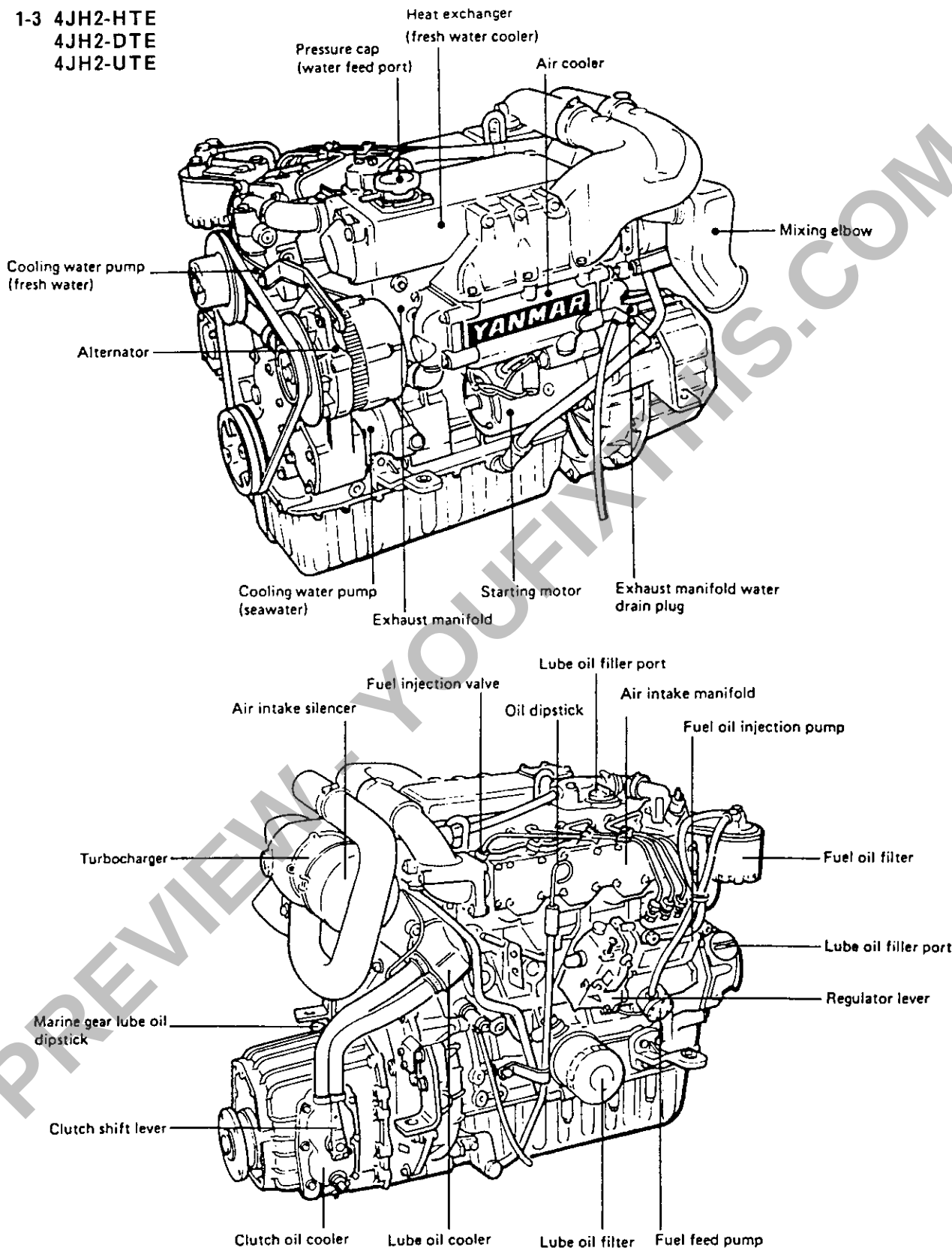
1-3 4JH2-HTE
4JH2-DTE
4JH2-UTE

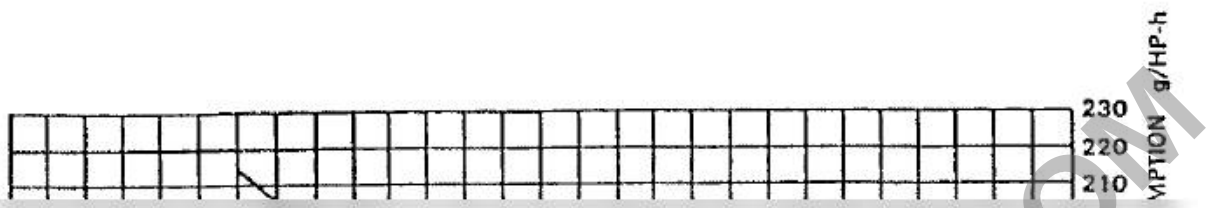


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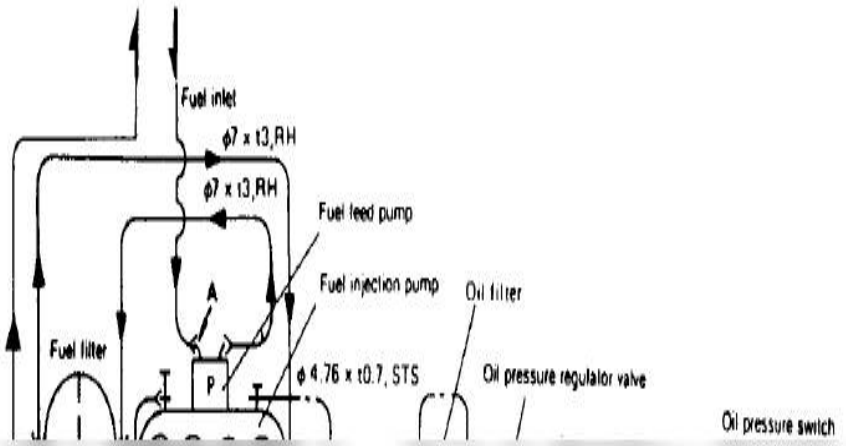
4-4. 4JH2-DT (B) E



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3-2.26 Mounting the intake manifold

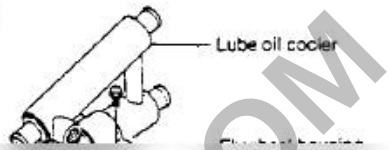
(1) Thoroughly clean the inside of the intake manifold, and mount the gasket packing and intake manifold.
(2) Mount the governor remote control bracket.



3-2.28 Mounting the lube oil cooler

Mount the lube oil cooler to the top of the flywheel housing with the bracket.

MODEL: 4JHE
4JH-TE



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Fault		Cause	Remedy
3. Engine's output is insufficient.	Defective injection timing, and other failures.	(1) Knocking sounds caused by improper (too fast) injection timing.	Inspect and adjust
