

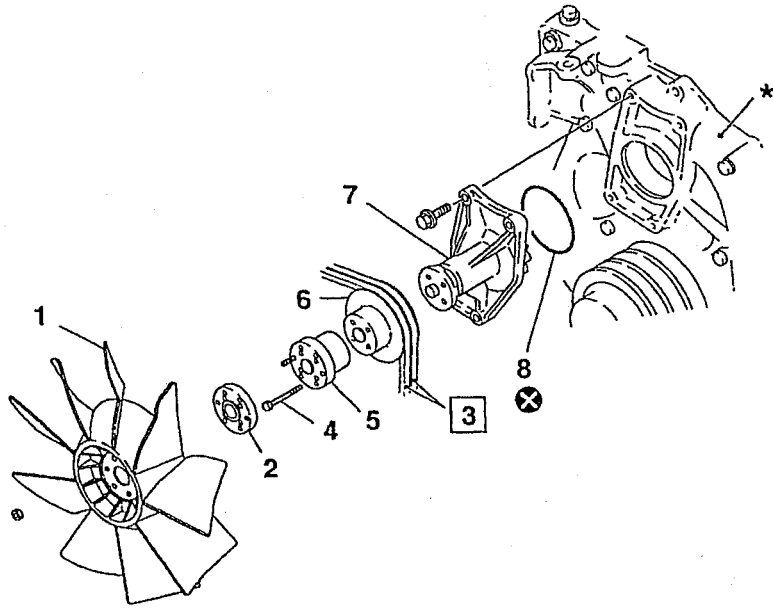
# MODIFICATION SUMMARY

This manual is a supplement to the Mitsubishi 6D34-T industrial diesel engine shop manual (publication No. 97821-05001) and pertains only to those specifications and service procedures which are specific to the 6D34-TL engine.

When servicing the 6D34-TL engine, please understand its differences from the 6D34-T engine summarized below and follow the instructions in this supplement in addition to those contained in the above-mentioned manual.

Group	Contents of different points	Service procedure																																																			
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# COOLING FAN, V-BELT AND WATER PUMP



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## ● Disassembly sequence

- 1 Cooling fan
- 2 Spacer
- 3 V-belt
- 4 Bolt
- 5 Spacer
- 6 Water pump pulley
- 7 Water pump assembly  Gr14

8 O-ring

\*: Timing gear case  Gr11

⊗: Non-reusable part

## ● Assembly sequence

Reverse the order of disassembly.

## CAUTION


- The V-belts 3 must be replaced together as a set. Never replace either V-belt individually.
- Apply soap suds to the O-ring 8 before fitting it. Do not apply engine oil to the O-ring since this would make it swell.

## Service standards

Unit: mm

Location	Maintenance item	Standard value	Limit	Remedy
3	V-belt tension	10 to 15	—	Adjust

## Special tools

Location	Tool name and shape	Part No.	Application
3	Belt Tension Gauge 	MH062345	V-belt tension measurement
	03612		

# GENERAL SPECIFICATIONS

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Item	Specifications
Engine model	6D34-T
Type	6-cylinder in-line, water-cooled 4-cycle diesel
Combustion chamber type	Direct injection type
Valve mechanism	Overhead valve (OHV) type
Maximum output kW/rpm {PS/rpm} (ISO, SAE)	125/2100 {170/2100}
Maximum torque N·m/rpm {kgf·m/rpm} (ISO, SAE)	590/1600 {60/1600}
Bore × Stroke mm	104 × 115
Total displacement cc	5861
Compression ratio	18.2
Empty mass kg*	480

\* Empty mass as measured according to Mitsubishi Motors Corporation standard.

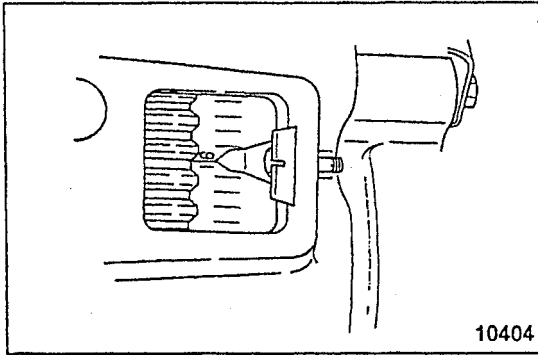
## Inspecting and Adjusting Valve Clearances

### Service standards

Unit: mm

Location	Maintenance item	Standard value	Limit	Remedy
—	Valve clearance (when cold)	0.4	—	Adjust

Valve clearances should be checked and adjusted when the engine is cold.



- Crank the engine until the "16" mark on the flywheel is aligned with the pointer in the flywheel housing inspection window.

#### NOTE

Pistons whose push rods are not pushing up their rockers are at the top-dead-center (TDC) positions of their compression strokes.

- When piston No. 1 is at the TDC position of its compression stroke, check and adjust the clearance of each valve marked "O" in the following table. When piston No. 6 is at the TDC position of its compression stroke, check and adjust the clearance of each valve marked "x" in the table. Be sure to check and adjust every valve.

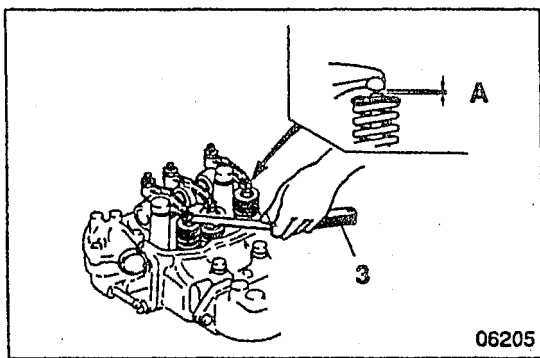
Piston No.	1		2		3		4		5		6		
	In.	Ex.	In.	Ex.	In.	Ex.	In.	Ex.	In.	Ex.	In.	Ex.	
No. 1 piston at TDC of compression stroke	○	○	○			○	○			○			
No. 6 piston at TDC of compression stroke				x	x			x	x			x	x

#### NOTE

To measure the clearance, insert a feeler gauge 3. The gauge should be able to move in the gap, albeit not loosely. Accurate measurements cannot be taken if the gauge moves loosely in the gap.

