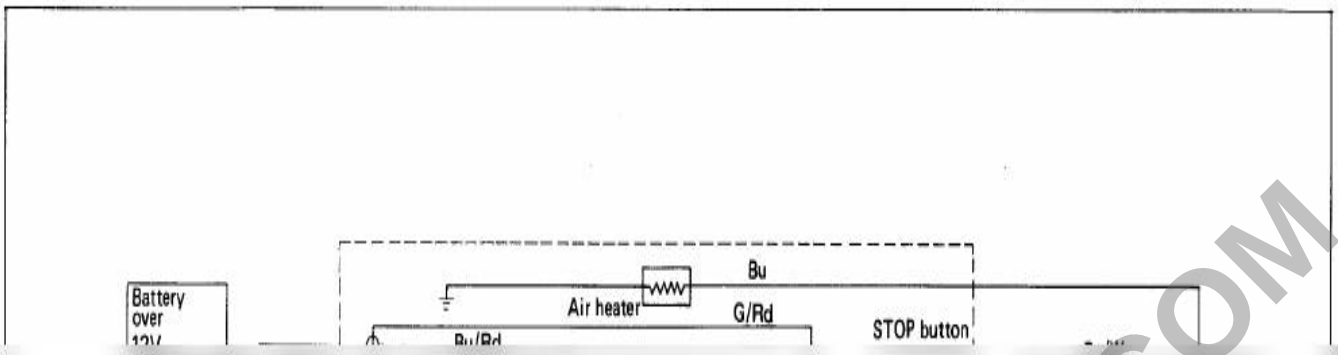
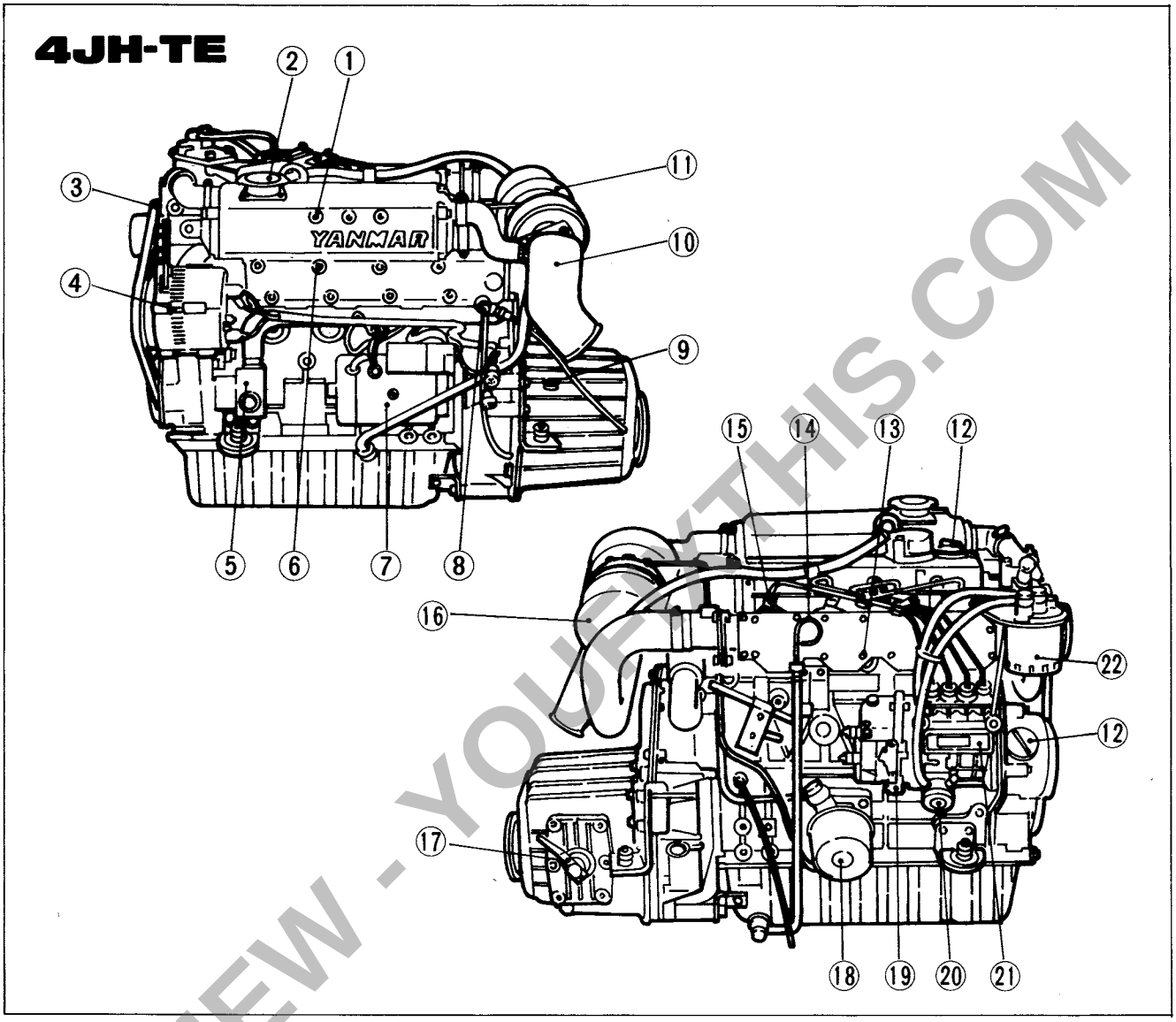


