Diesel Generator Set
Model DGFC 60 Hz

200 kW, 250 kVA Standby
180 kW, 225 kVA Prime

Description

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

A primary feature of the DG GenSet is strong motor-starting capability and fast recovery from transient load changes. The torque-matched system includes a heavy-duty Cummins 4-cycle diesel 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 DG GenSet accepts 100% of the nameplate standby rating in one step, in compliance with NFPA 110 requirements.

The DG GenSet offers both user- and environment-friendly operation. The standard generator set control provides basic operation including automatic remote starting and automatic fault shutdown. Controls may be upgraded to the PowerCommand® digital electronic control with AmpSentry™ protection. Optional weather-protective housings and coolant heaters shield the generator set from extreme operating conditions. Environmental concerns are addressed by low exhaust emission engines, sound-attenuated housings, exhaust silencers, and dual-wall fuel tanks.

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 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** - Engine certified to U.S. EPA Nonroad Source Emission Standards, CFR 40, Tier 2.
- **Cummins Heavy-Duty Engine** - Rugged 4-cycle industrial diesel 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 standard Detector™ Control features NFPA 110 compliance, or select the PowerCommand® advanced digital control for even greater capability and features. PowerCommand control is Listed to UL508.
- **Cooling System** - Standard cooling package provides reliable running at the rated power level, at up to 50°C ambient temperature.
- **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** - Optional weather-protective housings are available.
- **Fuel Tanks** - Dual wall sub-base fuel tanks and in-skid day tanks are also offered.
- **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.

Specifications – General

See outline drawing 500-3121 for installation design specifications.

Unit Width, in (mm)	40.0 (1016)
Unit Height, in (mm)	56.4 (1433)
Unit Length, in (mm)	104.8 (2662)
Unit Dry Weight, lb (kg)	3296 (1495)
Unit Wet Weight, lb (kg)	3391 (1538)
Rated Speed, rpm	1800
Voltage Regulation, No Load to Full Load	±0.5%
Random Voltage Variation	±0.5%
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.

Cooling	**Standby**	**Prime**
Fan Load, HP (kW)	17.7 (13.2)	17.7 (13.2)
Coolant Capacity with radiator, US Gal (L)	6.8 (25.7)	6.8 (25.7)
Coolant Flow Rate, Gal/min (L/min)	64.0 (242.2)	64.0 (242.2)
Heat Rejection To Coolant, Btu/min (MJ/min)	6608.0 (7.0)	5592.0 (5.9)
Heat Radiated To Room, Btu/min (MJ/min)	2680.0 (2.8)	2397.0 (2.5)
Maximum Coolant Friction Head, psi (kPa)	5.0 (34.5)	5.0 (34.5)
Maximum Coolant Static Head, ft (m)	60.0 (18.3)	60.0 (18.3)

Air		
Combustion Air, scfm (m^3/min)	643.0 (18.2)	579.0 (16.4)
Alternator Cooling Air, scfm (m^3/min)	1460.0 (41.3)	1460.0 (41.3)
Radiator Cooling Air, scfm (m^3/min)	9187.0 (260.0)	9187.0 (260.0)
Max. Static Restriction, in H_2O (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

Engine power available up to 4485 ft (1367 m) at ambient temperatures up to 104°F (40°C). Above 4485 ft (1367 m) derate at 4% per 1000 ft (305 m), and 0.33% per 1°F (0.6% per 1°C) above 104°F (40°C).

Engine

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

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	Cummins Model 6CTAA8.3-G3, Turbocharged and CAC, diesel-fueled
Displacement in^3 (L)	504.0 (8.3)
Overspeed Limit, rpm	2100 ±50
Regenerative Power, kW	22.00
Cylinder Block Configuration	Cast iron with replacable wet cylinder liners, In-line 6 cylinder
Cranking Current	550 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