		(2) Engine overheats or emits large amount of smoke due to improper (too slow) injection timing.	Inspect and adjust
		(3) Insufficient fuel delivery from feed pump.	Repair or replace
	Nozzle movements is defective	(1) Case nut loose.	Inspect and retighten
		(2) Defective injection nozzle performance.	Repair or replace nozzle
		(3) Nozzle spring is broken.	Replace
		(4) Excessive oil leaks from nozzle.	Replace nozzle assembly

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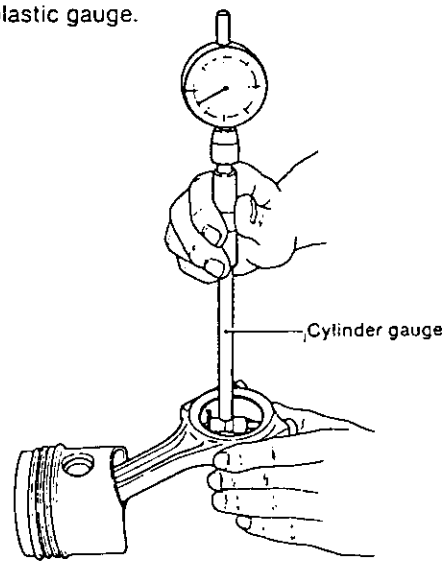
5-2 Crank pin bushing

5-2.1 Checking crank pin bushing

Check for flaking, melting or seizure on the contact surface.

5-2.2 Measuring crank pin oil clearance

Use a plastic gauge.



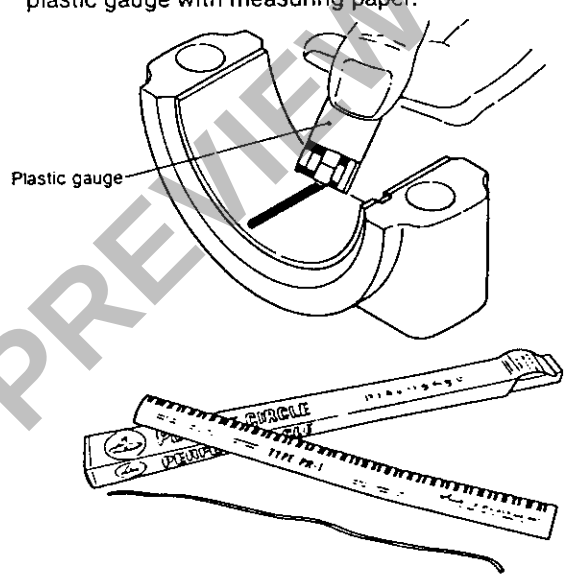
Procedure

(1) Use the press gauge (Plastigage) for measuring oil clearance in the crank pin.

