Technical datasheet of CHP unit

KE-MBG 200-E28-BR

400 V / 50 Hz	Biogas	
Electrical power	kW	200
Total thermal output	kW	224
Energy input	kW	519
Fuel consumption	Nm^3/h	86,6
Electrical efficiency	%	38,5
Thermal efficiency with LT	%	45,9
Thermal efficiency without LT	%	43,1
Overall efficiency with LT	**%**	**84,4**

Engine: MAN Type: E2876 LE202

No. of cylinders / configuration	-	6 in line
Engine speed	min^{-1}	1500
Bore / stroke / displacement	mm / mm / dm^3	128/166/12,82
Compression ratio	-	14
Engine power max.	kW	220
Spark plugs type	-	M14
Lube oil consumption max.	kg/h	0,15
Lube oil filling quantity max.	dm^3	65

Alternator: Leroy-Somer Type: LSA 46.3 L10

Voltage / frequency	V/Hz	400/50
PF	-	0,8L / 0,8C
Alternator efficiency at rated power	%	95,9
Max. ambient temperature	°C	40

Energy balance

						CHP unit performance parameters at rated load
Load	%	**100**	**75**	**50**	**95**
ISO standard engine power	kW	220	165	110	**209**
Electrical power	kW	211	158	104	**200**
Engine cooling thermal output	kW	103	89	80	**100**
Exhaust gas thermal output (180 °C)	kW	118	93	70	**113**
Thermal output mixture cooling - HT	kW	13	4	0	**11**
Thermal output mixture cooling - LT	kW	15	13	6	**15**
Total thermal output	kW	234	186	150	**224**
Radiation heat max.	kW	17	17	14	**17**
Energy input 1)	kW	545	422	309	**519**
Fuel consumption	Nm^3/h	90,8	70,3	51,5	**86,6**
Combustion air mass flow	kg/h	977	727	522	**925**
Exhaust gas mass flow, wet	kg/h	1121	838	604	**1062**
Exhaust temperature after turbocharger	°C	478	493	510	**481**
Alternator efficiency at PF=1	%	95,9	95,8	94,5	**95,9**
Electrical efficiency 1)	%	38,7	37,5	33,6	**38,5**
Thermal efficiency	%	43,0	44,0	48,4	**43,1**
Overall efficiency without LT	**%**	**81,7**	**81,5**	**82,0**	**81,6**

1) According to ISO 3046.

Fuel: Biogas

Min. methane number	-	100
Lower calorific value	MJ/Nm^3	21,6
Biogas composition $CH_4/C0_2$	% vol./% vol.	60/40
Gas pressure at gas regulation line inlet 1)	kPa	1,5÷10
Max. gas temperature	°C	30

1) The gas regulation line for MAN engines is standardly dimensioned at 4 ÷ 5 kPa.

Heating water circuit

Thermal output	kW	224
Temperature gradient	°C / °C	90 / 70
Min. cooling medium volume flow	m^3/h	9,90
Pressure loss of heating circuit 1)	bar	0,19
Heat transfer medium	-	Treated water
Max. operating pressure	bar	6

1) Pressure loss of all heating water circuit components at GENTEC CHP scope of supply.

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LT mixture cooling circuit

Thermal output	kW	15
Temperature gradient	°C / °C	43,9 / 40
Cooling medium volume flow	m^3/h	3,51
Max. allowable pressure loss 1)	kPa	-
Heat transfer medium concentration - glycol / water	% vol./% vol.	40/60
Max. operating pressure	bar	3
Dry cooler acoustic sound pressure level at 10 m 2)	dB(A)	65
Max. ambient temperature	°C	35

1) Pipework between CHP unit and dry cooler.

2) The value of the sound pressure level is considered in free field.

Emergency cooler

Thermal output	kW	224
Heat transfer medium	-	Ethylene glycol/Water-40/60
Max. allowable pressure loss 1)	kPa	-
Dry cooler acoustic sound pressure level at 10 m 2)	dB(A)	65
Max. ambient temperature	°C	35

1) Pipework between CHP unit and dry cooler.

2) The value of the sound pressure level is considered in free field

Ventilation and combustion air

Fan air volume flow 1)	m^3/h	6200
Max. allowable pressure loss of air duct 2)	Pa	-
Max. inlet air temperature	°C	35

1) At temperature 35 °C and pressure 101,3 kPa.

2) Air ducts between CHP unit and air inlet/air outlet.

Exhaust gas system

Exhaust gas mass flow, wet	kg/h	1062
Exhaust gas temperature at CHP unit outlet	°C	180
Max. allowable pressure loss 1)	mbar	-
Silencer flanges 2)	-	-

1) Exhaust gas pipe between CHP unit and outlet excluding components at GENTEC CHP scope of supply.

2) According to EN 1092-1.

Emissions

CO	mg/Nm^3	<1000
NO_x	mg/Nm^3	<500

Correlation 5% O_2.

Noise level

CHP unit design inside container 2)	dB(A)	65
Exhaust gas noise at 1 meter distance to silencer outlet 3)	dB(A)	80
Input/Output air ventilation 1)	dB(A)	80/80

All values of the sound pressure level is considered in free field.

1) Sound pressure level measured at 1 m distance from the CHP unit.

2) Sound pressure level measured at 10 m distance from the container.

3) On request, noise can be reduced by additional optimization of the standard silencer.

Dimensions and weight

Container dimensions L/W/H	mm	6100/2436/2750
Dry weight CHP unit design inside container	kg	11000

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Standard conditions and tolerances

Atmospheric pressure	kPa	100
Air temperature	°C	25
Relative air humidity	%	30
Tolerance for the electrical power	%	±3
Tolerance for the usable thermal output	%	±7
Tolerance for the specific fuel consumption	%	+5

The energy balance parameters listed in this data sheet are related to the standard conditions.

Detailed technical specifications of components on demand.

Change of technical parameters and printing errors reserved.

Release date	Created	Revision	Project / Offer
12.06.2023	EB	0	