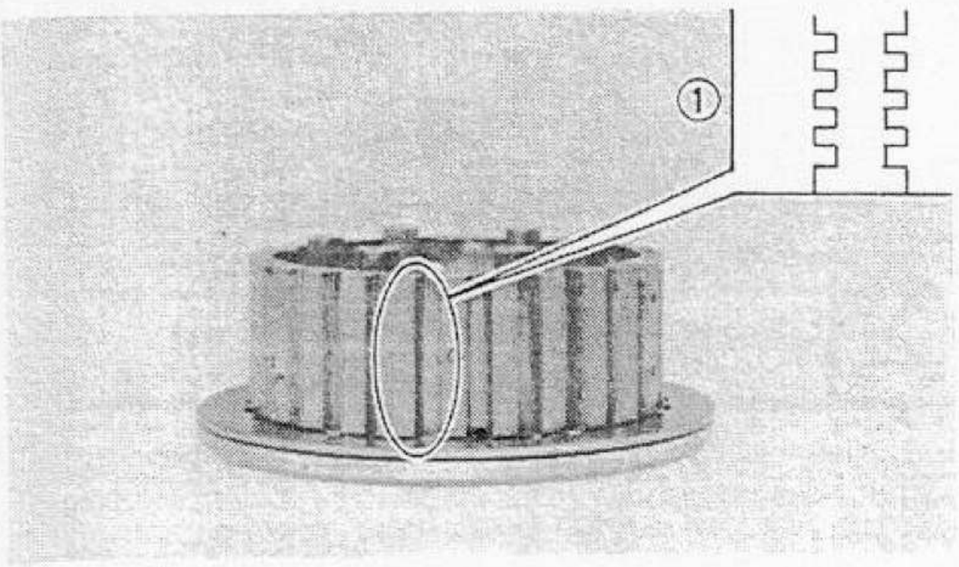


CLUTCH

1. Inspect:
   - Clutch housing dogs ①

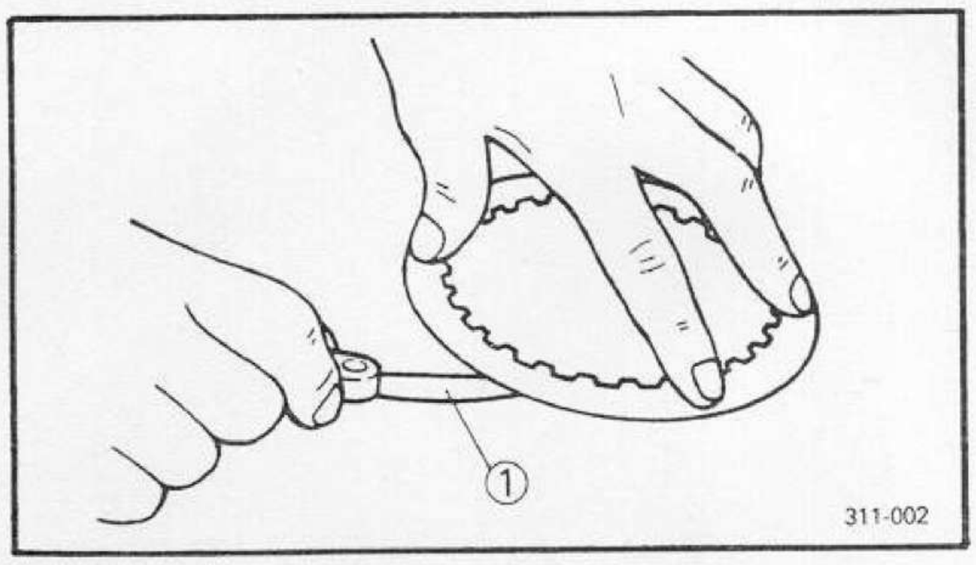
   Cracks/Pitting (edges):
   Moderate → Deburr.
   Severe → Replace clutch housing.

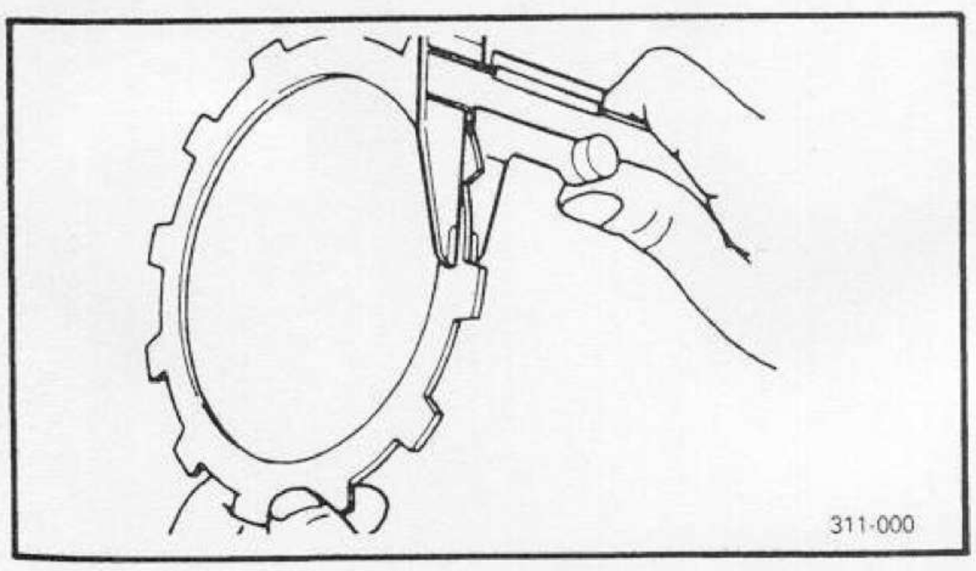
NOTE:
Pitting on friction plate dogs of clutch housing will cause erratic operation.



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.

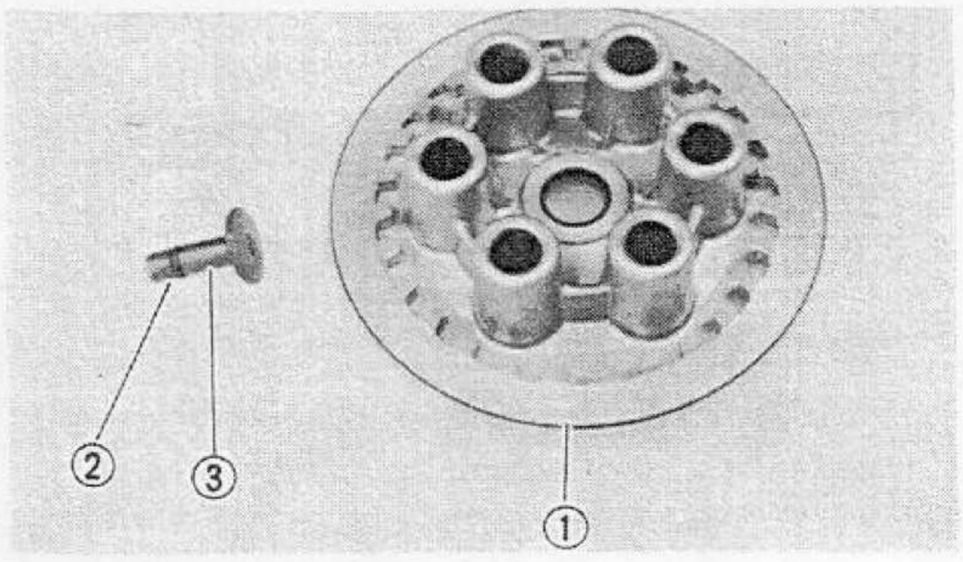




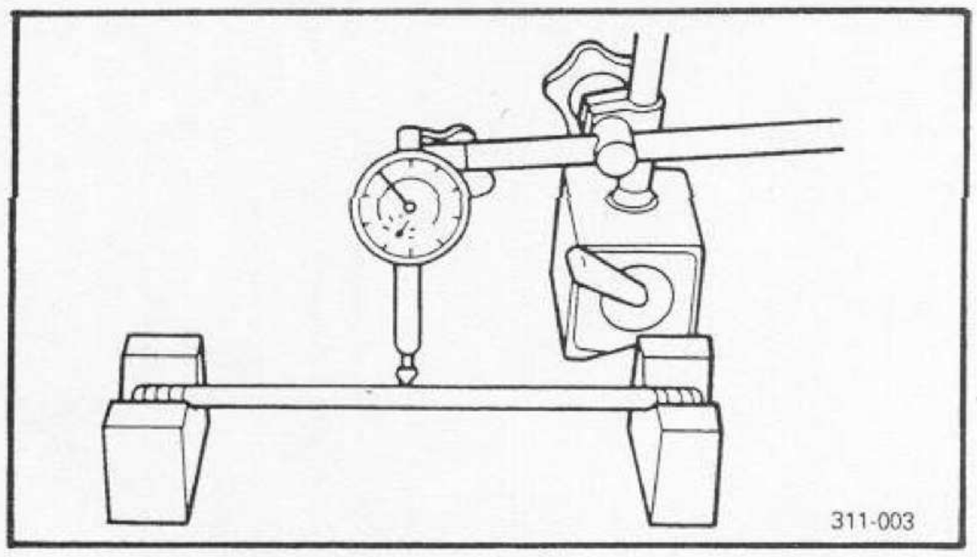
4. Measure:
   - Clutch plate warpage
   - Friction plate thickness
     Out of specification → Replace clutch or friction plate as a set.

① Feeler guage

	Standard	Wear limit
Friction plate thickness	2.9 ~ 3.1 mm (0.114 ~ 0.122 in)	2.5 mm (0.098 in)
Clutch plate warp limit	–	0.10 mm (0.0039 in)

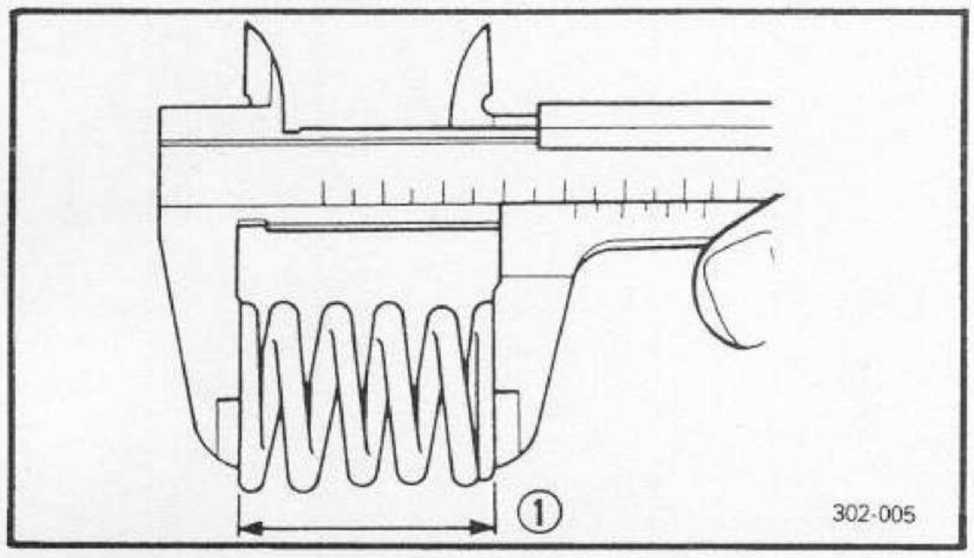


5. Inspect:
   - Pressure plate ①
   - O-ring ②
   - Short push rod ③
     Damage → Replace.



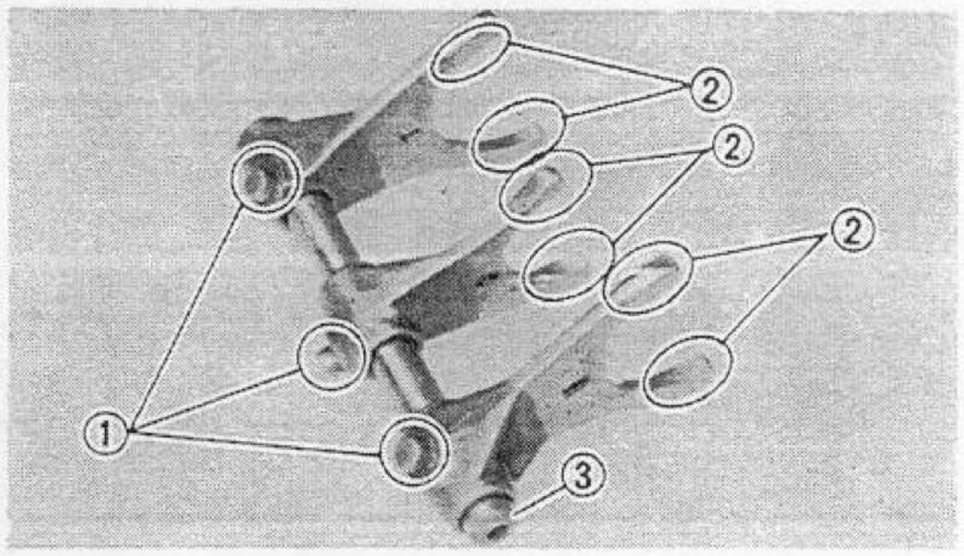
6. Measure:
   - Long push rod
     Roll on V-block.
     Exceeds bending limit → Replace.

Bend Limit: 0.3 mm (0.012 in)



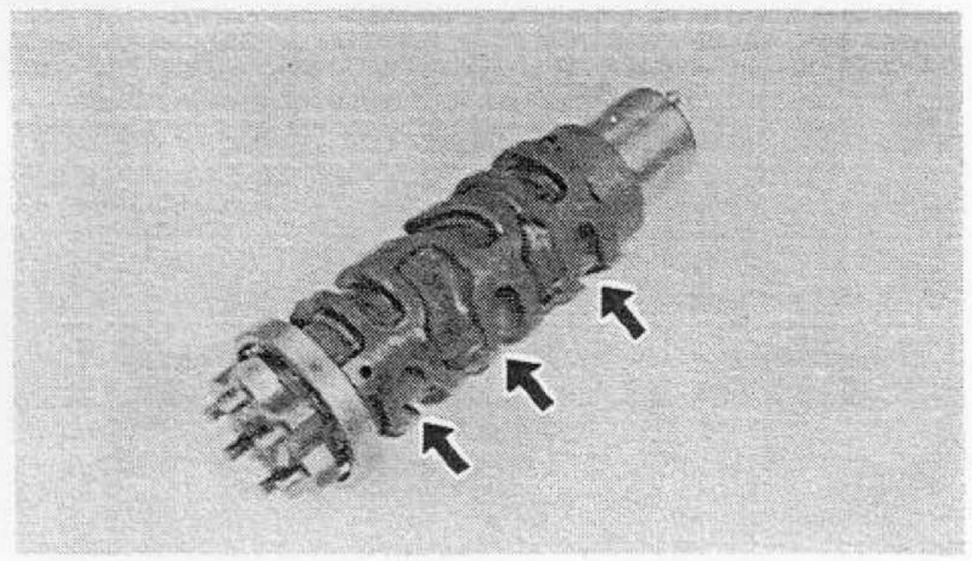
7. Measure:
   - Clutch spring free play
     Out of specification → Replace spring as a set.

Clutch spring minimum free length ① :
54.0 mm (2.126 in)



TRANSMISSION

1. Inspect:
   - Shift fork cam follower ①
   - Shift fork pawl ②
   - Shift fork guide bar ③
     Scoring/Bends/Wear → Replace.

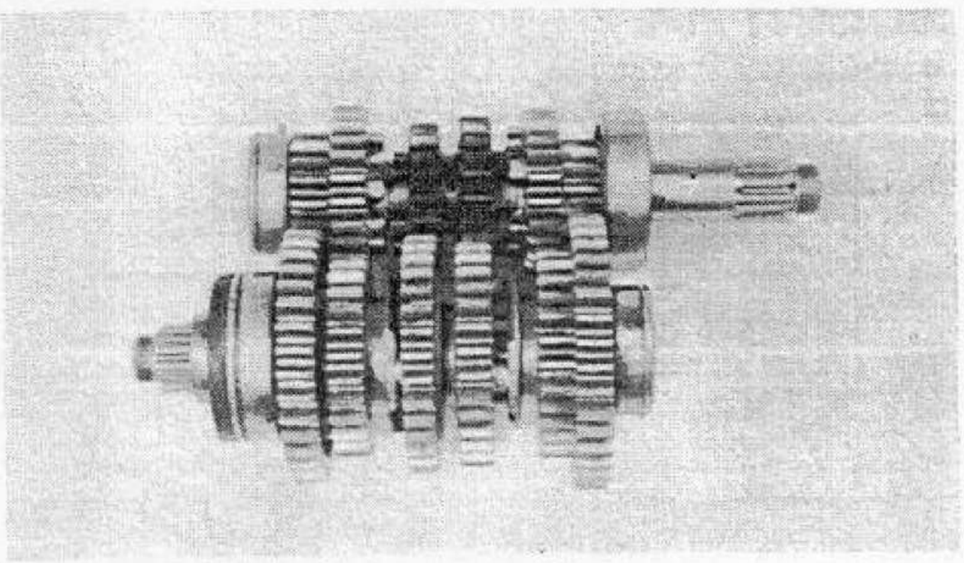


2. Inspect:
   - Shift cam groove
   - Shift cam dowel and side plate
   - Shift cam stopper plate, circlip and stopper
     Wear/Damage → Replace.

3. Measure:
   - Transmission shaft runout
     Use centering device and dial gauge.
     Out of specification → Replace bent shaft.

Maximum Runout: 0.08 mm (0.0031 in)

4. Inspect:
   - Gear teeth
     Blue discoloration/Pitting/Wear → Replace.
   - Mated dogs
     Rounded edges/Cracks/Missing portions → Replace.

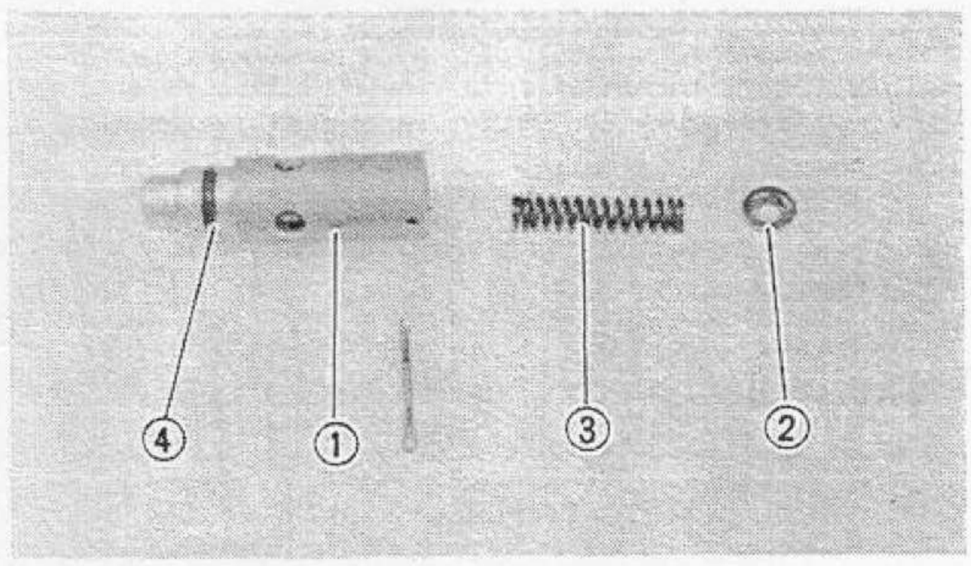


5. Check:
   - Proper gear engagement (Each gear)
     (to its counter part)
     Incorrect → Reassemble.
   - Gear movement
     Roughness → Replace.

3

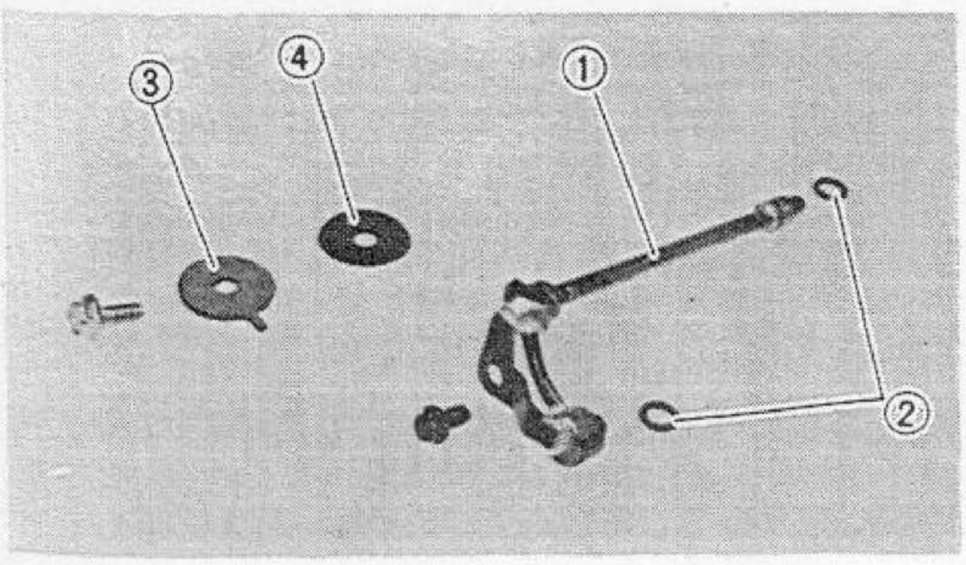
SHIFTER

1. Inspect:
   - Shift return spring
     Damage → Replace.
   - Change shaft
     Damage/Bends/Wear → Replace.



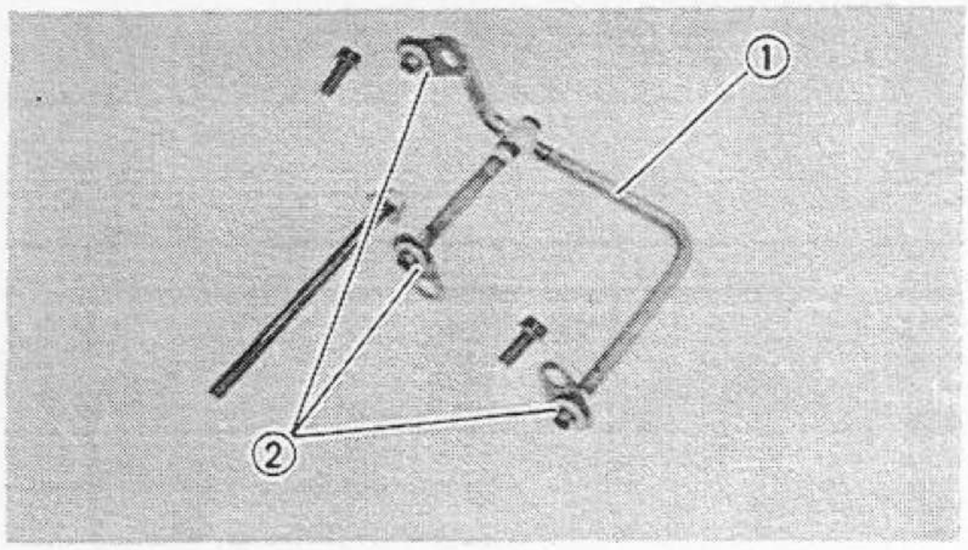
RELIEF VALVE

1. Check:
   - Relief valve body ①
   - Cover ②
   - Spring ③
   - O-ring ④
     Damage/Wear → Replace.



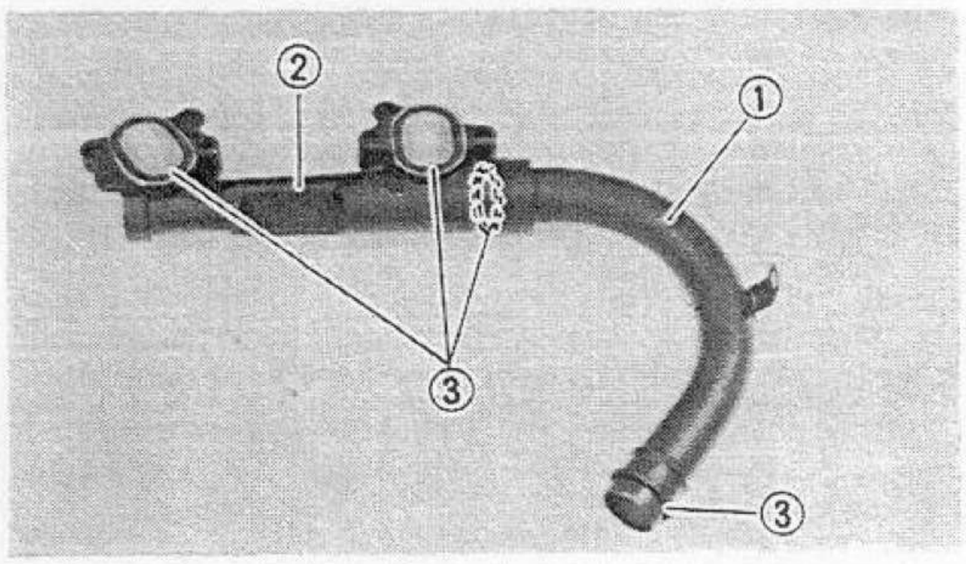
OIL PIPES

1. Check:
   - Oil pipe 2 ①
   - O-ring ②
   - Oil plug plate ③
   - Gasket ④
     Damage → Replace.
     Comtamination → Wash and blow out passage.



2. Check:
   - Oil pipe 5 ①
   - O-ring ②

   Damage → Replace.
   Comtamination → Wash and blow out passage.



COOLANT PIPE

1. Check:
   - Coolant pipe ①
   - Water jacket joint ②
   - O-rings ③

   Damage → 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

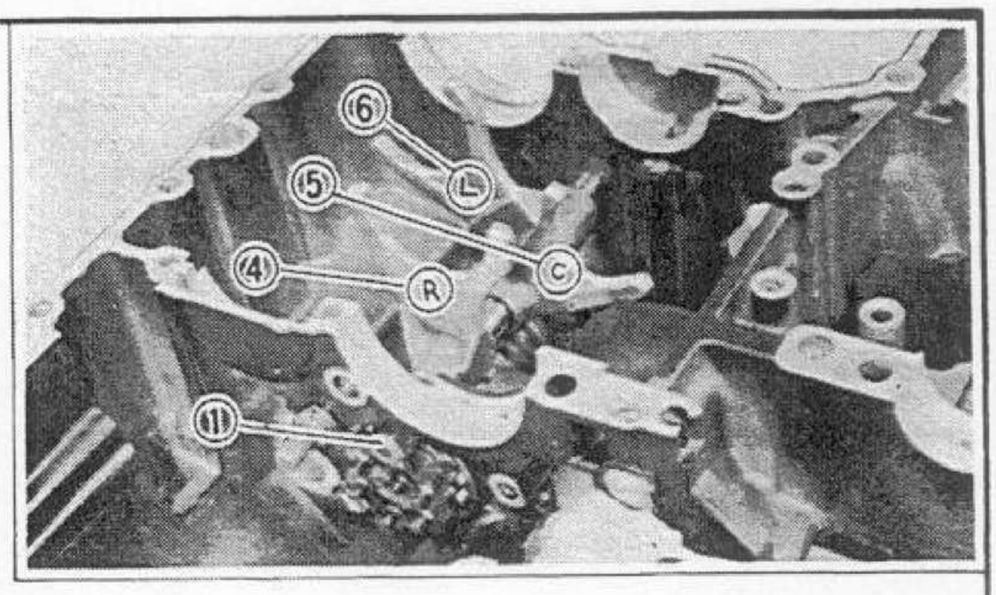
   Damage/Looseness/Bends → Replace.

ENGINE ASSEMBLY AND ADJUSTMENT

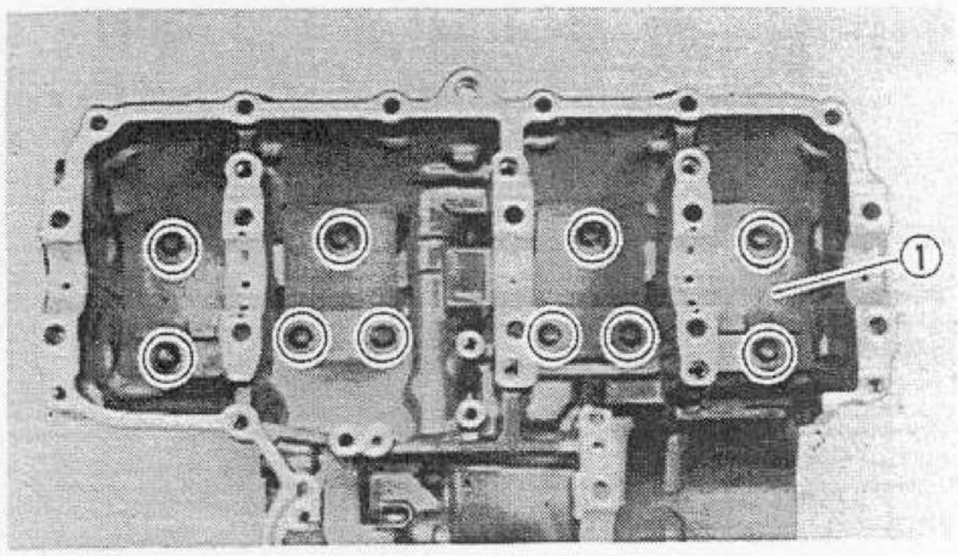
LOWER CRANKCASE

① Guide bar
② Stopper lever
③ Shift fork guide bar stopper
④ Shift fork (R)
⑤ Shift fork (C)
⑥ Shift fork (L)
⑦ Shift cam
⑧ Main axle bearing stopper
⑨ Crankshaft main bearing
⑩ O-ring

CRANKSHAFT MAIN BEARING SELECTION: CRANKSHAFT MAIN BEARING NO. = CRANKCASE NO. – CRANKSHAFT NO.	
CALCULATED NO.	COLOR CODE
1	BLUE
2	BLACK
3	BROWN
4	GREEN
5	YELLOW

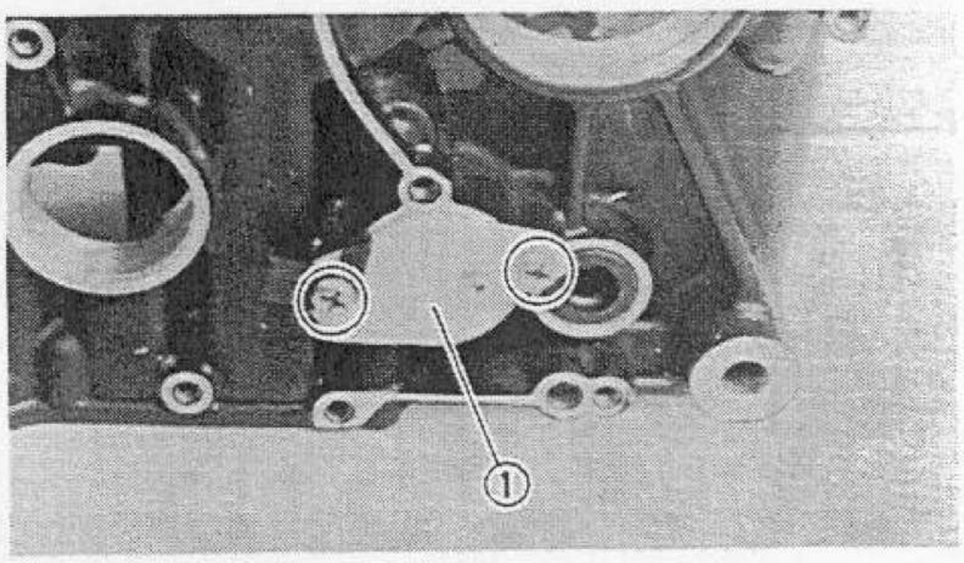


ENGINE ASSEMBLY AND ADJUSTMENT

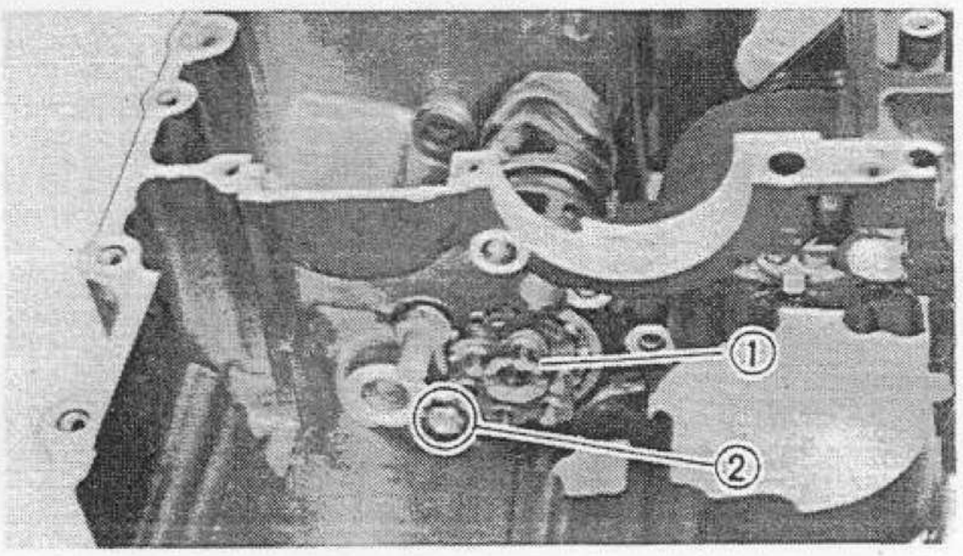


1. Install:
   - Oil baffle plates ①

	Oil Baffle Plate Bolts: **10 Nm (1.0 m·kg, 7.2 ft·lb)**

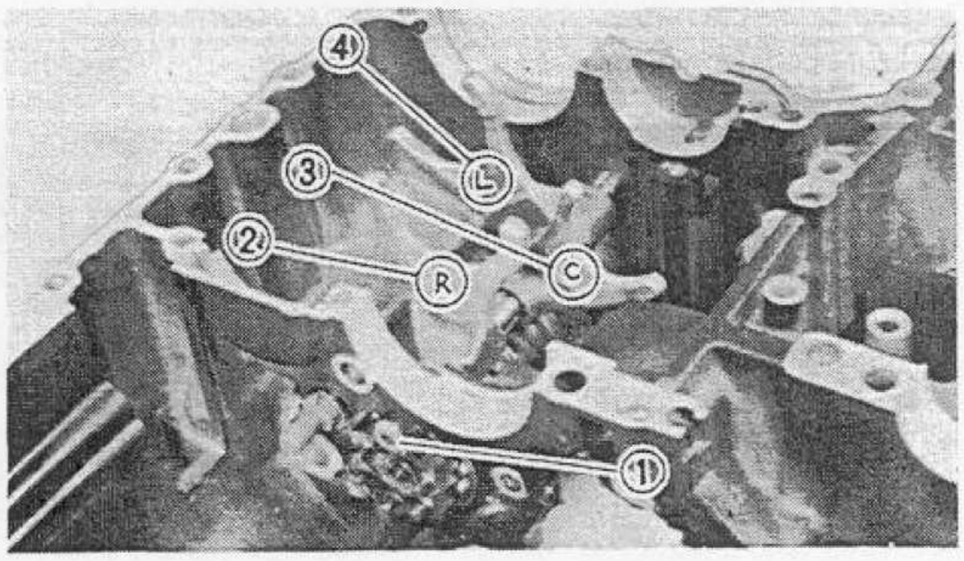


2. Install:
   - Neutral switch assembly ①



3. Install:
   - Shift cam assembly ①
   - Bolt ②

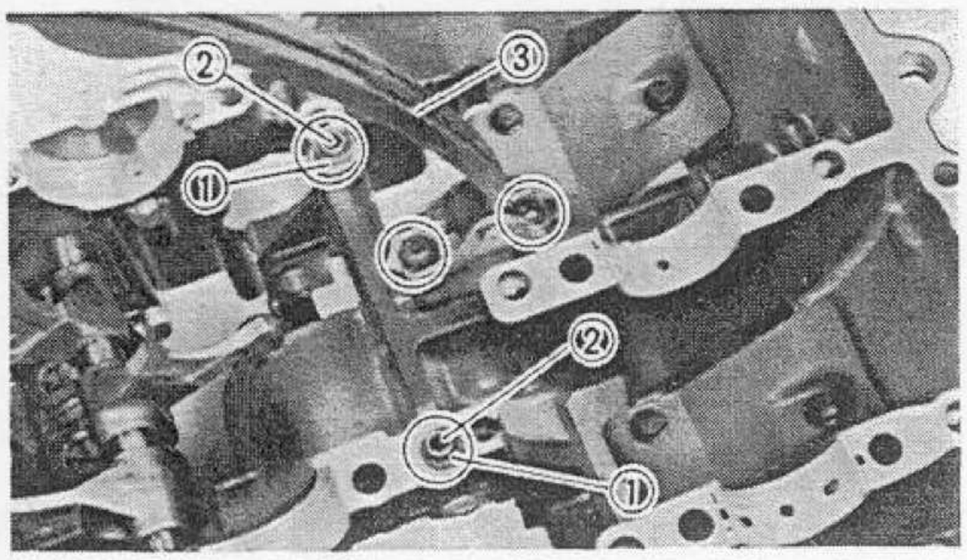
	Bolt: **10 Nm (1.0 m·kg, 7.2 ft·lb)**



4. Install:
   - Guide bar ①
   - "R" shift fork ②
   - "C" shift fork ③
   - "L" shift fork ④

NOTE:

All shift fork letters should face to the right side and be in sequence (R, C, L) begining from the right.



