

CSDG - C150N6

CUMMINS / C150N6 150



**Sales and
Service**

Cummins Sales and Service

CSDG - C150N6

For assistance, questions or concerns on any material contained within this submittal packet contact one of the following people:

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THIS SUBMITTAL IS BASED UPON OUR INTERPRETATION OF THE PROJECT REQUIREMENTS AND/OR SPECIFICATIONS AND IS IN ACCORDANCE WITH YOUR ORDER AND PRODUCT AVAILABILITY OF FROM OUR VENDORS. PLEASE REVIEW THE ENCLOSED DATA COMPLETELY AND CAREFULLY. SHOULD ADDITIONAL INFORMATION OR CLARIFICATION BE REQUIRED PLEASE FORWARD A SUBMITTAL COPY, COMPLETE WITH YOUR NOTATIONS, TO OUR OFFICE WITHIN THIRTY (30) DAYS FOR A PROMPT RESPONSE AND/OR RESUBMITTAL.

CONSIDERABLE ATTENTION IS GIVEN TO THE PREPARATION OF THIS SUBMITTAL TO ENSURE IT IS COMPLETE, CONCISE AND CORRECT AS IS POSSIBLE. PLEASE REVIEW IT CAREFULLY AND THOROUGHLY.



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Bill of Materials

Feature Code	Description	Qty
C150N6 Install-US-Stat C150 N6 A331-2 L155-2 L090-2 L193-2 B184-2 R098-2 B946-2 F217-2 P176-2 F252-2 F065-2 F179-2 H609-2 H703-2 H012-2 K796-2 H536-2 KV03-2 KY06-2 2200 4400 KB72-2 A366-2 C284-2 A422-2 D041-2 A333-2 BB89-2 E125-2 H527-2 E089-2 H669-2 E153-2 H706-2 L028-2 L050-2 A322-2 H268-2 L260-2	C150N6, 150kW, 60Hz, Standby, Natural Gas/Propane Genset U.S. EPA, Stationary Emergency Application C150N6, 150kW, 60Hz, Standby, Natural Gas/Propane Genset Duty Rating - Standby Power (ESP) Emissions Certification - SI, EPA, Emergency, Stationary, 40CFR60 Listing - UL 2200 NFPA 110 Type 10 Level 1 Capable Exciter/Regulator - Permanent Magnet Generator, 3 Phase Sensor Voltage - 120/208, 3 Phase, Wye, 4 Wire Alternator - 60Hz, 12L, 208/120V, 120C, 40C Ambient Aluminum Sound Attenuated Level 2 Enclosure, with Exhaust System Enclosure Color - Green, Aluminum Enclosure - Wind Load 180 MPH, ASCE7-10 Battery Rack Skidbase - Housing Ready Control Mounting - Left Facing PowerCommand 2.3 Controller Gauge - Oil Pressure Stop Switch - Emergency Control Display Language - English Load Connection - Single Circuit Breaker, Location A, 200A - 600A, 3P, LSI, 600 Volts AC, 100%, UL 2200 Circuit Breaker or Terminal Box (Position B)-None 4400 Circuit Breaker or Terminal Box (Position C)-None Bottom Entry, Right Engine Governor - Electronic, Isochronous Single Gas Fuel - NG or LP Vapor Engine Starter - 12 Volt DC Motor Engine Air Cleaner - Normal Duty Battery Charging Alternator Battery Charger - 6 Amp, Regulated Engine Cooling - Radiator, High Ambient Air Temperature, Ship Fitted Warning - Low Coolant Level Extension - Coolant Drain Engine Coolant - 50% Antifreeze, 50% Water Mixture Coolant Heater Engine Oil Genset Warranty - 2 Years Base Literature - English Packing - Skid, Poly Bag Extension - Oil Drain Green Sound Level 2 Intake Baffle - Ship Loose	2
0541-0835	Fuel Connection Kit, Flexible-1 1/4"NPT, Gaseous, 31"L	2
A054F439	Enclosure Kit-Sound Level 2 Duct	2



Spark-ignited generator set

125 & 150 kW standby
EPA emissions



Description

Cummins Power Generation generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby applications.

Features

Gas engine - Rugged 6-cylinder Cummins QSJ8.9G spark-ignited engine delivers reliable power. The electronic air/fuel ratio control provides optimum engine performance and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Control system - The PowerCommand® 2.3 electronic control is standard equipment and provides total generator set system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance. The PowerCommand® 3.3 control is also available as an option.

Cooling system - Standard cooling package provides reliable running at up to 50° C (122° F) ambient temperature.

Enclosures - The aesthetically appealing enclosure incorporates special designs that deliver one of the quietest generators of its kind. Aluminum material plus durable powder coat paint provides the best anti-corrosion performance. The generator set enclosure has been evaluated to withstand 180 MPH wind loads in accordance with ASCE7-10. The design has hinged doors to provide easy access for service and maintenance.

NFPA - The generator set accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

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

Model	Natural Gas		Propane		Data sheets
	Standby (60 Hz)		Standby (60 Hz)		
	kW	kVA	kW	kVA	60 Hz
C125N6	125	156	125	156	NAD-6303
C150N6	150	188	150	188	NAD-6304

Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3*
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	± 0.25% @ 60 Hz
Radio frequency emissions compliance	FCC code title 47 part 15 class B

* - with heavy-duty engine air cleaner option installed

Engine specifications

Design	Turbocharged and Aftercooled
Bore	114.1 mm (4.49 in)
Stroke	144.5 mm (5.69 in)
Displacement	8.9 liters (543 in ³)
Cylinder block	Cast iron, in-line 6 cylinder
Battery capacity	850 amps at ambient temperature of 0° F to 32° F (-18° C to 0° C)
Battery charging alternator	100 amps
Starting voltage	12-volt, negative ground
Lube oil filter type(s)	Spin-on
Standard cooling system	125 kW - 50° C (122° F) ambient cooling system 150 kW - 45° C (113° F) ambient cooling system
Rated speed	1800 rpm

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	120° C (248° F) standby
Exciter type	Torque match (shunt) with PMG as option
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 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

1-phase	3-phase
• 120/240	• 120/208
• 120/240	• 277/480
• 277/480	• 347/600
• 347/600	• 127/220

Generator set options

Fuel system

- Single fuel - natural gas or propane vapor, field selectable
- Dual fuel – natural gas and propane vapor auto changeover
- Low fuel gas pressure warning

Engine

- Normal or Heavy-duty engine air cleaner
- Shut down – low oil pressure
- Extension – oil drain
- Engine oil heater

Alternator

- 120° C temperature rise alternator
- 105° C temperature rise alternator
- PMG
- Alternator heater, 120V
- Reconnectable full 1 phase output alternator

Control

- PC2.3 with AmpSentry
- PC3.3 with Paralleling
- AC output analog meters
- Stop switch – emergency
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)

Electrical

- One, two or three circuit breaker configurations
- 80% rated circuit breakers
- 100% rated LSI circuit breakers

Enclosure

- Aluminum enclosures with muffler installed – green color
 - Weather
 - Sound Level 1
 - Sound Level 2

Cooling system

- Shutdown – low coolant level
- Warning – low coolant level
- Extension – coolant drain
- Coolant heater options:
 - < 4° C (40° F) - Cold weather
 - < -17° C (0° F) - Extreme cold

Exhaust system

- Exhaust connector NPT
- Exhaust muffler mounted

Generator set application

- Base barrier – elevated genset
- Battery rack, single or dual battery
- Radiator outlet duct adapter

Warranty

- Base warranty – 2 year / 1000 hours, standby
- 3-year standby warranty options
- 5-year standby warranty options

Generator set accessories

- Coolant heaters – 1000W / 1500W
- Battery rack, single or dual battery
- Battery heater kit
- Engine oil heater
- Remote control displays
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)
- Annunciator – RS485

- Remote monitoring device – PowerCommand 500/550
- Battery charger – stand-alone, 12V
- Circuit breakers
- Enclosure Sound Level 1 to Sound Level 2 upgrade kit
- Base barrier – elevated generator set
- Mufflers – industrial, residential, or critical
- Alternator PMG
- Alternator heater

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Control system PowerCommand 2.3



An integrated generator set control system providing voltage regulation, engine protection and operator interface.

Power management - Provides battery monitoring and testing features and smart-starting control system.

InPower™ – PC-based service tool available for detailed diagnostics.

PCCNet RS485 - Network interface (standard) to devices such as remote annunciator for NFPA 110 applications.

Control boards - Potted for environmental protection.

Ambient operation - Suitable for operation in ambient temperatures from -40° C to +70° C and altitudes to 13,000 feet (5,000 meters).

AC Protection

- AmpSentry protective relay
- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload
- Overload warning
- Reverse kW shutdown
- Reverse VAR shutdown
- Short circuit protection

Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Emergency stop
- Fuel-in-rupture-basin warning or shutdown

Operator/display panel

- Manual off switch
- 320 x 240 Pixels graphic LED backlight LCD with push button access for viewing engine and alternator data and providing setup, controls, and adjustments (English, Spanish, or French).
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20° C to +70° C

Alternator data

- Line-to-line and Line-to-neutral AC volts
- 3-phase AC current
- Frequency
- Total kVA

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

Other data

- Generator set model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)

Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 2-phase line-to-line sensing
- Configurable torque matching

Control functions

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Automatic transfer switch (ATS) control
- Generator set exercise, field adjustable

Options

- Auxiliary output relays (2)
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand 500/550 for remote monitoring and alarm notification (accessory)
- Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- **Digital governing**
- AC output analog meters (bargraph)
 - Color-coded graphical display of:
 - 3-phase AC voltage
 - 3-phase current
 - Frequency
 - kVA
- Remote operator panel

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):

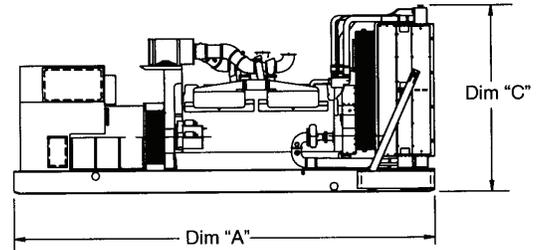
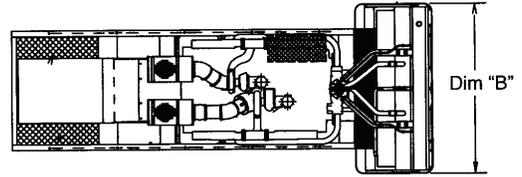
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* wet kg (lbs.)
Open Set				
C125N6	2867 (113)	1016 (40)	1415 (56)	1580 (3483)
C150N6	2867 (113)	1016 (40)	1415 (56)	1580 (3483)
Weather Protective Enclosure				
C125N6	2867 (113)	1016 (40)	1836 (72)	1661 (3662)
C150N6	2867 (113)	1016 (40)	1836 (72)	1661 (3662)
Sound Attenuated Enclosure Level 1				
C125N6	3621 (143)	1016 (40)	1836 (72)	1776 (3915)
C150N6	3621 (143)	1016 (40)	1836 (72)	1776 (3915)
Sound Attenuated Enclosure Level 2				
C125N6	4061 (160)	1016 (40)	1836 (72)	1791 (3940)
C150N6	4061 (160)	1016 (40)	1836 (72)	1791 (3940)

* Weights above are average. Actual weight varies with product configuration

see below drawings for overall shipping weight and dimensions

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

 <p>The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.</p>	 <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>International Building Code</p> <p>The generator set is certified to International Building Code (IBC) 2012.</p>	 <p>The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.</p>
	 <p>All low voltage models are CSA certified to product class 4215-01.</p>
	<p>U.S. EPA</p> <p>Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.</p>

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.

