

Diesel Generator set X2.5 series engine

15.4 - 25.0 kVA @50 Hz, 3Ø

11.8 - 20.0 kVA @50 Hz, 1Ø

11.2 - 18.4 kW @60 Hz, 3Ø

11.0 - 18.0 kW @60 Hz, 1Ø



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 0600 is standard offering which provides total generator set system integration, including automatic remote start/stop, alarm and status message display. The PowerCommand® 1.1 is an optional control system offering

Fuel System - Advanced governing system for optimum fuel consumption

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 with an option of **Door Alarm** protection

Remote operations - Standard 150 L and Optional high capacity 1000 L fuel tank (Single wall or Dual wall), 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

Surge protection - Optional offering of lightning & surge protection for adverse calamities for 3 Phase applications with ATS

Fuel Level Sensor - Optional real-time fuel level monitoring with 1000 L fuel tank only

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

Model	3-phase ratings				1-phase ratings* *1.0 PF			
	Standby rating		Prime rating		Standby rating		Prime rating	
	50 Hz kVA (kW)	60 Hz kW (kVA)	50 Hz kVA (kW)	60 Hz kW (kVA)	50 Hz kVA (kW)	60 Hz kW (kVA)	50 Hz kVA (kW)	60 Hz kW (kVA)
C17D5T	16.9 (13.5)		15.4 (12.3)		13.0 (13.0)		11.8 (11.8)	
C22D5T	22.0 (17.6)		20.0 (16.0)		17.1 (17.1)		15.5 (15.5)	
C28D5T	27.5 (22.0)		25.0 (20.0)		22.0 (22.0)		20.0 (20.0)	
C12D6T		12.3 (15.4)		11.2 (14.0)		12.1 (12.1)		11.0 (11.0)
C16D6T		15.8 (19.8)		14.4 (18.0)		15.8 (15.8)		14.4 (14.4)
C20D6T		20.2 (25.3)		18.4 (23.0)		19.8 (19.8)		18.0 (18.0)

Note: Consult factory for other details

Generator set specifications

Governor regulation class	ISO 8528 Part 5 Class G2
Voltage regulation, no load to full load	± 0% Droop
Random voltage variation	± 0.70% @1500 rpm - 50 Hz ± 0.67% @1800 rpm - 60 Hz
Frequency regulation	± 2.5% Droop
Random frequency variation	± 0.46% @1500 rpm- 50 Hz ± 0.38% @1800 rpm - 60 Hz
EMC compatibility	EN 61000-6-2 & EN 61000-6-3

Engine specifications

Bore	91.4 mm (3.6 in.)
Stroke	127 mm (5.0 in.)
Displacement	2.5 litres (153 in ³)
Cylinder block	Alloy cast iron, in-line 3, cylinder
Battery capacity	65 AH
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, coupling disc
Insulation system	Class H
Standard temperature rise	125 °C for 3 Phase and 105 °C for 1 Phase
Alternator IP	IP23
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)	No load < 2% non-distorting balanced linear load < 5.0%
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 2% (for 50 Hz)

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

Control System

- Controller- PowerStart 0600 **OR** PowerCommand 1.1
- Integrated automatic transfer switch

Heaters (Optional)

- Engine Coolant heater – 240 V

Fuel Tanks and Accessories

- Single wall 150 litre **OR** Single wall 1000 litre **OR** Dual wall 1000 litre
- **Fuel level alarms-**
 - Warning **OR** Shutdown for 1000 litre tank (with PowerStart 0600)
 - Shutdown for 1000 litre tank (with PowerCommand1.1)
- **Fuel level sensors**
 - Pressure based fuel level sensors for 1000 litre tank (Optional):
Sensor 4-20mA **OR** Sensor 0-10 VDC **OR** Sensor RS485

Genset Housing

- Sound level 1 (74 dBA) **OR** Sound level 2 (70 dBA)

Battery Charger (Optional)

- Advanced static battery charger – set mounted
AC Input – 110-240 V, Output – 12 V, 6 amp

Miscellaneous Options (Optional)