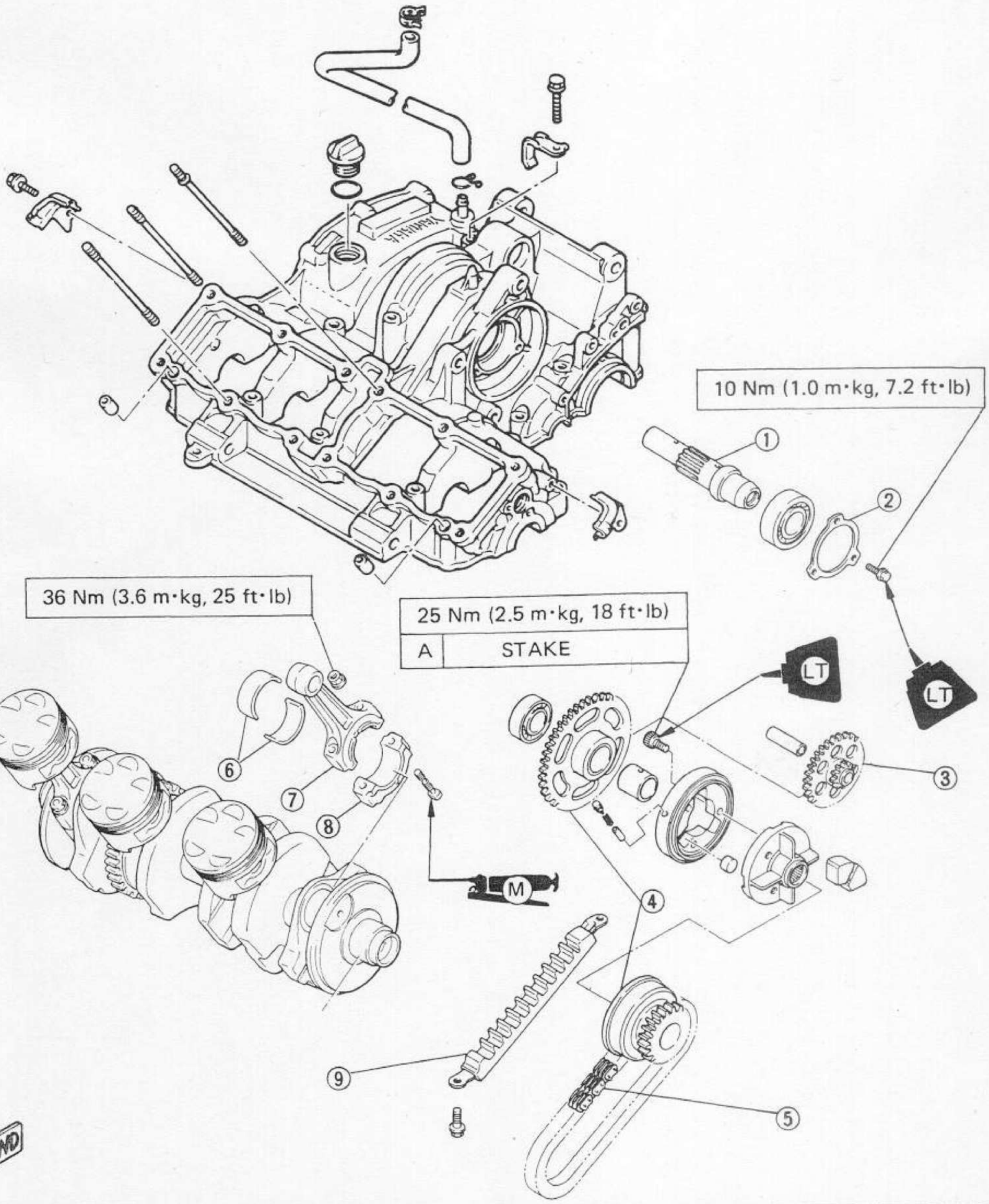
5. Install:
   - O-rings ①
   - Dowels ②
   - Intake side cam chain guide ③

	Chain guide screw: **10 Nm (1.0 m·kg, 7.2 ft·lb)**

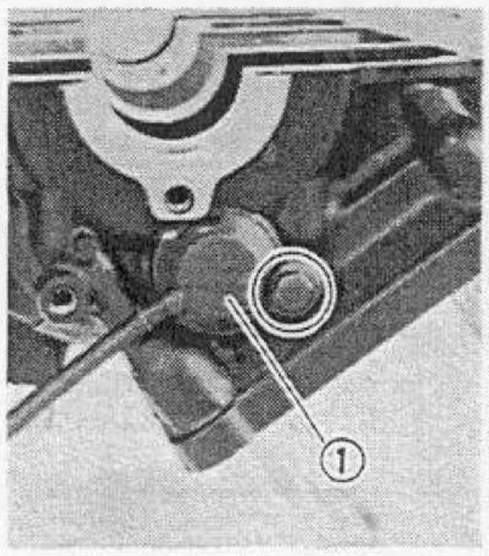
PPER CRANKCASE

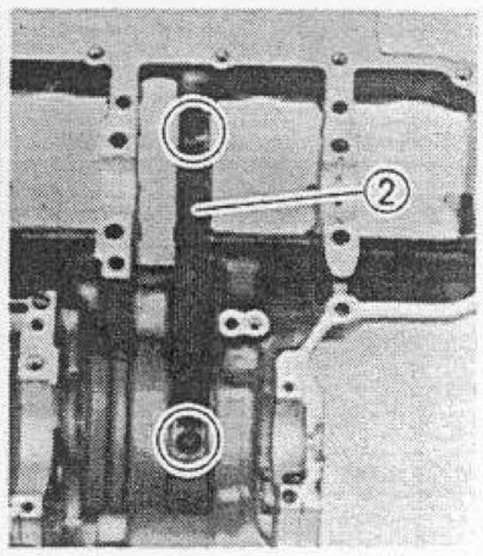
AC generator shaft
Cover plate
Starter idle gear
Starter clutch damper assembly
HY-VO chain
Connecting rod bearing
Connecting rod
Connecting rod cap
HY-VO chain guide

CONNECTING ROD BEARING SELECTION: CONNECTING ROD BEARING = CONNECTING ROD NO. – CRANKSHAFT NO.	
CALCULATED NO.	COLOR CODE
1	BLUE
2	BLACK
3	BROWN
4	GREEN



ENGINE ASSEMBLY AND ADJUSTMENT



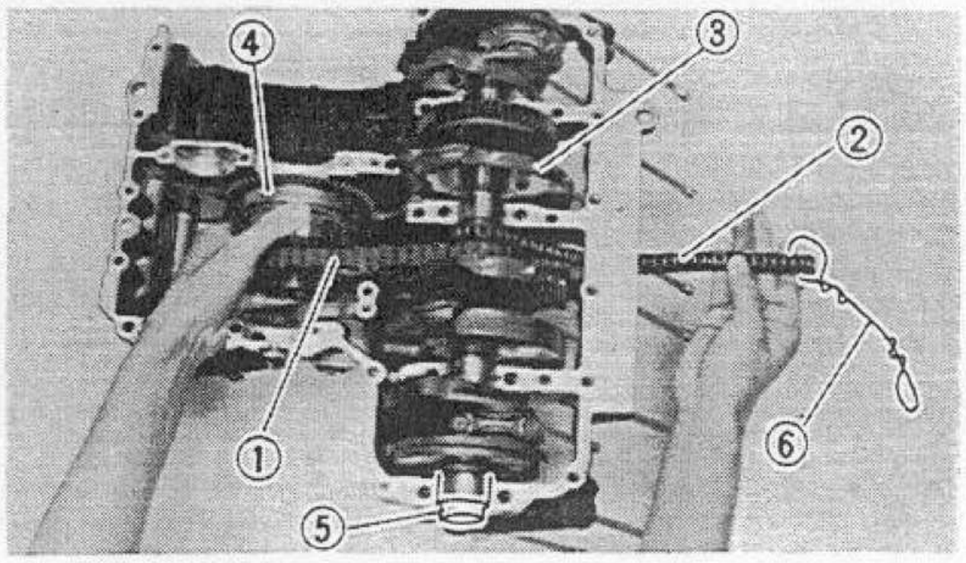


1. Install:
   - Pick up coils ①

	Pick Up Coil Bolt: **10 Nm (1.0 m·kg, 7.2 ft·lb)**

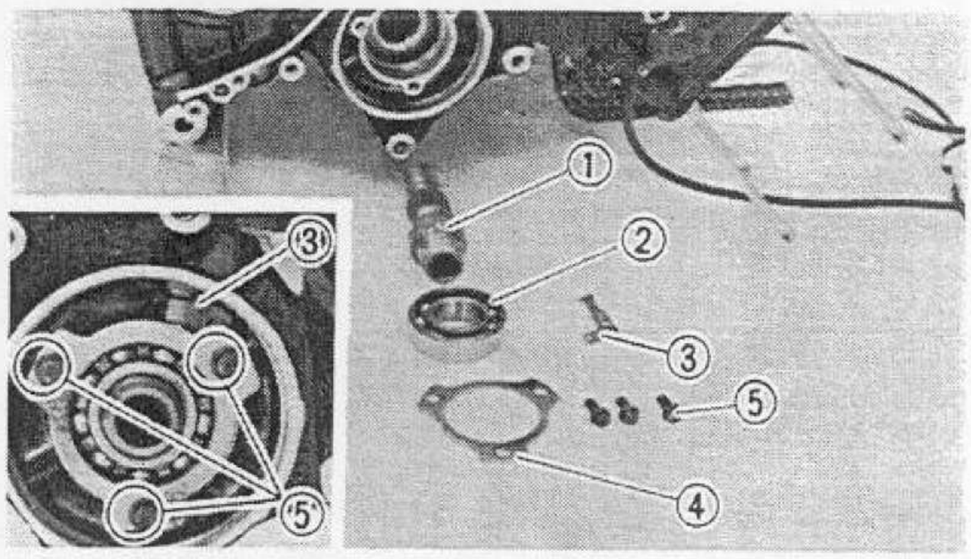
   - HY-VO chain guide ②

	HY-VO Chain Guide Bolt: **10 Nm (1.0 m·kg, 7.2 ft·lb)**



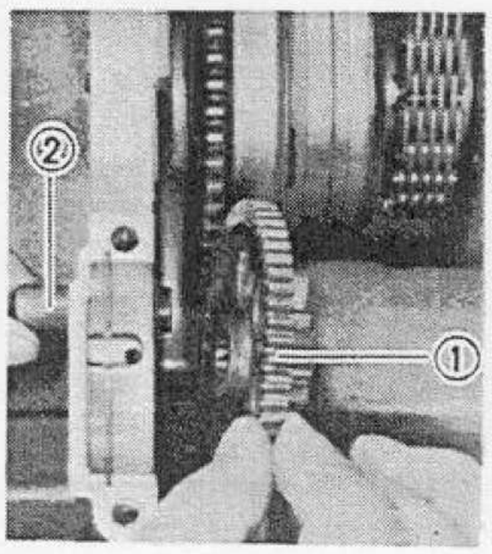
2. Install:
   - HY-VO chain ①
   - Cam chain ②
     (onto crankshaft)
   - Crankshaft assembly ③
   - Starter clutch damper assembly ④

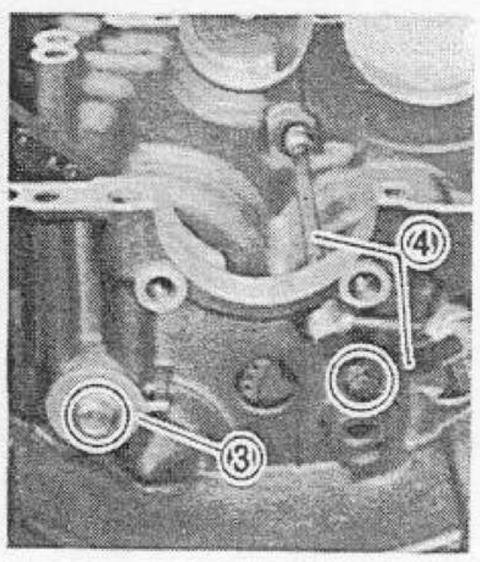
NOTE:
- The stepped crankshaft end ⑤ should face to the left.
- Pass the cam chain through the cam chain cavity. Be sure to attach a retaining wire ⑥ to the cam chain.



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

	Cover Plate Bolts: **10 Nm (1.0 m·kg, 7.2 ft·lb)** **Apply LOCTITE®**





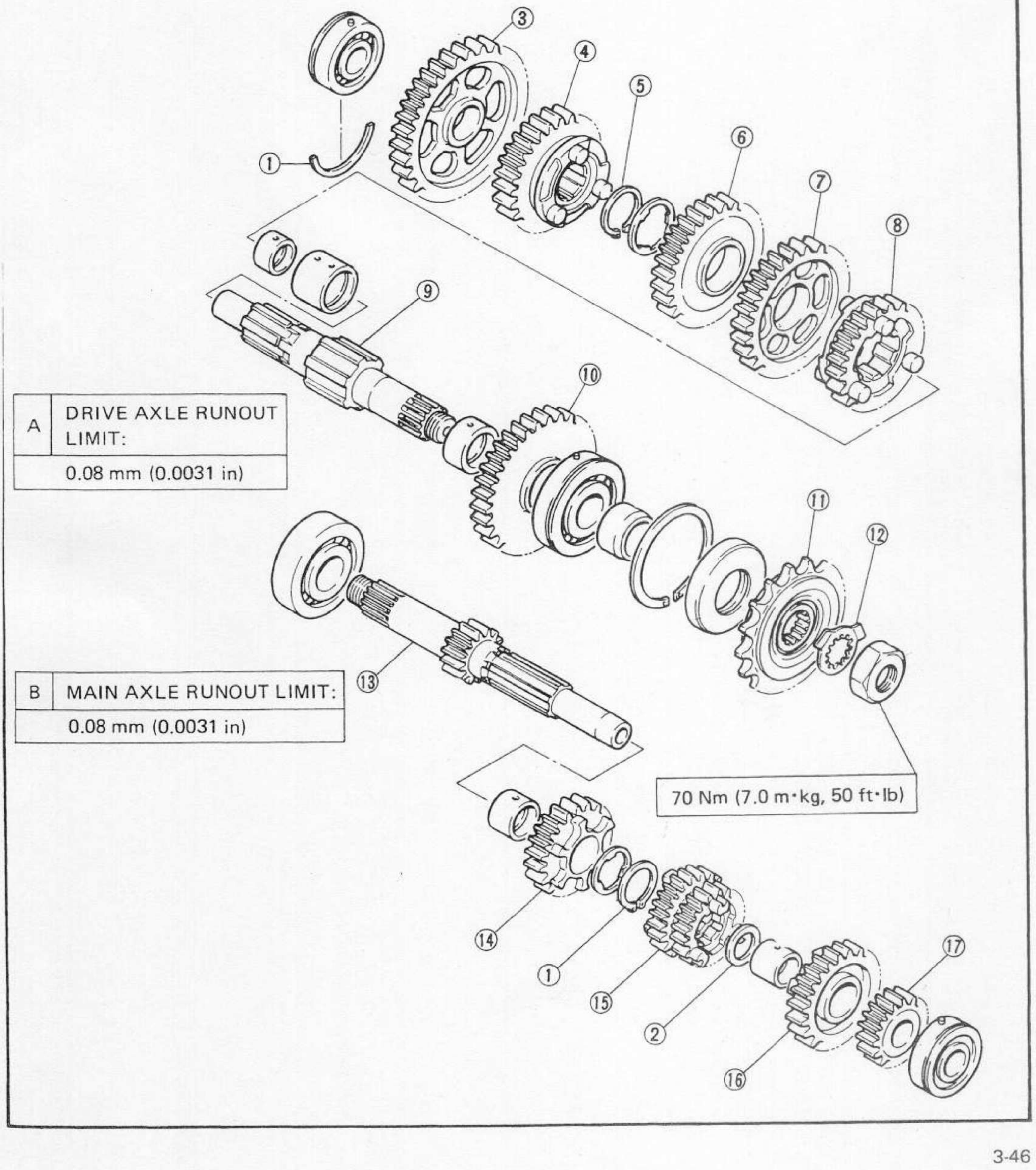
4. Install:
   - Starter idle gear ①
   - Shaft ②
   - Gasket
   - Oil plug plate ③

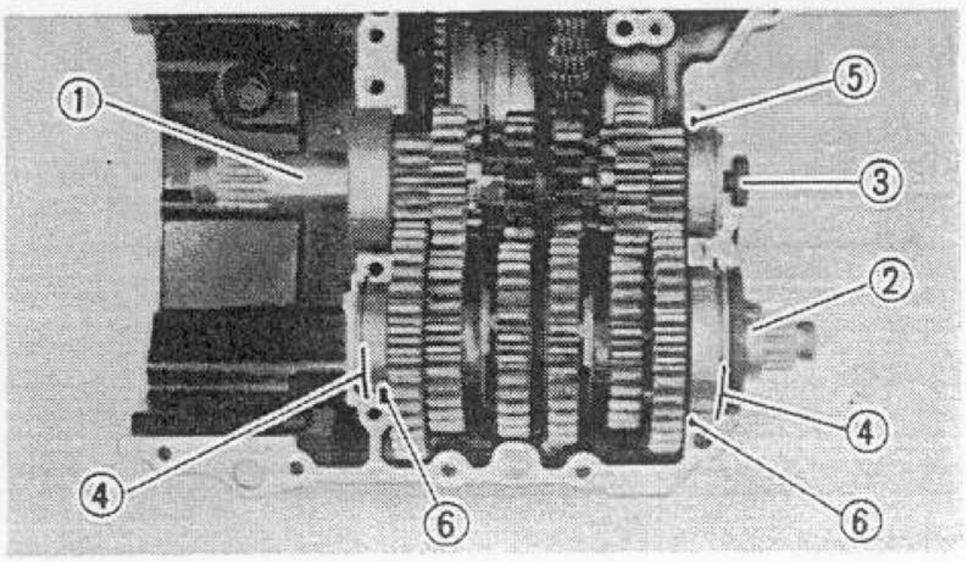
	Oil Plug Plate Bolt: **10 Nm (1.0 m·kg, 7.2 ft·lb)**

   - Oil pipe 2 ④

Transmission

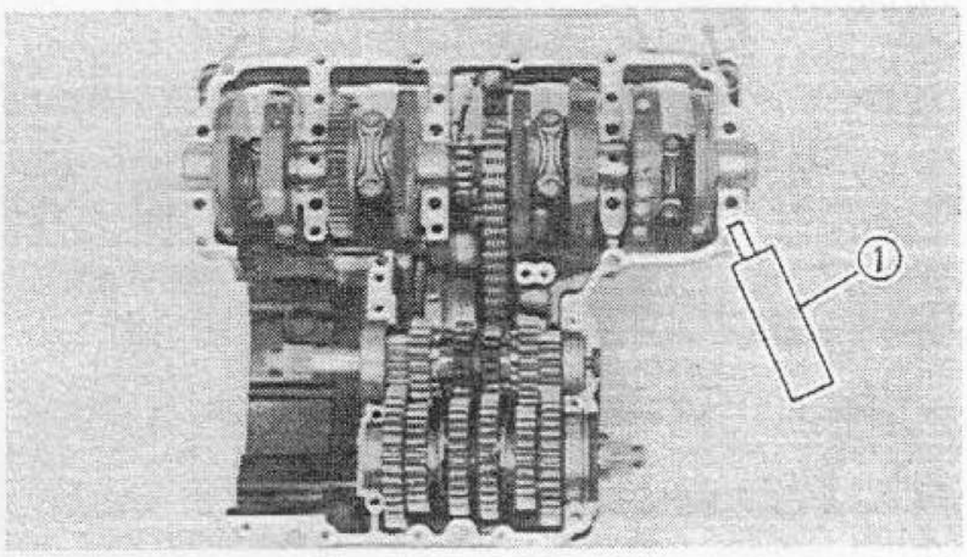
① Criclip
② Plain washer
③ 1st wheel gear (37T)
④ 5th wheel gear (28T)
⑤ Circlip
⑥ 4th wheel gear (30T)
⑦ 3rd wheel gear (32T)
⑧ 6th wheel gear (26T)
⑨ Drive axle
⑩ 2nd wheel gear (35T)
⑪ Drive sprocket
⑫ Lock washer
⑬ Main axle
⑭ 5th pinion gear (22T)
⑮ 3rd/4th pinion gear (18T/20T)
⑯ 6th pinion gear (24T)
⑰ 2nd pinion gear (16T)

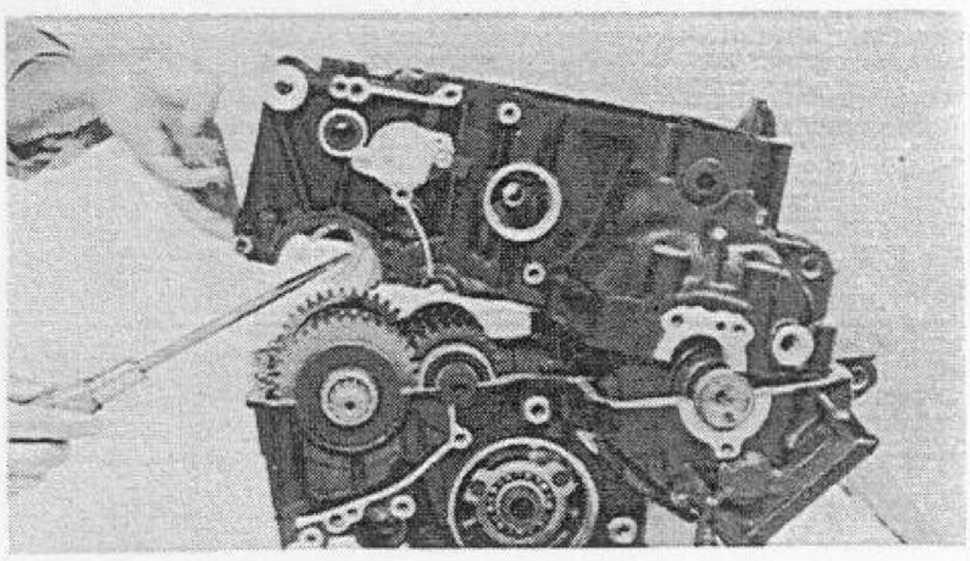


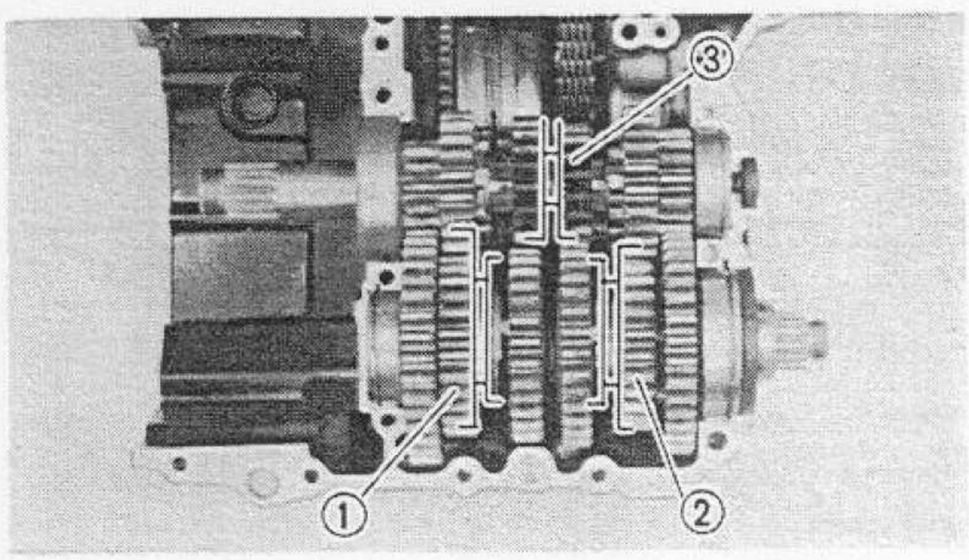


5. Install:
   - Main axle assembly ①
   - Drive axle assembly ②
   - Oil seal ③
   - Circlip ④

NOTE:
- Be sure the drive axle bearing circlips ④ are inserted into upper crankcase positioning grooves.
- Be sure the main axle bearing pin ⑤ should face to front and drive axle bearing pins ⑥ should face to rear.







CRANKCASE ASSEMBLY

1. Apply:
   - Quick Gasket ① (ACC-11001-05-01)
     (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.

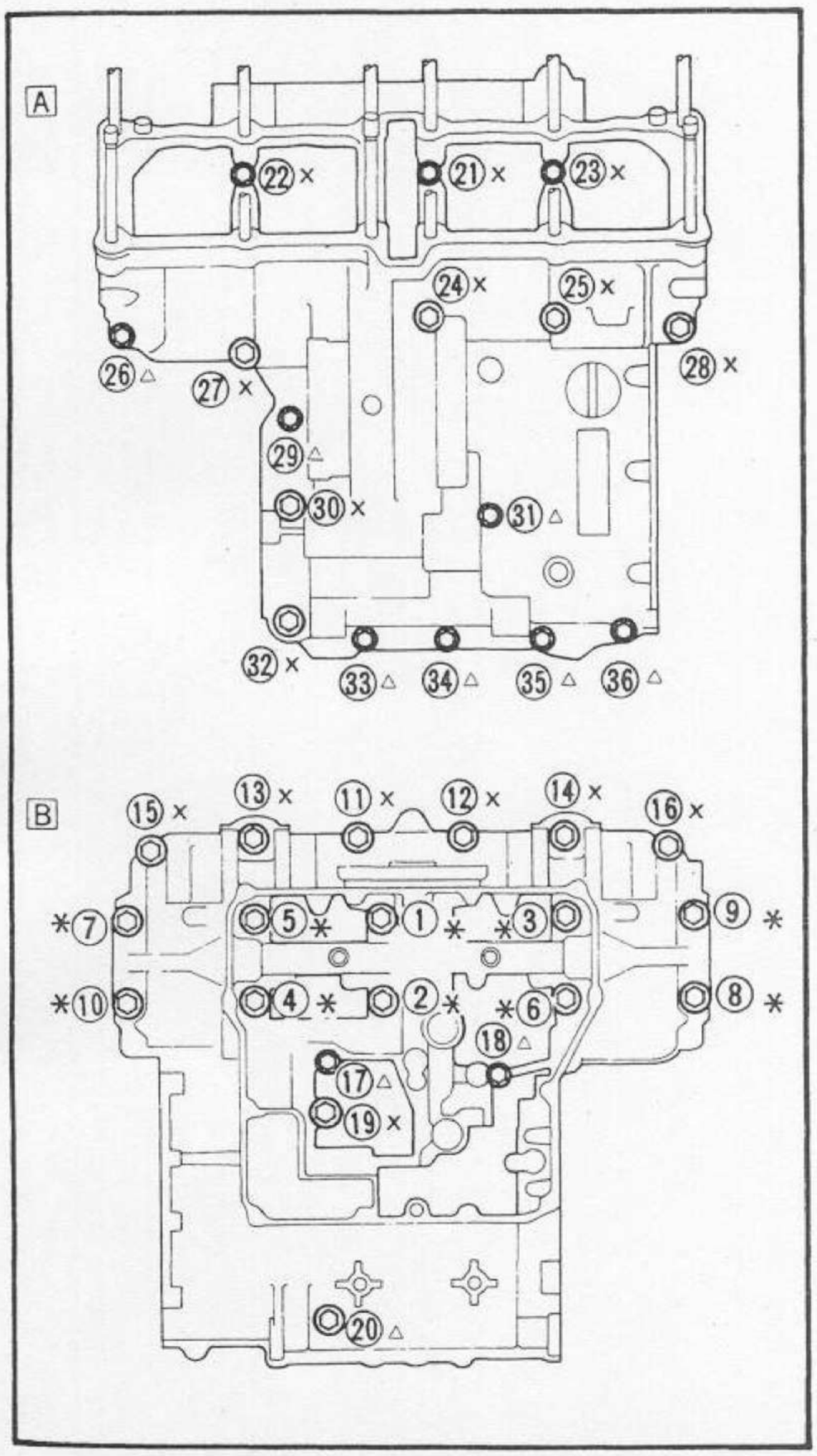
2. Set shift cam and transmission gears in NEUTRAL position.
3. Place lower crankcase assembly on the upper crankcase assembly.
4. Install:
   - Lower crankcase
     Carefully guide shift forks so that they mesh smoothly with transmission gears.

NOTE:
- Mesh the shift fork "L" with the 6th wheel gear ① and "R" with the 5th wheel gear ② on the drive axle.
- Mesh the shift fork "C" with the 3rd/4th pinion gear ③ on the main axle.

