

Technical Data Sheet

93800052307_V01_en_GB

Voltage / Frequency

Cooling water temperature (in / out)

NOx emissions (dry, 5 % O₂)

Mixture cooler 1st stage water temperature (in)

Mixture cooler 2nd stage water temperature (in)

Exhaust gas temperature

Catalytic converter

Special equipment

Elevation above sea level

Combustion air temperature

Relative combustion air humidity

Standard specifications and regulations

MTU 16V4000 GS

GG16V4000A1



V / Hz	11000	/	50
°C		76 / 91	
mg/m³ i.N.		< 250	
°C		43	
°C		411	
°C		not included	
		Fast start capability 120s	
m / mbar	100	/	1000
°C		25	
%		30	
		VDE-AR-N 4110	

Energy balance	%	100	75	50
Electrical Power ^{2) 3)}	kW	2026	1520	1013
Energy input ^{4) 5)}	kW	4834	3688	2566
Thermal output total ⁶⁾	kW	1215	883	600
Thermal output engine (block, lube oil, 1st stage mixture cooler) ⁶⁾	kW	1215	883	600
Thermal output mixture cooler 1st stage ⁶⁾	kW			
Thermal output mixture cooler 2nd stage ⁶⁾	kW	170	116	74
Exhaust heat (120 °C) ⁶⁾	kW	(995)	(840)	(663)
Engine power ISO 3046-1 ²⁾	kW	2080	1561	1045
Generator efficiency at power factor = 1	%	97.4	97.4	96.9
Electrical efficiency ⁴⁾	%	41.9	41.2	39.5
Total efficiency	%	87.6	87.9	88.7
Power consumption ⁷⁾	kW			
Combustion air / Exhaust gas				
Combustion air volume flow ¹⁾	m³ i.N./h	8090	6062	4041
Combustion air mass flow	kg/h	10447	7829	5218
Exhaust gas volume flow, wet ¹⁾	m³ i.N./h	8496	6374	4259
Exhaust gas volume flow, dry ¹⁾	m³ i.N./h	7600	5690	3783
Exhaust gas mass flow, wet	kg/h	10801	8101	5408
Exhaust temperature after turbocharger	°C	411	447	503
Reference fuel ⁸⁾				
Natural gas			CH ₄ >95 Vol. %	
Sewage gas			not applicable	
Biogas			not applicable	
Landfill gas			not applicable	
Fuel requirements ⁹⁾				
Minimum methane number	MN		72	
Range of heating value: design / operation range without power derating	kWh/m³ i.N.		10.0 - 10.5 / 8.0 - 11.0	
Exhaust gas emissions ^{5) 8)} Compliance with emissions standards only for ≥ 1013 kWel				
NOx, stated as NO ₂ (dry, 5 % O ₂)	mg/m³ i.N.	< 250		
CO (dry, 5 % O ₂)	mg/m³ i.N.	< 1000		
HCHO (dry, 5 % O ₂)	mg/m³ i.N.	< 120		
VOC (dry, 5 % O ₂)	mg/m³ i.N.			
Otto-gas engine, lean burn operation with turbocharging				
Number of cylinders / configuration		16	/	V
Engine type			16V4000L64FNER	
Engine speed	1/min		1500	
Bore	mm		170.0	
Stroke	mm		210.0	
Displacement	dm³		76.3	
Mean piston speed	m/s		10.5	
Compression ratio			12.5	
BMEP at nominal engine speed min-1	bar	21.8		
Lube oil consumption ¹⁰⁾	dm³/h	0.35		
Exhaust back pressure min. - max. after module	mbar - mbar		30 - 60	
Generator				
Rating power (temperature rise class F) ¹¹⁾	kVA		2840	
Insulation class / temperature rise class			F / F	
Winding pitch			2/3	
Protection			IP 23	
Max. allowable p.f. inductive (overexcited) / capacitive (underexcited) ¹²⁾			0.8 / 0.95	
Voltage tolerance / frequency tolerance	%		± 10 / ± 5	
Engine cooling water system				
Coolant temperature (in / out), design	°C	76 / 91		
Coolant flow rate, constant ^{13) 14)}	m³/h	75.5		
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	bar / m³/h	2.94	/
Max. operation pressure (coolant before engine)	bar		6.0	
Exhaust gas heat exchanger (EGHE)				
Exhaust gas temperature (out)	°C			
Coolant temperature (in / out), design	°C			
Coolant volumetric flow, constant ^{13) 14)}	m³/h			
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	kPa / m³/h	/	
Min. coolant flow rate / min. operation gauge pressure	m³/h / bar		/	
Max. operation pressure (coolant water)	bar			

