



Technical Data Sheet

mtu 12V4000 GS



GG12V4000D1

Application
 Operation mode
 Engine type
 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
 Maximum ambient air dew point on site
 Standard specifications and regulations

V / Hz
 °C
 mg/m³ i.N.
 °C
 °C
 °C
 m / mbar
 °C
 °C

400	78 / 92	50
	< 500	
	43	
	420	
	not included	
100	25	1000
	30	
	VDE-AR-N 4110	

Energy balance	%	100	75	50
Electrical Power ^{2) 3)}	kW	1521	1141	761
Energy input ^{4) 5)}	kW	3443	2645	1871
Thermal output total ⁶⁾	kW	788	576	403
Thermal output engine (block, lube oil, 1st stage mixture cooler) ⁶⁾	kW	788	576	403
Thermal output mixture cooler 1st stage ⁶⁾	kW			
Thermal output mixture cooler 2nd stage	kW	115	79	49
Exhaust heat optional (120 °C) ⁶⁾	kW	(742)	(624)	(498)
Engine power ISO 3046-1 ²⁾	kW	1560	1171	784
Generator efficiency at power factor = 1	%	97.5	97.5	97.1
Electrical efficiency ⁴⁾	%	44.2	43.1	40.7
Total efficiency	%	88.6	88.5	88.8
Power consumption ⁷⁾	kW			

Combustion air / Exhaust gas				
Combustion air volume flow ¹⁾	m ³ i.N./h	5849	4413	2959
Combustion air mass flow	kg/h	7553	5699	3821
Exhaust gas volume flow, wet ¹⁾	m ³ i.N./h	6142	4640	3118
Exhaust gas volume flow, dry ¹⁾	m ³ i.N./h	5509	4155	2774
Exhaust gas mass flow, wet	kg/h	7814	5904	3962
Exhaust temperature after turbocharger	°C	420	453	512

Reference fuel ⁸⁾		
Natural gas		CH ₄ >95 Vol.%
Sewage gas		not applicable
Biogas		not applicable
Landfill gas		not applicable
Propane HD 5		not applicable

Fuel requirements ⁹⁾		
Nominal rated methane number	MN	72
Range of heating value: design / operation range without power derating	kWh/m ³ i.N.	10.0 - 10.5 / 8.3 - 11.0

Exhaust gas emissions 5) 8) Compliance with emissions standards only for ≥ 761 kWel		Raw emissions
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.	< 120
VOC (dry, 5 % O ₂)	mg/m ³ 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	dm ³		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⁾	dm ³ /h	0.27	
Exhaust back pressure min. - max. after module	mbar - mbar		30 - 60
Turbocharger setting			

Generator		
Generator type		
Rating power (temperature rise class F) ¹¹⁾	kVA	2152
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 / 92	
Coolant flow rate, constant ^{13) 14)}	m ³ /h	52.4	
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	1.9	/ 38.6
Max. operation pressure (coolant before engine)	bar		6
Mixture cooler 1st stage, external			
Coolant temperature (in / out), design	°C		
Coolant volumetric flow, design, constant ^{13) 14)}	m ³ /h		
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}		/
Min. coolant flow rate / min. operation gauge pressure	m ³ /h / bar		/
Max. operation pressure before mixture cooler	bar		

Mixture cooler 2nd stage, external				
Coolant temperature (in / out), design	°C		43 / 46.1	
Coolant volumetric flow, design, constant ^{13) 14)}	m³/h		34.3	
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	bar / m³/h	0.48	/ 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 in heat exchanger, design ¹⁴⁾	Cv value ^{15) 16)}	bar / m³/h		/
Max. operation gauge pressure (heating water)	bar			
Room ventilation				
Genset ventilation heat ¹⁷⁾	kW			86
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			18000
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			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	/ 150 - 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)	121.4		
Dimensions (aggregate)				
Length	mm			~ 5100
Width	mm			~ 2000
Height	mm			~ 2300
Weight	kg			~ 13500 (~ 13000)
Power derating				
Design drawing				
Load step				
Maintenance plan				
Configuration change				
Boundary conditions and consumables				
Systems and consumables have to conform to the following actual company standards:			A001072	
<ol style="list-style-type: none"> Normal cubic meter at 1013 mbar and T = 273 K Prime power operation will be designed specific to the project Generator gross power at nominal voltage, power factor = 1 and nominal frequency (ISO 8528-6) According to ISO 3046 (+ 5 % tolerance), using reference fuel used at nominal voltage, power factor = 1 and nominal frequency Emission values during grid parallel operation Thermal output at layout temperature; tolerance +/- 8 % Max. admissible cos phi depending on voltage in accordance with the requirements of the valid 'Standard specifications and regulations' Deviations from the layout parameters respectively the reference fuel can have influence on the obtained efficiency and exhaust emissions Functional capability Reference value at nominal load (without amount of oil exchange) oil density set to 860g/l If the voltage tolerance is greater than +/-5%, the theoretical service life of the insulation system may be reduced due to the permanent max. nominal conditions of the generator. Max. allowable cos phi at nominal power (view of producer) 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. Pressure loss at reference flow rate 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. Stated values for pure water, adaption for other cooling fluid composition necessary Only generator- and surface losses Frost-free conditions must be guaranteed Amount of ventilation air must be adapted to the gas safety concept Assemblies including pipe work All sound pressure levels at nominal load, according to ISO 8528-10 and ISO 6798. Max. admissible cos phi depending on voltage in accordance with the requirements of the valid 'Standard specifications and regulations' 				