Technical Data Sheet

MTU 12V4000 GS

TD_0178_L64_1521_50_250_EN_SI_V2	**GG12V4000D1**			
Voltage / Frequency	V / Hz	**400**	**/**	**50**
Cooling water temperature (in / out)	°C		**78 / 90**	
NOx emissions (dry, 5 % O_2)	mg/m³ i.N.		**< 250**	
Mixture cooler 1st stage water temperature (in)	°C			
Mixture cooler 2nd stage water temperature (in)	°C		**45**	
Exhaust gas temperature	°C		**422**	
Catalytic converter			**not included**	
Special equipment				
Elevation above sea level	m / mbar	**100**	**/**	**1000**
Combustion air temperature	°C		**25**	
Relative combustion air humidity	%		**30**	
Standard specifications and regulations			**VDE-AR-N 4110**	

Energy balance	**%**	**100**	**75**	**50**
Electrical Power [2) 3)]	kW	1521	1140	760
Energy input [4) 5)]	kW	3560	2729	1920
Thermal output total [6)]	kW	1608	1260	938
Thermal output engine (block, lube oil, 1st stage mixture cooler) [6)]	kW	828	602	416
Thermal output mixture cooler 1st stage[6)]	kW			
Thermal output mixture cooler 2nd stage [6)]	kW	116	79	50
Exhaust heat optional (120 °C) [6)]	kW	(780)	(658)	(522)
Engine power ISO 3046-1 [2)]	kW	1560	1170	784
Generator efficiency at power factor = 1	%	97.5	97.4	97.0
Electrical efficiency [4)]	%	42.7	41.8	39.6
Total efficiency	%	87.9	87.9	88.4
Power consumption [7)]	kW			
Combustion air / Exhaust gas				
Combustion air volume flow [1)]	m³ i.N./h	6100	4573	3069
Combustion air mass flow	kg/h	7880	5908	3965
Exhaust gas volume flow, wet [1)]	m³ i.N./h	6404	4806	3233
Exhaust gas volume flow, dry [1)]	m³ i.N./h	5748	4302	2878
Exhaust gas mass flow, wet	kg/h	8148	6112	4108
Exhaust temperature after turbocharger	°C	422	458	516
Reference fuel [8)]				
Natural gas			CH_4 >95 Vol.%	
Sewage gas			not applicable	
Biogas			not applicable	
Landfill gas			not applicable	
Fuel requirements [9)]				
Nominal rated methane number	MN		70	
Range of heating value: design / operation range without power derating	kWh/m³ i.N.		10.0 - 10.1 / 8.0 - 11.0	
Exhaust gas emissions [5) 8)] Compliance with emissions standards only for ≥ 760 kWel				
NOx, stated as NO_2 (dry, 5 % O_2)	mg/m³ i.N.	< 250		
CO (dry, 5 % O_2)	mg/m³ i.N.	< 1200		
HCHO (dry, 5 % O_2)	mg/m³ i.N.	< 130		
VOC (dry, 5 % O_2)	mg/m³ i.N.			
Otto-gas engine, lean burn operation with turbocharging				
Number of cylinders / configuration		12	/	v
Engine type			12V4000L64FNER	
Engine speed	1/min		1500	
Bore	mm		170.0	
Stroke	mm		210.0	
Displacement	dm³		57.2	
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	0.27		
Exhaust back pressure min. - max. after module	mbar - mbar		30 - 60	
Generator				
Rating power (temperature rise class F) [11)]	kVA		1935	
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)]	m³/h	63.92		
Pressure drop, design [14)] Cv value [13) 15)]	bar / m³/h	2.8	/	38.7
Max. operation pressure (coolant before engine)	bar		6	
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	45 / 48.4			
Coolant volumetric flow, design, constant [13) 14)]		m³/h	32.0			
Pressure drop, design [14)]	Cv value [13) 15)]	bar / m³/h	0.42	/		50.6
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		88		
Inlet air temperature: (min./design/max.)		°C		20 / 25 / 30		
Min. engine room temperature [18)]		°C		15		
Max. temperature difference ventilation air (in / out)		°C		20		
Min. supply air volume flow rate (combustion + ventilation) [19)]		m³ i.N./h		18500		
Gearbox		**%**	**100**	**75**		**50**
Efficiency		%				
Starter battery						
Nominal voltage / power / capacity required		V / kW / Ah		24 / 9 / --		
Filling quantities						
First filling quantity lube oil / refilling amount lube oil		dm³		320 / 280		
Coolant in engine circuit		dm³		200		
Coolant in mixture cooler		dm³		20		
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	80	/		144 - 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	83.3	87.4	88.6	91.3
Frequency		Hz	**1000**	**2000**	**4000**	**8000**
Sound pressure level		dB	90.1	87.3	92.9	103.9
Linear total sound pressure level		Lin dB	104.9			
A-weighted total sound pressure level		dB(A)	104.5			
A-weighted total sound power level		dB(A)	123.9			
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	118.5	120.3	110.8	102.2
Frequency		Hz	**1000**	**2000**	**4000**	**8000**
Sound pressure level		dB	92.9	92.3	92.1	82.5
Linear total sound pressure level		Lin dB	122.8			
A-weighted total sound pressure level		dB(A)	108.4			
A-weighted total sound power level		dB(A)	121.3			
Dimensions (aggregate)						
Length		mm		~ 4600		
Width		mm		~ 2200		
Height		mm		~ 2300		
Gross weight (dry weight)		kg		~ 16500 (~ 15500)		
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) oil density set to 860g/l
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.
22) Max. admissible cos phi depending on voltage in accordance with the requirements of the valid 'Standard specifications and regulations'