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Generator Set Data Sheet



Model: C150N6
Frequency: 60 Hz
Fuel type: Natural gas
kW rating: 150 Natural gas standby

Emissions level: EPA Emissions

Fuel consumption	Natural gas Standby				Propane Standby			
	kW (kVA)				kW (kVA)			
Ratings	150 (188)				150 (188)			
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full
scfh	718.7	1111.3	1487.2	1915.0	288.4	438.5	596.3	783.0
m ³ /hr	20.35	31.47	42.12	54.3	8.17	12.42	16.89	22.2

Engine	Natural gas Standby Rating	Propane Standby Rating
Engine model	QSJ8.9G	
Configuration	Cast Iron, In line, 6 cylinders	
Aspiration	Turbocharged and aftercooled	
Gross engine power output, kWm (bhp)	179 (240)	
Bore, mm (in)	114.1 (4.49)	
Stroke, mm (in)	144.5 (5.69)	
Rated speed, rpm	1800	
Compression ratio	9.7:1	
Lube oil capacity, L (qt)	20.8 (22)	

Fuel supply pressure	
Minimum operating pressure, kPa (in H ₂ O)	1.5 (6)
Maximum operating pressure, kPa (in H ₂ O)	3.5 (13)

Air	Natural gas Standby Rating	Propane Standby Rating
Combustion air, m ³ /min (scfm)	13.7 (483)	13.9 (490)
Maximum normal duty air cleaner restriction, kPa (in H ₂ O)	0.37 (1.5)	
Maximum heavy-duty air cleaner restriction, kPa (in H ₂ O)	3.7 (15.0)	

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Exhaust	Natural gas	Propane
	Standby Rating	Standby Rating
Exhaust flow at set rated load, m ³ /min (cfm)	40.8 (1440)	42.7 (1509)
Exhaust temperature at set rated load, °C (°F)	641.1 (1186)	668.9 (1236)
Maximum back pressure, kPa (inH ₂ O)	9 (36.1)	

Standard set-mounted radiator cooling	Natural gas	Propane
	Standby Rating	Standby Rating
Ambient design, °C (°F)	45 (113)	
Fan load, kWm (HP)	10.3 (13.8)	
Coolant capacity (with radiator), L (US gal)	26 (6.9)	
Cooling system air flow, m ³ /min (scfm)	249.2 (8800)	
Maximum cooling air flow static restriction, kPa (inH ₂ O)	0.125 (0.5)	

Weights	Natural gas	Propane
	Unit wet weight kg (lb)	1776 (3915)

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

see below drawings for overall shipping weight and dimensions

Derating factors

Natural gas	
Standby	Engine power available up to 775 m (2540 ft.) and ambient temperatures up to 40° C (104° F). Above these conditions, derate at 4.25% per 300 m (985 ft.) and 2% per 10° C (18° F).
Propane	
Standby	Engine power available up to 775 m (2540 ft.) and ambient temperatures up to 40° C (104° F). Above these conditions, derate at 4.25% per 300 m (985 ft.) and 2% per 10° C (18° F).

Ratings definitions

Emergency standby power (ESP)	Limited-time running power (LTP)	Prime power (PRP)	Base load (continuous) power (COP)
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.	Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.	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.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

Alternator data

Standard alternators	Single phase table	Three phase table					Full single phase output, reconnectable
Maximum temperature rise above 40° C ambient	120° C	120° C	120° C	120° C	120° C	120° C	120° C
Feature code	BB88-2	B986-2	B946-2	B943-2	B952-2	BB86-2	BB88-2
Alternator data sheet number	ADS-212	ADS-210	ADS-210	ADS-209	ADS-209	ADS-209	ADS-212
Voltage ranges	120/240	120/240	120/208	277/480	347/600	127/220	120 - 480
Voltage feature code	R104-2	R106-2	R098-2	R002-2	R114-2	R020-2	Varies by voltage
Surge kW	152	156	156	156	156	156	Varies by voltage
Full load current amps at standby rating	625	452	521	226	181	493	Varies by voltage

Optional alternators for improved starting capability	Single phase table	Three phase table					Full single phase output, reconnectable
Maximum temperature rise above 40° C ambient	105° C	105° C	105° C	105° C	105° C	105° C	105° C
Feature code	BB87-2	BB94-2	BB93-2	BB95-2	BB92-2	BB85-2	BB87-2
Alternator data sheet number	ADS-212	ADS-210	ADS-210	ADS-209	ADS-209	ADS-210	ADS-212
Voltage ranges	120/240	120/240	120/208	277/480	347/600	127/220	120 – 480
Voltage feature code	R104-2	R106-2	R098-2	R002-2	R114-2	R020-2	Varies by voltage
Surge kW	153	157	156	157	157	156	Varies by voltage
Full load current amps at standby rating	625	452	521	226	181	493	Varies by voltage

Formulas for calculating full load currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

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PowerCommand®

2.3 Control System



Control System Description

The PowerCommand control system is a microprocessor-based generator set monitoring, metering and control system designed to meet the demands of today's engine driven generator sets. The integration of all control functions into a single control system provides enhanced reliability and performance, compared to conventional generator set control systems. These control systems have been designed and tested to meet the harsh environment in which gensets are typically applied.

Features

- 320 x 240 pixels graphic LED backlight LCD.
- Multiple language support.
- AmpSentry™ protective relay - true alternator overcurrent protection.
- Real time clock for fault and event time stamping.
- Exerciser clock and time of day start/stop.
- Digital voltage regulation. Three phase full wave FET type regulator compatible with either shunt or PMG systems.
- Generator set monitoring and protection.
- 12 and 24 VDC battery operation.
- Modbus® interface for interconnecting to customer equipment.
- Warranty and service. Backed by a comprehensive warranty and worldwide distributor service network.
- Certifications - suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., CE and CSA standards.

PowerCommand Digital Genset Control PCC 2300



Description

The PowerCommand generator set control is suitable for use on a wide range of generator sets in non-paralleling applications. The PowerCommand control is compatible with shunt or PMG excitation style. It is suitable for use with reconnectable or non-reconnectable generators, and it can be configured for any frequency, voltage and power connection from 120-600 VAC Line-to-Line.

Power for this control system is derived from the generator set starting batteries. The control functions over a voltage range from 8 VDC to 30 VDC.

Features

- 12 and 24 VDC battery operation.
- Digital voltage regulation - Three phase full wave FET type regulator compatible with either shunt or PMG systems. Sensing is three phase.
- Full authority engine communications (where applicable) - Provides communication and control with the Engine
- due to thermal Control Module (ECM).
- AmpSentry™ protection provides industry-leading alternator overcurrent protection:
 - Time-based generator protection applicable to both line-to-line and line-to-neutral, that can detect an unbalanced fault condition and swiftly react appropriately. Balanced faults can also be detected by AmpSentry and appropriate acted upon.
- Reduces the risk of Arc Flash overload or electrical faults by inverse time protection
- Common harnessing - with higher feature Cummins controls. Allows for easy field upgrades.
- Generator set monitoring - Monitors status of all critical engine and alternator functions.
- Digital genset metering (AC and DC).
- Genset battery monitoring system to sense and warn against a weak battery condition.
- Configurable for single or three phase AC metering.
- Engine starting - Includes relay drivers for starter, Fuel Shut Off (FSO), glow plug/spark ignition power and switch B+ applications.
- Generator set protection – Protects engine and alternator.
- Real time clock for fault and event time stamping.
- Exerciser clock and time of day start/stop.
- Advanced serviceability - using InPower™, a PC-based software service tool.

- Environmental protection - The control system is designed for reliable operation in harsh environments. The main control board is a fully encapsulated module that is protected from the elements.
- Modbus interface for interconnecting to customer equipment.
- Configurable inputs and outputs - Four discrete inputs and four dry contact relay outputs.
- Warranty and service - Backed by a comprehensive warranty and worldwide distributor service network.
- Certifications - Suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., CE and CSA standards.

Base Control Functions

HMI Capability

Operator adjustments - The HMI includes provisions for many set up and adjustment functions.

Generator set hardware data - Access to the control and software part number, generator set rating in kVA and generator set model number is provided from the HMI or InPower.

Data logs - Includes engine run time, controller on time, number of start attempts, total kWh, and load profile (control logs data indicating the operating hours at percent of rated kW load, in 5% increments. The data is presented on the operation panel based on total operating hours on the generator.)

Fault history - Provides a record of the most recent fault conditions with control date and time stamp. Up to 32 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)
- kW, kVar, power factor, kVA (three phase and total)
- Frequency

AmpSentry: 3x current regulation for downstream tripping/motor inrush management. Thermal damage curve (3-phase short) or fixed timer (2 sec for 1- Phase Short or 5 sec for 2-Phase short).

Engine data

- Starting battery voltage
- Engine speed
- Engine temperature
- Engine oil pressure
- Engine oil temperature
- Intake manifold temperature
- Comprehensive Full Authority Engine (FAE) data (where applicable)

Service adjustments - The HMI includes provisions for adjustment and calibration of generator set control functions. Adjustments are protected by a password. Functions include:

Service adjustments (continued)

- Engine speed governor adjustments
- Voltage regulation adjustments
- Cycle cranking
- Configurable fault set up
- Configurable output set up
- Meter calibration
- Display language and units of measurement

Engine Control

SAE-J1939 CAN interface to full authority ECMs (where applicable). Provides data swapping between genset and engine controller for control, metering and diagnostics.

