

Technical Data Sheet

93800050098_V05_en_GB

Voltage / Frequency

Cooling water temperature (in / out)

NOx emissions (dry, 5 % O₂)

Intercooler 1st stage water temperature (in)

Intercooler 2nd stage water temperature (in)

Exhaust gas temperature

Catalytic converter

Special equipment

Altitude above sea level ²⁾

Intake air temperature

Relative intake air humidity

Standard specifications and regulations

GB2145N5

20V4000L33



| | | |
|------------------------|-----|--------------|
| V / Hz | 400 | 50 |
| °C | | 78 / 90 |
| mg/m ³ i.N. | | < 500 |
| °C | | 40 |
| °C | | 441 |
| °C | | not included |
| m / mbar | 100 | 1000 |
| °C | | 25 |
| % | | 30 |

| Energy balance | % | 100 | 75 | 50 |
|--|----|----------|---------|---------|
| Electrical Power COP, ISO 8528-1 ^{2) 3)} | kW | 2145 | 1609 | 1073 |
| Energy input ^{4) 5)} | kW | 4990 | 3836 | 2690 |
| Thermal output total ⁶⁾ | kW | 1161 | 873 | 620 |
| Thermal output engine (block, lube oil, 1st stage intercooler) ⁶⁾ | kW | 1161 | 873 | 620 |
| Intercooler 1st stage water temperature (in) ⁶⁾ | kW | | | |
| Intercooler 2nd stage water temperature (in) ⁶⁾ | kW | 142 | 98 | 62 |
| Exhaust heat (120 °C) ⁶⁾ | kW | (1078) | (900) | (685) |
| Engine power ISO 3046-1 ²⁾ | kW | 2200 | 1650 | 1104 |
| Generator efficiency at power factor = 1 | % | 97.5 | 97.5 | 97.2 |
| Electrical efficiency ⁴⁾ | % | 43 | 41.9 | 39.9 |
| Total efficiency | % | 87.9 | 88.2 | 88.4 |
| CHP coefficient | | 1.85 | 1.84 | 1.73 |
| Power consumption ⁷⁾ | kW | | | |

| Combustion air / Exhaust gas | | | | |
|--|-----------------------|-------|------|------|
| Combustion air volume flow ¹⁾ | m ³ i.N./h | 8399 | 6357 | 4331 |
| Combustion air mass flow | kg/h | 10846 | 8209 | 5593 |
| Exhaust gas volume flow, wet ¹⁾ | m ³ i.N./h | 8677 | 6571 | 4480 |
| Exhaust gas volume flow, dry ¹⁾ | m ³ i.N./h | 8017 | 6064 | 4127 |
| Exhaust gas mass flow, wet | kg/h | 11212 | 8491 | 5791 |
| Exhaust temperature after turbocharger | °C | 441 | 470 | 502 |

| Reference fuel ⁸⁾ | | | | |
|------------------------------|--|--|----------------|--|
| Natural gas | | | H | |
| Sewage gas | | | not applicable | |
| Biogas | | | not applicable | |
| Landfill gas | | | not applicable | |

| Fuel requirements ⁹⁾ | | | | |
|---|-------------------------|--------|--------------------------|--|
| Minimum methane number | MZ | | 80 | |
| Range of heating value: design / operation range | kWh/m ³ i.N. | | 10.1 - 10.5 / 8.0 - 11.0 | |
| Exhaust gas emissions ^{5) 8)} | | | | |
| NOx, stated as NO ₂ (dry, 5 % O ₂) | mg/m ³ i.N. | < 500 | | |
| CO (dry, 5 % O ₂) | mg/m ³ i.N. | < 1000 | | |
| HCHO (dry, 5 % O ₂) | mg/m ³ i.N. | | | |
| VOC (dry, 5 % O ₂) | mg/m ³ i.N. | | | |

