



# Diesel Generator set X2.5 series engine

11.8 – 25.0 kVA 50 Hz  
10.9 – 18.1 kW 60 Hz



## Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Prime Power applications in remote locations.

## Features

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

**Alternator** - Excellent motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads.

**Control system** - The PowerStart® 0500 electronic control is standard and the PowerCommand® 1.1 is optional. They provide total generator set system integration, including automatic remote start/stop, alarm and status message display.

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

**Enclosure** - Weather-protective and sound-attenuated enclosure.

**Remote operations** - Optional high capacity 1000 L fuel tank, robust structural strength, and pilferage protected lockable enclosure.

**Extended service interval** - Optional 1000 hour fuel filter, lube oil and air filter change intervals.

**Lifting capability**- Single point lifting arrangement for ease of transportation. Additional fork-lift pockets also provided.

**Integrated ATS** - Optional automatic transfer switch and manual by-pass switch integrated inside the generator set enclosure.

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

Model	3-Phase ratings		1-Phase ratings* *1.0 PF	
	Prime rating		Prime rating	
	50 Hz kVA (kW)	60 Hz kVA (kW)	50 Hz kVA (kW)	60 Hz kVA (kW)
C17D5T	15.0 (12.0)	-	11.8 (11.8)	-
C22D5T	20.0 (16.0)	-	15.5 (15.5)	-
C28D5T	25.0 (20.0)	-	20.0 (20.0)	-
C12D6T	-	13.6 (10.9)	-	10.9 (10.9)
C16D6T	-	18.0 (15.0)	-	14.5 (14.5)
C20D6T	-	22.0 (18.0)	-	18.1 (18.1)

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G2
Voltage regulation, no load to full load	± 1%
Random voltage variation	± 1%
Frequency regulation	Droop
Random frequency variation	± 0.75%
EMC compatibility	Radiated emissions to EN 61000-6-4, Conducted immunity to EN 61000-6-2

## Engine specifications

Bore	91.4 mm (3.6 in.)
Stroke	127 mm (5.0 in.)
Displacement	2.5 litres (153 in <sup>3</sup> )
Configuration	Cast iron, in-line 3 cylinder
Battery capacity	650 amps minimum at ambient temperature of -18 °C (0 °F)
Battery charging alternator	36 amps
Starting voltage	12 volts, negative ground
Fuel system	Direct injection
Fuel filter	Spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow filter
Standard cooling system	50 °C (122 °F) ambient radiator with coolant recovery system

## Alternator specifications

Design	Brushless, 4 pole
Stator	2/3 pitch
Rotor	Single bearing, flexible disc
Insulation system	Class H
Standard temperature rise	125 °C
Exciter type	Self-excited
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion (THDV)	< 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
240/416 - 3 phase	220/380, 230/400, 240/416 – 3 Phase
240 - 1 Phase	230 – 1 Phase

Note: Consult factory for other voltages.

## Generator set options and accessories

### Control

- PowerStart 0500 control
- PowerCommand 1.1 control
- 2 or 4 pole main circuit breaker
- Auxiliary configurable signal inputs (8) and configurable relay outputs (8)
- Low fuel level warning or shutdown
- External emergency stop switch

### Enclosure

- Sound level 1
- Sound level 2

### Fuel tanks

- 150 litre
- 1000 litre

### Service interval

- Extended service change interval

### Warranty

- 20 months / 4000 hours / unlimited hours within the first 12 months

### Other

- Integrated automatic transfer switch
- Set-mounted battery
- Battery charger – 6 amp
- Language literature options

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

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## PowerStart 0500 Control system



The PowerStart 500 control is microprocessor based generator set monitoring and control system. The control provides a simple operator interface to the generator set, manual and remote start/stop control and shutdown fault indication. The integration of all control functions into a single control provides enhanced reliability and performance compared to conventional generator set control systems. This control has been designed and tested to meet the harsh environment in which gensets are typically applied.

