Ratings

| RPM | Gross Engine Output | | | | Net Engine Output * | | | |
|---|---|---|---|---|---|---|---|---|
| | PRP | | ESP | | PRP | | ESP | |
| | kWm | BHP | kWm | BHP | kWm | BHP | kWm | BHP |
| 1500 | 96 | 129 | 106 | 142 | 92 | 124 | 102 | 137 |

1 kWm = 1,34102 BHP
* When the engine is used with a cooling system using an electrically driven fan, net engine output data may change and quoted figures should be used for reference only

## Basic data

Engine model ..... 4M10G110/5
N° of Cylinders / Valves .....4 / 8
Cylinders arrangement ..... In line
Bore x Stroke (mm) .....105 × 118
Displacement (L) .....4.087
Thermodynamic Cycle ..... Diesel 4 stroke
Firing Order ..... 1-3-4-2
Mean Piston Speed (m/s) .....5.9
BMEP @ ESP (Bar) .....20.8
Cooling System .....Liquid (water + 50% antifreeze)
Injection System .....Direct
Fuel System .....Mechanical Pump
Aspiration ..... Turbocharged and Aftercooled
Compression ratio .....17.5 : 1
Flywheel housing .....SAE 3
Flywheel .....11.5"
Rotation Viewed from Flywheel… ..... Counter Clockwise
Allowed static bending moment of the flywheel housing…. .....7000
N° of teeth on flywheel ring gear .....128
Inertia of flywheel (kg•m²) .....0.391
Inertia of crankshaft (kg•m²) .....0.111
Emission standard .....N/A
Overall Dimensions with radiator (Length x Width x Height) (mm) .....1330×741×995
Engine dry weight without radiator and without radiator pipes (kg) .....400
Engine dry weight with radiator and radiator pipes (kg) .....495
Engine wet weight with radiator (includes oil, coolant) (kg) .....530

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## Air intake system

Air intake temperature rise (°C) ..... ≤ 5
Air intake restriction clean filter (mBar) ..... ≤ 30
Air intake restriction dirty filter (mBar) ..... ≤ 60
Recommended air flow @ PRP (m³/min) ..... 6.26
Recommended air flow @ ESP (m³/min) ..... 6.92
Min. diameter of intake pipe (mm) ..... 60

## Aftercooling system

Aftercooler system type ..... Air to Air
Max. intake temperature @ 25°C ambient temperature (°C) ..... 55
Max. difference between intake temperature and ambient temperature (°C) ..... 30
Max. intake pressure drop of aftercooler (mBar) ..... 80

## Lubrication system

Oil capacity Low / High (L) ..... 12 / 14
Oil pressure in normal condition idle speed (Bar) ..... ≥ 1
Oil pressure in normal condition at 1500 Rpm @ PRP (Bar) ..... 3 - 5
Lowest oil pressure alarm (shutdown) (Bar) ..... 1
High Oil Pressure Warning …. ..... 10
Max. oil temperature (°C) ..... 110
Oil flow at 1500 Rpm (L/min) ..... 52.8
Oil fuel consumption ratio based on engine fuel consumption data ..... ≤ 0.1%
Total system capacity (including filters) (L) ..... 13

## Heat balance test data (with ambient temperature 35 °C)

Total heat dissipation @ ESP (kJ/s) ..... 163.4
- Heat Rejection to Jacket Water @ ESP (kJ/s) ..... 54.7
- Heat Rejection to Aftercooler @ ESP (kJ/s) ..... 16.9
- Radiated Heat to Ambient @ ESP (kJ/s) ..... 13.1
- Heat Rejected to Exhaust @ ESP (kJ/s) ..... 78.7

## Exhaust system

Max. exhaust back pressure (mBar) ..... 50
Max. exhaust temperature before turbocharger (°C) ..... 700
Max. exhaust temperature after turbocharger (°C) ..... 550
Exhaust flow @ PRP (m³/min) ..... 19.01
Exhaust flow @ ESP (m³/min) ..... 21.63
Min. diameter of exhaust pipe (mm) ..... 70
Max. bending moment of exhaust gas exit flange (Nm) ..... 10