12 VDC/24 VDC battery operations - PowerCommand will operate either on 12 VDC or 24 VDC batteries.

Temperature dependent governing dynamics (with electronic governing) - modifies the engine governing control parameters as a function of engine temperature. This allows the engine to be more responsive when warm and more stable when operating at lower temperature levels.

Isochronous governing - (where applicable) Capable of controlling engine speed within +/-0.25% for any steady state load from no load to full load. Frequency drift will not exceed +/-0.5% for a 33 °C (60 °F) change in ambient temperature over an 8 hour period.

Droop electronic speed governing - Control can be adjusted to droop from 0 to 10% from no load to full load.

Remote start mode - It accepts a ground signal from remote devices to automatically start the generator set and immediately accelerate to rated speed and voltage. The remote start signal will also wake up the control from sleep mode. The control can incorporate a time delay start and stop.

Remote and local emergency stop - The control accepts a ground signal from a local (genset mounted) or remote (facility mounted) emergency stop switch to cause the generator set to immediately shut down. The generator set is prevented from running or cranking with the switch engaged. If in sleep mode, activation of either emergency stop switch will wakeup the control.

Sleep mode - The control includes a configurable low current draw state to minimize starting battery current draw when the genset is not operating. The control can also be configured to go into a low current state while in auto for prime applications or applications without a battery charger.

Engine starting - The control system supports automatic engine starting. Primary and backup start disconnects are achieved by one of two methods: magnetic pickup or main alternator output frequency. The control also supports configurable glow plug control when applicable.

Cycle cranking - Is 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.

Alternator Control

The control includes an integrated three phase Line-to-Line sensing voltage regulation system that is compatible with shunt or PMG excitation systems. The voltage regulation system is a three phase full wave rectified and has an FET output for good motor starting capability.

Major system features include:

Digital output voltage regulation - Capable of regulating output voltage to within +/-1.0% for any loads between no load and full load. Voltage drift will not exceed +/- 1.5% for a 40 °C (104 °F) change in temperature in an eight hour period. On engine starting or sudden load acceptance, voltage is controlled to a maximum of 5% overshoot over nominal level. The automatic voltage regulator feature can be disabled to allow the use of an external voltage regulator.

Droop voltage regulation - Control can be adjusted to droop from 0-10% from no load to full load.

Torque-matched V/Hz overload control - The voltage roll-off set point and rate of decay (i.e. the slope of the V/Hz curve) is adjustable in the control.

Fault current regulation - PowerCommand will regulate the output current on any phase to a maximum of three times rated current under fault conditions for both single phase and three phase faults. In conjunction with a permanent magnet generator, it will provide three times rated current on all phases for motor starting and short circuit coordination purpose.

Protective Functions

On operation of a protective function the control will indicate a fault by illuminating the appropriate status LED on the HMI, 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.

Protective functions include:

Battle Short Mode

When enabled and the *battle short* switch is active, the control will allow some shutdown faults to be bypassed. If a bypassed 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 shutdowns and others that are critical for proper operation are not bypassed. Please refer to the control application guide or manual for list of these faults.

Derate

The derate function reduces output power of the genset in response to a fault condition. If a derate command occurs while operating on an isolated bus, the control will issue commands to reduce the load on the genset via contact closures or modbus.

Configurable Alarm and Status Inputs

The control accepts up to four alarm or status inputs (configurable contact closed to ground or open) to indicate a configurable (customer-specified) condition. The control is programmable for warning, shutdown or status indication and for labeling the input.

Emergency Stop

Annunciated whenever either emergency stop signal is received from external switch.

Full Authority Electronic Engine Protection

Engine fault detection is handled inside the engine ECM. Fault information is communicated via the SAE-J1939 data link for annunciation in the HMI.

General Engine Protection

Low and high battery voltage warning - Indicates status of battery charging system (failure) by continuously monitoring battery voltage.

Weak battery warning - The control system will test the battery each time the generator set is signaled to start and indicate a warning if the battery indicates impending failure.

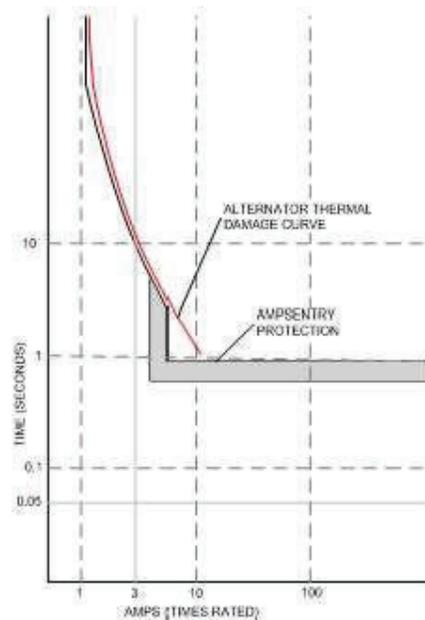
Fail to start (overcrank) shutdown - The control system will indicate a fault if the generator set fails to start by the completion of the engine crank sequence.

Fail to crank shutdown - Control has signaled starter to crank engine but engine does not rotate.

Cranking lockout - The control will not allow the starter to attempt to engage or to crank the engine when the engine is rotating.

Alternator Protection

AmpSentry protective relay - A comprehensive monitoring and control system integral to the PowerCommand Control System that guards the electrical integrity of the alternator and power system by providing protection against a wide array of fault conditions in the generator set or in the load. It also provides single and three phase fault current regulation so that downstream protective devices have the maximum current available to quickly clear fault conditions without subjecting the alternator to potentially catastrophic failure conditions. Thermal damage curve (3-Phase short) or fixed timer (2 sec for 1-Phase short, 5 sec for 2-Phase short). See document R1053 for a full-size time over current curve.



AmpSentry Maintenance Mode (AMM) - Instantaneous tripping, if AmpSentry Maintenance mode is active (50mS response to turn off AVR excitation/shutdown genset) for arc flash reduction when personnel are near genset.

High AC voltage shutdown (59) - Output voltage on any phase exceeds preset values. Time to trip is inversely proportional to amount above threshold. Values adjustable from 105-125% of nominal voltage, with time delay adjustable from 0.1-10 seconds. Default value is 110% for 10 seconds.

Low AC voltage shutdown (27) - Voltage on any phase has dropped below a preset value. Adjustable over a range of 50-95% of reference voltage, time delay 2-20 seconds. Default value is 85% for 10 seconds. Function tracks reference voltage. Control does not nuisance trip when voltage varies due to the control directing voltage to drop, such as during a V/Hz roll-off during synchronizing.

Under frequency shutdown (81 u) - Generator set output frequency cannot be maintained. Settings are adjustable from 2-10 Hz below reference governor set point, for a 5- 20 second time delay. Default: 6 Hz, 10 seconds.

Under frequency protection is disabled when excitation is switched off, such as when engine is operating in idle speed mode.

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 a 1-20 second time delay. Default: 6 Hz, 20 seconds, disabled.

Overcurrent warning/shutdown - Thresholds and time delays are configurable. Implementation of the thermal damage curve with instantaneous trip level calculated based on current transformer ratio and application power rating.

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

Field overload shutdown - Monitors field voltage to shutdown generator set when a field overload condition occurs.

Over load (kW) warning - Provides a warning indication when engine is operating at a load level over a set point.

Adjustment range: 80-140% of application rated kW, 0-120 second delay. Defaults: 105%, 60 seconds.

Reverse power shutdown (32) - Adjustment range: 5-20% of standby kW rating, delay 1-15 seconds. Default: 10%, 3 seconds.

Reverse Var shutdown - Shutdown level is adjustable: 15-50% of rated Var output, delay 10-60 seconds. Default: 20%, 10 seconds.

Short circuit protection - Output current on any phase is more than 175% of rating and approaching the thermal damage point of the alternator. Control includes algorithms to protect alternator from repeated over current conditions over a short period of time.

Field Control Interface

Input signals to the PowerCommand control include:

- Coolant level (where applicable)
- Fuel level (where applicable)
- Remote emergency stop
- Remote fault reset
- Remote start
- Battleshort
- Rupture basin
- Start type signal
- Configurable inputs - Control includes (4) input signals from customer discrete devices that are configurable for warning, shutdown or status indication, as well as message displayed

Output signals from the PowerCommand control include:

- Load dump signal: Operates when the generator set is in an overload condition.
- Delayed off signal: Time delay based output which will continue to remain active after the control has removed the run command. Adjustment range: 0 – 120 seconds. Default: 0 seconds.

- Configurable relay outputs: Control includes (4) relay output contacts (3 A, 30 VDC). These outputs can be configured to activate on any control warning or shutdown fault as well as ready to load, not in auto, common alarm, common warning and common shutdown.

- Ready to load (generator set running) signal: Operates when the generator set has reached 90% of rated speed and voltage and latches until generator set is switched to off or idle mode.

Communications Connections Include:

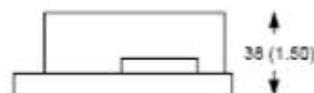
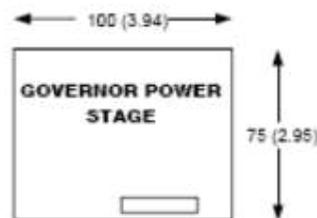
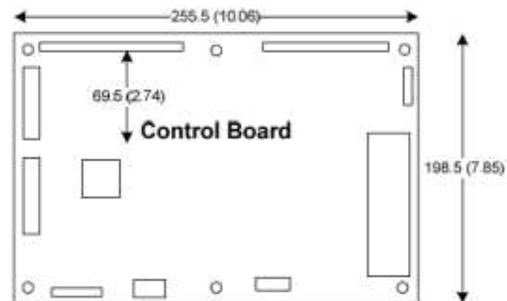
- PC tool interface: This RS-485 communication port allows the control to communicate with a personal computer running InPower software.

- Modbus RS-485 port: Allows the control to communicate with external devices such as PLCs using Modbus protocol.

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

- Networking: This RS-485 communication port allows connection from the control to the other Cummins products.

Mechanical Drawings



PowerCommand Human Machine Interface HMI320



Description

This control system includes an intuitive operator interface panel that allows for complete genset control as well as system metering, fault annunciation, configuration and diagnostics. The interface includes five genset status LED lamps with both internationally accepted symbols and English text to comply with customer's needs. The interface also includes an LED backlit LCD display with tactile feel soft-switches for easy operation and screen navigation. It is configurable for units of measurement and has adjustable screen contrast and brightness.

The *run/off/auto* switch function is integrated into the interface panel.

All data on the control can be viewed by scrolling through screens with the navigation keys. The control displays the current active fault and a time-ordered history of the five previous faults.

