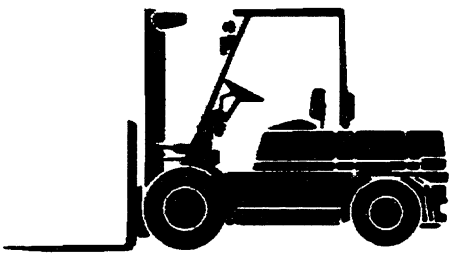
MITSUBISHI
FORKLIFT TRUCKS

SERVICE MANUAL

4G33
for FG10
FGC10
FG14
FG15
FGC15

4G52
for FG20
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FG25
FGC25

4G54
for FG30
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Quality makes the Difference

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APPENDIX – INSPECTION GUIDE

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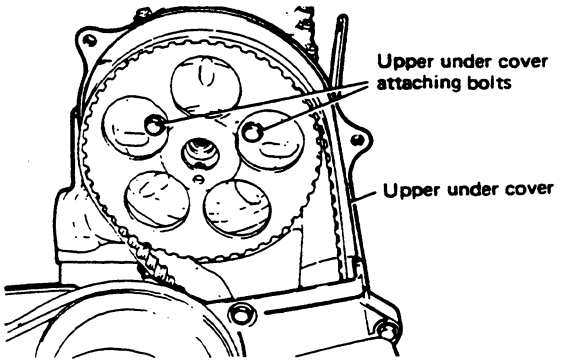
SPECIFICATIONS

Item				4G33	4G52	4G54
Engine	Type			Water-cooled, 4-stroke cycle, in-line 4-cylinder, vertical, OHC, semi-spherical combustion chamber type gasoline		
	Cylinder bore × stroke		mm (in.)	73 × 86 (2.874 × 3.386)	84 × 90 (3.307 × 3.543)	91.1 × 98 (3.587 × 3.858)
	Piston displacement		cc (cu in.)	1439 (87.8)	1995 (122)	2555 (156)
	Compression ratio			1 : 9.0	1 : 8.5	1 : 8.2
	Compression pressure		kg/cm^2 (psi)/rpm	10.5 (149.3)/250		
	Maximum output		HP/rpm	30/2400	39/2400	50/2400
	Maximum torque		kg-m/rpm	9.7/1600	13.4/1800	17/1600
	Fuel consumption		g/PSh/rpm		210/1800	
	Dimensions (length × height × width)		mm (in.)	576 × 739 × 568 (22-5/8 × 29-1/8 × 22-3/8)	652.5 × 759 × 604 (25-3/4 × 29-7/8 × 23-3/4)	
	Weight		kg (lb)	130 (286)	180 (398)	170 (375)
	No-load speed		rpm	600 ~ 650		
	Type of piston			Solid		
	No. of piston rings	Compression rings		2		
		Oil ring		1		
	Valve timing	Intake valves	Open	deg.	At 20 BTDC	At 25 BTDC
			Close		At 48 ABDC	At 55 ABDC
		Exhaust valves	Open		At 51 BBDC	At 62 BBDC
			Close		At 17 ATDC	At 14 ABDC
	Valve clearance	Intake		mm (in.)	0.15 (0.0059) (hot)	
		Exhaust			0.25 (0.0098) (hot)	
	Starter			Electric		
	Type of blowby gas recycling system			Closed type		
Ignition system	Method			By battery		
	Timing (BTDC)		deg./rpm	5/600 ~ 700	6/650	
	Firing order			1–3–4–2		
	Ignition coil			Ordinary type		
	Distributor	Type		Contact-point		
		Contact point gap	mm (in.)	0.45 ~ 0.55 (0.0177 ~ 0.0217)		
		Spark advancer		Centrifugal/vacuum type		
	Spark plugs	Model		W14E–U	BP4E (NGK) or W14EX–U (ND)	
		Gap	mm (in.)	0.7 ~ 0.8 (0.028 ~ 0.031)		

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(3) Tighten the timing belt upper under cover attaching bolts.



