

**Natural
Gas
Engines**



GTA8.3-G2

GENERATOR MODEL GE & GP MODELS

**Four Stroke Cycle, Turbocharged, Aftercooled
In-line, 6 Cylinder Natural Gas Engine**

RATINGS

EMERGENCY STANDBY

Gross Power	RPM	CR	bhp	kWm
(1)	1800	10.5:1	230	172
(2)	1800	8.5:1	214	160
(1)	1500	10.5:1	182	136
(2)	1500	8.5:1	169	126

PRIME POWER

Gross Power	RPM	CR	Bhp	kWm
(1)	1800	10.5:1	209	156
(2)	1800	8.5:1	194	145
(1)	1500	10.5:1	165	123
(2)	1500	8.5:1	154	115

(1) 32° C (90° F) or lower water temperature to aftercooler or use of air-to-air aftercooler with 100° F or lower air temperature to the radiator.

(2) 54° C (130° F) or lower water temperature to aftercooler or use of air-to-air aftercooler with 130° F or lower air temperature to the radiator.

SPECIFICATIONS

Bore	4.49 in	114 mm
Stroke	5.32 in	135 mm
Piston Displacement	504.5 cu in	8.27 L
†Lube System		
Oil Pan Capacity		
High	5.0 gal	18.9 L
Low	4.0 gal	15.1 L
Coolant Capacity		
Engine Only	11.5 qts	10.9 L
Engine with Radiator	112.0 qts	106.0 L
Weight		
Base Engine	1590 lbs	721 kg
‡GE/GP Engine	2010 lbs	912 kg

† Oil filters not included in total.

‡ Includes radiator and base rails.

FUEL APPLICATION GUIDE

COMPRESSION RATIO	10.5:1	8.5:1
Dry, Processed Natural Gas	X	X
Propane (HD5)	-	X

STANDARD DESIGN FEATURES

Basic Engine: All major parts and components are interchangeable with the Cummins Diesel except a few special parts developed for natural gas operation.

Cooling System: High flow centrifugal pump with spin-on corrosion resistor/additive filter.

Fuel System: Balanced intake manifold for even fuel distribution. Varifuel carburetion for optimum fuel consumption and high altitude operation.

Ignition System: Capacitor discharge, electronic microcircuit-based ignition system. Operates on 12 or 24 volt DC and utilizes individual step-up coils. The single-firing system provides accurate and consistent camshaft-referenced timing providing maximum engine performance.

Exhaust System: Dry exhaust manifold and water-cooled center turbo section.

Lubrication: Positive pressure feed to all bearings and wear surfaces. Includes tubular oil cooler and thermostatically controlled oil temperature.

Power Takeoff: Flywheel adaptable to all standard PTO's, clutches and AC generators.

Speed Control: Isochronous electronic governor (12 or 24 volt) with droop adjustment providing precise and stable engine control.

Valve Train: Specifically designed for spark ignited engines including inserts.

GTA8.3-G2

GENERATOR MODEL

GE & GP MODELS

AVAILABLE EQUIPMENT

Generator Drive Models include the Base Engine plus the following options:

OPTIONS	GE	GP
Air Cleaner - Dry - Two Stage	S	S
Radiator - Air-to-Air Blower Fan	S	S
Starter - 12 or 24 Volt	S	S
Alternator - 12 or 24 Volt	S	S
Electronic Governor	S	S
Fuel Valve - 12 or 24 Volt	S	S
Extended Base Rails	S	S
By-Pass Oil Filter	O	S

GE = Generator Drive Unit - Emergency Standby

GP = Generator Drive Unit - Prime Power

S = Standard O = Optional

TURBOCHARGED ENGINES

Turbocharged engines utilizing 10.5:1 compression ratio and air-to-air charge-air-cooling must not exceed 100° F air temperature to the charge-air-cooler.

Turbocharged engines with 10.5:1 compression ratio and water-to-air aftercooling must not exceed 90° F coolant temperature to the aftercooler circuit.