(2) Mount the connecting rod on the crank pin (tighten to specified torque).

Connecting rod tightening torque	5.0 ~ 5.5 kg-m (36.15 ~ 39.77 ft-lb)

(3) Remove the connecting rod and measure the broken plastic gauge with measuring paper.

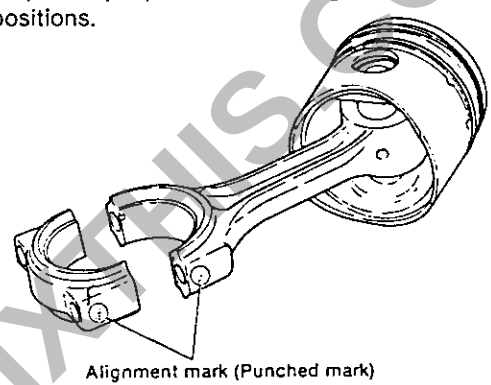


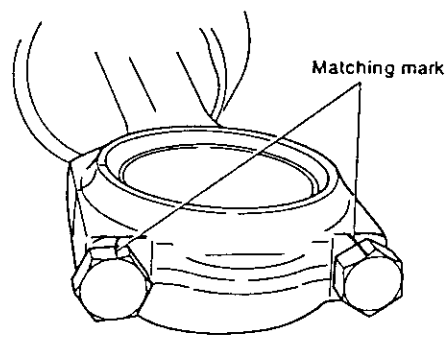
5-2.3 Precautions on replacement of crank pin bushing

(1) Wash the crank pin bushing.

(2) Wash the large end cap, mount the crank pin bushing and make sure that it fits tightly on the large end cap.

(3) When assembling the connecting rod, match up the large end and large end cap number. Coat the bolts with engine oil and gradually tighten them alternately to the specified torque.
If a torque wrench is not available, make match marks on the bolt heads and large end cap (to indicate the proper torque position) and retighten the bolts to those positions.

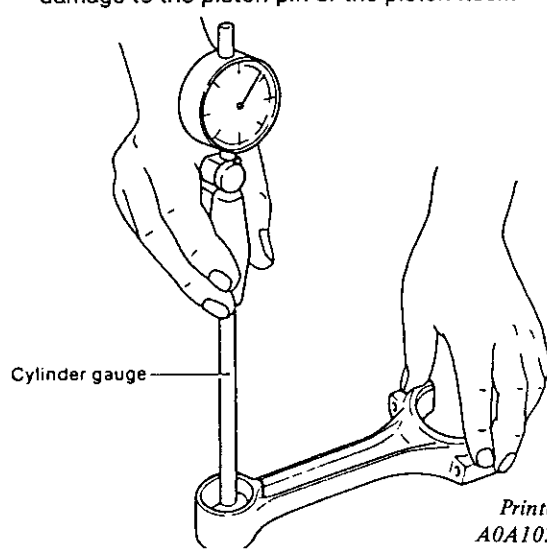




(4) Make sure there is no sand, metal cuttings or other foreign matter in the lube oil, and that the crankshaft is not scratched. Take special care in cleaning the oil holes.

5-3 Piston pin bushing

(1) Measuring piston pin clearance
Excessive piston pin bushing wear may result in damage to the piston pin or the piston itself.



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MODELS

4JH2E
4JH2-TE
4JH2-HTE
4JH2-DTE

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Ref. 4JH/4JH2E PARTS DEFERING

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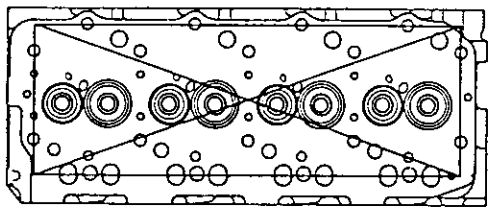
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3-1 Inspecting the cylinder head

The cylinder head is subjected to very severe operating conditions with repeated high pressure, high temperature and cooling. Thoroughly remove all the carbon and dirt after disassembly and carefully inspect all parts.