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## Cooling system with standard radiator

System designed for ambient temperature up to (°C) [1] ..... 50
Radiator type ..... Mechanical
Fan type ..... Belt driven pusher
Min. inside diameter of coolant outlet pipe (mm) ..... 36
Coolant capacity of radiator and pipes (L) ..... 14.2
Coolant alarm (shutdown) temperature (°C) ..... 105
Thermostat opening temperature / full open temperature (°C) ..... 76 / 89
Max. additional restriction for external cooling circuit (Bar) ..... 0.38
Coolant capacity of the engine (L) ..... 9.4
Cooling fan airflow (m³/min)* ..... 125.7
Fan absorbed power (kW) ..... 2.5
Additional restriction (for reference) - Duct allowance (Pa) ..... 50

* Air flow figure assumes the presence of the standard radiator provided, taking into consideration the backpressure caused

## Fuel system

Governor ..... Electronic
Governor steady state speed stability at constant load (ISO 8528-5 Class G3) [2] ..... ≤ +/- 0.5 %
Max. restriction at fuel inlet (Bar) ..... 0.09
Max. pressure at fuel inlet (Bar) ..... 0.12
Max. fuel return restriction (Bar) ..... 0.12
Max. fuel inlet temperature (°C) ..... 50
Fuel supply flow (L/hr) ..... 84
Min. internal diameter of inlet pipe (mm) ..... 10
Min. internal diameter of return pipe (mm) ..... 10

## Electrical system

Electrical system voltage (negative to ground) (Vdc) ..... 12
Starter power (kW) ..... 3.8
Battery charger current (A) ..... 80
Battery charger absorbed power (kW) ..... 1.12
Max. electric resistance of starting circuit (Ω) ..... 0.004
Min. sectional area of wire (mm²) ..... 50
Min. cold start temperature without auxiliary starting device (°C) [3] ..... - 15
Min. cold start temperature with auxiliary starting device (°C) [3] ..... -25

[1] The indicated value is based on the AOT value of 50°C for an engine tested at 100% of the ESP Power, reflecting temperature in an open condition, without an enclosure or container, without any airflow obstruction in the front of the radiator, without air recirculation, with free exhaust gas exit and with the engine thermostatic valve in its full open condition, without a closing plate present. The reference air restriction is equal to 50Pa. For the equivalent ATB (Air-to-Boil) performance in a customer or project basis, please consult Baudouin Application Engineering.

[2] This refers only to the frequency response of the engine and should not be confused with the performance class of the Generator Set, which is subject to additional contributing factors such as alternator selection and control settings.

[3] Engines used in emergency standby application or applications that require immediate start under load, they must be equipped with coolant heaters. Baudouin recommend heaters installation to be executed by providing constant coolant circulation across all the engine components. Two heaters are required for V-type engines, one per each side.

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## Noise

Diesel engine noise (Acoustic power level) (dB(A)) .....108
Noise - upper side (dB(A)) .....93.8
Noise - right side (view from flywheel) (dB(A)) .....94.5
Noise - left side (view from flywheel) (dB(A)) .....93.6
Noise – front (radiator) side (dB(A)) .....92.2
Noise – rear (flywheel) side (dB(A)) .....93.9

Notes :

a) Noise test made at 100% of the ESP power, at 1 mt. distance, on engine without radiator, without cooling fan and without silencer.
b) Noise test refers to ISO 6798 norm : "Reciprocating internal combustion engines. Measurement of emitted airborne noise. Engineering method and survey method".

## Fuel consumption

| Rating | gr/kWh | L/hr |
|---|---|---|
| 100% ESP | 204.7 | 24.43 |
| 100% PRP | 202.4 | 21.25 |
| 75% PRP | 201.3 | 16.01 |
| 50% PRP | 208.1 | 10.58 |
| 25% PRP | 229.6 | 6.02 |
| | Fuel consumption tolerance +/- 5% | |

## 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.

1) All ratings are based on operating conditions under ISO 8528-1, ISO 3046, DIN6271. Performance tolerance of ±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.

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