- Surge Protection Device for 3-Phase
- Aux 101 - Auxiliary configurable signal inputs (8) and configurable relay outputs (8) for PowerCommand 1.1 only
- Extended service interval (1000 hours)

Warranty and Literature

- 20 months / 4000 hours / unlimited hours within the first 12 months Prime **OR** 24 months / 4000 hours Prime **OR** 12 months / 1500 hours Prime
- Literature language options: English **OR** French **OR** German **OR** Spanish **OR** Portuguese **OR** Dutch **OR** Italian **OR** Finnish **OR** Danish **OR** Russian **OR** Greek **OR** Norwegian **OR** Chinese

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

Genset controller PS 0600

Description

The PowerStart control is a 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 and AMF (Auto Mains Failure) Functionality. 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. The PowerStart generator set control is suitable for use on a wide range of generator sets in non-paralleling applications. It is suitable for use with reconnectable or non-reconnectable generators, can be configured for either 50 Hz or 60 Hz and voltage and power connection from 190-600 VAC line-to-line. This control includes an intuitive operator interface that allows Genset start/stop for complete genset control as well as system metering, fault annunciation, configuration and diagnostics. The interface includes seven generator set status LED lamps with both internationally accepted symbols and English text to comply with customer needs.

The interface also includes an LED backlit LCD display with tactile-feel soft-switches for easy operation and screen navigation. The manual/auto/stop switch function is integrated into overlay of the controller. All data on the control can be viewed by scrolling through Screens with the navigation keys. Screen can be viewed either by scrolling or non-scrolling mode. Forward navigation and backward navigation is also provided. The control displays the current active fault, fault occurrences and time-ordered history of the five previous faults with respect to Real Time Clock Stamp, Engine Running Time. Power for this control is derived from the generator set Starting batteries and functions over a voltage from 8VDC to 32VDC.

Features

- Integrated 128x64 Pixel monochrome graphic LCD Display
- 12 and 24V battery operation
- Genset monitoring-monitor status of all critical engine and alternator functions
- Digital genset metering (AC and DC)
- Genset battery monitoring system to warn against a weak battery connection
- Configurable for single phase or three phase or split phase AC metering
- Engine starting includes solid state output to operate external relay to start the engine, fuel shutoff (FSO) and glow Plug
- Genset Protection: protects engine and alternator
- Real time clock for fault and event stamping
- Fuel level measurement using 4-20mA input sensor

- Exerciser clock and time of delay start/stop initiate a test without load
- Maintenance due alarm based on engine running time and real time clock
- Auto Main Failure (AMF) Provides load transfer operation in open transition mode
- AMF Test with or without load options
- Utility Voltage monitoring and protection

- Remote start capability in Auto mode
- Advanced serviceability using Inpower™ a PC based Software service tool
- Modbus interface for interconnecting to customer PLC/BMS
- Configurable Inputs and Outputs
- Environmental protection: The Control is designed for reliable operation in harsh environment

Control functions

LCD capability

LED indicating lamps

- For Genset Running, Remote Start, AMF Test Active, Genset Shutdown, Warning, Load connected to Genset, Load connected to Utility, Manual Mode, Stop Mode and Auto Mode.

LCD display

- 128 x 64 Pixel Monochrome Graphics display

Operation Interface

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

Operator adjustments

- The LCD includes provisions for necessary set up and adjustment functions.
- Data Log includes engine run time and controller on time Fault History.
- Provides a record of the most recent fault Condition with Engine run time stamp, RTC stamp and occurrences
- Up to 5 events are stored in the control non-volatile memory.

AMF Functionality

- When Auto Mains Failure is enabled, and controller is in Auto Mode and if utility goes off then control starts the Genset automatically and transfers load onto Genset. If Utility returns and is healthy then load again gets retransferred onto Utility. AMF provides load transfer operation in Open Transition transfer mode.

Fuel Level Feature

- The Control will show the warning fault when the fuel level in the tank goes below the predefined threshold. Control includes time delays to prevent nuisance warning signals.