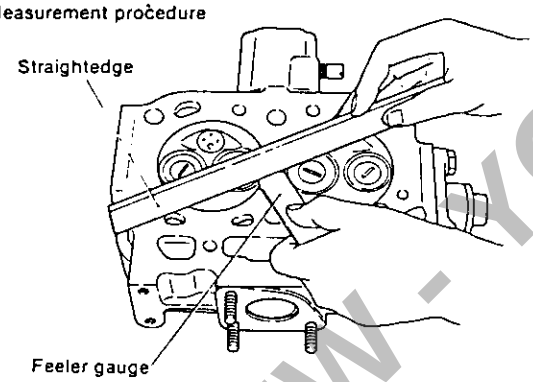


3-1.1 Distortion of the combustion surface

Carefully check for cylinder head distortion as this leads to gasket damage and compression leaks.

(1) Clean the cylinder head surface.
(2) Place a straight-edge along each of the four sides and each diagonal. Measure the clearance between the straight-edge and combustion surface with a feeler gauge.

Measurement procedure

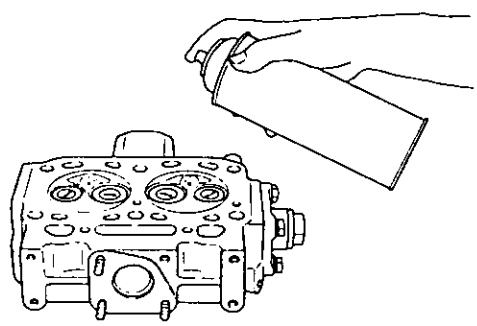


mm (in.)

	Standard	Wear limit
Cylinder head distortion	0.05 (0.0019) or less	0.15 (0.0059)

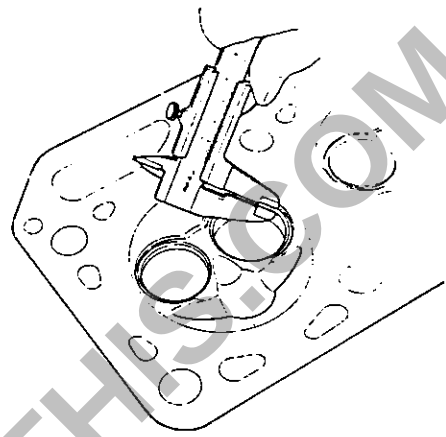
3-1.2 Checking for cracks in the combustion surface

Remove the fuel injection nozzle, intake and exhaust valve and clean the combustion surface. Check for discoloration or distortion and conduct a color check test to check for any cracks.



3-1.3 Checking the intake and exhaust valve seats

Check the surface and width of the valve seats.
If they are too wide, or if the surfaces are rough, correct to the following standards:

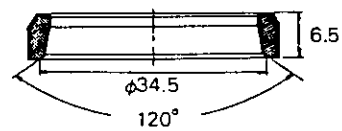


Seat angle	Intake	120°
	Exhaust	90°

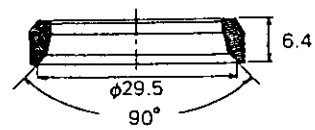
mm (in.)

Seat width	Standard	Wear limit
Intake	1.28 (0.0504)	1.78 (0.0700)
Exhaust	1.77 (0.0697)	2.27 (0.0894)

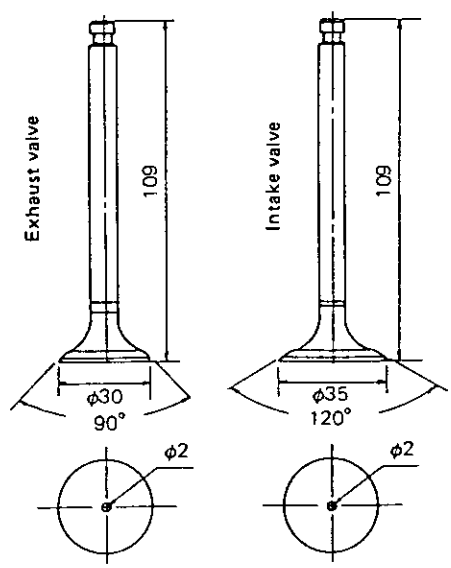
Intake valve seat



Exhaust valve seat



Standard dimension



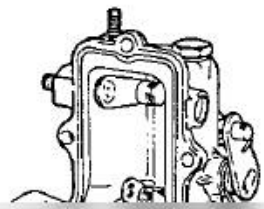
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3. Don't forget to mount the washers to both sides of the governor lever.



(9) Fit the stop lever return spring to the end of the governor lever shaft.



