

YANMAR

SERVICE MANUAL

MARINE DIESEL ENGINE

MODELS

4JHE

4JH-TE

4JH-HTE

4JH-DTE

FOREWORD

This service manual has been compiled for engineers engaged in sales, service, inspection and maintenance. Accordingly, descriptions of the construction and functions of the engine are emphasized in this manual while items which should already be common knowledge are omitted.

One characteristic of a marine diesel engine is that its performance in a vessel is governed by its applicability to the vessel's hull construction and its steering system.

Engine installation, fitting out and propeller selection have a substantial effect on the performance of the engine and the vessel. Moreover, when the engine runs unevenly or when trouble occurs, it is essential to check a wide range of operating conditions—such as installation on the hull and suitability of the ship's piping and propeller—and not just the engine itself. To get maximum performance from this engine, you should completely understand its functions, construction and capabilities, as well as proper use and servicing.

Use this manual as a handy reference in daily inspection and maintenance, and as a text for engineering guidance.

Models **4JH(B)E • 4JH-T(B)E** **4JH-HT(B)E • 4JH-DT(B)E**

CHAPTER 1 GENERAL

1. Exterior Views	1-1
2. Specifications	1-4
3. Construction	1-5
4. Performance Curves	1-6
5. Engine Cross Section	1-10
6. Dimensions	1-11
7. Piping Diagrams	1-15
8. Parts Interchangeability	1-18

CHAPTER 2 BASIC ENGINE PARTS

1. Cylinder Block	2-1
2. Cylinder Liners	2-4
3. Cylinder Head	2-6
4. Piston and Piston Pins	2-13
5. Connecting Rod	2-17
6. Crankshaft and Main Bearing	2-20
7. Camshaft and Tappets	2-23
8. Timing Gear	2-26
9. Flywheel and Housing	2-28

CHAPTER 3 FUEL INJECTION EQUIPMENT

1. Fuel Supply System	3-1
2. Disassembly, Reassembly and Inspection of Governor	3-9
3. Disassembly, Reassembly and Inspection of Fuel Injection Pump	3-18
4. Adjustment of Fuel Injection Pump and Governor	3-28
5. Automatic Advancing Timer	3-34
6. Fuel Feed Pump	3-36
7. Fuel Injection Nozzle	3-38
8. Troubleshooting	3-42
9. Fuel Injection Pump Service Data	3-44
10. Tools	3-45
11. Fuel Filter	3-47
12. Fuel Tank (Optional)	3-48
13. Design Change of Fuel Piping Line	3-49

CHAPTER 4 INTAKE AND EXHAUST SYSTEM

1. Intake and Exhaust System	4-1
2. Intake Silencer	4-4
3. Intake Manifold	4-5
4. Turbocharger	4-6
5. Mixing Elbow	4-21
6. Breather	4-22

CHAPTER 5 LUBRICATION SYSTEM

1. Lubrication System	5-1
2. Lube Oil Pump	5-3
3. Lube Oil Filter	5-6
4. Oil Pressure Control Valve	5-8
5. Lube Oil Cooler	5-9
6. Piston Cooling Nozzle	5-11
7. Rotary Waste Oil Pump (Optional)	5-12

CHAPTER 6 COOLING WATER SYSTEM

1. Cooling Water System	6-1
2. Sea Water Pump	6-4
3. Fresh Water Pump	6-7
4. Heat Exchanger	6-10
5. Pressure Cap and Sub Tank	6-12
6. Thermostat	6-14
7. Kingston Cock (Optional)	6-16
8. Sea Water Filter (Optional)	6-17
9. Bilge Pump and Bilge Strainer (Optional)	6-18

CHAPTER 7 REDUCTION AND REVERSING GEAR

Marine gear model KBW 20 and 21

1. Construction	7-1
2. Installation	7-6
3. Inspection and Servicing	7-7
4. Operation and Maintenance	7-8
5. Disassembly	7-13
6. Reassembly	7-17
7. Special Tools	7-23

Marine gear model KM4A, (Angle drive)

1. Construction	7-24
2. Shifting Device	7-28
3. Inspection and Servicing	7-33
4. Special Tools	7-43
5. Disassembly	7-45
6. Reassembly	7-53