Exercise Scheduler

- It is used only when genset is in Auto mode. It is used to start a Scheduler schedule at No Load condition. A trim Exercise Scheduler Enable is available to enable or disable the feature.

Maintenance

- Maintenance due alarm based on Engine Running Time or Real time clock

Control data

- Access to the control software part number and software version are provided from the LCD or InPower™.

Alternator data

- Voltage (single or three phase line-to-line and line-to-neutral)
- Current (single or three phase)
- kVA, kVAR, kW, Power Factor (Three phase and total)
- Frequency
- Totalized positive and negative kWh, kVARh, kVAh

Utility AC data

- Voltage (three/single phase LL and LN) -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
 - Genset and Utility AC Meter Calibration

Engine control

- CT ratio, and Genset ratings setup
- Start/Stop time delay setup
- Real time clock setup with daylight saving
- AMF Setup with test mode and transfer/retransfer time delays
- Modbus baud rate, parity setup
- Exercise scheduler repeat interval, Day, time and duration setup
- Maintenance due setup
- LCD brightness and contrast control

Battery operation

- Control will operate on 12V/24V batteries

Auto start mode

- Accepts a ground signal from remote devices to automatically start the generator set. The remote start signal will also wake up the control from sleep

mode. The control can incorporate a time delay start and stop.

Emergency stop

- The control annunciates when an emergency stop signal is received and the generator set immediately shuts down. The generator set is prevented from running or cranking with the switch engaged E-stop switch.

Sleep mode

- The control includes a configurable low current draw state to minimize starting battery current draw when the genset is not operating

Engine starting

- The control supports automatic engine starting. Primary and backup start disconnects are achieved by battery charging alternator feedback or main alternator output frequency. The control also supports configurable glow plug control when applicable.

Cycle cranking

- Configurable for the number of starting cycles (1 to 7) and duration of crank and rest periods. Control includes starter protection algorithms to prevent the operator from specifying a starting sequence that might be damaging.

Time delay start and stop (cooldown)

- Configurable for time delay of 0-300 seconds prior to starting after receiving a remote start signal and

for time delay of 0-600 seconds prior to shut down after signal to stop in normal operation modes. Default for both time delay periods is 0 seconds.

Auto Mains Failure functions

- AMF primarily means that the genset controller is controlling both the genset breaker and a utility breaker in a transfer pair arrangement.
- AMF is only for use in a single genset / single utility arrangement. AMF's primary job is to keep loads powered. AMF completely manages the system by automatically starting the genset and transferring load when it detects utility failure. AMF has numerous built-in configurable sensors to determine the availability of the utility and genset sources. Sensors include under voltage, overvoltage, over/under frequency and breaker failure. PS0600 control supports only open transition (Break before Make) AMF functionality.

AMF Test mode

- AMF supports test mode with or without load options along with test mode duration.

Load Transfer Switch Type

- AMF breaker outputs can be continuous (contact pair) or pulsed (GTEC) type based on load transfer switch selection.

Transfer switch control functions

Under-voltage sensing	: All phases on the normal as well as on generator source.
Normal source pickup	: Adjustable 85-100%
Dropout	: Adjustable 75-98% of nominal voltage
Over-voltage sensing	: All phases on the normal source
Source pickup	: Adjustable 105-135%
Dropout	: Adjustable 105-135%
Under frequency dropout	: Adjustable 70% to 85%
Under frequency pickup	: Adjustable 85% to 100%
Over frequency Dropout	: Adjustable 105%-115%

Timers

- Control provides transfer time delays including Time delay engine start (0-3600 sec), time delay normal to emergency (0-300 sec) and programmed transition delay (0-600 sec)
- Control provides retransfer time delays including time delay emergency to normal (0-1800 sec) and programmed transition delay (0-600 sec), time delay engine cooldown (0-3600 sec)

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 In Power™ Service Tool provide service keys and procedures based on the service codes provided. In Power is used to configure settings.

Configurable alarm input

- The control accepts maximum three alarm inputs (contact closed to ground) to cause a shutdown or warning response from the control.

Emergency stop

- Annunciated whenever an emergency stop signal is received from external switch.

