

# Diesel generator set QSX15 series engine



350 kW - 500 kW standby

## Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.

## Features

**Cummins® heavy-duty engine** - Rugged 4-cycle, industrial diesel 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 and fault clearing short-circuit capability.

**Permanent magnet generator (PMG)** - Offers enhanced motor starting and fault clearing short-circuit capability.

**Control system** - 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 Level 1 compliance.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

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

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW	60 Hz	50 Hz
<b>DFEG</b>	350 (438)		320 (400)				D-3398	
<b>DFEH</b>	400 (500)	352 (440)	365 (456)	320 (400)			D-3399	D-3402
<b>DFEJ</b>	450 (563)	400 (500)	410 (513)	364 (455)			D-3400	D-3403
<b>DFEK</b>	500 (625)	440 (550)	455 (569)	400 (500)			D-3401	D-3404

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 801.2, Level 4 electrostatic discharge IEC 801.3; Level 3 radiated susceptibility

## Engine specifications

Design	Turbocharged with air-to-air charge air cooling
Bore	136.9 mm (5.39 in)
Stroke	168.9 mm (6.65 in)
Displacement	14.9 L (912.0 in <sup>3</sup> )
Configuration	Cast iron with replaceable wet liners, in-line 6 cylinder
Battery capacity	900 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Full authority electronic (FAE) Cummins HPI-TP
Fuel filter	
Air cleaner type	
Lube oil filter type(s)	Single spin-on combination full flow and bypass filters
Standard cooling system	40 °C (104 °F) ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 °C standby at 40 °C ambient
Exciter type	PMG (Permanent magnet generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% 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

## Available voltages

60 Hz line-neutral/line-line				50 Hz line-neutral/line-line			
• 110/190	• 110/220	• 115/200	• 115/230	• 110/190	• 110/220	• 115/200	• 115/230
• 120/208	• 127/220	• 139/240	• 220/380	• 120/208	• 127/220	• 139/240	• 220/380
• 230/400	• 240/416	• 255/440	• 277/480	• 230/400	• 240/415	• 255/440	
• 347/600							

Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- 208/240/480 V thermostatically controlled coolant heater for ambient above 4.5 °C (40 °F)
- 208/240/480 V thermostatically controlled coolant heater for ambient below 4.5 °C (40 °F)
- 120 V 300 W lube oil heater
- Heavy duty air cleaner with safety element

### Alternator

- 80 °C rise

- 105 °C rise
- 150 °C rise
- 120/240 V 300 W anti-condensation heater

### Exhaust System

- Critical grade exhaust silencer
- Exhaust packages
- Industrial grade exhaust silencer
- Residential grade exhaust silencer

### Fuel system - 60 Hz

- 1136 L (300 gal) sub-base tank
- 1514 L (400 gal) sub-base tank
- 1893 L (500 gal) sub-base tank
- 2271 L (600 gal) sub-base tank
- 2498 L (660 gal) sub-base tank
- 3218 L (850 gal) sub-base tank
- 6435 L (1700 gal) sub-base tank

### Fuel system - 50 Hz

- 155 L (41 gal) in-skid day tank (dual wall)
- 208 L (55 gal) in-skid day tank (single wall)
- 1595 L (425 gal) sub-base tank
- 3191 L (850 gal) sub-base tank

### Cooling system

- High ambient 50 °C radiator

### Control panel

- 120/240 V 100 W control anti-condensation heater
- Ground fault indication
- Power transfer control
- Remote fault signal package
- Run relay package

### Generator set

- AC entrance box
- Battery
- Battery charger
- Export box packaging
- UL 2200 Listed
- Main line circuit breaker
- Paralleling accessories
- Remote annunciator panel
- Spring isolators
- Enclosure: aluminum, steel, weather protective or sound attenuated
- 2 year standby power warranty
- 2 year prime power warranty
- 5 year basic power warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

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## Control system PCC2100 or PCC3201



**PowerCommand control** is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet™ and optional Echelon® LonWorks® network interface.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- 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
- Configurable for local language

### Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning (some models)
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (some models)
- Engine speed

### AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down
- Excitation fault

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA

### Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history

### Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

### Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Suitable for PMG or shunt excitation
- Single and three phase fault regulation
- Configurable torque matching

### Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- Configurable customer inputs (4)
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

### Paralleling (Option)

- Active digital phase lock loop synchronizer
- Isochronous kW and kVar load sharing controls
- kW import/export and kVar/PF control for utility (mains) paralleling

### Options

- PCC 3201 paralleling control
- LED bargraph AC data display
- Thermostatically controlled space heater
- Key-type mode switch
- Ground fault module
- Auxiliary relays (3)
- Echelon LONWORKS interface
- Modicon Gateway to convert to Modbus (loose)
- PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- Digital input and output module(s) (loose)
- Remote annunciator (loose)

For further detail on PCC 2100 see document S-1409.

For further detail on PCC 3201 see document S-1444.

**Emergency standby power (ESP):**

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Limited-time running power (LTP):**

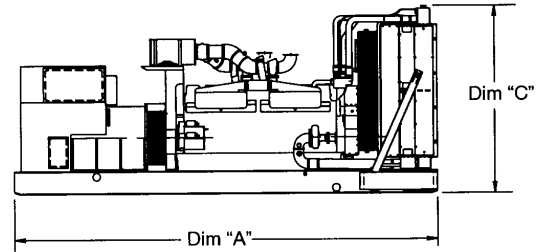
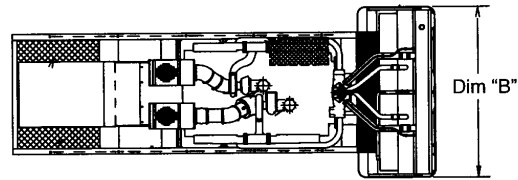
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528

**Prime power (PRP):**

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Base load (continuous) power (COP):**

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
<b>DFEG</b>	3864 (152.1)	1524 (60.0)	1812 (71.3)	3856 (8500)	3992 (8800)
<b>DFEH</b>	3864 (152.1)	1524 (60.0)	1812 (71.3)	3856 (8500)	3992 (8800)
<b>DFEJ</b>	3864 (152.1)	1524 (60.0)	1812 (71.3)	4082 (9000)	4218 (9300)
<b>DFEK</b>	3864 (152.1)	1524 (60.0)	1812 (71.3)	4309 (9500)	4445 (9800)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

**Codes and standards**

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

	<p>This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.</p>		<p>All low voltage models are CSA certified to product class 4215-01.</p>
	<p>The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.</p>		<p>The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.</p>
		<p><b>U.S. EPA</b></p>	<p>Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.</p>

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building’s electrical system except through an approved device or after building main switch is open.

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