



TD_1298_T24_2513_60_1_EN_US_V1

GG20V4000D2

Application
 Operation mode
 Engine type
 Voltage / Frequency
 Cooling water temperature (in / out)
 NOx emissions (dry)
 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
 °F
 g/bhp-hr
 °F
 °F
 °F
 ft / psi
 °F
 °F

Power Generation Island Mode 20V4000T24N		
600		60
	171 / 198	
	< 1	
	131	
	768	
	not included	
	Gearbox	
328		14.5
	95	
	79.0	

Energy balance	%	100	75	50
Electrical Power ²⁾³⁾	kWe	2513	1885	1257
Energy input ⁴⁾⁵⁾	kBTU/hr	20332	15712	10948
Thermal output total ⁶⁾	kBTU/hr	9578	7708	5573
Thermal output engine (block, lube oil, 1st stage mixture cooler) ⁶⁾	kBTU/hr	5347	4065	2832
Thermal output mixture cooler 1st stage ⁶⁾	kBTU/hr			
Thermal output mixture cooler 2nd stage	kBTU/hr	622	368	166
Exhaust heat optional (248 °F) ⁶⁾	kBTU/hr	(4231)	(3643)	(2741)
Engine power ISO 3046-1 ²⁾	bhp	3487	2626	1770
Generator efficiency at power factor = 1	%	97.2	96.8	95.9
Electrical efficiency ⁴⁾	%	42.2	41.0	39.2
Total efficiency	%	89.3	90.0	90.1
Power consumption ⁷⁾	kWe			

Combustion air / Exhaust gas				
Combustion air volume flow ¹⁾	ft ³ /min	5982	4444	2981
Combustion air mass flow	lb/hr	28946	21505	14427
Exhaust gas volume flow, wet ¹⁾	ft ³ /min	6280	4675	3142
Exhaust gas volume flow, dry ¹⁾	ft ³ /min	5641	4181	2798
Exhaust gas mass flow, wet	lb/hr	29940	22271	14962
Exhaust temperature after turbocharger	°F	768	1008	924

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 80
Range of heating value: design / operation range without power derating	BTU/ft ³ 969.1 - 1014.5 / 773.0 - 1062.8

Exhaust gas emissions^{5) 8) 23) 24)} Compliance with emissions standards only for ≥ 1257 kWel

Raw emissions	
NOx, stated as NO ₂ (dry)	g/bhp-hr < 1
CO (dry)	g/bhp-hr < 3.00
HCHO (dry)	g/bhp-hr
VOC (dry)	g/bhp-hr < 0.7

Otto-gas engine, lean burn operation with turbocharging			
Number of cylinders / configuration		20	/ v
Engine type			20V4000T24N
Engine speed	rpm		1500
Bore	in		6.7
Stroke	in		8.3
Displacement	in ³		5817.39
Mean piston speed	ft/sec		34.45
Compression ratio			12.5
BMEP at nominal engine speed min-1	psi	314.5	
Lube oil consumption ¹⁰⁾	gal/hr	0.12	
Exhaust back pressure min. - max. after module	in H ₂ O - in H ₂ O		12 - 24
Turbocharger setting			H65-TA50

Generator	
Generator type	LVS1804W2Wdg07
Rating power (temperature rise class F) ¹¹⁾	kVA 3871
Insulation class / temperature rise class	H / F
Winding pitch	2/3
Protection	IP23
Max. allowable p.f. inductive (overexcited) / capacitive (underexcited) ¹²⁾	0.8 / 1
Voltage tolerance / frequency tolerance	% +/- 5 / +/- 5

Engine cooling water system			
Coolant temperature (in / out), design	°F	171 / 198	
Coolant flow rate, constant ^{13) 14)}	gal/min	449.09	
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	psi / gal/min 49.7	243.2
Max. operation pressure (coolant before engine)	psi		87

Mixture cooler 1st stage, external			
Coolant temperature (in / out), design	°F		
Coolant volumetric flow, design, constant ^{13) 14)}	gal/min		
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	psi / gal/min	
Min. coolant flow rate / min. operation gauge pressure	gal/min / psi		
Max. operation pressure before mixture cooler	psi		

TD_1298_T24_2513_60_1_EN_US_V1		GG20V4000D2		
Mixture cooler 2nd stage, external				
Coolant temperature (in / out), design		°F	131 / 138.0	
Coolant volumetric flow, design, constant ^{13) 14)}		gal/min	193.7	
Pressure drop, design ¹⁴⁾	Cv value ^{13) 15)}	psi / gal/min	12.17	213.7
Max. operation pressure before mixture cooler		psi	87	
Heating circuit interface				
Engine coolant temperature (in / out), design		°F		
Heating water temperature (in / out), design		°F		
Heating water flow rate, design ^{14) 16)}		gal/min		
Pressure drop in heat exchanger, design ¹⁴⁾	Cv value ^{15) 16)}	psi / gal/min		
Max. operation gauge pressure (heating water)		psi		
Room ventilation				
Genset ventilation heat ¹⁷⁾		kBTU/hr	612	
Inlet air temperature: (min./design/max.)		°F	86 / 95 / 104	
Min. engine room temperature ¹⁸⁾		°F	59	
Max. temperature difference ventilation air (in / out)		°F	36	
Min. supply air volume flow rate (combustion + ventilation) ¹⁹⁾		ft ³ /min	22000	
Gearbox				
Efficiency		%	100	75
		%	99.5	99.4
				99.3
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		gal	126 / 119	
Coolant in engine circuit		gal	82	
Coolant in mixture cooler		gal	7	
Heating water for plate heat exchanger ²⁰⁾		gal		
Lube oil for gearbox		gal	24	
Gas regulation line				
Nominal size / gas pressure min. - max. (at gas regulation line inlet)		DN / psi - psi	100	2.5 - 3.6
Engine sound level²¹⁾ (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
Sound pressure level	dB	93.1	95.1	91.5
Frequency	Hz	1000	2000	4000
Sound pressure level	dB	93.5	92.8	91.8
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 noise²¹⁾ (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
Sound pressure level	dB	118.4	118.9	108.8
Frequency	Hz	1000	2000	4000
Sound pressure level	dB	91.9	91.5	91.8
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	in	~ 280		
Width	in	~ 80		
Height	in	~ 100		
Weight	lb	~ 55000 (~ 54000)		
Power derating				
Design drawing				
Load step				
Maintenance plan				
Configuration change		No		
Boundary conditions and consumables				
Systems and consumables have to conform to the following actual company standards:		A001072		

- 1) Normal cubic meter at 15 psi 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 (ISO 8528-6)
- 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) Max. admissible cos phi depending on voltage in accordance with the requirements of the valid 'Standard specifications and regulations'
- 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) 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.
- 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 gal/min at a pressure drop of 1 psi. 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'
- 23) Non-certified engine. The owner/operator must comply with EPA 40CFR60 JJJJ, state and local requirements
- 24) A catalyst may be required to meet applicable emission requirements / VOC emissions based on natural gas with C2+ < 4 %