

# Diesel generator set QSX15 series engine

364 kVA–550 kVA 50 Hz  
409 kW–500 kW 60 Hz



## Description

This Cummins® Power Generation commercial generator set is a fully integrated power generation system, providing optimum performance, reliability, and versatility for stationary standby and prime power.

## Features

**Cummins® heavy-duty engine** – Rugged 4-cycle industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Optional permanent magnet generator (PMG)** – Offers enhanced motor starting and fault clearing short circuit capability.

**Alternator** – Low reactance 2/3 pitch windings; low waveform distortion with non-linear loads, fault clearing short-circuits capability, and class H insulation.

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

**Control system** – The PowerCommand® electronic control is standard equipment and provides total genset system integration, including auto remote start/stop, precise frequency and voltage regulation, alarm and status message display, AmpSentry protection and output metering.

**Enclosures** – Optional weather-protective and sound attenuated enclosures.

**Warranty** – Backed by a comprehensive warranty and Worldwide distributor network.

Model	Standby rating		Prime rating		Emissions compliance TA Luft/EU stage EPA Tier	Controller Std/Opt	Data sheet
	50 Hz kVA (kW)	60 Hz kW (kVA)	50 Hz kVA (kW)	60 Hz kW (kVA)			
<b>C400 D5e</b>	400 (320)		364 (291)		4g/Former EU Stage II	2.2/3/3	DS346-CPGK
<b>C450 D5e</b>	450 (360)		409 (327)		4g/Former EU Stage II	2.2/3/3	DS347-CPGK
<b>C500 D5e</b>	500 (400)		455 (364)		4g/Former EU Stage II	2.2/3/3	DS348-CPGK
<b>C550 D5e</b>	550 (440)		500 (400)		4g/Former EU Stage II	2.2/3/3	DS349-CPGK
<b>C450 D6e</b>		450 (562)		409 (511)	EPA Tier 2	2.2/3/3	DS350-CPGK
<b>C500 D6e</b>		500 (625)		455 (568)	EPA Tier 2	2.2/3/3	DS351-CPGK

## Generator set specifications

Governor regulation class	ISO 8528 G3
Voltage regulation, no load to full load	+/- 1%
Random voltage variation	+/- 1%
Frequency regulation	Isochronous
Random frequency variation	+/- 0.25%
Radio frequency emissions compliance	BS EN 61000-6-2:2005/BS EN 61000-6-3:2007

## Engine specifications

Design	4 cycle, in-line, turbo charged, charge air cooled
Bore	137 mm (5.39 in.)
Stroke	169 mm (6.65 in.)
Displacement	15 liter (912 in <sup>3</sup> )
Cylinder block	Cast iron, 6 cylinder
Battery capacity	100 AH
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection
Fuel filter	Spin on fuel filters with water separator
Air cleaner type	Dry replaceable element with restriction indicator
Lube oil filter type(s)	Spin on full flow filter
Standard cooling system	122 °F (50 °C) ambient radiator

## Alternator specifications

Design	Brushless, single bearing, revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible disc
Insulation system	Class H
Standard temperature rise	Standby 125-163 °C
Exciter type	Self excited (PMG optional)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion (THDV)	No load < 1.5%. Non distorting balanced linear load < 5%
Telephone influence factor (TIF)	< 50 per NEMA MG1
Telephone harmonic factor (THF)	< 2%

## Available voltages

50 Hz Line-Neutral/Line-Line		60 Hz Line-Neutral/Line-Line	
• 110/190	• 220/380	• 110/190	• 220/380
• 115/200	• 230/400	• 115/200	• 230/400
• 120/208	• 240/416	• 120/208	• 240/416
• 127/220	• 255/440	• 127/220	• 255/440
		• 139/240	• 277/480

## Generator set options and accessories

### Engine

- Heavy duty air cleaner
- Water jacket heater 240 V

### Enclosure

- Sound attenuated canopy

### Alternator

- Alternator heater
- Exciter voltage regulator (PMG)
- High alternator temp shutdown

### Circuit breaker

- 3 or 4 pole main circuit breaker
- Motorised 3 or 4 pole circuit breaker
- Aux contacts and trip alarm
- Shunt trip – 24 VDC

### Fuel tank

- Low fuel level warning or shutdown
- High fuel level warning
- Electric fuel transfer pump

### Control panel

- PowerCommand 3.3
- AC output bargraph
- Shutdown audible alarm
- Exhaust gas temp guage
- Earth fault shutdown
- Control cabinet heater

### Warranty

- 10 years for major components
- 5 years for standby application

- 2 years for prime application

### Silencer

- 9 dB attenuation critical silencer
- 25 dB attenuation residential silencer

### Battery charger

- Set mounted
- Standalone
- 5 A or 10 A

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

## PowerCommand 2.2 control system

The PowerCommand control system is an integrated microprocessor based generator set control system providing voltage regulation, engine protection, alternator protection, operator interface and isochronous governing. Refer to document S-1568 for more detailed information on the control.



### Major features

- AmpSentry – Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.
- Power management – Control function provides battery monitoring and testing features and smart starting control system.
- Advanced control methodology – Three phase sensing, full wave rectified voltage regulation, with a PWM output for stable operation with all load types.
- Communications interface – Control comes standard with PCCNet and Modbus interface.
- Regulation compliant – Prototype tested: CE, UL, and CSA compliant.
- Service – InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.
- Easily upgradeable – PowerCommand controls are designed with common control interfaces.
- Reliable design – The control system is designed for reliable operation in harsh environment.
- Multi-language support.

