



GeneratorJoe



**Power
Generation**

Spark-Ignited Generator Set Model GGHH 60 Hz

Natural Gas - 100 kW, 125 kVA Standby
Propane - 100 kW, 125 kVA, Standby



4016 Quartz Drive
Santa Rosa, CA 95405
Phone: 707 539-9003
Fax: 707 539-5212
Email: sales@generatorjoe.NET
Web www.generatorjoe.NET

Description

The Cummins Power Generation GG-series commercial generator set is a fully integrated power generation system providing optimum performance, reliability, and versatility for stationary standby power applications.

A primary feature of the GG GenSet is strong motor-starting capability and fast recovery from transient load changes. The torque-matched system includes a heavy-duty Ford 4-cycle spark-ignited engine, an AC alternator with high motor-starting kVA capacity, and an electronic voltage regulator for precise regulation under steady-state or transient loads. The GG GenSet accepts 100% of the nameplate standby rating in one step, in compliance with NFPA110 requirements.

LP vapor fuel system is standard with several options for natural gas and LP liquid as well as dual fuel.

The GG GenSet offers both user- and environment-friendly operation. A low emissions option with NOx below 1.5 gm/hp-hr is available. The standard PowerCommand® digital electronic control is an integrated system that combines engine and alternator controls for high reliability and optimum GenSet performance, and meets NFPA 110 requirements.

A wide range of options, accessories, and services are available, allowing configuration to your specific power generation needs.

Every production unit is factory tested at rated load and power factor. This testing includes demonstration of rated power and single-step rated load pickup. Cummins Power Generation manufacturing facilities are registered to ISO9001 quality standards, emphasizing our commitment to high quality in the design, manufacture, and support of our products. The generator set is CSA certified and is available as UL2200 Listed. The PowerCommand control is UL508 Listed.

All Cummins Power Generation systems are backed by a comprehensive warranty program and supported by a worldwide network of 170 distributors and service branches to assist you with warranty, service, parts, and planned maintenance support.

Features

- **UL Listed Generator Set** - The complete generator set assembly is available Listed to UL2200.
- **Low Exhaust Emissions** - An optional closed loop fuel control system and 3-way catalytic converter with less than 1.5 gm/hp-hr NOx is available.
- **Ford Heavy-Duty Gas Engine** - Rugged 4-cycle industrial spark-ignited engine delivers reliable power. The electronic governor provides fast response to load changes.
- **Alternator** - Several alternator sizes offer selectable motor-starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads, fault-clearing short-circuit capability, and class H insulation.
- **Control Systems** - The PowerCommand electronic control is standard equipment and provides total genset system integration, including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection, and NFPA 110 compliance. PowerCommand control is Listed to UL508.
- **Cooling Systems** - Standard cooling package provides reliable running at up to 40°C ambient temperature. An optional 50°C cooling system is offered.
- **Integral Vibration Isolation** - Robust skid base supports the engine, alternator, and radiator on isolators, minimizing transmitted vibration.
- **E-Coat Finish** - Dual electro-deposition paint system provides high resistance to scratching, corrosion, and fading.
- **Housings** - Weather-protective and sound-attenuated housings are available.
- **Certifications** - Generator sets are designed, manufactured, tested, and certified to relevant UL, NFPA, ISO, IEC, and CSA standards.
- **Warranty and Service** - Backed by a comprehensive warranty and worldwide distributor service network.

Generator Set

The general specifications provide representative configuration details. Consult the outline drawing for installation design.

See outline drawing 500-3485 for installation design specifications.

Unit Width, in (mm)	40.0 (1016)
Unit Height, in (mm)	55.0 (1397)
Unit Length, in (mm)	104.8 (2662)
Unit Dry Weight, lb (kg)	2410 (1093)
Unit Wet Weight, lb (kg)	2498 (1133)
Rated Speed, rpm	1800
Voltage Regulation, No Load to Full Load	±1.0%
Random Voltage Variation	±1.0%
Frequency Regulation	Isochronous
Random Frequency Variation	±0.5%
Radio Frequency Interference	Meets requirements of most industrial and commercial applications