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II. Names of parts



No.	Names of Parts	No.	Names of Parts
1	Fresh water tank (fresh water cooler)	12	Lube oil feed port
2	Pressure cap (water feed port)	13	Air intake manifold
3	Cooling water pump (fresh water)	14	Oil dipstick
4	Alternator	15	Fuel injection valve
5	Cooling water pump (sea water)	16	Air intake silencer
6	Exhaust manifold	17	Clutch shift lever
7	Starting motor	18	Lube oil filter
8	Exhaust manifold water drain plug	19	Speed control lever
9	Marine gear lube oil dipstick	20	Fuel feed pump
10	Mixing elbow	21	Fuel oil injection pump
11	Turbo-charger	22	Fuel oil filter

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X. Trouble shooting

Problem	Possible cause	Possible remedy	See
1) Engine * Engine hard to start or will not start	1) Incorrect speed control position	* Set remote control lever in the high idle speed position	Page 17
	2) No fuel	* Check fuel tank	
	3) Fuel shut off valve closed	* Open shut off valve	
	4) Defective fuel feed pump	* Replace fuel feed pump	Your YANMAR Dealer
	5) Clogged fuel filter	* Replace filter	Page 26

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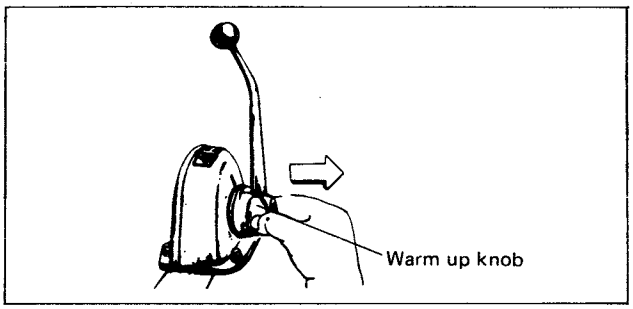
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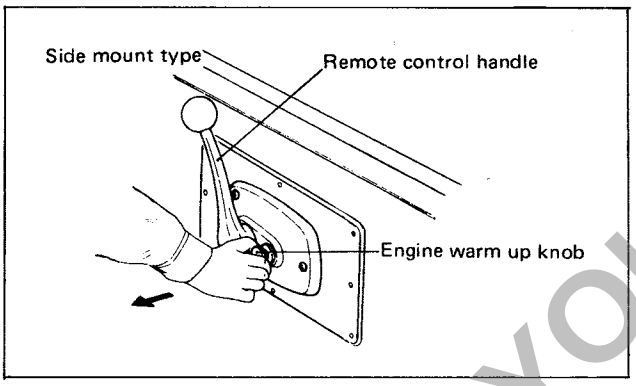
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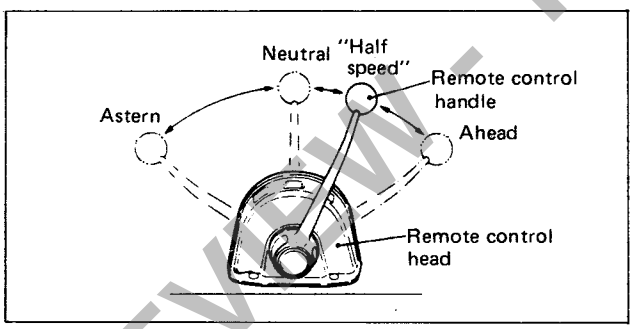
VII. Method of operation