Power Output	**Standby**	**Prime**
Gross Engine Power Output, bhp (kWm)	317.0 (236.5)	285.0 (212.6)
BMEP at Rated Load, psi (kPa)	265.0 (1827.1)	240.0 (1654.7)
Bore, in. (mm)	4.49 (114.0)	4.49 (114.0)
Stroke, in. (mm)	5.32 (135.1)	5.32 (135.1)
Piston Speed, ft/min (m/s)	1596.0 (8.1)	1596.0 (8.1)
Compression Ratio	16.8:1	16.8:1
Lube Oil Capacity, qt. (L)	25.2 (23.8)	25.2 (23.8)
Fuel Flow		
Fuel Flow at Rated Load, US Gal/hr (L/hr)	55.0 (208.2)	55.0 (208.2)
Maximum Inlet Restriction, in. Hg (mm Hg)	4.0 (101.6)	4.0 (101.6)
Maximum Return Restriction, in. Hg (mm Hg)	10.0 (254.0)	10.0 (254.0)
Air Cleaner		
Maximum Air Cleaner Restriction, in. H_2O (kPa)	25.0 (6.2)	25.0 (6.2)
Exhaust		
Exhaust Flow at Rated Load, cfm (m^3/min)	1605.0 (45.4)	1436.0 (40.6)
Exhaust Temperature, °F (°C)	952.0 (511.1)	925.0 (496.1)
Max Back Pressure, in. H_2O (kPa)	41.0 (10.2)	41.0 (10.2)

Fuel System	Direct injection, number 2 diesel fuel, fuel filters; water separator; automatic electric fuel shutoff

Fuel Consumption		**Standby**				**Prime**			
60 Hz Ratings, kW (kVA)		**200 (250)**				**180 (225)**			
	Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full
	US Gal/hr	4.6	7.8	11.0	14.5	4.3	7.3	10.0	13.0
	L/hr	17	30	42	55	16	28	38	49

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

Three Phase

[ ] 110/190
[ ] 115/200
[ ] 120/208
[ ] 110/220
[ ] 127/220
[ ] 115/230
[ ] 120/240
[ ] 139/240
[ ] 220/380
[ ] 240/416
[ ] 255/440
[ ] 277/480
[ ] 347/600

Single Phase

[ ] 110/220
[ ] 115/230
[ ] 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
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

Three Phase Table[1]		**105° C**	**105° C**	**125° C**	**125° C**	**125° C**	**150° C**	**150° C**	**150° C**				
Feature Code		B415	B304	B417	B414	B303	B416	B413	B419				
Alternator Data Sheet Number		212	212	212	212	211	211	211	211				
Voltage Ranges		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	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	347/600				
Surge kW		208	209	209	208	209	207	207	209				
Motor Starting kVA (at 90% sustained voltage)	Shunt	770	770	770	770	672	672	672	672				
	PMG	920	920	920	920	791	791	791	791				

Full Load Current - Amps at Standby Rating	110/190 761	115/200 723	120/208 695	127/220 657	139/240 602	220/380 380	240/416 347	255/440 328	277/480 301	347/600 241

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.

Single Phase Table		**105° C**	**125° C**	**125° C**									
Feature Code		B415	B417	B414									
Alternator Data Sheet Number		212	212	212									
Voltage Ranges		120/240[1]	120/240[1]	120/240[1]									
Surge kW		205	205	205									
Motor Starting kVA (at 90% sustained voltage)	Shunt	420	420	420									
	PMG	500	500	500									

Full Load Current - Amps at Standby Rating	110/220[1] 606	115/230[1] 580	120/240[1] 556

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.

Control System

Optional Features Shown

Standard - Detector™ Control System

- Automatic remote starting
- Control components designed to withstand the vibration levels typical in generator sets
- Controls generator set starting and shutdown

Standard Detector 12 Light (NFPA110) Control Description

- 12 light engine monitor (NFPA110 level)
- Common alarm contact
- Coolant temperature gauge
- Cycle cranking control
- DC voltmeter
- Field circuit breaker
- Individual 1/2 A relay signals
- Lamp test switch
- Oil pressure gauge
- Remote starting, 12 V, 2 wire
- Reset switch
- Run-Off-Auto switch
- Running time meter

