Cooling waster temperature (in) out) **Comparison (in)	Technical Data Sheet 93800050222_V05_en_GB	MTU 12V4000 GS GG12V4000A1		mu onsite energy		
Michael sections (etc.) \$ 5% Q, 1	Voltage / Frequency		6300		50	
Ministruct cooler 1st stage water temperature (in) "C 40 100 1	Cooling water temperature (in / out)					
Michate accolor 2nd stage water temperature (in)		•		< 500		
Exhause pas emperature Special equipment Special equipment Special equipment Special equipment Special equipment Special equipment Studies above sea tree! Relative combustion air hunnifolty Special equipment Studies above sea tree! Relative combustion air hunnifolty Special equipment Special equip	• • • • • • • • • • • • • • • • • • • •					
Catalysis converser Allitude above sea level 100	• • • • • • • • • • • • • • • • • • • •					
Special equipment	- .	°C				
Additional actions are level or combustion and responsible or comb	· · · · · · · · · · · · · · · · · · ·			not included		
Combustion air temperature "C 25 Relative combustion air humidity "Bandurd specifications and regulations "Bandurd specifications "Bandu				,		
Section Sect			100	7	1000	
Standard specifications and regulations	·					
Electrical Promote 10	· · · · · · · · · · · · · · · · · · ·	%		30		
Electrical Proper 10	· · · · · · · · · · · · · · · · · · ·	0/_	100	75	50	
Energy Ingrit 495						
Themsholl output total "Present output total "Present output moutput cooler 1st stage minuture cooler 1st stage minuture cooler 1st stage "	Energy input ^{4) 5)}					
Themail culput misture cooler 1st stage misture cooler) 6						
Thermal output mixture cooler 1st stage 1						
Thermato unjout involure cooler 2nd stages 6			004	400	 	
Exhaust part of 120°C 61			88	66	47	
Engine power ISO 3046-1 *** 1320						
Semerator efficiency at power factor = 1						
Selectical efficiency %	Generator efficiency at power factor = 1					
Total afficiency	Electrical efficiency 4)					
Rower consumption Power consumption RW Substitution Residual Substit	Total efficiency					
Combustion air / Exhaust gas Combustion air / Universities Solities Sol	Power consumption 7)					
Combustion air mass flow Exhaust gas volume flow, right 1	Combustion air / Exhaust gas					
Combustion air mass flow Exhaust gas volume flow, yet 10	Combustion air volume flow 1)	m³ i.N./h	5019	3788	2593	
Ethatusi gase rollume flow, dry 3	Combustion air mass flow	kg/h	6481	4892	3348	
Ethatist age mass flow, well character and turbocharger "C 440 472 488 ethatist temperature after turbocharger "C 440 472 480 ethatist and separature after turbocharger "C 440 472 480 ethatist and separature after turbocharger "C 440 472 480 ethatist and separature after turbocharger "C 440 472 480 ethatist and separature after turbocharger "C 440 472 480 ethatist and separature after turbocharger "C 440 472 480 ethatist and separature after turbocharger "C 440 472 480 ethatist and separature after turbocharger "C 440 472 480 ethatist and separature after turbocharger "C 440 472 480 ethatist and separature after after a separature after after a separature	Exhaust gas volume flow, wet 1)	m³ i.N./h	5183	3917	2683	
Exhaust temporature after turbocharger Reference fuel 9	Exhaust gas volume flow, dry 1)	m³ i.N./h	4791	3612	2469	
Reference fuel Page	Exhaust gas mass flow, wet	kg/h	6700	5063	3468	
Natural gas	Exhaust temperature after turbocharger	°C	440	472	498	
Sewage gas	Reference fuel 8)					
Biogas	Natural gas			CH₄ >95 Vol.%		
Landfull gas	Sewage gas					
MZ	Biogas			• • • • • • • • • • • • • • • • • • • •		
Minimum methane number Range of heating value: design/ operation range without power derating between the setting value: design/ operation range without power derating between the setting value: design/ operation range without power derating between the setting value: design/ operation range without power derating between the setting value: design/ operation value and setting value and				not applicable		
Range of heating value: design / operation range without power derating Exhaust gas emissions Passes Pa						
Exhaust gas emissions \$\frac{9}{3} \ No. \ \$ \ \$ \ \$ \ \$ \ \$ \ \$ \ \$ \ \$ \ \$ \						
NOX, stated as NO ₂ (dry, 5 % O ₂)	Range of neating value: design / operation range without power derating	KVVn/m³ I.N.		10.0 - 10.5 / 8.0 - 11.0		
CO (dry, 5 % O-2)		/2: N	500			
HCHO (dry, 5 % Q.) mg/m³ i.N. mg/m³ i.N. mg/m² i.N. mg/m² i.N.						
