

Model: C1400 N5C
Frequency: 50 Hz
Fuel Type: Natural Gas MI 68 +
Emissions NOx: 500 mg/Nm³
LT Water Inlet Temp: 40°C (104°F)
HT Water Outlet Temp: 90°C (194°F)

Generator set data sheet
1400 kW continuous

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Measured Sound Performance Data Sheet:	MSP-1067
Prototype Test Summary Data:	PTS-287
Remote Radiator Cooling Outline:	0500-4335

Fuel Consumption (ISO3046/1)	100% Load	90% Load	75% Load	50% Load
Fuel Consumption (LHV) ISO3046/1, kW (MMBTU/hr) ^{1,2,3,4,5}	3367 (11.5)	3066 (10.47)	2605 (8.9)	1853 (6.33)
Mechanical Efficiency ISO3046/1, percent ^{1,2,4,5}	42.8%	42.3%	41.6%	39.3%
Electrical Efficiency ISO3046/1, percent ^{1,2,3,4,5}	41.6%	41.1%	40.3%	37.8%

Engine

Engine Manufacturer	Cummins
Engine Model	QSK60G
Configuration	V16
Displacement, L (cu.in)	60 (3671)
Aspiration	Turbocharged (1)
Gross Engine Power Output, kWm (hp)	1455 (1950)
BMEP, bar (psi)	19.4 (281)
Bore, mm (in)	159 (6.26)
Stroke, mm (in)	190 (7.48)
Rated Speed, rpm	1500
Piston Speed, m/s (ft/min)	9.5 (1870)
Compression Ratio	12.7:1
Lube Oil Capacity, L (qt)	380 (400)
Overspeed Limit, rpm	1875
Regenerative Power, kW	N/A
Full Load Lubricating oil consumption, g/kWe-hr (g/hp-hr)	0.18 (0.14)

Fuel System

Gas supply pressure to engine inlet, bar (psi)	0.12 (1.7)
Minimum Methane Index	68

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) ⁶	5.12 (16.8)
Genset Width, m (ft) ⁶	2.23 (7.30)
Genset Height, m (ft) ⁶	2.77 (9.08)
Genset Weight (wet), kg (lbs) ⁶	15450 (33,990)

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 affect of Cummins supplied coolant pumps. There is a 10 kW allowance for customer supplied coolant pumps.
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 cappability 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.

Energy Data

	100% Load	90% Load	75% Load	50% Load
Continuous Generator Electrical Output kW _e ^{1,5,6,7}	1400	1260	1050	700
Continuous Shaft Power, kW _m (bhp) ^{1,5,6,7}	1455 (1950)	1311 (1757)	1097 (1471)	741 (993)
Total Heat Rejected in LT Circuit, kW (MMBTU/h) ²	112 (0.38)	103 (0.35)	86 (0.29)	60 (0.2)
Total Heat Rejected in HT Circuit, kW (MMBTU/h) ²	759 (2.59)	666 (2.27)	568 (1.94)	382 (1.3)
Unburnt, kW (MMBTU/h) ²	64 (0.22)	59 (0.2)	52 (0.18)	40 (0.14)
Heat Radiated to Ambient, kW (MMBTU/h) ²	230 (0.78)	210 (0.72)	182 (0.62)	137 (0.47)
Available Exhaust heat to 105C, kW (MMBTU/h) ²	776 (2.65)	720 (2.46)	631 (2.15)	470 (1.6)