Standard Features		Optional Features
• 5% voltage adjust rheostat • AC ammeter (dual scale) • AC voltmeter (dual scale) • Dual scale frequency/engine RPM meter • High coolant temp shutdown (red light) • Low coolant temperature (yellow light) • Low fuel (yellow light) • Low oil pressure shutdown (red light)	• Overcrank shutdown (red light) • Overspeed shutdown (red light) • Pre-alarm high coolant temp (yellow light) • Pre-alarm low oil pressure (yellow light) • Run indicator (green light) • Two customer selected faults (red light) • Voltmeter/Ammeter phase selector	• Audible alarm • CSA282 • Emergency stop • Low battery voltage warning • Remote fault signal package • Speed adjust rheostat • Time delay start/stop

Optional Features Shown

Optional - PowerCommand® Control with AmpSentry™ Protection

- AmpSentry Protection guards the electrical integrity of the alternator and power system from the effects of overcurrent, over/under voltage, under frequency and overload conditions
- Control components are designed to withstand the vibration levels typical in generator sets
- Integrated automatic voltage regulator and engine speed governor

Standard Control Description

- Analog % of current meter (amps)
- Analog % of load meter (kW)
- Analog AC frequency meter
- Analog AC voltage meter
- Cycle cranking control
- Digital display panel
- Emergency stop switch
- Idle mode control
- Menu switch
- Panel backlighting
- Remote starting, 12 V, 2 wire
- Reset switch
- Run-Off-Auto switch
- Sealed front panel, gasketed door
- Self diagnostics
- Separate customer interconnection box
- Voltmeter/Ammeter phase selector switch

Standard Protection Functions		Standard Performance Data
Warnings • High coolant temperature • High DC voltage • Low coolant temperature • Low DC voltage • Low fuel-day tank • Low oil pressure • Oil pressure sender fault • Overcurrent • Overload load shed contacts • Temperature sender fault • Up to four customer fault inputs • Weak battery	**Shutdowns** • Emergency stop • Fail to crank • High AC voltage • High coolant temperature • Low AC voltage • Low coolant level (option for alarm only) • Low oil pressure • Magnetic pickup failure • Overcrank • Overcurrent • Overspeed • Short circuit • Underfrequency	**AC Alternator** • Current by phase • Kilowatts • Kilowatt hours • Power factor • Voltage line to line • Voltage line to neutral **Engine Data** • Battery voltage • Coolant temperature • Engine running hours • Engine starts counter • Oil pressure • Oil temperature • RPM

Generator Set Options

Engine
[ ] 120/240 V, 1000 W coolant heaters
[ ] 120/240 V, 150 W lube oil heater

Cooling System
[ ] 125°F (50°C) ambient cooling

Fuel System
[ ] 12 hour dual wall sub-base tank
[ ] 24 hour dual wall sub-base tank
[ ] Single wall sub-base fuel tank, 125 gal

Alternator
[ ] 105°C rise alternator
[ ] 125°C rise alternator
[ ] 120/240 V, 100 W anti-condensation heater
[ ] PMG excitation
[ ] Single phase

Control Panel
[ ] 120/240 V, 100 W control anti-condensation heater
[ ] CSA 282 compliance package
[ ] Emergency stop
[ ] Engine gauges
[ ] Low battery voltage warning
[ ] Low coolant level warning/shutdown
[ ] PowerCommand Control
[ ] Remote fault signal package
[ ] Remote speed adjust

Exhaust System
[ ] GenSet mounted muffler
[ ] Heavy duty exhaust elbow
[ ] Slip on exhaust connection

Generator Set
[ ] AC entrance box
[ ] Batteries
[ ] Battery charger
[ ] Export box packaging
[ ] UL2200 Listed
[ ] Main line circuit breaker
[ ] PowerCommand Network
[ ] QuietSite Stage 1 housing w/silencer
[ ] QuietSite Stage II housing w/silencer
[ ] Remote annunciator panel
[ ] Spring isolators
[ ] Weather protective enclosure with silencer
[ ] 2 year prime power warranty
[ ] 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

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

Cummins Power Generation
1400 73rd Avenue N.E.
Minneapolis, MN 55432
763.574.5000
Fax: 763.574.5298
www.cumminspowergeneration.com

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.