

## Basic Technical Data

nominal electrical output	1560	kW
maximum heat output <sup>1)</sup>	1697	kW

load	50	75	100	%
maximum heat output	982	1339	1697	kW
fuel input	1995	2821	3654	kW
electrical efficiency	39,1	41,5	42,7	%
heat efficiency	49,2	47,5	46,4	%
total efficiency (fuel utilization)	88,3	89,0	89,1	%
gas consumption	307	434	562	Nm <sup>3</sup> /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 <sub>x</sub>	CO	
with 5% of O <sub>2</sub> in exhaust gases	500	650	mg/Nm <sup>3</sup>

## Generator

type	MJB 500 MC4
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 V16
producer	MWM
number of cylinders	16
arrangement of cylinders	V
bore × stroke	170/195 mm
displacement	71 dm <sup>3</sup>
compression ratio	14 : 1
speed	1500 rpm
nominal oil consumption	0,15 g/kWh
max. engine output	1602 kW

TCG 2020V16 BG65% CH<sub>4</sub> ; 30.01.2017

## Thermal System

### Secondary Circuit

heat carrier	water
circuit's heat output	1577 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	18,9 kg/s
max. working pressure	600 kPa
allowed operation over-pressure on connecting flanges <sup>1)</sup>	450 kPa
min. pressure in system	100 kPa
water volume in CHP unit circuit	230 dm <sup>3</sup>
pressure reserve of pump for covering pressure losses outside container	50 kPa

1) highest allowed over-pressure created by connected system to secondary circuit in place of connecting flanges.

### Primary Circuit

heat carrier	water + ethylene glycol
ethylene glycol's concentration	35 %
circuit's heat output	1577 kW
max. working pressure	300 kPa
water volume in CHP unit circuit	1840 dm <sup>3</sup>



**Aftercooler Circuit <sup>1)</sup>**

heat carrier	water + ethylene glycol	
ethylene glycol's concentration	35	%
circuit's heat output	120	kW
coolant temperature (outlet from CHP unit – informative)	54,0	°C
coolant temperature (inlet into CHP unit) max	50,0	°C
nominal flow rate	9,7	kg/s
max. working pressure	300	kPa
water volume in CHP unit circuit	290	dm <sup>3</sup>

1) Parameters are valid if the dry cooler (optional) is part of delivery

**Fuel, Gas Inlet**

methane content	65	%
minimal methane content	> 45	%
low heat value	23,4	MJ/Nm <sup>3</sup>
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	96	kW
amount of combustion air	6023	Nm <sup>3</sup> /hr
outdoor air temperature, min / max	-20/35	°C
max. air temperature at the outlet flange	50	°C

**Exhaust Gas and Condensate Outlet**

amount of exhaust gases	6533	Nm <sup>3</sup> /hr
exhaust gas temperature, nominal / max	150/180	°C
max. back-pressure of exhaust gases downstream the CHP unit flange	10	mbar
speed of exhaust gases at the outlet (DN 500)	14,3	m/s

**Lubricant Charges**

amount of lubrication oil in the engine	265	dm <sup>3</sup>
volume of engine additional oil tank	685	dm <sup>3</sup>
replenishment oil tank volume	500	dm <sup>3</sup>

**Noise Parameters**

CHP unit in 10 m from container	78	dB(A)
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**Electrical Parameters**

nominal voltage	230/400	V	
nominal frequency	50	Hz	
power factor <sup>1)</sup>	0,89		
nominal current at cos φ=0.8	2560	A	
generator circuit breaker	NW32 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	< 30	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	3000	A	
recommended connection cable <sup>2)</sup> (l < 50m, at t < 35°C)	7×NYY (3×240+120)		
power factor [-]	1	0,95	0,89
output [% P <sub>nom</sub> ]	100	100	98

1) Power factor adjustable from 0,89C ÷ 1 ÷ 0,89L (range from 0.89C ÷ 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:

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, internal parts of unit	RAL 5010 (blue)
container	RAL 5013 (blue)



## Unit Dimensions and Weights

total length	14800	mm
width total / transport	6200 / 3150	mm
height total / transport	10000 / 3000	mm
service weight of the entire CHP unit	43470	kg

## Caution

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

