



# Diesel generator set QSZ13 series engine

400 kVA - 550 kVA 50 Hz  
350 kWe - 500 kWe 60 Hz



## Description

This Cummins® 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** - Standard 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 sound-attenuated enclosures are available.

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

| Model    | Standby rating        |                       | Prime rating          |                       | EU Stage/<br>U.S.EPA | Controller<br>Std/Opt | Data sheet |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|------------|
|          | 50 Hz<br>kVA<br>(kWe) | 60 Hz<br>kWe<br>(kVA) | 50 Hz<br>kVA<br>(kWe) | 60 Hz<br>kWe<br>(kVA) |                      |                       |            |
| C400D5EB | 400 (320)             |                       | 364 (291)             |                       | EU Stage IIIa        | 2.2/3.3               | EMERD-6301 |
| C450D5EB | 450 (360)             |                       | 409 (327)             |                       | EU Stage IIIa        | 2.2/3.3               | EMERD-5934 |
| C500D5   | 500 (400)             |                       | 455 (364)             |                       | EU Stage II          | 2.2/3.3               | EMERD-5935 |
| C550D5   | 550 (440)             |                       | 500 (400)             |                       | UR                   | 2.2/3.3               | EMERD-6530 |
| C350D6E  |                       | 350 (440)             |                       | 320 (400)             | EPA Tier 3           | 2.2/3.3               | EMERD-6302 |
| C400D6E  |                       | 400 (500)             |                       | 364 (455)             | EPA Tier 3           | 2.2/3.3               | EMERD-5936 |
| C440D6   |                       | 440 (550)             |                       | 400 (500)             | EPA Tier 2           | 2.2/3.3               | EMERD-5937 |
| C500D6   |                       | 500 (625)             |                       | 455 (569)             | UR                   | 2.2/3.3               | EMERD-6531 |

## Generator set specifications

|   |   |
|---|---|
| Performance class                         | ISO 8528 Genset models have been tested in accordance with ISO 8528-5. Consult factory for transient performance information. |
| Voltage regulation, no load to full load  | ± 1%  |
| Random voltage variation                  | ± 1%  |
| Frequency regulation                      | Isochronous   |
| Random frequency variation                | ± 0.25%   |
| Electromagnetic Compatibility Performance | Emissions to EN 61000-6-2:2005<br>Immunity to EN 61000-6-4:2007+A1:2011   |

## Engine specifications

|                             |  |
|-----------------------------|--|
| Design                      | 4 cycle, in-line, turbocharged and charge air-cooled |
| Bore                        | 130 mm (5.12 in)                                     |
| Stroke                      | 163 mm (6.42 in)                                     |
| Displacement                | 13 liter (793 in <sup>3</sup> )                      |
| Cylinder block              | Cast iron, 6 cylinder                                |
| Battery capacity            | 100 AH   |
| Battery charging alternator | 80 amps  |
| Starting voltage            | 24 volts, negative ground                            |
| Fuel system                 | XPI  |
| 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 Harmonic Factor (THF)              | < 2%   |

## Available voltages

| 50 Hz Line – Neutral/Line - Line |           | 60 Hz Line – Neutral/Line - Line |           |
|----------------------------------|-----------|----------------------------------|-----------|
| • 120/208*                       | • 220/380 | • 120/208                        | • 220/380 |
| • 127/220                        | • 230/400 | • 127/220                        | • 230/400 |
| • 255/440*                       | • 240/416 | • 139/240*                       | • 240/416 |
|                                  |           | • 277/480                        | • 255/440 |

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

## Generator set options

### Engine

- Heavy duty air cleaner
- Coolant heater 240 v

### Fuel Tank

- Low fuel level warning or shutdown
- High fuel level warning
- Electric fuel transfer pump
- Dual wall fuel tank

### Battery charger

- Set mounted
- Standalone
- 5 A or 10 A

### Alternator

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

### Control panel

- PowerCommand 3.3
- PowerCommand 3.3 MLD
- AC output bargraph
- Shutdown audible alarm
- Earth fault shutdown
- Control cabinet heater

### 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

### Warranty

- 1 years for prime application
- 2 years/1000hours for standby application
- 3 years for major components

### Silencer

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

### Enclosure

- Sound attenuated canopy
- Sound attenuated canopy with 4-point chassis lift

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

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## 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.

**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).

## PowerCommand 3.3 control system (MLD)

The PowerCommand 3.3 has the following additional features and benefits over the PowerCommand 2.2. Refer to document S-1570 for more detailed information on the control.