Mode			< 1000			
Number of cylinders / Configuration 12						
Number of cylinders / configuration 12		mg/m² i.iv.				
Engine type 1 12V4000L33FN Engine speed 1/min 1500 Bore mm 170.0 Stroke mm 210.0 Displacement dm³ 57.2 Mean piston speed mj. 10.5 Compression ratio bar 18.5 BMEP at nominal engine speed min-1 bar 18.5 Lube oil consumption 100 m/s 0.45 Exhaust back pressure min max. after module mbar - mbar 30 - 60 Generator Rating power (temperature rise class F) 111 kVA 2148 Insulation class / temperature rise class F) 111 kVA 2148 Insulation class / temperature rise class F) 112 Max. allowable p.f. inductive (overexcited) / capacitive (underexcited) 120 Voltage tolerance / frequency tolerance / % ± 10 / ± 5 Engine cooling water system Coolant temperature (in out), design C 78 / 90 Coolant flow rate, constant 13140 ms. copacitive (underexcited) 120 Exhaust gas temperature (not), design C 70 Coolant remperature (in out), design C 70 Exhaust gas temperature (und, design C 70 Coolant temperature (und, design C 70 Coolant temperature (und, design C 70 C 70 Coolant remperature (und, design C 70 C 70 C 70 Coolant remperature (und, design C 70 C 70 C 70 Coolant remperature (und, design C 70			12	/	V	
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 bar 18.5 MEP at nominal engine speed min-1 Lube oil consumption ¹⁰⁾ dm³/h 0.45 Exhaust back pressure min - max. after module mbar - mbar mbar mbar mbar mbar mbar mbar mbar			12	12\/4000L33EN	v	
Bore mm 170.0 Stroke mm 210.0 Displacement dm³ 57.2		1/min				
Stroke mm 210.0						
Displacement dm3 57.2						
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) dm³/h 0.45 Exhaust back pressure min max. after module mbar - mbar 30 - 60 Generator Rating power (temperature rise class F) 11) kVA 2148 Insulation class / temperature rise class F / F F Winding pitch 2/3 F Protection IP 23 Protection P23 Max. allowable p.f. inductive (overexcited) / capacitive (underexcited) 12) 0.8 / 0.95 P Voltage tolerance / frequency tolerance % ±10 / ±5 Engine cooling water system ** ±10 / ±5 Coolant temperature (in / out), design °C 78 / 90 Coolant temperature (in / out), design °C 78 / 90 Coolant temperature (on design 14) Cv value 13/15) bar / m3/h 2.43 / 33.6 Max. operation pressure (coolant before engine) bar °C Coolant semperature (in / out), design °C Coolant						
Compression ratio 12.8 BMEP at nominal engine speed min-1 bar 18.5 Lube oil consumption ¹⁰⁾ dm³/h 0.45 Exhaust back pressure min max. after module mbar - mbar 30 - 60 Generator Rating power (temperature rise class F) ¹¹⁾ kVA 2148 Insulation class / temperature rise class F perature rise class F / 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 temperature (in / out), design °C 78 / 90 Coolant temperature (in / out), design bar / m³/h 51.6 Pressure drop, design ¹⁴⁾ Cv value ^{13) 15)} bar / m³/h 2.43 / 33.6 Max space at exchanger (EGHE) Exhaust gas temperature (out) °C Coolant temperature (in / out), design	·					
BMEP at nominal engine speed min-1	Compression ratio	,0				