Engine protection

- Low lube oil pressure warning/shutdown - Level is preset to match the capabilities of the engine used. Control includes time delays to prevent nuisance shutdown signals.
- High coolant temperature warning/shutdown - Level is preset to match the capabilities of the engine used. Control includes time delays to prevent nuisance shutdown signals.
- Low coolant temperature warning - Indicates that engine temperature may not be high enough for 1 min. and start or proper load acceptance.
- Sensor failure indication - Logic is provided on the base control to detect analog sensor or interconnecting wiring failures.

General engine protection:

Low Fuel Level Warning - Indicates that engine fuel level reached the Low Fuel Level Warning Threshold (30% by default).

Charging Alternator Failure Warning - Indicates that engine charging alternator voltage reached the low/high charging alternator threshold when charging alternator enable trim is enabled.

- **Low and high battery voltage warning** - Indicates status of battery charging system (failure) by continuously monitoring battery voltage.
- **Weak battery warning** - The control will test the battery each time the generator set is signaled to start and indicate a warning if the battery indicates impending failure.
- **Cranking lockout** - The control will not allow the starter to attempt to engage or to crank the engine when the engine is running.
- **Fail to start shutdown** - The control will indicate a fault if the generator set fails to start by the completion of the engine crank sequence.

Alternator protection

Battleshort Mode

- When enabled and Battleshort switch is active, the control will allow non-critical shutdown faults to be bypassed. If a bypass shutdown fault occurs, the fault code and description will still be annunciated, but the genset will not shutdown. This will be followed by a fail to shutdown fault. Emergency stop critical shutdown faults are not bypassed. Please refer to control service and operator manual for list of critical faults.

Environment

The control is designed for proper operation without recalibration in ambient temperatures from -15 °C (5 °F) to +70° C (158 °F), and for storage from -20 °C (-4 °F) to +80 °C (176 °F). Control will operate with humidity up to 95%, non-condensing.

The control board is conformal coated to provide resistance to dust and moisture. The single membrane surface, which is impervious to effects of dust, moisture, oil and exhaust fumes. This panel uses a sealed membrane to provide long reliable service life in harsh environments.

High AC voltage shutdown (59)

- Output voltage on any phase exceeds preset values. Values adjustable from 105-125% of nominal voltage, with time delay adjustable from 1-10 seconds. Default value is 110% for 5 seconds.

Low AC voltage shutdown (27)

- Voltage on any phase has dropped below a preset value. Adjustable over range of 50-95% of voltage, time delay 2-20 seconds. Default value is 90% for 5 seconds.

Under frequency shutdown (81 u)

- Generator set output frequency cannot be maintained. Settings are adjustable from 2-10 Hz below nominal governor set point, for a 500-2000 half cycles delay. Default: 5 Hz, 1000 half cycles.

Over frequency shutdown/warning (81 o)

- Generator set is operating at a potentially damaging frequency level. Settings are adjustable from 2-10 Hz above nominal governor set point for 100-2000 half cycles delay. Default: 5 Hz, 1000 half cycles.

Loss of sensing voltage shutdown

- Shutdown of generator set will occur on loss of voltage sensing inputs to the control.

Current Imbalance Warning Fault

- Issues warning when current imbalance is observed per phase when genset is in running state.

High Current warning/shutdown (51)

- Implementation of the thermal damage curve with instantaneous trip level calculated based on current transformer ratio and application power rating.

Auto Mains Failure Protections:

- Breaker/ATS Switch fail to close warning - when the control signals an ATS switch to close, it will monitor the ATS switch feedback contacts and verifies that switch is closed. If the control does not sense ATS switch closure within an adjustable time period of the close signal, the fail to close warning will be initiated.
- Breaker/ATS Switch fail to open warning - when the control signals an ATS switch to open, it will monitor the ATS switch feedback contacts and verifies that switch is opened. If the control does not sense ATS switch opened within an adjustable time period after the open signal, the fail to open warning will be initiated.