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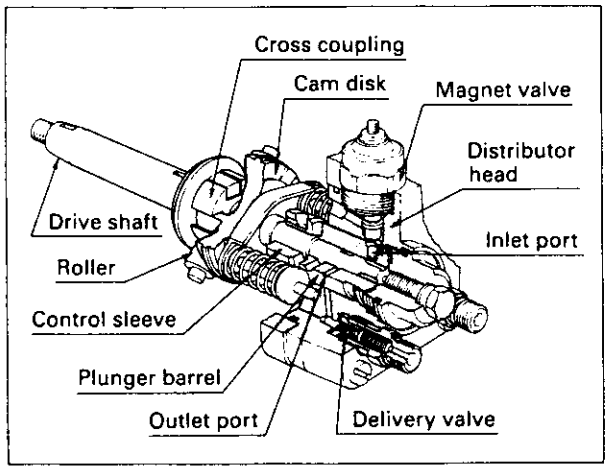


Fig. 4 Cutaway view of fuel delivery

Because the plunger rotates and reciprocates simultaneously, suction of the fuel oil into the pressure chamber, pressurization in the pressure chamber and delivery into the engine cylinder are all possible.

Speed Governing

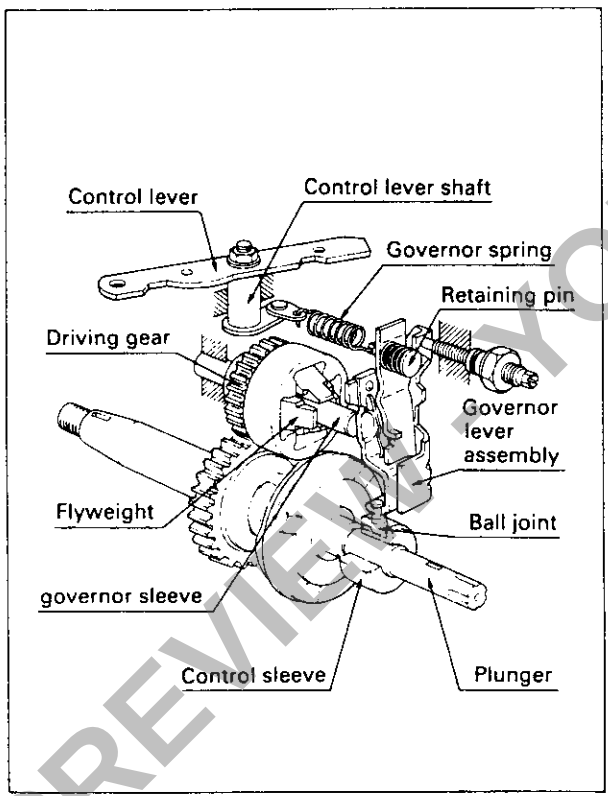


Fig. 5 Cutaway view of speed governing

The governor is located in the upper part of the injection pump chamber. Four flyweights and a governor sleeve are held in the flyweight holder, which is mounted on the governor shaft.
The flyweight holder is rotated and accelerated by the drive shaft gear, through rubber dampers.
The governor lever assembly is supported by pivot bolts in the pump housing, and the ball joint at the bottom of the lever assembly is inserted into the control sleeve, which slides over the outside surface of the plunger. The top of the lever assembly (the tension lever) is connected to the governor spring by a retaining pin, while the opposite end of the governor spring is connected to the control lever shaft. The control lever shaft is inserted into the governor cover and a control lever is attached to the control lever shaft. The accelerator pedal is connected directly to the control lever by a linkage, and the governor spring set force changes in response to the control lever position (i.e. accelerator pedal position).
Injection quantity control is governed by the mutually opposing forces of the flyweights' centrifugal force and the governor spring's set force.
The flyweights' centrifugal force, which changes in response to engine speed, acts on the governor lever through the governor sleeve.
The governor spring's set force, which is dependant on control lever position, i.e. accelerator pedal position, acts on the governor lever through the retaining pin.

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19. Pump Reassembly, Adjustment and Inspection (4JH2-UTE)

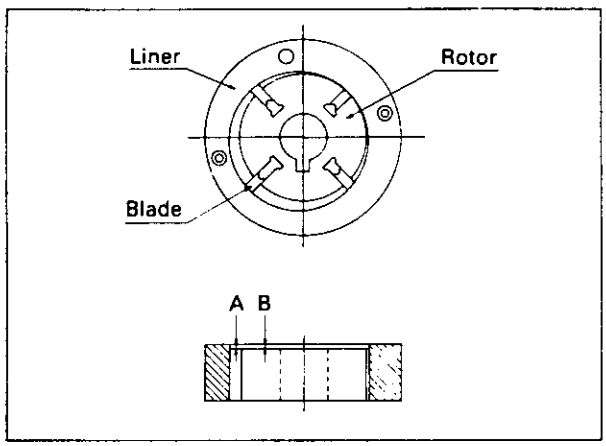
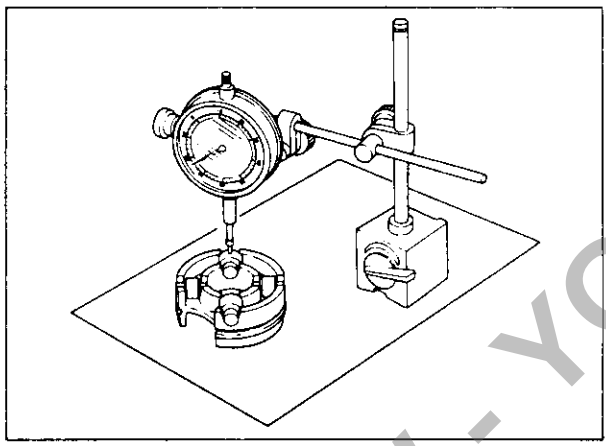


