

Model: C1100 N6C
Frequency: 60 Hz
Fuel Type: Natural Gas MI 70 +
Emissions NOx: 0.5 g/hp-h
LT Water Inlet Temp: 40°C (104°F)
HT Water Outlet Temp: 90°C (194°F)

Generator set data sheet
 1100 kW continuous

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Measured Sound Performance Data Sheet:	MSP-1068			
Prototype Test Summary Data:	PTS-288			
Generator Set Outline Drawing:	A029E093 Heavy Duty Air Cleaner A029U550 Standard Air Cleaner			
Fuel Consumption (ISO3046/1)	100% Load	90% Load	75% Load	50% Load
Fuel Consumption (LHV) ISO3046/1, kW (MMBTU/hr) ^{1,2,3,4,6}	2633 (8.99)	2384 (8.14)	2024 (6.91)	1427 (4.87)
Mechanical Efficiency ISO3046/1, percent ^{1,3,4,6}	43.0%	42.7%	41.9%	39.7%
Electrical Efficiency ISO3046/1, percent ^{1,2,3,4,6}	41.8%	41.5%	40.8%	38.6%
Engine				
Engine Manufacturer	Cummins			
Engine Model	QSK60G			
Configuration	V16			
Displacement, L (cu.in)	60 (3671)			
Aspiration	Turbocharged (1)			
Gross Engine Power Output, kWm (hp)	1132 (1517)			
BMEP, bar (psi)	19 (276)			
Bore, mm (in)	159 (6.26)			
Stroke, mm (in)	190 (7.48)			
Rated Speed, rpm	1200			
Piston Speed, m/s (ft/min)	7.6 (1496)			
Compression Ratio	13.7:1			
Lube Oil Capacity, L (qt)	380 (400)			
Overspeed Limit, rpm	1500			
Regenerative Power, kW	N/A			
Full Load Lubricating oil consumption, g/kWe-hr (g/hp-hr)	0.15 (0.12)			
Fuel System				
Gas supply pressure to engine inlet, bar (psi) ⁸	0.2 (2.9)			
Minimum Methane Index	70			
Engine Electrical System(s)				
Electric starter voltage, volts	24			
Ignition timing, deg before top dead center	18			
Minimum battery capacity @ 40 deg.C (104 deg.F), AH	720			
Genset Dimensions				
Genset Length, m (ft) ⁵	5.12 (16.8)			
Genset Width, m (ft) ⁵	2.23 (7.30)			
Genset Height, m (ft) ⁵	2.77 (9.08)			
Genset Weight (wet), kg (lbs) ⁵	15625 (34,375)			

Notes:

1. At ISO3046 reference conditions, altitude 1013 mbar (30in Hg), air inlet temperature 25°C (77°F)
2. Power output and efficiency include the effect of Cummins supplied engine driven LT coolant pump
3. At electrical output of 1.0 Power Factor
4. Based on pipeline natural gas with LHV of 33.44mJ/Nm³ (905 BTU/ft³)
5. Subtract 3°C ambient temperature capability for each 100 mm (4 in) H₂O back pressure above the information shown on page 2.
6. Weights and dimensions represent a generator set with its standard features only. See outline drawing for other configurations.
7. According to ISO 3046/1 with fuel consumption tolerance of +5% -0%
8. Minimum gas supply pressure dependant on LHV of fuel

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Energy Data	100% Load	90% Load	75% Load	50% Load
Continuous Generator Electrical Output kW ^{e 1,5,6,7}	1100	990	825	550
Continuous Shaft Power, kWm (bhp) ^{1,5,6,7}	1132 (1517)	1017 (1363)	848 (1137)	567 (760)
Total Heat Rejected in LT Circuit, kW (MMBTU/h) ²	87 (0.3)	80 (0.27)	69 (0.24)	45 (0.15)
Total Heat Rejected in HT Circuit, kW (MMBTU/h) ²	592 (2.02)	490 (1.67)	404 (1.38)	309 (1.05)
Unburnt, kW (MMBTU/h) ²	82 (0.28)	76 (0.26)	63 (0.21)	42 (0.14)
Heat Radiated to Ambient, kW (MMBTU/h) ²	169 (0.58)	151 (0.52)	128 (0.44)	91 (0.31)
Available Exhaust heat to 105C, kW (MMBTU/h) ²	562 (1.92)	517 (1.76)	457 (1.56)	341 (1.16)