| Otto-gas engine, lean burn operation with turbocharging | | | | |
|---|--------------------|------|--------------|---|
| Number of cylinders / configuration | | 20 | / | V |
| Engine type | | | 20V4000L33FN | |
| Engine speed | 1/min | | 1500 | |
| Bore | mm | | 170 | |
| Stroke | mm | | 210 | |
| Displacement | dm ³ | | 95.3 | |
| Mean piston speed | m/s | | 10.5 | |
| Compression ratio | | | 12.8 | |
| BMEP at nominal engine speed min-1 | bar | 18.5 | | |
| Lube oil consumption ¹⁰⁾ | dm ³ /h | 0.75 | | |
| Exhaust back pressure min. - max. after engine | mbar - mbar | | 30 - 60 | |

| Generator | | | | |
|--|-----|--|----------------|--|
| Rating power (temperature rise class F) ¹¹⁾ | kVA | | 2800 | |
| Insulation class / temperature rise class | | | H / F | |
| Winding pitch | | | 2/3 | |
| Protection | | | IP 23 | |
| Max. allowable p.f. inductive (overexcited) / capacitive (underexcited) ¹²⁾ | | | 0.8 / 0.95 | |
| Voltage tolerance / frequency tolerance | % | | ± 10.0 / ± 5.0 | |

| Engine cooling water system | | | | |
|---|-------------------------|---------|---|------|
| Coolant temperature (in / out) | °C | 78 / 90 | | |
| Coolant flow rate ^{13) 14)} | m ³ /h | 94.3 | | |
| Pressure drop ¹⁴⁾ CVs value ^{13) 15)} | bar / m ³ /h | 2.7 | / | 57.4 |
| Max. operation pressure (coolant before engine) | bar | | 6 | |

| Exhaust gas heat exchanger (EGHE) | | | | |
|---|-------------------------|----|---|--|
| Exhaust gas temperature (out) | °C | | | |
| Coolant temperature (in / out) | °C | / | | |
| Coolant volumetric flow ^{13) 14)} | m ³ /h | | | |
| Pressure drop ¹⁴⁾ CVs value ^{13) 15)} | bar / m ³ /h | | / | |
| Min. coolant flow rate / min. operation gauge pressure | m ³ /h / bar | -- | / | |
| Max. operation pressure (coolant water) | bar | | | |