CAUTION:

Before tightening the crankcase bolts, check the following points:

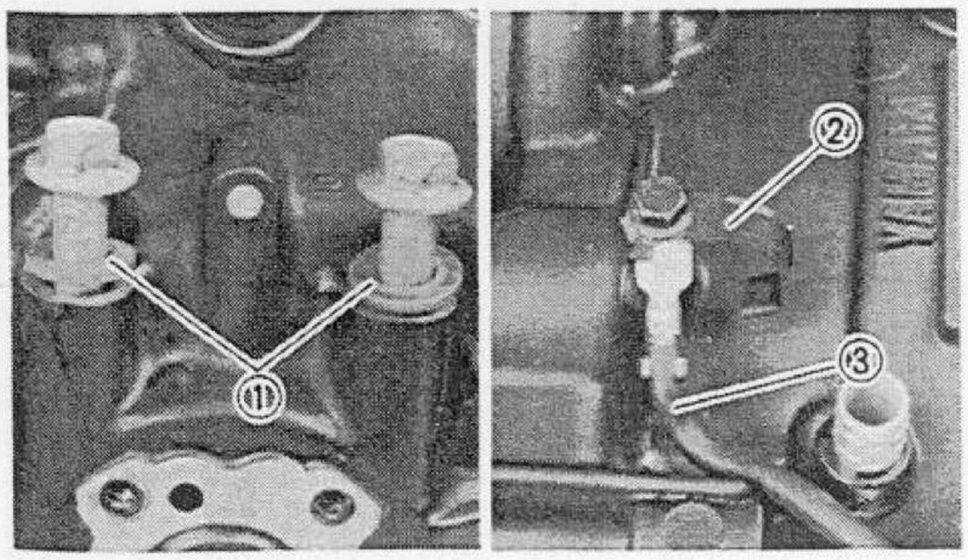
- **Be sure the gear shifts correctly while hand-turning the shift cam.**



5. Tighten:
   - Lower crankcase bolt [B]
   - Upper crankcase bolt [A]

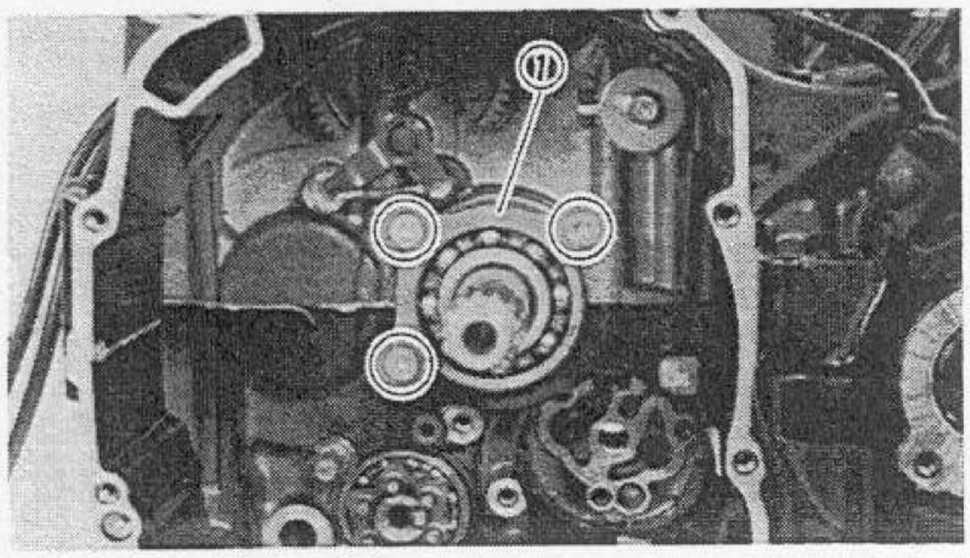
   (Follow proper tightening sequence.)

△6 mm Bolts:
12 Nm (1.2 m·kg, 8.7 ft·lb)
×8 mm Bolts:
24 Nm (2.4 m·kg, 17 ft·lb)
*9 mm Bolts:
32 Nm (3.2 m·kg, 23 ft·lb)



NOTE:

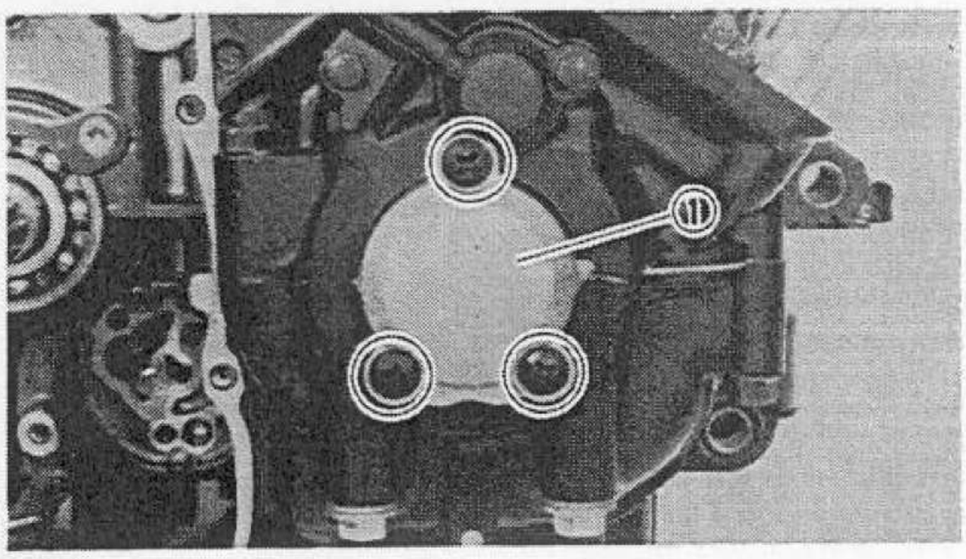
- Install the washer ① on Bolt No. 7, 8, 9, and 10.
- Install the clamp ② and ground lead ③ on Bolt No. 31.



6. Install:
   - Main axle bearing stopper ①

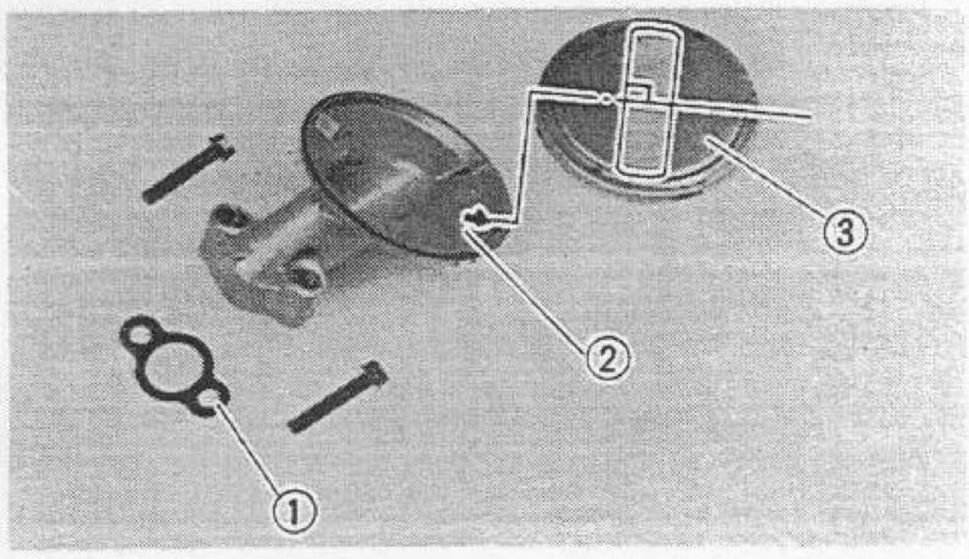
Bearing Stopper Screw:
10 Nm (1.0 m·kg, 7.2 ft·lb)
LOCTITE®

NOTE:
Use #30 Torx Driver (YU-29843-6).



7. Install:
   - O-ring
   - Right crankshaft end cover ①

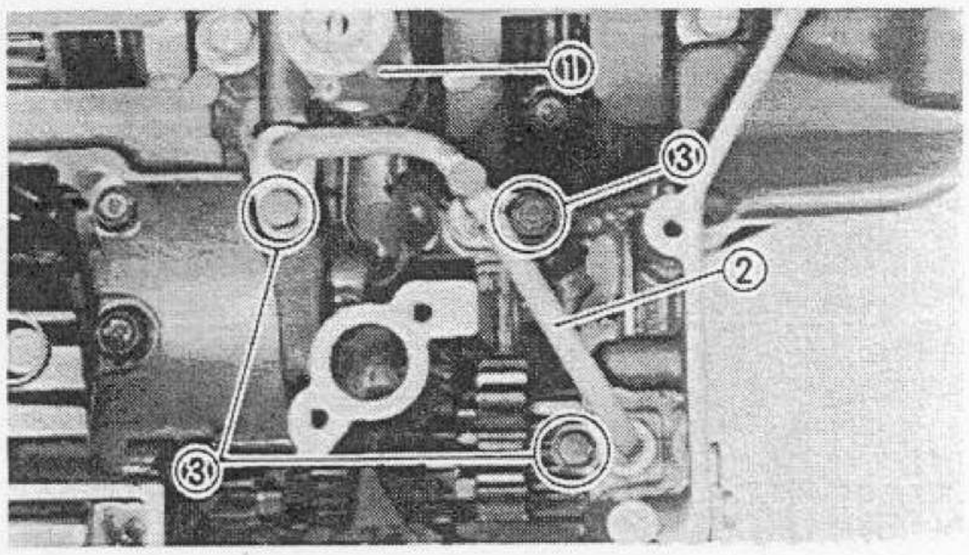
Crankshaft End Cover Screws:
7 Nm (0.7 m·kg, 5.1 ft·lb)



OIL STRAINER AND OIL PAN

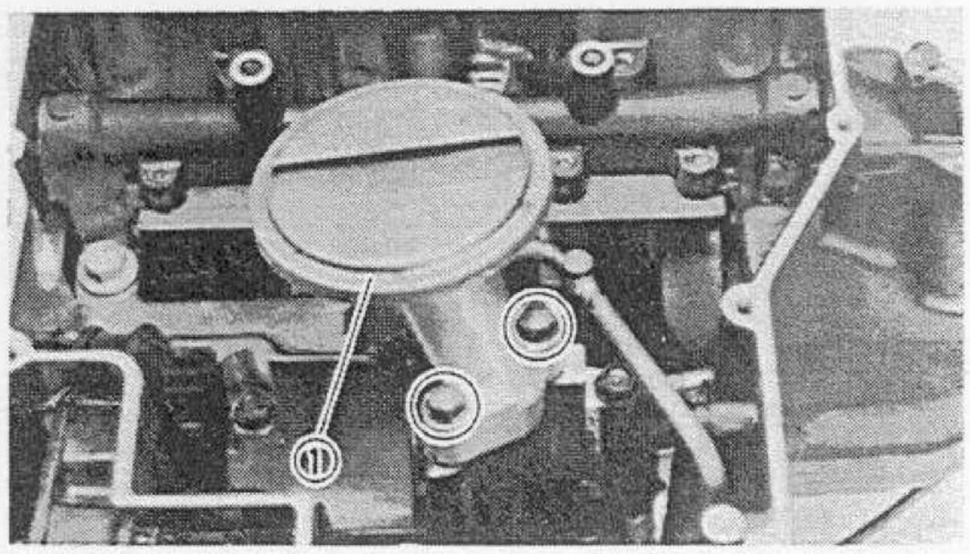
1. Install:
   - Gasket ①
   - Housing ②
   - Oil strainer element ③

NOTE:
The element (window) must be installed vertically against housing arrow mark.



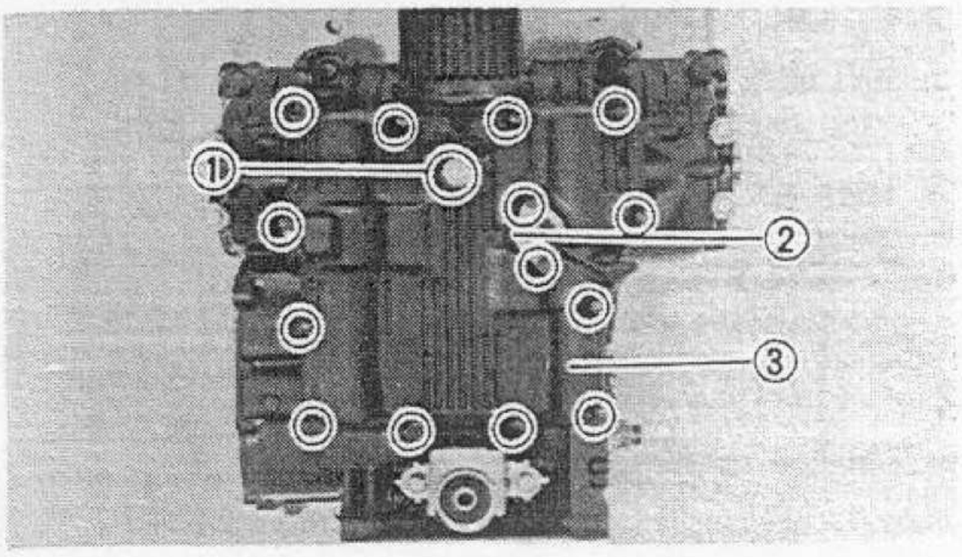
2. Install:
   - Relief valve ①
   - Oil pipe 5 ②

Oil Pipe 5 Bolts:
6 mm ③:
10 Nm (1.0 m·kg, 7.2 ft·lb)



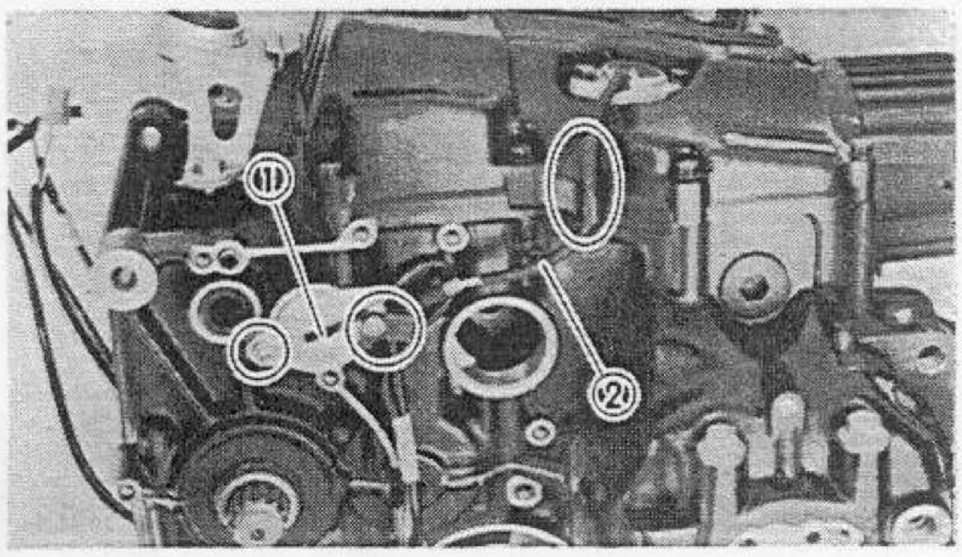
3. Install:
   - Oil strainer assembly ①

Oil Strainer Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)



4. Install:
   - Drain plug ①
   - Oil level switch ②
   - Oil pan ③

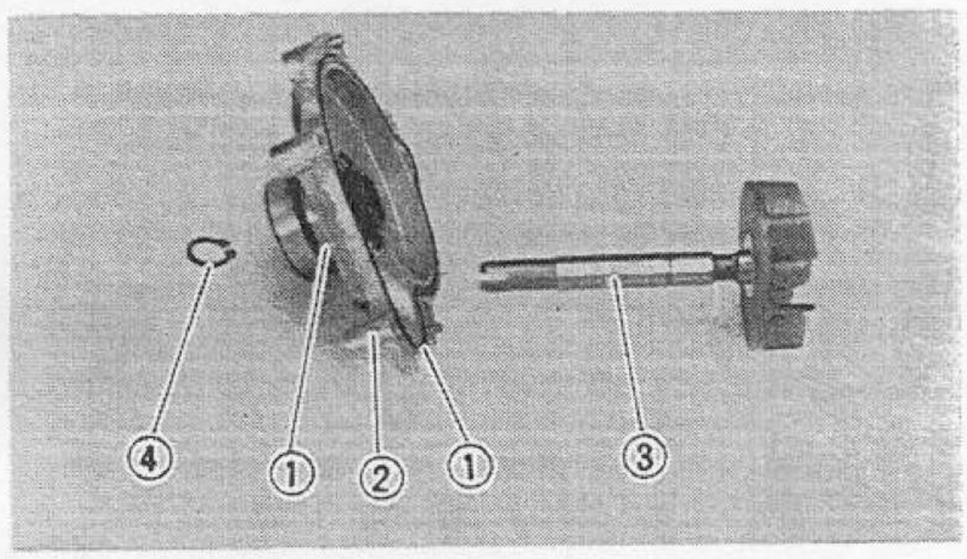
Drain Plug:
43 Nm (4.3 m·kg, 31 ft·lb)
Oil Level Switch Bolts:
Oil Pan Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)



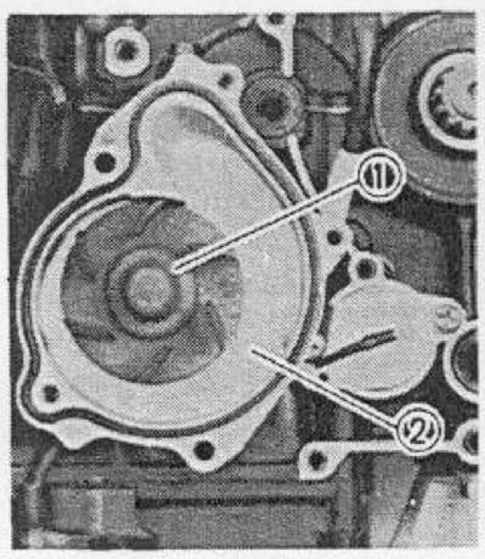
5. Connect:
   - Neutral switch lead ①
   - Oil level switch lead ②

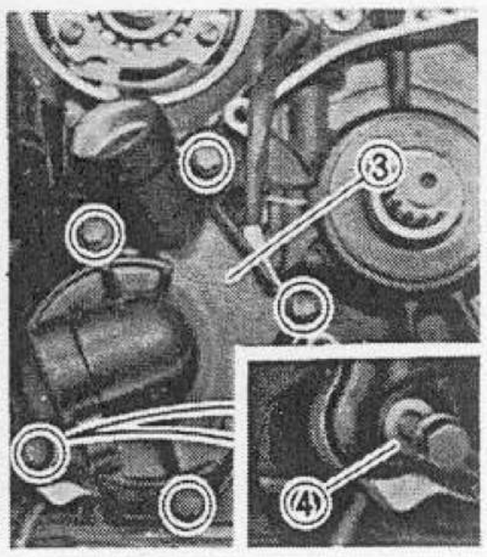
3

WATER PUMP



1. Install:
   - O-rings ①
   - Housing ②
   - Impeller ③
   - Circlip ④



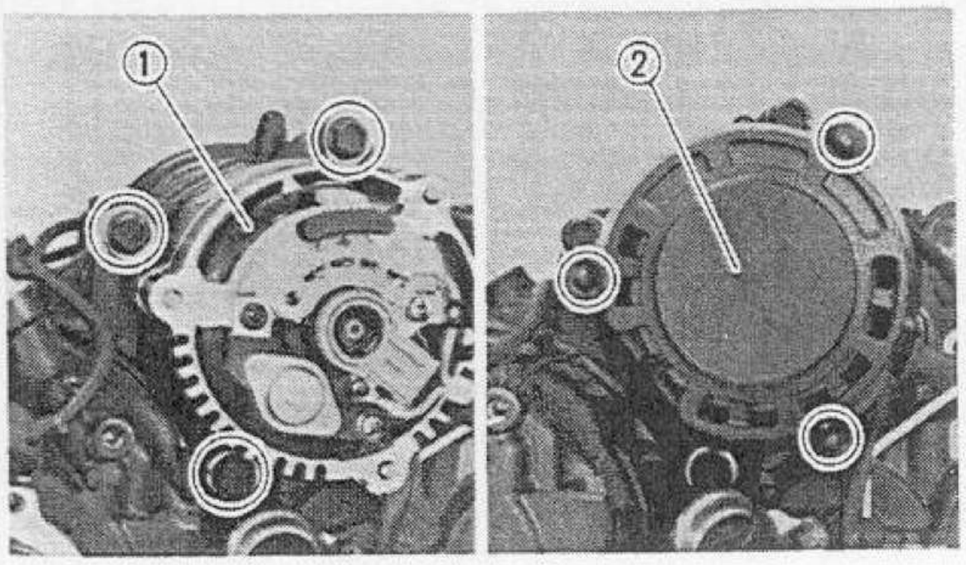


2. Install
   - Housing ② and impeller ① assembly
   - Water pump cover ③

Water Pump Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)

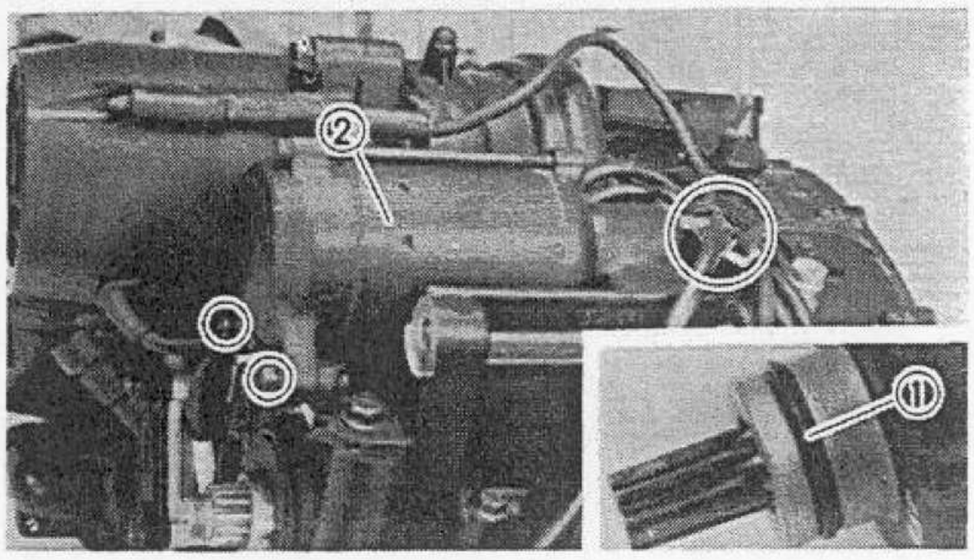
NOTE:
Use cupper washer ④ on coolant drain bolt.

AC GENERATOR AND STARTER MOTOR



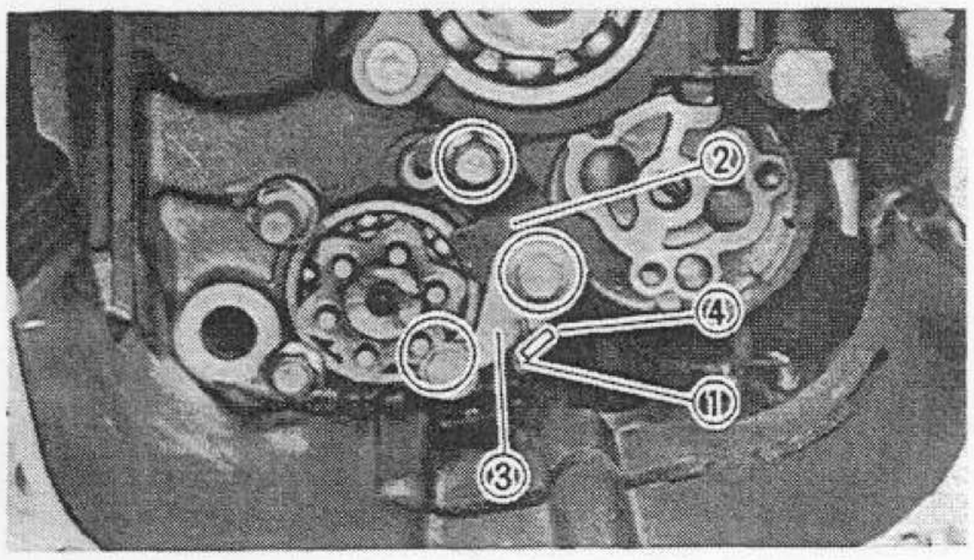
1. Install:
   - Generator ①
   - Generator cover ②

Generator Bolts:
20 Nm (2.0 m·kg, 14 ft·lb)
Generator Cover Nut:
5 Nm (0.5 m·kg, 3.6 ft·lb)



2. Check:
   - Starter motor O-ring ①
     Damage → Replace
3. Install:
   - Starter motor ②

	Strater Motor Bolt: **10 Nm (1.0 m·kg, 7.2 ft·lb)**

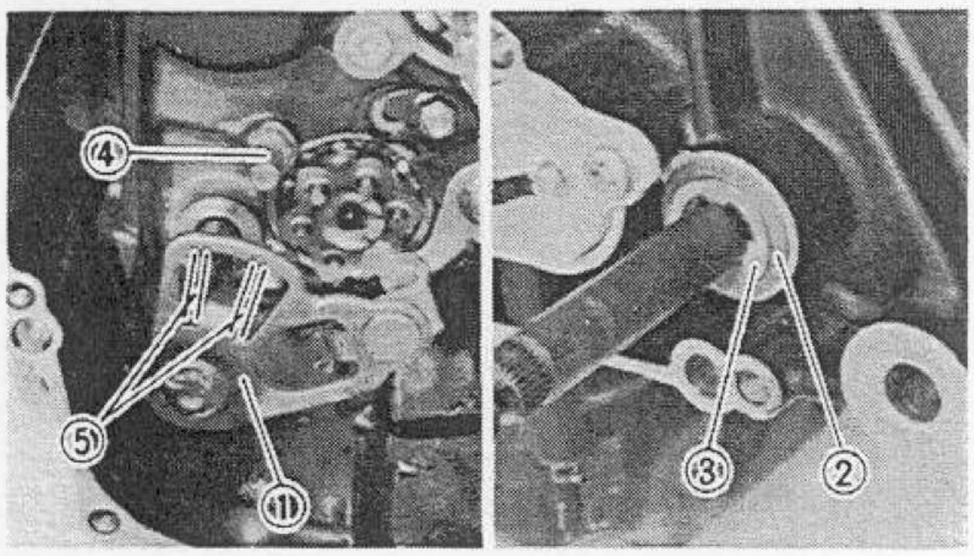


CHANGE LEVER AND OIL PUMP

1. Install:
   - Spring ①
   - Shift fork shaft stopper ②
   - Stopper lever ③

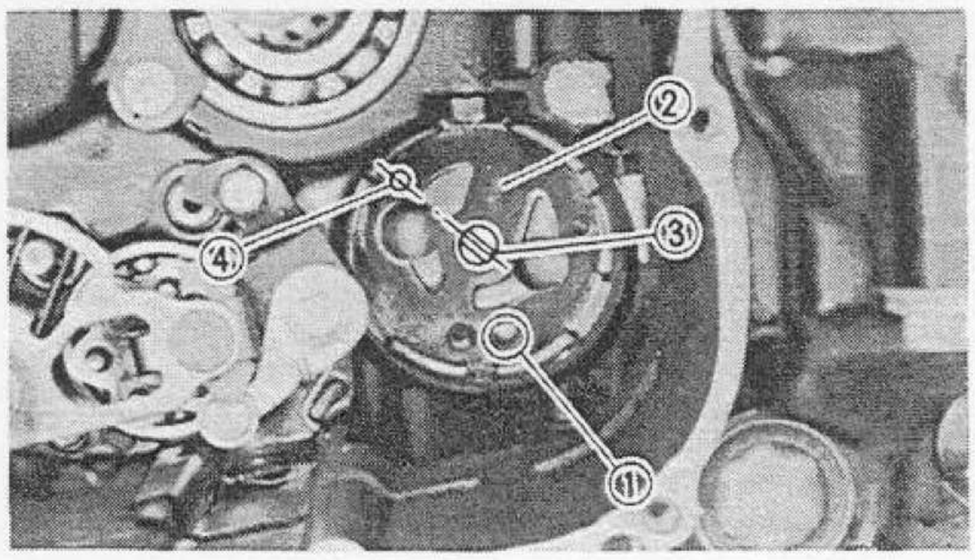
	Bolts: **10 Nm (1.0 m·kg, 7.2 ft·lb)** **LOCTITE®**

NOTE:
- Mesh the stopper lever ③ with the shift cam stopper.
- Hook the spring ends on the stopper lever and crankcase boss ④.



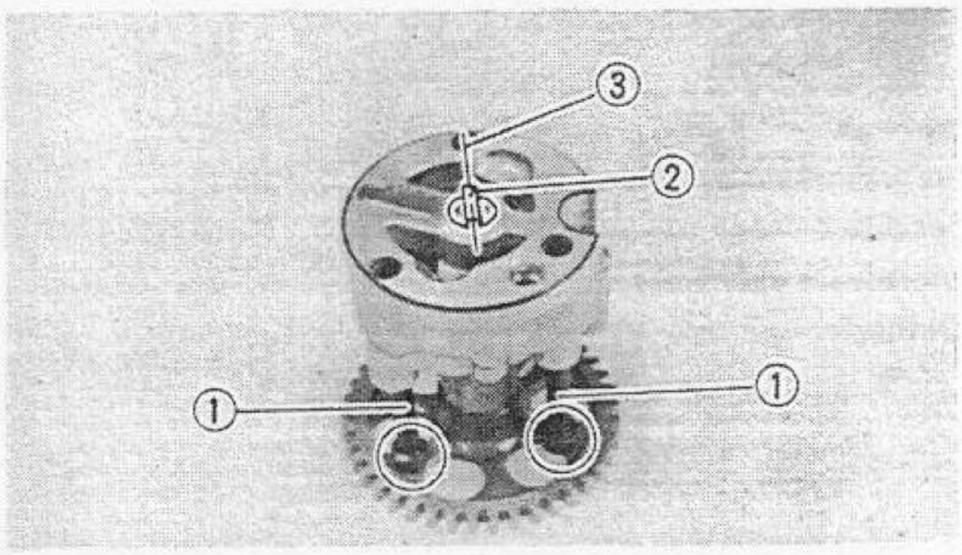
2. Install:
   - Change lever assembly ①
   - Wahser ②
   - Circlip ③

NOTE:
Insert the stopper ④ between springs ⑤.



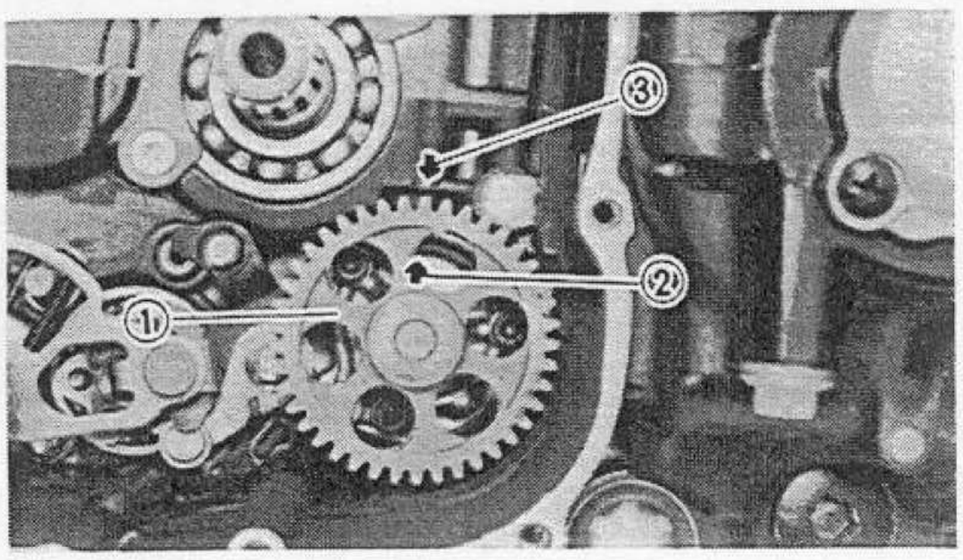
3. Install:
   - Dowel ①
   - Gasket ②

NOTE:
Align the water pump impeller shaft slot ③ with the oil pump thread hole ④.



4. Install:
   - Oil pump mounting bolts ①

NOTE:
Align the oil pump shaft projection ② with the oil pump hole ③.

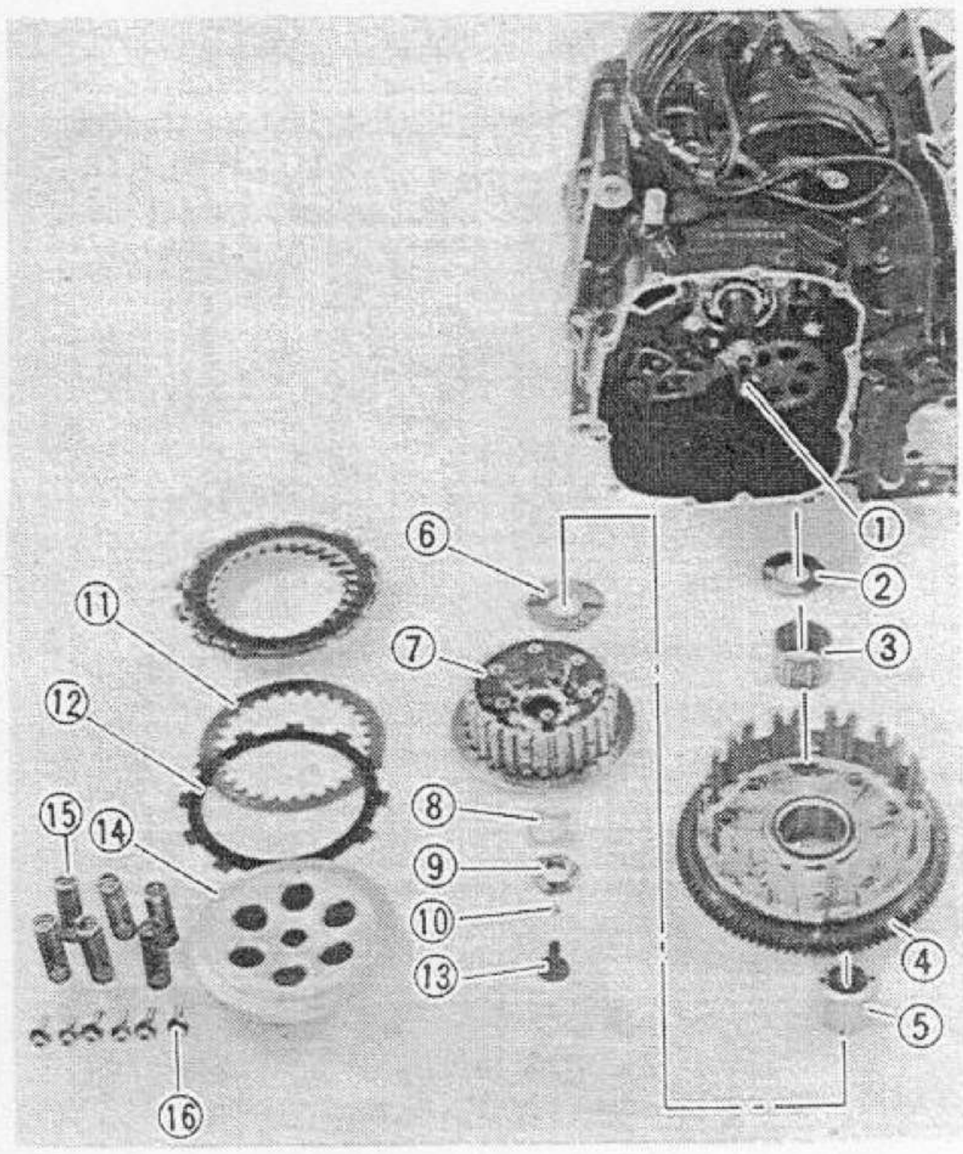


5. Install
   - Oil pump assembly ①

	Oil Pump Mounting Bolts: **10 Nm (1.0 m·kg, 7.2 ft·lb)**

NOTE:
Align the oil pump arrow mark ② with crankcase arrow mark ③.

