



Gas Engine Data Sheet

Model : 12M33G2N0/5

Frequency: 50HZ

Fuel Type: Natural gas

Ratings

| Engine Speed (RPM) | Continuous Power (COP) (kWm/PS) | | Rated Power (PRP) (kWm/PS) | |
|--------------------|---------------------------------|-----------|----------------------------|-----------|
| | Gross Power | Net Power | Gross Power | Net Power |
| 1500 | 600/816 | 570/775 | 600/816 | 570/775 |

| Generator Set Output | Continuous Power (COP) | | Rated Power (PRP) | |
|----------------------|------------------------|-----|-------------------|-----|
| | kW | kVA | kW | kVA |
| | 500 | 625 | 500 | 625 |

Rating definitions

Continuous Power (COP)

1. Power output available with constant load for unlimited time.
2. For continuous operation at constant load.
3. Without overload capacity.

Prime Power (PRP)

1. Power output available with varying load for unlimited time.
2. Average power output is no more than 70% of the PRP over 24 h of operation.
3. 100% load operation cannot exceed 500h every year.
4. 10% overload can operate 1h within every 12h, and the accumulative overload operation cannot exceed 25h every year.

Conversion table

| | |
|--|--------------------------------|
| 1 in = 25.4 mm | 1 ft = 0.3048 m |
| 1 cfm = 1.7 m ³ /h = 28.3 L/min | 1 lb _m = 0.45359 kg |
| 1 kW = 1.36 PS = 1.34 HP | 1 kcal/h = 1.163 W |
| 1 Imp gal = 4.546 lit. | 1 mm Hg = 133 Pa |
| 1 US gal = 3.785 lit. | 1 inch Hg = 3386 Pa |
| 1 BTU = 1.055 kJ | 1 mm water = 9.789 Pa |
| 1 psi = 6.89 kPa | 1 inch water = 248.64 Pa |
| 1 lbm.ft = 1.356 J | 1 lb _f = 4.45 N |

Note:

1. The power rating is in accordance with ISO 3046.
2. Test conditions: 100 kPa, 25°C air inlet temperature, relative humidity of 30%.
3. The derating in different altitude and temperature can be confirmed from the engineers of Baudouin.
4. Natural gas refers to Standard Pipeline Natural gas, CNG and LNG with a methane number that is greater than 70. Consult Sales Application Engineering and perform gas analysis for fuel types that vary from these conditions.

Update history:

Certified by:

Date

2019-10-25

Contents of tested gas

The technical data is based on natural gas with the following contents.

| Constituent | Abbrev | %Mole |
|---|--------|--------------------------|
| Methane | CH4 | 97.05 |
| Ethane | C2H6 | 0.40 |
| Ethylene | C2H4 | <0.01 |
| Propane | C3H8 | 0.10 |
| Butane | C4H10 | 0.04 |
| Pentane | C5H12 | <0.02 |
| Hexane | C6H14 | <0.01 |
| Nitrogen | N2 | 1.92 |
| Oxygen | O2 | 0.49 |
| Hydrogen | H2 | <0.01 |
| Carbon monoxide | CO | <0.01 |
| Carbon Dioxide | CO2 | <0.01 |
| Density (at 100 kPa, 25°C) | | 0.6852 kg/m ³ |
| Higher calorific value (at 100 kPa, 25°C) | | 36.42 MJ/m ³ |
| Lower calorific value (at 100 kPa, 25°C) | | 32.81 MJ/m ³ |
| Methane number (at 100 kPa, 25°C) | | 97.3 |