The control is specifically designed and tested for resistance to RFI/EMI and to resist effects of vibration to provide a long reliable life when mounted on a generator set. The control includes transient voltage surge suppression to provide compliance to referenced standards.

Field control interface

Input signals to the control include:

- Remote start
- Emergency stop
- Configurable customer inputs:

Control includes (1 Control includes 3 input signals which can be configured for diagnostic inputs. Out of which 1st input can also be configured as Battleshort input. 2nd and 3rd inputs get configured to Utility CB status and Genset CB status when Auto mains failure is enabled.)

Output signals from the control include:

Control includes 6 configurable outputs which can be configured to Diagnostic Output, Glow Plug, Ready to load, L series governor. Configurable output 3, Configurable output 4, Configurable output 5 and Configurable output 6 get configured to AMF specific outputs (Utility/ Genset CB Open/ Close driver) when Auto mains failure is enabled.

Communications connections include:

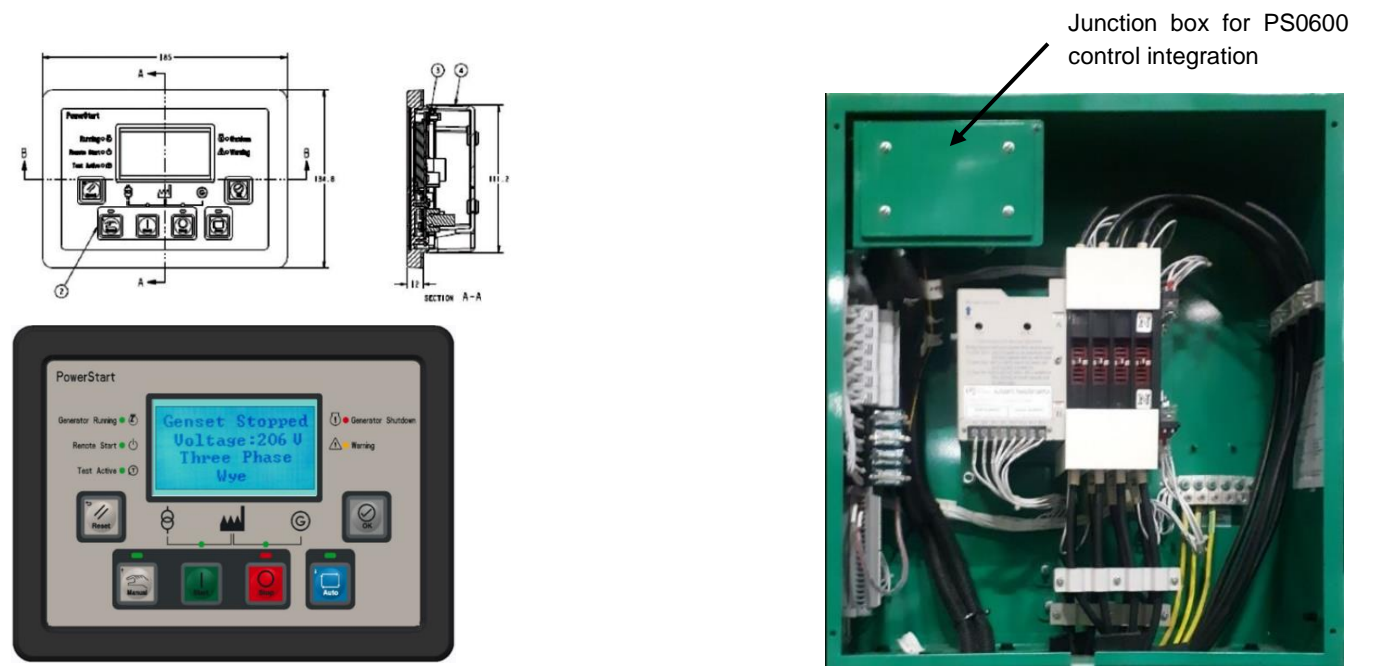
Control provides one RS-485 port which can be used either for PCTool interface or Modbus master interface based on protocol selection from LCD or InpowerTM.