Features

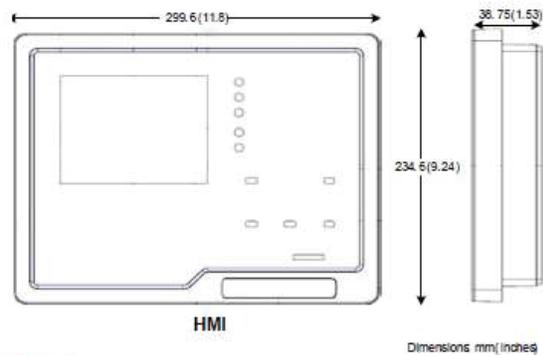
- LED indicating lamps:
 - Genset running
 - Remote start
 - Not in auto
 - Shutdown
 - Warning
 - Auto
 - Manual and stop
- 320 x 240 pixels graphic LED backlight LCD.
- Four tactile feel membrane switches for LCD defined operation. The functions of these switches are defined dynamically on the LCD.
- Seven tactile feel membrane switches dedicated screen navigation buttons for up, down, left, right, ok, home and cancel.
- Six tactile feel membrane switches dedicated to control for auto, stop, manual, manual start, fault reset and lamp test/panel lamps.

- Two tactile feel membrane switches dedicated to control of circuit breaker (where applicable).
- Allows for complete genset control setup.
- Certifications: Suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., CE and CSA standards.
- LCD languages supported: English, Spanish, French, German, Italian, Greek, Dutch, Portuguese, Finnish, Norwegian, Danish, Russian and Chinese Characters.

Communications connections include:

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

Mechanical Drawing



Software

InPower (beyond 6.5 version) is a PC-based software service tool that is designed to directly communicate to PowerCommand generator sets and transfer switches, to facilitate service and monitoring of these products.

Environment

The control is designed for proper operation without recalibration in ambient temperatures from -40 °C to +70 °C (-40 °F to 158 °F) and for storage from -55 °C to +80 °C (-67 °F to 176 °F). Control will operate with humidity up to 95%, non-condensing.

The HMI is designed for proper operation in ambient temperatures from -20 °C to +70 °C (-4 °F to 158 °F) and for storage from -30 °C to +80 °C (-22 °F to 176 °F).

The control board is fully encapsulated to provide superior resistance to dust and moisture. Display panel has a 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.

The control system 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.

Certifications

PowerCommand meets or exceeds the requirements of the following codes and standards:

- NFPA 110 for level 1 and 2 systems.
- ISO 8528-4:2005 compliance, controls and switchgear (second edition)
- CE marking: The control system is suitable for use on generator sets to be CE-marked.
- EN50081-1,2 residential/light industrial emissions or industrial emissions.
- EN50082-1,2 residential/light industrial or industrial susceptibility.
- ISO 7637-2, level 2; DC supply surge voltage test.
- Mil Std 202C, Method 101 and ASTM B117: Salt fog test.
- UL 6200 recognized and suitable for use on UL 2200 Listed generator sets.
- CSA C282-M1999 compliance
- CSA 22.2 No. 14 M91 industrial controls.
- PowerCommand control systems and generator sets are designed and manufactured in ISO 9001 certified facilities.

Warranty

All components and subsystems are covered by an express limited one year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available.



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

Our energy working for you.™





Alternator data sheet

Frame size: **UC3G**

Characteristics								
Weights:		Wound stator assembly:	434 lb	197 kg				
		Rotor assembly:	465 lb	211 kg				
		Complete alternator:	1290 lb	585 kg				
Maximum speed:			2250 rpm					
Excitation current:		Full load:	2 Amps					
		No load:	0.5 Amps					
Insulation system:		Class H throughout						
1 Ø Ratings (1.0 power factor)		60 Hz			50 Hz			
(Based on specific temperature rise at 40 °C ambient temperature)		Double delta	4 lead		Double delta			
		<u>120/240</u>	<u>120/240</u>		110-120 <u>220-240</u>			
125 °C rise ratings	kW/kVA	120/120	150/150		105/105			
105 °C rise ratings	kW/kVA	113/113	135/135		96/96			
3 Ø Ratings (0.8 power factor)		Upper broad range		LBR*	347/600	Broad range		
(Based on specified temperature rise at 40 °C ambient temperature)		<u>120/208</u> <u>240/416</u>	<u>139/240</u> <u>277/480</u>	<u>190-208</u> <u>380-416</u>	<u>347/600</u>	<u>110/190</u> <u>220/380</u>	<u>120/208</u> <u>240/415</u>	<u>127/220</u> <u>254/440</u>
150 °C Rise ratings	kW	166	192	166	192	146	146	142
	kVA	108	240	208	240	182	182	178
125 °C Rise ratings	kW	160	180	160	180	140	140	137
	kVA	200	225	200	225	175	175	171
105 °C Rise ratings	kW	150	165	150	165	128	128	125
	kVA	188	206	188	206	160	160	156
80 °C Rise ratings	kW	130	140	130	140	111	111	108
	kVA	163	175	163	175	139	139	135
3 Ø Reactances (per unit, ±10%)								
(Based on full load at 105 °C rise rating)								
Synchronous		2.34	1.93	1.75	1.61	1.99	1.67	1.45
Transient		0.20	0.17	0.15	0.14	0.17	0.14	0.12
Subtransient		0.13	0.11	0.10	0.10	0.12	0.10	0.09
Negative sequence		0.15	0.12	0.11	0.11	0.12	0.10	0.09
Zero sequence		0.09	0.08	0.06	0.06	0.08	0.06	0.06
3 Ø Motor starting								
Maximum kVA	(Shunt)	563	563	563		400		
(90% sustained voltage)	(PMG)	663	663	663		500		
Time constants (Sec)								
Transient		0.038	0.038	0.038		0.038		
Subtransient		0.012	0.012	0.012		0.012		
Open circuit		1.000	1.000	1.000		1.000		
DC		0.010	0.010	0.010		0.010		



Alternator data sheet

Frame size: **UC3G**

Windings	(@ 20° C)				
Stator resistance	(Line to Line, Ohms)	0.0420	0.0340	0.0550	0.0420
Rotor resistance	(Ohms)	1.6600	1.6600	1.6600	1.6600
Number of leads		12	12	6	12

* Lower broad range 110/190 thru 120/208, 220/380 thru 240/416.



Prototype Test Supported Emergency/Standby Generator Sets Certification

Cummins Power Generation certifies that its commercial generator sets bearing the Prototype Test Supported (PTS) seal have been subjected to a design and development process that includes extensive prototype testing and evaluation. A PTS production model is engineered and manufactured according to documentation developed through comprehensive research, design and design verification.

Design verification is based on tests of preproduction prototype models manufactured specifically for prototype test purposes and not sold as new equipment. To be certified as a PTS model, the generator set must satisfy these prerequisites:

DESIGN - The PTS certified generator set must be designed specifically for emergency/standby applications that require high reliability and rapid response.

PROTOTYPE TESTING - Design suitability of the PTS certified generator set must be proven by tests on preproduction prototype models. The prototype test program is intended to:

1. Confirm the engine and generator have reserve capacity beyond rating to minimize the potential of damage or shutdown during steady state or transient loading conditions, including momentary overloads.
2. Demonstrate generator set, controls and accessories capability to perform reliably and compatibly in service during disturbances common in actual load circuits.
3. Verify the integrity of the generator and excitation system insulation systems and electrical components to withstand heating under rated load and transient overcurrent conditions.
4. Evaluate generator set mechanical and electrical strength to perform without damage during abnormal operating conditions, such as short circuits or out-of-phase paralleling. While operating at rated load, the generator set must be subjected to several 3-phase short circuits of 20 second duration. After the tests, the generator set is inspected to verify that no electrical or mechanical damage was incurred by any components.
5. Determine by endurance testing that no resonance conditions exist in the generator set or accessories that will cause premature failure of components on production units.
6. Investigate and identify failure modes to minimize the risk of any single component failure or human error that could lead to lack of essential electrical supply.
7. Provide a margin of safety, by actual trials, between the generator set component design and protection systems so that the components are not damaged before the protective devices activate a shutdown.

DOCUMENTATION AND SOFTWARE - The PTS certified generator set must be documented in a single drawing package with all components identified with Cummins Power Generation part numbers. A PTS test certificate must be created for each PTS generator set certifying the PTS testing performed.

QUALITY ASSURANCE - Engineering drawings, specifications and test requirements for a PTS certified generator set must be classified by components and assembly quality characteristics. A component and process inspection and test plan must be developed and maintained to measure product conformance to documentation requirements.

PRODUCTION MODEL TESTING - PTS certified generator sets must be subjected to complete production tests that demonstrate conformance to specifications at all rated conditions, including start-up, full load pickup and a performance run at full rated load and power factor.



Prototype Test Support (PTS) 60 Hz Test Summary



<u>Generator set models</u>	<u>Representative prototype</u>
C125N6	Model: C150N6
C150N6	Engine: QJSJ8.9G-G2
	Alternator: UC27J

The following summarizes prototype testing conducted on the designated representative prototype of the specified models. This testing is conducted to verify the complete generator set electrical and mechanical design integrity. Prototype testing is conducted only on generator sets not sold as new equipment.

Maximum surge power: 156.4 kW
The generator set was evaluated to determine the stated maximum surge power.

Maximum motor starting: 220 kVA
The generator set was tested to simulate motor starting by applying the specified kVA load at low lagging power factor (0.4 or lower). With this load applied, the generator set recovered to a minimum of 90% rated voltage

Alternator temperature rise:
The highest rated temperature rise (120 °C) test result are reported as follows to verify that worst case temperature rises do not exceed allowable NEMA MG1 limits for class H insulation. Tests were conducted per IEEE 115, rise by resistance and embedded detector, with rated voltages. Only the highest temperatures are reported.

Location	Maximum Rise (°C)
Alternator Stator:	N/A
Alternator Rotor:	N/A
Exciter Stator:	N/A
Exciter Rotor:	N/A

Torsional analysis and testing:
The generator set with UC27J was tested to verify that the design is not subjected to harmful torsional stresses. A spectrum analysis of the transducer output was conducted over the speed range of 1650 to 1950 RPM.

Cooling system: 50 °C ambient
0.5 in H2O restriction

The cooling system was tested to determine ambient temperature and static restriction capabilities. The test was performed at full rated load elevated ambient temperature under static restriction conditions.

Durability:
The generator set was subjected to a 1500 hour endurance test replicating field duty cycles operating at variable load up to the standby rating based upon MIL-STD-705 to verify structural soundness and durability of the design.