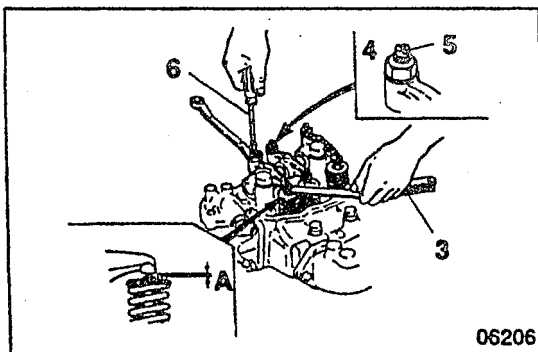
- If any measurement is out of specification, make adjustments as follows:

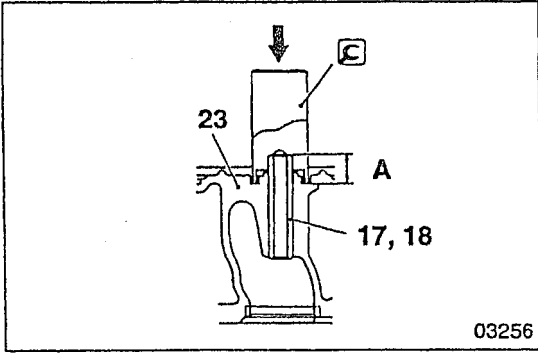
Standard value: 0.4 mm




#### [Adjustment]

- To adjust the valve clearance A, loosen the lock nut 4 and turn the adjusting screw 5 until the feeler gauge 3 moves more stiffly in the gap.
- After adjusting the clearance, tighten the lock nut 4. At this time, use a screwdriver 6 to stop the adjusting screw 5 from turning. Next, insert the feeler gauge 3 once more to confirm that the clearance A is correct.




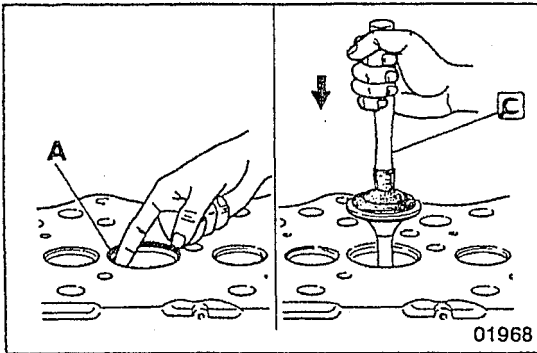


[Installation]

Install the valve guide 17, 18 using the  Valve Guide Installer. Strike the Valve Guide Installer until it sits snugly on the cylinder head 23.


**CAUTION** 

- The valve guides 17, 18 must be pressed in to the specified depth A. Be sure to use the  Valve Guide Installer for this operation.  
A: 10 mm
- Exhaust valve guides 18 are longer than inlet valve guides 17. Be sure to install the correct type of guide in each location.



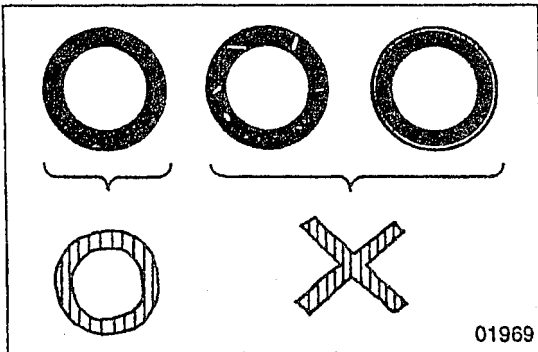
**7 8 19 20** Valves and valve seats

[Inspection]

- Apply an even coat of minium to the valve seat 19, 20 surface A that makes contact with the valve 7, 8.
- Using the  Valve Lapper, strike the valve 7, 8 against the valve seat 19, 20 once. Do not rotate the valve during this operation.

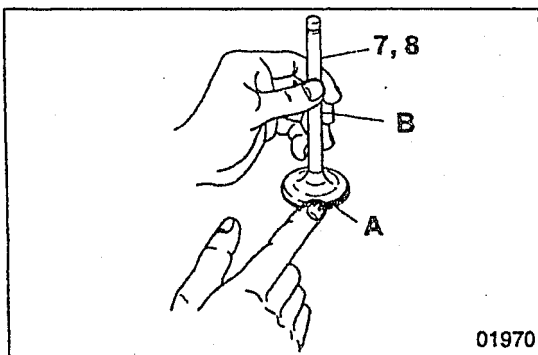
**NOTE**

Carry out these inspections after inspecting the valves 7, 8 and valve guides 17, 18.



- If the minium deposited on the valve 7, 8 indicates a poor contact pattern, rectify the contact pattern as follows:

Contact	Corrective action
Minor defect	Lapping
Serious defect	Reface or replace valve and valve seat



[Refacing]

Lap the valve in accordance with the following procedure:

- Apply a thin, even coat of lapping compound to the surface A of the valve 7, 8 that makes contact with the valve seat 19, 20.

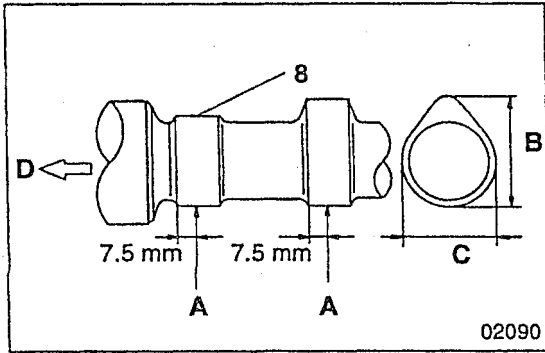
**CAUTION** 

Ensure that no compound adheres to the stem B of the valve 7, 8.

**NOTE**

- Start with intermediate-mesh compound (120 to 150 mesh) and finish with fine-mesh compound (200 mesh or more).
- The addition of a small amount of engine oil makes lapping compound easier to apply.

# CAMSHAFT



## 8 Inspecting camshaft

### (1) Cam lift

If any base circle-to-lobe height difference is less than the required value, replace the camshaft 8.

#### NOTE

Since the cams are tapered, they must be measured at the position A shown in the diagram.

