

Basic Technical Data

| | | |
|-----------------------------------|------|----|
| nominal electrical output | 1200 | kW |
| maximum heat output ¹⁾ | 1283 | kW |

| | | | | |
|--|------|------|------|---------------------|
| load | 50 | 75 | 100 | % |
| maximum heat output | 742 | 1013 | 1283 | kW |
| fuel input | 1519 | 2152 | 2790 | kW |
| electrical efficiency | 39,5 | 41,8 | 43,0 | % |
| heat efficiency | 48,8 | 47,1 | 46,0 | % |
| total efficiency (fuel utilization) | 88,3 | 88,9 | 89,0 | % |
| gas consumption | 234 | 331 | 429 | Nm ³ /hr |

The Basic Technical Data are applicable for the standard conditions pursuant to the "Technical instructions" document.

The minimum permanent electrical output must not drop below 50 % of the nominal output.

Gas consumption is mentioned for biogas with methane content 65%, at normal conditions (0°C, 101,325 kPa).

Gas consumption tolerance, or fuel input tolerance, at 100% load is +5%.

Tolerance of other parameters are mentioned in "Technical Instructions-Validity of Technical Data" document.

1) Maximum heat output is a sum of heat outputs of secondary circuit with exhaust gas cooled to 150°C and aftercooler circuit

Observance of Emission Limits

| | | | |
|--|-----------------|-----|--------------------|
| emissions | NO _x | CO | |
| with 5% of O ₂ in exhaust gases | 500 | 650 | mg/Nm ³ |

Generator

| | | |
|---------------------------------|-------------|----|
| type | MJB 450 LB4 | |
| producer | MARELLI | |
| cos φ | 0,8/1,0 | |
| efficiency in the working point | 97,4 | % |
| voltage | 400 | V |
| frequency | 50 | Hz |

Engine

| | | |
|--------------------------|--------------|-------|
| type | TCG 2020 V12 | |
| producer | MWM | |
| number of cylinders | 12 | |
| arrangement of cylinders | V | |
| bore × stroke | 170/195 | mm |
| displacement | 53 | dm³ |
| compression ratio | 14 : 1 | |
| speed | 1500 | rpm |
| nominal oil consumption | 0,2 | g/kWh |
| max. engine output | 1232 | kW |

TCG 2020V12 BG65% CH₄; 08.03.2016

Thermal System

Secondary Circuit

| | | |
|--|-------|-----------------|
| heat carrier | water | |
| circuit's heat output | 1195 | kW |
| nominal water temperature, input / output | 70/90 | °C |
| nominal temperature drop | 20 | °C |
| return water temperature, min / max | 40/70 | °C |
| nominal flow rate | 15,0 | kg/s |
| max. working pressure | 600 | kPa |
| min. pressure in system | 100 | kPa |
| water volume in CHP unit circuit ¹⁾ | 1310 | dm ³ |
| pressure loss at the nominal flow rate ¹⁾ | 90 | kPa |

1) total value (engine-generator in sound enclosure and exhaust gas module without connecting pipeline)

Utilization of exhaust gas output for other purposes

| | | |
|--|-----|----|
| heat output of exhaust gases (cooling to 150°C) | 562 | kW |
| exhaust gas temperature | 434 | °C |

Primary Circuit

| | | |
|----------------------------------|-------------------------|-----|
| heat carrier | water + ethylene glycol | |
| ethylene glycol's concentration | 35 | % |
| circuit's heat output | 633 | kW |
| max. working pressure | 300 | kPa |
| water volume in CHP unit circuit | 250 | dm³ |



Aftercooler Circuit

| | | |
|--|-------------------------|-----------------|
| heat carrier | water + ethylene glycol | |
| ethylene glycol's concentration | 35 | % |
| circuit's heat output | 88 | kW |
| coolant temperature (outlet from CHP unit – informative) | 53,0 | °C |
| coolant temperature (inlet into CHP unit) max | 50,0 | °C |
| nominal flow rate | 9,7 | kg/s |
| pressure reserve at the nominal flow rate ¹⁾ | 70 | kPa |
| highest allowed maximal hydrostatic height of system | 10 | m |
| maximal connect-able volume of system outside the module of CHP unit ³⁾ | 175 | dm ³ |
| max. working pressure | 300 | kPa |
| min. working pressure | 50 | kPa |
| water volume in CHP unit circuit | 50 | dm ³ |

1) pressure reserve of internal part for covering pressure losses of external parts of circuit (interconnection pipeline and dry cooler)
 2) if connected volume overstep mentioned value, it is necessary to install into system additional expansion vessel

Fuel, Gas Inlet

| | | |
|--|------|--------------------|
| methane content | 65 | % |
| minimal methane content | > 45 | % |
| low heat value | 23,4 | MJ/Nm ³ |
| gas pressure | 6 | kPa |
| max. pressure change under varying consumption | 10 | % |
| max. gas temperature | 35 | °C |