7-1. Starting

1. Pull out the engine warm up knob and place the control lever in the "HALF SPEED" position.







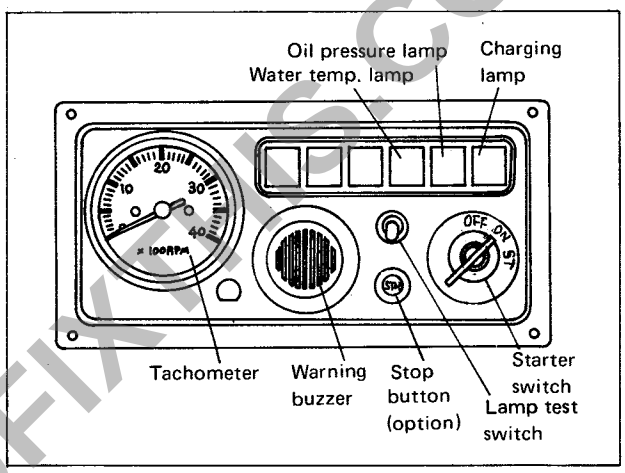
NOTE

1) **The knob for engine warm up can only be operated when the control lever is placed in the "Neutral" position.**

2. Turn the battery switch "ON".

3. Turn the key to the "START" positon. The engine will start. When the engine starts, release the key. The key automatically returns to the "ON" position.

4. When the engine is started, return the remote control handle to the "NEUTRAL" position. (Do not turn off the battery switch even after the engine starts. In the "ON" position, power is supplied to the gauges and warning devices on the instrument panel.)



IMPORTANT

1) **RELEASE the key switch when the engine starts.**
If the key switch is released before the engine starts, wait until the starter motor and engine stop running before trying again.

2) **Do not operate the starter motor more than 15 seconds at a time. If the engine does not start, wait at least one minute before trying again.**

3) **When the engine is operated at a low idling speed (below 1000rpm) for a long time (over 2 hours), excessive carbon and fuel residue tends to accumulate due to incomplete combustion.**
Carbon deposits on the injection holes of the fuel injection valve exhaust valve, the turbine blades of the turbocharger, etc. cause a drop in engine output, knocking, and other troubles. To prevent these problems, be sure to blow off the carbon accumulations by full speed operation.
Operate the engine at over 2500rpm for one minute in every two(2) hours of continuous low idling operation.