General Data

| | |
|---|------------------------------------|
| Engine model..... | 12M33G2N0/5 |
| No. of Cylinders/Valves..... | 12/48 |
| Cylinders arrangement | V-engine |
| Bore×Stroke mm (in) | 150×185 (5.9×7.28) |
| Displacement L (in ³) | 39.2 (2392) |
| Thermodynamic Cycle..... | 4 stroke |
| Fuel type..... | Natural gas |
| Control system..... | WOODWARD |
| Combustion system | Spark-ignited |
| Fuel system | Lean Burn |
| Aspiration..... | Turbocharged and Intercooled |
| Compression ratio..... | 11:1 |
| Flywheel housing | SAE0 |
| Flywheel..... | 18" |
| Inertia of flywheel kg·m ² (lbm·ft ²) | 7.18 (170.4) |
| Inertia of crankshaft kg·m ² (lbm·ft ²)..... | 4.52 (107.3) |
| Emission standard | N/A |
| Engine dimensions and weight without radiator | |
| - Length mm (in.)..... | 2164 (82.8) |
| - Width mm (in.)..... | 1497 (58.9) |
| - Height mm (in.) | 1710 (67.3) |
| Engine dry weight kg (lbm)..... | 3390 (7474) |
| Direction of rotation..... | Anticlockwise (from flywheel side) |
| Max. ambient temperature restriction °C (°F)..... | 35 (95) |

Performance

| | |
|------------------------------------|---------------|
| Idle speed RPM..... | 700-750 |
| Rated engine speed RPM..... | 1500 |
| Mean piston speed m/s (ft/s) | 9.25 (30.3) |
| BMEP @ PRP Bar (psi)..... | 12.24 (177.6) |

Air intake system

| | |
|--|-------------|
| Max. temperature rise before turbocharger °C (°F)..... | ≤5 (41) |
| Air intake restriction with clean filter kPa (psi) | ≤3 (0.44) |
| Air intake restriction with dirty filter kPa (psi) | ≤5 (0.73) |
| Air flow Mass @ PRP kg/h (lb/hr) | 2660 (5864) |
| Air flow Volume @ PRP m ³ /min (cfm)..... | 37.4 (1320) |

Fuel system

| | |
|--|-------------|
| Min. gas pressure of mixer inlet kPa (psi)..... | 2 (0.29) |
| Max. gas pressure of mixer inlet kPa (psi) | 7 (1.02) |
| Pressure loss of gas mixer kPa (psi) | 0.5 (0.073) |
| Suction pressure max. kPa (psi)..... | 3 (0.435) |
| Max. gas inlet temperature °C (°F)..... | 50 (122) |
| Min. diameter of inlet pipe mm (in.) | 40 (1.57) |

Exhaust system

| | |
|--|--------------|
| Max. exhaust back pressure kPa (psi) | 7.5 (1.09) |
| Max. exhaust temperature before turbocharger °C (°F)..... | 730 (1346) |
| Max. exhaust temperature after turbocharger °C (°F)..... | 680 (1256) |
| Exhaust flow Mass @ PRP kg/h (lb/hr) | 2771 (6109) |
| Exhaust flow Volume @ PRP m ³ /min (cfm) | 129.5 (4571) |
| Min. diameter of the exhaust pipe mm (in.) | 195 (7.68) |
| Max. bending moment at the turbocharger flange (N • m) | 10 |
| Exhaust Manifold | dry |

Cooling system

| | |
|---|-----------------|
| Coolant capacity of engine without radiator L (Imp gal) | 75.94 (16.7) |
| Coolant flow of engine pump @ rated speed m ³ /h (cfm) | 71 (41.7) |
| Min. pressure in cooling system kPa (psi) | 50 (7.26) |
| Max. additional restriction kPa (psi) | 50 (7.26) |
| Min. inner diameter of coolant outlet pipe mm (in.) | 45 (1.77) |
| Alarm temperature of coolant °C (°F)..... | 95 (203) |
| Shut down temperature of coolant °C (°F)..... | 98 (208.4) |
| Thermostat opening temp. /full open temp. °C (°F) | 76/88 (169/190) |

Fan

| | |
|--|-----|
| - rotating speed RPM | N/A |
| - diameter mm (in.)..... | N/A |
| - number of blades | N/A |
| - Material..... | N/A |
| - type..... | N/A |
| - air flow m ³ /min (cfm) | N/A |
| - power consumption kW (PS) | N/A |