B: Lobe height

C: Base circle diameter

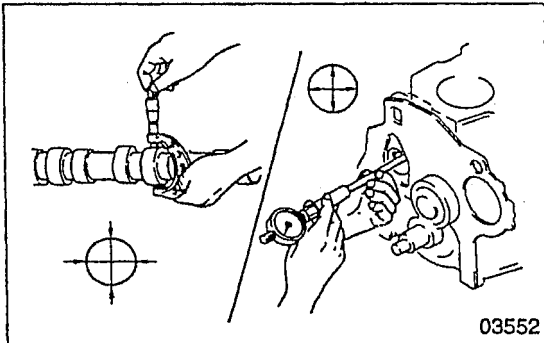
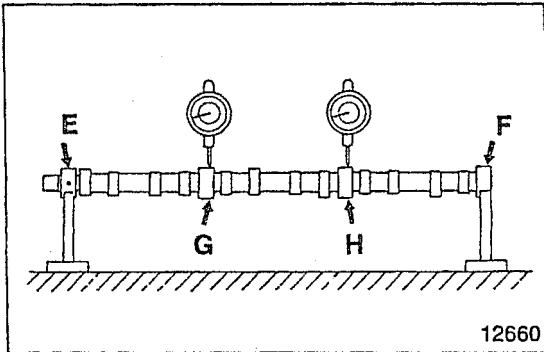
D: Front of engine

### (2) Camshaft bend

Support the camshaft 8 at its No. 1 journal E and No. 4 journal F, then take measurements at the No. 2 journal G and No. 3 journal H. If either measurement exceeds the specified limit, replace the camshaft.

#### NOTE

Turn the camshaft 11 through one revolution. One-half of the dial indicator reading represents the camshaft's bend.



## 8 to 10, 12, 13 Camshaft and camshaft bushings

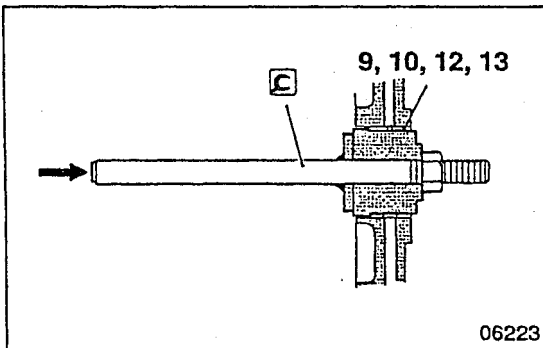
[Inspection]

If any clearance exceeds the specified limit, replace the defective part(s).

### Camshaft bushings

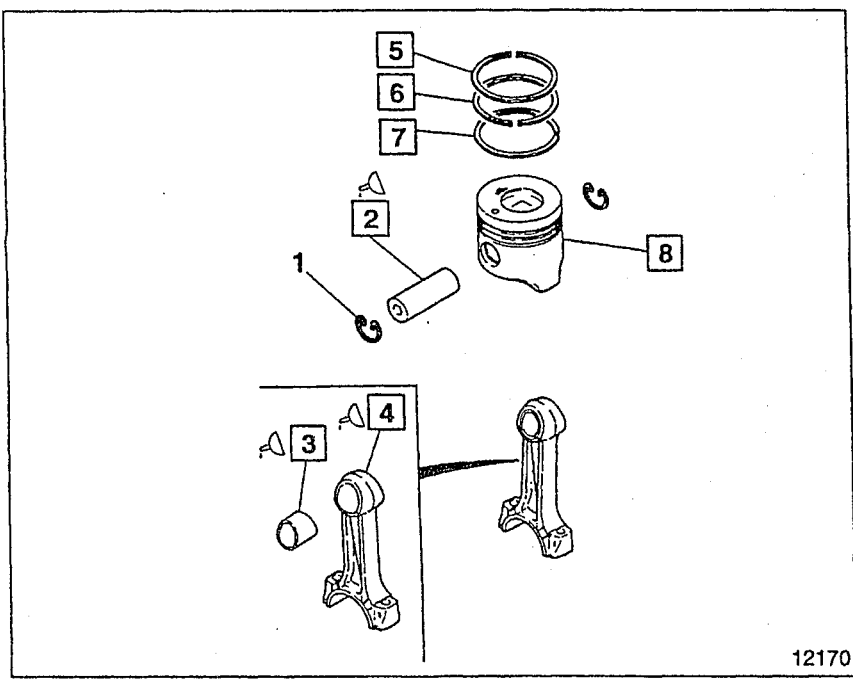
[Removal]

Remove the No. 3 and 4 camshaft bushings (12 and 13) from the rear end of the crankcase.



# PISTONS, CONNECTING RODS, AND CYLINDER LINERS

## Piston and Connecting Rod Assembly



● **Disassembly sequence**

- 1 Snap ring
- 2 Piston pin
- 3 Connecting rod bushing
- 4 Connecting rod
- 5 1st compression ring
- 6 2nd compression ring
- 7 Oil ring
- 8 Piston

● **Assembly sequence**

Reverse the order of disassembly.

**Service standards**

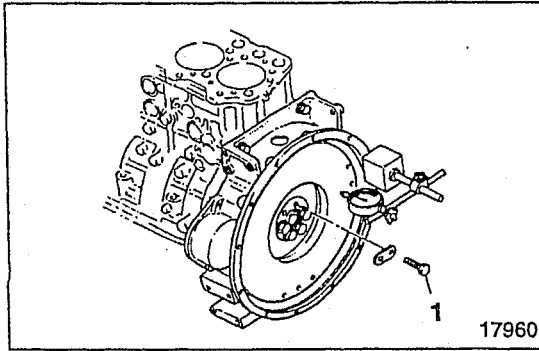
Unit: mm

Location	Maintenance item	Standard value (Basic diameter in [ ])	Limit	Remedy	
2, 3	Piston pin-to-connecting rod small end bushing clearance	[36] 0.03 to 0.04	0.1	Replace	
2, 8	Piston pin-to-piston clearance	[36] 0.007 to 0.021	0.05	Replace	
4	Connecting rod bend and torsion	—	0.05	Correct or replace	
5 to 7	Piston ring end gap	1st compression ring	0.3 to 0.45	1.5	Replace
		2nd compression ring	0.3 to 0.5		
		Oil ring	0.25 to 0.45		
5 to 8	Piston ring-to-piston ring groove clearance	1st compression ring	0.02 to 0.10	0.2	Replace
		2nd compression ring	0.05 to 0.08	0.15	
		Oil ring	0.03 to 0.06		

**Lubricants and sealants**

Location	Points of application	Type	Quantity
2	Piston pin outer surface	Engine oil	As required
3	Connecting rod bushing outer surface	Engine oil	As required
4	Bushing installation surface of connecting rod	Engine oil	As required