Cooling	Natural Gas		Propane	
	Standby		Standby	
Fan Load, HP (kW)	9.8 (7.3)		9.8 (7.3)	
Coolant Capacity with radiator, US Gal (L)	8.8 (33.1)		8.8 (33.0)	
Coolant Flow Rate, Gal/min (L/min)	29.4 (111.3)		29.4 (111.3)	
Heat Rejection To Coolant, Btu/min (MJ/min)	4120.0 (4.4)		4120.0 (4.4)	
Heat Radiated To Room, Btu/min (MJ/min)	4620.0 (4.9)		4620.0 (4.9)	
Maximum Coolant Friction Head, psi (kPa)	2.0 (13.8)		2.0 (13.8)	
Maximum Coolant Static Head, ft (m)	10.0 (3.0)		10.0 (3.0)	
Air				
Combustion Air, scfm (m ³ /min)	222.0 (6.3)		204.0 (5.8)	
Alternator Cooling Air, scfm (m ³ /min)	1308.0 (37.0)		1308.0 (37.0)	
Radiator Cooling Air, scfm (m ³ /min)	6825.0 (193.1)		6825.0 (193.1)	
Max. Static Restriction, in H ₂ O (Pa)	0.5 (124.5)		0.5 (124.5)	

Rating Definitions

Standby Rating based on: Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. (Equivalent to Fuel Stop Power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.

Prime (Unlimited Running Time) Rating based on: Applicable for supplying power in lieu of commercially purchased power. Prime power is the maximum power available at a variable load for an unlimited number of hours. A 10% overload capability is available for limited time. (Equivalent to Prime Power in accordance with ISO8528 and Overload Power in accordance with ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Base Load (Continuous) Rating based on: 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.

Site Derating Factors

Natural Gas

Engine power available up to 1950 ft (594 m) at ambient temperatures up to 104°F (40°C). Above 1950 ft (594 m) derate at 4% per 1000 ft (305 m), and 1% per 10°F (2% per 11°C) above 104°F (40°C).

Propane

Engine power available up to 1000 ft (305 m) at ambient temperatures up to 77°F (25°C). Above 1000 ft (305 m) derate at 4% per 1000 ft (305 m), and 1% per 10°F (2% per 11°C) above 77°F (25°C).



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Engine

Rugged Ford® spark-ignited engines are designed to operate efficiently on gaseous fuels. Fuel system options available for natural gas, LP vapor, and LP liquid. In addition, for extra system reliability, combination natural gas/LP vapor or natural gas/LP liquid with automatic changeover are available.

Electronic governing provides precise speed regulation, especially useful for applications requiring constant (isochronous) frequency regulation such as Uninterruptible Power Supply (UPS) systems, non-linear loads, or sensitive electronic loads. Optional coolant heaters are recommended for all emergency standby installations or for any application requiring fast load acceptance after start-up.

Specifications – Engine

Base Engine	WSG-1068, Turbocharged
Displacement in³ (L)	412.5 (6.8)
Overspeed Limit, rpm	2400 ±50
Regenerative Power, kW	16.00
Cylinder Block Configuration	Cast iron, V 10 cylinder
Cranking Current	200 amps at ambient temperature of 32°F (0°C)
Battery Charging Alternator	37 amps
Starting Voltage	12-volt, negative ground
Lube Oil Filter Types	Single spin-on canister-combination full flow with bypass
Standard Cooling System	104°F (40°C) ambient radiator cooling system
Standard Fuel	Natural gas

Power Output	Natural Gas		Propane	
	Standby		Standby	
Gross Engine Power Output, bhp (kWm)	176.0 (131.3)		164.0 (122.3)	
BMEP at Rated Load, psi (kPa)	168.0 (1158.3)		168.0 (1158.3)	
Bore, in. (mm)	3.55 (90.2)		3.55 (90.2)	
Stroke, in. (mm)	4.17 (105.9)		4.17 (105.9)	
Piston Speed, ft/min (m/s)	1250.0 (6.4)		1250.0 (6.4)	
Compression Ratio	9.0:1		9.0:1	
Lube Oil Capacity, qt. (L)	6.0 (5.7)		6.0 (5.7)	
Fuel Flow				
Minimum Operating Pressure, in. H ₂ O (kPa)	7.0 (1.7)		7.0 (1.7)	
Maximum Operating Pressure, in. H ₂ O (kPa)	13.6 (3.4)		13.6 (3.4)	
Air Cleaner				
Maximum Air Cleaner Restriction, in. H ₂ O (kPa)	15.0 (3.7)		15.0 (3.7)	
Exhaust				
Exhaust Flow at Rated Load, cfm (m ³ /min)	687.0 (19.4)		633.0 (17.9)	
Exhaust Temperature, °F (°C)	1184.0 (640.0)		1184 (640)	
Max Back Pressure, in. H ₂ O (kPa)	20.0 (5.0)		20.0 (5.0)	