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Mixture cooler 1st stage, external					
Coolant temperature (in / out), design	°C				
Coolant volumetric flow, design, constant ^{13) 14)}	m³/h				
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	bar / m³/h	/		
Min. coolant flow rate / min. operation gauge pressure	m³/h / bar		/		
Max. operation pressure before mixture cooler	bar				
Mixture cooling 2nd stage, external					
Coolant temperature (in / out), design	°C		43 / 47.6		
Coolant volumetric flow, design, constant ^{13) 14)}	m³/h		34.3		
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	bar / m³/h	0.6	/	45.3
Max. operation pressure before mixture cooler	bar		6		
Heating circuit interface					
Engine coolant temperature (in / out), design	°C				
Heating water temperature (in / out), design	°C				
Heating water flow rate, design ^{14) 16)}	m³/h				
Pressure drop, design ¹⁴⁾	Cv value ^{15) 16)}	bar / m³/h	/		
Max. operation gauge pressure (heating water)	bar				
Room ventilation					
Genset ventilation heat ¹⁷⁾	kW		120		
Inlet air temperature: (min./design/max.)	°C		20 / 25 / 30.0		
Min. engine room temperature ¹⁸⁾	°C		15		
Max. temperature difference ventilation air (in / out)	K		20		
Min. supply air volume flow rate (combustion + ventilation) ¹⁹⁾	m³ i.N./h		25000		
Gearbox	%	100	75	50	
Efficiency	%	-	-	-	
Starter battery					
Nominal voltage / power / capacity required	V / kW / Ah		24 / 2 x 9 / --		
Filling quantities					
Lube oil for engine	dm³		330		
Coolant in engine	dm³		270		
Coolant in mixture cooler	dm³		25		
Heating water for plate heat exchanger ²⁰⁾	dm³				
Lube oil for gearbox	dm³				
Gas regulation line					
Nominal size / gas pressure min. - max. (at gas regulation line inlet)	DN / mbar - mbar		100	/	155 - 250
Engine sound level ²¹⁾ (1 meter distance, free field) +3 dB(A) for total A-weighted level tolerance; + 5 dB for single octave level					
Frequency	Hz	63	125	250	500
Sound pressure level	dB	84.8	90.5	90.0	93.0
Frequency	Hz	1000	2000	4000	8000
Sound pressure level	dB	92.5	91.8	99.2	101.4
Linear total sound pressure level	Lin dB	104.8			
A-weighted total sound pressure level	dB(A)	104.4			
A-weighted total sound power level	dB(A)	124.1			
Undampened exhaust noise ²¹⁾ (1 meter distance to outlet within 90°, free field) +3 dB(A) for total A-weighted level tolerance; + 5 dB for single octave level					
Frequency	Hz	63	125	250	500
Sound pressure level	dB	113.9	119.8	111.9	104.5
Frequency	Hz	1000	2000	4000	8000
Sound pressure level	dB	97.1	96.8	94.0	83.9
Linear total sound pressure level	Lin dB	121.6			
A-weighted total sound pressure level	dB(A)	108.0			
A-weighted total sound power level	dB(A)	121.0			
Dimensions (aggregate)					
Length	mm	~ 5300			
Width	mm	~ 2000			
Height	mm	~ 2300			
Gross weight (dry weight)	kg	~ 17700 (~ 17000)			
Power derating					
Elevation	specific to the project				
Combustion air temperature	specific to the project				
Mixture cooler coolant temperature (in)	specific to the project				
Methane number	specific to the project				
Boundary conditions and consumables					
Systems and consumables have to conform to the following actual company standards:			A001072		
1) Normal cubic meter at 1013 mbar and T = 273 K					
2) Prime power operation will be designed specific to the project					
3) Generator gross power at nominal voltage, power factor = 1 and nominal frequency					
4) According to ISO 3046 (+ 5 % tolerance), using reference fuel used at nominal voltage, power factor = 1 and nominal frequency					
5) Emission values during grid parallel operation					
6) Thermal output at layout temperature; tolerance +/- 8 %					
7) Power consumption of all electrical consumers which are mounted at the module / genset					
8) Deviations from the layout parameters respectively the reference fuel can have influence on the obtained efficiency and exhaust emissions					
9) Functional capability					
10) Reference value at nominal load (without amount of oil exchange)					
11) Generator (at nominal power) max. 1000 m height of location and max. 40 °C intake air temperature; else power derating					
12) Max. allowable cos phi at nominal power (view of producer)					
13) Stated values for cooling fluid composition 65% water and 35% glycol, adaption for use of other cooling fluid composition necessary The system design must consider the tolerance.					
14) Pressure loss at reference flow rate					
15) The Cv value declares the volumetric flow in m³/h at a pressure drop of 1 bar. Min. and max. flow rate limits are defined.					
16) Stated values for pure water, adaption for other cooling fluid composition necessary					
17) Only generator- and surface losses					
18) Frost-free conditions must be guaranteed					
19) Amount of ventilation air must be adapted to the gas safety concept					
20) Assemblies including pipe work					
21) All sound pressure levels at nominal load, according to ISO 8528-10 and ISO 6798. Resonance effects of the connected exhaust line can influence the exhaust noise sound pressure level					
22) Max. admissible cos phi depending on voltage in accordance with the requirements of the valid 'Standard specifications and regulations'					