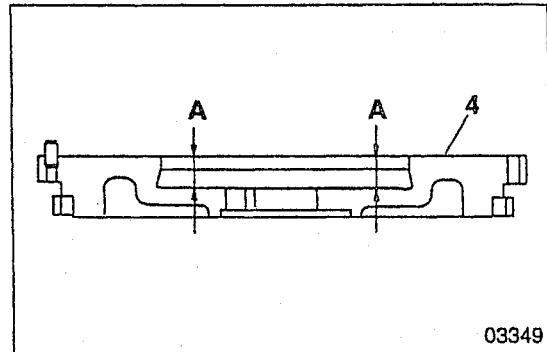
# FLYWHEEL



[Inspection]

## (1) Runout

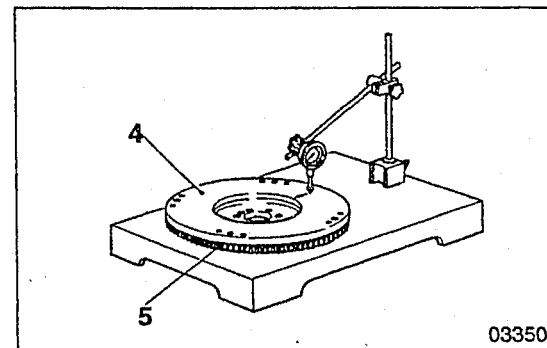
If runout exceeds the specified limit, check that the bolts 1 are tightened correctly and inspect the crankshaft \* mounting surface. Then, rectify or replace the flywheel assembly 4 as required.



## (2) Height of friction surface

If the measurement is below the specified value, rectify or replace the flywheel assembly 4.

A: Height of friction surface

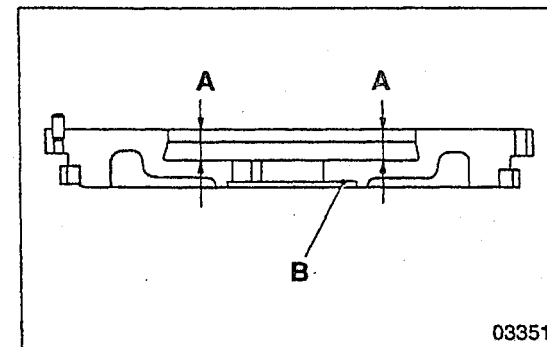


## (3) Distortion of friction surface

If distortion exceeds the specified limit, rectify or replace the flywheel assembly 4.

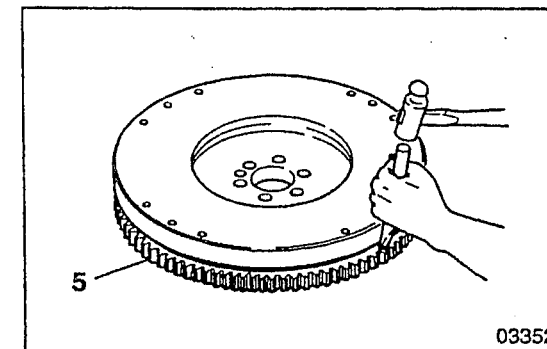
### NOTE

If any abnormality is evident on the ring gear 5, replace the ring gear before making inspections.



[Rectification]

Grind the friction surface such that its height A remains greater than the specified minimum. The friction surface must remain parallel with surface B with a tolerance of 0.1 mm.



## 5 Ring gear

[Inspection]

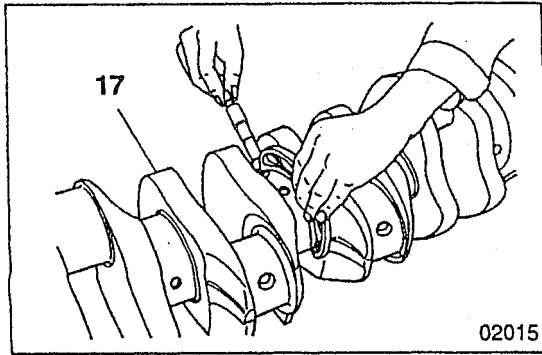
Inspect the ring gear 5 for damage and abnormal wear. If any defect is evident, the ring gear must be replaced.

[Removal]

- Heat the ring gear 5 evenly with an acetylene torch or the like.
- Remove the ring gear 5 from the flywheel by tapping around its entire periphery.



# CRANKSHAFT AND CRANKCASE

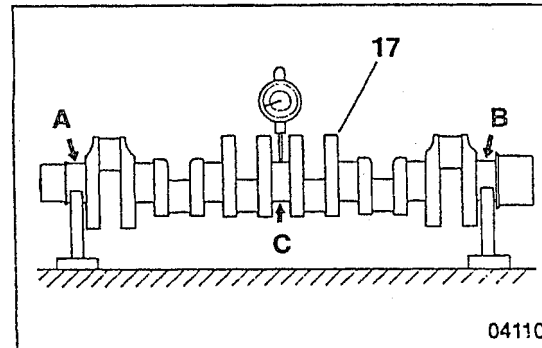


## 17 Crankshaft

[Inspection]

### (1) Roundness and cylindricity of crankshaft journal and pin

If either measurement exceeds the specified limit, replace the crankshaft 17 or grind it to undersize.

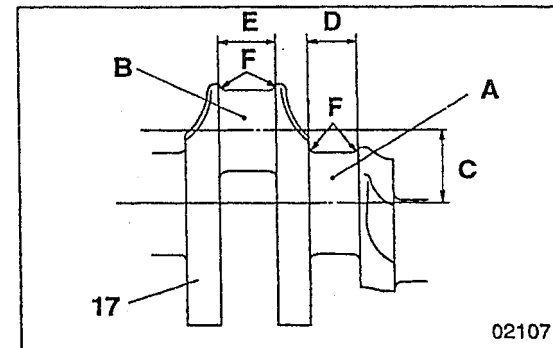


### (2) Bend

- Support the crankshaft 17 at its No. 1 journal A and No. 7 journal B. Measure the extent of bending in the crankshaft at the centre of the No. 4 journal C.
- If the measurement exceeds the specified limit, replace the crankshaft.

### NOTE

With the dial indicator applied to the centre journal, turn the crankshaft 17 through one revolution. One-half of the dial indicator reading represents the extent of bending.



[Rectification]

### NOTE

If the crankshaft 17 is rectified by grinding, the main bearing 2, 18 must be replaced with undersized ones.

- Grind such that the centre-to-centre distance C between the journal A and pin B does not change.

C:  $57.5 \pm 0.075$  mm

- Grind such that the journal width D and pin width E do not change.