CAUTION:
Be sure the oil pump shaft projection mesh with the water pump impeller shaft slot.

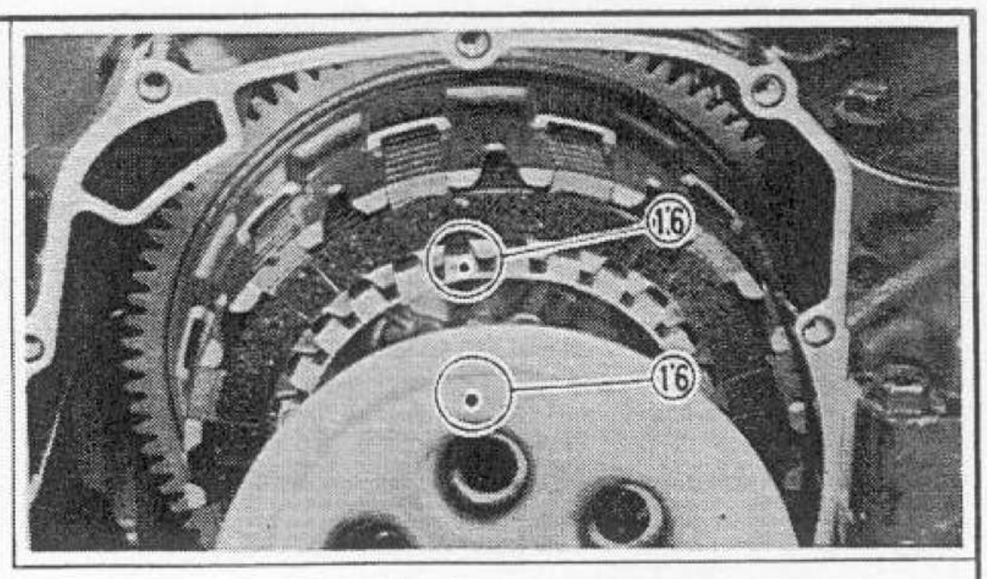


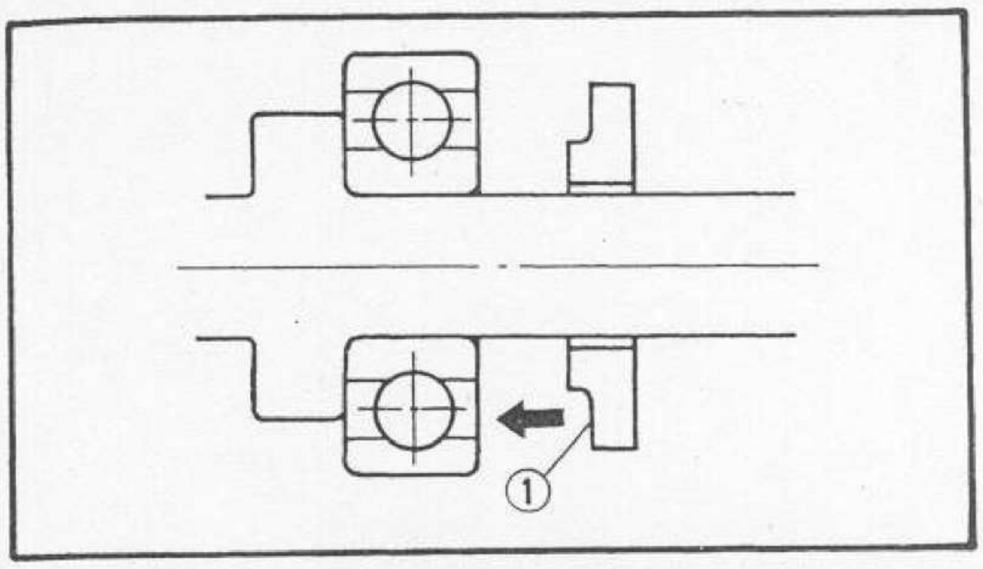
CLUTCH

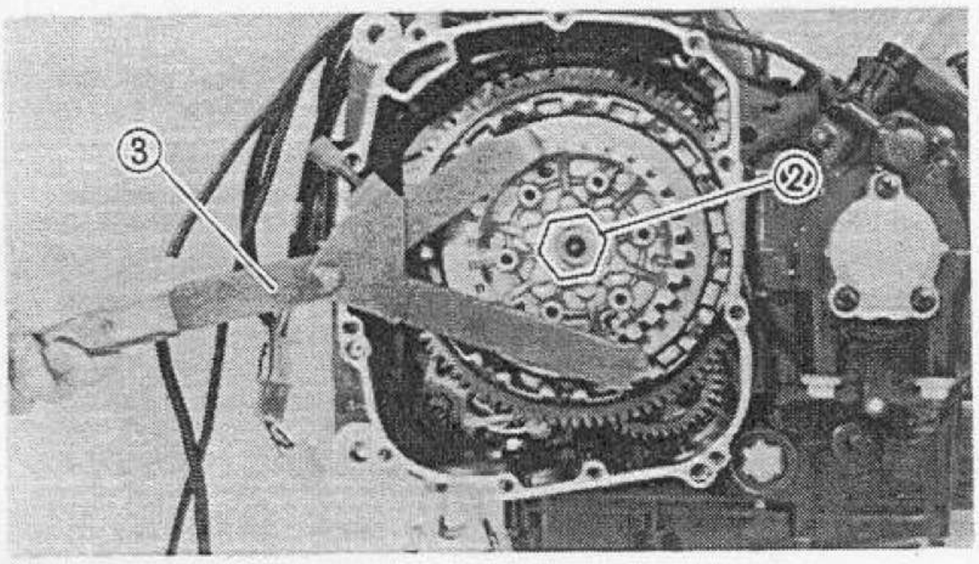
1. Install:
   - Push rod #2 ①
   - Thrust washer ②
   - Bearing ③
   - Primary driven gear ④
   - Spacer ⑤
   - Washer ⑥
   - Clutch boss ⑦
   - Lock washer ⑧
   - Clutch boss securing nut ⑨
   - Push rod ball ⑩
   - Clutch plates ⑪
   - Friction plates ⑫
   - Push rod #1 ⑬
   - Pressure plate ⑭
   - Clutch springs ⑮
   - Clutch spring holding screws ⑯

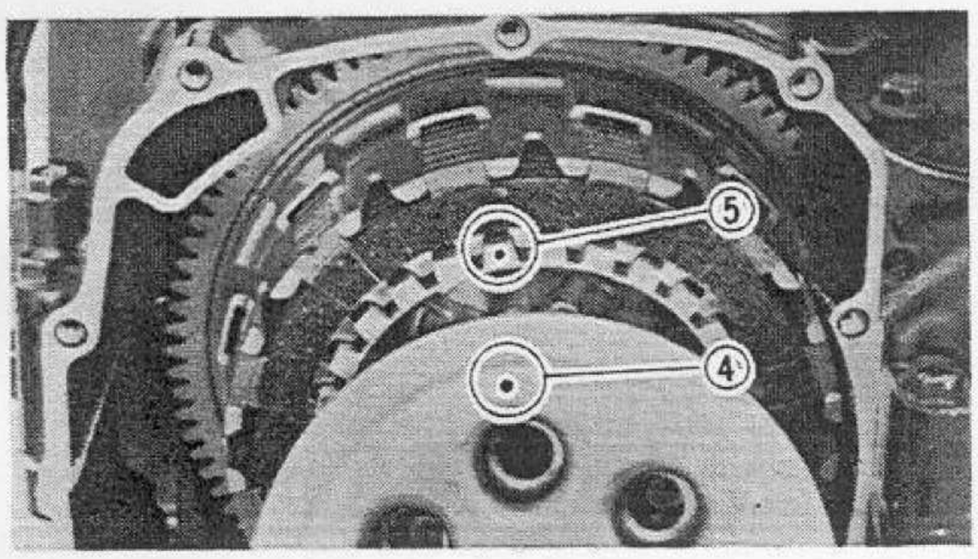
Clutch

① Clutch spring
② Pressure plate
③ Push rod # 1
④ O-ring
⑤ Push rod ball
⑥ Clutch plate
⑦ Clutch boss
⑧ Friction plate
⑨ Washer
⑩ Primary driven gear
⑪ Bearing
⑫ Spacer
⑬ Thrust washer
⑭ Push rod # 2
⑮ Clutch release assembly
⑯ Match mark









Clutch Assembling Notes

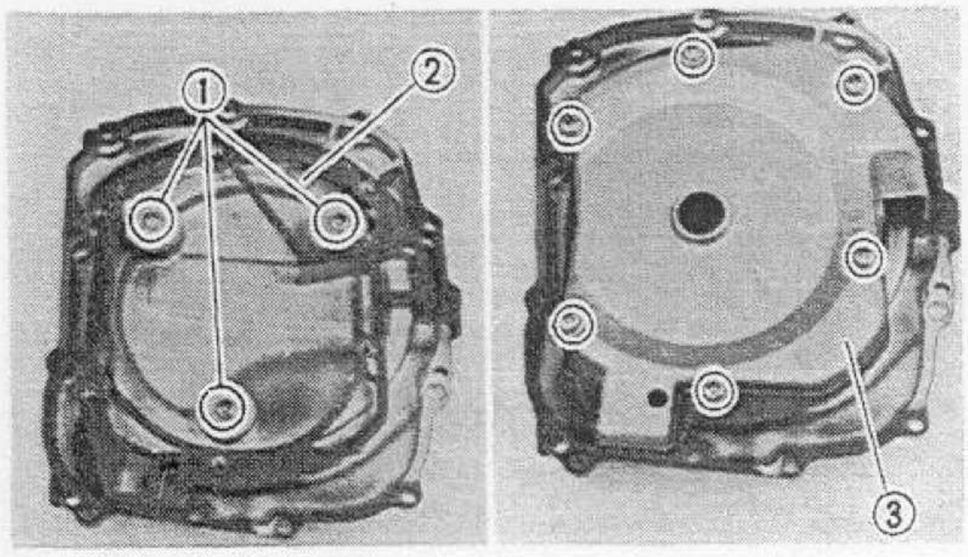
- Be sure the thrust washer must be installed its stepped fringe ① facing the bearing.

- Tighten the clutch boss securing nut ② using Universal Clutch Holder ③ (YM-91042).

Clutch Boss Securing Nut:
70 Nm (7.0 m·kg, 50 ft·lb)

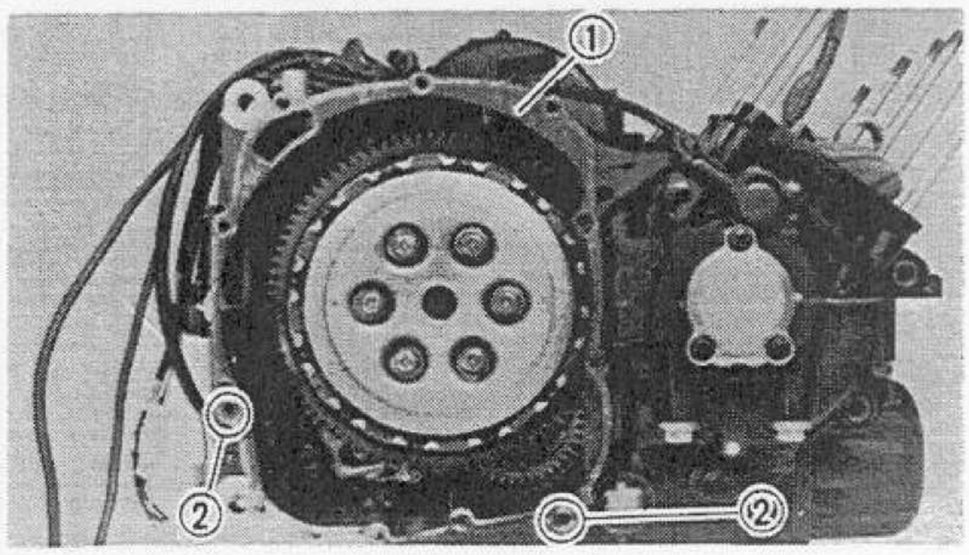
- Align the pressure plate mark ④ with clutch boss mark ⑤ .

Clutch Spring Holding Screws:
8 Nm (0.8 m·kg, 5.8 ft·lb)

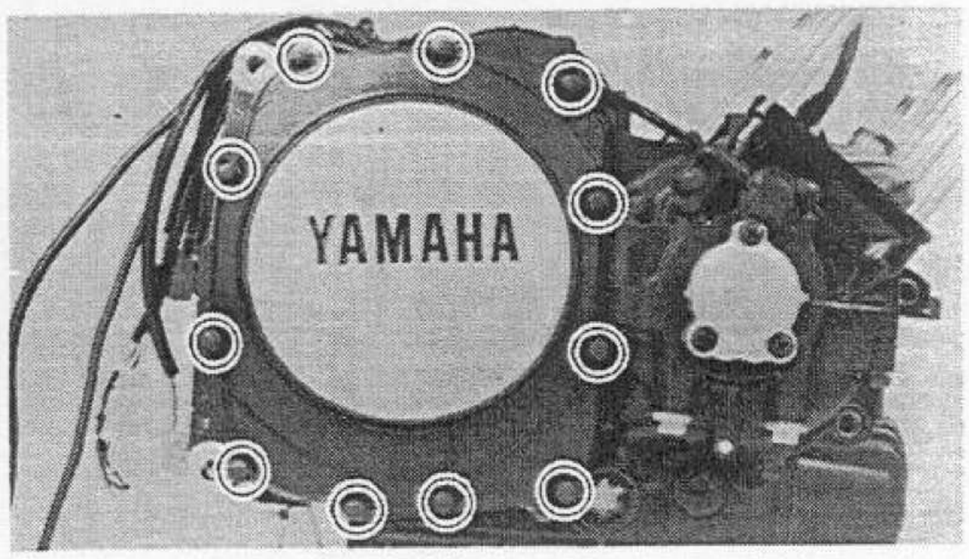


RIGHT CRANKCASE COVER

1. Install:
   - Cover
   - Rubber ring
   - Washer ①
   - Gasket ②
   - Breather ③

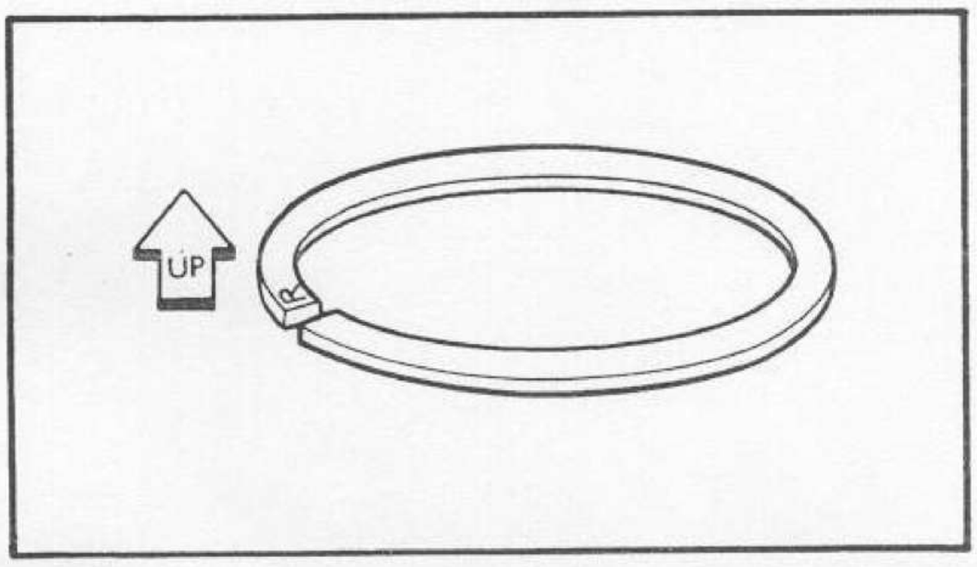


2. Install:
   - Gasket ①
   - Dowels ②



3. Install:
   - Right crankcase cover assembly.

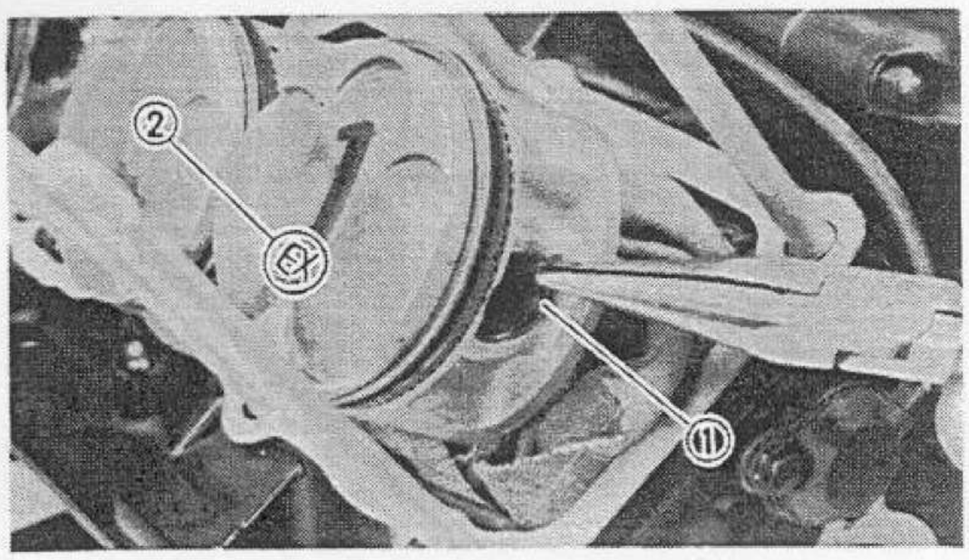
Crankcase Cover Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)



PISTON AND CYLINDER

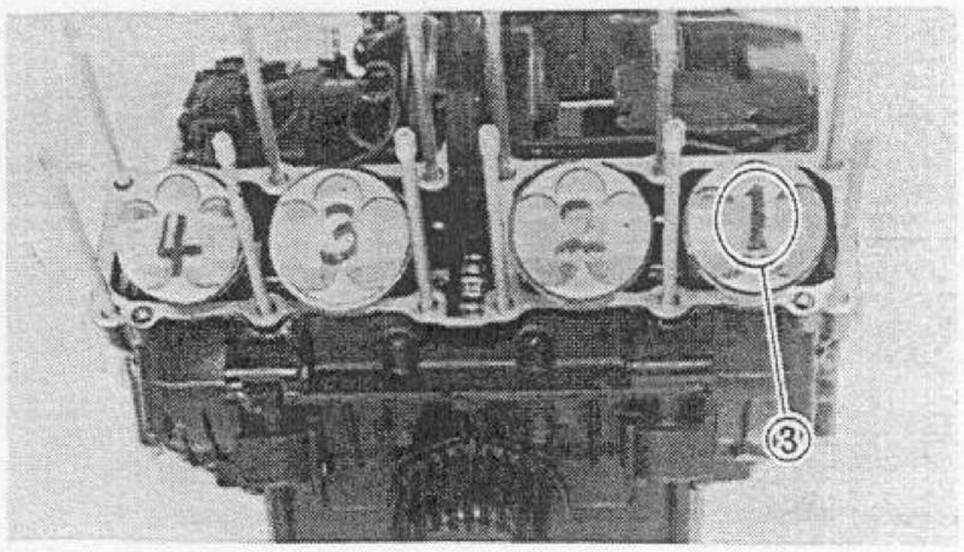
1. Install:
   - Piston rings

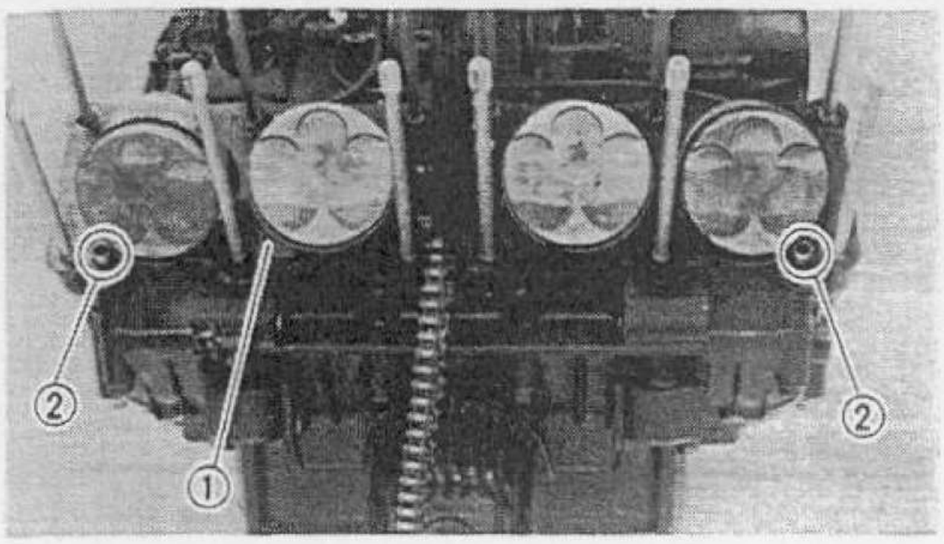
NOTE:
Be sure to install rings so that Manufacturer's marks or numbers are located on the top side of the rings. Oil the pistons and rings liberally.



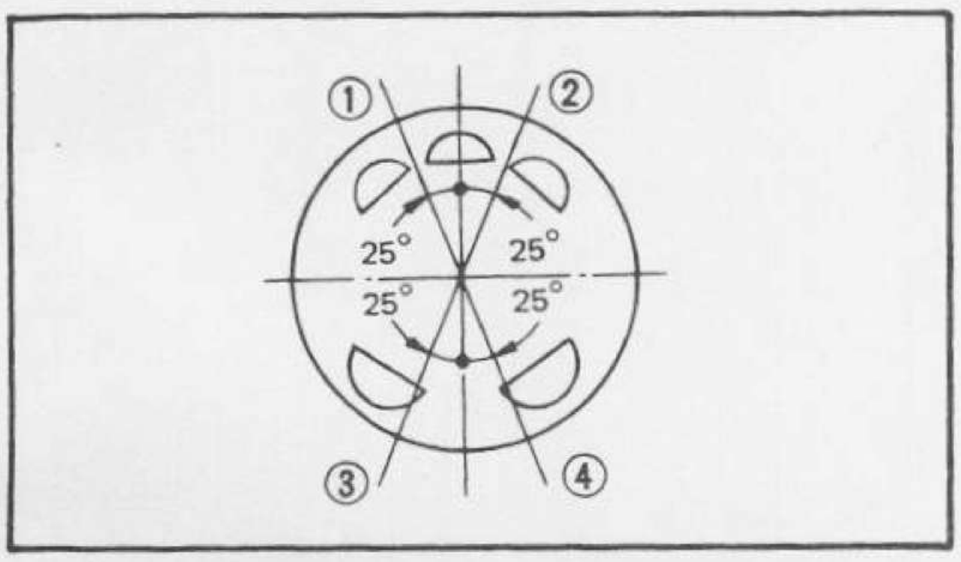
2. Install:
   - Piston pin
   - Piston
   - Piston pin Circlip (New) ①

NOTE:
- Be sure the piston "EX" mark ② 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 ③ should be in sequence (1, 2, 3, 4) begining from the left.



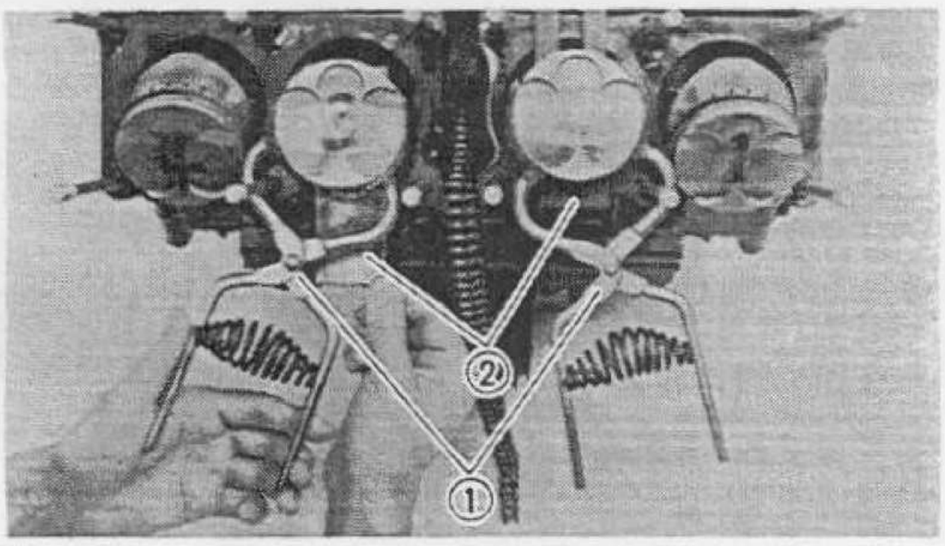


3. Install:
   - Cylinder gasket ①
   - Dowels ②



4. Oil liberally:
   - Piston
   - Rings
   - Cylinders

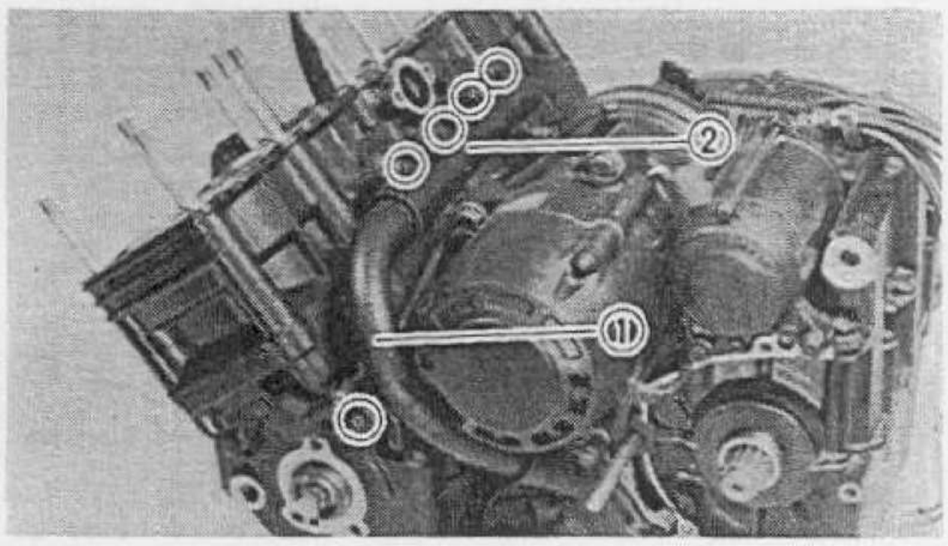
5. Set:
   - Top ring end ①
   - Oil ring end (Lower) ②
   - Oil ring end (Upper) ③
   - 2nd ring end ④



6. Install:
   - Cylinder

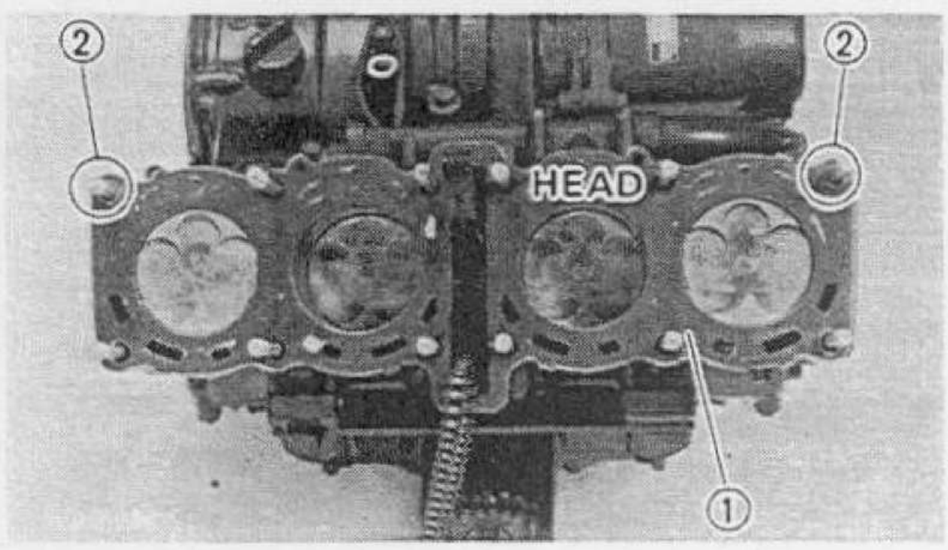
   Use Piston Ring Compressor ① (YM-04008) and Piston Base ② (YM-01067).

NOTE:
Pass the cam chain and exhaust side cam chain guide throuch cam chain cavity.



7. Install:
   - Coolant feed pipe ①
   - Water jacket joint ②

	Coolant Feed Pipe Bolt: **Water Jacket Joint Bolt:** **10 Nm (1.0 m·kg, 7.2 ft·lb)**



CYLINDER HEAD AND CAMSHAFT

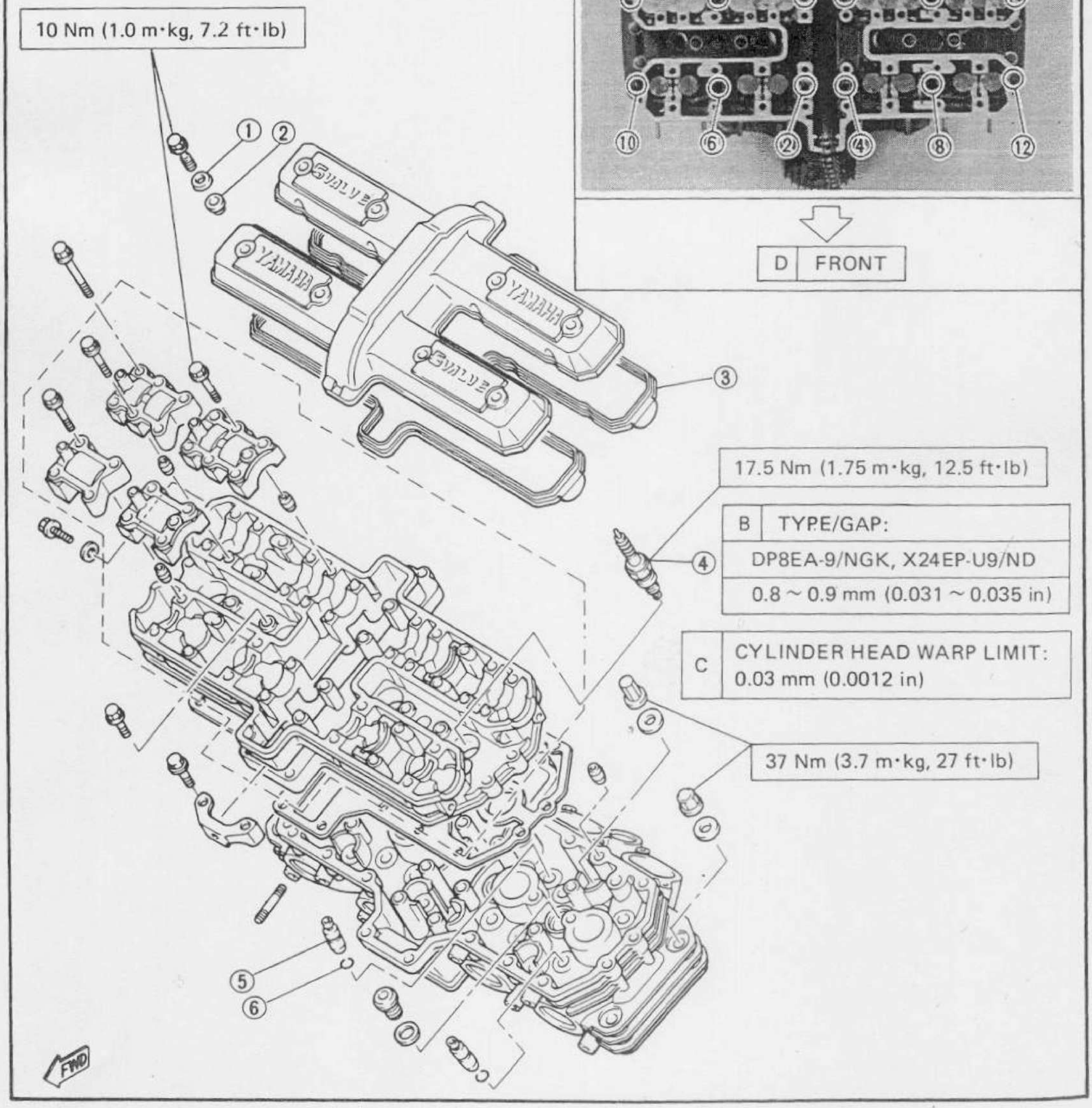
Cylinder Head

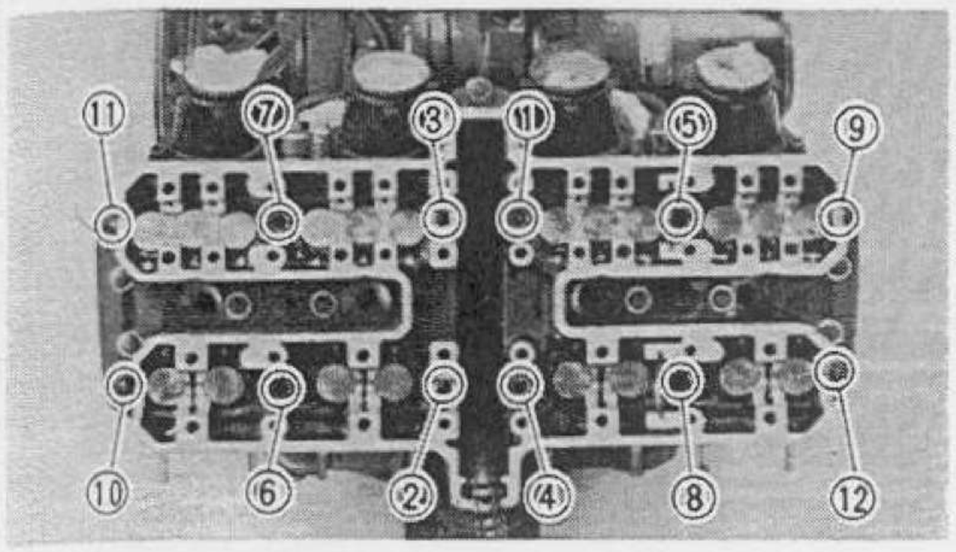
1. Install:
   - Cylinder head gasket ① (New)
   - Dowels ②

NOTE:
The gasket "HEAD" mark should face upward.