Installing upper under cover (4G33)

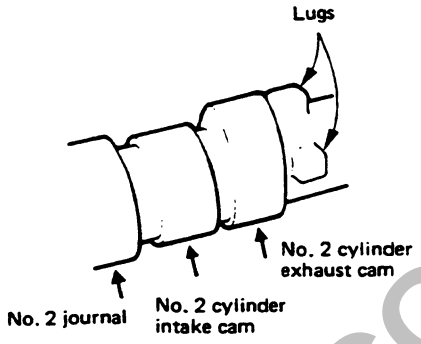
(4) Lift the camshaft sprocket upward and install the sprocket to the camshaft. If the sprocket is tight and hard to be lifted for fitting it in the spacer, insert a screwdriver into the hole in the top of the camshaft sprocket and pry up the sprocket with the screwdriver tip at the stepped upper under cover. If the dowel pin hole in camshaft sprocket is not aligned with the dowel pin on the tip of the spacer, tap the two lugs provided on the rear of No. 2 cylinder exhaust cam with a screwdriver. This will make it easy to rotate the camshaft. However, do not attempt to turn the crankshaft. Tighten the camshaft sprocket attaching bolt to the torque specification.

NOTE

Check to make sure the timing mark put on the timing belt during removal is in alignment with the mark on the camshaft sprocket.



Installing camshaft sprocket (4G33)

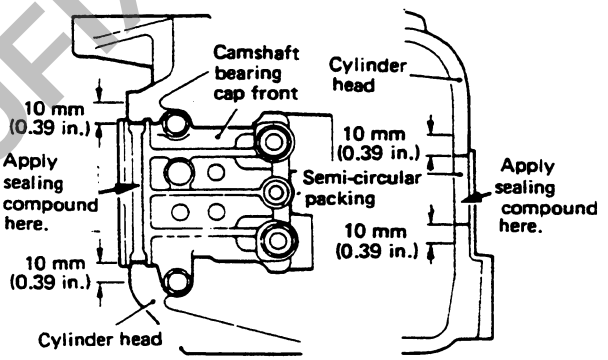


Lugs for rotating camshaft

(5) Install the timing belt upper front cover.

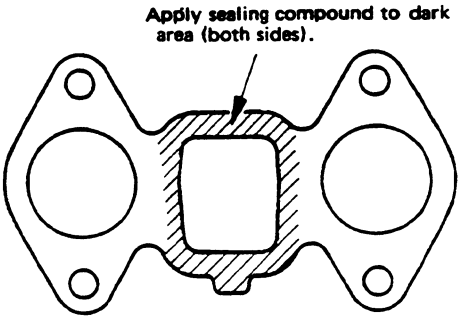
(6) Fit the gasket in the groove of the rocker cover, mount the cover on the cylinder head and secure it by tightening the mounting bolts to the torque specification.

Before installing the rocker cover, be sure to apply the sealing compound to the camshaft bearing cap and semi-circular packing as shown.



Applying sealing compound (1)

(7) Install the intake manifold gasket on the right side of the cylinder head. Apply the sealing compound, THREE BOND No. 1121-A, to the surfaces, as shown hatched, below. Do not re-use the gasket.



Applying sealing compound (2)