Aftercooler coolant or air temperature exceeding the above limits **MUST** use the 8.5:1 compression ratio and must not exceed 130° F coolant temperature to the aftercooler circuit or 130° F air to the Charge-Air-Cooler.

PERFORMANCE

Rating data shown represents gross engine performance capabilities obtained and corrected in accordance to conditions of 29.61 in. Hg. (100 kPa) barometric pressure [300 ft. (91 m) altitude], 77° F (25° C) inlet air temperature and 0.30 in. Hg. (1 kPa) water vapor pressure using dry processed natural gas fuel with 905 BTU per standard cubic foot (33.72 k J/l) lower heating value.

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner and muffler; not included are alternator, compressor, fan and optional equipment, driven components or installation of a catalytic converter. Materials and specifications are subject to change without notice.

ADDITIONAL REFERENCE INFORMATION:

Engine Data Sheets DS2000A, DS2011A

Performance Curves PC2000A, PC2011A

PC2032A, PC2031A

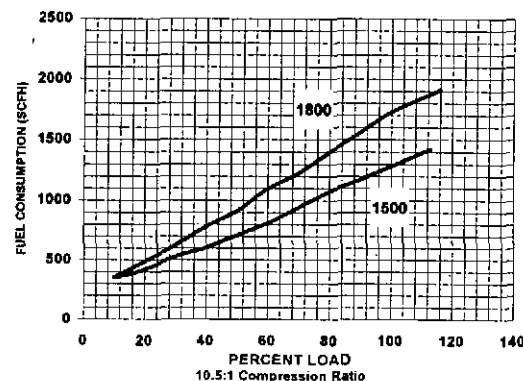
Installation Diagrams

Generator Base 3394047

Generator GE/GP 3394048

GENERATOR APPLICATION GUIDELINES

Rating guidelines for Emergency Standby Power, Prime Power, Unlimited Time Running Prime Power, Limited-Time Running Prime Power, and Continuous Power are included on the Performance Curve sheet referenced above.



Warranty

Cummins Natural Gas Engines carry a state-of-the-art warranty on both workmanship and materials. See your nearest Cummins Distributor or Dealer for full details, or write Cummins Natural Gas Engines, Inc., 8713 Airport Freeway, Suite #316, Fort Worth, Texas 76180, U.S.A.



**Natural
Gas
Engines**



Cummins Natural Gas Engines, Inc.
A Cummins Company
8713 Airport Freeway, Suite #316
Fort Worth, Texas 76180 • U.S.A.
Telephone: (817)581-7575 • FAX: (817)581-4548