### Base control functions

**LCD display** – 16 character x 2 line alphanumeric LED backlight LCD.

**Operation interface** – Six tactile-feel membrane switches for LCD navigation, genset operation and control setup. These switches are indicated by internationally accepted symbols and English text.

**Data logs** – Includes engine run time and controller on time.

**Fault history** – Provides a record of the most recent fault conditions with control hour's time stamp. Up to 5 events are stored in the control non-volatile memory.

### Alternator data

- Voltage (single or three phase line-to-line and line-to-neutral)
- Current (single or three phase)
- KVA (three phase and total)
- Frequency

### Engine data

- Starting battery voltage
- Engine running hours
- Engine temperature
- Engine oil pressure

**Service adjustments** – The control includes provisions for adjustment and calibration of generator set control functions. Functions include:

- Voltage selection
- Frequency selection
- Configurable input set up
- Configurable output set up
- Meter calibration
- Units of measurement

### Protective functions

On operation of a protective function the control will indicate a fault by illuminating the appropriate status LED, as well as display the fault code and fault description on the LCD. The nature of the fault and time of occurrence are logged in the control. The service manual and InPower Service Tool provide service keys and procedures based on the service codes provided.

### 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 control include

- Configurable output: Control includes (1) solid state driver rated at 1 amp. This output can be configured to activate on ready to load, or common warning and common shutdown condition.

#### Communications connections include

- PC tool interface: This RS-485 communication port allows the control to communicate with a personal computer running InPower software.

Note – An RS-232 or USB to RS-485 converter is required for communication between PC and control.

## Optional PowerCommand® 1.1 Control system



The PowerCommand® 1.1 control is an integrated generator set control system providing voltage regulation, engine protection, and operator interface. Major features include:

- Integrated digital electronic voltage regulation
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating generator set running, not in auto, common warning, common, shutdown, manual run mode and remote start

## Automatic transfer switch

### Description

This optional automatic transfer switch (ATS) is integrated into the generator set for transferring loads between a utility and a generator set, or between two generators.

The ATS PowerCommand® microprocessor control monitors utility and emergency standby generator power. When utility power fails or is unsatisfactory, the control starts the generator and then transfers the load from the utility, to the generator. Once stable utility power returns, the switch automatically transfers the load back to the utility.



### Transfer switch features

**Advanced transfer switch mechanism** - True transfer switch mechanism with break-before-make action that prevents objectionable ground currents, and nuisance ground fault tripping, that can result from overlapping neutral designs.

**Positive interlocking** - Mechanical interlocking prevents source-to-source connection through the power contacts and prevents simultaneous closing of normal and emergency contacts.

**PowerCommand® control**- The fully integrated controller is designed for practical functionality with LED indicators and digital display push-buttons. This allows for setup, as well as accuracy of software-enabled features, settings, and adjustments.

**Main contacts** – Heavy-duty silver alloy contacts withstand thousands of switching cycles without burning, pitting, or welding. They require no routine contact maintenance and provide 100% continuous current ratings.

**Easy service/access** - Door-mounted controls, ample access space, and compatible terminal markings allow for easy access. User-friendly controller is easily configurable in the field.

**Manual operation** - Standard handle can be used to manually operate the switch after the power source has been properly disconnected.

### Specifications

<b>Arc interruption</b>	Multiple leaf arc chutes cool and quench the arcs. Barriers prevent interphase flashover.
<b>Amperage rating</b>	Transfer switches rated for 63 and 125 continuous amperes.
<b>Voltage rating</b>	Transfer switches up to 480 VAC, 50 Hz or 60 Hz
<b>Altitude</b>	Up to 2,000 m (6,561 ft) without derating
<b>Total transfer time (source-to-source)</b>	Will not exceed 100 m/sec with normal voltage applied to the actuator and without programmed transition enabled.
<b>Manual operation handles</b>	Transfer switches are equipped with a removable operating handle which allows operation during servicing in order to facilitate troubleshooting with sources of power disconnected

