

# Technical Data Sheet

006250283\_250284\_Q01\_2\_12L64\_1287\_50\_250\_EN\_SI\_V01

Voltage / Frequency

Cooling water temperature (in / out)

NOx emissions (dry, 5 % O<sub>2</sub>)

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 12V4000 GS

GG12V4000D1



V / Hz	400	/	50
°C		78 / 91	
mg/m <sup>3</sup> i.N.		< 250	
°C		60	
°C		442	
		not included	
m / mbar	100	/	1000
°C		35	
%		60	
		VDE-AR-N 4110	

Energy balance	%	100	75	50
Electrical Power <sup>2) 3)</sup>	kW	1287	965	644
Energy input <sup>4) 5)</sup>	kW	3023	2323	1629
Thermal output total <sup>6)</sup>	kW	1415	1117	809
Thermal output engine (block, lube oil, 1st stage mixture cooler) <sup>6)</sup>	kW	729	543	382
Thermal output mixture cooler 1st stage <sup>6)</sup>	kW			
Thermal output mixture cooler 2nd stage <sup>6)</sup>	kW	62	40	23
Exhaust heat optional ( 120 °C ) <sup>6)</sup>	kW	( 686 )	( 574 )	( 427 )
Engine power ISO 3046-1 <sup>2)</sup>	kW	1320	992	665
Generator efficiency at power factor = 1	%	97.5	97.3	96.8
Electrical efficiency <sup>4)</sup>	%	42.6	41.6	39.5
Total efficiency	%	89.4	89.6	89.2
Power consumption <sup>7)</sup>	kW			

## Combustion air / Exhaust gas

Combustion air volume flow <sup>1)</sup>	m <sup>3</sup> i.N./h	5032	3808	2618
Combustion air mass flow	kg/h	6501	4920	3382
Exhaust gas volume flow, wet <sup>1)</sup>	m <sup>3</sup> i.N./h	5289	4006	2755
Exhaust gas volume flow, dry <sup>1)</sup>	m <sup>3</sup> i.N./h	4729	3575	2454
Exhaust gas mass flow, wet	kg/h	6723	5091	3502
Exhaust temperature after turbocharger	°C	442	474	503

## Reference fuel <sup>8)</sup>

Natural gas			CH <sub>4</sub> >95 Vol.%
Sewage gas			not applicable
Biogas			not applicable
Landfill gas			not applicable

## Fuel requirements <sup>9)</sup>

Nominal rated methane number	MN		70
Range of heating value: design / operation range without power derating	kWh/m <sup>3</sup> i.N.		10.0 - 10.1 / 8.0 - 11.0

## Exhaust gas emissions <sup>5) 8)</sup> Compliance with emissions standards only for ≥ 644 kWel

NOx, stated as NO <sub>2</sub> (dry, 5 % O <sub>2</sub> )	mg/m <sup>3</sup> i.N.	< 250
CO (dry, 5 % O <sub>2</sub> )	mg/m <sup>3</sup> i.N.	< 1000
HCHO (dry, 5 % O <sub>2</sub> )	mg/m <sup>3</sup> i.N.	< 130
VOC (dry, 5 % O <sub>2</sub> )	mg/m <sup>3</sup> 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 <sup>3</sup>		57.2	
Mean piston speed	m/s		10.5	
Compression ratio			12.5	
BMEP at nominal engine speed min-1	bar	18.4		
Lube oil consumption <sup>10)</sup>	dm <sup>3</sup> /h	0.23		
Exhaust back pressure min. - max. after module	mbar - mbar		30 - 60	

## Generator

Rating power (temperature rise class F) <sup>11)</sup>	kVA		2152
Insulation class / temperature rise class			H / F
Winding pitch			2/3
Protection			IP 23
Max. admissible cos phi inductive (overexcited) / capacitive (underexcited) <sup>12) 22)</sup>			0.8 / 0.95
Voltage tolerance / frequency tolerance	%		± 10 / ± 5

## Engine cooling water system

Coolant temperature (in / out), design	°C		78 / 91
Coolant flow rate, constant <sup>13) 14)</sup>	m <sup>3</sup> /h		51.97
Pressure drop, design <sup>14)</sup>	Cv value <sup>13) 15)</sup>	bar / m <sup>3</sup> /h	1.9 / 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 <sup>13) 14)</sup>	m <sup>3</sup> /h		
Pressure drop, design <sup>14)</sup>	Cv value <sup>13) 15)</sup>	kPa / m <sup>3</sup> /h	/
Min. coolant flow rate / min. operation gauge pressure	m <sup>3</sup> /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 <sup>13) 14)</sup>		m³/h		
Pressure drop, design <sup>14)</sup>	Cv value <sup>13) 15)</sup>	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	60 / 61.7	
Coolant volumetric flow, design, constant <sup>13) 14)</sup>		m³/h	33.0	
Pressure drop, design <sup>14)</sup>	Cv value <sup>13) 15)</sup>	bar / m³/h	0.52	/ 46.7
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 <sup>14) 16)</sup>		m³/h		
Pressure drop, design <sup>14)</sup>	Cv value <sup>15) 16)</sup>	bar / m³/h	/	
Max. operation gauge pressure (heating water)		bar		

## Room ventilation

Genset ventilation heat <sup>17)</sup>		kW		70
Inlet air temperature: (min./design/max.)		°C	30 / 35 / 40	
Min. engine room temperature <sup>16)</sup>		°C	15	
Max. temperature difference ventilation air (in / out)		°C	20	
Min. supply air volume flow rate (combustion + ventilation) <sup>19)</sup>		m³ i.N./h	15000	

## Gearbox

Efficiency		%	100	75	50
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## Starter battery

Nominal voltage / power / capacity required		V / kW / Ah		24 / 9 / --
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## 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 <sup>20)</sup>		dm³		
Lube oil for gearbox		dm³		

## Gas regulation line

Nominal size / gas pressure min. - max. (at gas regulation line inlet)		DN / mbar - mbar	80	/	132 - 250
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## Engine sound level <sup>21)</sup> (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 <sup>21)</sup> (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	~ 4900
Width	mm	~ 1800
Height	mm	~ 2300
Gross weight (dry weight)	kg	~ 14000 (~ 13000)

## 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
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- 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
- 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 %
- Power consumption of all electrical consumers which are mounted at the module / genset
- 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
- Generator (at nominal power) max. 1000 m height of location and max. 40 °C intake air temperature; else power derating
- 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.  
Resonance effects of the connected exhaust line can influence the exhaust noise sound pressure level
- Max. admissible cos phi depending on voltage in accordance with the requirements of the valid 'Standard specifications and regulations'