CHAPTER 8 REMOTE CONTROL

1. Remote Control System	8-1
2. Remote Control Installation	8-2
3. Remote Control Inspection	8-5
4. Remote Control Adjustment	8-6

CHAPTER 9 ELECTRICAL SYSTEM

1. Electrical System	9-1
2. Battery	9-6
3. Starter Motor	9-9
4. Alternator	9-20
5. Instrument Panel and Wiring Codes	9-30
6. Warning Devices	9-35
7. Air Heater (Optional)	9-38
8. Electric Type Engine Stop Device (Optional)	9-39
9. Tachometer	9-41
10. Alternator 12V/80A (Optional)	9-44

CHAPTER 10 DISASSEMBLY AND REASSEMBLY

1. Disassembly and Reassembly Precautions	10-1
2. Disassembly and Reassembly Tools	10-2
3. Disassembly and Reassembly	10-9
4. Bolt/nut Tightening Torque	10-32
5. Test Running	10-33

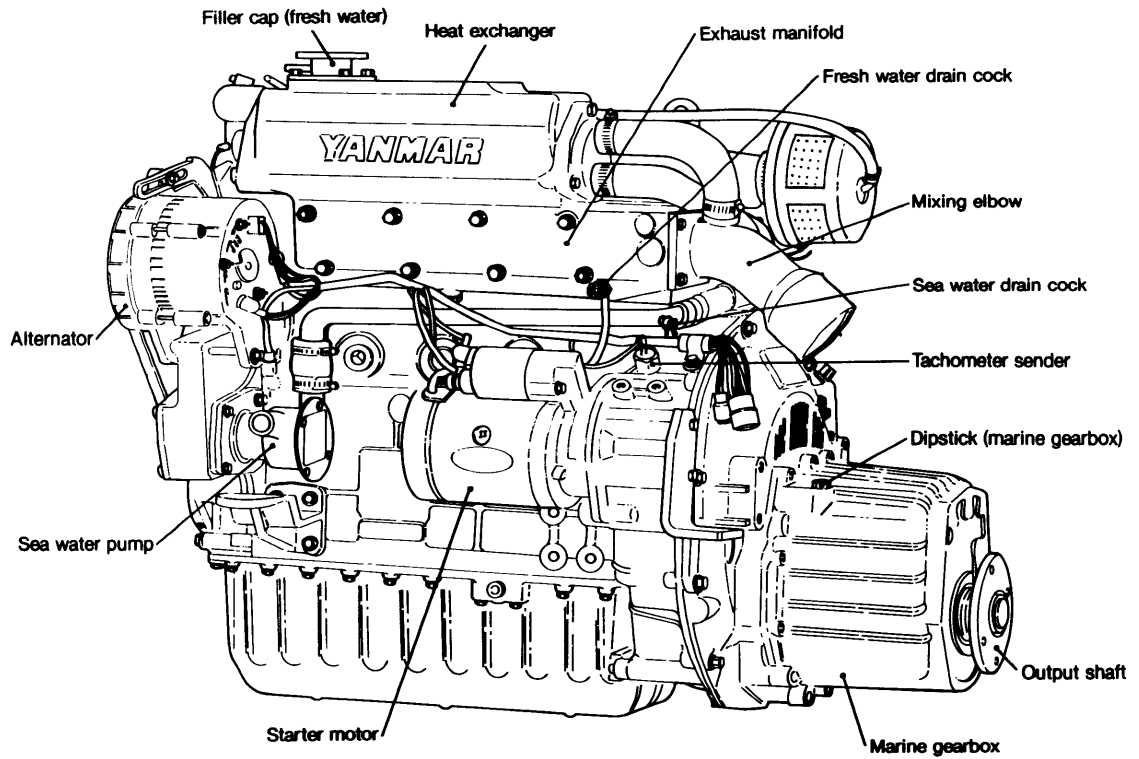
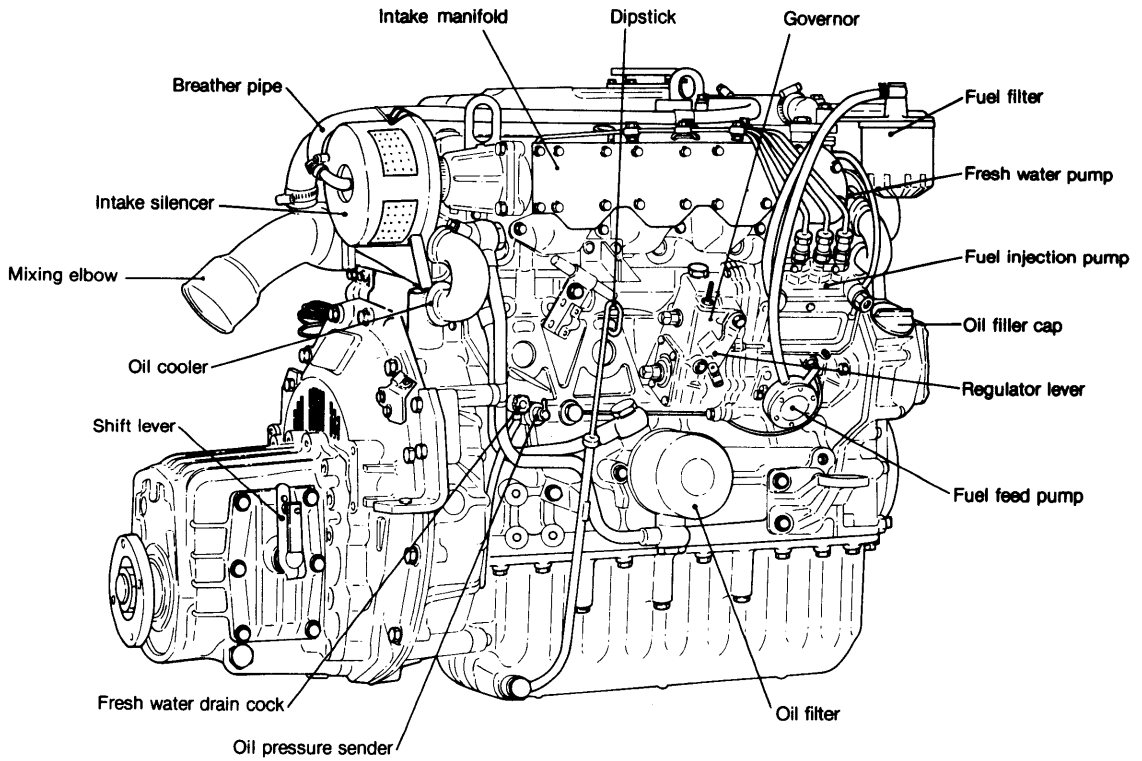
CHAPTER 1