Cylinder Head

① Washer
② Rubber washer
③ Gasket
④ Spark plug
⑤ Valve guide
⑥ Circlip

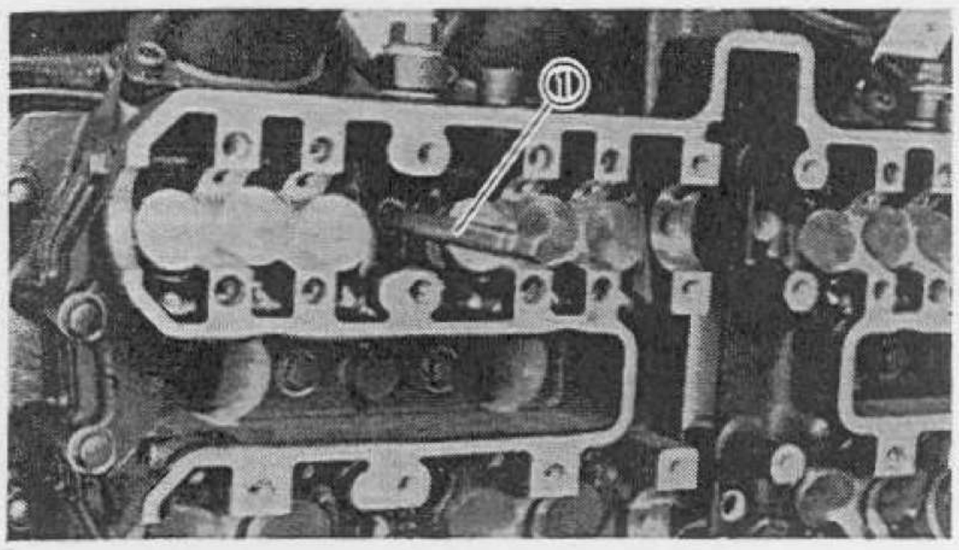




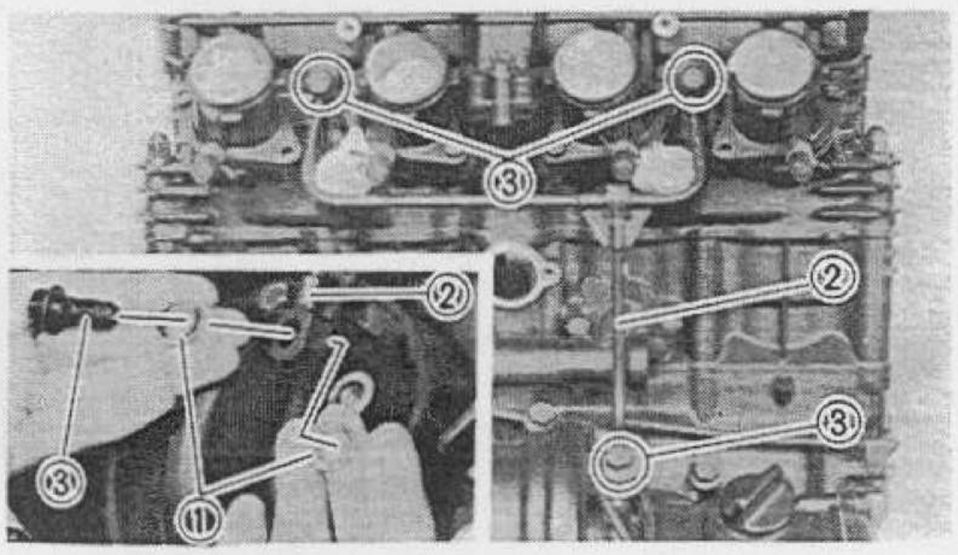
2. Install:
   - Camshaft case and cylinder head assembly

	Cylinder Head Nut: **37 Nm (3.7 m·kg, 27 ft·lb)**

NOTE:
Tighten the nuts in their proper tightening sequence and toruqe nuts in two srage.

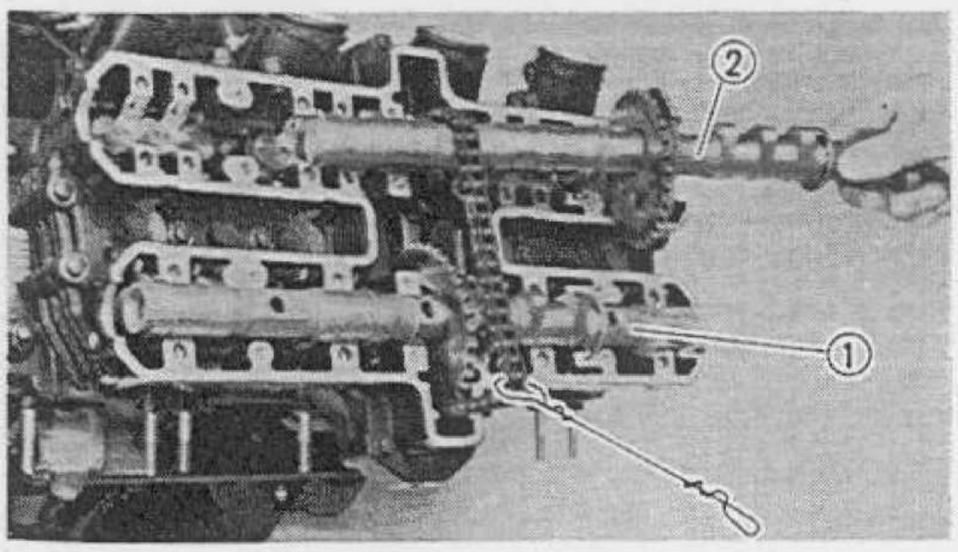


NOTE:
Tighten the cylinder head nuts in the camshaft case using Hexagon Wrench ① (YM-3448)



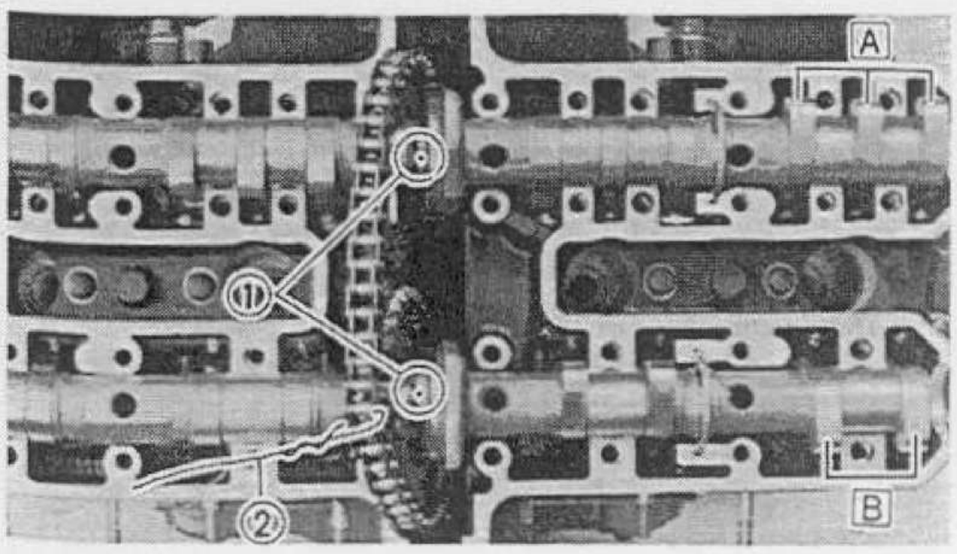
3. Install:
   - Washers ①
   - Oil pipe 1 ②
   - Oil pipe union bolts ③

	Oil Pipe Union Bolts: **21 Nm (2.1 m·kg, 15 ft·lb)**



Camshaft

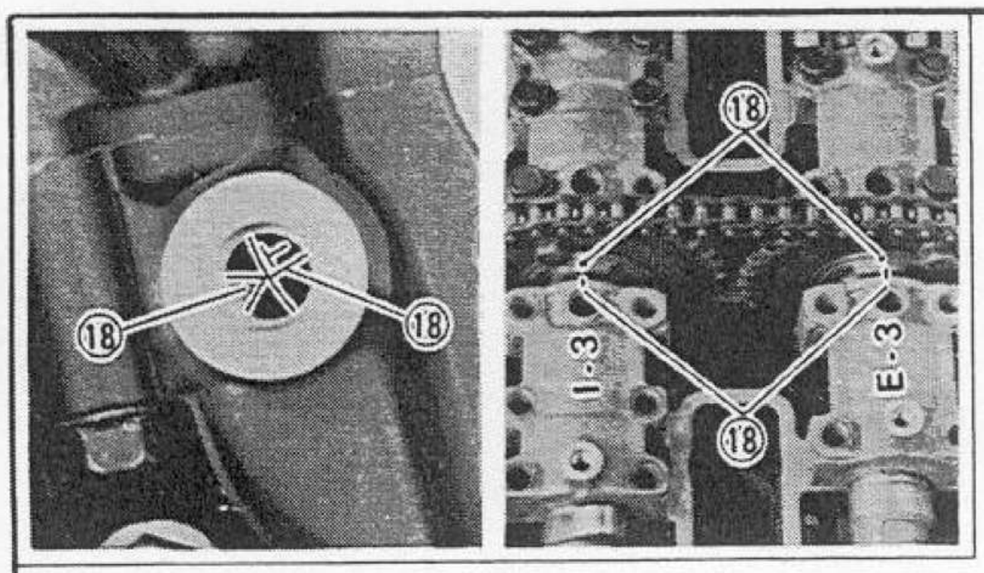
1. Install:
   - Exhaust camshaft ①
   - Intake camshaft ②



NOTE:
- "3-Lobe" [A] for intake camshaft
- "2-Lobe" [B] for exhaust camshaft
- Make sure the timing mark ① on the camshaft faces upward.
- Apply engine oil to camshaft bearing surfaces before installing camshafts.
- Remove the retaining wire ② .

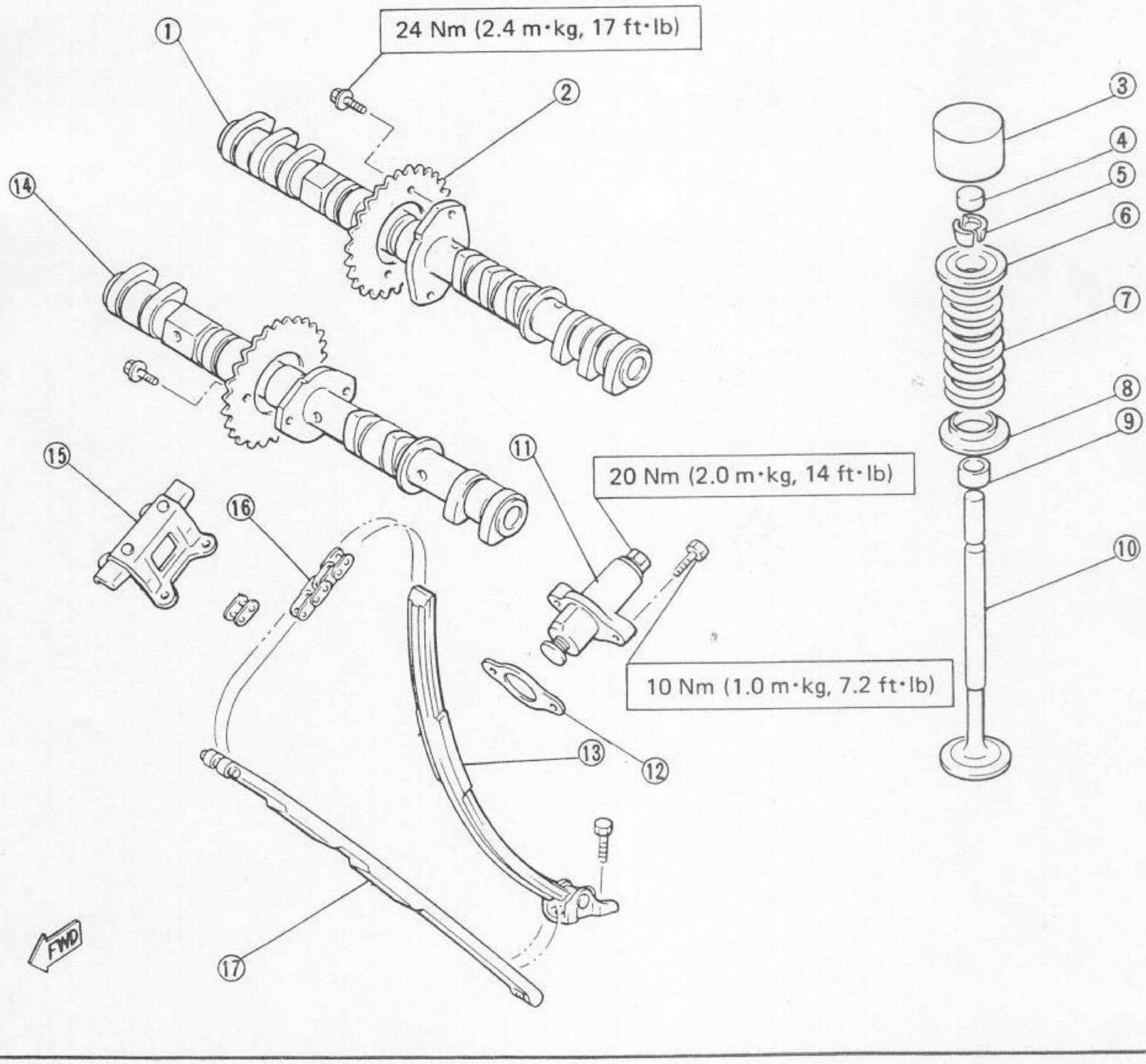
Camshaft

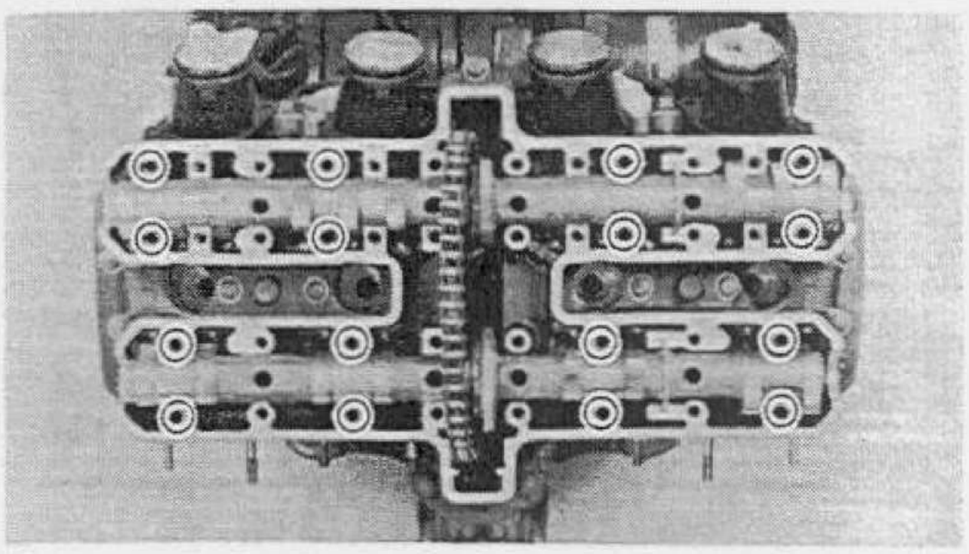
① Camshaft (Intake)
② Cam chain sprocket
③ Valve lifter
④ Valve pad
⑤ Valve retainer
⑥ Spring seat
⑦ Valve spring
⑧ Spring seat
⑨ Oil seal
⑩ Valve
⑪ Chain tensioner assembly
⑫ Gasket
⑬ Intake side chain guide
⑭ Camshaft (Exhaust)
⑮ Upper chain guide
⑯ Cam chain
⑰ Exhaust side chain guide
⑱ Match mark



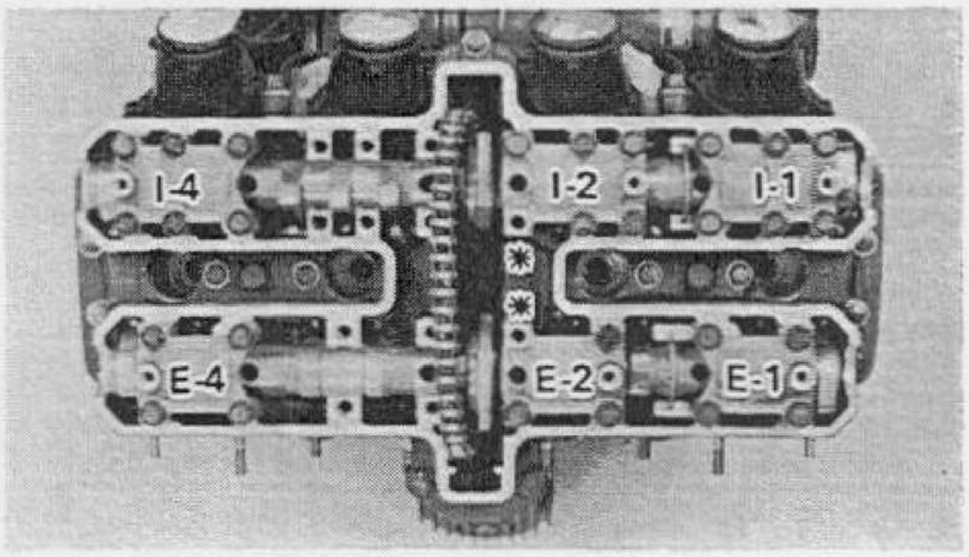
A	VALVE CLEARANCE (COLD):	
B	Intake	0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in)
C	Exhaust	0.21 ~ 0.30 mm (0.0083 ~ 0.0118 in)

D	VALVE SPRING COLOR:	
E	Intake	Blue
F	Exhaust	Red





2. Install:
   - Camshaft cap dowels



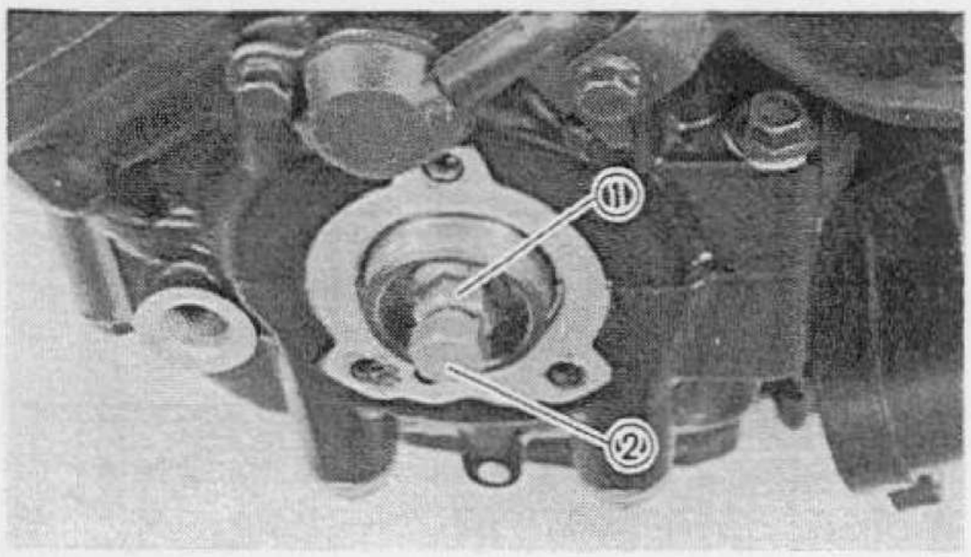
3. Install:
   - No. 1 intake (I-1) camshaft cap
   - No. 2 intake (I-2) camshaft cap
   - No. 4 intake (I-4) camshaft cap
   - No. 1 exhaust (E-1) camshaft cap
   - No. 2 exhaust (E-2) camshaft cap
   - No. 4 exhaust (E-4) camshaft cap

Camshaft Cap Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)

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

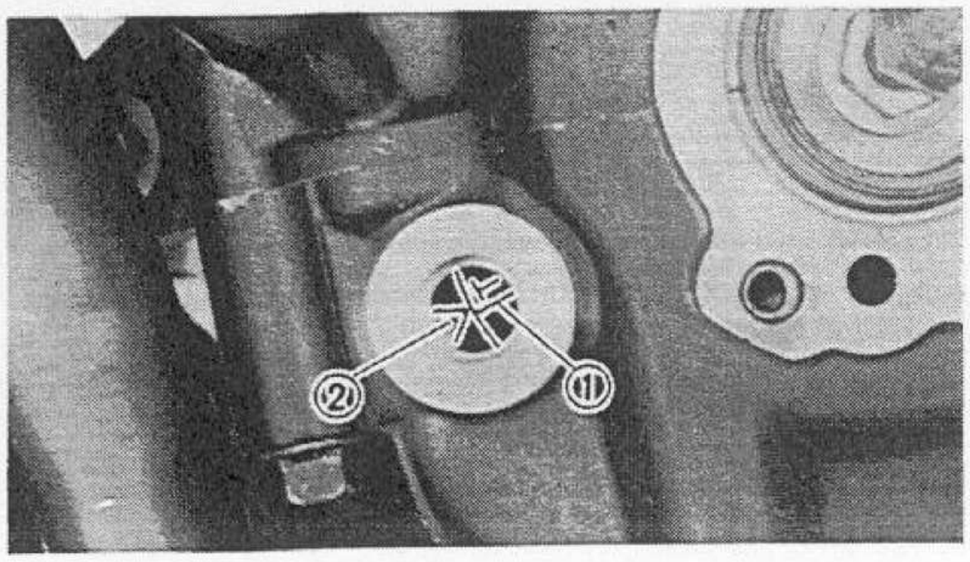
CAUTION:

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

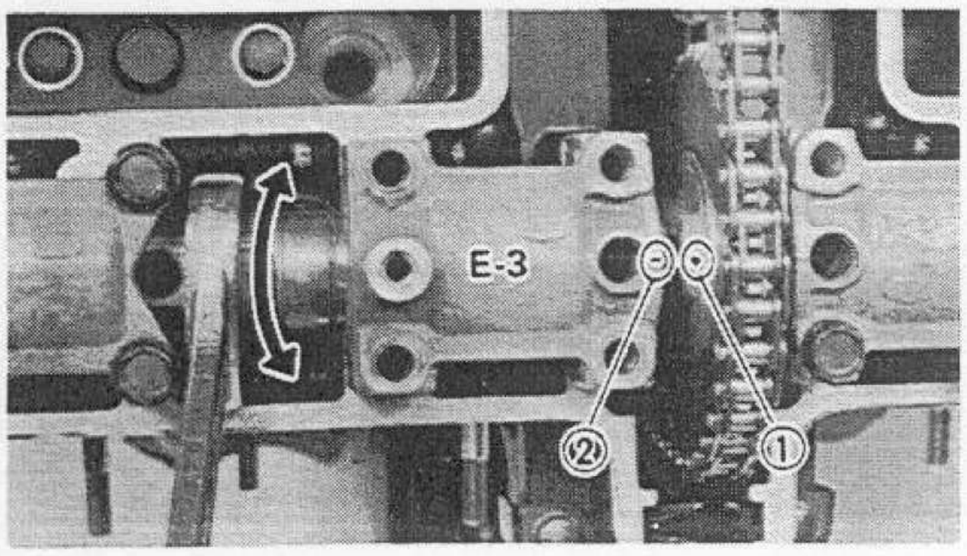


Cam Chain

1. Install:
   - Locknut ①
   - Bolt (8 mm) ②
     (into left crankshaft end)



2. Turn:
   - Crankshaft
     (Counterclockwise)
3. Align:
   - Crankshaft web "T" mark ①
     (with the stationary pointer ② when #1 piston is at TDC on compression stroke.)

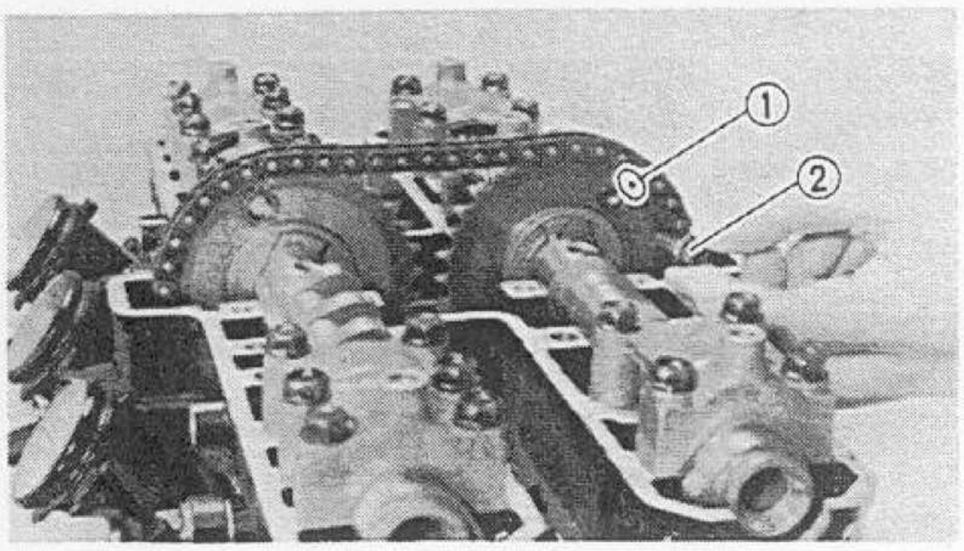


4. Position:
   - Cam chain
     (onto sprockets)
5. Install:
   - Sprockets
     (onto the it's seated position of the camshaft)
6. Position:
   - Exhaust "E-3" camshaft cap
     (onto cylinder head)
7. Rotate:
   - Exhaust camshaft
8. Align:
   - Exhaust camshaft timing mark ①
     (with the "E-3" camshaft cap mark ②)

CAUTION:

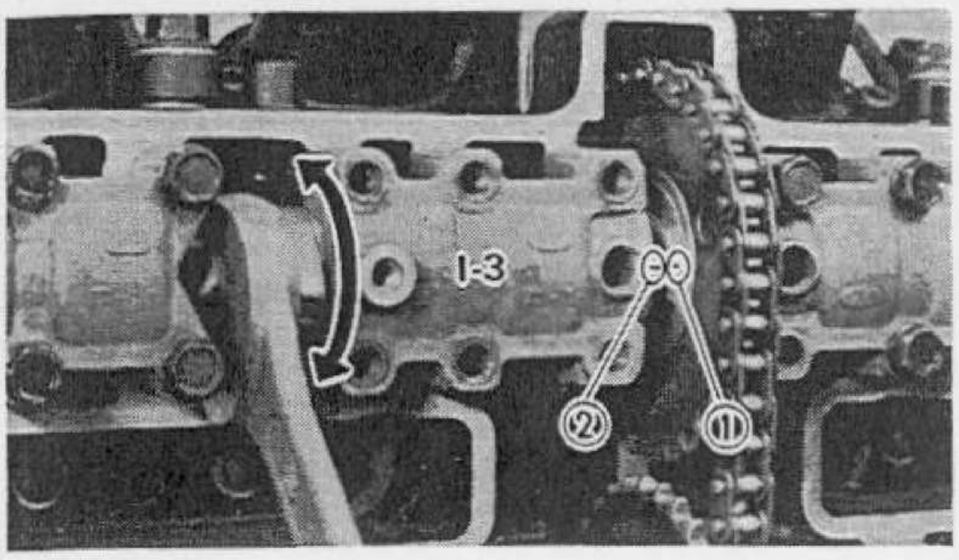
Do not rotate the camshaft over 1/2 turn or damage to the piston and valve will result.

9. Remove:
   - Exhaust "E-3" camshaft cap
10. Force the exhaust sprocket countercloskwise (viewing from right side engine) to remove all cam chain slack.



11. Align:
    - Marked sprocket hole ①
      (with the exhaust camshaft thread hole)
12. Install:
    - Exhaust sprocket bolt ②
      (temporarily tighten)

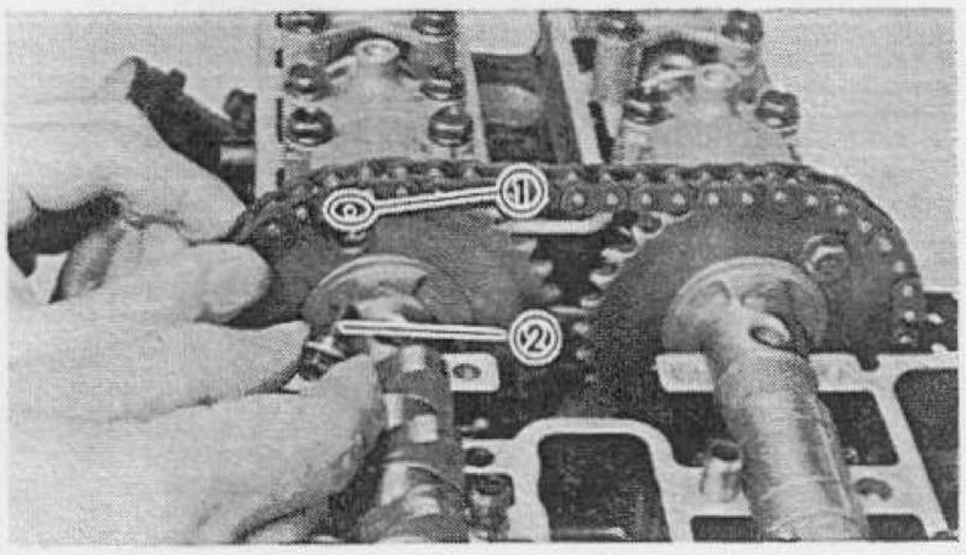
NOTE:
- If the sprocket hole do not align with the camshaft hole, Adjust chain links between crankshaft and exhaust camshaft.
- Do not rotate the exhaust camshaft or camshaft and camshaft cap alignment is necessary.



13. Position
    - Intake "I-3" camshaft cap (onto cylinder head)
14. Rotate:
    - Intake camshaft
15. Align:
    - Intake camshaft timing mark ①
      (with the "I-3" camshaft cap mark ②)

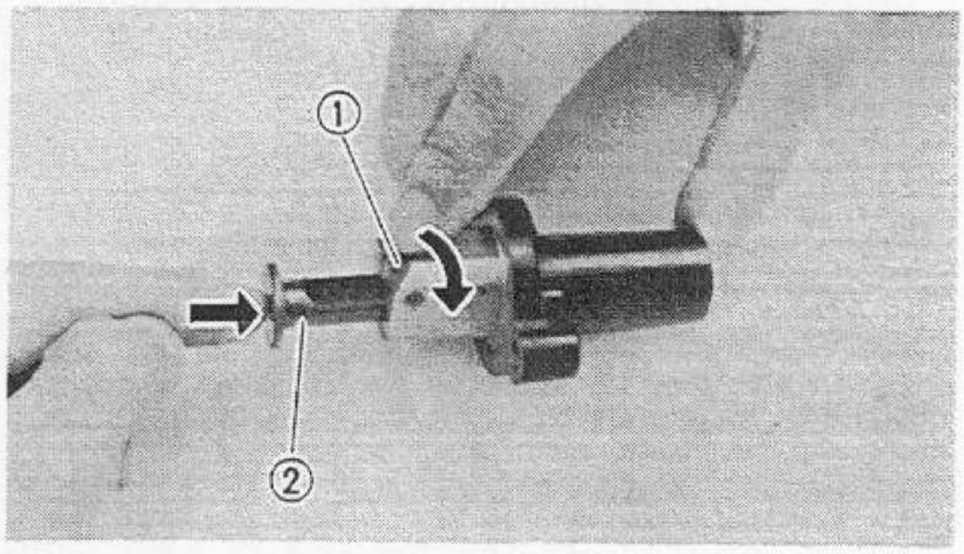
CAUTION:

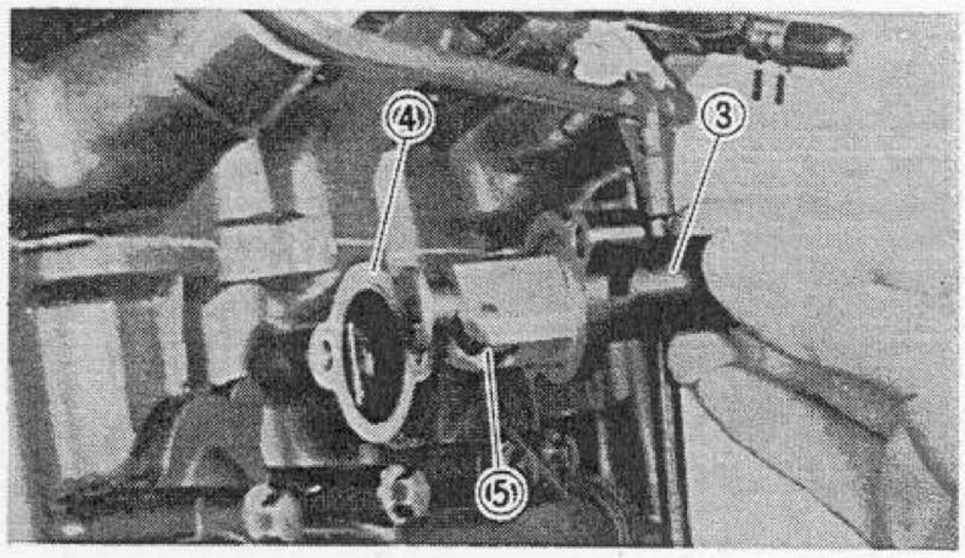
Do not rotate the camshaft over 1/2 turn or damage to the piston and valve will result.