Steady state performance:
The generator set was tested to verify steady state operating performance. It was within the specified maximum limits.

Voltage regulation:	± 1%
Random voltage variation:	± 1%
Frequency regulation:	Isochronous
Random frequency variation:	± 0.5%

Transient performance:
The generator set was tested with the listed alternator to verify single step loading capability as required by NFPA 110. Voltage and frequency response on load addition or rejection were evaluated. The following results were recorded at 0.8 power factor:

Full load acceptance:

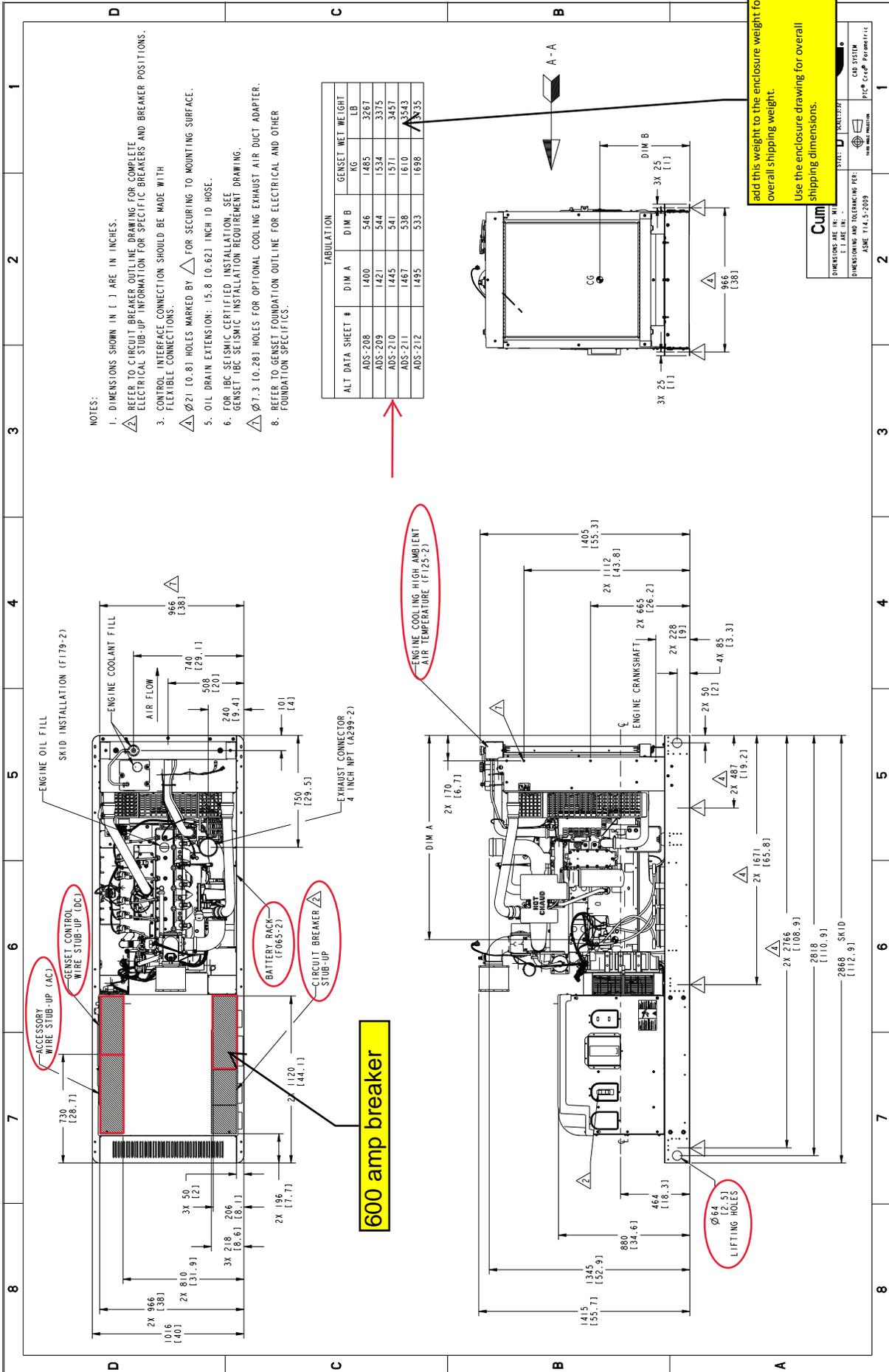
Voltage dip:	26.9%
Recovery time:	5.3 seconds
Frequency dip:	16.2%
Recovery time:	6.3 seconds

Full load rejection:

Voltage rise:	12.5%
Recovery time:	2.2 seconds
Frequency rise:	15.7%
Recovery time:	4.5 seconds

Harmonic analysis:
(per MIL-STD-705B, Method 601.4)

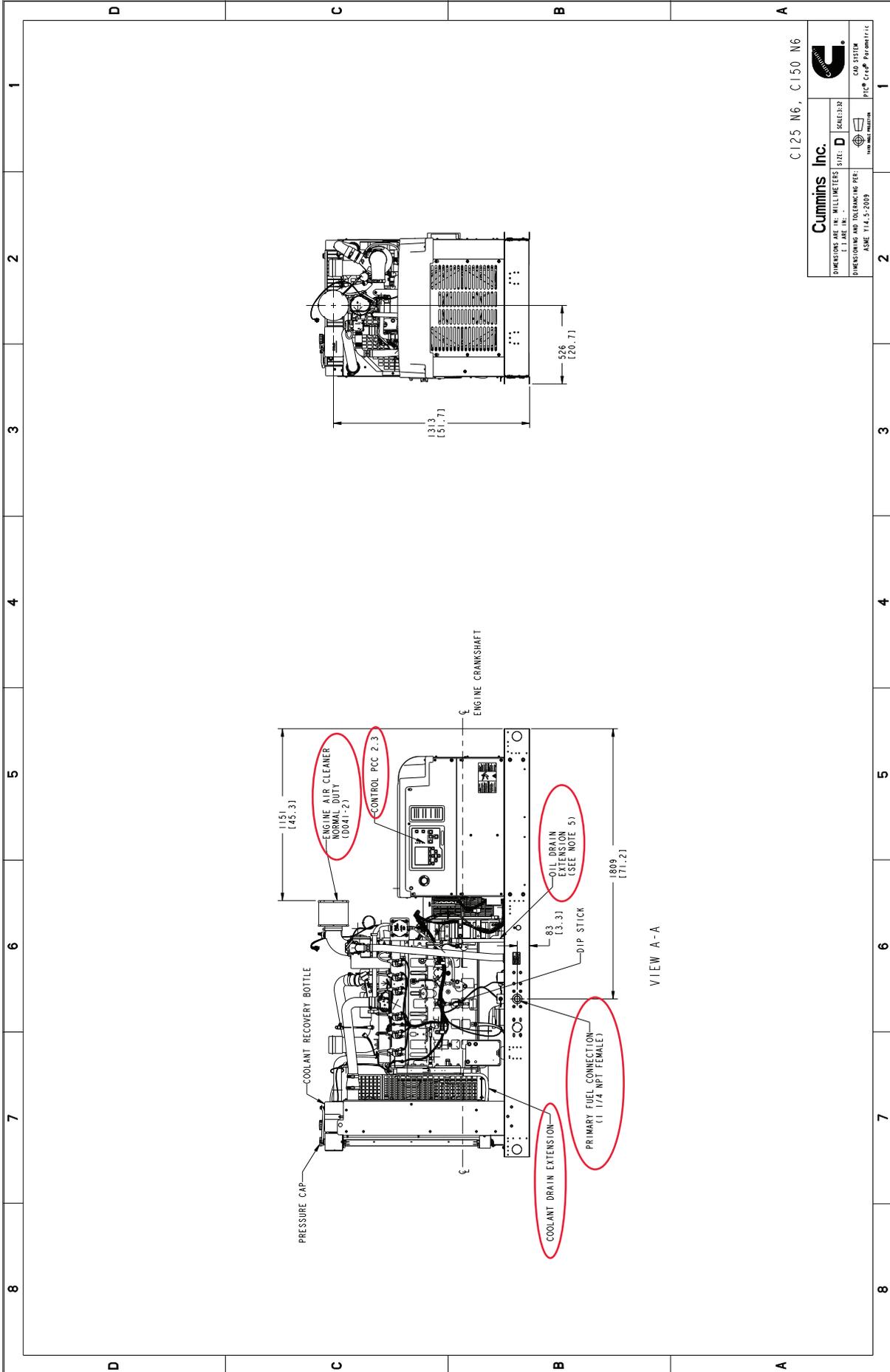
Harmonic	<u>Line to Line</u>		<u>Line to Neutral</u>	
	<u>No load</u>	<u>Full load</u>	<u>No load</u>	<u>Full load</u>
3	0.0	0.1	0.0	0.1
5	0.8	1.2	0.8	1.2
7	0.7	2.2	0.7	2.1
9	0.0	0.0	0.0	0.0
11	0.2	0.3	0.2	0.3
13	0.2	0.4	0.2	0.4
15	0.0	0.0	0.0	0.1



Part Number: **A055J588** Part Revision: **C**
 Part Name: **OUTLINE, GENSET**
 Drawing Category: **Detail State: Released** Sheet 1 of 3

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C125 N6, C150 N6

	DIMENSIONS ARE IN MILLIMETERS LISTED IN INCHES	SCALE: 3:1
	DIMENSIONS AND TOLERANCES PER: ASME Y14.5-2009	UNLESS OTHERWISE SPECIFIED

CAD SYSTEM: PTC® Creo® Parametric

Part Number: A055J588 Part Revision: C
Part Name: OUTLINE, GENSET
 Drawing Category: Detail State: Released Sheet 2 of 3

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Data Sheet

Circuit Breakers

Description

This Data sheet provides circuit breaker manufacturer part numbers and specifications. The Circuit breaker box description is the rating of that breaker box installation on a Cummins Generator. Please refer to the website of the circuit breaker manufacturer for breaker specific ratings and technical information.