Lube oil consumption 100 dm³/h 0.45 Exhaust back pressure min max. after module mbar - mbar 30 - 60 Generator Rating power (temperature rise class F) 110 kVA 2148 Insulation class / temperature rise class F) F / F Winding pitch 2/3 Protection IP 23 Max. allowable p.f. inductive (overexcited) / capacitive (underexcited) 120 0.8 / 0.95 Voltage tolerance / frequency tolerance 6 10.8 / 0.95 Voltage tolerance / frequency tolerance 8 2.8 / 0.95 Voltage tolerance / frequency tolerance 8 2.8 / 0.95 Voltage tolerance / frequency tolerance 8 2.8 / 0.95 Voltage tolerance / frequency tolerance 8 2.8 / 0.95 Voltage tolerance / frequency tolerance 8 2.8 / 0.95 Voltage tolerance / frequency tolerance 8 8 9 78 / 90 8 9 78 / 90 <td rows<="" td=""><td>BMEP at nominal engine speed min-1</td><td>bar</td><td>18.5</td><td>·=·-</td><td></td></td>	<td>BMEP at nominal engine speed min-1</td> <td>bar</td> <td>18.5</td> <td>·=·-</td> <td></td>	BMEP at nominal engine speed min-1	bar	18.5	·=· -	
Exhaust back pressure min max. after module mbar - mbar 30 - 60 Generator Rating power (temperature rise class F) 11) kVA 2148 Insulation class / temperature rise class F F / 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	Lube oil consumption 10)					
Generator Rating power (temperature rise class F) 11) kVA 2148 Insulation class / temperature rise class F / 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 ***C 78 / 90 Coolant temperature (in / out), design °C 78 / 90 Coolant flow rate, constant 13) 14) m³/h 51.6 Pressure drop, design 14) Cv value 13) 15) bar / m³/h 2.43 / 33.6 Max. operation pressure (coolant before engine) bar / m³/h 2.43 / 33.6 Exhaust gas heat exchanger (EGHE) ***C ***C Coolant temperature (in / out), design °C ***C Coolant temperature (in / out), design °C ***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 / <td>Exhaust back pressure min max. after module</td> <td></td> <td>-</td> <td>30 - 60</td> <td></td>	Exhaust back pressure min max. after module		-	30 - 60		
Insulation class / temperature rise class	Generator					
Insulation class / temperature rise class	Rating power (temperature rise class F) 11)	kVA		2148		
Variable	Insulation class / temperature rise class					
Protection	Winding pitch					
Voltage tolerance / frequency tolerance	Protection			IP 23		
Coolant temperature (in / out), design °C 78 / 90				0.8 / 0.95		
Coolant temperature (in / out), design °C 78 / 90 Coolant flow rate, constant (13) 14) m³/h 51.6 Pressure drop, design (14) Cv value (13) 15) bar / m³/h 2.43 / 33.6 Max. operation pressure (coolant before engine) bar 6.0 6.0 Exhaust gas heat exchanger (EGHE) Exhaust gas temperature (out) °C Coolant temperature (in / out), design °C Coolant temperature (in / out), design m³/h m³/h Fressure drop, design (14) Cv value (13) 15) kPa / m³/h / Pressure drop, design (14) Cv value (13) 15) kPa / m³/h / / Min. coolant flow rate / min. operation gauge pressure m³/h / bar / /	Voltage tolerance / frequency tolerance	%		± 10 / ± 5		
Max. operation pressure (coolant before engine) Cv value 13) 15) bar / m³/h 2.43 / 33.6	Engine cooling water system					
Pressure drop, design ¹⁴⁾ Cv value ^{13) 15)} bar / m³/h 2.43 / 33.6 Max. operation pressure (coolant before engine) bar 6.0 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 /	Coolant temperature (in / out), design					
Max. operation pressure (coolant before engine) bar 6.0 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 / bar /	Coolant flow rate, constant (13) (14)					
Exhaust gas heat exchanger (EGHE) Exhaust gas temperature (out) Coolant temperature (in / out), design CC Coolant volumetric flow, constant 13 14) Pressure drop, design 14) Cv value 13 15) KPa / m³/h Min. coolant flow rate / min. operation gauge pressure CC			2.43	· · · · · · · · · · · · · · · · · · ·	33.6	