- Modbus RS485 port: Allows the control to communicate with external devices such as PLCs using Modbus protocol.
- PC tool interface: This RS-485 communication port allows the control to communicate with a personal computer running InPowerTM software.
- Note - An RS-485 or USB to RS-232 converter is required for communication between control and PC.

Software

InPower (beyond 11.5.2.0 version) is a PC-based software service tool that is designed to directly communicate to PowerStart generator sets and transfer switches, to facilitate service and monitoring of these products.

Mechanical



ATS with PowerStart 0600 controller

Genset controller PC 1.1

- The PowerCommand 1.1 control is a microprocessor-based generator set monitoring control system. The control provides a simple operator interface to the generator set, digital voltage regulation, digital engine speed governing, start / stop control, and protective functions.
- The PowerCommand 1.1 generator set control is suitable for use on a wide range of generator sets in non-paralleling applications.
- The PowerCommand Control can be configured for any frequency, voltage and power configuration from 120 to 600 VAC for 50 Hz or 60 Hz operation.
- Power for the control is derived from the generator set starting batteries. The control functions over a voltage range from 8 VDC to 35 VDC.

Major features

- 12 or 24 VDC Battery Operation
- Digital Engine Speed Governing (optional) to provide isochronous frequency regulation.
- Digital Voltage Regulation full wave rectified single phase (Line to Line) sensing.
- Generator Set Monitoring. Monitors status of all critical engine and alternator conditions functions.
- Engine Starting includes relay drivers for start, Fuel Shut Off (FSO), and glow plug.
- Configurable Inputs and Outputs. Two discrete inputs and two dry contact relay outputs.
- Generator Set Monitoring: Displays status of all critical engine & alternator generator set functions.
- Smart Starting Control System: Integrated fuel ramping to limit black smoke & frequency overshoot.
- Advanced Serviceability using INPOWER.

Control system

The standard control system includes a control board with an external control switch and status indicator. The control board includes all functions necessary to locally or remotely start and stop, regulate voltage, and protect the generator set.

Control Switch - RUN/OFF/AUTO - In the OFF mode the generator set is immediately shut down (if running) and cannot be started. In the RUN mode the generator set will execute its start sequence and operate at rated speed and voltage. In the AUTO mode, the generator set can be started with a start signal from a remote device, such as an automatic transfer switch. The fault/status lamp will flash until the generator set is at rated speed and voltage. Operation of the switch to the OFF position or activation of optional remote fault reset switch while in auto mode resets faults in the control.

Status indications

The control has a lamp driver for external fault/status indication. Functions include:

- The lamp flashes during preheat (when used) and while the generator set is starting.
- READY TO LOAD – flashing until the rated voltage and frequency, then on continuously.
- Fault conditions are displayed by flashing a two digit fault code number.
- LED indicating lamps – includes LED indicating lamps for the following functions:
 - Not in Auto
 - Remote Start
 - Warning
 - Shutdown
 - Auto
 - Run
- Remote Emergency Stop Switch Input. Immediate shutdown of the generator set on operation.

Base Engine Protection -

- Low Oil Pressure Shutdown
- High Engine Temperature Shutdown
- Underspeed/Sensor Fail Shutdown
- Fail to Start
- Battery Charging Alternator Fail Warning

Options

Digital Engine Speed Governing to provide isochronous frequency regulation.



GTEC transfer switch open transition

Description

The GTEC automatic transfer switch combines reliability and flexibility in a small, economic package for transferring loads between a utility and a generator set, or between two generators.

The PowerCommand microprocessor control monitors utility and emergency Standby generator power. When utility power fails or is unsatisfactory, the control starts the generator 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.

High-pressure 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.

The fully integrated controller is designed for practical functionality, with LED indicators and digital push-buttons for ease of operator use.



Microprocessor control - A standard, fully featured microprocessor-based control. Software-enabled features, settings, and adjustments are available for ease of setup and accuracy.

Advanced transfer switch mechanism - True transfer switch mechanism with break-before-make action.

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

Positive interlocking - Mechanical interlocking prevents source-to-source connection through the power contacts.