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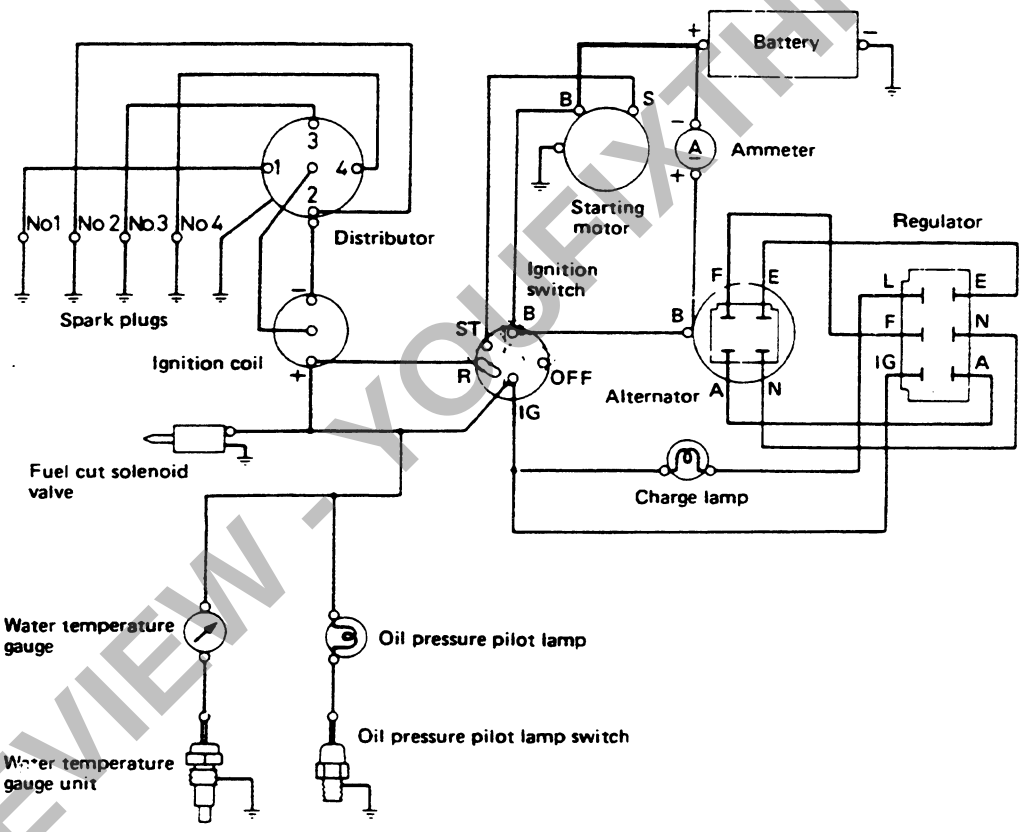
GENERAL DESCRIPTION

The electrical system consists of three circuits; namely, 1) the starter circuit including starting motor, 2) the ignition circuit having the distributor, ignition coil and spark plugs, and 3) the battery charging circuit comprising the alternator and regulator.

Following are the model numbers of the electrical components used.

Specifications

Item	4G33	4G52	4G54
Starting motor	M3T12672	M3T25981 (for dry clutch) M2T58081 (for wet clutch)	
Distributor	T3T05772	T3T04582	
Ignition coil	TB-61	LB-63	
Spark plugs	W14EX-U	BP-4E (NGK) or W14EX-U (ND)	
Alternator	021000-6420	AH2250 M7	
Regulator	RQB-2D1		



Wiring diagram

Adjustment

Distributor point gap

See INSPECTION GUIDE (P. 77 ~ 79).

To adjust the point gap, proceed as follows: Loosen the contact breaker lock screw. Turn the adjusting screw with the distributor cam in maximum lift position until the specified gap is obtained. After adjusting, tighten the lock screw.

Ignition timing

See INSPECTION GUIDE (P. 78 ~ 79).

Carry out this adjustment after adjusting the point gap.

(1) Align the notch in the crankshaft pulley with the timing mark "T" of the indicator as shown.

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Unit: kg-m (lb-ft)

Group	Item	4G33	4G52	4G54
Fuel pump	Upper body attaching screws	0.3 ~ 0.5 (2.2 ~ 3.6)	0.2 ~ 0.5 (1.4 ~ 3.6)	
	Cap attaching screws	0.07 ~ 0.22 (0.51 ~ 1.59)		

General bolts

Unit: kg-m (lb-ft)