Fig. 1

1. Feed Pump Assembly

Set the rotor and blades inside the liner as a unit, so that their axial clearance will be within the specified tolerance. (The feed pump is delivered as a pre-adjusted assembly.)

Clearance between liner and rotor : A
0.010–0.020 mm.
Clearance between liner and blades: B
0.010–0.020 mm.


Fig. 2

2. Roller Height

When reassembling the roller holder, select the roller so that the difference in height (See Fig. 2) will be within the specified tolerance. (The roller holder is delivered as a pre-adjusted assembly.)

Difference in roller height:
±0.02 mm.

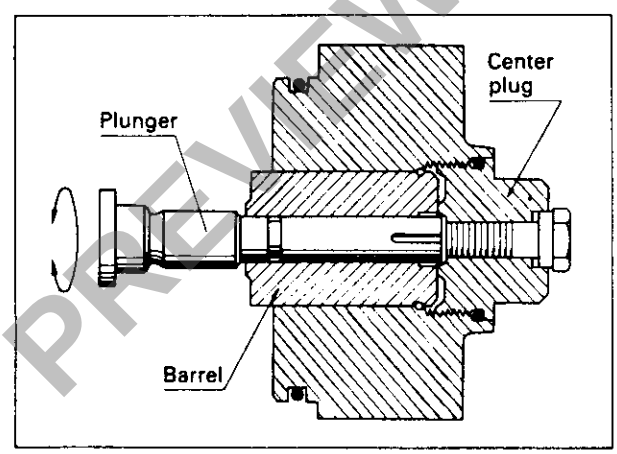


Fig. 3

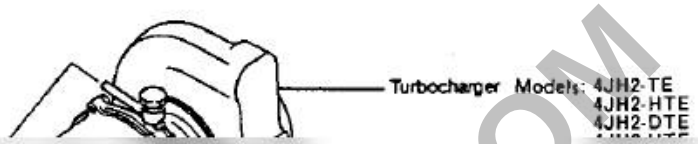
3. Distributor Head Inspection

a) Plunger barrel movement.
With the center plug tightened to the head at the specified torque (6-8 kg.m) insert the plunger into the barrel. Confirm that in any position the plunger slides smoothly in the barrel.

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2. Installation

2-1 Installation angle

During operation the angular inclination of the gearbox in the longitudinal direction must be less than 20° relative to the water line.

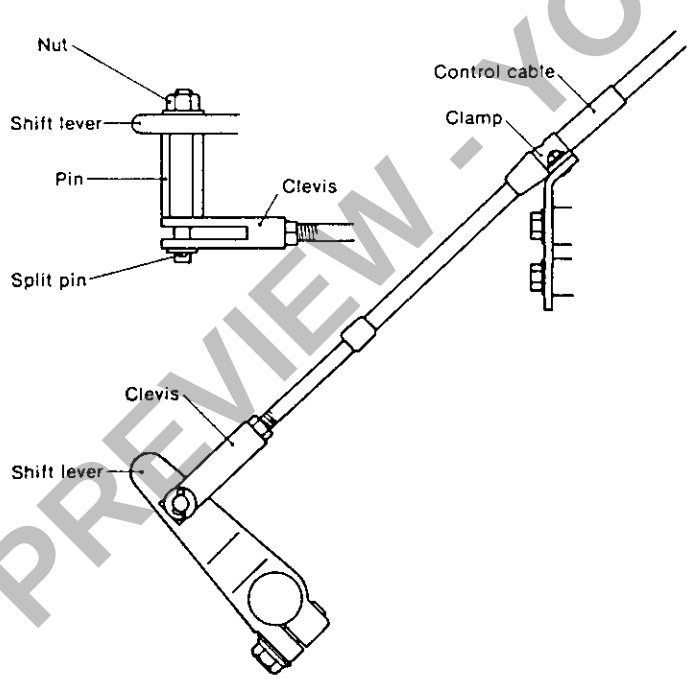
2-2 Remote control unit

This marine gearbox is designed for single lever control to permit reversing at full engine speed (to avoid danger, etc.). Normally, Morse or Teleflex single lever control is employed. During installation, make sure that the remote control lever and shift lever on the marine gearbox are coordinated. Shifting the lever toward the propeller side produces forward movement, while moving the lever toward the engine side causes the vessel to move in the reverse direction.

