

Q RANGE DIESEL GENERATOR SET C400D5Q

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 applications.

STANDARD FEATURES

Cummins engine – Rugged 4 cycle industrial diesel delivers reliable power, and fast response to load changes.

Alternator - Stamford S series self-excited alternator. Optional Permanent Magnet Alternator is also available.

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

Control system - The PowerCommand® control, microprocessor-based generator set monitoring and control system.

Open and enclosed genset versions available.



Warranty - Backed by a comprehensive warranty and wide distributor and dealer network.

Coolant heater - The engine is fitted as standard with a 230V coolant heater to ensure that the engine starts during low ambient temperatures by circulating warmed coolant through the engine.

Enhanced battery system - Including a flooded/SLI technology battery, charger and disconnecter.

GENERAL DATA

GENSET	C400D5Q diesel generator set						
ENGINE	QSG12-G3						
CONTROLLER	PC2.2						
	Model	Phases	Voltage (V)	Frequency (Hz)	ESP Power (kVA/kW)	PRP Power (kVA/kW)	Current ESP (A)
ALTERNATOR	S4L1D-F41	3	400/230	50	400 / 320	360 / 288	577

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FUEL CONSUMPTION

	STANDBY (kVA/kW)				PRIME (kVA/kW)			
RATINGS	400 / 320				360 / 288			
LOAD	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full
l/h	21.5	40.3	59.2	81.7	19.9	36.8	53.8	71.7

SPECIFICATIONS

GENERATOR SET SPECIFICATIONS

Governor type	Electric (ECM)
Performance class	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 EN61000-6-3: 2007 + A1: 2011 Immunity to EN61000-6-2: 2005
Coolant Heater	230VAC, 2250W
Fuel tank capacity	995 l
Autonomy @ 75%PRP (usable)	18h
Guaranteed sound power level - Lw(A) (Enclosed)	98 dB(A)
Sound pressure level - Lp(A) (Enclosed): @1m @7m	81 dB(A)* 71 dB(A)*

*Estimated

ENGINE SPECIFICATIONS

	Standby Rating	Prime Rating
Engine manufacturer	Cummins	
Engine model	QSG12-G3	
Design	4 cycle, in-line, turbocharged after-cooled	
Displacement, l	12	
Rated speed, rpm	1500	
Lube oil capacity, l (Total system with combo filters)	34.1	
Gross engine power output, kWm	369	332
Bore, mm	132	
Stroke, mm	144	
Cylinder block	Cast iron, 6 cylinder	
Battery charging alternator, A	110	
Starting voltage, VDC	24, 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	50 °C ambient radiator	

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ALTERNATOR SPECIFICATIONS

Alternator manufacturer	Stamford
Alternator model	S4L1D-F41
Voltage, VAC	400/230
Design	Brushless, single bearing, revolving field
Stator	2/3 pitch
Insulation system	Class H
Standard temperature rise	Standby 50 Hz – 163 °C/27 °C ambient
Exciter type	Self-excited
Winding	311
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan

BATTERY SYSTEM

Design	Lead acid, flooded/SLI technology battery
Number of batteries	2
Battery Voltage, VDC	2x12
Battery Capacity, Ah	2x140
Battery Charger	Standard. 12/24VDC, 4A
Battery Disconnecter	Standard

INTAKE AIR SYSTEM*

	Standby Rating
Combustion Air, m3/min	22.6
Maximum air cleaner restriction, kPa	6.2

*Engine based data

EXHAUST SYSTEM*

	Standby Rating
Exhaust gas flow at rated load, m3/min	54.5
Exhaust gas temperature, °C	507
Maximum exhaust back pressure, kPa	10.2

*Engine based data

COOLING SYSTEM

Ambient design, °C (open genset)	50
Ambient design, °C (enclosed genset)	40
Fan load, kWm	14
Coolant capacity (with radiator), l	48
Cooling system air flow, m ³ /sec @ 12.7 mm H ₂ O (open genset)	7.1

FUEL FLOW

Maximum fuel flow, L/h	182
Maximum fuel inlet restriction, mm Hg (clean filter)	152
Maximum fuel inlet temperature, °C	71

TRANSPORTATION, STORAGE & HANDLING

Lifting configuration*	Single lifting point - Enclosed
Forklift lifting	Enclosed and Open versions

*See outline drawing for details

GENERATOR SET OPTIONS

- Alternator - Permanent Magnet Generator (PMG)
- Language literature
- Maintenance kit
- Optional warranty

Note: other options upon request, please contact your Sales Representative for availability and/or for any additional customization request.

