

Gaseous Fuel Generator Set GTA28 Engine Series



Specification Sheet
Model GFGA EPA SI NSPS Compliant Capable



| KW(KVA) @ 0.8 P.F | |
|--------------------|------------------|
| Compression | 60 Hz-1800 RPM |
| Ratio | Standby |
| 8.5:1 (Note 1 & 3) | 450 kW (562 kVa) |
| 8.5:1 (Note 2 & 3) | 280 kW (350 kVa) |

Note:

(1) Natural Gas Rating

(2) Propane Rating - Per EPA SI NSPS this engine cannot operate more than 100 hours annually on propane fuel as back up fuel to natural gas.

(3) 54°C (130°F) or lower water temperature to the aftercooler.

NOTE: This engine is EPA compliant capable. A site validation emission test must be performed.

| Fuel Application Guide | |
|---|-------|
| Compression Ratio | 8.5:1 |
| Dry Processed Natural Gas | Yes |
| Propane (HD-5) | Yes |
| All gases such as field gas, digester and sewage gas will require an analysis of the specified gas and pre-approval from CNGE. Consult you Cummins Distributor for details. | |

Description

The Cummins NPower GF-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 GF GenSet is strong motor-starting capability and fast recovery from transient load changes. The torque-matched system includes a heavy-duty Cummins 4-cycle spark ignited engine, an AC alternator with high motor-starting kVA capacity, and an electronic voltage regulator with three phase sensing for precise regulation under steady-state or transient loads. The GF GenSet accepts 100% of the nameplate standby rating in one step. * Sets comply with 10 second ready to load per NFPA 110.

The standard PowerCommand® digital electronic control is an integrated system that combines engine and alternator controls for high reliability and optimum GenSet performance.

Optional protective housing and component heaters shield the generator set from extreme operating conditions.** Environmental concerns are addressed by low exhaust emission engines, sound-attenuated housings, and exhaust silencers. 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 NPower manufacturing facilities include quality standards, emphasizing our commitment to high quality in the design, manufacture, and support of our products. The PowerCommand control is UL508 Listed.

All Cummins NPower generator sets are backed by a comprehensive warranty program and supported by a worldwide network of 233 locations to assist with warranty, service, parts, and planned maintenance support.

Features

Cummins Heavy-Duty Engine - Rugged 4-cycle industrial spark ignited engine delivers reliable power, low emissions, and 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. The alternator electrical insulation system is UL1446 Recognized.

Control Systems - The PowerCommand electronic control is standard equipment and provides total genset system integration, including automatic remote starting/stopping, precise voltage regulation, alarm and status message display, output metering, and auto-shutdown at fault detection. PowerCommand control is Listed to UL508.

Cooling System - Standard cooling package provides reliable running at the rated power level, at up to 104°F ambient temperature.

Housings - Optional weather-protective housing and sound attenuation housing(s) are available.

Standards - Generators are designed, manufactured and tested to relevant UL, NFPA, ISO and IEC standards. The alternator is certified to CSA 22.2. The controls are CSA C282-M1999 and 22.2 No.14 M91. PowerCommand control is UL508 Listed.

Warranty and Service - Backed by a comprehensive warranty and worldwide distributor service network.

* Adequate fuel pressure and volume must be provided.

** Cold weather heaters are recommended when ambient temperatures are below 32 °F.

Generator Set

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

| Specifications - General | |
|--|---|
| Unit Width | 2032 mm (80 in) Open set |
| Unit Height | 2363 mm (93 in) Open set |
| Unit Length | 4268 mm (168in) Open set |
| Unit Dry Weight | 6883 to 7136 kg (15173 to 15731 lbs) - Dependant on selected alternator. |
| Rated Speed | 1800 rpm |
| 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 | Optional PMG excitation operates in compliance with BS800 and VDE level G and N. Addition of RFI protection kit allows operation per MIL-STD-461 and VDE level K. |
| See outline drawing for installation design specifications. | |

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. Usage is based on ISO 8528.