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Contents

I. **Specifications** 1
1-1. Engine specifications 1
1-2. Marine gear specifications 1
II. **Names of parts** 2
III. **Engine installation** 4
3-1. Inspection after unpacking 4
3-2. Preparation of the engine foundation plate 4
3-3. Engine installation 4
3-4. Propeller, propeller shaft 5
3-5. Cooling water supply device 5
3-6. Fuel oil supply device 8
3-7. Remote control 8
3-8. Recommended battery capacity 9
IV. **After launching** 10
V. **Fuel and lubricating oil** 11
5-1. Selection and handling of fuel oil 11
5-2. Selection of lubricating oil 12
VI. **Starting the new engine for the first time** 13
6-1. Supply of fuel oil 13
6-2. Supply of lubricating oil 13
6-3. Bleeding air from the fuel system 15
6-4. External inspection 15
6-5. Checking the instrument panel alarm system 15
6-6. Turning 16
VII. **Method of operation** 17
7-1. Starting 17
7-2. Cautions after starting the engine 18
7-3. Cautions during operation 18
7-4. Stopping 20
VIII. **Storage** 22
8-1. Storing 22
8-2. Removing engine from storage 22
IX. **Periodical inspection and maintenance** 23
9-1. Fuel oil system 24
9-2. Lubricating oil system 27
9-3. Cooling water system 28
9-4. Inspection of engine body 29
9-5. Washing the air intake silencer element 30
9-6. Electrical equipment 30
9-7. Inspecting the turbo-charger (Model RHB52, IHI make) 31
X. **Trouble shooting** 32
XI. **Fuel oil, lubricating oil and cooling water piping diagram** 36
11-1. 4JH-TE, 4JH-HTE, 4JH-DTE 36
11-2. 4JHE 37
XII. **Electrical wiring diagram** 38
XIII. **Optional device** 41

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5-2. Selection of lubricating oil

1. Engine lube oil

(1) Choice of lube oil

Lube oil selection is very important to a diesel engine. If an unsuitable oil is used, or oil is not changed regularly, it may result in damage and shorter engine life.

(2) Kinds of lube oil

Choose a lube oil with API service classifications CD.

(3) Lube oil viscosity

The viscosity of the lube oil greatly influences engine starting and running performance. The lube oil weight number should match the season and temperature.

Recommended SAE viscosity

SAE No.	SAE 10W	SAE20 or 20W	SAE30	SAE40
Engine room temperature	Below 0°C ~ 15°C ~ 30°C ~ 45°C			

2. Marine gear lube oil

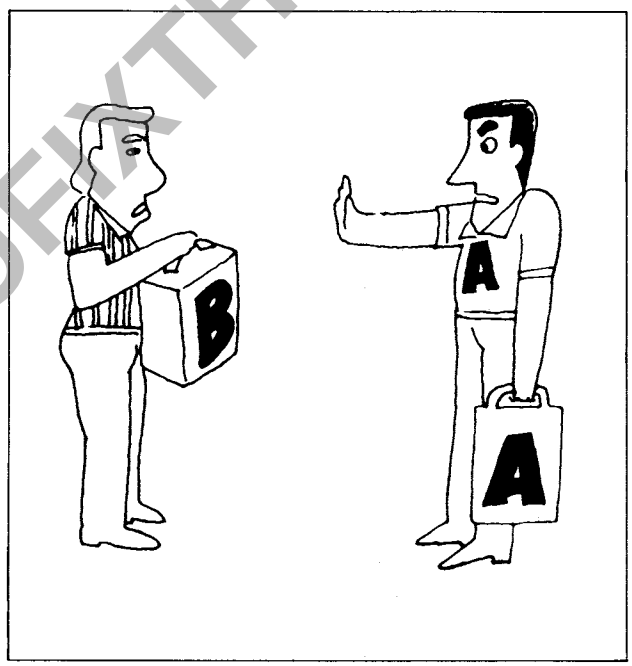
The marine gear lube oil is different from the engine lube oil. Choose a good quality lube oil from the list below.

Recommended brands of lube oil

Supplier	Brand name
SHELL	SHELL DEXRON
CALTEX	TEXAMATCI FLUID (DEXRON)
ESSO	ESSO ATF
MOBIL	MOBIL ATF220
B.P.	B.P.AUTRAN DX