Fuel Consumption - Natural Gas		Standby							
60 Hz Ratings, kW (kVA)		100 (125)							
	Load	1/4	1/2	3/4	Full				
	cfh	428.0	745.0	976.0	1260.0				
	m ³ /hr	12.1	21.1	27.6	35.7				
Fuel Consumption - Propane		Standby							
60 Hz Ratings, kW (kVA)		100 (125)							
	Load	1/4	1/2	3/4	Full				
	cfh	159.0	280.0	385.0	488.0				
	m ³ /hr	4.5	7.9	10.9	13.8				

Alternator

Several alternators are available for application flexibility based on the required motor-starting kVA and other requirements. Larger alternator sizes have lower temperature rise for longer life of the alternator insulation system. In addition, larger alternator sizes can provide a cost-effective use of engine power in across-the-line motor-starting applications and can be used to minimize voltage waveform distortion caused by non-linear loads.

Single-bearing alternators couple directly to the engine flywheel with flexible discs for drivetrain reliability and durability. No gear reducers or speed changers are used. Two-thirds pitch windings eliminate third-order harmonic content of the AC voltage waveform and provide the standardization desired for paralleling of generator sets. The standard excitation system is a self (shunt) excited system with the voltage regulator powered directly from the generator set output.

Alternator Application Notes

Separately Excited Permanent Magnet Generator (PMG) System - This option uses an integral PMG to supply power to the voltage regulator. A PMG system generally has better motor-starting performance, lower voltage dip upon load application, and better immunity from problems with harmonics in the main alternator output induced by non-linear loads. This option is recommended for use in applications that have large transient loads, sensitive electronic loads (especially UPS applications), harmonic content, or that require sustained short-circuit current (sustained 3-phase short circuit current at approximately 3 times rated for 10 seconds).

Alternator Sizes - On any given model, various alternator sizes are available to meet individual application needs. Alternator sizes are differentiated by maximum winding temperature rise, at the generator set standby or prime rating, when operated in a 40°C ambient environment. Available temperature rises range from 80°C to 150°C. Not all temperature rise selections are available on all models. Lower temperature rise is accomplished using larger alternators at lower current density. Lower temperature rise alternators have higher motor-starting kVA, lower voltage dip upon load application, and they are generally recommended to limit voltage distortion and heating due to harmonics induced by non-linear loads.

Alternator Space Heater - is recommended to inhibit condensation.

Available Output Voltages

<u>Three Phase</u>	<u>Single Phase</u>
[] 120/208	[] 120/240
[] 127/220	
[] 139/240	
[] 120/240	
[] 240/416	
[] 254/440	
[] 277/480	
[] 220/380	
[] 347/600	

Specifications – Alternator

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled by flexible disc
Insulation System	Class H per NEMA MG1-1.65
Standard Temperature Rise	150°C Standby
Exciter Type	Shunt
Phase Rotation	A (U), B (V), C (W)
Alternator Cooling	Direct drive centrifugal blower
AC Waveform Total Harmonic Distortion	<5% total no load to full linear load <3% for any single harmonic
Telephone Influence Factor (TIF)	<50 per NEMA MG1-22.43.
Telephone Harmonic Factor (THF)	<3



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Natural Gas												
Three Phase Table ¹		105° C	105° C	105° C	105° C	125° C	125° C	125° C	125° C	150° C	150° C	150° C
Feature Code		B418	B415	B268	B304	B417	B414	B267	B303	B416	B413	B419
Alternator Data Sheet Number		208	208	210	207	207	207	209	207	206	207	206
Voltage Ranges		110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	347/600	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	347/600	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	347/600
Surge kW		111	111	112	110	109	109	111	110	108	109	109
Motor Starting kVA (at 90% sustained voltage)	Shunt	422	422	563	360	360	360	516	360	313	360	313
	PMG	497	497	663	423	423	423	607	423	368	423	368
Full Load Current - Amps at Standby Rating		$\frac{120/208}{347}$	$\frac{127/220}{328}$	$\frac{139/240}{301}$	$\frac{220/380}{190}$	$\frac{240/416}{173}$	$\frac{277/480}{150}$	$\frac{347/600}{120}$				