Site Derating Factors

See engine data sheet FR 995060 for altitude and ambient derate curves.

Gensets with Weather or Sound Enclosures may reduce ambient capability by 2 to 4.5°C (4 to 8°F) depending on enclosure type and site conditions.

1) Data represents gross engine performance capabilities obtained and corrected in accordance with SAEJ1349 conditions of 29.61 in. Hg.(100KPa) barometric pressure [361 ft. (110m) altitude], 77°F (25°C) inlet air temperature, and 0.30 in Hg.(100KPa) water vapor pressure using dry processed natural gas fuel with 905 BTU per standard cubic foot (33.72 kJ/L) lower heating value. Deration may be required due to altitude, temperature or type of fuel. Consult your local Cummins Distributor for details.

2) FUEL SYSTEM

Standard Carburetor – IMPCO Make
 Low Pressure Dry Processed Natural Gas – (905 BTU/ft.² L.H.V.)
 Running Pressure to Engine381 to 508 mm H₂O(15 to 20 in. H₂O)
 Minimum Gas Supply Pipe Size @ Engine (NG)50.8 mm (2.0 in.)
 Gas Supply Filter Pressure Rating690 kPa (100psi)

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

The Genset (engine) performance is based on processed natural gas fuel with 905 BTU per standard cubic foot (33.72 kJ/L) lower heating value. Variations in fuel composition and/or supply pressure must be eliminated during steady state operation. Locate the gas regulator as near to the engine as possible. Some systems may need an accumulator or other device(s) for startup or unstable conditions, contact the Fuel Supply utility for details.



Engine

Cummins heavy-duty spark ignited engines use advanced combustion technology for reliable and stable power, low emissions, and fast response to sudden load changes.

Electronic governing is standard 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 | | Cummins Model GTA28 | | |
| Displacement | | 28 L (1171 in ³) | | |
| Overspeed Limit | | 2100 rpm | | |
| Regenerative Power | | 450 kW | | |
| Cylinder Block Configuration | | Cast iron with replaceable wet cylinder liners | | |
| Cranking Current | | 850 amps at ambient temperature of 0°C (32°F) | | |
| Battery Charging Alternator | | 37 amps | | |
| Battery Type | | 8D | | |
| Starting Voltage | | 24-volt, negative ground | | |
| Standard Cooling System | | 40°C (104 °F) ambient radiator | | |
| Lube Oil Filter Types | | Three spin-on canisters-combination full flow with bypass | | |
| Fuel | | STANDBY | | |
| Fuel Consumption | Load | 1/2 | 3/4 | Full |
| (Approximate) | kW | 225 | 337 | 450 |
| Natural Gas | CFH | 3460 | 4674 | 5832 |
| Propane Vapor * | CFH | 1242 | 1678 | 2094 |
| Propane Liquid * | GPH | 37 | 50 | 63 |
| Cooling | | Full Load | | |
| Jacket Water Heat Rejection to Coolant | | 479 kW (27239 BTU/min) | | |
| Aftercooler Heat Rejection to Coolant | | 59 kW (3385 BTU/min) | | |
| Heat Rejection to Room | | 53 kW (3022 BTU/min) | | |
| Jacket Water Coolant Capacity (w/radiator) | | 163 L (43 USG) | | |
| Jacket Water Coolant Flow Rate | | 795 L/min (210 GPM) | | |
| Aftercooler Coolant Capacity (w/radiator) | | 61 L (16 USG) | | |
| Aftercooler Coolant Flow Rate | | 235 L/min (62 GPM) | | |
| Maximum Coolant Friction Head ** | | 34 kPa (5 psi) | | |
| Maximum Coolant Static Head ** | | 18.3 m (60 ft) | | |
| Radiator Fan Load | | 42 kW (57 hp) | | |
| Air | | Full Load | | |
| Combustion Air | | 454 L/sec (962 cfm) | | |
| Maximum Air Cleaner Restriction | | 381 mm H ₂ O (15 in H ₂ O) | | |
| Alternator Cooling Air | | 1.31 m ³ /s (2780 cfm) | | |
| Radiator Cooling Air | | 32422 L/sec (68700 cfm) | | |
| Maximum Restriction at Radiator Discharge (static) | | 12.7 mm H ₂ O (0.5 in H ₂ O) | | |
| Exhaust | | Full Load | | |
| Gas Flow (Full Load) | | 1733 L/sec (3671 cfm) | | |
| Gas Temperature | | 659° C (1219° F) | | |
| Maximum Back Pressure | | 51 mm Hg (2 in Hg) | | |
| Engine | | Full Load | | |
| Gross Engine Power Output | | 523 kWm (701 hp) | | |
| BMEP *** | | 1241 kPa (180 psi) | | |
| Piston Speed | | 0.16 m/s (30 ft/min) | | |
| Oil Capacity | | 68 L (18 gal) | | |

