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Ratings

RPM	Gross Engine Output		
	COP kWm	PRP kWm	ESP kWm
1500	28.8	30	33

Basic data

Engine model	.....4M06G33/5
N° of Cylinders / Valves	.....4 / 8
Cylinders arrangement	.....In line
Bore x Stroke (mm)	.....89 × 92
Displacement (L)	.....2.3
Thermodynamic Cycle	.....Diesel 4 stroke
Cooling System	.....Liquid (water + 50% antifreeze)
Injection System	.....Direct
Fuel System	.....Mechanical Pump
Aspiration	.....Turbocharged
Compression ratio	.....17.5 : 1
Flywheel housing	.....SAE 3
Flywheel	.....11.5"
N° of teeth on flywheel ring gear	.....128
Inertia of flywheel (kg/m ²)	.....0.47
Inertia of crankshaft (kg/m ²)	.....0.039
Emission standard	.....N/A
Overall Dimensions with radiator (Length x Width x Height) (mm)1136 × 635 × 785
Engine dry weight (kg)280
Engine wet weight (includes oil, coolant) (kg)308

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Air intake system

Air intake temperature rise (°C)	≤ 5
Air intake restriction clean filter (mBar)	≤ 35
Air intake restriction dirty filter (mBar)	≤ 60
Recommended air flow @ PRP (m ³ /min)	1.92
Recommended air flow @ ESP (m ³ /min)	1.98
Min. diameter of intake pipe (mm)	50

Intercooling system


Intercooler heat dissipating capacity @ PRP (kJ/s)	N/A
Intercooler heat dissipating capacity @ ESP (kJ/s)	N/A
Max. intake temperature @ 25°C ambient temperature (°C)	N/A
Max. difference between intake temperature and ambient temperature (°C)	N/A
Max. intake pressure drop of intercooler (mBar)	N/A

Cooling system

System designed for ambient temperature up to (°C)	50
Min. inside diameter of coolant outlet pipe (mm)	32
Coolant capacity of radiator and pipes (L)	11
Coolant alarm (shutdown) temperature (°C)	105
Thermostat opening temperature / full open temperature (°C)	72 / 82
Min. pressure in cooling system (Bar)	0.15
Coolant capacity of the engine (L)	5

Exhaust system

Max. exhaust back pressure (mBar)	80
Max. exhaust temperature before turbocharger (°C)	≤ 700
Max. exhaust temperature after turbocharger (°C)	≤ 650
Exhaust flow @ PRP (m ³ /min)	6
Exhaust flow @ ESP (m ³ /min)	6.48
Min. diameter of exhaust pipe (mm)	50
Max. bending moment of exhaust gas exit flange (Nm)	10

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Lubrication system

Oil capacity Low / High (L)	7.1 / 9.5
Oil pressure in normal condition idle speed (Bar)	≥ 1
Oil pressure in normal condition at 1500 Rpm (Bar)	2 - 5
Lowest oil pressure alarm (shutdown) (Bar)	1
Max. oil temperature (°C)	115
Oil flow (L/min)	22
Oil fuel consumption ratio based on engine fuel consumption data	≤ 0.4 %
Total system capacity (including filters) (L)	11.5

Noise


Diesel engine noise (Acoustic power level) (dB(A))	106.1
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Fuel system

Governor	Electronic
Max. restriction at fuel pump inlet (Bar)	0.5
Max. fuel return restriction (Bar)	0.5
Max. fuel inlet temperature (°C)	70
Fuel supply flow (L/hr)	40.2
Min. pressure of fuel pump (Bar)	1.3
Min. diameter of inlet pipe (mm)	10
Min. diameter of return pipe (mm)	10

Electrical system

Electrical system voltage (negative to ground) (Vdc)	12
Starter power (kW)	3
Battery charger current (A)	55
Max. electric resistance of starting circuit (Ω)	0.004
Min. sectional area of wire (mm ²)	50
Min. cold start temperature without auxiliary starting device (°C)	- 5
Min. cold start temperature with auxiliary starting device (°C)	- 15

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Heat balance test data (with ambient temperature 28 °C)

Total heat dissipation @ ESP (kJ/s)44.1

Performance data

Mean Piston Speed (m/s)4.6

BMEP (Bar)11,47

Fan absorbed power (kW)0.5

Fuel consumption

Rating	gr/kWh	L/hr
100% ESP	212.9	8.5
100% PRP	211.7	7.6
75% PRP	212.2	5.4
50% PRP	221.9	4.1
25% PRP	269.2	2.4
Fuel consumption tolerance + 3 %		

Ratings definitions

Emergency Standby Power (ESP)

Emergency Standby Power is the maximum power available for a varying load for the duration of a main power network failure. The average load factor over 24 hours of operation should not exceed 70% of the engine's ESP power rating. Typical operational hours of the engine is 200 hours per year, with a maximum usage of 500 hours per year. This includes an annual maximum of 25 hours per year at the ESP power rating. No overload capability is allowed. The engine is not to be used for sustained utility paralleling applications.

Prime Power (PRP)

Prime Power is the maximum power available for unlimited hours of usage in a variable load application. The average load factor should not exceed 70% of the engine's PRP power rating during any 24 hour period. An overload capability of 10% is available, however, this is limited to 1 hour within every 12 hour period.

Continuous Power (COP)

Continuous Power is the maximum power available for an unlimited period of use at a constant load factor. No overload capability is allowed.

- 1) All ratings are based on operating conditions under ISO 8528-1, ISO 3046, DIN6271. Performance tolerance of $\pm 5\%$.
- 2) Test conditions : 100 kPa, 25°C air inlet temperature, relative humidity of 30%, with fuel density 0.84 kg/L. Derating may be required for conditions outside these; please contact the factory for details.
- 3) Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan and optional equipment.