| | | | | |
|--|------------------------------|-------------------------|-------------|-------------------------|
| Intercooler 1st stage, external | | | | |
| Coolant temperature (in / out) | °C | | | |
| Coolant volumetric flow ^{13) 14)} | m ³ /h | | | |
| Pressure drop ¹⁴⁾ | CVs value ^{13) 15)} | bar / m ³ /h | / | |
| Min. coolant flow rate / min. operation gauge pressure | | m ³ /h / bar | / | |
| Max. operation pressure in front of intercooler | | bar | | |
| Intercooler 2nd stage, external | | | | |
| Coolant temperature (in / out) | °C | | 40 / 43 | |
| Coolant volumetric flow ^{13) 14)} | m ³ /h | | 36.1 | |
| Pressure drop ¹⁴⁾ | CVs value ^{13) 15)} | bar / m ³ /h | 0.7 | / |
| Max. operation pressure in front of intercooler | | bar | | 6 |
| Heating circuit interface | | | | |
| Engine coolant temperature (in / out) | °C | | | |
| Heating water temperature (in / out) | °C | | | |
| Heating water flow rate ^{14) 16)} | m ³ /h | | | |
| Pressure drop ¹⁴⁾ | CVs value ^{15) 16)} | bar / m ³ /h | | / |
| Max. operation gauge pressure (heating water) | | bar | | |
| Room ventilation | | | | |
| Genset ventilation heat ¹⁷⁾ | kW | | | 113 |
| Combustion air temperature: (min./design/max.) | °C | | | 20 / 25 / 30 |
| Min. engine room temperature ¹⁸⁾ | °C | | | 15 |
| Max. temperature difference ventilation air (in / out) | K | | | 20 |
| Min. supply air volume flow rate (combustion+ventilation) ¹⁹⁾ | m ³ i.N./h | | | 24500 |
| Starter battery | | | | |
| Nominal voltage / power / capacity required | V / kW / Ah | | | 24 / 2 x 9 / -- |
| Filling quantities | | | | |
| Lube oil for engine | dm ³ | | | 350 |
| Coolant for engine | dm ³ | | | 310 |
| Coolant for intercooler LT / HT | dm ³ | | | 23 |
| Heating water for plate heat exchanger ²⁰⁾ | dm ³ | | | |
| Lube oil for gearbox | dm ³ | | | |
| Gas regulation line | | | | |
| Nominal size / gas pressure min. - max. | DN / mbar - mbar | | 100 | 180 - 250 |
| Engine sound level ²¹⁾ (1 meter distance, free field) | | | | |
| Frequency | Hz | 63 | 125 | 250 |
| Sound pressure level | dB | 83.3 | 96.5 | 92.6 |
| Frequency | Hz | 1000 | 2000 | 4000 |
| Sound pressure level | dB | 94.5 | 91.7 | 87.2 |
| | Lin dB | 102.8 | | |
| Sum of pressure levels | dB A | 100.1 | | |
| Sound power level | dB A | 120.3 | | |
| Undampened exhaust noise ²¹⁾ (1 meter distance to outlet within 90°, free field) | | | | |
| Frequency | Hz | 63 | 125 | 250 |
| Sound pressure level | dB | 110.4 | 110.7 | 104.8 |
| Frequency | Hz | 1000 | 2000 | 4000 |
| Sound pressure level | dB | 93.8 | 91.1 | 86.3 |
| | Lin dB | 114.4 | | |
| Sum of pressure levels | dB A | 102.1 | | |
| Sound power level | dB A | 114.1 | | |
| Dimensions (Aggregate) | | | | |
| Length | mm | | | 5900 |
| Width | mm | | | 2000 |
| Height | mm | | | 2400 |
| Gross weight (dry weight) | kg | | | 19700 (19000) |
| Power derating | | | | |
| Altitude | | | | specific to the project |
| Intake air temperature | | | | specific to the project |
| Intercooler 2nd stage coolant temperature | | | | specific to the project |
| Methane number | | | | specific to the project |
| Boundary conditions and consumables | | | | |
| Systems and consumables have to conform to the following actual company standards: | | | | DK-BS-0002 |

1) Normal cubic meter at 1013 mbar and T = 273 K

2) Prime power operation will be designed specific to the project

3) Generator gross power at nominal voltage, power factor = 1 and nominal frequency

4) According to ISO 3046 (+ 5 % tolerance), using reference fuel used at nominal voltage, power factor = 1 and nominal frequency

5) Emission values during grid parallel operation

6) Thermal output at layout temperature; tolerance +/- 8 %

7) Power consumption of all electrical consumers which are mounted at the module / genset

8) Deviations from the layout parameters respectively the reference fuel can have influence on the obtained efficiency and exhaust emissions

9) Functional capability

10) Reference value at nominal load (without amount of oil exchange)

11) Genset max. 1000 m height of location and max. 40 °C intake air temperature; else power derating

12) Max. allowable cos phi at nominal power (view of producer)

13) Stated values for cooling fluid composition 65% water and 35% glycol, adaption for use of other cooling fluid composition necessary

14) Pressure loss at reference flow rate

15) The CV value declares the volumetric flow in m³/h at a pressure drop of 1 bar. Min. and max. flow rate limits are defined.

16) Stated values for pure water, adaption for other cooling fluid composition necessary

17) Only generator- and surface losses

18) Frost-free conditions must be guaranteed

19) Amount of ventilation air must be adapted to the gas safety concept

20) Assemblies including pipe work

21) All sound pressure levels at nominal load COP

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