Intake Air Flow				
Intake Air Flow Mass, kg/s (lb/hr) ²	1.65 (13070)	1.49 (11800)	1.25 (9900)	0.85 (6730)
Intake Air Flow Volume, m ³ /s @ 0°C (scfm) ²	1.28 (2860)	1.16 (2590)	0.97 (2170)	0.66 (1470)
Maximum inlet restriction (after filter, limit for changing filters), below 35°C ambient temp, mm HG, (in H ₂ O)	28 (15)	22.7 (12.1)	15.7 (8.4)	7 (3.7)
Maximum inlet restriction (after filter, limit for changing filters), above 35°C ambient temp, mm HG, (in H ₂ O)	18.7 (10)	15.2 (8.1)	10.5 (5.6)	0 (2.5)

Exhaust Air Flow				
Exhaust Gas Flow Mass, kg/s (lb/hr) ²	1.71 (13540)	1.55 (12280)	1.29 (10220)	0.88 (6970)
Exhaust Gas Flow Volume, m ³ /s (cfm) ²	3.32 (7030)	3.03 (6420)	2.59 (5480)	1.84 (3900)
Exhaust Temperature After Turbine, °C (°F) ¹	412 (774)	417 (783)	436 (817)	467 (873)
Max Exhaust System Back Pressure, mmHG (in H ₂ O) ⁸	38 (20)	31 (17)	21 (11)	10 (5)

HT Cooling Circuit				
HT Circuit Engine Coolant Volume, l (gal)	181 (48)	181 (48)	181 (48)	181 (48)
HT Coolant Flow @ Max Ext Restriction, m ³ /h (gal/min)	63 (277)	63 (277)	63 (277)	63 (277)
Max HT Engine Coolant Inlet Temp, °C (°F) Reference ³	81 (178)	82 (180)	83 (181)	85 (185)
HT Coolant Outlet Temp, °C (°F) ³	90 (194)	90 (194)	90 (194)	90 (194)
Max Pressure Drop in External HT Circuit, bar (psig)	1.4 (20)	1.4 (20)	1.4 (20)	1.4 (20)
HT Circuit Maximum Pressure, bar (psig)	5 (73)	5 (73)	5 (73)	5 (73)
Static Head Pump Inlet, bar (psig)	.5-1.5 (7-20)	.5-1.5 (7-20)	.5-1.5 (7-20)	.5-1.5 (7-20)

LT Cooling Circuit				
LT Circuit Engine Coolant Volume, l (gal)	34 (9)	34 (9)	34 (9)	34 (9)
LT Coolant Flow @ Max Ext Restriction, m ³ /h (gal/min)	17 (75)	17 (75)	17 (75)	17 (75)
LT Coolant Inlet Temp, Thermostat Controlled °C (°F) ⁴	40 (104)	40 (104)	40 (104)	40 (104)
LT Coolant Inlet Temperature Maximum ⁴	50 (122)	52 (126)	56 (133)	63 (145)
Max Pressure Drop in External LT Circuit, bar (psig)	1 (15)	1 (15)	1 (15)	1 (15)
LT Circuit Maximum Pressure, bar (psig)	5 (73)	5 (73)	5 (73)	5 (73)
Static Head Pump Inlet, bar (psig)	.5-1.5 (7-20)	.5-1.5 (7-20)	.5-1.5 (7-20)	.5-1.5 (7-20)

Notes:

1. At ISO3046 reference conditions, altitude 1013 mbar (30in Hg), air inlet temperature 25°C (77°F)
2. Production variation/tolerance ±5%
3. Outlet temperature controlled by thermostat. Inlet temperature for reference only.
4. Inlet temperature controlled by thermostat to 40 °C but is allowed to go to 50 °C and ignition timing is retarded resulting in efficiency loss of 0.4 - 0.6%.
5. Power output and efficiency include the effect of Cummins supplied engine driven LT coolant pump
6. At electrical output of 1.0 Power Factor
7. Based on pipeline natural gas with LHV of 33.44mJ/Nm³ (905 BTU/ft³)
8. Subtract 3 °C ambient temperature capability for each 100 mm (4 in) H₂O back pressure above the information shown on page 2.