Exhaust gas temperature (out) Coolant temperature (in / out), design °C Coolant volumetric flow, constant 13 14) Pressure drop, design 14) Cv value 13 15) KPa / m³/h Min. coolant flow rate / min. operation gauge pressure °C w³/h /	Max. operation pressure (coolant before engine)	bar		6.0		
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 /						
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 /	Exhaust gas temperature (out)					
Pressure drop, design ¹⁴⁾ Cv value ^{13) 15)} kPa / m³/h / Min. coolant flow rate / min. operation gauge pressure m³/h / bar /	Coolant temperature (in / out), design					
Min. coolant flow rate / min. operation gauge pressure m³/h / bar /	Coolant volumetric flow, constant (3) (4)					
wax. operation pressure (coorant water) Dar						
	iviax. operation pressure (coolant water)	par				

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93800050222_V05_en_GB		GG12V4000A1		mtu		J energy
Mixture cooler 1st stage, external		GG 12V4	OUOAI			
• .		°C				
Coolant temperature (in / out), design Coolant volumetric flow, design, constant 13) 14)						
	Cv value 13) 15)	m³/h			,	
Pressure drop, design 14)	Cv value 37 37	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 / 43.2			
Coolant volumetric flow, design, constant 13) 14)	40) 45)	m³/h	25.7			
Pressure drop, design ¹⁴⁾	Cv value 13) 15)	bar / m³/h	0.24		/	53.7
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 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		7	'2	
Inlet air temperature: (min./design/max.)		°C			25 / 30	
Min. engine room temperature 18)		<u>c</u>			5	
Max. temperature difference ventilation air (in / out)		С К			20	
Min. supply air volume flow rate (combustion + ventilation)	19)	m³ i.N./h			500	
Gearbox		%	100			50
			100		75	50
Efficiency		%	-		-	-
Starter battery						
Nominal voltage / power / capacity required		V / kW / Ah		24 /	9 /	
Filling quantities						
Lube oil for engine		dm³		2	20	
Coolant in engine		dm³		2	00	
Coolant in mixture cooler		dm³		2	20	
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	80		/	170 - 250
Engine sound level ²¹⁾ (1 meter distance, free field) +3	dB(A) for total A-weighted					
Frequency	u=(//) / c. / c.u. // // c.gc.	Hz	63	125	250	500
Sound pressure level		dB	78.1	86.0	88.4	93.6
Frequency		Hz	1000	2000	4000	8000
· · ·						
Sound pressure level		dB	92.3	89.8	87.9	98.1
		Lin dB	101.2			
Sum of pressure levels		dB A	100.4			
Sound power level		dB	119.7			
Undampened exhaust noise ²¹⁾ (1 meter distance to out	let within 90°, free field) +					
Frequency		Hz	63	125	250	500
Sound pressure level		dB	113.8	115.7	113.1	105.7
Frequency		Hz	1000	2000	4000	8000
Sound pressure level		dB	97.7	94.7	90.3	86.3
		Lin dB	119.3			
Sum of pressure levels		dB A	107.9			
Sound power level		dB	120.5			
Dimensions (aggregate)		<u> </u>	120.0			
, , , , , , , , , , , , , , , , , , , ,		mm		F	000	
Length				~ 5000 ~ 2000		
Width		mm				
Height		mm		~ 2300		
Gross weight (dry weight)		kg		~ 14500	(~ 14000)	
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				•	the project	
Boundary conditions and consumables						
Systems and consumables have to conform to the following actua	I company standards			Ann	1067	
Normal cubic meter at 1013 mbar and T = 273 K				7.00		

- Systems and consumables have to conform to the following actual company standards: 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)
- 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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