D: 35 mm (No. 1 journal 32 mm)

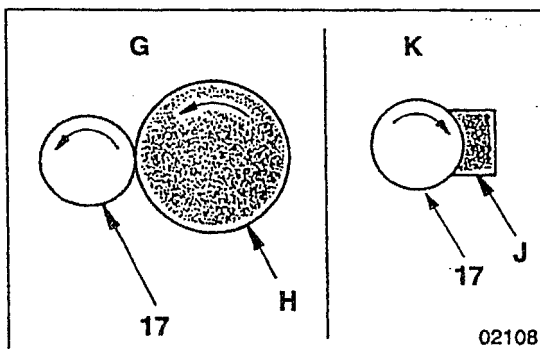
E:  $41^{+0.2}_0$  mm

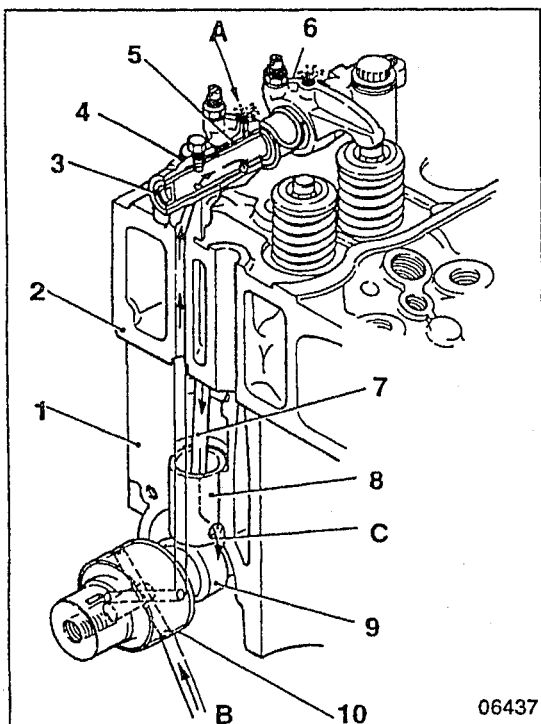
- Finish the corner fillet smoothly and to the specified radius F.

F:  $R4 \pm 0.2$  mm

- Carry out a magnetic inspection to check for cracks caused by grinding. Also, check that the Shore hardness of the surface has not dropped below Hs 75.

- When grinding G, turn the crankshaft 17 counter-clockwise as viewed from its front end. The grinder H should rotate in the same direction.
- When finishing K the crankshaft 17 with sandpaper or a whetstone J, rotate the crankshaft clockwise.

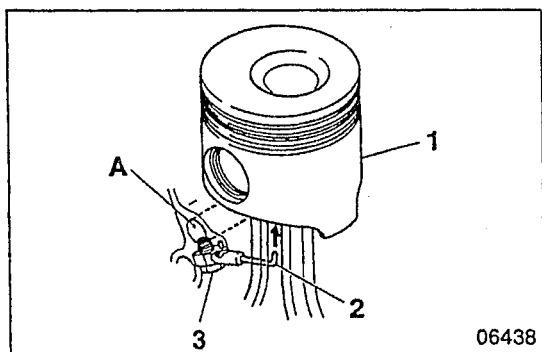




### ● Valve mechanism

- 1 Crankcase
- 2 Cylinder head
- 3 Rocker shaft
- 4 Rocker shaft bracket
- 5 Rocker bushing
- 6 Rocker
- 7 Push rod
- 8 Tappet
- 9 Camshaft bushing No. 1

A: Rocker oil hole  
 B: From oil main gallery  
 C: To oil pan

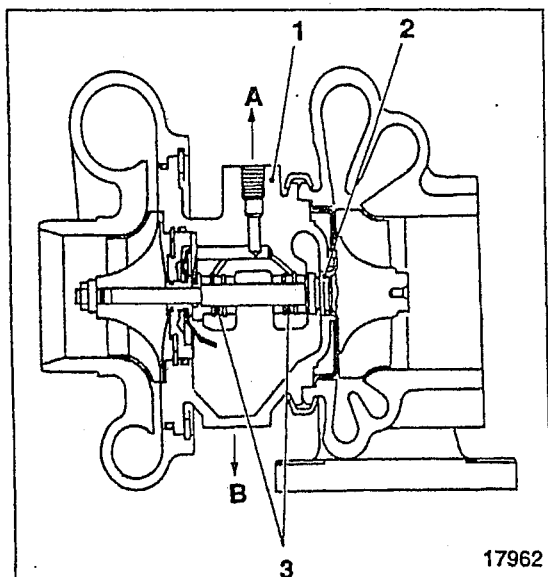


### ● Oil jet

- 1 Piston
- 2 Oil jet
- 3 Check valve

A: Main oil gallery

An oil jet 2 is fitted in the lower part of the main oil gallery A for each piston. These oil jets cool the pistons 1 by injecting oil into them. Each oil jet is fitted with a check valve 3 that opens and closes at specified oil pressure levels. At low oil pressures, these check valves close to maintain the required volume of oil in the lubrication system and prevent reductions in oil pressure.