### Operator panel features

### 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.

- 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 control of the paralleling breaker.

#### Masterless Load Demand (MLD)

- Load dependant start/stop of multi-gen system
- Predictive load input
- Run hour equalization

**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**

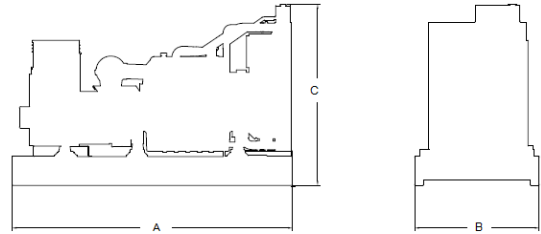
**Emergency Standby Power (ESP):**

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 3046-1, obtained and corrected in accordance with ISO15550.

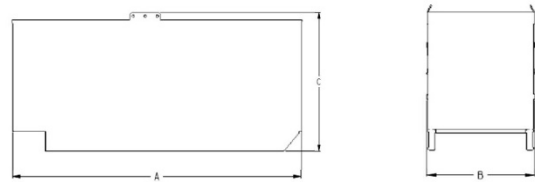
**Prime Power (PRP):**

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 ISO8528, ISO 3046-1 and corrected in accordance with ISO15550.

**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 Dimension**

| Model    | Open       |            |            |             |             | Enclosed   |            |            |             |             |
|----------|------------|------------|------------|-------------|-------------|------------|------------|------------|-------------|-------------|
|          | Dim "A" mm | Dim "B" mm | Dim "C" mm | Dry wt.* kg | Wet wt.* kg | Dim "A" mm | Dim "B" mm | Dim "C" mm | Dry wt.* kg | Wet wt.* kg |
| C400D5EB | 3376       | 1500       | 2191       | 3884        | 3934        | 5095       | 1564       | 2441       | 5020        | 5070        |
|          |            |            |            |             |             | 5095**     | 1564**     | 2330**     | 4813**      | 4863**      |
| C450D5EB | 3376       | 1500       | 2191       | 3884        | 3934        | 5095       | 1564       | 2441       | 5020        | 5070        |
|          |            |            |            |             |             | 5095**     | 1564**     | 2330**     | 4813**      | 4863**      |
| C500D5   | 3376       | 1500       | 2191       | 3879        | 3944        | 5095       | 1564       | 2441       | 5015        | 5080        |
|          |            |            |            |             |             | 5095**     | 1564**     | 2330**     | 4807**      | 4872**      |
| C550D5   | 3376       | 1500       | 2191       | 4120        | 4239        | 5095       | 1564       | 2441       | 5439        | 5558        |
|          |            |            |            |             |             | 5095**     | 1564**     | 2330**     | 5049**      | 5168**      |
| C350D6E  | 3376       | 1500       | 2191       | 3884        | 3934        | 5095       | 1564       | 2441       | 5021        | 5071        |
|          |            |            |            |             |             | 5095**     | 1564**     | 2330**     | 4813**      | 4863**      |
| C400D6E  | 3376       | 1500       | 2191       | 3884        | 3934        | 5095       | 1564       | 2441       | 5021        | 5071        |
|          |            |            |            |             |             | 5095**     | 1564**     | 2330**     | 4813**      | 4863**      |
| C440D6   | 3376       | 1500       | 2191       | 3879        | 3944        | 5095       | 1564       | 2441       | 5015        | 5080        |
|          |            |            |            |             |             | 5095**     | 1564**     | 2330**     | 4807**      | 4872**      |
| C500D6   | 3376       | 1500       | 2191       | 4120        | 4239        | 5095       | 1564       | 2441       | 5439        | 5558        |
|          |            |            |            |             |             | 5095**     | 1564**     | 2330**     | 5049**      | 5168**      |

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

\*\*Note: Weights and dimensions are for 4-point Chassis Lift.

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## Codes and standards

|                  |   |                             |   |
|------------------|---|-----------------------------|---|
| ISO9001          | This product was manufactured in a plant whose quality management system is registered as being in conformity with ISO 9001.                          | <b>EU Stage<br/>U.S.EPA</b> | This generator set conforms to former EU Stage IIIa emission levels (50 Hz) and EPA Tier 3 (60 Hz) emissions regulations. |
| <b>CE</b>        | The CE marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.   | <b>ISO 8528</b>             | This generator set has been designed to comply with ISO 8528 standards.   |
| <b>UK<br/>CA</b> | The UKCA marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request. | <b>AS 3000</b>              | This generator set has been designed to be compatible with AS/NZS 3000 Standard   |

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