GENERAL

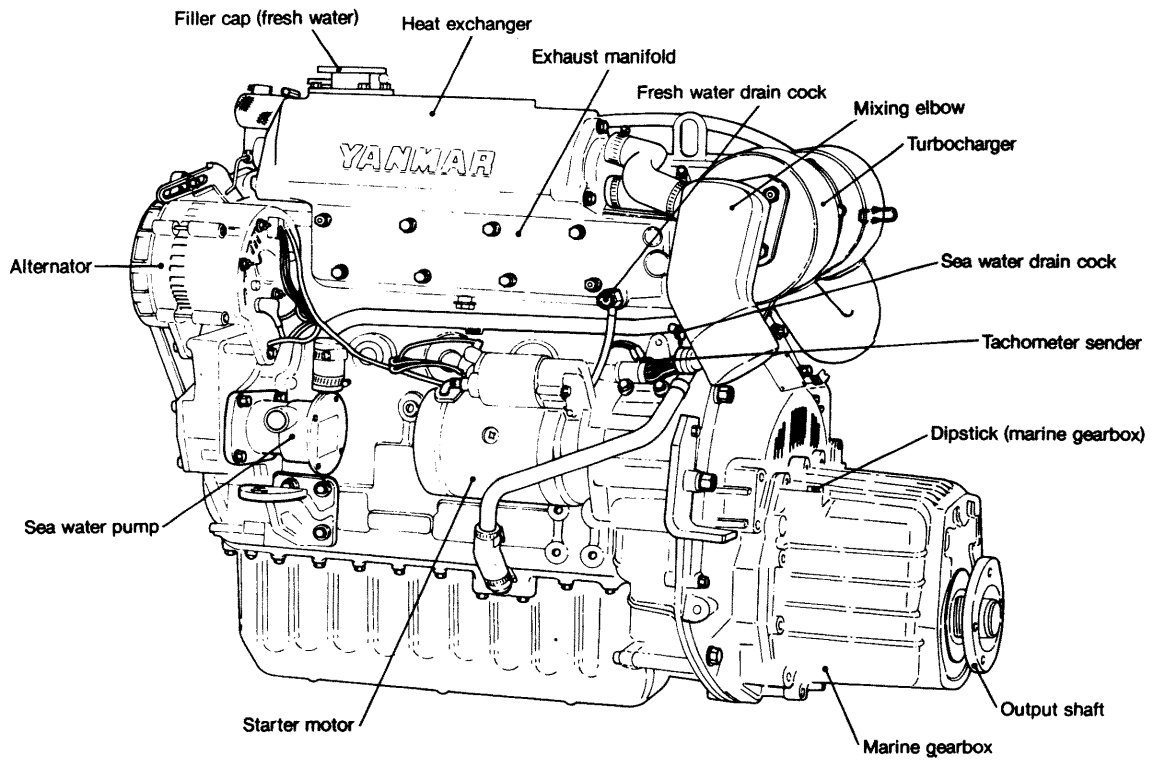
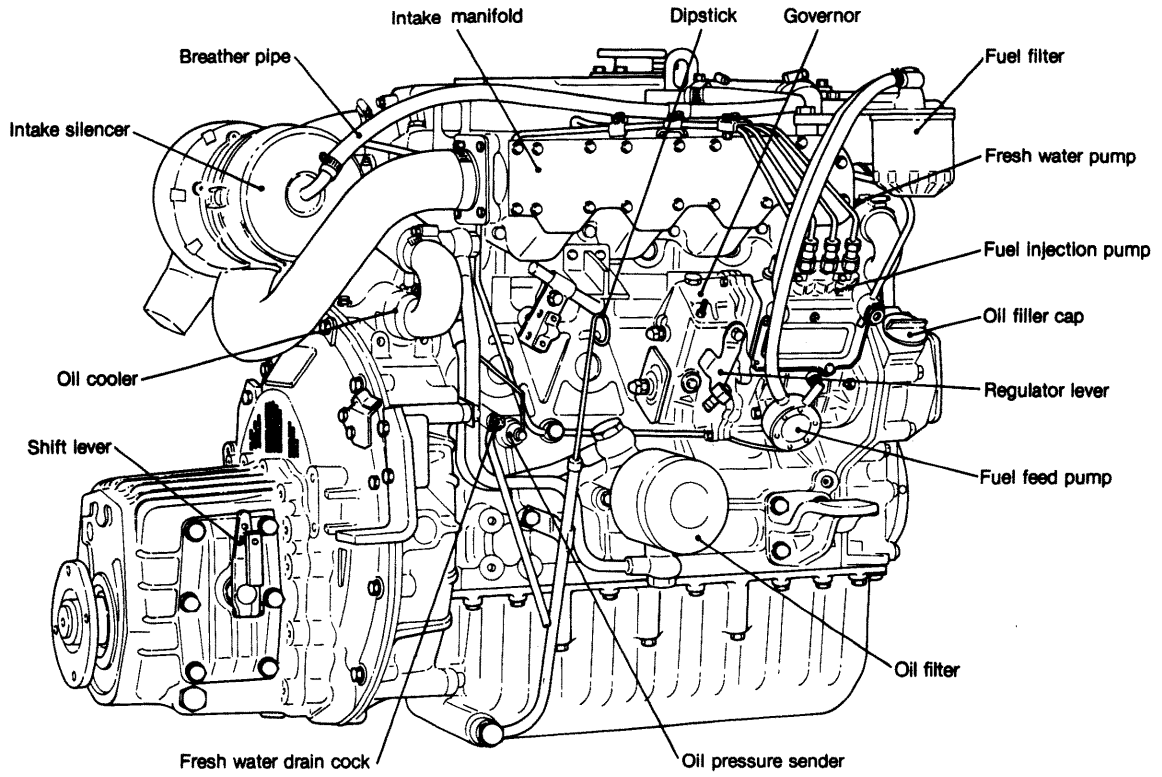
1. Exterior Views	1-1
2. Specifications	1-4
3. Construction	1-5
4. Performance Curves	1-6
5. Engine Cross Section	1-10
6. Dimensions	1-11
7. Piping Diagrams	1-15
8. Parts Interchangeability	1-18