Size (diam X pitch) mm (in.)	Torque		
	Marking on head "4"	Marking on head "7"	Marking on head "10"
M5 X 0.8 (0.20 X 0.03)	–	0.4 ~ 0.6 (2.9 ~ 4.3)	–
M6 X 1.0 (0.24 X 0.04)	–	0.8 ~ 1 (5.8 ~ 7.2)	1 ~ 1.3 (7 ~ 9.4)
M8 X 1.25 (0.31 X 0.05)	1 ~ 1.3 (7 ~ 9.4)	1.5 ~ 2.2 (10.8 ~ 16)	2.5 ~ 3.5 (18 ~ 25.3)
M10 X 1.25 (0.39 X 0.05)	1.8 ~ 2.5 (13 ~ 18)	3 ~ 4.2 (22 ~ 30)	5 ~ 7 (36 ~ 51)
M12 X 1.25 (0.47 X 0.05)	3 ~ 4.2 (22 ~ 30)	5.5 ~ 7.5 (40 ~ 54)	9.5 ~ 12 (69 ~ 87)
M14 X 1.5 (0.55 X 0.06)	5 ~ 7 (36 ~ 51)	8 ~ 11 (58 ~ 80)	16 ~ 19 (116 ~ 137)

Tapered threads

Unit: kg-m (lb-ft)

Screw size	Torque	
	Female thread (light alloy)	Female thread (cast iron)
NPTF 1/16	0.5 ~ 0.8 (3.6 ~ 5.8)	0.8 ~ 1.2 (5.8 ~ 8.7)
PT 1/8	0.8 ~ 1.2 (5.8 ~ 8.7)	1.5 ~ 2.2 (11 ~ 16)
PT 1/4, NPTF 1/4	2 ~ 3 (14 ~ 22)	3.5 ~ 4.5 (25 ~ 33)
PT 3/8	4 ~ 5.5 (29 ~ 40)	5.5 ~ 7.5 (40 ~ 54)
PT 1/2	7 ~ 10 (51 ~ 72)	12 ~ 16 (87 ~ 116)

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Symtom or suggestion	Cause	Remedy
Ignition system is responsible for	Distributor defective	Refer to 4. ELECTRICAL EQUIPMENT TROUBLESHOOTING.
	Condenser defective	Replace condenser.
	Spark plugs defective	Refer to 4. ELECTRICAL EQUIPMENT TROUBLESHOOTING.
	Ignition coil defective	Replace ignition coil.
	Primary high tension cord connections loose	Retighten connections.
	Ignition timing incorrect	Retime.

COMPLAINT 2: Engine idles erratically

Symptom or suggestion	Cause	Remedy
Carburetor is suspected of mis-adjustment		Refer to 3. CARBURETOR TROUBLESHOOTING.
Air is suspected of leaking in past carburetor heat insulator or intake manifold	Carburetor heat insulator or intake manifold gasket leaking	Retighten intake manifold nuts, carburetor mounting nuts, vacuum line or vacuum hose. Replace gaskets and other parts if necessary.
Valves or valve seats are suspected of having worn and leaking		Refer to 2. ENGINE PROPER TROUBLESHOOTING.
Cylinder head gasket is suspected of leaking		Replace gasket.

COMPLAINT 3: Alternator will not charge battery

Symptom or suggestion	Cause	Remedy
Battery charge pilot lamp will not glow when engine is stopped	Low battery voltage	Refer to 4. ELECTRICAL EQUIPMENT TROUBLESHOOTING.
	Relay defective	Replace relay.
	Poor connections in charge circuit	Retighten connections. Replace parts if necessary.
Battery charge pilot lamp will glow when engine is running at high speed	Alternator defective	Replace alternator.
	Relay defective	Replace relay.

COMPLAINT 4: Engine fires irregularly

Symptom or suggestion	Cause	Remedy
Ignition system is responsible for	Poor connections in ignition circuit	Retighten connections. Replace parts if necessary.
	Spark plugs faulty	Repalce plugs.
	Ignition timing incorrect	Retime.

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GENERAL DESCRIPTION

Adjustment

Valve clearance

See INSPECTION GUIDE (P. 28).

(1) Run the engine until cooling water temperature rises to a level between 80° and 90°C (176° and 194°F). At this temperature of cooling water, the engine is hot enough for valve clearance adjustment. By the firing order, 1-3-4-2, proceed as follows:

(2) At each cylinder, loosen the rocker nut, with the piston brought to the top dead center position on compression stroke. Using a feeler gauge, set the clearance to the specification by turning the adjusting screw; and lock the screw by tightening nut while holding screw with a screwdriver.