## Transfer switch control functions

**Under-voltage sensing:** All phases on the normal source, and single phase on generator source.

**Normal source pickup:** adjustable 80-95%

**Dropout:** adjustable 70-90% of nominal voltage

**Generator source pickup:** 90%

**Dropout:** 75% of nominal voltage

**Over-voltage sensing:** All phases on the normal source

**Source pickup:** 120%

**Dropout:** 125%

**Under-frequency sensing:** Default setting is OFF

**Generator source pickup:** 90% of nominal frequency

**Dropout:** 85% of nominal frequency

**Normal source pickup:** 80%

**Dropout:** 70%

**Over-frequency sensing:** Default setting is OFF

**Normal source pickup:** 130%

**Dropout:** 140%

**Engine start time-delay:** Prevents nuisance generator set starts due to momentary power variation or loss.

**Transfer normal to emergency time-delay:** Allows generator set to stabilize before application of load. Prevents power interruption if normal source variation or loss is momentary. Allows staggered transfer of loads in multiple transfer switch systems. For genset-to-genset applications, delays transfer of load from lead to secondary generator.

**Re-transfer emergency to normal time-delay:** Allows the utility to stabilize before re-transfer of load. Prevents needless power interruption if return of normal source is momentary. Allows staggered transfer of loads in multiple transfer switch systems. For genset-to-genset applications, delays re-transfer of load from secondary back to lead generator.

## Transfer switch electrical performance

The transfer switches listed below must be protected by either circuit breakers or fuses. The following withstand current ratings (WCR) are available when protecting the transfer switch with a circuit breaker or fuse.

### Fuse protection

Transfer switch ampere	Overload current (make-break test)	Endurance cycles at current (operational performance capability)	WCR at 480 V max with current limiting fuse	Max fuse, size and type
63	95 amps	6,000 at 63 amps	26,000 amps	RT16NT-00 63 amp IEC NH Fuse type
125	188 amps	6,000 at 125 amps	26,000 amps	RT16NT-00 125 amp IEC NH Fuse type

### Circuit breaker protection

Transfer switch ampere	Max breaker rating	Specified Circuit breaker protection Manufacturer, model and type
63	63 amps	Schneider: NSX160FTM, EZD100, NSD100F, NSD100K Siemens: 3VU, 3RV1, 3VT1 ABB: Isomax S1, S2X80, Si m100
125	125 amps	Schneider: NSX160FTM, NSD160K Siemens: 3VL, 3VT1 ABB: Isomax S2, Isomax S3, S3X, Sim250



All switches meet IEC 60947-6-1

## 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) :

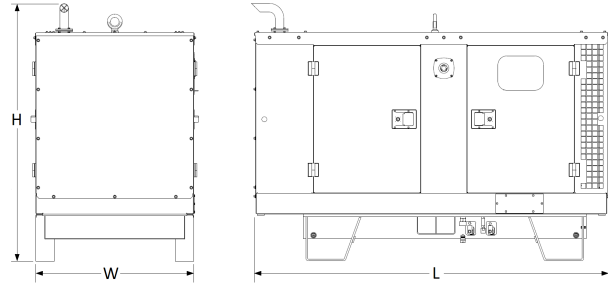
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### 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.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number. Do not use for installation design.

## Typical enclosed generator set dimensions

Model	Length "L" mm	Width "W" mm	Height "H" mm	Weight* dry kg	Weight* wet kg
C17D5T	2082	987	1511	1093	1109
C22D5T	2082	987	1511	1109	1125
C28D5T	2082	987	1511	1123	1140
C12D6T	2082	987	1511	1093	1109
C16D6T	2082	987	1511	1109	1125
C20D6T	2082	987	1511	1123	1142

\*Weights represent a set with standard features. Does not include fuel. 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>This generator set is available with CE certification.</p>
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**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.

For more information contact your local Cummins distributor or visit [power.cummins.com](http://power.cummins.com)

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