Propane												
Three Phase Table ¹		105° C	105° C	105° C	105° C	125° C	125° C	125° C	125° C	150° C	150° C	150° C
Feature Code		B418	B415	B268	B304	B417	B414	B267	B303	B416	B413	B419
Alternator Data Sheet Number		208	208	210	207	207	207	209	207	206	207	206
Voltage Ranges		110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	347/600	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	347/600	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	347/600
Surge kW		104	104	104	103	102	102	104	103	101	102	102
Motor Starting kVA (at 90% sustained voltage)	Shunt	422	422	563	360	360	360	516	360	313	360	313
	PMG	497	497	663	423	423	423	607	423	368	423	368
Full Load Current - Amps at Standby Rating		$\frac{120/208}{347}$	$\frac{127/220}{328}$	$\frac{139/240}{301}$	$\frac{220/380}{190}$	$\frac{240/416}{173}$	$\frac{277/480}{150}$	$\frac{347/600}{120}$				

Notes:

1. Single phase power can be taken from a three phase generator set at up to 2/3 set rated 3-phase kW at 1.0 power factor. Also see Note 2 below.

Natural Gas												
Single Phase Table		105° C	105° C	105° C	105° C	125° C	125° C	125° C	125° C			
Feature Code		B418	B415	B274	B268	B417	B414	B273	B267			
Alternator Data Sheet Number		208	208	209	210	207	207	208	209			
Voltage Ranges		120/240 ¹	120/240 ¹	120/240 ²	120/240 ²	120/240 ¹	120/240 ¹	120/240 ²	120/240 ²			
Surge kW		108	108	110	109	106	106	109	108			
Motor Starting kVA (at 90% sustained voltage)	Shunt	250	250	305	330	215	215	250	305			
	PMG	290	290	360	385	250	250	290	360			
Full Load Current - Amps at Standby Rating		$\frac{120/240^1}{278}$	$\frac{120/240^2}{417}$									

Propane												
Single Phase Table		105° C	105° C	105° C	105° C	125° C	125° C	125° C	125° C			
Feature Code		B418	B415	B274	B268	B417	B414	B273	B267			
Alternator Data Sheet Number		208	208	209	210	207	207	208	209			
Voltage Ranges		120/240 ¹	120/240 ¹	120/240 ²	120/240 ²	120/240 ¹	120/240 ¹	120/240 ²	120/240 ²			
Surge kW		101	101	103	102	100	100	102	101			
Motor Starting kVA (at 90% sustained voltage)	Shunt	250	250	305	330	215	215	250	305			
	PMG	290	290	360	385	250	250	290	360			
Full Load Current - Amps at Standby Rating		$\frac{120/240^1}{278}$	$\frac{120/240^2}{417}$									

Notes:


1. The broad range alternators can supply single phase output up to 2/3 set rated 3-phase kW at 1.0 power factor.
2. The extended stack (full single phase output) and 4 lead alternators can supply single phase output up to full set rated 3-phase kW at 1.0 power factor.



