

Technical Data Sheet

93800050098_V08_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

Altitude above sea level

Combustion air temperature

Relative combustion air humidity

Standard specifications and regulations

MTU 20V4000 GS

GG20V4000A1



V / Hz	400	/	50
°C		78 / 90	
mg/m ³ i.N.		< 500	
°C			
°C		40	
°C		441	
		not included	
m / mbar	100	/	1000
°C		25	
%		30	

Energy balance	%	100	75	50
Electrical Power ^{2) 3)}	kW	2145	1609	1073
Energy input ^{4) 5)}	kW	4990	3837	2700
Thermal output total ⁶⁾	kW	1161	873	622
Thermal output engine (block, lube oil, 1st stage mixture cooler) ⁶⁾	kW	1161	873	622
Thermal output mixture cooler 1st stage ⁶⁾	kW			
Thermal output mixture cooler 2nd stage ⁶⁾	kW	142	98	62
Exhaust heat (120 °C) ⁶⁾	kW	(1078)	(900)	(687)
Engine power ISO 3046-1 ²⁾	kW	2200	1650	1105
Generator efficiency at power factor = 1	%	97.5	97.5	97.1
Electrical efficiency ⁴⁾	%	43.0	41.9	39.7
Total efficiency	%	87.9	88.1	88.2
Power consumption ⁷⁾	kW			
Combustion air / Exhaust gas				
Combustion air volume flow ¹⁾	m ³ i.N./h	8399	6357	4350
Combustion air mass flow	kg/h	10846	8210	5617
Exhaust gas volume flow, wet ¹⁾	m ³ i.N./h	8677	6572	4499
Exhaust gas volume flow, dry ¹⁾	m ³ i.N./h	8017	6065	4144
Exhaust gas mass flow, wet	kg/h	11212	8493	5816
Exhaust temperature after turbocharger	°C	441	470	502
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	MZ		80	
Range of heating value: design / operation range without power derating	kWh/m ³ i.N.		10.1 - 10.5 / 8.0 - 11.0	
Exhaust gas emissions ^{5) 8)}				
NOx, stated as NO ₂ (dry, 5 % O ₂)	mg/m ³ i.N.	< 500		
CO (dry, 5 % O ₂)	mg/m ³ i.N.	< 1000		
HCHO (dry, 5 % O ₂)	mg/m ³ i.N.			
VOC (dry, 5 % O ₂)	mg/m ³ i.N.			
Otto-gas engine, lean burn operation with turbocharging				
Number of cylinders / configuration		20	/	V
Engine type			20V4000L33FN	
Engine speed	1/min		1500	
Bore	mm		170.0	
Stroke	mm		210.0	
Displacement	dm ³		95.3	
Mean piston speed	m/s		10.5	
Compression ratio			12.8	
BMEP at nominal engine speed min-1	bar	18.5		
Lube oil consumption ¹⁰⁾	dm ³ /h	0.75		
Exhaust back pressure min. - max. after module	mbar - mbar		30 - 60	
Generator				
Rating power (temperature rise class F) ¹¹⁾	kVA		2800	
Insulation class / temperature rise class			H / 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		78 / 90	
Coolant flow rate, constant ^{13) 14)}	m ³ /h		90.1	
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	bar / m ³ /h	2.55	/
Max. operation pressure (coolant before engine)	bar		6.0	57.4
Exhaust gas heat exchanger (EGHE)				
Exhaust gas temperature (out)	°C			
Coolant temperature (in / out), design	°C			
Coolant volumetric flow, constant ^{13) 14)}	m ³ /h			
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	kPa / m ³ /h	/	
Min. coolant flow rate / min. operation gauge pressure	m ³ /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 cooler 2nd stage, external				
Coolant temperature (in / out), design	°C	40 / 43.8		
Coolant volumetric flow, design, constant ^{13) 14)}	m³/h	35.3		
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	bar / m³/h	0.72	/ 42.6
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		113	
Inlet air temperature: (min./design/max.)	°C		20 / 25 / 30	
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		24500	
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		350	
Coolant in engine	dm³		310	
Coolant in mixture cooler	dm³		23	
Heating water for plate heat exchanger ²⁰⁾	dm³			
Lube oil for gearbox	dm³			
Gas regulation line				
Nominal size / gas pressure min. - max.	DN / mbar - mbar	100	/	180 - 250
Engine sound level ²¹⁾ (1 meter distance, free field) +3 dB(A) for total A-weighted level tolerance				
Frequency	Hz	63	125	250 500
Sound pressure level	dB	84.6	91.9	88.9 92.4
Frequency	Hz	1000	2000	4000 8000
Sound pressure level	dB	92.9	89.8	84.6 92.9
	Lin dB	99.8		
Sum of pressure levels	dB A	98.1		
Sound power level	dB	118.0		
Undamped exhaust noise ²¹⁾ (1 meter distance to outlet within 90°, free field) +3 dB(A) for total A-weighted level tolerance				
Frequency	Hz	63	125	250 500
Sound pressure level	dB	109.0	110.2	104.2 98.1
Frequency	Hz	1000	2000	4000 8000
Sound pressure level	dB	92.5	89.1	84.6 72.3
	Lin dB	113.5		
Sum of pressure levels	dB A	101.1		
Sound power level	dB	113.1		
Dimensions (aggregate)				
Length	mm		~ 5900	
Width	mm		~ 2000	
Height	mm		~ 2400	
Gross weight (dry weight)	kg		~ 19700 (~ 19000)	
Power derating				
Altitude			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:

A001067

- 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) Genset 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
- 22) Max. admissible cos phi depending on voltage in accordance with the requirements of the BDEW Mittelspannungsrichtlinie (German Medium Voltage Directive)

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