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Altitude and Temperature Derate Multiplication Factor ^{1.2.3}

Barometer		Altitude		Table A									
In Hg	mbar	Feet	Meters	Derate Multiplier for all operation modes									
20.7	701	9843	3000	0.75	0.75	0.75	0.75	0.71	0.68	0.61	0.53	-	
21.4	723	9022	2750	0.79	0.79	0.79	0.78	0.73	0.70	0.63	0.54	-	
22.1	747	8202	2500	0.82	0.82	0.82	0.81	0.76	0.72	0.64	0.55	-	
22.8	771	7382	2250	0.86	0.86	0.86	0.84	0.80	0.74	0.65	0.55	-	
23.5	795	6562	2000	0.89	0.89	0.89	0.88	0.83	0.78	0.67	0.56	-	
24.3	820	5741	1750	0.93	0.93	0.93	0.91	0.86	0.81	0.68	0.56	-	
25.0	846	4921	1500	0.96	0.96	0.96	0.94	0.90	0.85	0.69	0.57	-	
25.8	872	4101	1250	1.00	1.00	1.00	0.97	0.93	0.89	0.71	0.57	-	
26.6	899	3281	1000	1.00	1.00	1.00	1.00	0.97	0.93	0.72	0.58	-	
27.4	926	2461	750	1.00	1.00	1.00	1.00	1.00	0.96	0.74	0.58	-	
28.3	954	1640	500	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.59	-	
29.1	983	820	250	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.59	-	
29.5	995	492	150	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.59	-	
30.0	1012	0	0	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.59	-	
Air Filter Inlet Temperature				°C	0	15	20	25	30	35	40	45	50
				°F	32	59	68	77	86	95	104	113	122

Methane Number vs LT Temp - Table C ⁴

		LT Return Temperature		
		40°C	45°C	50°C
Methane Number	80			
	75			
	70			
	65			
	60			

Methane Number Capability Table B

Load (Percent of Rated)			
100%	90%	75%	50%
70	65	60	60

Table D Altitude and Ambient Heat Rejection Factor adjustment for HT and LT Circuits

LT & HT Circuit Heat Rejection Calculation Procedure

- Determine derate multiplier vs. temp derate from Table A.
- Using the multipliers from #1 above as the percent load factor, determine the heat rejection
- From table D find the HT and LT circuit multiplier
- Multiply the result of step 2 by the result of step 3 to obtain the heat rejection at your altitude and temperature.

Barometer		Altitude		Multiplier for HT & LT Heat Rejection vs Alt & Temp.									
In Hg	mbar	Feet	Meters										
20.7	701	9843	3000	1.06	1.10	1.11	1.13	1.14	1.15	1.17	1.18	1.19	
21.4	723	9022	2750	1.05	1.09	1.10	1.12	1.13	1.14	1.15	1.17	1.18	
22.1	747	8202	2500	1.04	1.08	1.09	1.10	1.12	1.13	1.14	1.16	1.17	
22.8	771	7382	2250	1.03	1.07	1.08	1.09	1.11	1.12	1.13	1.14	1.16	
23.5	795	6562	2000	1.02	1.06	1.07	1.08	1.09	1.11	1.12	1.13	1.15	
24.3	820	5741	1750	1.01	1.04	1.06	1.07	1.08	1.10	1.11	1.12	1.14	
25.0	846	4921	1500	0.99	1.03	1.05	1.06	1.07	1.09	1.10	1.11	1.12	
25.8	872	4101	1250	0.98	1.02	1.04	1.05	1.06	1.07	1.09	1.10	1.11	
26.6	899	3281	1000	0.97	1.01	1.02	1.04	1.05	1.06	1.08	1.09	1.10	
27.4	926	2461	750	0.96	1.00	1.01	1.03	1.04	1.05	1.07	1.08	1.09	
28.3	954	1640	500	0.95	0.99	1.00	1.02	1.03	1.04	1.05	1.07	1.08	
29.1	983	820	250	0.94	0.98	0.99	1.00	1.02	1.03	1.04	1.06	1.07	
29.5	995	492	150	0.94	0.97	0.99	1.00	1.01	1.03	1.04	1.05	1.06	
30.0	1012	0	0	0.93	0.97	0.98	0.99	1.01	1.02	1.03	1.05	1.06	
Air Filter Inlet Temperature				°C	0	15	20	25	30	35	40	45	50
				°F	32	59	68	77	86	95	104	113	122

Notes:

- Ambient temperature is the same as air filter inlet temperature. LT inlet temperature is 40°C, or 10°C above ambient, whichever is higher.
- Table refers to the capability to run at continuous power level. For short periods of time the genset can run at 5°C higher temperature with reduced efficiency.
- Subtract 3°C ambient temperature capability for each 100 mm (4 in) H₂O back pressure above the information shown on page 2.
- This generator set is capable of operating for short periods of time under with the LT temperature and/or the fuel methane number outside of the recommended limits with decreased performance. Operation in the green area will result in normal performance. Operation in the yellow area is recommended only for short periods of time and will result in reduced efficiency and shorter spark plug life. Operation in the red area is NOT recommended.