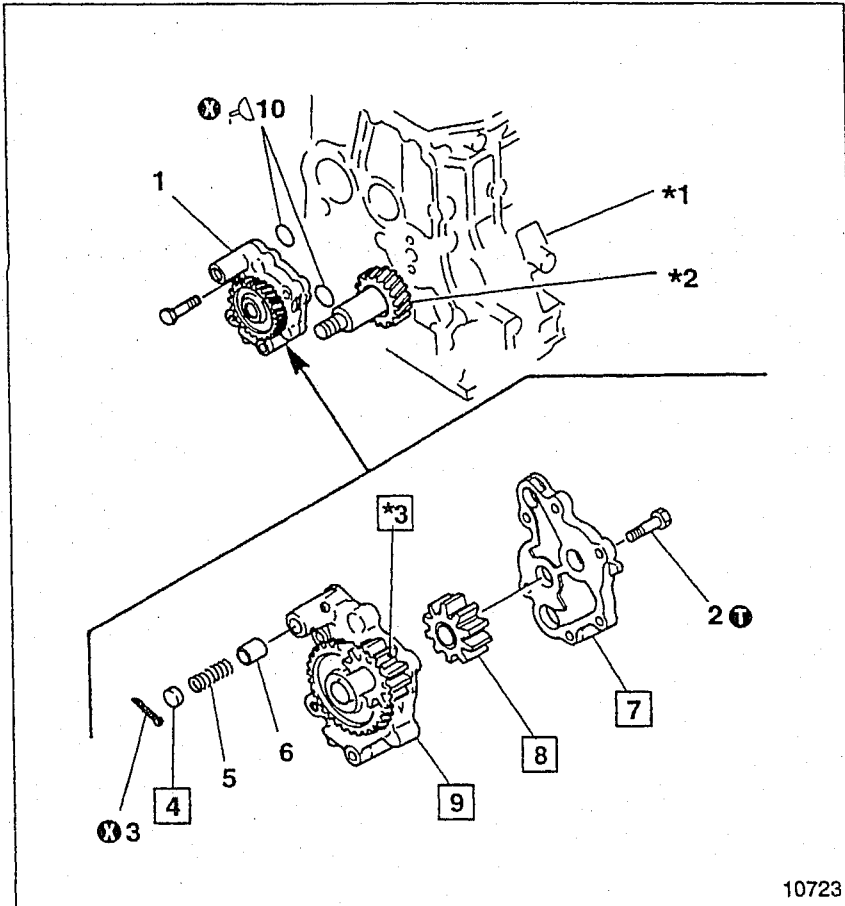
### ● Turbocharger

- 1 Bearing housing
- 2 Piston ring
- 3 Bearing

A: From main oil gallery  
 B: To oil pan

Via an oil pipe, engine oil is delivered from the main oil gallery to the bearing housing 1 to lubricate bearing 3. At each end of the turbine wheel shaft, piston ring 2 acts as an oil seal.

# OIL PUMP



## ● Disassembly sequence

- 1 Oil pump assembly
- 2 Bolt
- 3 Split pin
- 4 Seat
- 5 Spring
- 6 Relief valve
- 7 Oil pump cover
- 8 Driven gear assembly
- 9 Oil pump case assembly
- 10 O-ring

\*1: Crankcase Gr 11

\*2: Crankshaft gear

\*3: Drive gear

⊗: Non-reusable part

## ● Assembly sequence

Reverse the order of disassembly.

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## Service standards

Unit: mm

Location	Maintenance item	Standard value (Basic diameter in [ ])	Limit	Remedy
—	Backlash between oil pump gear and crankshaft gear Gr 11	0.09 to 0.18	0.3	Replace
6	Relief valve opening pressure	$1.1 \pm 0.1$ kPa { $11 \pm 1.0$ kgf/cm <sup>2</sup> }	—	—
5	Relief valve spring load (installed length = 38)	23.15 kg	—	Replace
7, *3	Clearance between drive gear shaft and oil pump cover	[20] 0.04 to 0.07	0.15	Replace
8, 9	Clearance between driven gear shaft and driven gear assembly	[20] 0.04 to 0.07	0.15	Replace
8, 9, *3	Difference between height of each gear and depth of case	0.01 to 0.07	0.18	Replace
	Clearance between case and tooth tips of each gear	0.10 to 0.19	0.2	

## ⓘ Tightening torque

Unit: N·m {kgf·m}

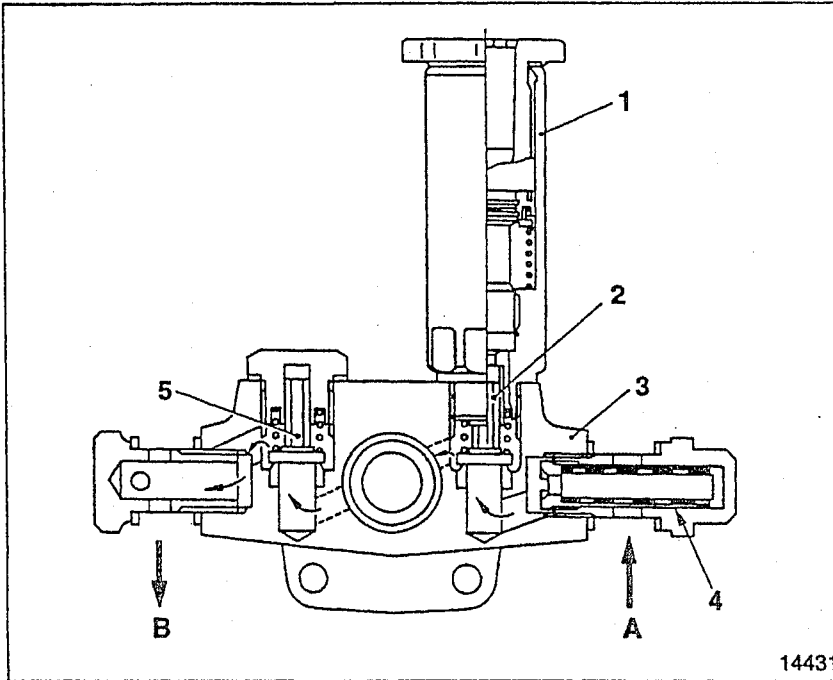
Location	Parts to be tightened	Tightening torque	Remarks
2	Oil pump cover mounting bolt	$9.8 \pm 2.0$ { $1.0 \pm 0.2$ }	—

## 👉 Lubricants

Unit: N·m {kgf·m}

Location	Point of application	Type	Quantity
10	Entire circumference of O-ring	Engine oil	As required

**Feed Pump**

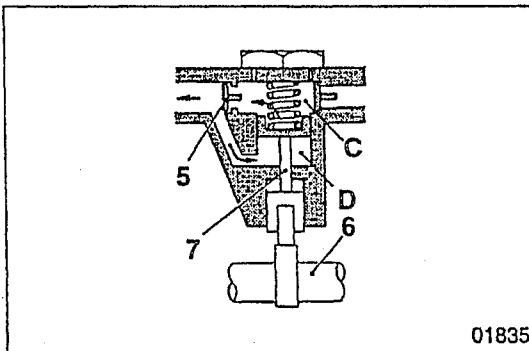


- 1 Priming pump
- 2 Inlet check valve
- 3 Feed pump housing
- 4 Gauze filter
- 5 Outlet check valve

**A:** From fuel tank  
**B:** To fuel filter

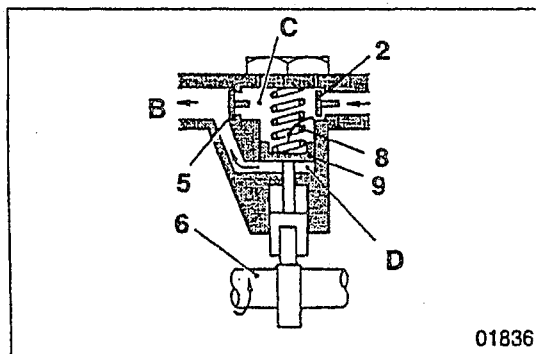
The feed pump is driven by the camshaft in the injection pump. The priming pump 1 enables fuel to be drawn up manually when the injection pump is stationary. It is particularly useful for air bleeding.

