

## Basic Technical Data

nominal electrical output	2000	kW
maximum heat output <sup>1)</sup>	2138	kW

load	50	75	100	%
maximum heat output	1237	1688	2138	kW
fuel input	2535	3588	4651	kW
electrical efficiency	39,4	41,8	43,0	%
heat efficiency	48,8	47,0	46,0	%
total efficiency (fuel utilization)	88,2	88,8	89,0	%
gas consumption	390	552	716	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 560 LA4		
producer	MARELLI		
cos φ	0,8/1,0		
efficiency in the working point	97,3	%	
voltage	400	V	
frequency	50	Hz	

## Engine

type	TCG 2020 V20	
producer	MWM	
number of cylinders	20	
arrangement of cylinders	V	
bore × stroke	170/195	mm
displacement	89	dm³
compression ratio	14 : 1	
speed	1500	rpm
nominal oil consumption	0,15	g/kWh
max. engine output	2055	kW

TCG 2020V20 BG65% CH<sub>4</sub>; 30.1.2017

## Thermal System

### Secondary Circuit

heat carrier	water	
circuit's heat output	2015	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	24,1	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	280	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	2015	kW
max. working pressure	300	kPa
water volume in CHP unit circuit	2400	dm³



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

heat carrier	water + ethylene glycol	
ethylene glycol's concentration	35	%
circuit's heat output	123	kW
coolant temperature (outlet from CHP unit – informative)	53,0	°C
coolant temperature (inlet into CHP unit) max	50,0	°C
nominal flow rate	11,1	kg/s
max. working pressure	300	kPa
water volume in CHP unit circuit	330	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	128	kW
amount of combustion air	7715	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	8365	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)	18,3	m/s

**Lubricant Charges**

amount of lubrication oil in the engine	300	dm <sup>3</sup>
volume of engine additional oil tank	685	dm <sup>3</sup>
replenishment oil tank volume	650	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>	0,81	
nominal current at cos φ=0.8	3600	A
generator circuit breaker	NW40 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	< 40	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	4000	A
recommended connection cable <sup>2)</sup> (l< 50m, at t<35°C)	9×NYY (3×240+120)	

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:

power factor [-]	1	0,95	0,89
output [% P <sub>nom</sub> ]	100	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, internal parts of unit	RAL 5010 (blue)
container	RAL 5013 (blue)



## Unit Dimensions and Weights

length total / transport	20000 / 16300	mm
width total / transport	5500 / 3300	mm
height total / transport	10000 / 3300	mm
service weight of the entire CHP unit	57720	kg

## Caution

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

