

GENERAL ENGINE DATA

Type	-----	4-Cycle, Water Cooled	
Aspiration	-----	Turbo-Charged, Inter Cooler (Raw water to Cooler)	
Cylinder Arrangement	-----	60°V	
No. of Cylinders	-----	12	
Bore mm(in.)	-----	150	(5.91)
Stroke mm(in.)	-----	160	(6.30)
Displacement Liter(in. ³)	-----	33.93	(2071)
Compression Ratio	-----	14.5 : 1	
Dry Weight - Engine only - kg(lb)	-----	3720	(8203)
Wet Weight - Engine only - kg(lb)	-----	3946	(8701)

PERFORMANCE DATA**Steady State Speed Stability Band at any Constant Load(Generator Use)**

Hydraulic (std.) or Electric Governor - %	-----	±0.25 or better	
Idling Speed -rpm	-----	600 ~ 650	
Maximum Overspeed Capacity - rpm	-----	2400	
Moment of Inertia of Rotating Components J- kg · m ² (lbf · ft ²)	-----	10.65	(1011)
(Includes 18 inch Flywheel)			
Cyclic Speed Variation with Flywheel at	1800rpm -----	1/552	
	1500rpm -----	1/373	

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Flywheel Housing	-----	1961	(1447)
		- N · m(lbf · ft)	

AIR INLET SYSTEM

Maximum Intake Air Restriction (Includes piping)- kPa (in.H ₂ O)	-----	3.92	(15.7)
Maximum Allowable Intake Air Temperature- °C (°F)	-----	45	(113)

EXHAUST SYSTEM

Maximum Allowable Back Pressure - kPa (in.H ₂ O)	-----	4.41	(17.7)
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LUBRICATION SYSTEM

Oil Pressure at Idle - MPa (psi)	-----	0.2 ~ 0.3	(29 ~ 43)
at Rate Speed - MPa (psi)	-----	0.5 ~ 0.6	(71 ~ 86)
Maximum Oil Temperature- °C (°F)	-----	110	(230)
Oil Capacity of Marine Pan	High - liter (U.S.gal)	-----	120 (31.7)
	Low - liter (U.S.gal)	-----	92 (24.3)
Total System Capacity (Includes Oil Filter) - liter (U.S.gal)	-----	140	(37.0)
Maximum Installation Angle	Front Up	-----	11°
	Front Down	-----	9.5°
Maximum Instantaneous Operating Angle	Front Up	-----	45°
(Engine Level)	Front Down	-----	24°
	Side to Side	-----	22.5°

COOLING SYSTEM

Coolant Capacity - liter (U.S.gal)	-----	100	(26.4)
(Engine only)			
Maximum External Friction Head at Engine Outlet-MPa(psi)	-----	0.034	(5.0)
Recommended Static Head of Coolant above Crankshaft Center - m(ft)			
	MAX.	-----	10 (32.8)
	MIN.	-----	7 (23.0)
Standard Thermostat (Modulating)Range- °C (°F)	-----	71 ~ 85	(160 ~ 185)
Maximum Coolant Temperature at Engine Outlet- °C (°F)	-----	95	(203)
Recommended Coolant Temperature at Engine outlet- °C (°F)	-----	80	(176)
Minimum Coolant Expansion Space-% of System Capacity	-----	10	
Maximum Coolant Temperature at Inter Cooler Inlet, TK type- °C (°F)	-----	32	(90)

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FUEL SYSTEM

Fuel Injection Pump	_____	Bosch P Type x 2
Maximum Suction Head of Feed Pump - kPa (in. Hg)	_____	14.7 (4.3)
Maximum Level of Fuel Tank - m	_____	5.0
	Continuous Use	_____
	Stand-by Use	_____
		2.0
Minimum Fuel Oil Supply Pipe Inner Diameter - mm(in.)	_____	20 (0.79)
Minimum Fuel Oil Leak Pipe Inner Diameter - mm(in.)	_____	20 (0.79)

STARTING SYSTEM

Battery Charging Alternator - V-Ah	_____	24-35
Starting Motor Capacity - V -kW	_____	24-7.5×2
Maximum Allowable Resistance of Cranking Circuit - m Ω	_____	1.5
Recommended Minimum Battery Capacity		
At 5°C (41°F) and above - Ah	_____	300
Below 5°C (41°F) through -5°C (23°F)	_____	500
Cranking Ampere of Starter at 5°C (41°F) / -5°C (23°F)		
Static Ampere -A		380 × 2 / 480 × 2
Momentary Ampere -A		680 × 2 / 900 × 2