Applicable Models

Engine	Models					
Kubota	C10D6	C15D6	C20D6			
QSJ2.4	C20N6	C25N6	C30N6	C30N6H	C36N6	C36N6H
	C40N6	C40N6H	C50N6H	C60N6H		
B3.3	C25D6	C30D6	C35D6	C40D6	C50D6	C60D6
QSJ5.9G	C45N6	C50N6	C60N6	C70N6	C80N6	C100N6
QSJ8.9G	C125N6	C150N6				
QSB5	DSFAC	DSFAD	DSFAE	C50D6C	C60D6C	C80D6C
	C100D6C	C125D6C				
QSB7	DSGAA	DSGAB	DSGAC	DSGAD	DSGAE	
		C125D6D	C150D6D	C175D6D	C200D6D	
QSL9	DSHAD	DQDAA	DQDAB	DQDAC		
QSM11	DQHAB					
QSX15	DFEJ	DFEK				

Instructions

1. Locate the circuit breaker feature code or part number and use the charts below to find the corresponding manufacturer circuit breaker catalog number.
2. Use the first letter of the circuit breaker catalog number to determine the "frame" of the breaker. If the first letter is an "N", use the second letter. Then follow the corresponding website link from the table below to find the breaker catalog number description.

Please refer to the catalog numbering systems page, which is given in the chart, to understand the nomenclature of the catalog number.

Frame	Catalog name*	Catalog number description page(s)
P	0612CT0101 http://www.schneider-electric.us/en/download/document/0612CT0101/	16-17
H, J, and L	0611CT1001 http://www.schneider-electric.us/en/download/document/0611CT1001/	8-9
Q	0734CT0201 http://www.schneider-electric.us/en/download/document/0734CT0201/	4

*The following link may also be used to search specifically by the breaker part number or for the catalog name listed above. <http://products.schneider-electric.us/technical-library/>

3. Search the catalog by using the first 3 letters of the breaker catalog number and the first 5 numbers to find information such as trip curves, accessories, and dimensional details regarding the circuit breaker.

*If the catalog number starts with "N", skip the N and begin your search with the second letter.

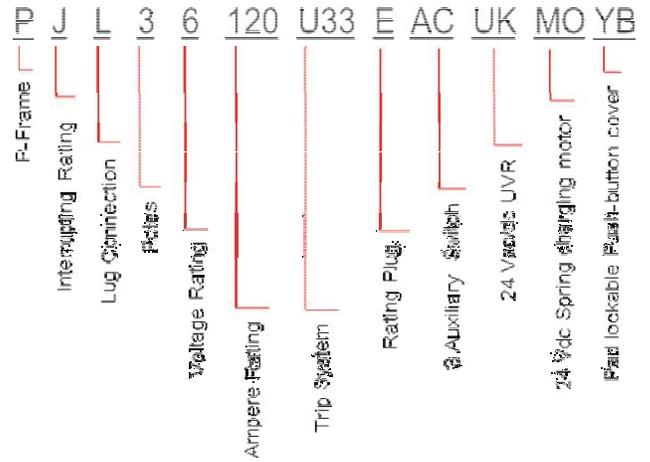
*If the first 3 letters are "PJP," the search will not work. You will need to start with just "PJ" and use the description pages to obtain the information you are looking for on the "PJP."

Example

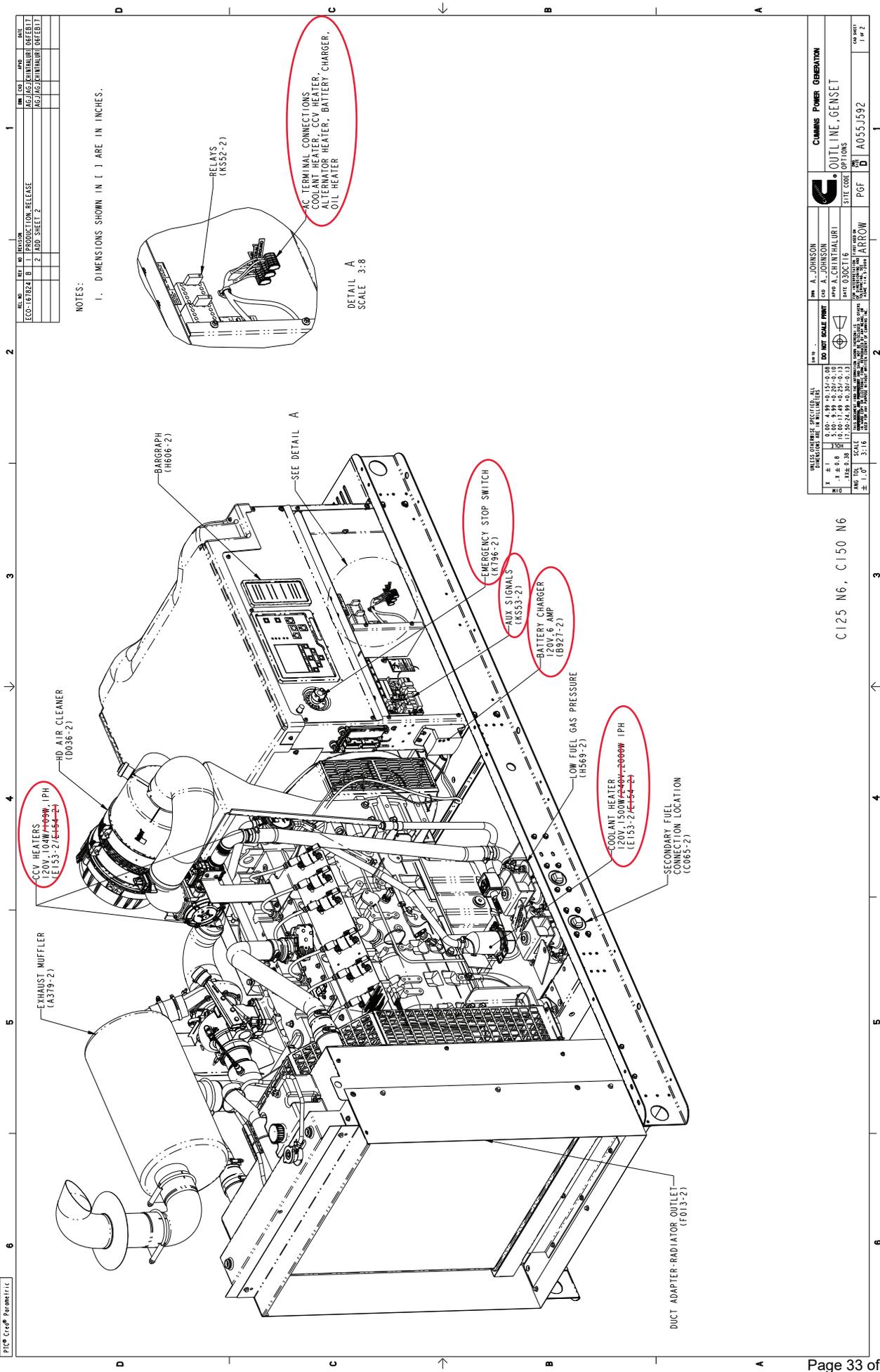
After finding your circuit breaker catalog number to be "PJL36120U33EACUKMOYB," navigate to the P-frame catalog by using the link provided.

Look at pages 16-17 of the pdf catalog to find the nomenclature of the breaker.

Search the P-frame spec sheet using the search "PJL36120."



Feature Code	Breaker Box Description	Cummins Part #	Manufacturer	Breaker Catalog Number	Trip Unit	Plug Type
KX27-2	CB, Loc B, 70A-250A, 3P, LSI, 600VAC, 80%, UL	A050J727	Schneider Electric	JDL36250CU33X	MicroLogic 3.2S	N/A
KX28-2	CB, Loc B, 70A-250A, 3P, LSI, 600VAC, 100%, UL	A050J727	Schneider Electric	JDL36250CU33X	MicroLogic 3.2S	N/A
KX29-2	CB, Loc C, 70A-250A, 3P, LSI, 600VAC, 100%, UL	A050J727	Schneider Electric	JDL36250CU33X	MicroLogic 3.2S	N/A
KX30-2	CB, Loc A, 125A-400A, 3P, LSI, 600VAC, 100%, UL	A051D115	Schneider Electric	LGL36400CU33X	MicroLogic 3.3S	N/A
KX31-2	CB, Loc B, 125A-400A, 3P, LSI, 600VAC, 100%, UL	A051D115	Schneider Electric	LGL36400CU33X	MicroLogic 3.3S	N/A
KX32-2	CB, Loc A, 200A-600A, 3P, LSI, 600VAC, 80%, UL	A044T468	Schneider Electric	NLGL36600U33X-600A	MicroLogic 3.3S	N/A
KX33-2	CB, Loc B, 200A-600A, 3P, LSI, 600VAC, 80%, UL	A044T468	Schneider Electric	NLGL36600U33X-600A	MicroLogic 3.3S	N/A
KX34-2	CB, Loc C, 15A, 3P, 600VAC, 80%, UL	A043L506	Schneider Electric	HDL36015	Thermal Magnetic	N/A
KX35-2	CB, Loc C, 20A, 3P, 600VAC, 80%, UL	A043L480	Schneider Electric	HDL36020	Thermal Magnetic	N/A
KX36-2	CB, Loc C, 25A, 3P, 600VAC, 80%, UL	A043L508	Schneider Electric	HDL36025	Thermal Magnetic	N/A
KX37-2	CB, Loc C, 30A, 3P, 600VAC, 80%, UL	A043L475	Schneider Electric	HDL36030	Thermal Magnetic	N/A
KX38-2	CB, Loc C, 40A, 3P, 600VAC, 80%, UL	A043L464	Schneider Electric	HDL36040	Thermal Magnetic	N/A
KX39-2	CB, Loc C, 50A, 3P, 600VAC, 80%, UL	A043L461	Schneider Electric	HDL36050	Thermal Magnetic	N/A
KX40-2	CB, Loc C, 60A, 3P, 600VAC, 80%, UL	A043L459	Schneider Electric	HDL36060	Thermal Magnetic	N/A
KX41-2	CB, Loc C, 70A, 3P, 600VAC, 80%, UL	A043L451	Schneider Electric	HDL36070	Thermal Magnetic	N/A
KX42-2	CB, Loc C, 80A, 3P, 600VAC, 80%, UL	A043L012	Schneider Electric	HDL36080	Thermal Magnetic	N/A



NOTES:
 1. DIMENSIONS SHOWN IN [] ARE IN INCHES.