Combustion and Ventilation Air

| | | |
|---|---------|---------------------|
| unused heat removed by the ventilation air | 75 | kW |
| air temperature at the ventilation inlet min / max | 20 - 35 | °C |
| air temperature at the ventilation recommended | 25 | °C |
| amount of combustion air | 4627 | Nm ³ /hr |
| max. amount of ventilation air at the outlet flange | 27915 | m ³ /hr |
| max. air temperature at the outlet flange | 50 | °C |
| max. counter-pressure on flanges of ventilation air ¹⁾ | 120 | Pa |

1) total sum of pressure losses of connected ventilation pipeline without necessity of using additional fan

Exhaust Gas and Condensate Outlet

| | | |
|--|---------|---------------------|
| amount of exhaust gases | 5016 | Nm ³ /hr |
| exhaust gas temperature between engine-generator set and exhaust exchanger nominal / max | 434/550 | °C |
| exhaust gas temperature, nominal / max | 150/180 | °C |
| permissible pressure loss of the interconnecting and following exhaust piping | 10 | mbar |
| speed of exhaust gases at the outlet (DN 400) | 17,2 | m/s |

Lubricant Charges

| | | |
|---|-----|-----------------|
| amount of lubrication oil in the engine | 205 | dm ³ |
| volume of engine additional oil tank | 510 | dm ³ |
| replenishment oil tank volume | 350 | dm ³ |

Noise Parameters

| version | standard | option ¹⁾ |
|--|----------|----------------------|
| sound enclosure of CHP unit at 1m | 80 | dB(A) |
| ventilation inlet and outlet at 1m from the silencer | 80 | 65 dB(A) |
| exhaust gas outlet at 1m from the silencer flange | 80 | 60 dB(A) |

1) noise parameters can be reduced by optimizing components to the required acoustic pressure level



Electrical Parameters

| | | |
|---|-------------------|------|
| nominal voltage | 230/400 | V |
| nominal frequency | 50 | Hz |
| power factor ¹⁾ | 0,87 | |
| nominal current at cos φ=0.8 | 2000 | A |
| generator circuit breaker | NW25 H1 3P | |
| short-circuit resistance of switchboard R1 | 40 | kA |
| short-circuit resistance of switchboards R2, R3, R4 and R5 | 10 | kA |
| contribution of the actual source to the short-circuit current | < 20 | kA |
| protection of power switchboard R1 closed/open | IP 31/00 | |
| protection of control switchboard R2 closed/open | IP 31/00 | |
| protection of frequency changers' switchboard R3 closed/open | IP 31/00 | |
| protection of engine switchboard R4 closed/open | IP 31/00 | |
| protection of cooling switchboard R5 closed/open | IP 66/00 | |
| recommended superior protection | 2250 | A |
| recommended connection cable ²⁾ (l< 50m, at t<35°C) | 5×NYY (3×240+120) | |
| 1) Power factor adjustable from 0,87C ÷ 1 ÷ 0,87L (range from 0.87C ÷ 1 must be verified according to the various types of generators). L = inductive load - overexcited C = capacitive load - underexcited Operation of the generator with a power factor of less than 0.95 causes a power limitation sets the following table: | | |
| power factor [-] | 1 | 0,95 |
| output [% P _{nom}] | 100 | 98 |

2) The stated cables are for information only. A check calculation for temperature rise and voltage drop must be made according to the actual length, placement and type of the cable (maximum allowed voltage drop is 10 V)

Colour Version

| | |
|----------------------|------------------|
| engine and generator | RAL 5010 (blue) |
| base frame | RAL 9017 (black) |
| sound enclosure | RAL 5013 (blue) |

Unit Dimensions and Weights

| | Engine generator set | Exhaust gas module | |
|----------------|----------------------|--------------------|----|
| length | 7100 | 5600 | mm |
| width | 2500 | 1300 | mm |
| height | 4010 | 2680 | mm |
| service weight | 19620 | 4075 | kg |

| Ventilation silencer | | | |
|----------------------|------|--|----|
| length | 1580 | | mm |
| width | 1580 | | mm |
| height | 2500 | | mm |
| service weight | 1100 | | kg |

| Exhaust silencer | | | |
|------------------|------------|--|----|
| length | 4800 | | mm |
| width | ø 900 | | mm |
| height | horizontal | | mm |
| service weight | 1000 | | kg |

| Switchboards | height [mm] | width [mm] | depth [mm] |
|-------------------|-------------|------------|------------|
| R1 | 2100 | 800/1000 | 800/1000 |
| R2 | 2100 | 1600 | 400 |
| R3 ⁽¹⁾ | 2100 | 600÷1200 | 500 |
| R4 ⁽²⁾ | 1200 | 800 | 300 |
| R5 ⁽³⁾ | 430÷1060 | 330÷855 | 200÷350 |

Overall service weight 900 kg

1) Dimensions depend on direction of power outlets:

Passing through switchboard = 2100x800x800 mm

One direction = 2100x800x1000 mm

Width of switchboard R1 may be extended in special cases.

2) Switchboard's width depends on size of frequency changers.

3) Switchboard's height depends on MWM. Standard is 1200 mm.

4) Switchboard's dimension depends on number of dry coolers' fans.

Caution

Manufacturer reserves the right to alter this document and the linked source materials.