* Emergency use only. Not for primary fuel use.

*** BMEP @ rated load on NG.

** Jacket water only.

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 drive train 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 rating, when operated in a 40°C (104°F) ambient environment. Available temperature rises range from 80°C to 150°C (176°F to 302°F). 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

| Three Phase Reconnectable | | | Single Phase Non-Reconnectable | | Three Phase Non-Reconnectable | | |
|---------------------------|---------|--------------------------|--------------------------------|--------------------------|-------------------------------|--------------------------|---------|
| <input type="checkbox"/> | 120/208 | <input type="checkbox"/> | 240/416 | <input type="checkbox"/> | 120/240 | <input type="checkbox"/> | 220/380 |
| <input type="checkbox"/> | 127/220 | <input type="checkbox"/> | 254/440 | | | <input type="checkbox"/> | 347/600 |
| <input type="checkbox"/> | 139/240 | <input type="checkbox"/> | 277/480 | | | | |
| <input type="checkbox"/> | 120/240 | | | | | | |

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 or better |
| Standard Temperature Rise * | 125° C * |
| Exciter Type | PMG |
| 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 |

| | 80° C Alternator | | | 105° C Alternator | | | 125° C Alternator | | |
|--|--|----------|---------|--|---------|---------|--|---------|---------|
| Voltage Ranges | 120/208 Thru 139/240 240/416 Thru 277/480 | 277/480 | 347/600 | 120/208 Thru 139/240 240/416 Thru 277/480 | 277/480 | 347/600 | 120/208 Thru 139/240 240/416 Thru 277/480 | 277/480 | 347/600 |
| Motor Starting | Broad Range | 480 | 600 | Broad Range | 480 | 600 | Broad Range | 480 | 600 |
| Maximum KVA (90% Sustained Voltage) | 2429 | 2208 | 2208 | 2208 | 1896 | 1896 | 1896 | 1749 | 1749 |
| Alternator Datasheet No. | ADS308E | ADS 307E | ADS307E | ADS307E | ADS306E | ADS306E | ADS306E | ADS305E | ADS305E |
| Full Load Current (Amps @ Standby Rating) | 120/208V | 127/220 | 139/240 | 220/380 | 240/416 | 254/440 | 277/480 | 347/600 | |
| | 1561 | 1476 | 1353 | 855 | 781 | 738 | 677 | 541 | |

* Other Temp Rises Available. See options at end of datasheet for more details.

Control System



PowerCommand Control 1.1

The PowerCommand Control is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). The integration of all functions into a single control system provides enhanced reliability and performance compared to conventional generator set control systems. Prototype tested; UL, CSA, and CE compliant. Major features

Features

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- InPower™ PC-based service tool available for detailed diagnostics.

AC Protection

- Over current warning and shutdown.
- Over and under voltage shutdown.
- Over and under frequency shutdown.
- Over excitation (loss of sensing) fault.
- Field overload.
- Integrated digital electronic voltage regulator.