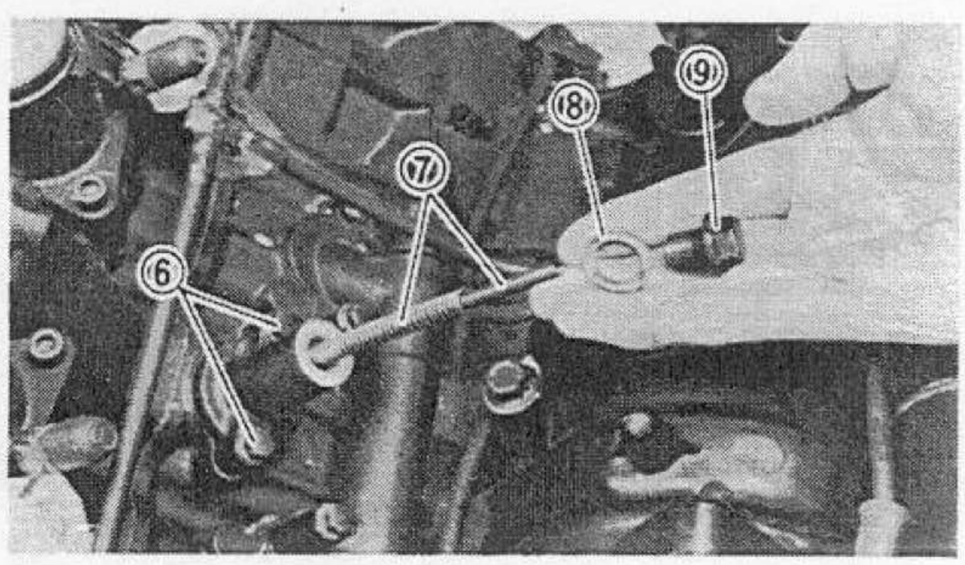


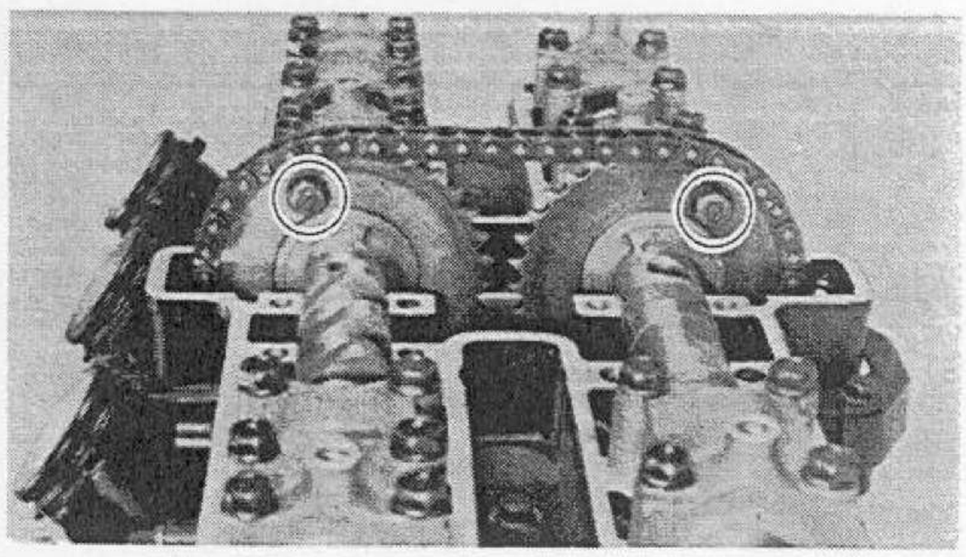
16. Remove:
    - Intake "I-3" camshaft cap
17. Force the intake sprocket countercloskwise (viewing from right side engine) to remove all cam chain slack.
18. Align:
    - Marked sprocket hole ①
      (with the intake camshaft thread hole)
19. Install:
    - Intake sprocket bolt ②
      (temporarily tighten)

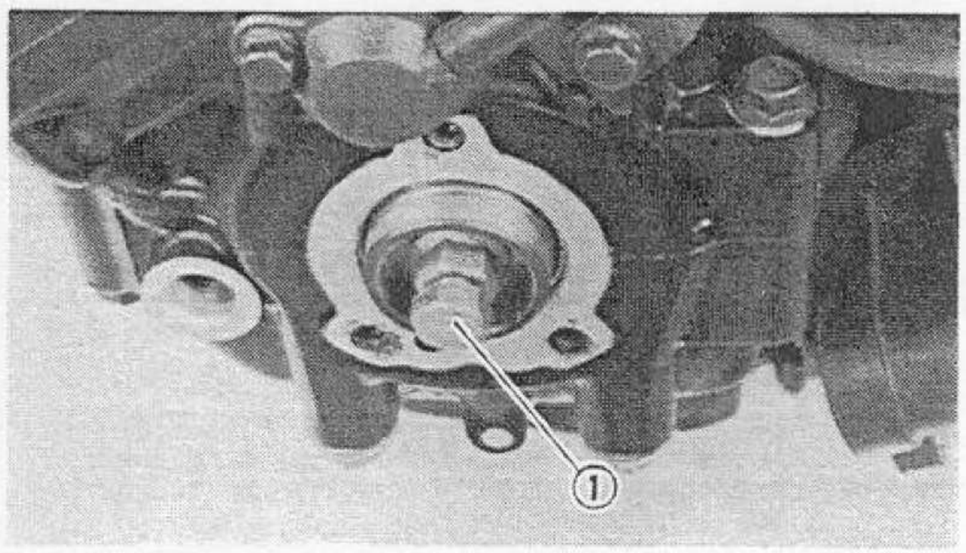
NOTE:
- If the sprocket hole do not align with the camshaft thread hole. Adjust chain links between exhaust and intake camshafts.
- Do not rotate the intake camshaft or camshaft and camshaft cap alignment is necessary.











20. Install:
    - Cam chain tensioner

Cam chain tensioner installation steps:
- Remove the tensioner end cap bolt and spring.
- Release the cam chain tensioner one-way cam ①.
- Push the tension rod assembly ② into the body.
- Install the tensioner ③ with a new gasket ④ onto the cylinder

CAUTION:

The one-way cam ⑤ should be faced downward.

Tensioner Body Bolts ⑥ :
10 Nm (1.0 m·kg, 7.2 ft·lb)

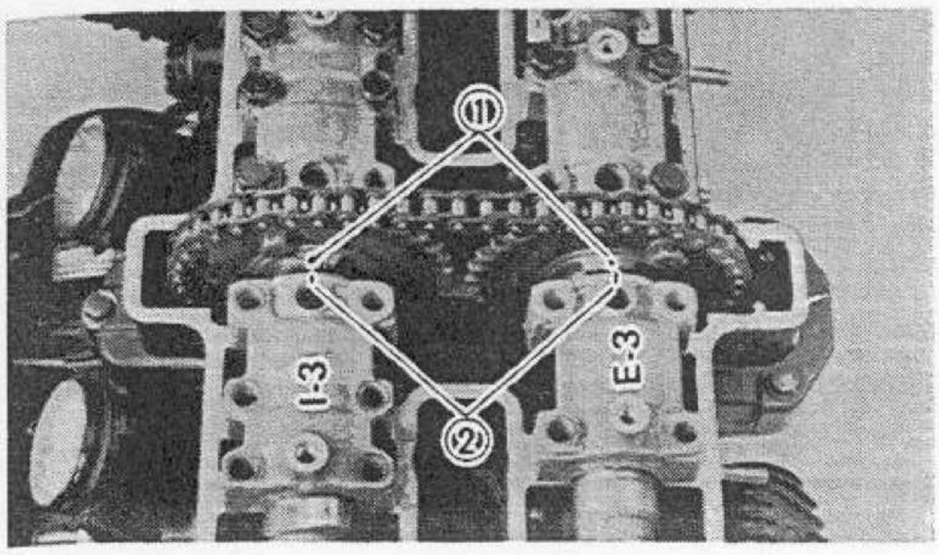
- Install the springs ⑦ , washer ⑧ and end cap bolt ⑨ .

Tensioner End Cap Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)

21. Rotate:
    - Crankshaft
      Counterclockwise
22. Install:
    - Sprocket bolts (all)

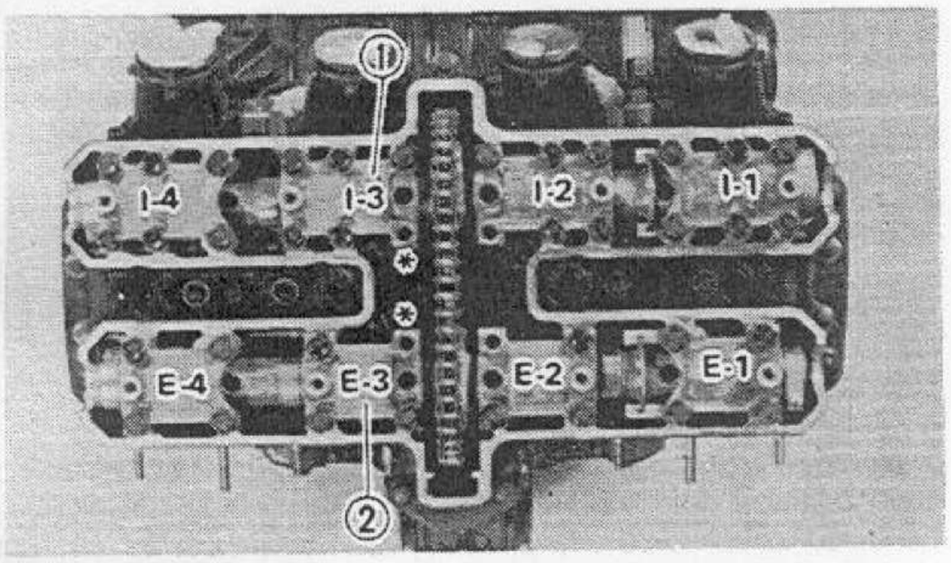
Sprocket Bolts:
24 Nm (2.4 m·kg, 17 ft·lb)

NOTE:
If difficult to tighten the cam sprocket securing bolts; hold the 8 mm bolt ① on the left crankshaft end.



23. Install:
    - No. 3 exhaust (E-3) camshaft cap
    - No. 3 intake (I-3) camshaft cap

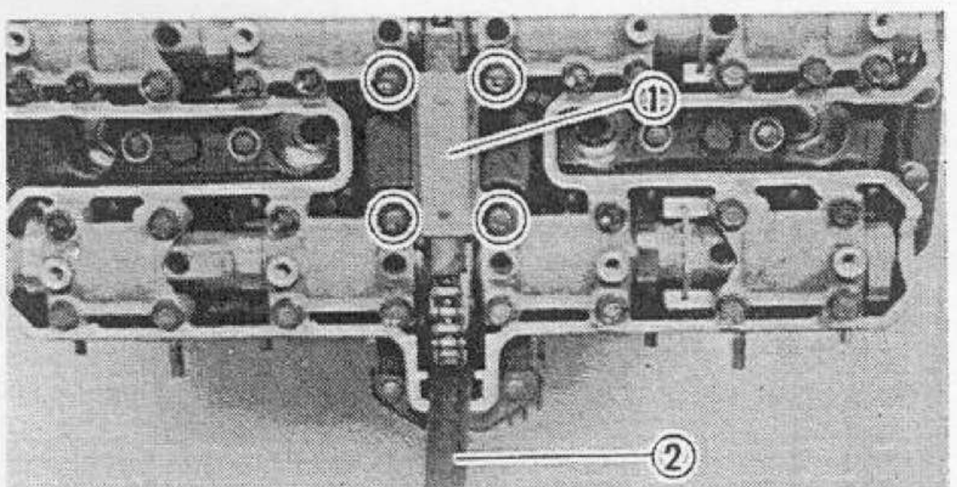
NOTE:
- Be sure the camshaft timing marks ① align with the camshaft cap mark ② .
- Be sure the "T" mark on the crankshaft web align with the stationary pointer when #1 position is at TDC on compression stroke.



24. Tighten:
    - No. 3 intake ① and exhaust ② camshaft cap bolts.

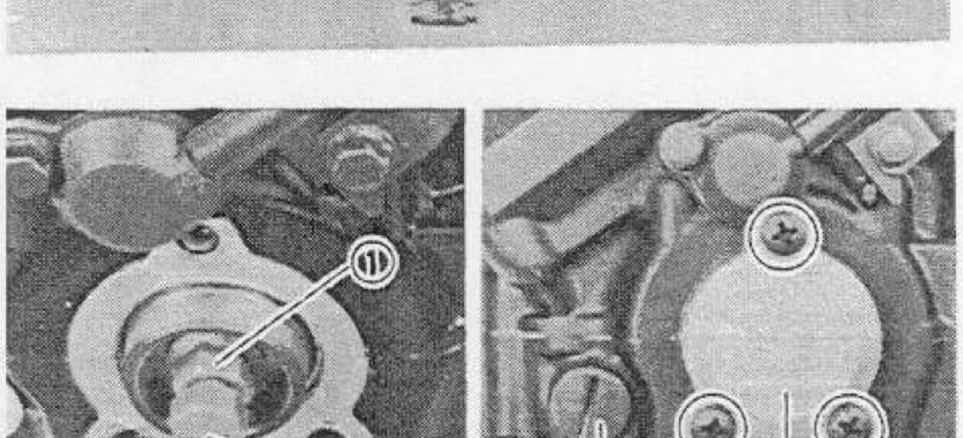
Camshaft Cap Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
Do not install the bolt at * marked places in this stage.



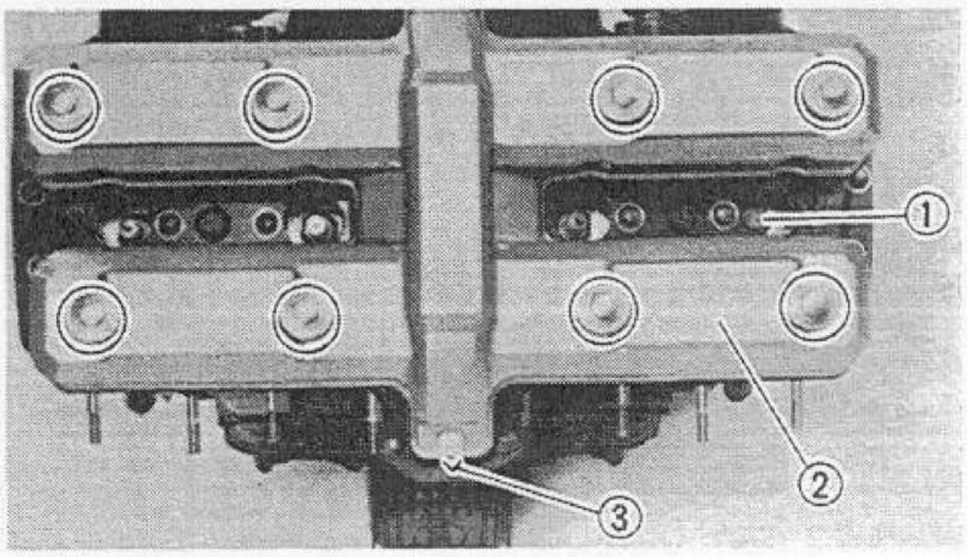
25. Install:
    - Upper chain guide ①
    - Exhaust chain guide ②

Upper Chain Guide Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)



26. Remove:
    - Locknut ①
    - Bolt (8 mm) ②
27. Install:
    - O-rings
    - Left crankshaft end cover ③
    - Plug screw ④

Crankshaft End Cover Screws:
7 Nm (0.7 m·kg, 5.1 ft·lb)



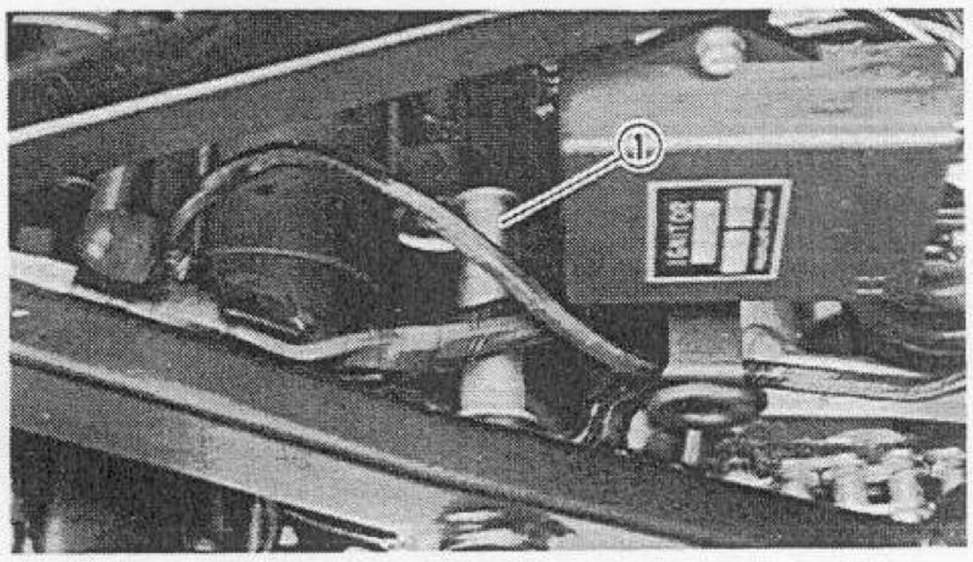
28. Install:
    - Spark plug ①
    - Cylinder head gasket
    - Cylinder head cover ②
    - Rubber plugs
    - Washers
    - Bolts

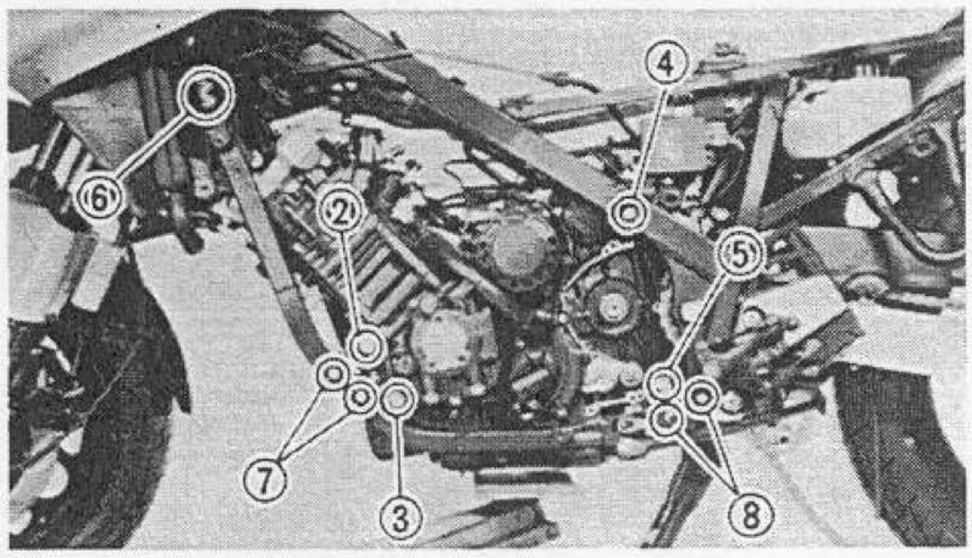
Spark Plug:
17.5 Nm (1.75 m·kg, 12.5 ft·lb)
Cylinder Head Cover Bolts:
10 Nm (1.0 m·kg, 7.2 ft·lb)

NOTE:
Be sure the cylinder head gasket mark ③ face front.

REMOUNTING ENGINE

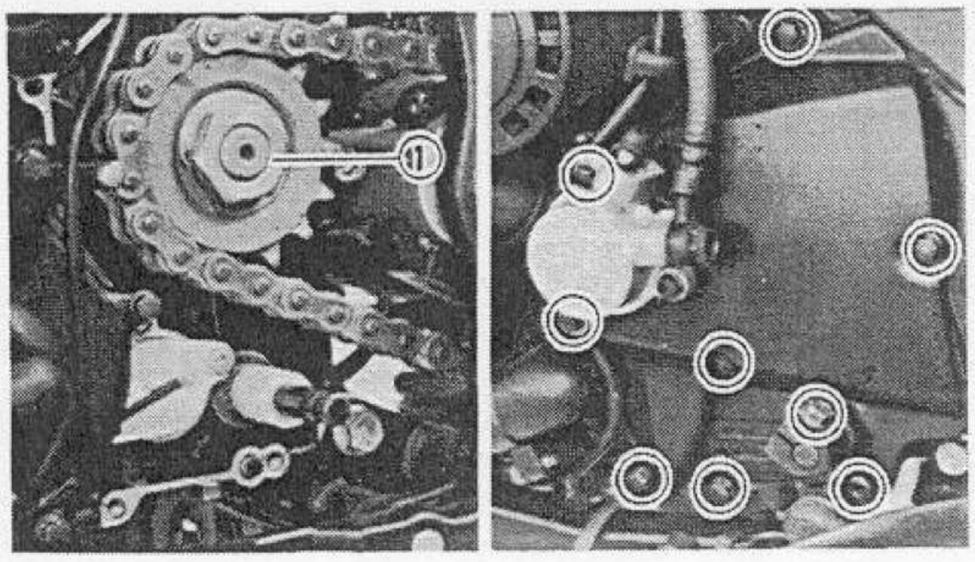
1. Reverse engine removal steps. Pay close attention to installation of following steps.
2. Install:
    - Rear upper mounting collar ①



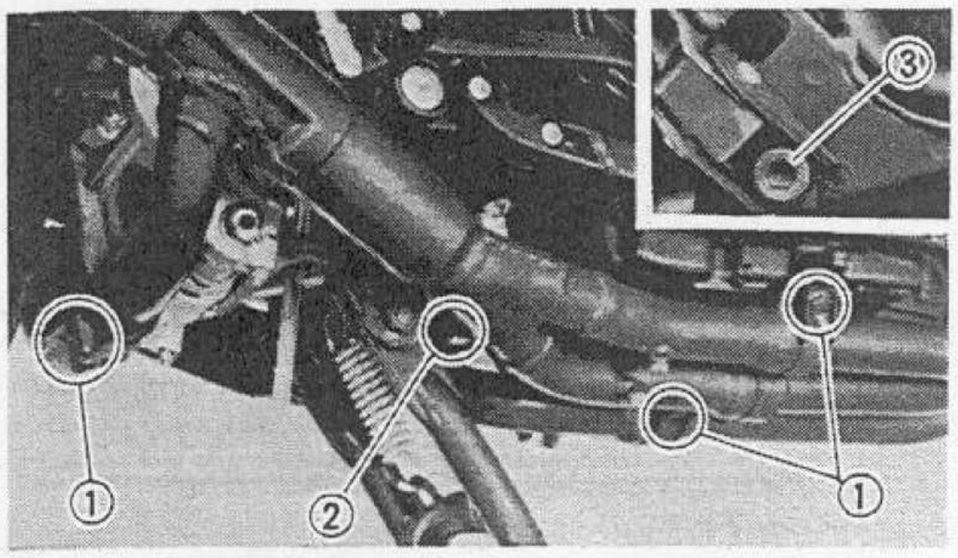


Front Upper Mounting Bolt ② :
Front Lower Mounting Bolt ③ :
Rear Upper Mounting Bolt ④ :
Rear Lower Mounting Bolt ⑤ :
55 Nm (5.5 m·kg, 40 ft·lb)
Front Down Tube Bolts ⑥ :
Middle Down Tube Bolts ⑦ :
Rear Down Tube Bolts ⑧ :
28 Nm (2.8 m·kg, 20 ft·lb)

3. Tighten:

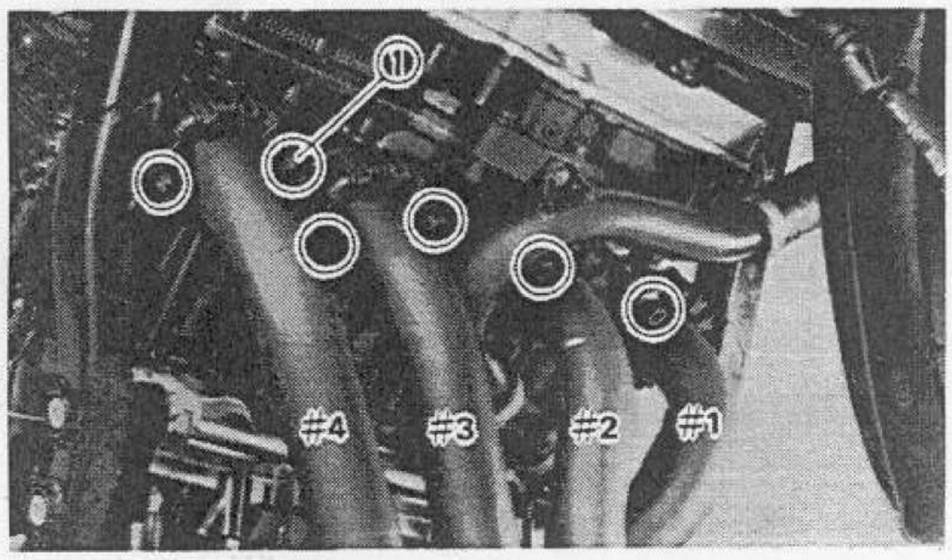


Drive Chain Sprocket Nut ① :
70 Nm (7.0 m·kg, 50 ft·lb)
Left Crankcase Cover Screw:
10 Nm (1.0 m·kg, 7.2 ft·lb)



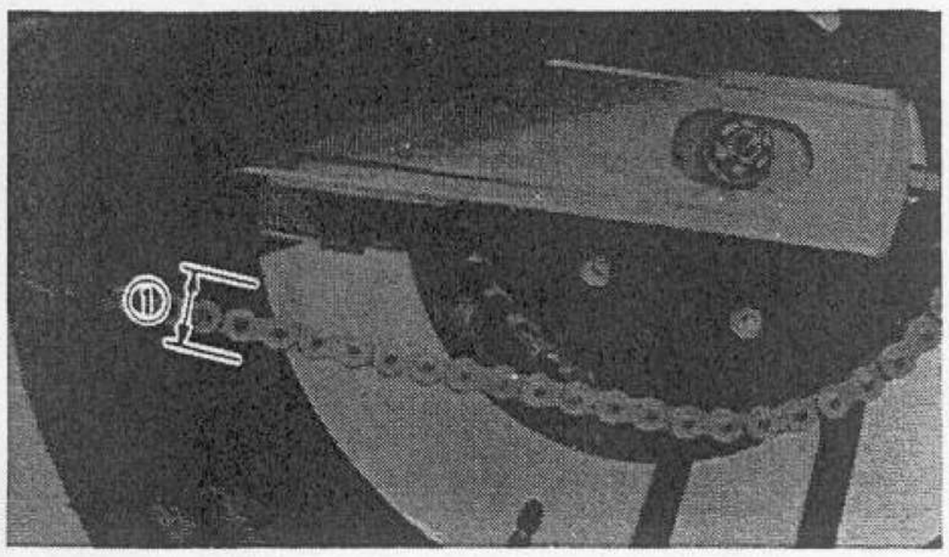
4. Tighten:

Muffler Clamp Bolts ① :
20 Nm (2.0 m·kg, 14 ft·lb)
Muffler Stay Bolt ② :
25 Nm (2.5 m·kg, 18 ft·lb)
Muffler/Rear Footrest Bolt ③ :
42 Nm (4.2 m·kg, 30 ft·lb)



5. Tighten:

Exhaust Pipe Flange Nut ① :
10 Nm (1.0 m·kg, 7.2 ft·lb)



6. Adjust:
- Drive chain deflection

Standard Drive Chain Deflection ① :
15 ~ 20 mm (0.6 ~ 0.8 in)

7. Tighten:

Rear Axle Nut:
107 Nm (10.7 m·kg, 77.4 ft·lb)

8. Fill:
- Crankcase

Engine Oil:
3.5 L (3.1 Imp qt, 3.7 US qt)

9. Fill:
- Radiator

Coolant:
2.3 L (2.0 Imp qt, 2.4 US qt)

CHAPTER 5.
CARBURETION

CARBURETOR 5-1
SECTION VIEW 5-2
REMOVAL 5-3
DISASSEMBLY 5-3
INSPECTION 5-4
ASSEMBLY 5-5
FUEL LEVEL ADJUSTMENT 5-5

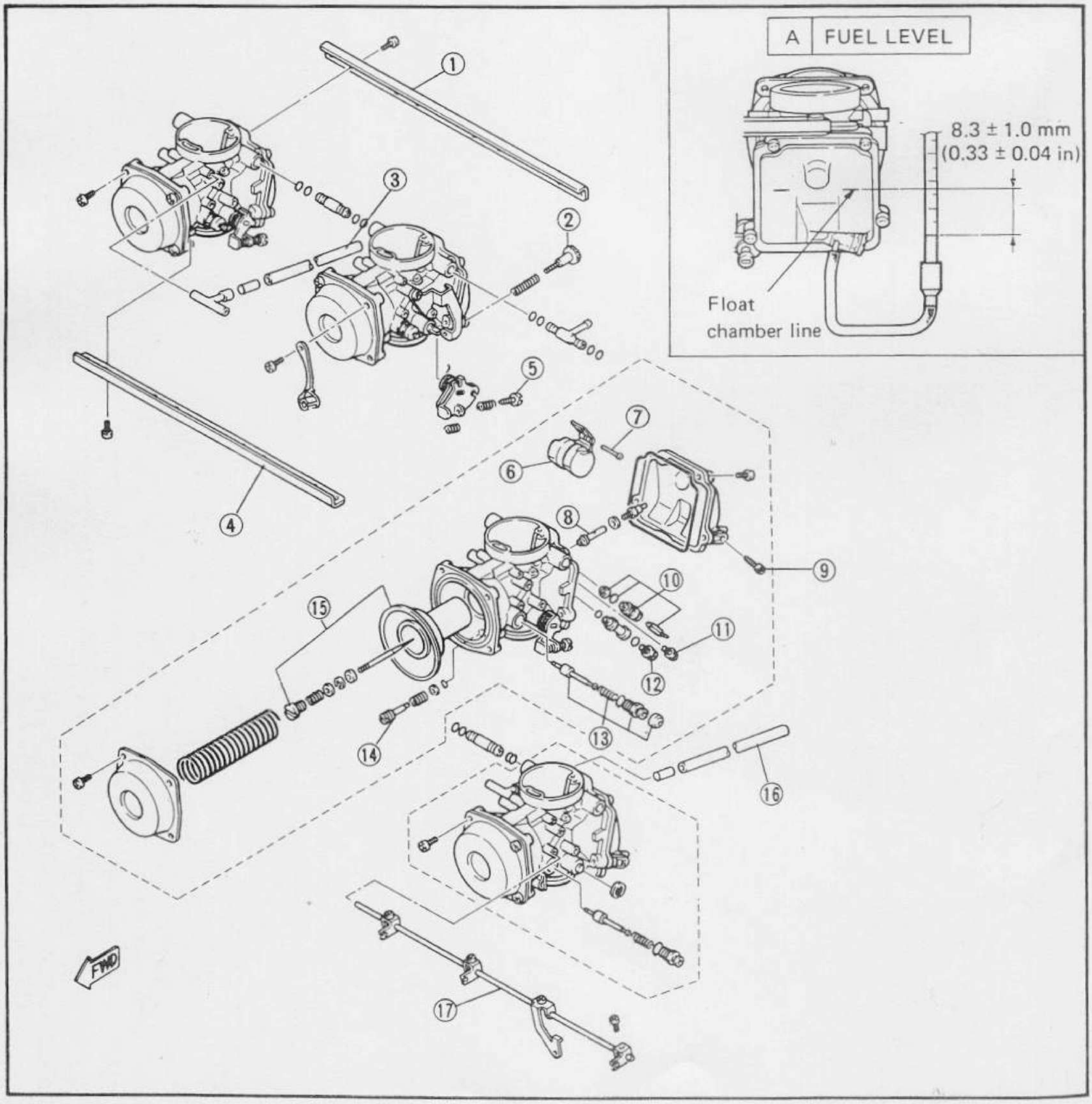
AIR CLEANER AND CRANKCASE VENTILATIONS SYSTEM 5-6

CARBURETION

CARBURETOR

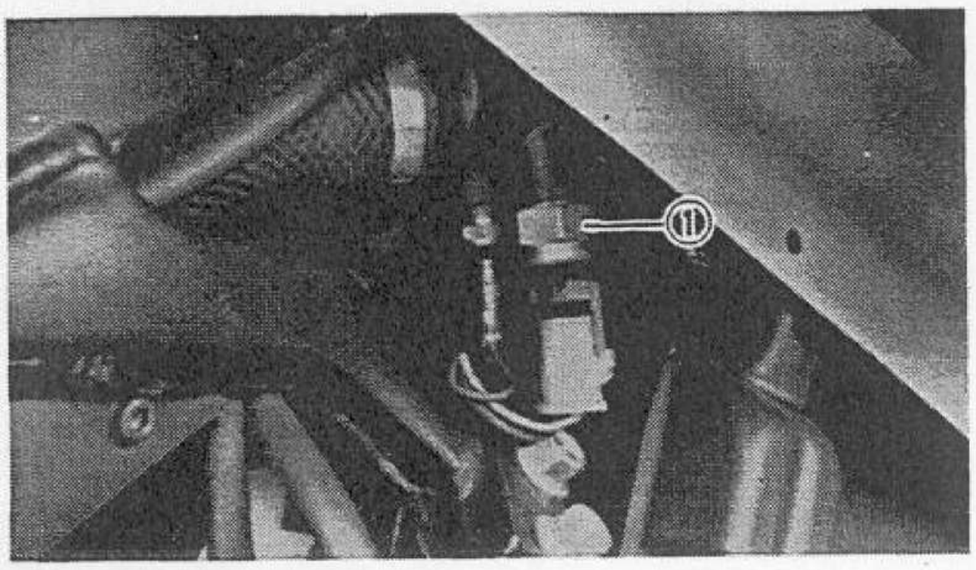
① Upper bracket
② Throttle stop screw
③ Fuel overflow hose
④ Lowr bracket
⑤ Syncronization screw
⑥ Float
⑦ Float pin
⑧ Neelde jet
⑨ Fuel drain screw
⑩ Float needle valve
⑪ Pilot jet
⑫ Main jet
⑬ Starter plunger assembly
⑭ Pilot screw
⑮ Piston valve assembly
⑯ Fuel feed hose
⑰ Starter lever shaft