**Natural
Gas
Engines**



GTA8.3-G2

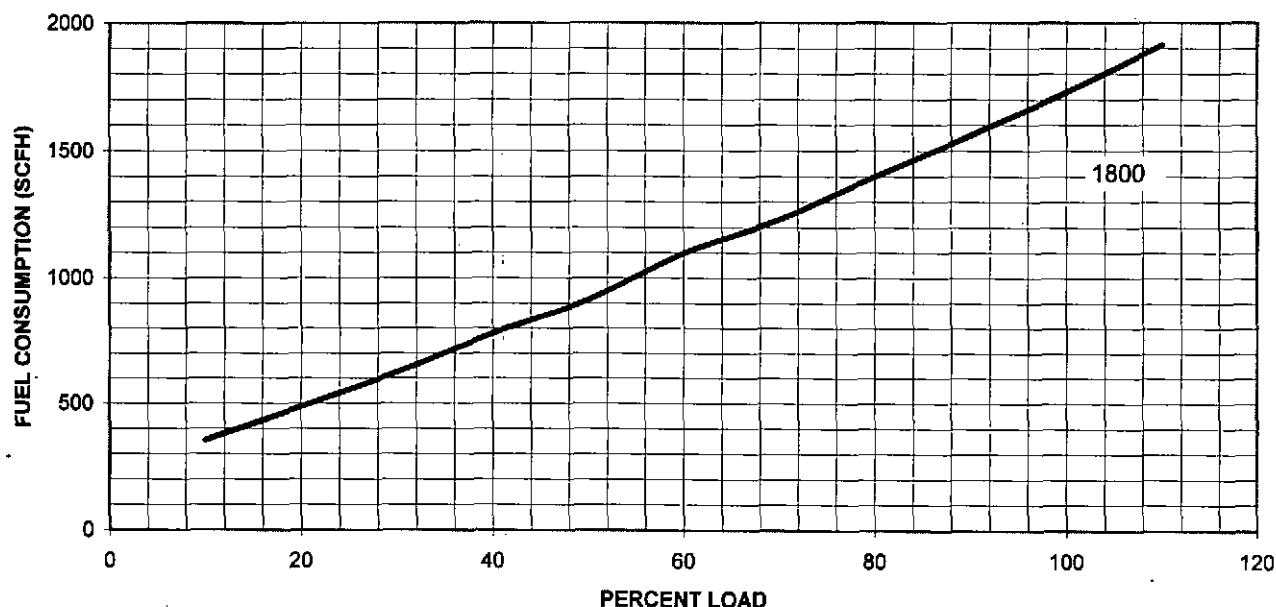
**PERFORMANCE
CURVE #2000A**

Model:	GTA8.3	Application:	Generator Drive 60 Hz
Type:	4 Stroke, Inline, 6 Cylinder NG	Rating:	230 HP at 1800 RPM
Aspiration:	Turbocharged & Aftercooled	Bore & Stroke:	4.49 in. (114 mm) / 5.32 in. (135 mm)
Compression Ratio:	10.5:1	Displacement:	504.5 cu. in. (8.3L)

FUEL CONSUMPTION

1800 RPM

% LOAD	Power HP	Torque Ft.-Lb.	Consump. SCFH
110	230	671	1914
100	209	610	1728
90	188	549	1560
80	167	488	1398
70	146	427	1230
60	125	366	1098
50	105	305	912
40	84	244	780
30	63	183	624
20	42	122	486
10	21	61	354



Rating data shown represents gross engine capabilities obtained and corrected in accordance to conditions of 29.61 in. Hg. (100 kPa) barometric pressure [300 ft. (91 m) altitude], 77° F (25° C) inlet air temperature and 0.30 in. Hg. (1 kPa) water vapor pressure using dry processed natural gas with 905 BTU per standard cubic foot (33.72 kJ/l) lower heating value. However, when ambient and/or installed conditions vary from these conditions, performance characteristics can be expected to vary accordingly. This data is subject to instrumentation, measurement and engine-to-engine variability.

RATED POWER AND RATED TORQUE CERTIFIED WITHIN +/- 5%

POWER RATING APPLICATION GUIDELINES FOR GENERATOR DRIVE ENGINES

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. Generator drive engines are not designed for and shall not be used in variable speed D.C. generator set applications.

STANDBY POWER RATING

Standby Power Rating is applicable for supplying emergency power for the duration of the utility power outage. NO OVERLOAD capability is available for this rating. Under no condition is an engine to operate in parallel with the public utility at the Standby Power rating.

This rating should be applied where reliable utility power is available. A standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency.

PRIME POWER RATING

Prime Power Rating is applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:

UNLIMITED TIME RUNNING PRIME POWER

PRIME POWER is the MAXIMUM POWER available at the variable load for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours.

The total operating time at 100% Prime Power shall not exceed 500 hours per year.

A 10% overload capability is available for a period of 1 hour within a 12 hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

LIMITED TIME RUNNING PRIME POWER

Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operating up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.

CONTINUOUS POWER RATING

Continuous Power Rating is applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

REFERENCE STANDARDS

BS 5514 and DIN 6271 standards are based on ISO 3046.