1. Exterior Views

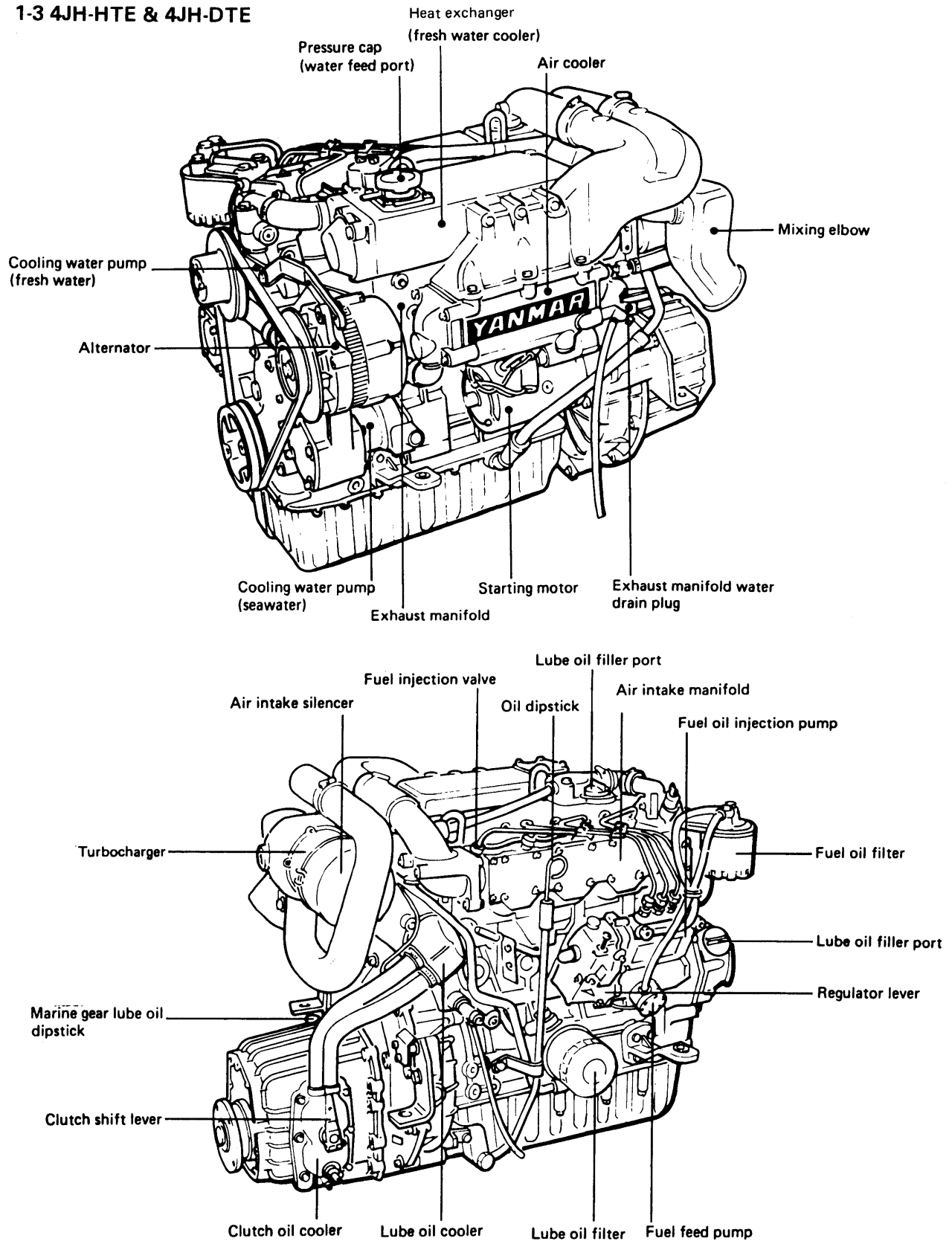
1-1 4JHE



1-2 4JH-TE



1-3 4JH-HTE & 4JH-DTE



2. Specifications

Model		4JHE	4JH-TE	4JH-HTE	4JH-DTE	
Type		Vertical 4-cycle water cooled diesel engine				
Combustion system		Direct injection				
Aspiration		Normal aspiration	Exhaust gas turbine turbocharger	Exhaust gas turbine turbocharger with intercooler		
Number of cylinders		4				
Bore x stroke		mm (in.) 78 x 86 (3.07 x 3.39)				
Displacement		ℓ (cu.in.) 1.644 (100.33)				
One hour rating output (DIN6270B)	Output/crankshaft speed	HP/rpm (kW/rpm)	44/3600 (32.4/3600)	55/3600 (40.5/3600)	66/3600 (48.6/3600)	77/3600 (56.7/3600)
	Brake mean effective pressure	Kg/cm ² (lb./in. ²)	6.69 (95.15)	8.36 (118.91)	10.0 (142.20)	11.7 (166.37)
	Piston speed	m/sec. (ft./sec.)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)
Continuous rating output (DIN6270A)	Output/crankshaft speed	HP/rpm (kW/rpm)	40/3500 (29.5/3500)	50/3500 (36.8/3500)	60/3500 (44.2/3500)	70/3500 (51.5/3500)
	Brake mean effective pressure	kg/cm ² (lb./in. ²)	6.26 (89.04)	7.82 (111.23)	9.39 (133.53)	11.0 (156.42)
	Piston speed	m/sec. (ft./sec.)	10.0 (32.81)	10.0 (32.81)	10.0 (32.81)	10.0 (32.81)
Compression ratio		17.8	16.2	15.9	15.9	
Fire order		180° 180° 180° 180° 1 - 3 - 4 - 2 - 1				
Fuel injection pump		Bosch in-line type YPES-CL				
Fuel injection timing (FID)		degree	12° ± 1° (*9° ± 1°) bTDC	12° ± 1° bTDC	12° ± 1° bTDC	12° ± 1° bTDC
Fuel injection pressure		kg/cm ² (lb./in. ²)	200 ± 5 (2844 ± 71)			
Fuel injection nozzles		Hole type				
Direction of rotation	Crankshaft	Counter-clockwise viewed from stern				