DETAIL A
 SCALE 3:8

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS		DIMENSIONS ARE IN MILLIMETERS	
mm	in.	mm	in.
0.00-4.99	0.157-0.198	0.00-4.99	0.157-0.198
5.00-9.99	0.197-0.236	10.00-14.99	0.394-0.591
10.00-14.99	0.394-0.591	15.00-19.99	0.591-0.787
15.00-19.99	0.591-0.787	20.00-24.99	0.787-0.984
20.00-24.99	0.787-0.984	25.00-29.99	0.984-1.181
25.00-29.99	0.984-1.181	30.00-34.99	1.181-1.378
30.00-34.99	1.181-1.378	35.00-39.99	1.378-1.575
35.00-39.99	1.378-1.575	40.00-44.99	1.575-1.772
40.00-44.99	1.575-1.772	45.00-49.99	1.772-1.969
45.00-49.99	1.772-1.969	50.00-54.99	1.969-2.166
50.00-54.99	1.969-2.166	55.00-59.99	2.166-2.363
55.00-59.99	2.166-2.363	60.00-64.99	2.363-2.560
60.00-64.99	2.363-2.560	65.00-69.99	2.560-2.757
65.00-69.99	2.560-2.757	70.00-74.99	2.757-2.954
70.00-74.99	2.954-3.151	75.00-79.99	3.151-3.348
75.00-79.99	3.151-3.348	80.00-84.99	3.348-3.545
80.00-84.99	3.545-3.742	85.00-89.99	3.742-3.939
85.00-89.99	3.939-4.136	90.00-94.99	4.136-4.333
90.00-94.99	4.333-4.530	95.00-99.99	4.530-4.727
95.00-99.99	4.727-4.924	100.00-104.99	4.924-5.121
100.00-104.99	5.121-5.318	105.00-109.99	5.318-5.515
105.00-109.99	5.515-5.712	110.00-114.99	5.712-5.909
110.00-114.99	5.909-6.106	115.00-119.99	6.106-6.303
115.00-119.99	6.303-6.500	120.00-124.99	6.500-6.697
120.00-124.99	6.697-6.894	125.00-129.99	6.894-7.091
125.00-129.99	7.091-7.288	130.00-134.99	7.288-7.485
130.00-134.99	7.485-7.682	135.00-139.99	7.682-7.879
135.00-139.99	7.879-8.076	140.00-144.99	8.076-8.273
140.00-144.99	8.273-8.470	145.00-149.99	8.470-8.667
145.00-149.99	8.667-8.864	150.00-154.99	8.864-9.061
150.00-154.99	9.061-9.258	155.00-159.99	9.258-9.455
155.00-159.99	9.455-9.652	160.00-164.99	9.652-9.849
160.00-164.99	9.849-10.046	165.00-169.99	10.046-10.243
165.00-169.99	10.243-10.440	170.00-174.99	10.440-10.637
170.00-174.99	10.637-10.834	175.00-179.99	10.834-11.031
175.00-179.99	11.031-11.228	180.00-184.99	11.228-11.425
180.00-184.99	11.425-11.622	185.00-189.99	11.622-11.819
185.00-189.99	11.819-12.016	190.00-194.99	12.016-12.213
190.00-194.99	12.213-12.410	195.00-199.99	12.410-12.607
195.00-199.99	12.607-12.804	200.00-204.99	12.804-13.001
200.00-204.99	13.001-13.198	205.00-209.99	13.198-13.395
205.00-209.99	13.395-13.592	210.00-214.99	13.592-13.789
210.00-214.99	13.789-13.986	215.00-219.99	13.986-14.183
215.00-219.99	14.183-14.380	220.00-224.99	14.380-14.577
220.00-224.99	14.577-14.774	225.00-229.99	14.774-14.971
225.00-229.99	14.971-15.168	230.00-234.99	15.168-15.365
230.00-234.99	15.365-15.562	235.00-239.99	15.562-15.759
235.00-239.99	15.759-15.956	240.00-244.99	15.956-16.153
240.00-244.99	16.153-16.350	245.00-249.99	16.350-16.547
245.00-249.99	16.547-16.744	250.00-254.99	16.744-16.941
250.00-254.99	16.941-17.138	255.00-259.99	17.138-17.335
255.00-259.99	17.335-17.532	260.00-264.99	17.532-17.729
260.00-264.99	17.729-17.926	265.00-269.99	17.926-18.123
265.00-269.99	18.123-18.320	270.00-274.99	18.320-18.517
270.00-274.99	18.517-18.714	275.00-279.99	18.714-18.911
275.00-279.99	18.911-19.108	280.00-284.99	19.108-19.305
280.00-284.99	19.305-19.502	285.00-289.99	19.502-19.699
285.00-289.99	19.699-19.896	290.00-294.99	19.896-20.093
290.00-294.99	20.093-20.290	295.00-299.99	20.290-20.487
295.00-299.99	20.487-20.684	300.00-304.99	20.684-20.881
300.00-304.99	20.881-21.078	305.00-309.99	21.078-21.275
305.00-309.99	21.275-21.472	310.00-314.99	21.472-21.669
310.00-314.99	21.669-21.866	315.00-319.99	21.866-22.063
315.00-319.99	22.063-22.260	320.00-324.99	22.260-22.457
320.00-324.99	22.457-22.654	325.00-329.99	22.654-22.851
325.00-329.99	22.851-23.048	330.00-334.99	23.048-23.245
330.00-334.99	23.245-23.442	335.00-339.99	23.442-23.639
335.00-339.99	23.639-23.836	340.00-344.99	23.836-24.033
340.00-344.99	24.033-24.230	345.00-349.99	24.230-24.427
345.00-349.99	24.427-24.624	350.00-354.99	24.624-24.821
350.00-354.99	24.821-25.018	355.00-359.99	25.018-25.215
355.00-359.99	25.215-25.412	360.00-364.99	25.412-25.609
360.00-364.99	25.609-25.806	365.00-369.99	25.806-26.003
365.00-369.99	26.003-26.200	370.00-374.99	26.200-26.397
370.00-374.99	26.397-26.594	375.00-379.99	26.594-26.791
375.00-379.99	26.791-26.988	380.00-384.99	26.988-27.185
380.00-384.99	27.185-27.382	385.00-389.99	27.382-27.579
385.00-389.99	27.579-27.776	390.00-394.99	27.776-27.973
390.00-394.99	27.973-28.170	395.00-399.99	28.170-28.367
395.00-399.99	28.367-28.564	400.00-404.99	28.564-28.761
400.00-404.99	28.761-28.958	405.00-409.99	28.958-29.155
405.00-409.99	29.155-29.352	410.00-414.99	29.352-29.549
410.00-414.99	29.549-29.746	415.00-419.99	29.746-29.943
415.00-419.99	29.943-30.140	420.00-424.99	30.140-30.337
420.00-424.99	30.337-30.534	425.00-429.99	30.534-30.731
425.00-429.99	30.731-30.928	430.00-434.99	30.928-31.125
430.00-434.99	31.125-31.322	435.00-439.99	31.322-31.519
435.00-439.99	31.519-31.716	440.00-444.99	31.716-31.913
440.00-444.99	31.913-32.110	445.00-449.99	32.110-32.307
445.00-449.99	32.307-32.504	450.00-454.99	32.504-32.701
450.00-454.99	32.701-32.898	455.00-459.99	32.898-33.095
455.00-459.99	33.095-33.292	460.00-464.99	33.292-33.489
460.00-464.99	33.489-33.686	465.00-469.99	33.686-33.883
465.00-469.99	33.883-34.080	470.00-474.99	34.080-34.277
470.00-474.99	34.277-34.474	475.00-479.99	34.474-34.671
475.00-479.99	34.671-34.868	480.00-484.99	34.868-35.065
480.00-484.99	35.065-35.262	485.00-489.99	35.262-35.459
485.00-489.99	35.459-35.656	490.00-494.99	35.656-35.853
490.00-494.99	35.853-36.050	495.00-499.99	36.050-36.247
495.00-499.99	36.247-36.444	500.00-504.99	36.444-36.641
500.00-504.99	36.641-36.838	505.00-509.99	36.838-37.035
505.00-509.99	37.035-37.232	510.00-514.99	37.232-37.429
510.00-514.99	37.429-37.626	515.00-519.99	37.626-37.823
515.00-519.99	37.823-38.020	520.00-524.99	38.020-38.217
520.00-524.99	38.217-38.414	525.00-529.99	38.414-38.611
525.00-529.99	38.611-38.808	530.00-534.99	38.808-39.005
530.00-534.99	39.005-39.202	535.00-539.99	39.202-39.399
535.00-539.99	39.399-39.596	540.00-544.99	39.596-39.793
540.00-544.99	39.793-39.990	545.00-549.99	39.990-40.187
545.00-549.99	40.187-40.384	550.00-554.99	40.384-40.581
550.00-554.99	40.581-40.778	555.00-559.99	40.778-40.975
555.00-559.99	40.975-41.172	560.00-564.99	41.172-41.369
560.00-564.99	41.369-41.566	565.00-569.99	41.566-41.763
565.00-569.99	41.763-41.960	570.00-574.99	41.960-42.157
570.00-574.99	42.157-42.354	575.00-579.99	42.354-42.551
575.00-579.99	42.551-42.748	580.00-584.99	42.748-42.945
580.00-584.99	42.945-43.142	585.00-589.99	43.142-43.339
585.00-589.99	43.339-43.536	590.00-594.99	43.536-43.733
590.00-594.99	43.733-43.930	595.00-599.99	43.930-44.127
595.00-599.99	44.127-44.324	600.00-604.99	44.324-44.521
600.00-604.99	44.521-44.718	605.00-609.99	44.718-44.915
605.00-609.99	44.915-45.112	610.00-614.99	45.112-45.309
610.00-614.99	45.309-45.506	615.00-619.99	45.506-45.703
615.00-619.99	45.703-45.900	620.00-624.99	45.900-46.097
620.00-624.99	46.097-46.294	625.00-629.99	46.294-46.491
625.00-629.99	46.491-46.688	630.00-634.99	46.688-46.885
630.00-634.99	46.885-47.082	635.00-639.99	47.082-47.279
635.00-639.99	47.279-47.476	640.00-644.99	47.476-47.673
640.00-644.99	47.673-47.870	645.00-649.99	47.870-48.067
645.00-649.99	48.067-48.264	650.00-654.99	48.264-48.461
650.00-654.99	48.461-48.658	655.00-659.99	48.658-48.855
655.00-659.99	48.855-49.052	660.00-664.99	49.052-49.249
660.00-664.99	49.249-49.446	665.00-669.99	49.446-49.643
665.00-669.99	49.643-49.840	670.00-674.99	49.840-50.037
670.00-674.99	50.037-50.234	675.00-679.99	50.234-50.431
675.00-679.99	50.431-50.628	680.00-684.99	50.628-50.825
680.00-684.99	50.825-51.022	685.00-689.99	51.022-51.219
685.00-689.99	51.219-51.416	690.00-694.99	51.416-51.613
690.00-694.99	51.613-51.810	695.00-699.99	51.810-52.007
695.00-699.99	52.007-52.204	700.00-704.99	52.204-52.401
700.00-704.99	52.401-52.598	705.00-709.99	52.598-52.795
705.00-709.99	52.795-52.992	710.00-714.99	52.992-53.189
710.00-714.99	53.189-53.386	715.00-719.99	53.386-53.583
715.00-719.99	53.583-53.780	720.00-724.99	53.780-53.977
720.00-724.99	53.977-54.174	725.00-729.99	54.174-54.371
725.00-729.99	54.371-54.568	730.00-734.99	54.56