WARRANTY

All components and subsystems are covered by an express limited warranty, please consult details in Global Commercial Warranty Statement depending on your application. Other optional and extended factory warranties and local distributor maintenance agreements are available.

CONTROL SYSTEM

PowerCommand 2.2 – 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.

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 PCC Net 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.
- English and symbology-based 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).

Service adjustments – The HMI includes provisions for adjustment of generator set control functions.

Adjustments are protected by a password. Functions include:

- Engine speed governor adjustments.
- Voltage regulation adjustments.
- Cycle cranking.
- Configurable fault set up.
- Configurable output set up.
- Meter calibration.
- Units of measurement

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 (over crank) shutdown.
- Fail to crank shutdown.
- Cranking lockout.
- Sensor failure indication.
- Low fuel level warning or shutdown (user configurable).
- Fuel-in-rupture-basin warning or shutdown (user own installation).

- 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.

FIELD CONTROL INTERFACE

Input signals to the base control include:

- Remote start.
- Local and emergency stop.
- Configurable inputs: Control includes (4) input signals from customer.

Output signals from the PowerCommand control include:

- Configurable relay outputs: Control includes (2) relay output contacts rated at 2 A.

Configuration & Network

- Advanced service ability using Inpower™ a PC based Software service tool.
- Modbus interface for interconnecting to customer PLC/BMS
- Configurable Inputs and Outputs
- Configurable alarm inputs to cause a shutdown or warning response.

Warranty & Compliance

- Environmental protection: The Control is designed for reliable operation in harsh environment.
- Warranty and service backed by a comprehensive warranty and worldwide distributor service network.

Note: Please, refer to PC2.2 product literature for additional Information on Control System.



PowerCommand 2.2 control operator/Display panel

RATINGS DEFINITIONS

Emergency Standby Power (ESP):

Applicable for supplying power continuously to varying electrical loads for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528-1 and ISO 3046-1, obtained and corrected in accordance with ISO 15550

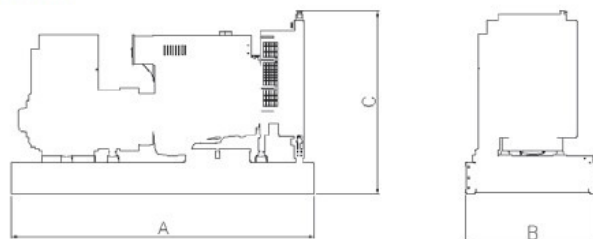
Limited-Time Running Power (LTP):

Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528-1.

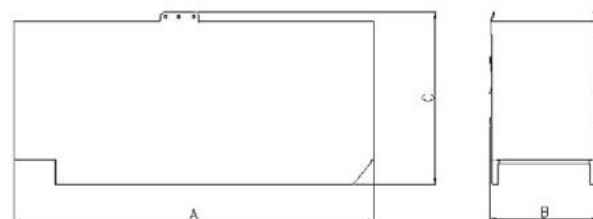
Prime Power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528-1. Ten percent overload capability is available in accordance ISO 3046-1, obtained and corrected in accordance with ISO 15550.

OPEN



ENCLOSED



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

Do not use for installation design

DIMENSIONS

MODEL	OPEN					ENCLOSED				
	Length "A" mm	Width "B" mm	Height "C" mm	Dry wt.* kg	Wet wt.* kg	Length "A" mm	Width "B" mm	Height "C" mm	Dry wt.* kg	Wet wt.* kg
C400D5Q	4015	1400	2115	3091	3136	4015	1400	2495	3655	3795

* Note: Weights represent a set with standard features. Wet weights do not include fuel.

REFERENCE DOCUMENTS

Additional documents are available for consult In Power Suite™ (powersuite.cummins.com) for detailed technical information.

CODES AND STANDARDS

ISO 9001 ISO 14001	This product was manufactured in a facility whose quality management system is certified to ISO 9001 and its Health Safety Environmental Management Systems certified to ISO 14001.	CE	This generator set is available as CE marked.
		UK CA	This generator set is available as UKCA marked.
2000/14/EC	All enclosed products are designed to meet EU Noise Directive 2000/14/EC.	ISO 8528	This generator set has been designed to comply with ISO 8528 standards.
2014/30/EU 2006/42/EC 2011/65/EU 2014/35/EU	All products are designed to meet or exceed EU legislation on Electromagnetic Compatibility (EMC), Machinery Safety, Restriction of the use of certain hazardous substances (RoHS) and Electrical Equipment for use within certain voltage limits.		

For more information, please contact your local Cummins distributor or visit cummins.com

Our energy working for you™.