NOTE

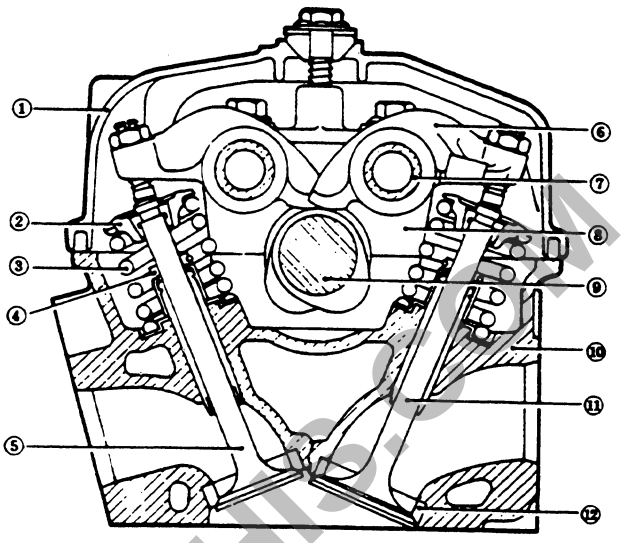
When carrying out this adjustment, make sure that the cylinder head bolts have been retightened.

CYLINDER HEAD ASSEMBLY

Description

Cylinder head proper

The head is an aluminum-alloy in material, shaped by a low-pressure die-casting technique and toughened by heat treatment. The combustion chambers are semi-spherical. Intake and exhaust ports are of cross-flow type in arrangement, forming two valve rows, right and left, along the camshaft. The right and left valves in cross section present "V" shape by their stems. The camshaft is held by five bearings.



1-Rocker cover
2-Valve spring retainer
3-Valve spring
4-Valve stem seal
5-Exhaust valve
6-Rocker arm
7-Rocker shaft
8-Camshaft bearing cap
9-Camshaft
10-Cylinder head
11-Intake valve
12-Valve seat ring

Cylinder head – Cross section

Intake manifold

The intake manifold is also aluminum alloy in material. It is of a separate branch type to provide good efficient performance. The incoming air is heated by hot water returning from the engine. This design assures good vaporization of fuel and supports complete combustion.

Cooling water from the cylinder head water jacket enters the intake manifold, then passes through the thermostat and finally returns to the radiator. The manifold is provided with a bypass circuit through which the water proceeds to the heatrizer located on the lower side of the carburetor bracket. From the heatrizer it returns to the water pump through heater piping.

Exhaust manifold

The exhaust manifold is made of cast iron and it has a separate exhaust port for each cylinder.

Camshaft (4G33)

The valve actuating mechanism is of an overhead camshaft (O.H.C.) type and is excellent in performance in all speed ranges. The camshaft, driven by the timing belt (a single loop of cog belt), is supported by five bearings. The cam lobe is chilled to provide long-wearing service. The fuel pump drive cam is eccentric and its surfaces are induction hardened for improved wear resistance.