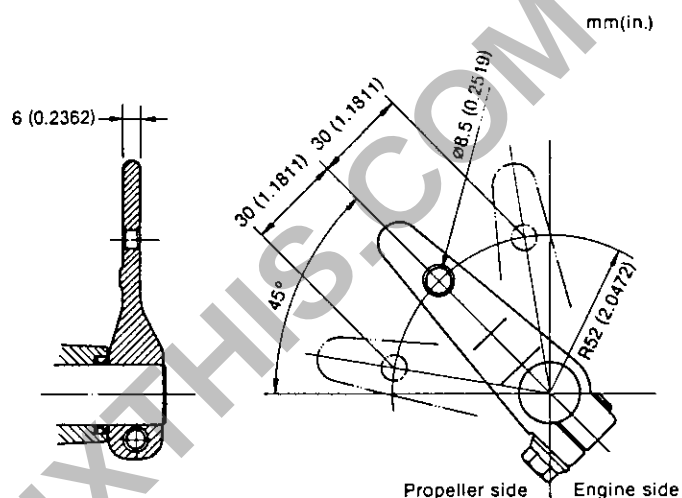
To connect the linkage, the operating cable must be positioned at right angles to the shift lever when the shift lever is in the neutral position.

The shift play, measured at the pivot point of the shift lever, must be at least 30mm (1.1811in.) on each side (reverse and forward) of the neutral position. Greater shift play has no adverse effect on the marine gearbox. After connecting the linkage, confirm that the remote control and the shift lever on the marine gearbox work properly.

A typical linkage arrangement is illustrated in the figure below.



When the cable is attached to the hole 52mm (2.0472in.) from the center of the rotation of the shift lever, these strokes must be 30mm (1.1811in.)



Side view of clutch

2-3 Clutch operation force (reference value)

Operation position / Operation direction	Operation lever position at 52mm (2.0472in.)	Remarks
Engaging stroke	Approx. 9.5kg (20.94 lb)	Engine speed at 1000 rpm
Disengaging stroke	Approx. 11.5kg (25.35 lb)	

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Adjusting point	Part No.	Thickness. mm (in.)	No. of shims
t1	177095-02150	0.1 (0.0039)	2
		0.3 (0.0118)	1
		0.5 (0.0197)	2
		1.0 (0.0394)	1
t2	177090-02250	0.1 (0.0039)	2
		0.3 (0.0118)	1
		0.5 (0.0197)	1
		1.0 (0.0394)	1
t3 & t4	177075-02150	0.3 (0.0118)	4
		0.4 (0.0157)	4
		0.5 (0.0197)	4
t5 & t6	177090-02310	0.1 (0.0039)	4
		0.3 (0.0118)	2
		0.5 (0.0197)	2
		1.0 (0.0394)	2

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(3)Standard size of parts

mm (in.)

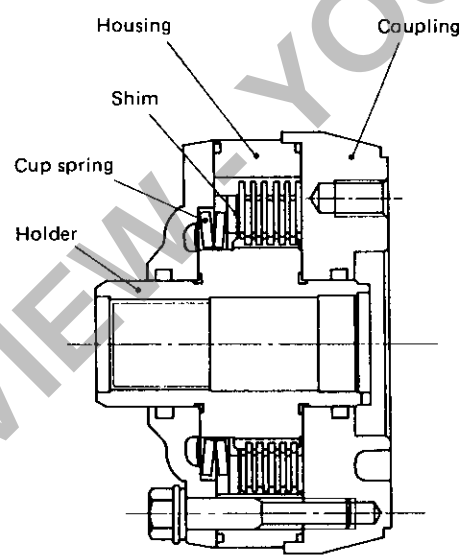
	A + A'	B	C + C'	D	E	F	Drive cone neutral center position
KM3P2	132.40 ~ 132.75 (5.2126 ~ 5.2264)	131.20 ~ 132.10 (5.1654 ~ 5.2008)	141.20 ~ 141.55 (5.5591 ~ 5.5728)	139.56 ~ 141.00 (5.4945 ~ 5.5512)	23.50 ~ 24.10 (0.9252 ~ 0.9488)	57.83 ~ 58.65 (2.2768 ~ 2.3091)	47.3 (1.8622)

NOTE:Compare your measurements with the above standard size. If your measurements differ largely from the standard sizes, measurements may not be correct. Check and measure again.