OPERATION AT ELEVATED TEMPERATURE AND ALTITUDE

The engine may be operated at:

STANDBY POWER RATING up to 3000 ft. (914 m) altitude and 100° F (38° C) without power deration.

PRIME POWER RATING up to 5000 ft. (1524 m) altitude and 100° F (38° C) without power deration.

For sustained operation at high load factors at higher altitudes, the engine rating should be adjusted to limit performance by 3% per 1000 ft. (305 m) altitude and 1% per 10° F inlet air temperature.



Natural Gas Engines



GTA8.3-G2

ENGINE DATA SHEET

DS2000A

GENERATOR DRIVE MARKETS

RATINGS	CR	HP	kW	RPM	REFERENCE INFORMATION
STANDBY POWER	10.5:1	230	172	1800	Model ----- GTA8.3-G2 Performance Curve ----- PC2000A
PRIME POWER	10.5:1	209	156	1800	INSTALLATION DIAGRAMS
CONTINUOUS POWER	10.5:1	178	132	1800	Generator GE ----- 3394048

GENERAL ENGINE DATA

Type.....	4 cycle, in-line, 6 Cylinder
Aspiration.....	Turbocharged & Aftercooled
Bore - in. (mm) x stroke - in. (mm).....	4.49 (114) x 5.32 (135)
Displacement - cu. in. (Litre).....	504.5 (8.27)
Compression Ratio.....	10.5:1
Dry Weight	
Fan Hub to Flywheel - lb. (kg)	1590 (721)
Radiator Cooled Engine - lb. (kg)	2010 (912)
Heat Exchanger Cooled Engine - lb. (kg)	1973 (895)
Wet Weight	
Fan Hub to Flywheel - lb. (kg)	1650 (748)
Radiator Cooled Engine - lb. (kg)	2136 (969)
Heat Exchanger Cooled Engine - lb. (kg.)	2053 (931)
C.G. Distance From Front Face of Block (Engine Only) - in. (mm)	17.6 (447)
C.G. Distance Above Crank Centerline (Engine Only) - in. (mm).....	7.8 (198)
Moment of Inertia of Rotating Components (w/o Flywheel, w/ Flywheel) - lb. - ft. ² (kg m ²)	8.73, 21.93 (.368, .924)
Firing Order	1-5-3-6-2-4

ENGINE MOUNTING

Maximum Allowable Bending Moment at Rear Face of Block - lb. ft. (N m)	1000 (1356)
Moment of Inertia About Roll Axis - lb. - ft. ² (kg m ²)	209 (23.6)

EXHAUST SYSTEM

Maximum Allowable Back Pressure - in. Hg. (mm Hg)	2 (50)
Exhaust Outlet Pipe Size - in. (mm).....	3.5 (89)
Exhaust Gas Flow - cfm (L/s)	1485 (701)
Maximum Exhaust Temp (Stack Temp - Dry Manifold) - °F (°C)	1100 (593)

AIR INDUCTION SYSTEM

IMPCO High Altitude, Low Pressure Gas System (Std)	
Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner	
Clean Element - in. H ₂ O (mm H ₂ O).....	15 (380)
Dirty Element - in. H ₂ O (mm H ₂ O).....	25 (635)
Minimum Dirt Holding Capacity With Heavy Duty Air Cleaner - gm/cfm (gm L/s)	25 (53)
Intake Air Flow Requirement @ Rated RPM and Load + or - 5 % cfm (L/s).....	513 (242)