The gauze filter 4 removes large impurities from fuel drawn up from the fuel tank and thus prevents clogging of the feed pump. It must be washed regularly in gas oil.



● **Suction stroke**

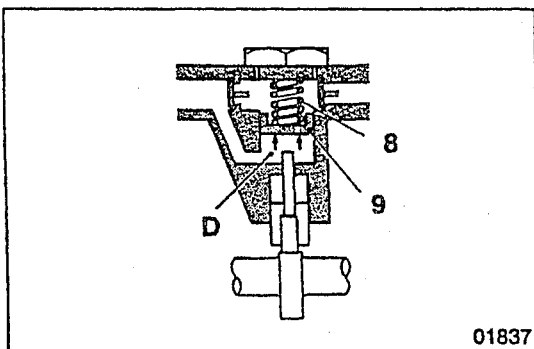
When the injection pump camshaft 6 forces up the push rod 7, fuel in the suction chamber C is compressed and opens the outlet check valve 5. Most of the fuel forced out is drawn into the pressure chamber D below the piston.



● **Pressure feed stroke**

As the camshaft 6 turns and the cam loses its lift, the piston 9 is pushed down by the piston spring 8. The fuel in the pressure chamber D is thus forced out and fed toward the fuel filter B.

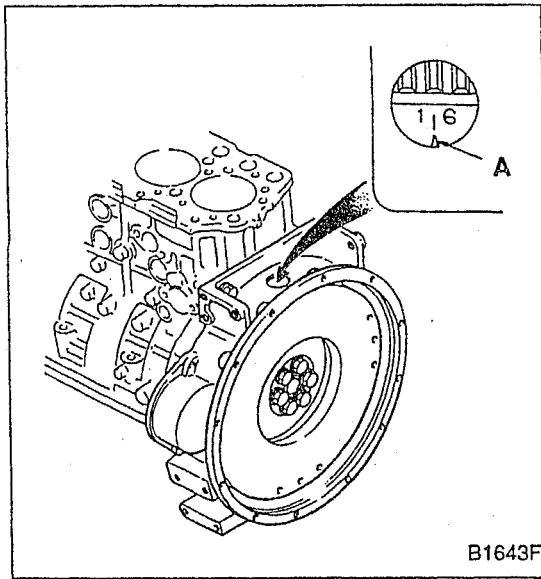
At the same time, the outlet check valve 5 closes and the inlet check valve 2 opens. As a result, fuel is again drawn into the suction chamber C.



● **Stoppage**

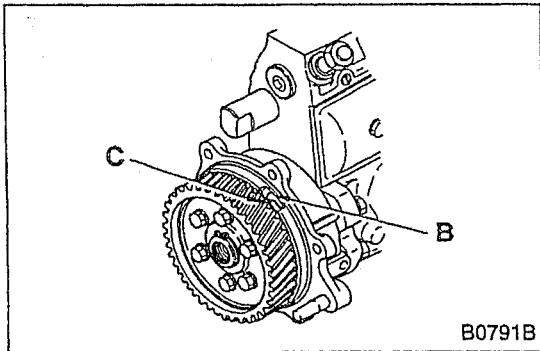
When pressure in the pressure chamber D exceeds a preset level, the piston spring 8 cannot push back the piston 9. The pump therefore stops operating, preventing pressure in the fuel filter from rising more than necessary.

# INJECTION PUMP

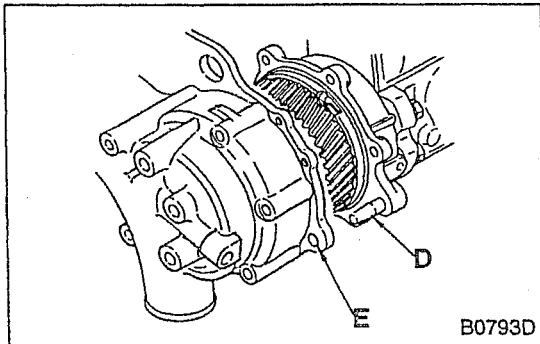


## [Installation]

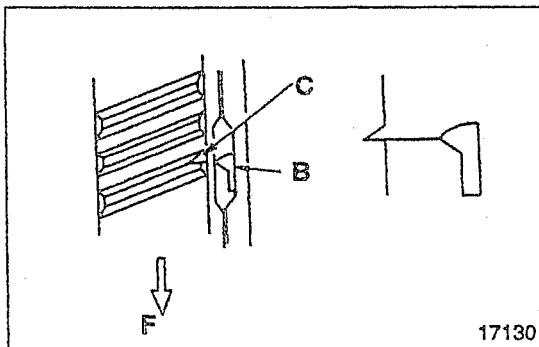
- Crank the engine until the "1-6" mark on the flywheel is aligned with the pointer **A** in the flywheel housing inspection window. With the engine in this condition, piston No. 1 is at the top-dead-center (TDC) position of its compression stroke.
- If the inlet and exhaust valves of cylinder No. 1 are not pushed up by their push rods with the engine in this condition, piston No. 1 is at the TDC position of its compression stroke. If the inlet and exhaust valves are pushed up, turn the crankshaft by 360°.



- Align the alignment mark **B** on the timer case with the notch **C** on the injection pump gear.