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Control System

	<p>PowerCommand Control with AmpSentry™ Protection</p> <ul style="list-style-type: none"> The PowerCommand Control is an integrated generator set control system providing governing, voltage regulation, engine protection, and operator interface functions. PowerCommand Controls include integral AmpSentry protection. AmpSentry provides a full range of alternator protection functions that are matched to the alternator provided. Controls provided include Battery monitoring and testing features, and Smart-Starting control system. InPower PC-based service tool available for detailed diagnostics. Available with Echelon LonWorks™ network interface. NEMA 3R enclosure. Suitable for operation in ambient temperatures from -40C to +70C, and altitudes to 13,000 feet (5000 meters). Prototype tested; UL, CSA, and CE compliant. 	
<p>AmpSentry AC Protection</p> <ul style="list-style-type: none"> Overcurrent and short circuit shutdown Overcurrent warning Single & 3-phase fault regulation Over and under voltage shutdown Over and under frequency shutdown Overload warning with alarm contact Reverse power and reverse Var shutdown Excitation fault 	<p>Engine Protection</p> <ul style="list-style-type: none"> Overspeed shutdown Low oil pressure warning and shutdown High coolant temperature warning and shutdown High oil temperature warning (optional) Low coolant level warning or shutdown Low coolant temperature warning High and low battery voltage warning Weak battery warning Dead battery shutdown Fail to start (overcrank) shutdown Fail to crank shutdown Redundant start disconnect Cranking lockout Sensor failure indication 	<p>Operator Interface</p> <ul style="list-style-type: none"> OFF/MANUAL/AUTO mode switch MANUAL RUN/STOP switch Panel lamp test switch Emergency Stop switch Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls, and adjustments LED lamps indicating genset running, not in auto, common warning, common shutdown (5) configurable LED lamps LED Bargraph AC data display (optional)
<p>Alternator Data</p> <ul style="list-style-type: none"> Line-to-line and line-to-neutral AC volts 3-phase AC current Frequency Total and individual phase kW and kVA 	<p>Engine Data</p> <ul style="list-style-type: none"> DC voltage Lube oil pressure Coolant temperature Lube oil temperature (optional) 	<p>Other Data</p> <ul style="list-style-type: none"> Genset model data Start attempts, starts, running hours KW hours (total and since reset) Fault history Load profile (hours less than 30% and hours more than 90% load) System data display (optional with network and other PowerCommand gensets or transfer switches)
<p>Governing</p> <ul style="list-style-type: none"> Integrated digital electronic isochronous governor Temperature dynamic governing Smart idle speed mode Glow plug control (some models) 	<p>Voltage Regulation</p> <ul style="list-style-type: none"> Integrated digital electronic voltage regulator 3-phase line to neutral sensing PMG (Optional) Single and three phase fault regulation Configurable torque matching 	<p>Control Functions</p> <ul style="list-style-type: none"> Data logging on faults Fault simulation (requires InPower) Time delay start and cooldown Cycle cranking (4) Configurable customer inputs (4) Configurable customer outputs (8) Configurable network inputs and (16) outputs (with optional network)
<p>Options</p>		
<ul style="list-style-type: none"> <input type="checkbox"/> Power Transfer Control <input type="checkbox"/> Analog AC Meter Display <input type="checkbox"/> Thermostatically Controlled Space Heater 	<ul style="list-style-type: none"> <input type="checkbox"/> Key-type mode switch <input type="checkbox"/> Ground fault module <input type="checkbox"/> Auxiliary Relays (3) 	<ul style="list-style-type: none"> <input type="checkbox"/> Echelon LonWorks interface <input type="checkbox"/> Digital input and output module(s) (loose) <input type="checkbox"/> Remote annunciator (loose)



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Generator Set Options

Engine

- 120/240 V, 1500 W coolant heaters

Cooling System

- 122°F (50°C) ambient cooling system
- Remote radiator cooling

Fuel System

- LP liquid
- Natural gas
- Natural gas/LP vapor with automatic changeover
- Natural gas/LP liquid with automatic changeover
- Low Emission 1.5gm/hp-hr NOx

Alternator

- 105°C rise alternator
- 125°C rise alternator
- 150°C rise alternator
- 120/240 V, 100 W anti-condensation heater
- 12 lead, broad range, extended stack (full single phase output)
- Lower broad range
- PMG excitation
- Upper broad range
- Single phase (4 lead)

Exhaust System

- Adapter NPT to Slip Fit
- Mounted residential muffler

Generator Set

- AC entrance box
- Battery charger
- Battery rack
- Coolant drain extension
- Duct Adapter
- Export box packaging
- Main line circuit breaker
- Oil drain extension
- Quiet Site I housing with silencer
- Quiet Site II housing with silencer
- Remote annunciator panel
- UL2200 Listed
- Weather protective enclosure with silencer
- 2 year standby warranty
- 5 year basic power warranty
- 5 year comprehensive warranty

Accessories and Services

A wide range of products and services is available to match your power generation system requirements. Cummins Onan products and services include:

- Diesel and Spark-Ignited Generator Sets
- Transfer Switches
- Bypass Switches
- Parallel Load Transfer Equipment
- Digital Paralleling Switchgear
- PowerCommand Network and Software
- Distributor Application Support
- Planned Maintenance Agreements



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Warranty

All components and subsystems are covered by an express limited one-year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available. Contact your distributor/dealer for more information.

Certifications



ISO9001 - This generator set was designed and manufactured in facilities certified to ISO9001.



CSA - This generator set is CSA certified to product class 4215-01.



PTS - The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Products bearing the PTS symbol have been subjected to demanding tests in accordance to NFPA 110 to verify the design integrity and performance under both normal and abnormal operating conditions including short circuit, endurance, temperature rise, torsional vibration, and transient response, including full load pickup.



UL - The generator set is available Listed to UL2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL508 - Category NITW7 for U.S. and Canadian usage.

See your distributor for more information



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AmpSentry is a trademark of Cummins Inc.
LonWorks is a registered trademark of Echelon.
Ford is a registered trademark of the Ford Motor Company.

Important: Backfeed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.