

Cogeneration unit

HE-EC-329/372-LG329-GZ

1. Basic technical data of genset

Engine: Liebherr G9512 natural gas		
Adjusting the temp. of the mixture	45	°C
No. of cylinders, cyl. arrangement	8	V-form
Bore	130	mm
Stroke	157	mm
Displacement	16.67	litre
Compression ratio	13.3:1	-
Engine speed	1500	rpm

Engine

- Reliable engine with high durability, easy to operate and service
- Single heads and removable wet cylinder liners
- Cooling forced by external electric pump with temperature regulation
- Low fuel consumption and low emission levels
- Closed crankcase breathing system
- Microprocessor-based engine management system

Alternator		
Electric power	450	kVA
Voltage	400	V
Frequency	50	Hz
Engine speed	1500	rpm
Efficiency at $\cos \phi = 1.0$	95.7	%

Alternator

- High efficiency
- Reliable
- Brushless, self-excited, double bearing
- High breaking capacity

2. Performance and efficiency

	%	Load ratio					
		100		80		60	
Energy in fuel	kW	785	100.0	653	100.0	482	100.0
Mechanical power	kW _m	344	43.8	275	42.1	206	42.7
Electrical power	kW _e	329	41.9	263	40.3	197	40.9
Heating power	kW _h	372	47.4	318	48.7	252	52.2
Total heat rejected in HT circuit	kW _r	126	16.1	115	17.6	98	20.3
Available exhaust heat (~120 °C)	kW _a	204	25.9	172	26.3	139	28.8
Heat from intercooler HT	kW _i	42	5.3	31	4.7	15	3.1
Fuel consumption	Nm ³ /h	82	-	68	-	50	-
Recommended load	%	50-100	-	-	-	-	-

3. Fuel, feed system

Fuel type	Natural gas
Calorific value	34,430 kJ/Nm ³
Gas supply pressure to engine inlet	5 – 8 kPa
Permissible changing rate of gas pressure	0.3 kPa/min

Air-fuel ratio system

- System equipped with gas shut-off solenoid valves
- Zero pressure valve – self-adjustment of gas dose
- Automatic control of excess air ratio – λ coefficient

4. Ventilation and combustion air

Heat radiated to ambient	70 kW
Amount of air needed for ventilation	14,917 m ³ /h
Amount of air needed for combustion	1,368 Nm ³ /h
Temperature of intake air for combustion	10-35 °C

5. Exhaust gas system

Exhaust temperature after turbine	475 °C
Maximum exhaust system back pressure	5 kPa
Exhaust gas volume flow	1,433 Nm ³ /h
Exhaust gas volume flow (120 °C)	2063 m ³ /h
Hot exhaust gas volume flow	3,926 m ³ /h
Exhaust gas mass flow	1,830 kg/h

6. Technical parameters of heating system

Nominal heating power	372 kW
Water flow in external circulation (85/65 °C)**	16 m ³ /h
Connections/type	DN 65
Disposable pressure	50 kPa

7. Mixture cooling, intercooler (LT system)

Thermal output	27 kW
Flow of LT system (45/40 °C**; ethylene glycol 50%)	9 m ³ /h

8. Enclosure versions

	Dimensions (mm)***	Mass* (kg)	Volume (dB)A
Open version	4200x1800x2500	5,500	104
Version in soundproof enclosure	4200x1800x3200	8,100	75 at 1m

Soundproof enclosure:

- Reduces sound emission in the engine room
- Improves the ventilation of engine and generator
- In case of several units in the room, makes servicing easier
- Is equipped with a standard lighting system and detection of dangerous gas concentration

Container version	8000x3000x3300	15,800	80 at 7m
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Container enclosure:

- Can reduce time of design process
- Reduces costs and project execution time
- Provides sound reduction suitable for ambient conditions
- Separate, ventilated operator room
- Equipped with ventilation and cooling systems to provide proper operation of the cogeneration unit
- Includes following systems: Basic and emergency lighting, service sockets and gas detection system

* Mass of ready-to-work unit (including liquids)

** Input/output

*** Length x width x height

9. Lube system

Lube oil – quantity	48 litre
Oil change interval	1000 hr
Oil consumption	0.08 l/h

- Automatic oil make-up system

10. Exhaust emissions data (nominal load, 5% O₂)

	ppm	mg/Nm ³
NOx	<400	<500
CO	<645	<750

Ambient conditions	
Atmospheric pressure	100 kPa
Ambient temperature	25 °C
Relative humidity	30%

Parameters tolerance
According to ISO 3046-1

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