SPECIFICATIONS	
ID Mark	1AE00
Main jet	#105
Main air jet	#65
Jet needle	5CEZ02
Needle jet	Y-0
Starter jet	
(GS. 1)	#37.5
(GS. 2)	ϕ0.5
Fuel level	8.3 ± 1.0 mm (0.326 ± 0.04 in)
Pilot screw	3.0 turns out
Float valve seat	ϕ1.2
Engine idle speed	1,000 ± 50 r/min



CAUTION:

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

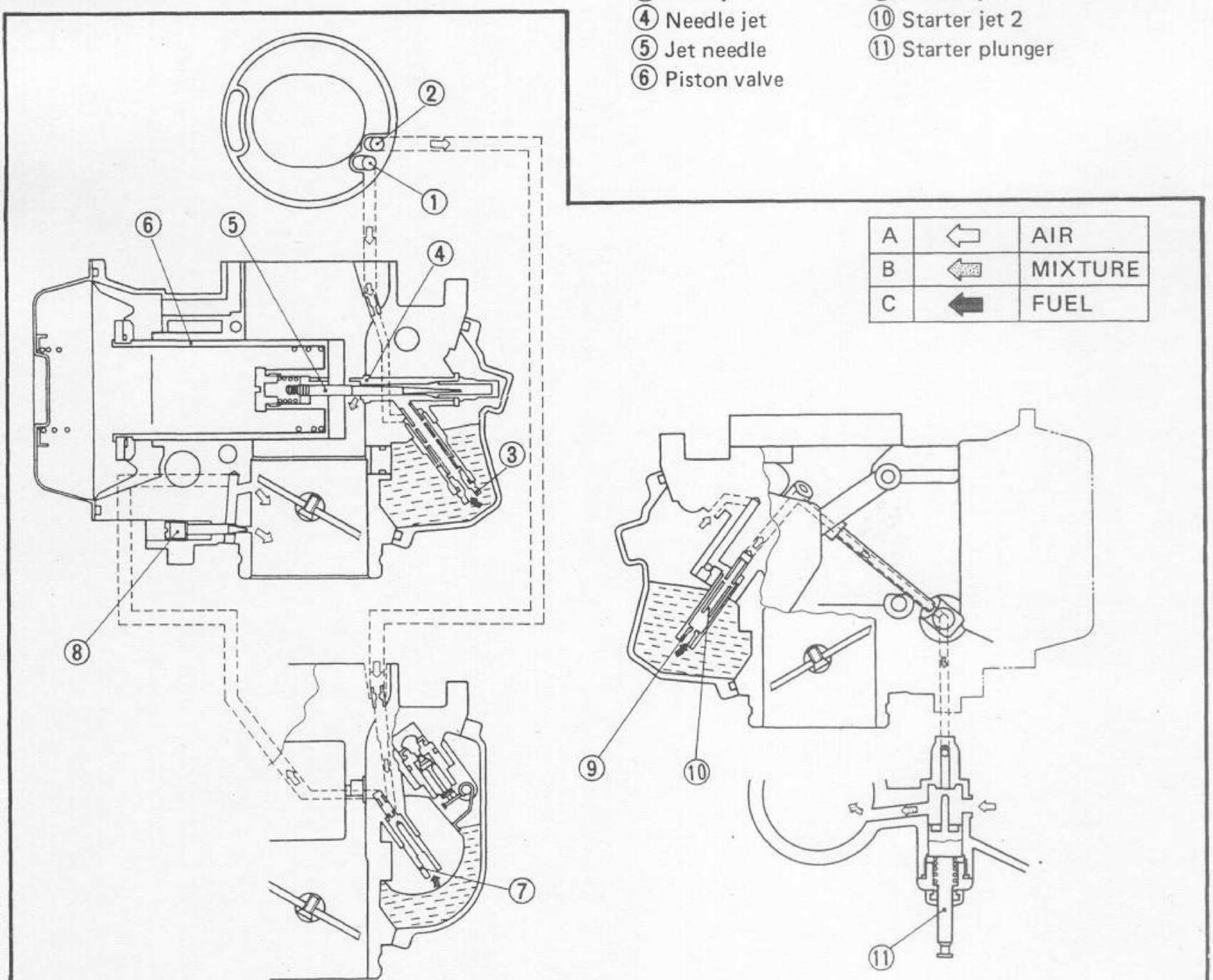


WARNING:

When the pilot screw adjustment is necessary, disconnect the thermostatic switch ① coupler to prevent cooling fan turning.

SECTION VIEW

① Main air jet
② Pilot air jet
③ Main jet
④ Needle jet
⑤ Jet needle
⑥ Piston valve
⑦ Pilot jet
⑧ Pilot screw
⑨ Starter jet 1
⑩ Starter jet 2
⑪ Starter plunger



5

REMOVAL

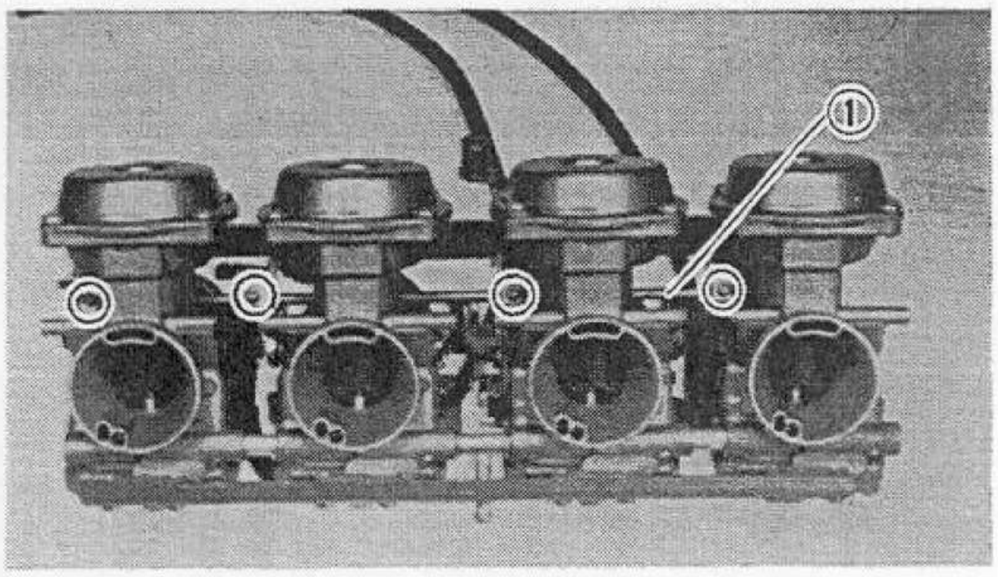
1. Remove:
   - Carburetor assembly
     Refer to engine removal section

DISASSEMBLY

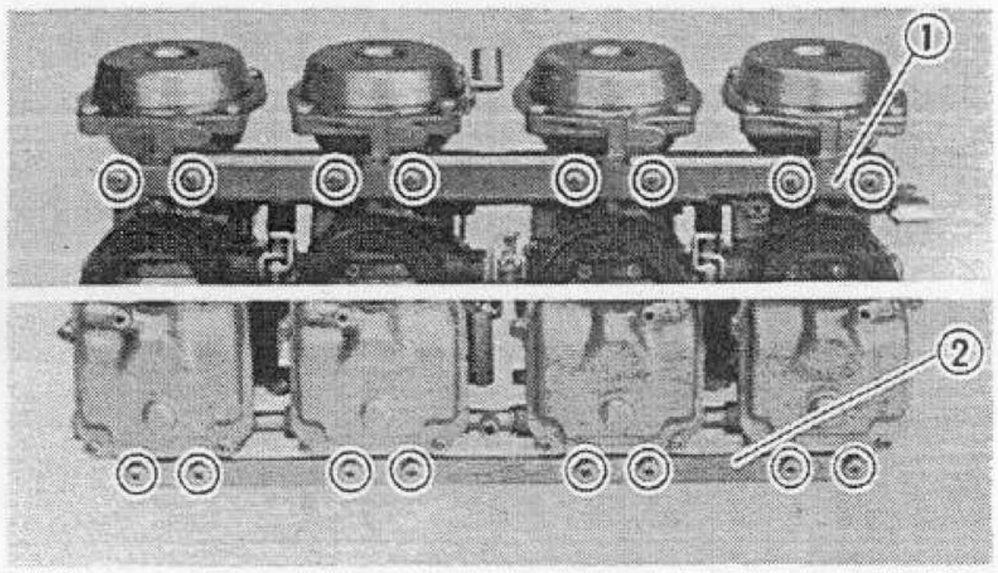
NOTE:

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

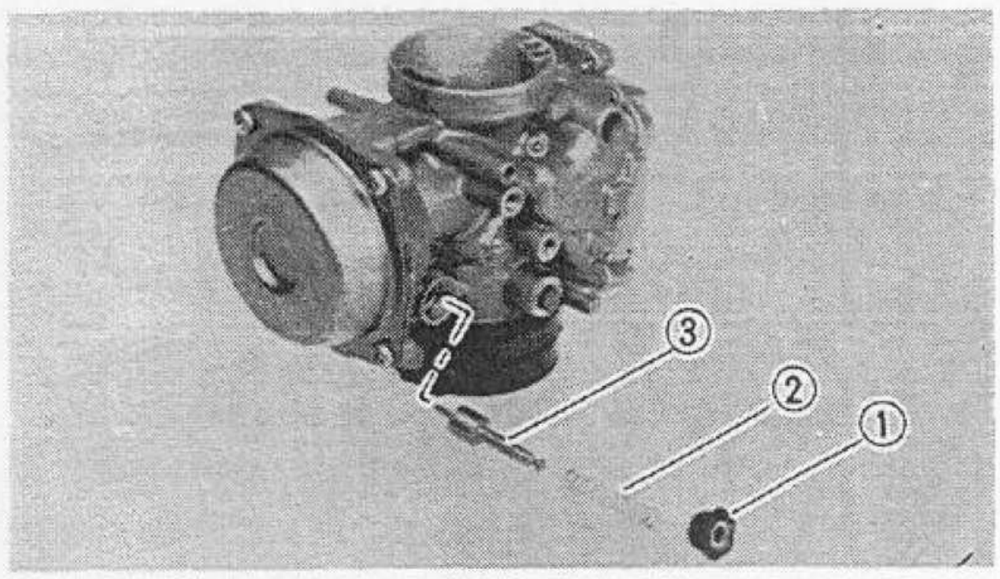
- Piston valve
- Starter plunger
- Float chamber components



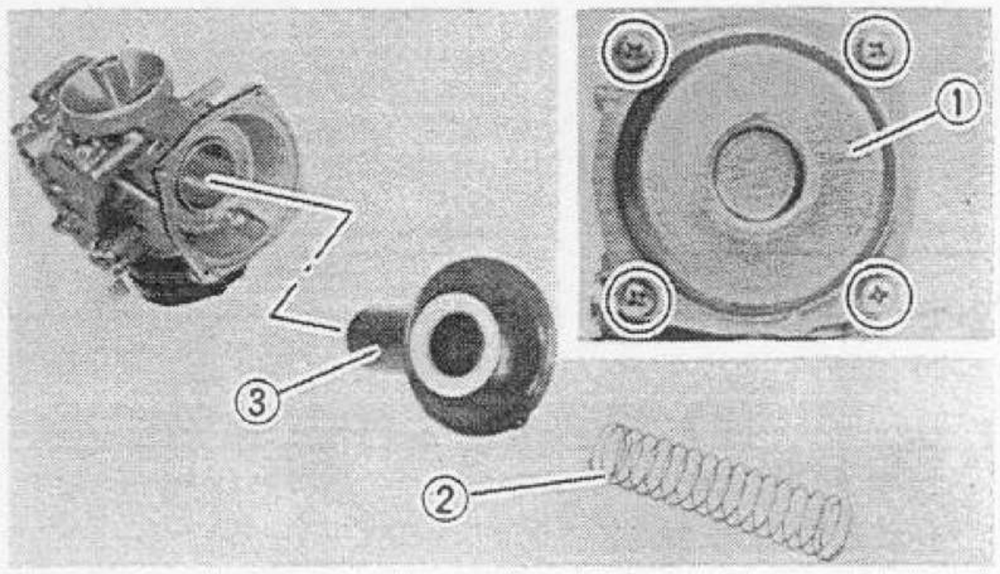
1. Remove:
   - Starter lever shaft ①



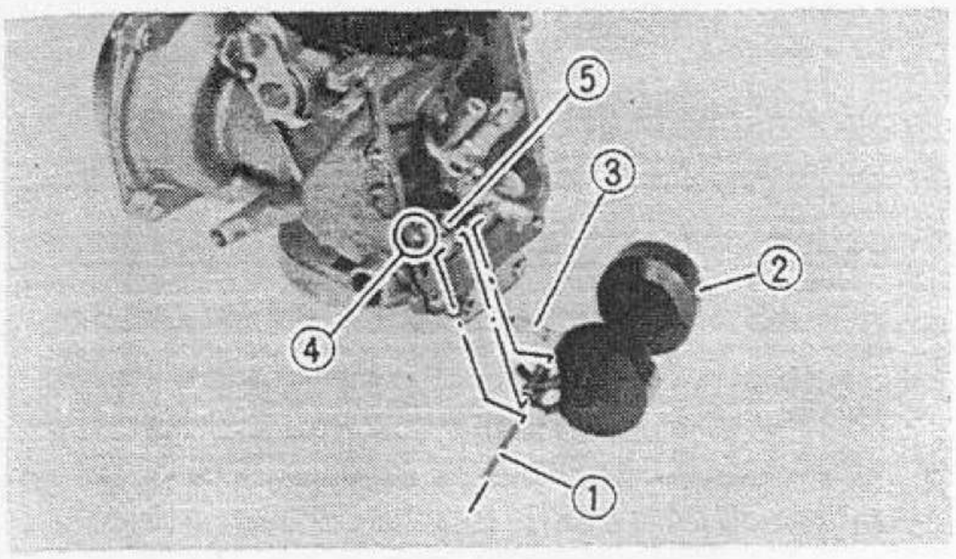
2. Remove:
   - Upper bracket ①
   - Lower bracket ②



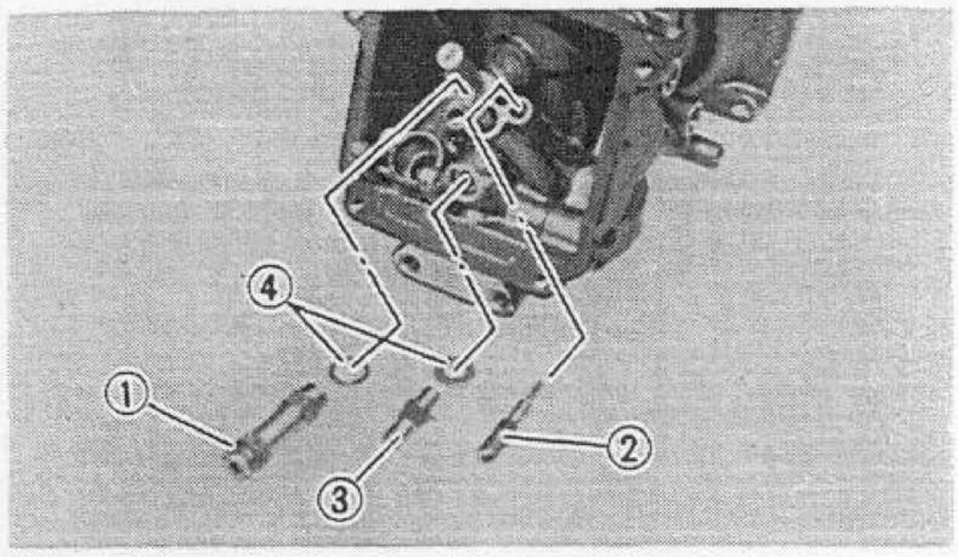
3. Remove:
   - Nut ①
   - Spring ②
   - Starter plunger ③



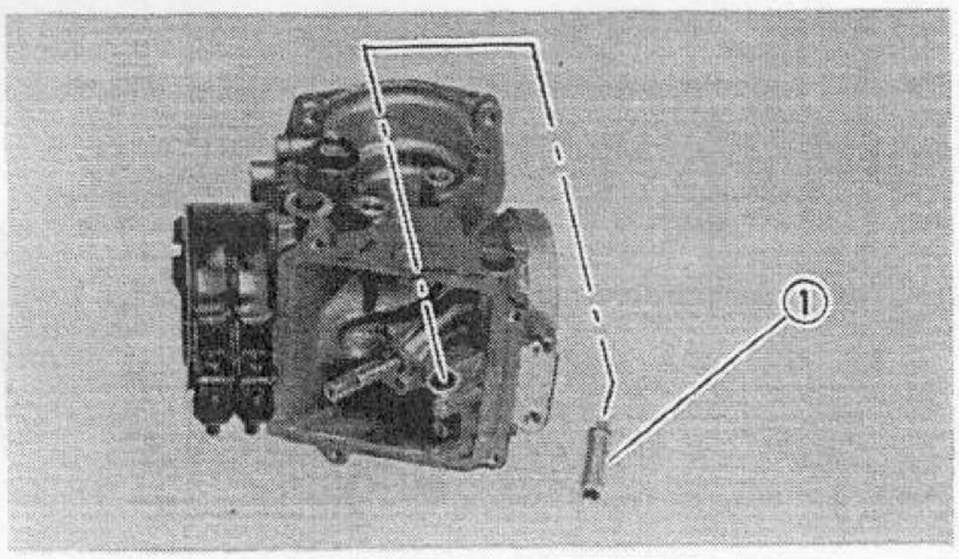
4. Remove:
   - Vacuum chamber cover ①
   - Spring ②
   - Vacuum piston assembly ③



5. Remove:
   - Float chamber cover
   - Gasket
   - Float pin ①
   - Float ②
   - Floart needle valve ③
   - Valve seat screw ④
   - Valve seat assembly ⑤



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



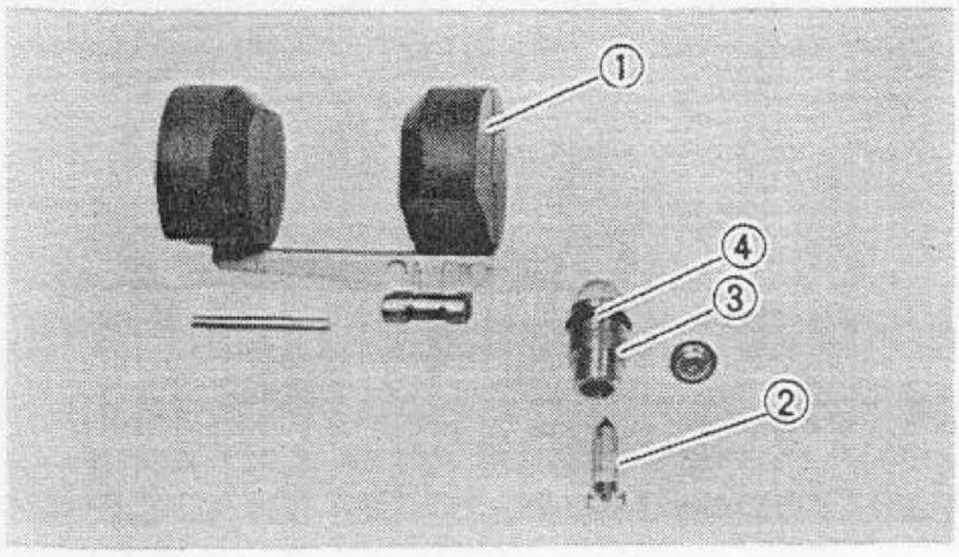
7. Remove:
   - Main nozzle ①

INSPECTION

1. Inspect:
   - Carburetor body
   - Fuel passage

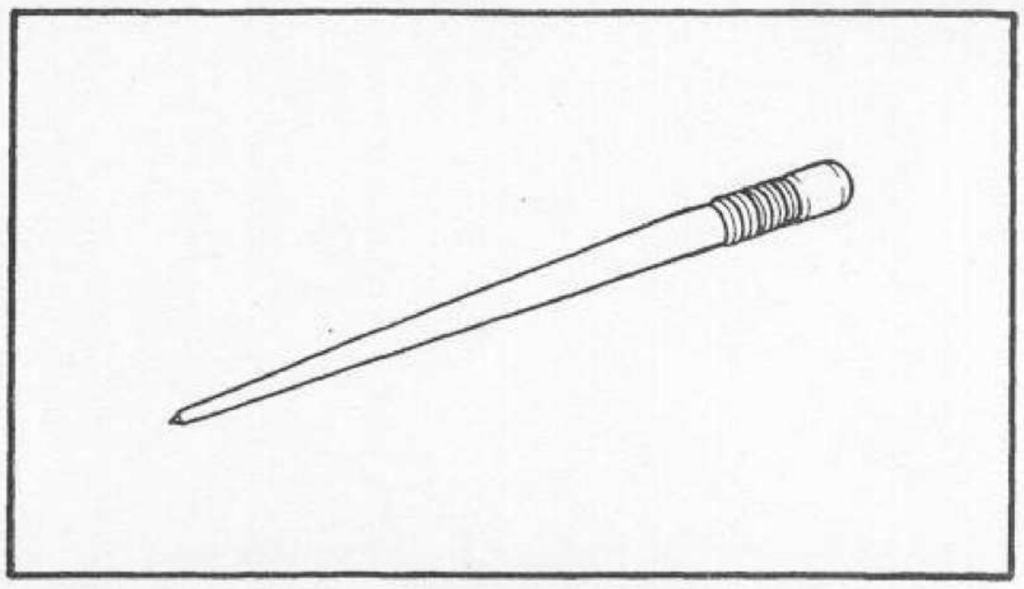
   Contamination → Clean as indicated.

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.

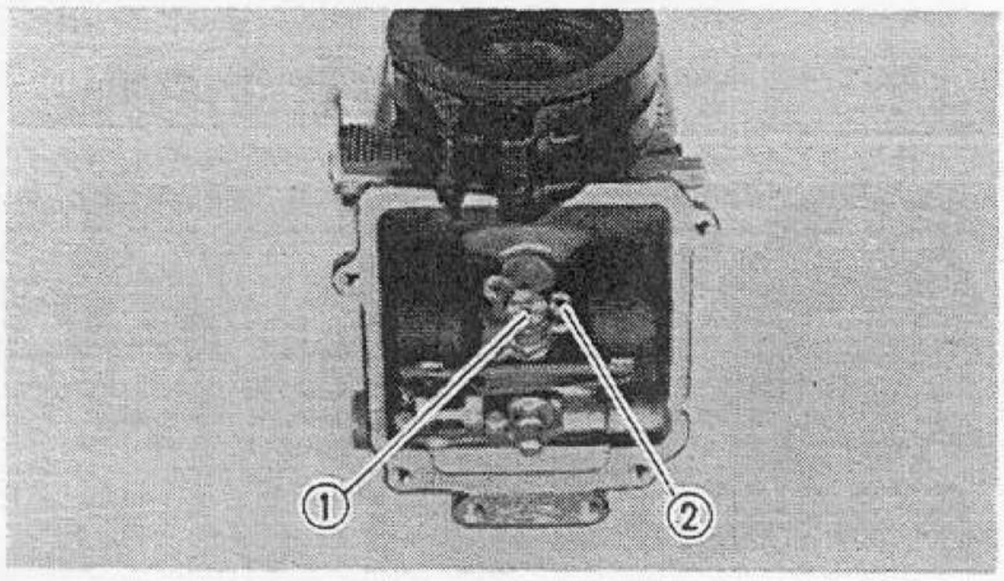


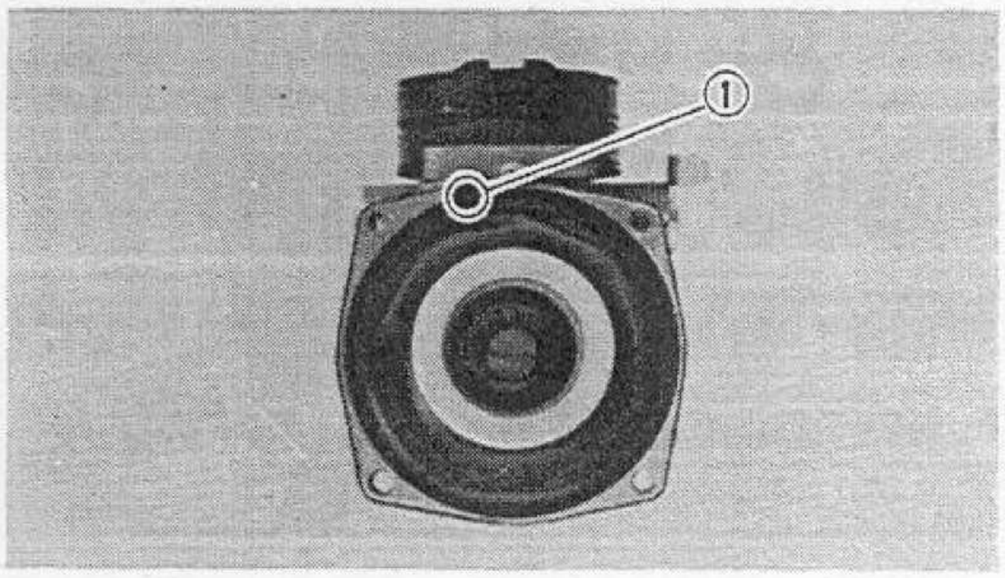
2. Inspect:
   - Float ①
   - Float needle valve ②
   - Seat ③
   - O-ring ④

   Damage/Wear/Contamination → Replace as a set



3. Inspect:
   - Vacuum piston
   - Rubber diaphragm
     Scratches (piston)/Tears (diaphragm) → Replace.
   - Jet needle
     Bends/Wear → Replace.
   - Starter plunger
     Wear/Damage → Replace.





ASSEMBLY

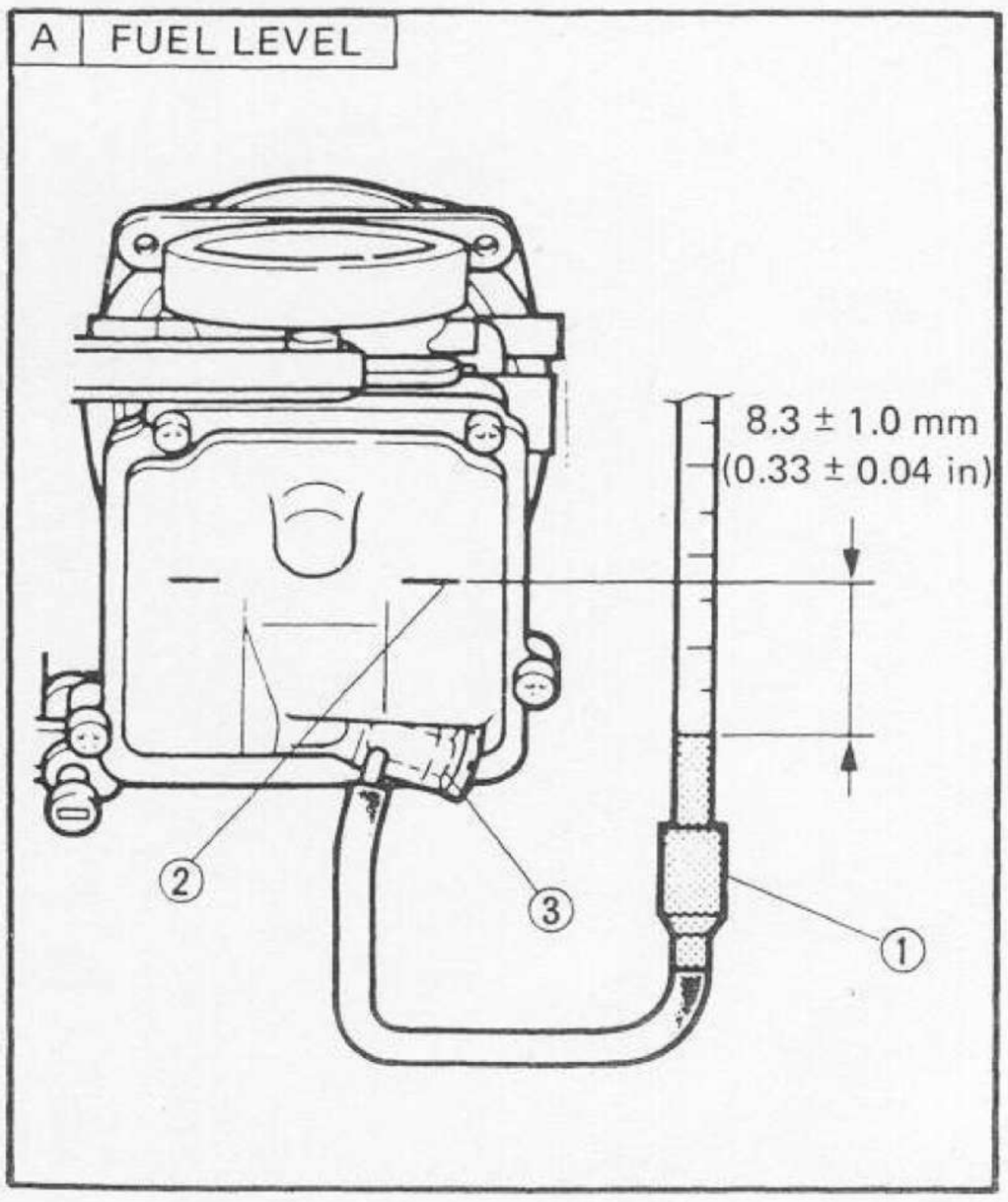
Reverse disassembly steps. Pay close attention to installation of vacuum piston diaphragm and location of each jet.

1. Install:
   - Washer
   - Pilot jet ②
   - Washer
   - 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.



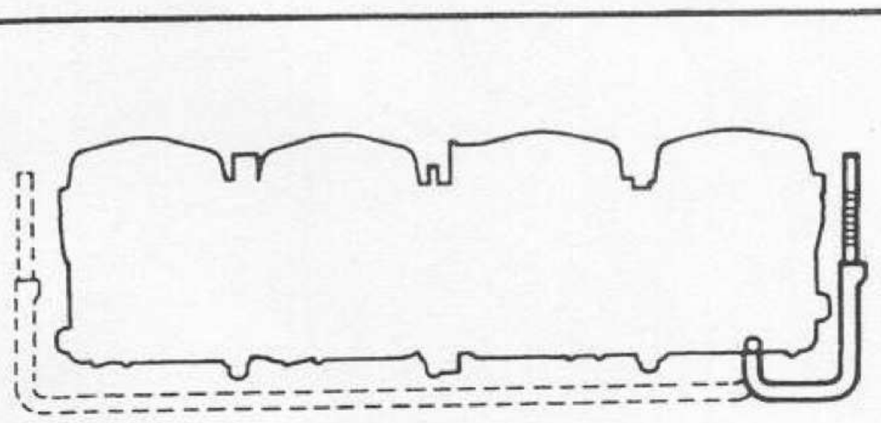
FUEL LEVEL ADJUSTMENT

1. Measure:
   - Fuel level

Fuel level inspection steps:
- Connect Fuel Level Gauge ① (YM-01312) or vinyl tube, 6 mm (0.24 in) inside diameter, to float chamber cover.
- Place tube vertically next to the float chamber line ②
- Set fuel cock to "ON".
- Loosen the drain screw ③.
- Warm up the engine, then shut it off after a few minutes.
- Check the fuel level. It should be within the specified range.

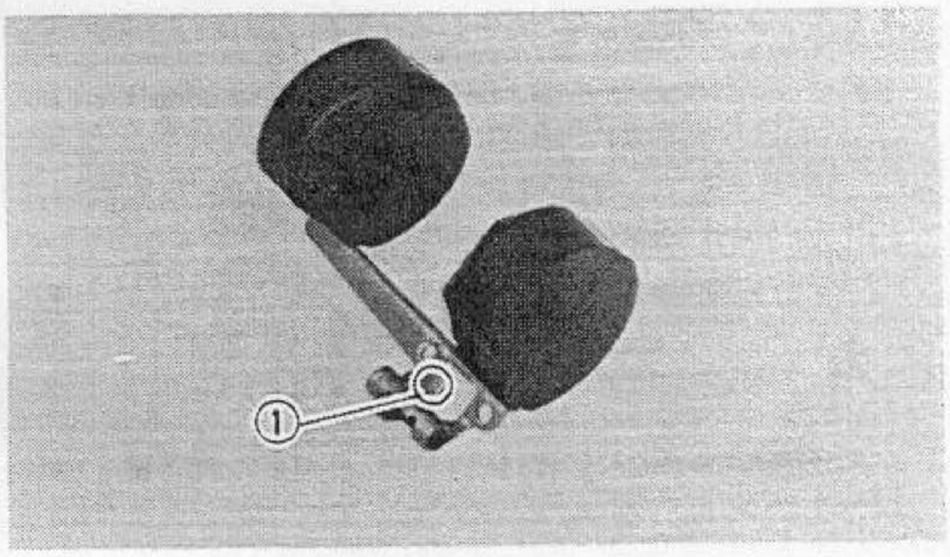
Fuel Level:
8.3 ± 1.0 mm (0.326 ± 0.04 in)
below float chamber line

Out of range → Follow next steps.