NOTE

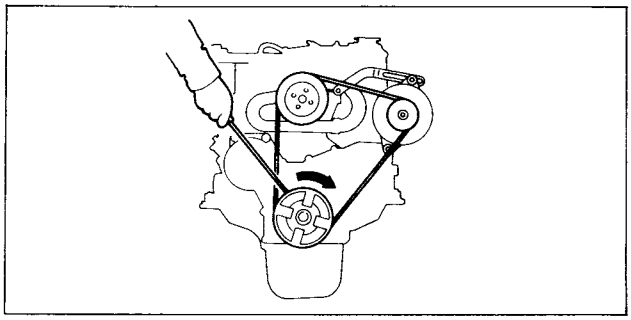
1) **When selecting a lube oil, consult your near-eat Yanmar dealer if you are not sure which oil is best.**
2) **Use of lube oils below the recommended standards will significantly shorten engine life.**
3) **Do not mix different lube oils since this lowers lubricating efficiency.**



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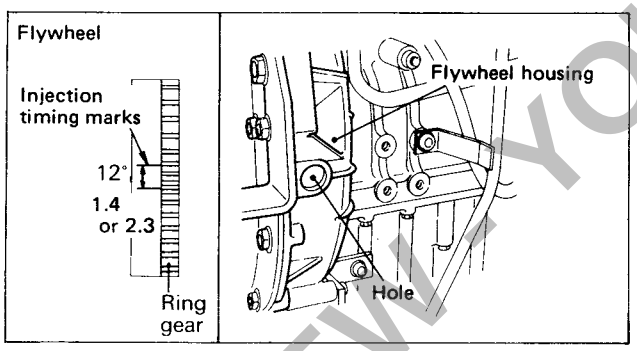
(3) Insert a turning bar into the hole on the crank pully on the front side. Crank the engine lightly to check the fuel injection timing.



(4) Timing marks on the flywheel can be seen through the hole on the flywheel housing.

NOTE

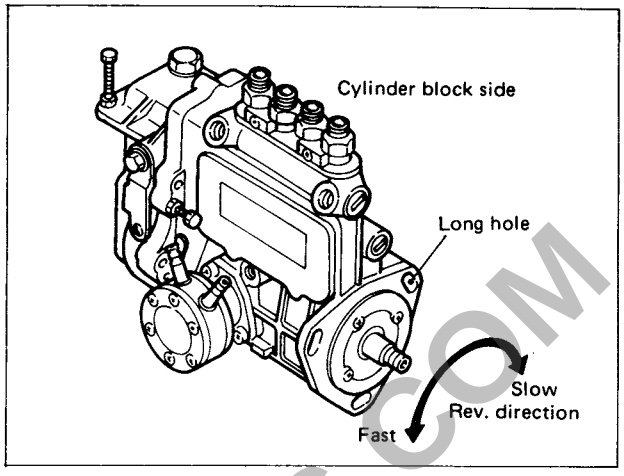
All timing marks on the flywheel are indicated by number; for example, 1.4 or 2.3. These indicate top dead center of the pistons. Fuel injection timing marks are described 12° before this TDC mark.



(5) Fuel should bubble out at the same time the timing mark on the flywheel and the indication mark on the flywheel housing line up.

(6) To adjust the fuel injection timing, adjust the installation position at the long hole of the pump. When it falls to the cylinder block side, injection timing is slower; when it falls to the other side, injection timing is faster.

Fuel injection timing
F.I.D. (b.T.D.C): 12° ±1°



(7) Check the fuel injection timing for all of the cylinders.

(8) Remove the fuel injection nozzle and check the injection spray condition. The spray should be cone-shaped.

If the spray is not cone-shaped, the following may apply:

a) injection pressure too low.
b) wear or sticking of the fuel injection nozzle.
c) fuel bad.

IMPORTANT

For disassembly, adjustment and inspection of the fuel injection pump and fuel injection valve, consult your nearest Yanmar dealer.

4. Replacing the fuel filter

(1) Since the fuel oil filter is of the cartridge type, the element cannot be cleaned by removing the filter. Replace the filter as a unit after the specified period of use.

Replace: Every 300 hours

(2) When installing the fuel oil filter, remove any dust and foreign matter from the contact surface.

(3) After installing the filter, bleed out the air, run the engine, and check for oil leaks.

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