(4) Adjusting shim set

	Part No.	Thickness.mm(in.)	No. of shims
Input shaft	177088-02350	0.5 (0.0197)	1
		0.4 (0.0157)	1
		0.3 (0.0118)	2
Output shaft	177088-02300	1.0 (0.0394)	1
		0.5 (0.0197)	1
		0.3 (0.0118)	2
		0.1 (0.0039)	3

13-13. Torque limiter



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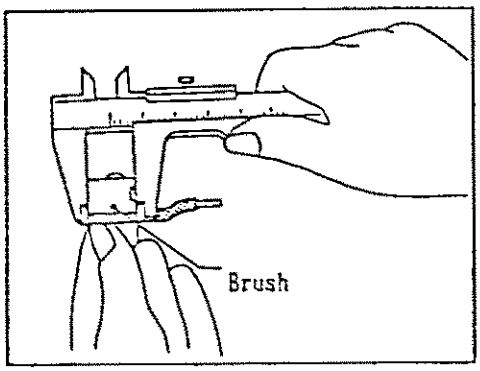


Fig. 22

5-3 Brushes

Measure the length of the brushes and if they are under the limit, replace them.

(mm)

Standard (New)	Limit (Used)
15	11

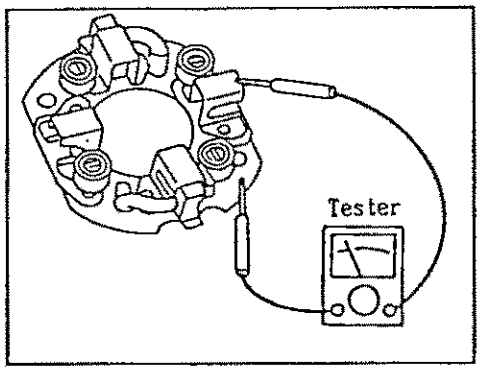


Fig. 23

5-4 Brush Holder

Insulation Test for the Brush Holder

Check for continuity between the brush holder's positive side and its base (negative side) with a tester. If there is no continuity the brush holder is still good.

Continuity Exists : (Unsatisfactory insulation)
Replace the brush holder.

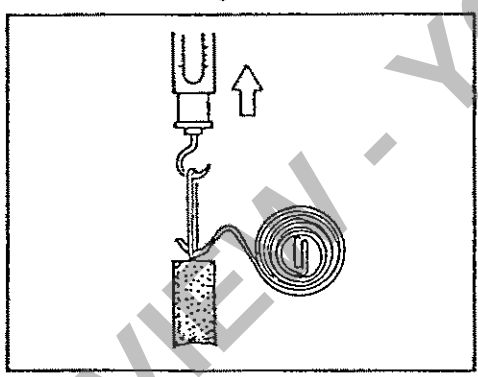


Fig. 24

(3) Inspection of the Brush Springs

Check the weight of the brush springs.

Standard Weight (Kg)
1.8 ~ 2.2

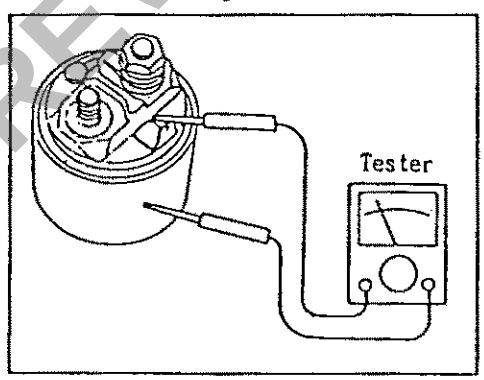


Fig. 25

5-5 Magnetic Switch

(1) Continuity Test for the Shunt Coil

Check for continuity between the "S" terminals and "M" (the switch body) with a tester. If there is continuity, then it is still good.

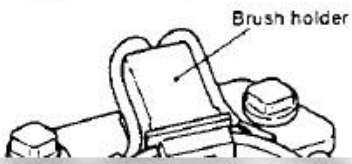
No continuity : (Disconnected coil)
Replace the magnetic switch.

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(3) Assembling the rear cover
Insert pins from the outside of the rear cover. Install the brush on the brush holder, then attach the rear cover. After assembly, pull out the pins.



(1) Measuring devices

DC voltmeter	0—15V or 0—30V, 0.5 Class, 1pc.
DC ammeter	0—100A, 1.0 Class, 1pc.
Variable resistor	0—0.25Ω, 1kW, 1pc.
Lamp	12V, 3W
100Ω resistor	3W
0.25Ω resistor	25W

(2) Measuring the regulating voltage

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