

Technical Data Sheet

023250338_250347_Q01_1_20L64_2147_50_500_EN_SI_V01

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 20V4000 GS

GG20V4000D1M



V / Hz	6300	/	50
°C		79 / 92	
mg/m ³ i.N.		< 500	
°C		58	
°C		441	
		not included	
m / mbar	100	/	1000
°C		35	
%		60	
		VDE-AR-N 4110	

Energy balance	%	100	75	50
Electrical Power ^{2) 3)}	kW	2147	1610	1074
Energy input ^{4) 5)}	kW	4935	3781	2635
Thermal output total ⁶⁾	kW	2329	1825	1300
Thermal output engine (block, lube oil, 1st stage mixture cooler) ⁶⁾	kW	1217	914	614
Thermal output mixture cooler 1st stage ⁶⁾	kW			
Thermal output mixture cooler 2nd stage ⁶⁾	kW	110	67	35
Exhaust heat optional (120 °C) ⁶⁾	kW	(1112)	(911)	(686)
Engine power ISO 3046-1 ²⁾	kW	2200	1655	1112
Generator efficiency at power factor = 1	%	97.6	97.3	96.5
Electrical efficiency ⁴⁾	%	43.5	42.6	40.7
Total efficiency	%	90.7	90.8	90.1
Power consumption ⁷⁾	kW			

Combustion air / Exhaust gas

Combustion air volume flow ¹⁾	m ³ i.N./h	8153	6142	4210
Combustion air mass flow	kg/h	10532	7934	5439
Exhaust gas volume flow, wet ¹⁾	m ³ i.N./h	8572	6463	4433
Exhaust gas volume flow, dry ¹⁾	m ³ i.N./h	7657	5762	3945
Exhaust gas mass flow, wet	kg/h	10896	8213	5631
Exhaust temperature after turbocharger	°C	441	468	499

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/m ³ i.N.		10.0 - 10.5 / 8.0 - 11.0

Exhaust gas emissions ^{5) 8)} Compliance with emissions standards only for ≥ 1074 kWel

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		20	/	v
Engine type			20V4000L64FNER	
Engine speed	1/min		1500	
Bore	mm		170.0	
Stroke	mm		210.0	
Displacement	dm ³		95.33	
Mean piston speed	m/s		10.5	
Compression ratio			12.5	
BMEP at nominal engine speed min-1	bar	18.4		
Lube oil consumption ¹⁰⁾	dm ³ /h	0.38		
Exhaust back pressure min. - max. after module	mbar - mbar		30 - 60	

Generator

Rating power (temperature rise class F) ¹¹⁾	kVA		3699
Insulation class / temperature rise class			F / F
Winding pitch			2/3
Protection			IP23
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		79 / 92
Coolant flow rate, constant ^{13) 14)}	m ³ /h		86.76
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	bar / m ³ /h	2.5 / 56.2
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)}	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		

Technical Data Sheet

023250338_250347_Q01_1_20L64_2147_50_500_EN_SI_V01

MTU 20V4000 GS

GG20V4000D1M



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	58 / 60.3	
Coolant volumetric flow, design, constant ^{13) 14)}		m³/h	44.0	
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	bar / m³/h	0.84	/ 49.2
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		109
Inlet air temperature: (min./design/max.)		°C	30 / 35 / 40	
Min. engine room temperature ¹⁶⁾		°C	15	
Max. temperature difference ventilation air (in / out)		°C	20	
Min. supply air volume flow rate (combustion + ventilation) ¹⁹⁾		m³ i.N./h		23500

Gearbox

Efficiency		%	100	75	50
------------	--	---	-----	----	----

Starter battery

Nominal voltage / power / capacity required		V / kW / Ah		24 / 2 x 9 / --
---	--	-------------	--	-----------------

Filling quantities

First filling quantity lube oil / refilling amount lube oil		dm³		478 / 450
Coolant in engine circuit		dm³		310
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	/	148 - 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	93.1	95.1	91.5	95.0
Frequency	Hz	1000	2000	4000	8000
Sound pressure level	dB	93.5	92.8	91.8	99.7
Linear total sound pressure level	Lin dB	104.0			
A-weighted total sound pressure level	dB(A)	102.0			
A-weighted total sound power level	dB(A)	122.3			

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	118.4	118.9	108.8	100.5
Frequency	Hz	1000	2000	4000	8000
Sound pressure level	dB	91.9	91.5	91.8	84.1
Linear total sound pressure level	Lin dB	122.0			
A-weighted total sound pressure level	dB(A)	106.5			
A-weighted total sound power level	dB(A)	119.4			

Dimensions (aggregate)

Length	mm	~ 6200
Width	mm	~ 2100
Height	mm	~ 2400
Gross weight (dry weight)	kg	~ 21500 (~ 20500)

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
--	---------

- 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'