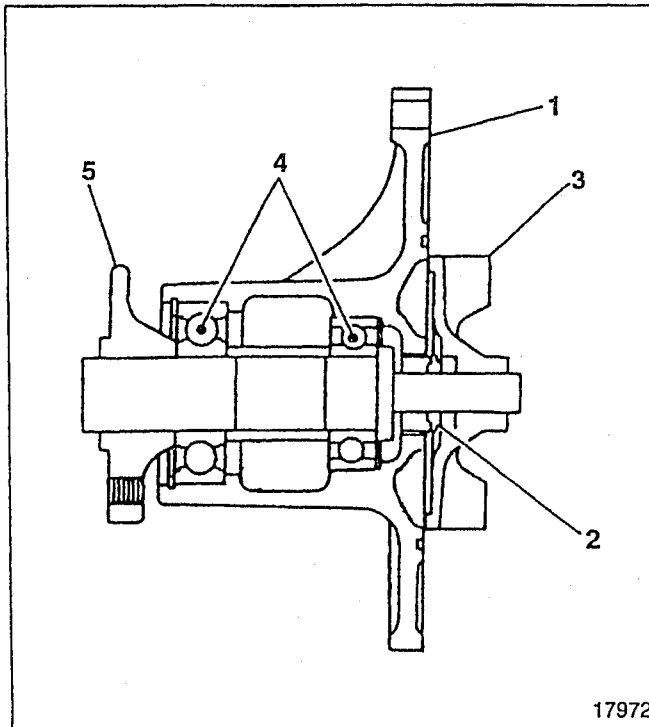


- Insert the timer case guide bar **D** into the front plate guide hole **E**. Using the bar as a guide, push the injection pump until the injection pump gear almost reaches the idler gear.



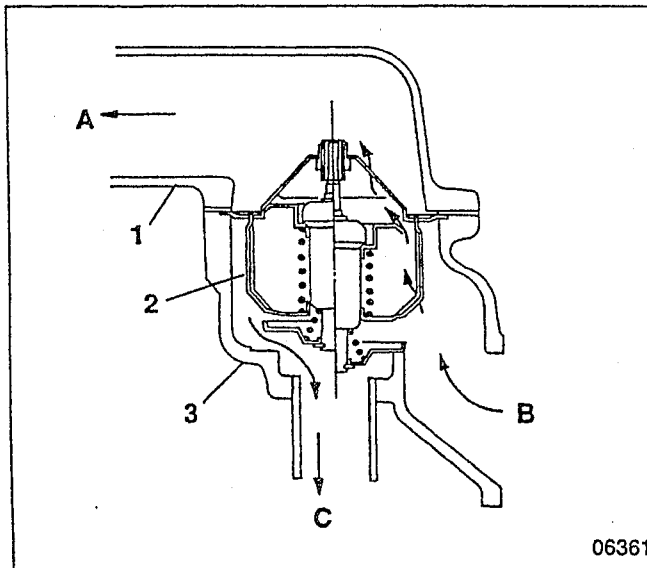
- Make sure the notch **C** on the injection pump gear is aligned with the alignment mark **B** on the timer case, then push the injection pump. As the gears mesh and the injection pump gear turns, the gear notch **C** will move in the "F" direction.

## Water Pump



- 1 Case
- 2 Unit seal
- 3 Impeller
- 4 Unit bearing
- 5 Flange

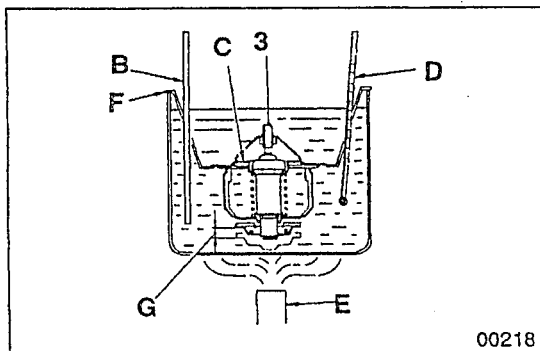
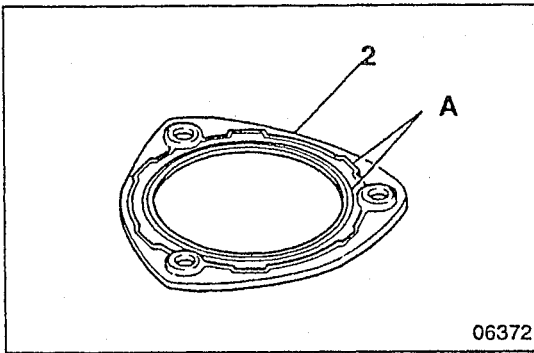
## Thermostat



- 1 Thermostat cover
- 2 Thermostat
- 3 Thermostat case

- A: To radiator
- B: From cylinder head
- C: To water pump

Thermostat 2 is a bottom bypass type that uses wax-charged pellets as its regulating element. As the wax changes from solid to liquid in line with temperature increases, the total wax volume changes. As a result, the position of the valve, changed by the coolant temperature, regulates the flow of coolant to the radiator and water pump (bypass side) and controls the coolant temperature.



## ◆ Service procedure

### 2 Thermostat cover gasket installation

Install the thermostat cover gasket 2 with the sealant application surface A toward the thermostat case 4.

### 3 Thermostat inspection

Place the thermostat in a container of water. While stirring the water with a rod B to ensure that it is heated evenly, carry out the following inspection procedure. If the measurements do not conform with the standard values, replace the thermostat 3.

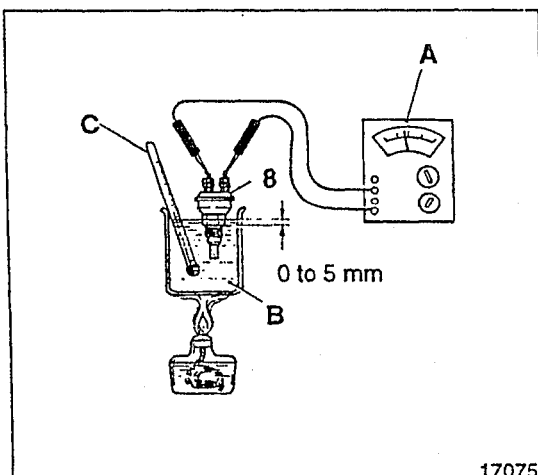
#### (1) Valve opening temperature

- Support thermostat 3 with wire F to keep it away from heat source E.
- Gradually heat the water until it reaches the valve opening temperature.
- Maintain this temperature for 5 minutes and check that valve C is open.
- When the water temperature drops below 65°C, check that valve C is completely closed.

D: Thermometer

#### (2) Valve lift

Heat the water to slightly higher than the valve opening temperature. With valve C fully open, maintain this water temperature for 5 minutes. Measure the extent of valve lift G.



### 8 Thermo switch

- Connect a circuit tester A set for resistance measurement to the terminals of thermo switch 8, and dip the thermo switch in test liquid B (glycerin) as deep as its threaded section.
- After checking that there is no continuity between the terminals, heat the liquid B.

#### NOTE

Stir the liquid while heating to ensure that it is heated evenly.

- With a mercury thermometer, measure the temperature at the moment when the switch operates and continuity is established between both terminals.