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Alternator Data

Voltage Range	Connection Configuration	Temp Rise Degrees C	Duty Cycle ⁴	Single Phase	Max Surge kVA ⁵	Alternator Data Sheet	Feature Code
380-480	Wye, 3 Phase	80	C	N/A	See Note 7	N/A	B830-2
416-480	Wye, 3 Phase	105	C	N/A	5202	539	B627-2
600	Wye, 3 Phase	80	C	N/A	3459	N/A	B582-2
4160	Wye, 3 Phase	80	C	N/A	3875	N/A	B590-2
4160	Wye, 3 Phase	105	C	N/A	3500	N/A	B834-2
12470-13800	Wye, 3 Phase	80	C	N/A	4750	N/A	B591-2

Continuous Rating Definition

Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating. (Equivalent to Continuous Power in accordance with ISO8528, ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Emissions	100% Load	90% Load	75% Load	50% Load
NO _x Emissions dry, ppm ¹	87	91	86	80
NO _x Emissions mg/Nm ³ @ 5% O ₂ , (g/hp-h) ¹	300 (0.5)	300 (0.5)	200 (0.5)	200 (0.5)
THC Emissions wet, ppm ²	1651	1712	1697	1686
THC Exhaust Emissions, mg/Nm ³ @ 5% O ₂ , (g/hp-h) ²	1870 (3.7)	1940 (3.8)	1890 (3.8)	1820 (3.9)
NMHC Emissions wet, ppm ^{2,3}	248	257	255	253
NMHC Exhaust Emissions, mg/Nm ³ @ 5% O ₂ , (g/hp-h) ^{2,3}	280 (0.6)	290 (0.6)	280 (0.6)	270 (0.6)
HCHO Emissions (wet), ppm ⁶	70	70	70	70
HCHO Exhaust Emissions, mg/Nm ³ @ 5% O ₂ , (g/hp-h) ⁶	150 (0.3)	150 (0.3)	150 (0.3)	140 (0.3)
CO Emissions (dry), ppm ²	519	499	477	440
CO Emissions Rate, mg/Nm ³ @ 5% O ₂ , (g/hp-h)	910 (1.8)	880 (1.7)	820 (1.7)	730 (1.6)
CO ₂ Emissions (dry), percent ¹	6.3	6.2	6.4	6.7
O ₂ Emissions (dry), percent ²	9.6	9.6	9.4	9.0
Particulates PM ₁₀ , g/hp-h ²	< 0.03	< 0.03	< 0.03	< 0.03

Notes

1. Production variation/tolerance $\pm 5\%$
2. Tolerance +/- 15%.
3. NMHC emission are an estimate. Actual NMHC emissions are a function of the non-methane hydrocarbons in the fuel.
4. Standby (S), Prime (P), Continuous (C) ratings.
5. Maximum rated starting kVA that results in minimum of 90% of rated sustained voltage during starting.
6. Tolerance +/- 35%.
7. Maximum Surge KVA or specific alternator data can be obtained by request if not published.

Cummins Power Generation
 1400 73rd Avenue NE
 Minneapolis, MN 55432 USA
 Telephone: +1 (763) 574-5000
 Fax: +1 (763)-574-5298
 Email: pgamail@cummins.com
 Web: www.cumminspower.com

Cummins Power Generation
 Manston Park, Columbus Avenue
 Manston, Ramsgate
 Kent CT12 5BF, UK
 Telephone: +44 (0) 1843-255000
 Fax: +44 (0) 1843-255902
 Email: cpq.uk@cummins.com
 Web: www.cumminspower.com

Cummins Power Generation
 8 Tanjong Penjuru
 Singapore 609019
 Telephone: +65 265-0155
 Fax: +65 264-0664 or 265-6909
 Email: mktg@sing.cummins.com
 Web: www.cumminspower.com

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