ACCESSORY EQUIPMENT

Air Cleaner		Silencer Type
Exhaust Manifold		Air Cooled
Turbocharger		Air Cooled
Air Cooler		Raw Water Cooled
Breather		Conduction Type
Governor		Hydraulic PSG Type
Fuel Injection Pump		
Fuel Feed Pump		
Fuel Injection Pipe		Standard Type
Fuel Injection Nozzle		
Fuel Filter		Paper Element Type
Lubricating Oil Pump		
Lubricating Oil Cooler		
Lubricating Oil Filter(Full-Flow)		Paper Element Type
Lubricating Oil Filter(By-Pass Flow)		Paper Element Type
Oil Pan		Large Capacity,steel
Cooling Water Pump		
Cooling Water Thermostat		
Starter		Earth Float Type
Alternator		Earth Float Type
Stop Solenoid		DC24V-15A
Engine Support		Marine Type
Accessory Drive		Front Drive Pulley

ACCESSORY EQUIPMENT(LOOSE SUPPLY)

Relay Safety		For Starter
Jack Bolt		
Companion Flange		
Standard Tools		
Standard Spare Parts		

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ENGINE RATING

All data represent net performance according to ISO3046 with standard accessories such as fuel injection pump, water pump L.O. pump and charging alternator under the condition of 100kPa(750 mm Hg), barometric pressure 298K(25°C) ambient temperature and 30% relative humidity.

A:Light duty B:Medium duty C:Heavy duty

ITEM	UNIT	Propulsion use			Generator use		
		A	B	C	60Hz	50Hz	
Engine Speed	rpm	2100	2000	1940	1800	1500	
No. of Cylinders		12					
Bore	mm (in.)	150 (5.91)					
Stroke	mm (in.)	160 (6.30)					
Displacement	liter (in. ³)	33.93 (2071)					
Brake Horse Power	kW (HP)	858 (1150)	776 (1040)	701 (940)	828 (1110)	709 (950)	
Brake Mean Effective Pressure	MPa (psi)	1.44 (209)	1.37 (199)	1.28 (186)	1.63 (236)	1.67 (242)	
Mean Piston Speed	m/s (ft/min)	11.2 (2205)	10.7 (2106)	10.3 (2028)	9.6 (1890)	8.0 (1575)	
Maximum Regenerative Power Absorption Capacity	kW (HP)	127 (170)	116 (155)	109 (146)	93 (125)	68 (91)	
Intake Air Flow	m ³ /min (CFM)	78 (2754)	71 (2507)	63 (2225)	72 (2542)	60 (2119)	
Exhaust Gas Flow	m ³ /min (CFM)	208 (7344)	188 (6638)	167 (5897)	190 (6709)	158 (5579)	
Coolant Flow	liter/min (U.S. GPM)	1200 (317)	1180 (312)	1160 (306)	1120 (296)	1000 (264)	
Coolant(Jacket water) Pressure (water pump outlet)	MPa (psi)	0.21 (31)	0.20 (28)	0.19 (27)	0.17 (24)	0.11 (16)	
Coolant Flow to Inter Cooler (TK only)	liter/min (U.S. GPM)	200 (53)	200 (53)	200 (53)	200 (53)	200 (53)	
Oil Flow	liter/min (U.S. GPM)	440 (116)	410 (108)	400 (106)	370 (98)	310 (82)	
Radiated Heat to Ambient	kJ/hr (BTU/min)	247473 (3910)	223802 (3536)	198670 (3139)	226069 (3572)	188615 (2980)	
Heat Rejection to Coolant (include water cooled manifold)	kJ/hr (BTU/min)	1732311 (27370)	1566612 (24752)	1390691 (21973)	1582482 (25003)	1320304 (20861)	
Heat Rejection to Inter Cooler (TK Version)	kJ/hr (BTU/min)	329964 (5213)	298402 (4715)	264893 (4185)	301425 (4763)	251487 (3973)	
Heat Rejection to Exhaust	kJ/hr (BTU/min)	2851553 (45054)	2578796 (40745)	2244142 (35457)	2445256 (38635)	1975967 (31220)	
Noise Level (1 m height & distance) (excludes, Intake,Exhaust)	dB(A)						
Maximum No Load Governed Speed	rpm	2258	2150	2086	1890	1575	

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