Intercooler system

| | |
|---|--------------|
| Intercooler system type | Air to Water |
| Max. intake temperature after intercooler °C (°F)..... | 55 (131) |
| Coolant capacity of intercooler L (Imp gal) | 8.2 (1.8) |
| Max. pressure drop of the intercooler kPa (psi) | 12 (1.74) |
| Coolant flow of intercooler @ rated speed m ³ /h (cfm) | 23 (13.5) |

Lubrication system

| | |
|--|---------------------|
| Oil capacity Low/High L (Imp gal) | 120/146 (26.4/32.1) |
| Oil pressure at idel speed kPa (psi)..... | ≥200 (29) |
| Oil pressure at rated speed kPa (psi) | 400~650 (58.1-94.3) |
| Oil pressure limit. Lowest value kPa (psi)..... | 200 (29) |
| Oil pressure limit. Highest value kPa (psi) | 1000 (145.1) |
| Max. oil temperature °C (°F)..... | 105 (221) |
| Oil consumption %Gas | ≤0.3 |
| Total system capacity including filter L (Imp gal) | 160 (35.2) |
| Oil flow L/min (cfm)..... | ≥392 (13.84) |

Electrical system

| | |
|--|-----------|
| Electrical system voltage V | 24 |
| Starter power kW | 8.5 |
| Battery charger current A | 55 |
| Max. electric resistance of the starting circuit mΩ | 2 |
| Min. sectional area of wire mm ² (in ²) | 70 (0.11) |
| No. of teeth on flywheel ring gear | 194 |
| No. of teeth on starter gear..... | 12 |

Cold start capability

| | |
|--|---------|
| Min. cold start temp. without air preheating °C (°F) | -5 (23) |
|--|---------|

Noise

| | |
|-------------------------------------|-------|
| Sound pressure level dB(A) 1m | 97.9 |
| Acoustic power level dB(A) | 113.2 |

Emission Limit

| | |
|------------------------------|-------|
| NOx mg/Nm ³ | ≤500 |
| CO g/kW·h | ≤1.35 |
| NMHC g/kW·h..... | ≤0.5 |
| HC g/kW·h..... | ≤1.5 |

Heat balance test data

| | | | | |
|--|--------------|---------------|-----------------|---------------|
| Ambient temperature | °C (°F) | 28 (82.4) | | |
| Load | | 100% of PRP | 75% of PRP | 50% of PRP |
| ISO standard rating | kWm (PS) | 600 (816) | 450 (612) | 300 (408) |
| Air ratio | | 1.41 | 1.39 | 1.35 |
| Engine total heat | kJ/s (BTU/s) | 1536.2 (1456) | 1267.4 (1201.3) | 929.4 (880.9) |
| Heat taken away by the coolant | kJ/s (BTU/s) | 286.7 (271.8) | 215 (203.8) | 143.4 (135.9) |
| Intercooler heat dissipating capacity | kJ/s (BTU/s) | 108.5 (102.8) | 81.4 (77.2) | 54.3 (51.5) |
| Heat taken away by the exhaust up to 120°C | kJ/s (BTU/s) | 585.4 (554.9) | 294.5 (73.1) | 220.9 (209.4) |
| Radiated heat to ambient | kJ/s (BTU/s) | 76.8 (72.8) | 76.8 (72.8) | 76.8 (72.8) |
| Gas Consumption | (g/kW.h) | 186.7 | 195.1 | 213.3 |
| Gas Consumption | (kg/h) | 112.02 | 87.8 | 64.0 |
| Mechanical Efficiency | % | 39.1 | 35.5 | 32.3 |
| Therma Efficiency | % | 51.3 | 46.6 | 45.0 |
| Total Efficiency | % | 90.4 | 82.1 | 77.3 |

Note: The above data are obtained from the laboratory and for reference only.