Digital Voltage Regulation

- 2-phase line-to-line sensing.
- Configurable torque matching.
- Integrated digital electronic voltage regulator.

Engine Protection

- Overspeed shutdown.
- Low oil pressure warning and shutdown.
- High coolant temperature warning and shutdown.
- Low coolant level warning or shutdown.
- Low coolant temperature warning.
- High, low and weak battery voltage warning.
- Fail to start (overcrank) shutdown.
- Fail to crank shutdown.
- Redundant start disconnect.
- Cranking lockout.
- Sensor failure indication.
- Low fuel level warning or shutdown.

Operator / Display Panel

- Manual off switch.
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols).
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start.

Other Display Data

- Genset model data.
- Start attempts, starts, running hours.
- Fault history.
- RS485 Modbus® interface.
- Data logging and fault simulation (requires InPower service)

Control Functions

- Time delay start and cooldown.
- Cycle cranking.
- PCCNet interface.
- (2) Configurable inputs.
- (2) Configurable outputs.

PCC Options

- Integrated digital electronic isochronous governing.
- Temperature dynamic governing.
- Auxiliary output relays (2).
- 120/240 V, 100 W anti-condensation heater.
- Remote annunciator with (3) configurable inputs and (4) configurable outputs.
- Remote operator panel.
- PMG alternator excitation.
- PowerCommand iWatch web server for remote monitoring and alarm notification (loose).
- Auxiliary, configurable signal inputs (8) and configurable relay outputs (8).
- AC output analog meters (bargraph).
Color-coded graphical display of:
 - 3-phase AC voltage
 - 3-phase current
 - Frequency
 - kVa
- PowerCommand 3.3 control with AmpSentry protection.

| PowerCommand Control Values | | |
|-----------------------------------|---|-------------------------|
| | PCC | Genset Reference Values |
| Ambient Operating Temperature | -40 to +70°C (-40 to 158°F) HMI -20 to +70°C (-4 to 158°F) | - |
| Operating Altitude | up to 5000 meters (13,000 ft.) | - |
| Alternator Data | | |
| Voltage | AC: Single or Three Phase Line-to-line or Line-to-neutral | - |
| Digital Output Voltage Regulation | Within +/-1.0% any loads between no load to full. Drift = no more than +/-1.5% for 40°C (104°F) temp change in 8 hours. | - |
| Current | 3-Phase AC | - |
| Frequency | 60 Hz | - |
| Battery Config | 12 VDC | 12 VDC |
| Engine Data | | |
| Voltage | DC | DC |
| Lube Oil Pressure | Adjustable | Adjustable |
| Engine Idle Speed | Adjustable | Adjustable |

Genset values are for reference only. For unit data see genset data tag.

Generator Set Options

Engine

- 240/480 V, 8000 W coolant heaters
- 120/208/240 V, 300 W lube oil heater

Cooling System

- Heat exchanger cooling
- Remote radiator cooling

Fuel System

- Flexible fuel connector
- Fuel strainer

Alternator

- 80° C rise alternator
- 105° C rise alternator
- 125° C rise alternator
- 120/240 V, 100 W anti-condensation heater
- Single phase

Exhaust System

- GenSet mounted muffler (Enclosure Models Only)
- Heavy duty exhaust elbow
- Slip on exhaust connection

Generator Set

- AC entrance box
- Batteries
- Battery charger
- Export box packaging
- Main line circuit breaker
- PowerCommand Network Communication Module (NCM)
- Stage I enclosure w/silencer
- Stage II enclosure w/silencer
- Remote annunciator panel
- Spring isolators
- Weather protective enclosure with silencer
- 2 year standby warranty
- 5 year basic power warranty

Available Products and Services

A wide range of products and services is available to match your power generation system requirements. Cummins Power Generation 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

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



CSA - The alternator is certified to CSA 22.2. The controls are CSA C282-M1999 and 22.2 No.14 M91.



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 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.

See your distributor for more information



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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.