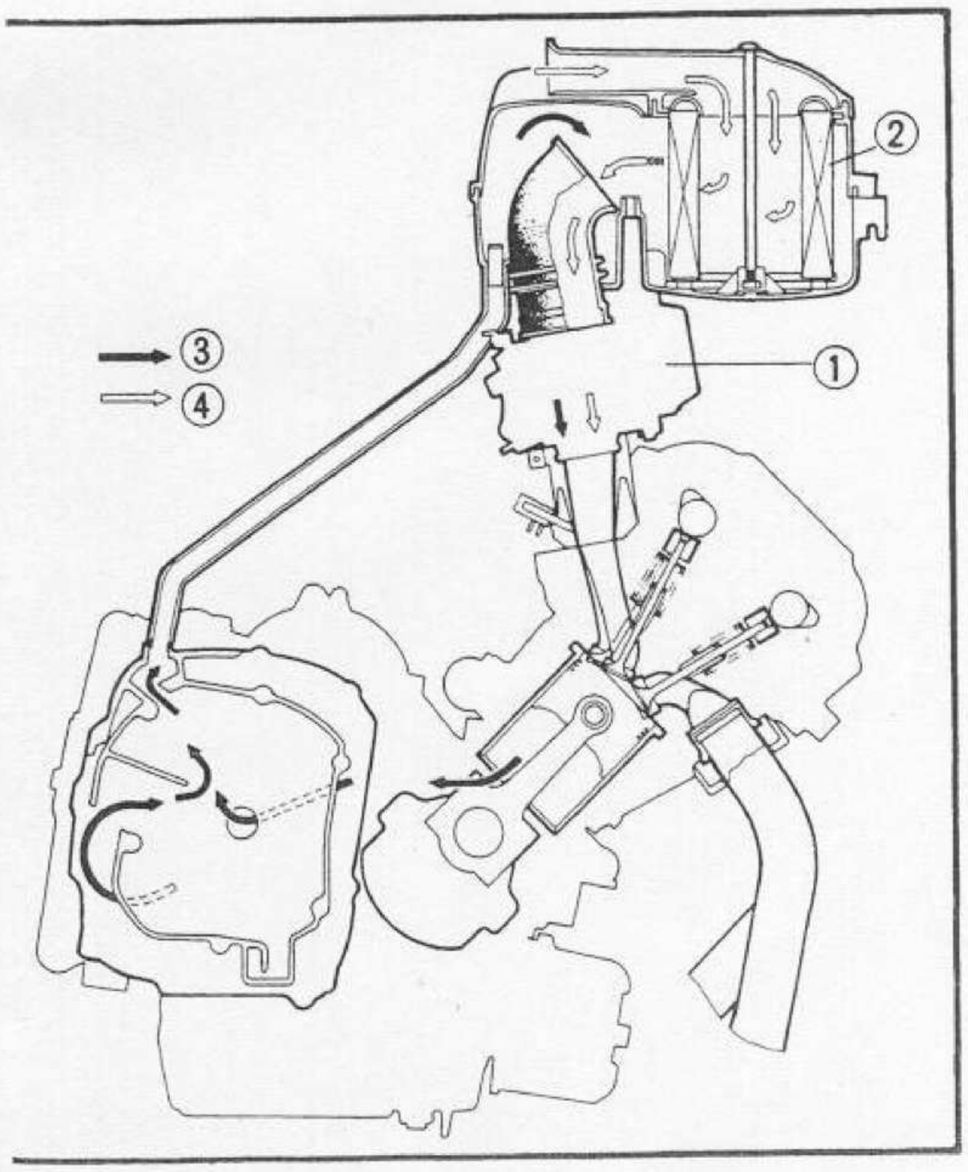
NOTE:
Fuel level readings of both side of carburetor line should be equal.

2. Remove:
   - Carburetors
   - Float assembly



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

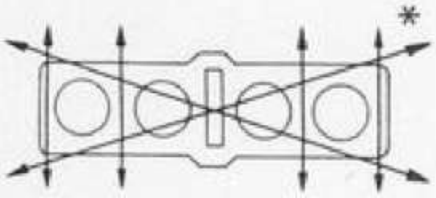
REFER TO "CHAPTER 2, Air Cleaner Maintenance."

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

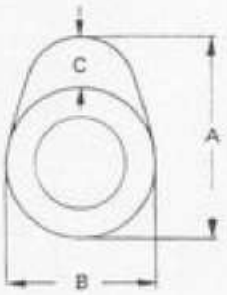
Item \ Model	FZ750N
Wheel Travel:	
Front Wheel Travel	140 mm (5.5 in)
Rear Wheel Travel	120 mm (4.7 in)
Electrical:	
Ignition System	BATTERY
Generator System	AC generator
Battery Type or Model	YB14L
Battery Capacity	12V 14AH
Headlight Type:	Bulb type (Quartz bulb)
Bulb Wattage x Quantity:	
Headlight	12V, 60W/55W x 1
Tail/Brake Light	12V, 8W/27W x 2
Flasher Light	12V, 27W x 4
Meter Light	12V, 3.4W x 4
Licence light	12V, 8W x 1
Indicator Light:	
Wattage x Quantity:	
"NEUTRAL"	12V, 3.4W x 1
"HIGH BEAM"	12V, 3.4W x 1
"TURN"	12V, 3.4W x 2
"OIL"	12V, 3.4W x 1

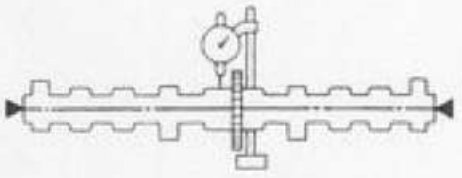
MAINTENANCE SPECIFICATIONS

Engine

Item \ Model	FZ750N
Cylinder Head:	
Warp Limit *	0.03 mm (0.0012 in) *Lines indicate straightedge measurement
	
Cylinder:	
Bore Size	68,000 ~ 68,005 (2.67717 ~ 2.67736 in)
Taper Limit	0.05 mm (0.002 in)
Out of Round Limit	0.05 mm (0.002 in)

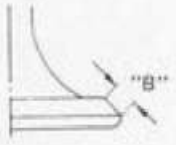
Item \ Model	FZ750N
Camshaft:	
Drive Method	Chain drive (Center)
Cam Cap Inside Dia.	24.500 ~ 24.521 mm (0.9646 ~ 0.9654 in)
Camshaft Outside Dia.	24.437 ~ 24.450 mm (0.9621 ~ 0.9626 in)
Shaft-to-Cap Clearance	0.050 ~ 0.084 mm (0.00197 ~ 0.00331 in)
Cam Dimensions	
Intake "A"	32.55 ~ 32.65 mm (1.2815 ~ 1.2854 in)
<Limit>	32.45 mm (1.278 in)
Intake "B"	24.95 ~ 25.05 mm (0.9823 ~ 0.9862 in)
<Limit>	24.85 mm (0.9783 in)
Exhaust "A"	32.4 ~ 32.5 mm (1.2756 ~ 1.2795 in)
<Limit>	32.3 mm (1.27 in)
Exhaust "B"	24.95 ~ 25.05 mm (0.9823 ~ 0.9862 in)
<Limit>	24.85 mm (0.978 in)
Camshaft Runout Limit	0.03 mm (0.0012 in)
Cam Chain:	
Cam Chain Type/No. of Links	DID219FTS (BUSH CHAIN)/110 Links
Cam Chain Adjustment Method	Automatic
Valve, Valve Seat, Valve Guide:	
Valve Clearance (Cold):	
IN.	0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in)
EX.	0.21 ~ 0.30 mm (0.0083 ~ 0.0118 in)
Valve Dimensions:	
"A" Head Dia.	
IN.	20.9 ~ 21.1 mm (0.8228 ~ 0.8307 in)
EX.	22.9 ~ 23.1 mm (0.9016 ~ 0.9094 in)
"B" Face Width	
IN.	1.98 ~ 2.55 mm (0.0779 ~ 0.1004 in)
EX.	1.98 ~ 2.55 mm (0.0779 ~ 0.1004 in)
"C" Seat Width	
IN.	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)
EX.	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)
"D" Margin Thickness	
IN.	0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in)
EX.	0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in)
Stem Outside Dia.:	
IN.	4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in)
EX.	4.960 ~ 4.975 mm (0.1953 ~ 0.1959 in)
<Limit>	
IN.	4.945 mm (0.1947 in)
EX.	4.930 mm (0.1941 in)



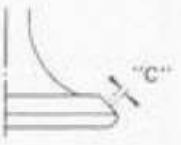




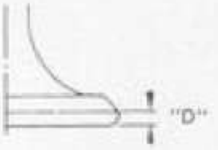
Head Dia.



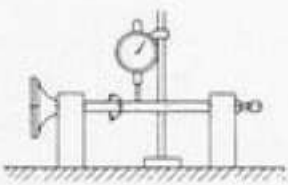
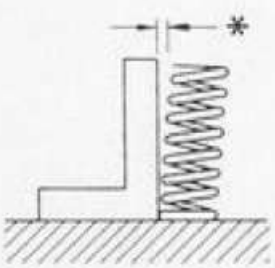
Face Width

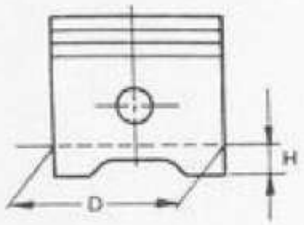
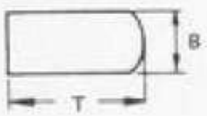
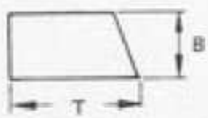
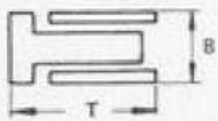
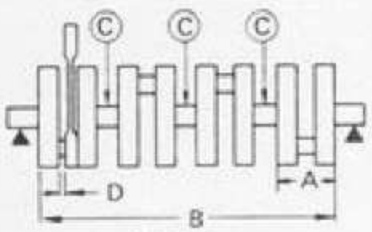


Seat Width



Margin Thickness

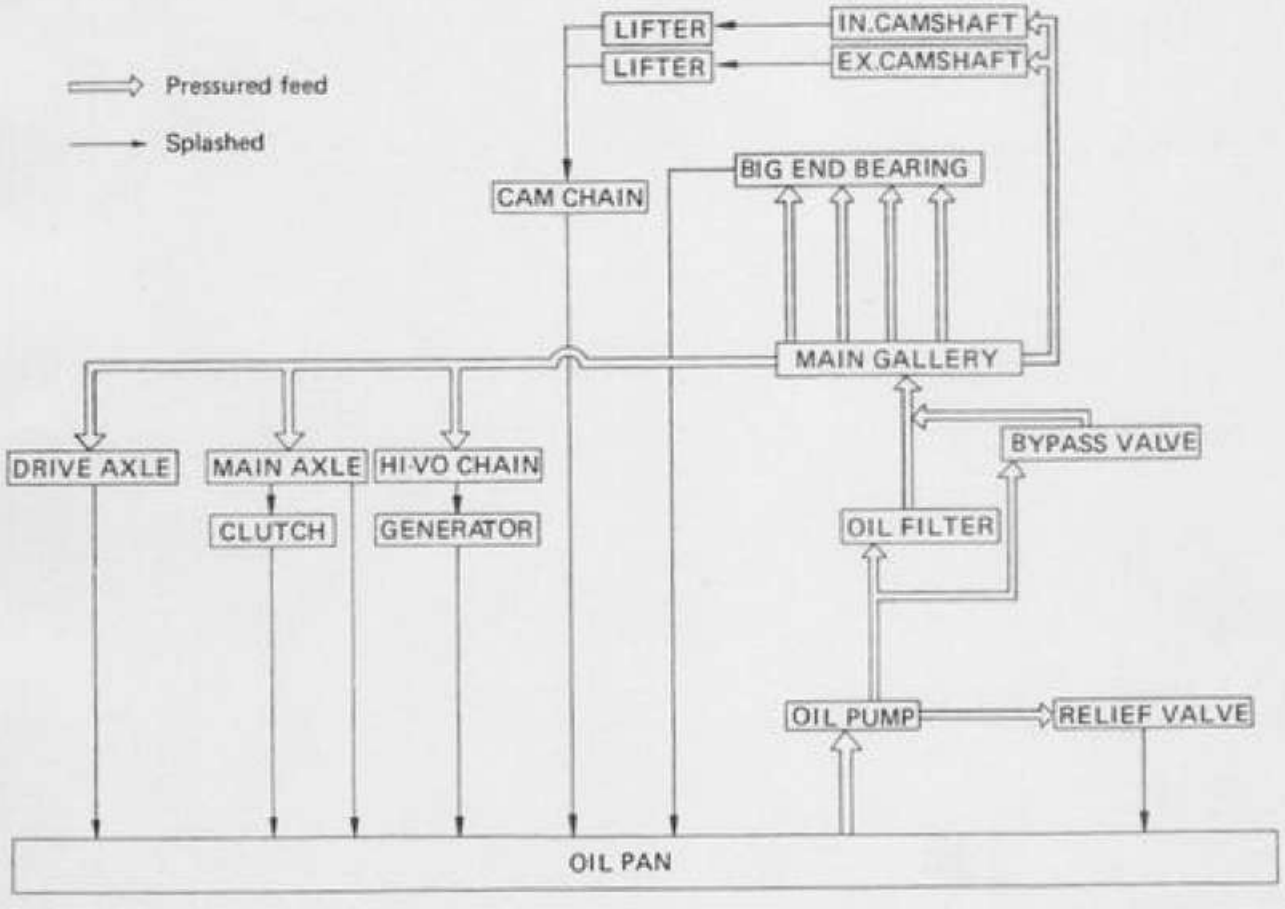
Item \ Model	FZ750N
Guide Inside Dia:	
IN.	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)
EX.	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)
<Limit>	
IN.	5.05 mm (0.1988 in)
EX.	5.05 mm (0.1988 in)
Stem-to-Guide Clearance:	
IN.	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
EX.	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)
<Limit>	
IN.	0.08 mm (0.0031 in)
EX.	0.10 mm (0.0039 in)
Stem Runout Limit:	0.01 mm (0.0004 in)
	
Valve Spring:	
Free Length:	
IN.	39.76 mm (1.565 in)
EX.	39.96 mm (1.573 in)
Set Length (Valve Closed):	
IN.	35.0 mm (1.378 in)
EX.	35.0 mm (1.378 in)
Set Force (Valve Closed):	
IN.	7.3 ~ 8.7 kg (16.1 ~ 19.2 lb)
EX.	11.0 ~ 13.0 kg (24.3 ~ 28.7 lb)
Tilt Limit *	
IN.	2.5°/1.7 mm (0.067 in)
EX.	2.5°/1.7 mm (0.067 in)
	
Direction of Winding (Top View):	
IN.	Right
EX.	Right

Item	Model	FZ750N
Piston:		
Piston Clearance		0.06 ~ 0.08 mm (0.00236 ~ 0.00315 in)
<Limit>		0.10 mm (0.0039 in)
Piston Size "D"		67.925 ~ 67.940 mm (2.6742 ~ 2.6748 in)
Measuring Point "H"		5.0 mm (0.197 in)
		
Oversize	2nd	68.50 mm (2.677 in)
Oversize	4th	69.00 mm (2.717 in)
Piston Ring:		
Top Ring:		
Type		Barrel
Dimensions (B x T)		1.0 x 2.6 mm (0.0394 x 0.1024 in)
End Gap (Installed)		0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in)
Side Clearance (Installed)		0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
2nd Ring:		
Type		Plain (Taper face)
Dimensions (B x T)		1.2 x 2.7 mm (0.0472 x 0.1063 in)
End Gap (Installed)		0.20 ~ 0.35 mm (0.0079 ~ 0.0138 in)
Side Clearance (Installed)		0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
Oil Ring:		
Dimensions (B x T)		2.0 x 2.5 mm (0.0787 x 0.0984 in)
End Gap (Installed)		0.2 ~ 0.7 mm (0.0079 ~ 0.0276 in)
Connecting Rod:		
Oil Clearance		0.032 ~ 0.056 mm (0.00126 ~ 0.00220 in)
Bearing Color Code		1. Blue 2. Black 3. Brown 4. Green
Crankshaft:		
		
Crank Width	"A"	55.7 ~ 59.5 mm (2.1929 ~ 2.3425 in)
Assembly Width	"B"	339.8 ~ 340.2 mm(13.378 ~ 13.394 in)
<Runout Limit>	"C"	0.03 mm (0.0012 in)
Big End Side Clearance	"D"	0.160 ~ 0.262 mm (0.0063 ~ 0.0103 in)
Journal Oil Clearance		0.020 ~ 0.044 mm (0.0008 ~ 0.0017 in)
Bearing Color Code		1. Blue 2. Black 3. Brown 4. Green 5. Yellow

Item \ Model	FZ750N
Clutch:	
Friction Plate Thickness	2.9 ~ 3.1 mm (0.1142 ~ 0.1220 in)
Quantity	8 pcs.
<Wear Limit>	2.8 mm (0.11 in)
Clutch Plate Thickness	1.9 ~ 2.1 mm (0.0748 ~ 0.0827 in)
Quantity	7 pcs.
<Warp Limit>	0.1 mm (0.0039 in)
Clutch Spring Free Height	55.5 mm (2.185 in)
Quantity	6 pcs.
Minimum Height	54.0 mm (2.126 in)
Push Rod Bending Limit	0.3 mm (0.012 in)
Clutch Release Method	Hydraulic inner push
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
Guide Bar Bending Limit	0.1 mm (0.004 in)
Carburetor:	
ID Mark	1AE00
Main Jet (M.J.)	#105
Main Air Jet (M.A.J.)	#65
Jet Needle (J.N.)	5CEZ02
Needle Jet (N.J.)	Y-0
Pilot Air Jet (P.A.J.)	#125
Pilot Jet (P.J.)	#15
Pilot Screw (P.S.)	3 (turns out)
Valve Seat Size (V.S.)	ϕ1.2
Starter Jet (G.S.1.)	#37.5
(G.S.2.)	ϕ0.5
Fuel Level (F.L.)	8.3 ± 1.0 mm (0.326 ± 0.04 in)
Engine Idling Speed	950 ~ 1,050 r/min
Vacuum Pressure at Idling Speed	Above 200 mm Hg (7.87 in Hg)
Vacuum Synchronous Difference	Below 10 mm Hg (0.394 in Hg)
Fuel Pump:	
Type	Electrical type
Consumption Amperage (Max.)	1.0A
Out-put Pressure	15.7 kPa (0.16 kg/cm^2, 2.28 psi)
Lubrication System:	
Oil Filter Type	Paper type
Oil Pump Type:	Trochoid type
Tip clearance	0.09 ~ 0.15 mm (0.00354 ~ 0.00591 in)
Side Clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)
Bypass Valve Setting Pressure	176.5 ~ 215.8 kPa (1.8 ~ 2.2 kg/cm^2, 25.6 ~ 31.3 psi)
Relief Valve Operating Pressure	382.5 ~ 460.9 kPa (3.9 ~ 4.7 kg/cm^2, 55.5 ~ 66.8 psi)

Item \ Model	FZ750N
Cooling System:	
Radiator Core Size:	
Width	350 mm (13.78 in)
Height	185 mm (7.28 in)
Thickness	32 mm (1.26 in)
Radiator Cap Opening Pressure	74 ~ 103 kPa (0.75 ~ 1.05 kg/cm², 10.7 ~ 14.9 psi)
Reservoir Tank Capacity	0.29 L (0.26 Imp qt, 0.31 US qt)
<From Low to Full Level >	0.15 L (0.13 Imp qt, 0.16 US qt)
Water Pump:	
Type	Single-suction centrifugal pump
Reduction Ratio	91/48 x 41/43 (1.808)

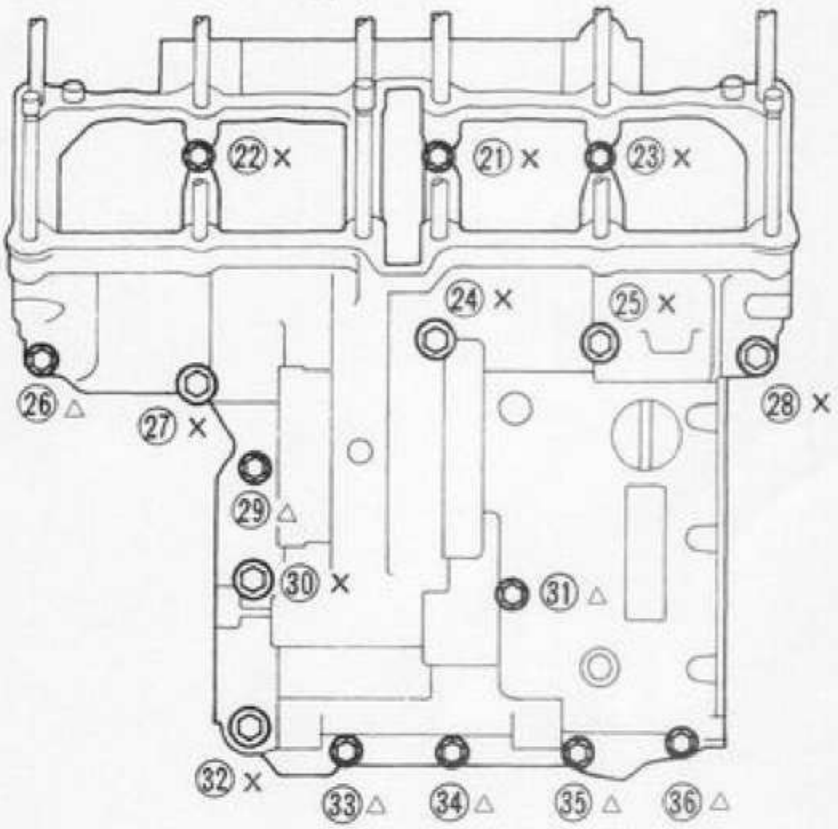
Lubrication Chart:



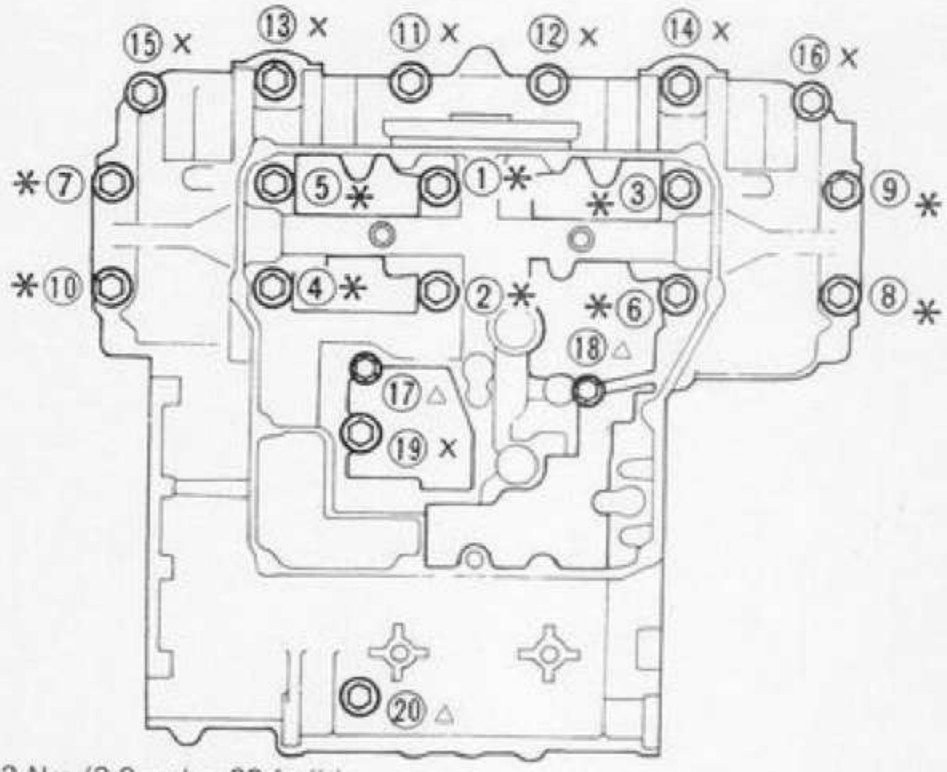
Item \ Model	FZ750N

Crankcase Tightening Sequence

Upper Case



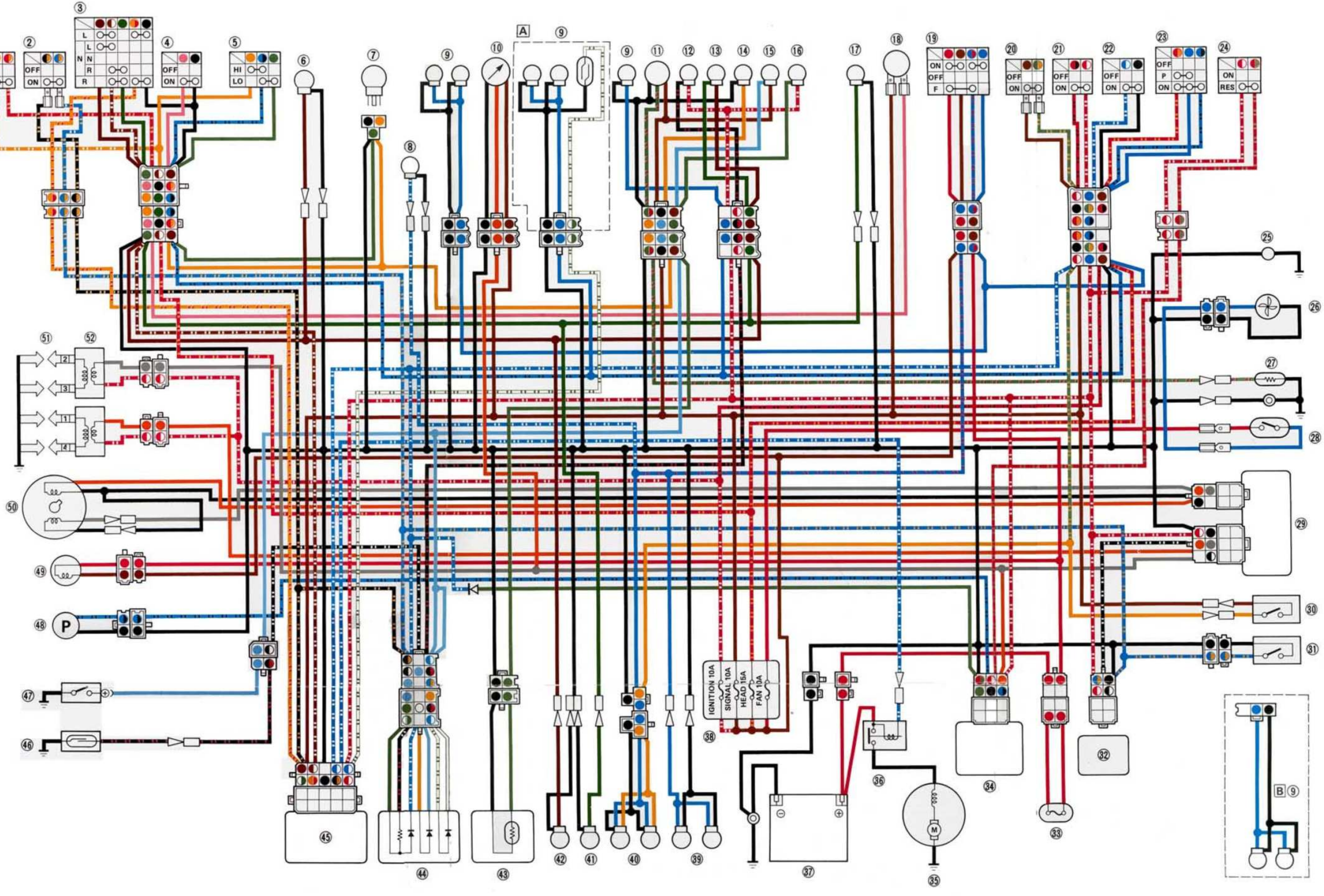
Lower Case



*: 9 mm Bolt: 32 Nm (3.2 m·kg, 23 ft·lb)
x: 8 mm Bolt: 24 Nm (2.4 m·kg, 17 ft·lb)
△: 6 mm Bolt: 12 Nm (1.2 m·kg, 8.7 ft·lb)

TIGHTENING TORQUE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Camshaft cap	Bolt	M6 x 1.0	40	10	1.0	7.2	
Cylinder head (Exhaust pipe)	Stud bolt	M6 x 1.0	8	5	0.5	3.6	
Cylinder head	Nut	M9 x 1.25	12	37	3.7	27	
Spark plug	–	M12 x 1.5	4	17.5	1.75	12.5	
Cylinder head cover	Bolt	M6 x 1.0	8	10	1.0	7.2	
Connecting rod cap	Nut	M8 x 0.75	8	36	3.6	25	
Cam chain sprocket	Bolt	M7 x 1.0	4	24	2.4	17	
Cam chain tensioner	Bolt	M6 x 1.0	2	10	1.0	7.2	
Cam chain tensioner end	Bolt	M11 x 1.0	1	20	2.0	14	
Chain guide (Intake side)	Bolt	M6 x 1.0	2	10	1.0	7.2	
Oil pump housing	Screw	M6 x 1.0	1	10	1.0	7.2	
Oil pump mount	Bolt	M6 x 1.0	3	10	1.0	7.2	
Oil filter case	–	M20 x 1.5	1	15	1.5	11	
Oil pan	Bolt	M6 x 1.0	12	10	1.0	7.2	
Drain plug	–	M14 x 1.5	1	43	4.3	31	
Oil pipe 1	Union bolt	M10 x 1.25	3	21	2.1	15	
Oil plug plate	Bolt	M6 x 1.0	1	10	1.0	7.2	
Oil level switch	Bolt	M6 x 1.0	2	10	1.0	7.2	
Exhaust pipe flange	Nut	M6 x 1.0	8	10	1.0	7.2	
Muffler stay	Bolt	M10 x 1.25	1	25	2.5	18	
Muffler clamp bolt	Bolt	M8 x 1.25	5	20	2.0	14	
Exhaust pipe blind plug (CO test)	Bolt	M6 x 1.0	4	10	1.0	7.2	
Crankcase (Cylinder head)	Stud bolt	M9 x 1.25	12	10	1.0	7.2	
Main axle bearing stopper	Torx	M6 x 1.0	3	10	1.0	7.2	
Crankshaft end cover	Screw	M6 x 1.0	6	7	0.7	5.1	
Crankcase cover (Clutch)	Bolt	M6 x 1.0	11	10	1.0	7.2	
Crankcase	Bolt	M6 x 1.0	10	12	1.2	8.7	
Crankcase	Bolt	M8 x 1.25	16	24	2.4	17	
Crankcase	Bolt	M9 x 1.25	10	32	3.2	23	
Starter clutch	Bolt	M8 x 1.25	3	25	2.5	18	Stake
Starter chain guide	Bolt	M6 x 1.0	2	10	1.0	7.2	
Clutch boss	Nut	M20 x 1.0	1	70	7.0	50	Use lock washer
Clutch spring	Bolt	M6 x 1.0	6	8	0.8	5.8	
Drive chain sprocket	Nut	M18 x 1.0	1	70	7.0	50	Use lock washer
Shift cam stopper lever	Bolt	M6 x 1.0	2	10	1.0	7.2	
Shift cam (Neutral)	Screw	M5 x 0.8	1	4	0.4	2.9	
Other engine part	Bolt	M8 x 1.25	–	20	2.0	14	
	Bolt	M6 x 1.0	–	10	1.0	7.2	
	Screw	M6 x 1.0	–	7	0.7	5	


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COLOR CODE CODE DE COULEUR FARBENKODIERUNG



① "PASS" switch
② Clutch switch
③ "TURN" switch
④ "HORN" switch
⑤ "LIGHTS" (Dimmer) switch
⑥ Front flasher light (L)
⑦ Headlight
⑧ Marker light
⑨ Meter light
⑩ Tachometer
⑪ Temp meter
⑫ "OIL LEVEL" indicator light
⑬ "TURN" indicator light
⑭ "HIGH BEAM" indicator light
⑮ "NEUTRAL" indicator light
⑯ "FUEL" warning light
⑰ Front flasher light (R)
⑱ Horn
⑲ Main switch
⑳ Front brake switch
㉑ "ENGINE STOP" switch
㉒ "START" switch
㉓ "LIGHTS" switch
㉔ "FUEL" (Reserve switch)
㉕ Body earth
㉖ Fan
㉗ Thermo unit
㉘ Thermo switch
㉙ Ignitor
㉚ Rear brake switch
㉛ Sidestand switch
㉜ Sidestand relay
㉝ Fuse (Main)
㉞ Pump relay
㉟ Starter motor
㊱ Starter relay
㊲ Battery
㊳ Fuse box
㊴ License light
㊵ Tail/brake light
㊶ Rear flasher light (R)
㊷ Rear flasher light (L)
㊸ Fuel sender
㊹ Diode
㊺ Relay assembly
㊻ Oil level switch
㊼ Neutral switch
㊽ Fuel pump
㊾ AC generator
㊿ Pick up coil
(51) Spark plug
(52) Ignition coil
[A] Except for Germany
[B] For Germany