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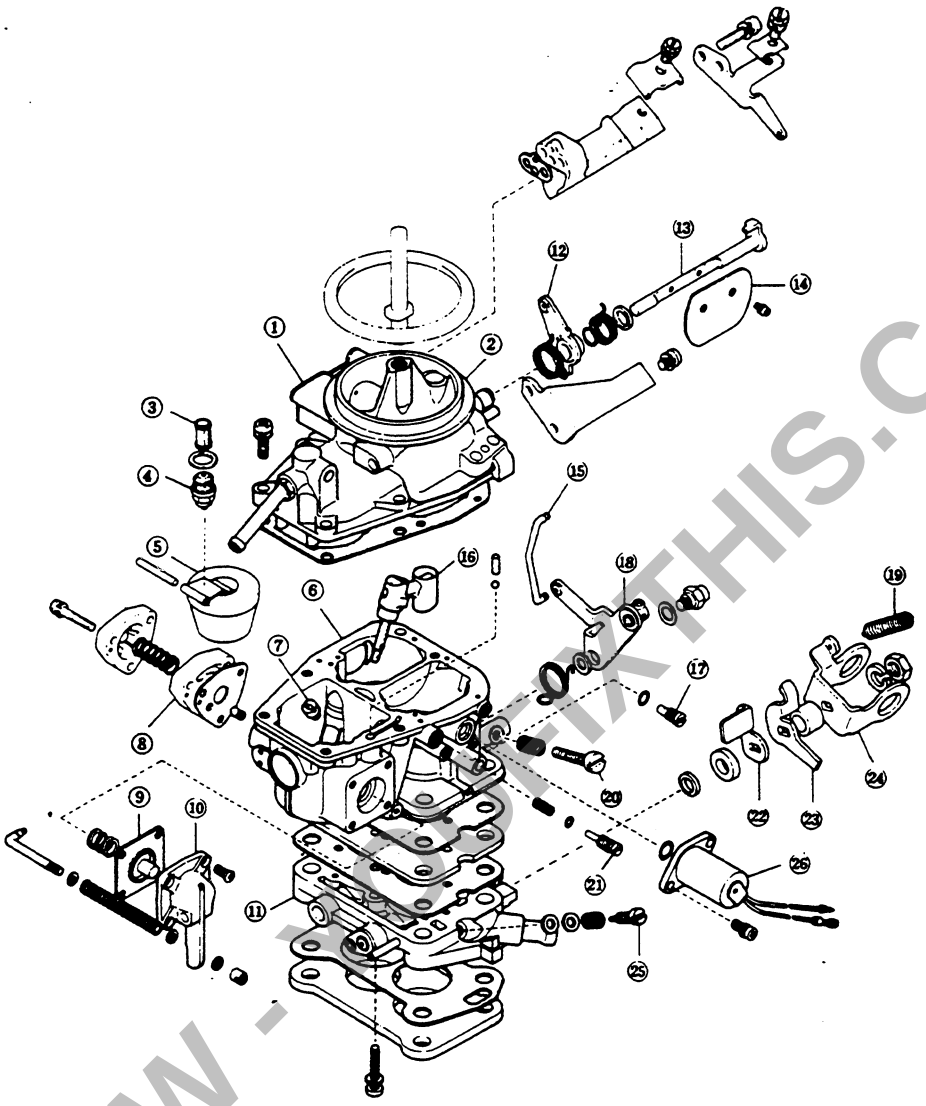
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1-Bimetal
2-Float chamber cover
3-Screen
4-Needle valve
5-Float
6-Main body
7-Main jet
8-Enrichment body assembly
9-Membrane
10-Pump cover
11-Throttle body
12-Choke lever assembly
13-Choke shaft
14-Choke valve
15-Choke connecting rod
16-Inner venturi
17-Pilot jet
18-Choke operating lever
19-Return spring
20-Speed adjusting screw
21-Bypass screw
22-Throttle stop lever
23-Abutment plate
24-Throttle lever
25-Mixture adjusting screw
26-Solenoid

Disassembled view of carburetor

Disassembly

This paragraph describes the fundamental rules or precautions to be followed in servicing the carburetor.

NOTE

a) Use wrenches and screwdrivers of the right size and type.

b) The parts removed should be set aside in group, each marked or tagged for its system or location so that the same combination or set as before can be reproduced at the time of reassembling.

c) Do not remove the inner venturi without valid reason.

d) Do not remove the bypass screw without valid reason because it is sealed.

e) Do not remove the throttle shaft and throttle valve.

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Symptom or suggestion	Cause	Remedy
Overheating is responsible for – con't	Fan belt slipping	Readjust or replace belt.
	Fan belt worn or broken	Replace belt.
	Fan belt wet with oil or grease	Clean belt.
	Thermostat defective	Replace thermostat.
	Water pump defective	Replace pump.
	Coolant passage clogged in radiator	Flush radiator.
	Ignition timing incorrect	Retime.
	Lack of engine oil	Refill. Keep oil at specified level.
	Air-fuel mixture too lean	Refer to 3. CARBURETOR TROUBLE-SHOOTING.
	Valve clearance incorrect	Readjust clearance.
Low compression is responsible for	Mechanical problems in engine	Refer to 2. ENGINE PROPER TROUBLESHOOTING.
Overcooling is responsible for	Thermostat stuck open	Clean, check and, if necessary, replace thermostat.
	Low ambient temperature	Cover radiator sufficiently to bring coolant temperature into normal operating range.