Main contacts - Heavy-duty silver alloy contacts with multi-leaf arc chutes are rated for 100% load interruption.

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.

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



ATS with PowerCommand® 1.1 controller

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

Arc interruption	Multiple leaf arc chutes cool and quench the arcs. Barriers prevent interphase flashover.
Amperage rating	Transfer switches rated for 63 and 125 continuous amperes.
Voltage rating	Transfer switches up to 480 VAC, 50 Hz or 60 Hz
Altitude	Up to 2,000 m (6,561 ft) without derating
Total transfer time (source-to-source)	Will not exceed 100 m/sec with normal voltage applied to the actuator and without programmed transition enabled.
Manual operation handles	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

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.

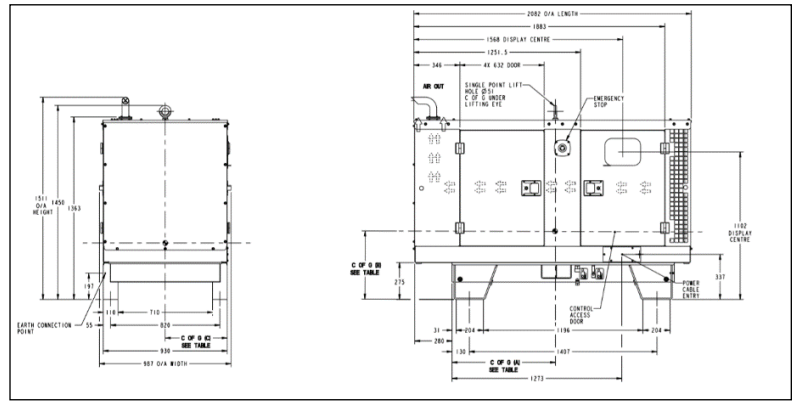
Prime power (PRP):

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.

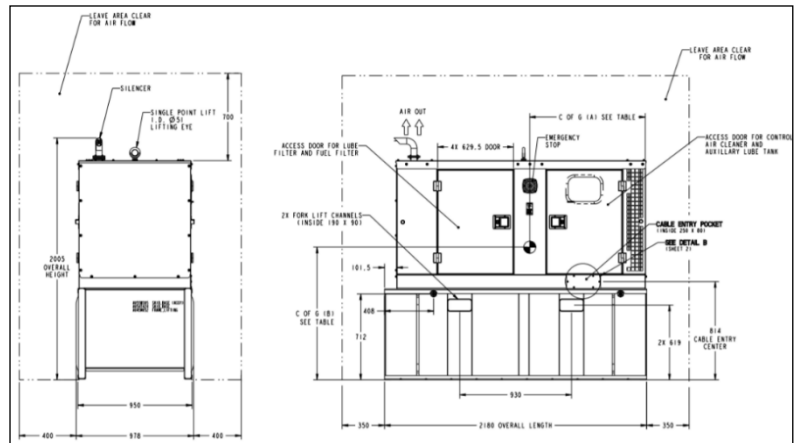
Base load (continuous) power (COP):

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.

Genset with 150 Ltr tank configuration



Genset with 1000 Ltr tank configuration



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	Tank size (Ltr)	Length "L" mm	Width "W" mm	Height "H" mm	Weight* dry kg	Weight* wet kg
C17D5T	150	2082	987	1511	1148	1164
	1000	2180	987	2005	1470	1496
C22D5T	150	2082	987	1511	1168	1185
	1000	2180	987	2005	1501	1517
C28D5T	150	2082	987	1511	1179	1198
	1000	2180	987	2005	1512	1530
C12D6T	150	2082	987	1511	1138	1154
	1000	2180	987	2005	1470	1486
C16D6T	150	2082	987	1511	1154	1170
	1000	2180	987	2005	1486	1502
C20D6T	150	2082	987	1511	1168	1187
	1000	2180	987	2005	1501	1519

*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.

	This generator set is designed and manufactured in facilities certified to ISO 9001		The CE marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
	All switches meet IEC 60947-6-1 AC31B		The UKCA marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.

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

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