GTA8.3-G2 GENERATOR DATA SHEET

COOLING SYSTEM

Page 2

Coolant Capacity - Engine Only U.S. quart (litre)	11.5 (10.9)
- Engine With Radiator - U.S. quart (litre)	112 (86.5)
- Engine With Heat Exchanger - U.S. quart (litre)	18.5 (17.4)
- Aftercooler Circuit - U.S. quart (litre)	5.6 (5.3)
- Aftercooler Circuit (Unit Mtd. Heat Exchanger) - U.S. quart (litre)	14.3 (13.5)
Engine Coolant Flow - 5 PSI External Water Circuit Resistance - U.S. GPM (L/min)	
1800 RPM	55 (3.5)
Maximum Coolant Friction Head External to the Engine - PSI (kPa)	5 (34)
Maximum Static Head of Coolant Above Engine Crank Centerline - ft. (m)	60 (18)
Maximum Air Restriction Across a Radiator - in. H ₂ O (mm H ₂ O)	5 (12.8)
Minimum Raw Water Flow @ 90° F (32° C) to Heat Exchanger - U.S. GPM (L/m)	44 (207)
Aftercooler Aux. Water Pump Coolant Flow	
- 3 PSI External Water Circuit Resistance - U.S. GPM (L/min)	
1800 RPM	50 (3.2)
Maximum Raw Water Inlet Pressure at Heat Exchanger - PSI (kPa)	100 (690)
Standard Thermostat (Modulating) Range - °F (°C)	178 - 203 (81 - 95)
Maximum Output Pressure of Engine Water Pump - PSI (kPa)	15 (103)
Heat Rejection to Ambient - Dry Manifold - BTU/min. (kW)	952 (17)
Heat Rejection to Coolant - Dry Manifold - BTU/min. (kW)	7619 (134)
Heat Rejection to Aftercooler - Dry Manifold - BTU/min. (kW)	816 (14)
Heat Rejection to Exhaust - Dry Manifold - BTU/min. (kW)	7891 (139)
Minimum Allowable Pressure Cap - PSI (kPa)	7 (48)
Maximum Allowable Top Tank Temperature - °F (°C)	212 (100)
Minimum Recommended Top Tank Temperature - °F (°C)	160 (71)
Minimum Allowable Fill Rate - U.S. GPM (L/min)	5 (19)
Maximum Allowable Initial Fill Time - min.	5
Minimum Allowable Coolant Expansion Space - % of System Capacity	6
Maximum Allowable Deaeration Time - min.	25
Minimum Allowable Drawdown - U.S. quart (litre)	2 (1.9)
(Drawdown does not include expansion area and must exceed volume not initially filled.)	
Fan HP @ 1800 Engine RPM (Fan Speed 1980 RPM) - BHP (kW)	10.0 (7.5)
Cooling Fan Air Flow @ 1" Static H ₂ O Pressure and 100° F (38° C) @ Radiator - cfm (L/s)	16000 (7552)

LUBRICATION SYSTEM

CNGE recommends a API CD Quality SAE 15W-40 heavy duty NATURAL GAS ENGINE OIL. The specifications recommended for 15W-40 oils are 600/800 ppm phosphorus, 650/850 ppm zinc, 1200 ppm calcium, TBN (ASTM D2896)-5/5.5, TAN (ASTM D664)-.5/7.7. Ash Content of 0.5 percent. Refer to Cummins Bulletin No. 3810340.

Oil Pressure @ Idle - PSI (kPa) (minimum allowable)	10 (69)
@ Rated Speed - PSI (kPa) (minimum allowable)	30 (207)
Maximum Allowable Oil Temperature - °F (°C)	260 (127)
Maximum Oil Consumption - U.S. qt./hr. (L/hr)	0.17 (.16)
Full Flow Filter Capacity - Replaceable Element Type - U.S. gal. (litre)	.66 (2.5)
By-Pass Filter Capacity - Replaceable Element type - U.S. gal. (litre)	3.4 (12.9)
Oil Pan Capacity - High/Low - U.S. gal. (litre)	5.0 - 4.0 (18.9 - 15.1)
Total System Capacity (Including By-Pass Filter) - U.S. gal. (litre)	9.0 - 8.6 (34.1 - 32.5)

ELECTRICAL SYSTEM

Minimum Recommended Battery Capacity - Cold Soak 0° F (-18° C) or Above	24 Volt
Engine Only (De-clutched Load) - Cold Cranking Amperes - CCA	900
- Reserve Capacity - min.	320
Engine With Connected Drive Train - Cold Cranking Amperes - CCA	900
- Reserve Capacity - min.	320
Maximum Allowable Resistance of Starting Circuit - Ohms	.002

GTA8.3-G2 GENERATOR DATA SHEET

FUEL SYSTEM

Page 3

Standard Carburetor - IMPCO Make

Low Pressure Dry Processed Natural Gas - (905 BTU/ft.³ L.H.V.)