Intake Air Flow

Intake Air Flow Mass, kg/s (lb/hr) ²	2.1 (16630)	1.89 (14970)	1.59 (12590)	1.11 (8790)
Intake Air Flow Volume, m ³ /s @ 0°C (scfm) ²	1.63 (3640)	1.47 (3280)	1.23 (2750)	0.86 (1920)
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	2.17 (17190)	1.96 (15520)	1.65 (13070)	1.15 (9110)
Exhaust Gas Flow Volume, m ³ /s (cfm) ²	4.38 (9270)	4 (8470)	3.43 (7260)	2.48 (5250)
Exhaust Temperature After Turbine, °C (°F) ¹	439 (822)	448 (838)	462 (864)	488 (910)
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)	70 (308)	70 (308)	70 (308)	70 (308)
Max HT Engine Coolant Inlet Temp, °C (°F) Reference ³	79 (174)	81 (178)	82 (180)	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 (15)	1 (15)	1 (15)	1 (15)
HT Circuit Maximum Pressure, bar (psig)	2.8 (41)	2.8 (41)	2.8 (41)	2.8 (41)
Static Head Pump Inlet, bar (psig)	0.5-1.5 (7-20)	0.5-1.5 (7-20)	0.5-1.5 (7-20)	0.5-1.5 (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)	23 (101)	23 (101)	23 (101)	23 (101)
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)	50 (122)	50 (122)	50 (122)
Max Pressure Drop in External LT Circuit, bar (psig)	1 (15)	1 (15)	1 (15)	1 (15)
LT Circuit Maximum Pressure, bar (psig)	1.4 (20)	1.4 (20)	1.4 (20)	1.4 (20)
Static Head Pump Inlet, bar (psig)	0.5-1.5 (7-20)	0.5-1.5 (7-20)	0.5-1.5 (7-20)	0.5-1.5 (7-20)

Notes:

- At ISO3046 reference conditions, altitude 1013 mbar (30in Hg), air inlet temperature 25°C (77°F)
- Production variation/tolerance ±5%
- Outlet temperature controlled by thermostat. Inlet temperature for reference only.
- 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%.
- Power output and efficiency include the affect of Cummins supplied coolant pumps. There is a 10 kW allowance for customer supplied coolant pumps.
- At electrical output of 1.0 Power Factor
- Based on pipeline natural gas with LHV of 33.44mJ/Nm³ (905 BTU/ft³)
- 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

Methane Number	LT Return Temperature			
	78	40°C	45°C	50°C
	73			
	68			
	63			
	58			

Methane Number Capability Table B

	Load (Percent of Rated)			
	100%	90%	75%	50%
68	60	60	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	1.06	1.10	1.11	1.13	1.14	1.15	1.17	1.18	1.19	
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 and LT inlet temperature is 10°C above ambient or 40°C 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.

Alternator Data

Voltage Range	Connection Configuration	Temp Rise Degrees C	Duty Cycle ⁴	Single Phase Factor	Maximum Surge kVA	Alternator Data Sheet	Feature Code
380-440	Wye, 3 Phase	80	C	N/A	5280	335	B703-2
400-416	Wye, 3 Phase	80	C	N/A	5000	334	B826-2
380-440	Wye, 3 Phase	105	C	N/A	5000	334	B551-2
400-416	Wye, 3 Phase	105	C	N/A	4563	333	B792-2
3300	Wye, 3 Phase	80	C	N/A	5398	324	B592-2
3300	Wye, 3 Phase	80	C	N/A	5477	518	B471-2
6300-6600	Wye, 3 Phase	80	C	N/A	5250	521	B593-2
10500-11000	Wye, 3 Phase	80	C	N/A	5196	521	B835-2
10000	Wye, 3 Phase	80	C	N/A	5145	521	B794-2

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 wet, ppm ¹	185	178	182	179
NO _x Emissions mg/Nm ³ @ 5% O ₂ , (g/hp-h) ¹	500 (1)	500 (1)	500 (1)	500 (1)
THC Emissions wet, ppm ²	975	1009	1063	1177
THC Exhaust Emissions, mg/Nm ³ @ 5% O ₂ , (g/hp-h) ²	1050 (2.2)	1090 (2.2)	1140 (2.4)	1210 (2.7)
NMHC Emissions wet, ppm ^{2,3}	146	151	159	176
NMHC Exhaust Emissions, mg/Nm ³ @ 5% O ₂ , (g/hp-h) ^{2,3}	160 (0.3)	160 (0.3)	170 (0.4)	180 (0.4)
CO Emissions (dry), ppm ²	423	422	425	433
CO Emissions Rate, mg/Nm ³ @ 5% O ₂ , (g/hp-h)	710 (1.5)	710 (1.5)	700 (1.5)	690 (1.5)
CO ₂ Emissions (dry), percent ¹	6.6	6.7	6.7	7.0
O ₂ Emissions (dry), percent ²	9.1	9.0	8.9	8.4
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.

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: cpg.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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