Specification sheet

Diesel generator set QSZ13 series engine

409 kVA - 500 kVA 50 Hz
364 kW - 440 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 and service - Backed by a comprehensive warranty and worldwide distributor network.

	Standby rating		Prime rating		Emissions compliance		
Model	**50 Hz kVA (kW)**	**60 Hz kW (kVA)**	**50 Hz kVA (kW)**	**60 Hz kW (kVA)**	**EU Stage/EPA Tier**	**Controller Std/Opt**	**Data sheet**
C450 D5eB	450 (360)		409 (327)		EU Stage IIIa	2.2/3.3	EMERD-5934
C500 D5	500 (400)		455 (364)		EU Stage II	2.2/3.3	EMERD-5935
C400 D6e		400 (500)		364 (455)	EPA Tier 3	2.2/3.3	EMERD-5936
C440 D6		440 (550)		400 (500)	EPA Tier 2	2.2/3.3	EMERD-5937

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 +A1:2001

Engine specifications

Design	4 cycle, in-line, turbo-charged and charge air cooled
Bore	130 mm (5.12 in)
Stroke	163 mm (6.42 in)
Displacement	13 liter (793 in^3)
Cylinder block	Cast iron, 6 cylinder
Battery capacity	100 AH
Battery charging alternator	80 amps
Starting voltage	24 volt, 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 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

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

Warranty
- ☐ 2 years for prime application
- ☐ 5 years for standby application
- ☐ 10 years for major components

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.

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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.
- 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 (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

- 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.

Masterless Load Demand (MLD)

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

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.

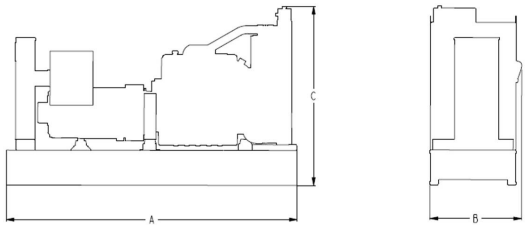
Prime power (PRP):

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



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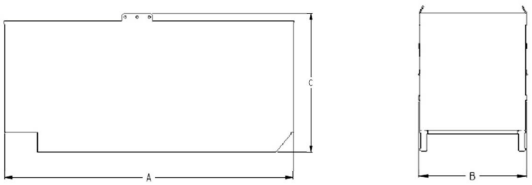

This outline drawing is to provide representative configuration details for Model series only.

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

Do not use for installation design

	Open					Enclosed				
Model	**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**
C450 D5eB	3686	1160	2266	3988	4053	5093	1564	2446	5177	5281
C500 D5	3686	1160	2266	3988	4053	5093	1564	2446	5177	5281
C400 D6e	3686	1160	2266	3988	4053	5093	1564	2446	5177	5281
C440 D6	3686	1160	2266	3988	4053	5093	1564	2446	5177	5281

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

Codes and standards

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

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