Maximum Running Pressure to Carburetor (After Regulation) - in. H₂O (mm hg) 6 (11)

Maximum Running Pressure to Engine Mounted Regulator - in. H₂O (mm hg) 20 (36)

Minimum Gas Supply Pipe Size @ Engine - in. (mm) 2 (51)

Gas Supply Filter Pressure Rating - PSI (kPa) 100 (690)

The preceding pipe sizes are only suggestions and piping may vary with temperatures distance of fuel tanks and application of local codes. Gas must be available at adequate volume and pressure for engine at the regulator.

FUEL APPLICATION GUIDE

Compression Ratio	10.5:1
Dry Processed Natural Gas	X

All gases such as field gas, digester and sewage require an analysis of the specified gas and pre-approval from CNGE. Consult your Distributor for details.

PERFORMANCE DATA - STANDBY POWER - C.R. 10.5:1

Low Idle Speed - RPM 900

Maximum No-Load Governed Speed - RPM 1980

Maximum Overspeed Capability - RPM 2100

Maximum Rated Speed - RPM 1800

Piston Speed - ft./min. (m/s) 1596 (8.108)

Brake Mean Effective Pressure - PSI (kPa) 201 (1386)

Maximum Fuel Consumption at Maximum Rated Output and Speed - cu. ft./hr. 1804

Cranking Torque at Minimum Unaided Start Temperature - lb. ft. (N m) 480 (651)

Crankshaft Thrust Bearing Load Limit - Maximum Intermittent - lb. (N) 800 (3558)

- Maximum Continuous - lb. (N) 600 (2669)

Maximum Allowable Power From Front of Crankshaft - HP (kW) 200 (149)

Maximum Allowable Power From Accessory Drive - HP (kW) 50 (37)

Minimum Cranking Speed - RPM 250

All data is based on the engine operating with fuel system, water pump, and lubrication oil pump; not included are battery charging alternator, fan, optional equipment, driven components or installation of catalytic converter.

The fuel consumption data shown above is published as approximate value for purposes of establishing pipe and system sizing.

Data shown above represents gross engine performance capabilities obtained and corrected to condition of 29.61 in. Hg. (100 kPa) barometric pressure [300 ft. (91 m) altitude], 77° F (25° C) inlet air temperature and 0.30 in. Hg (1 pa) water vapor pressure using dry processed natural gas fuel with 905 BTU per standard cubic foot (33.72 kJ/l) lower heating value.

ALTITUDE & AMBIENT TEMPERATURE REQUIREMENTS

The engine may be operated at the STANDBY RATING up to 3000 ft. (914 m) altitude and 100° F (38° C) inlet air temperature and at the PRIME AND CONTINUOUS POWER RATING up to 5000 ft. (1524 m) altitude and 100° F (38° C) inlet air temperature. For sustained operation at high load factor at higher altitudes and temperatures, please contact factory.

LIMITED WARRANTY

Cummins Natural Gas Engines carry a Limited Warranty on both factory workmanship and materials. See your nearest Cummins Distributor or dealer for full details, or write Cummins Natural Gas Engines, Inc., 8713 Airport Freeway, Suite #316, Fort Worth, Texas 76180, U.S.A.

GTA8.3-G2 GENERATOR DATA SHEET

This Data Sheet is subject to change without notice.

ENGINE MODEL: GTA8.3-G2 Data Sheet No: **DS2000A**
Printed in the U.S.A. 1/97