COMPLAINT 6: Poor acceleration

Symptom or suggestion	Cause	Remedy
Mechanical problems in engine are responsible for		Refer to 2. ENGINE PROPER TROUBLESHOOTING.
Carburetor is suspected of mis-adjustment		Refer to 3. CARBURETOR TROUBLE-SHOOTING.
Ignition system is responsible for	Distributor defective	Refer to 4. ELECTRICAL EQUIPMENT TROUBLESHOOTING.
	Spark plugs defective	Refer to 4. ELECTRICAL EQUIPMENT TROUBLESHOOTING.

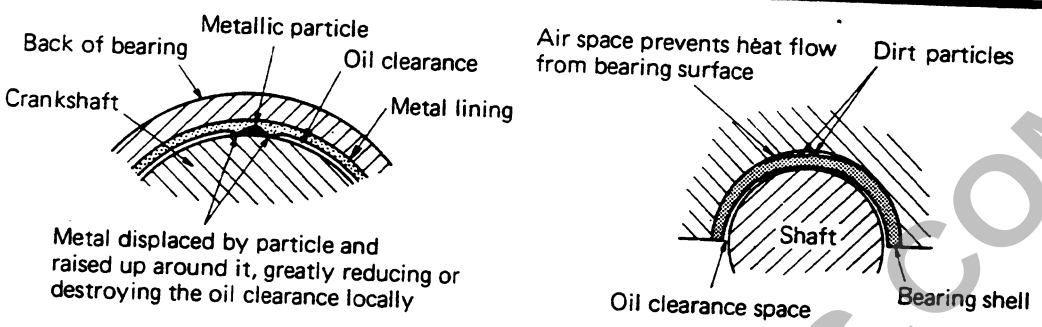
COMPLAINT 7: Excessive fuel consumption

Symptom or suggestion	Cause	Remedy
Mechanical problems in engine are responsible for		Refer to 2. ENGINE PROPER TROUBLESHOOTING.
Carburetor is suspected of mis-adjustment		Refer to 3. CARBURETOR TROUBLE-SHOOTING.
Ignition system is responsible for	Distributor point gap incorrect	Refer to 4. ELECTRICAL EQUIPMENT TROUBLESHOOTING.

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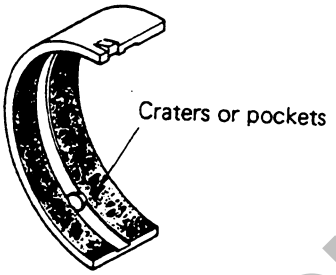
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What to check	How to check or Remarks
Bearings (main and connecting rod) – continued	**REFERENCE**

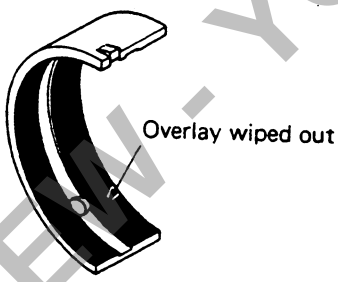


Typical bearing

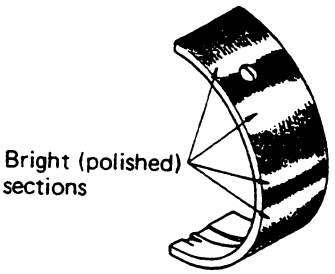
b) Fatigue failure — **Reject.**



c) Lack of oil — **Reject.**



d) Poor bearing seating in the bore (Local high spots formed on bearing metal introduce some air space which interferes with bearing cooling between bearing backing side of shell and seat.) — **Reject.**



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