	Propeller shaft (Forward)	Clockwise viewed from stern				
Power take off		At flywheel side				
Cooling system		Constant high temperature fresh water cooling Fresh water: Centrifugal pump Sea water: Rubber impeller pump				
Lubrication system		Forced lubrication with trochoid pump				
Starting system	Starting motor	DC 12V, 1.8kW				
	AC generator	12V, 55A				
Turbocharger	Type		RHB52 (IHI)	RHB52HW (IHI)		
	Model		MY29	MY31	MY34	
	Cooling system		Air cooling	Water cooling		
Air cooler system	Type			Sea-water cooled, Plate fin type	Sea-water cooled, Corrugated fin type	
	Radiation area	m ² (in. ²)		0.76 (1178)	0.67 (1038)	
Clutch	Model		KBW20	KBW21	KBW21	
	Type		Constant mesh gear with multiple friction disc clutch			
	Reduction ratio (Forward/Reverse)		2.17/3.06, 2.62/3.06, 3.28/3.06		2.17/3.06, 2.62/3.06	
	Propeller speed DIN6270A rating (Forward/Reverse)		1615/1145, 1336/1145, 1068/1145		1615/1145, 1336/1145	
	Lubricating oil capacity Effect/max	ℓ (cu.in.)	0.15/1.2 (9.15/73.22)			
	Clutch weight	kg (lb.)	26 (57.33)	30 (66.15)	30 (66.15)	
Dimensions	Overall length	mm (in.)	906.3 (35.68)	906.3 (35.68)	906.3 (35.68)	
	Overall width	mm (in.)	561 (22.09)	561 (22.09)	561 (22.09)	
	Overall height	mm (in.)	659 (25.94)	668 (26.30)	668 (26.30)	
Engine weight with clutch (dry)		kg (lb.)	226 (498)	232 (511)	246 (542)	
Lubricating oil capacity Effect/max.		ℓ (cu.in.)	3.0/6.5 (183.06/396.63)			
Cooling water capacity (Fresh water)	Fresh water tank	ℓ (cu.in.)	6.0 (366.12)			
	Sub tank	ℓ (cu.in.)	0.8 (48.82)			

Note: * Applicable engine number #/E 00101 ~ 00574

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