### Operator panel features

- 128 x 128 pixels graphic LED backlight LCD.
- Auto, manual, start, stop, fault reset and lamp test/panel lamp switches.
- Alpha-numeric display with pushbuttons.
- LED lamps indicating genset running, remote start, not in auto, common shutdown, common warning, manual run mode, auto mode and stop mode.

### Alternator data

- Line-to-neutral and line-to-line AC volts.
- 3-phase AC current.
- Frequency.
- kW, kvar, power factor kVA (three phase and total).

### Engine data

- DC voltage.
- Engine speed.
- Lube oil pressure and temperature.
- Coolant temperature.
- Comprehensive FAE data (where applicable).

### Other data

- Genset model data.
- Start attempts, starts, running hours, kW hours.
- Load profile (operating hours at % load in 5% increments).
- Fault history.
- Data logging and fault simulation (requires InPower).

### Standard control functions

#### Digital governing

- Integrated digital electronic isochronous governor.
- Temperature dynamic governing.

#### Digital voltage regulation

- Integrated digital electronic voltage regulator.
- 3-phase, 4-wire line-to-line sensing.
- Configurable torque matching.

#### AmpSentry AC protection

- AmpSentry protective relay.
- Over current and short circuit shutdown.
- Over current warning.
- Single and three phase fault regulation.
- Over and under voltage shutdown.
- Over and under frequency shutdown.
- Overload warning with alarm contact.
- Reverse power and reverse var shutdown.
- Field overload.

#### Engine protection

- Battery voltage monitoring, protection and testing.
- Overspeed shutdown.
- Low oil pressure warning and shutdown.
- High/low coolant temperature warning or shutdown.
- Low coolant level warning or shutdown.
- Fail to start (overcrank) shutdown.
- Fail to crank shutdown.
- Cranking lockout.
- Sensor failure indication.
- Low fuel level warning or shutdown (optional).
- Fuel-in-rupture-basin warning or shutdown (optional).
- Full authority electronic engine protection.

#### Control functions

- Time delay start and cool down.
- Real time clock for fault and event time stamping.
- Exerciser clock and time of day start/stop.
- Data logging.
- Cycle cranking.
- Load shed.
- Configurable inputs and outputs (4).
- Remote emergency stop.

## PowerCommand 3.3 control system

The PowerCommand 3.3 has the following additional features and benefits over the PowerCommand 2.3. Refer to document S-1570 for more detailed information on the control.



### Operator panel features

- 320 x 240 pixels graphic LED backlight LCD.
- In addition to the 2.2 functions, the operator panel displays paralleling breaker status and provides for direct control of the paralleling breaker.

### Paralleling control functions

- First Start Sensor System selects first genset to close to bus.
- Phase Lock Loop Synchronizer with voltage matching.
- Sync check relay.
- Isochronous kW and kVar load sharing.
- Load govern control for utility paralleling.
- Extended Paralleling (baseload/peak shave) Mode.
- Digital power transfer control, for use with a breaker pair to provide open transition, closed transition, ramping closed transition, peaking and base load functions.

## Ratings definitions

### 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.

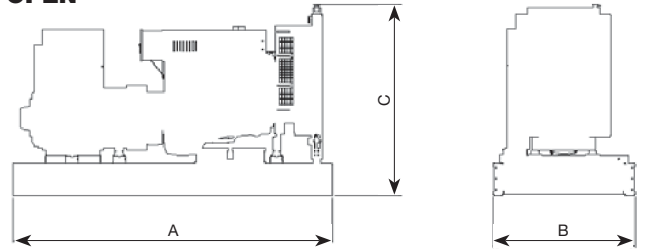
### Prime power (PRP):

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.

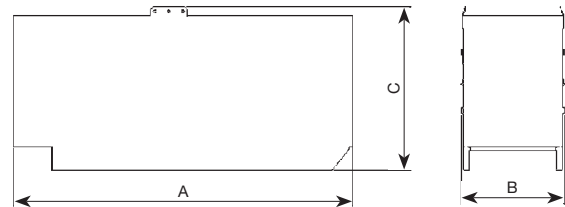
### Base load (continuous) power (COP):

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.

### OPEN



### ENCLOSED



This outline drawing is to provide representative configuration details for Model series only.

See respective model data sheet for specific model outline drawing number.



**Do not use for installation design**

## Weight and dimensions

Model	Open					Enclosed				
	A mm	B mm	C mm	Dry wt.* (kg)	Wet wt.* (kg)	A mm	B mm	C mm	Dry wt.* (kg)	Wet wt.* (kg)
<b>C400 D5e</b>	3427	1500	2066	3744	3878	5106	1553	2447	5049	5183
<b>C450 D5e</b>	3427	1500	2066	3987	4121	5106	1553	2447	5292	5426
<b>C500 D5e</b>	3427	1500	2066	3987	4121	5106	1553	2447	5292	5426
<b>C550 D5e</b>	3427	1500	2066	4137	4271	5106	1553	2447	5442	5576
<b>C450 D6e</b>	3427	1500	2066	3987	4121	5106	1553	2447	5292	5426
<b>C500 D6e</b>	3427	1500	2066	4137	4271	5106	1553	2447	5442	5576

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

## Certifications

	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		This generator set is available with CE certification.
<b>Emissions compliance</b>	This generator set conforms to former EU Stage II emission levels (50 Hz) and EPA Tier 2 (60 Hz) emissions regulations.	<b>ISO 8528</b>	This generator set has been designed to comply with ISO 8528 regulation.

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