Sound Pressure Level @ 7 meters, dB(A)

See notes 1-6 listed below

Configuration	Exhaust System	Position (Note 1)								8 Position Average
		1	2	3	4	5	6	7	8	
Standard – Unhoused	Infinite Exhaust	79.5	82.2	82.6	83.9	79.3	82.6	82.5	81.7	82.0
F216-2 Weather Protective Aluminium	Mounted	82.0	80.6	76.2	81.0	79.2	85.4	79.4	82.8	81.6
F231-2 Sound Attenuated Level 1, Aluminium	Mounted	81.1	76.3	71.9	72.8	72.2	73.0	71.5	76.1	75.7
F217-2 Sound Attenuated Level 2, Aluminium	Mounted	72.8	72.5	69.3	71.5	70.9	71.3	69.4	71.8	71.3

Sound Power Level, dB(A)

See notes 2-4, 7 and 8 listed below

Configuration	Exhaust System	Octave Band Center Frequency (Hz)										Overall Sound Power Level
		31.5	63	125	250	500	1000	2000	4000	8000	16000	
Standard – Unhoused	Infinite Exhaust	59.0	73.8	86.0	94.7	103.0	103.9	104.3	103.0	100.1	89.5	110.2
F216-2 Weather Protective Aluminium	Mounted	63.2	83.3	92.1	99.5	103.7	103.7	104.0	103.9	96.5	81.9	110.5
F231-2 Sound Attenuated Level 1, Aluminium	Mounted	62.2	77.2	87.2	92.4	96.2	97.0	96.5	94.3	96.7	80.0	103.7
F217-2 Sound Attenuated Level 2, Aluminium	Mounted	62.6	76.4	86.3	90.2	93.1	92.1	90.6	88.8	89.2	75.3	99.0

Exhaust Sound Power Level, dB(A)

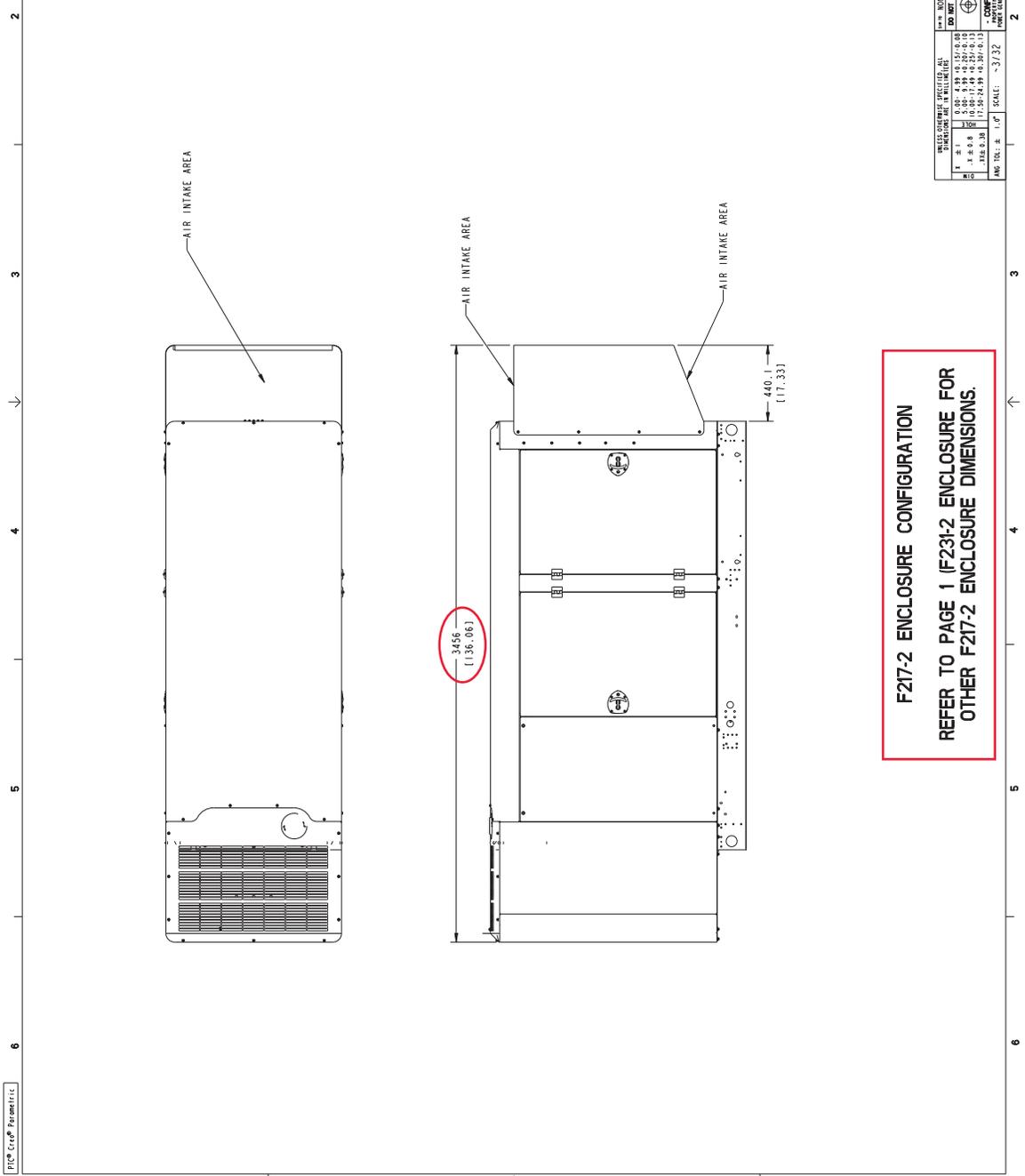
See notes 2 & 9 listed below

Open Exhaust (No Muffler) @ Rated Load	Octave Band Center Frequency (Hz)										Overall Sound Power Level
	31.5	63	125	250	500	1000	2000	4000	8000	16000	
	56.0	89.6	97.4	101.2	108.2	110.5	113.0	115.7	114.4	105.8	120.3

Note:

1. Position 1 faces the Generator front per ISO 8528-10. The positions proceed around the generator set in a counter-clockwise direction in 45° increments. All positions are at 7m (23 ft) from the surface of the generator set and 1.2 m (48 inches) from floor level.
2. Sound levels are subject to instrumentation, measurement, installation and manufacturing variability.
3. Data based on full rated load.
4. Sound data for generator set with infinite exhaust do not include exhaust noise.
5. Sound Pressure Levels are measured per ANSI S1.13 and ANSI S12.18, as applicable.
6. Reference sound pressure is 20 µPa.
7. Sound Power Levels per ISO 3744 and ISO 8528-10, as applicable.
8. Reference power – 1 pW (10⁻¹² W)
9. Exhaust Sound Power Levels are per ISO 6798, as applicable.

REV. NO.	DATE	BY	CHKD.	DESCRIPTION
ECO-155551	A	T		PRODUCTION RELEASE



**F217-2 ENCLOSURE CONFIGURATION
REFER TO PAGE 1 (F231-2 ENCLOSURE FOR
OTHER F217-2 ENCLOSURE DIMENSIONS.**

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Battery charger-6 amp

A045D925 60Hz/50Hz



Description

Cummins Power Generation fully automatic battery chargers are designed to both recharge your batteries, and extend your battery's life in applications where it is stored for long periods of time. This charger can handle poor power quality, exposure to extreme weather and rough handling.

To maximize battery life, a 3-stage charging cycle is implemented. The three charging stages are bulk stage, absorption stage and maintenance stage. During the bulk stage, the charger uses its full amp output to do the heaviest charging, quickly bringing your battery to about 75% of capacity. In the absorption stage, the current slows, adjusting for maximum charging efficiency while it gently tops off the battery to about 98% of capacity.

During the maintenance stage, a lower, closely-regulated, constant voltage is applied to maintain full charge and prevent discharge.

Unlike some "trickle chargers," the float charger won't apply more current than necessary to maintain full charge. Batteries can be connected indefinitely, without harm; in fact, the float charge extends battery life.

Features

Protection – Surge protected to IEEE and EN standards. All models include single pole cartridge type fuses mounted on the printed circuit board to protect against input or output overcurrent.

Lightweight and silent – Lighter than transformer types, completely silent but still provides full output when overloaded outlets drop AC voltage below the normal 115V.

Monitoring – Status LED indicators are provided to show the condition or charging status of the battery. When the red LED is on, it indicates that the battery is discharged and is recharging at the 'BULK' rate. When both the red and green LEDs are on, the battery is charging at the 'midrange' rate. When the green LED is on, the battery is 90% charged and ready for use.

Construction – Made using epoxy-potted cases making it the ultimate in durability, completely waterproof and able to withstand numerous caustic chemicals and gases, as well as being shockproof.

Fault Indication – The charger senses and indicates the following fault conditions: Defective or damaged cells, under-voltage at the battery, battery drawing more current than charger can replace, loss of power or extremely low AC voltage at the charger, other battery fault conditions and charger failure.

Compatibility – Works with Sealed Lead Acid (SLA), Absorbed Glass Mat (AGM) and Gel type batteries.

Low Electromagnetic and Radio

Frequency Interference – This product meets FCC class B for conducted and radiated emissions.

Listed – This product is UL listed according to the UL 1236 Standard.

Warranty – This product has a two year warranty

Specifications

Performance and physical characteristics

Output:	Nominal voltage	12 VDC
	Float voltage – 12 V batteries	13.0-13.6 VDC at 0-2 amps
	Maximum output current	6 A @ 12 VDC nom
Input:	Voltage AC	115, 208, 240 ±10%, 90-135
	Frequency	60 Hz ±5%
Battery:	Maximum battery size	150 Amp Hours
	Maximum recharge time	20 hours
Approximate net weight:		4 lbs. (1.81 Kg)
Approximate dimensions: height x width x depth-in(mm)		2.25 x 6.4 x 3.5 (57 x 162 x 89)
Ambient temperature operation: At full rated output		- 40°F to 158 °F (-40 °C to 70 °C)



Americas

1400 73rd Avenue N.E.
Minneapolis, MN 55432 USA
Phone: 763 574 5000
Fax: 763 574 5298

Europe, CIS, Middle East and Africa

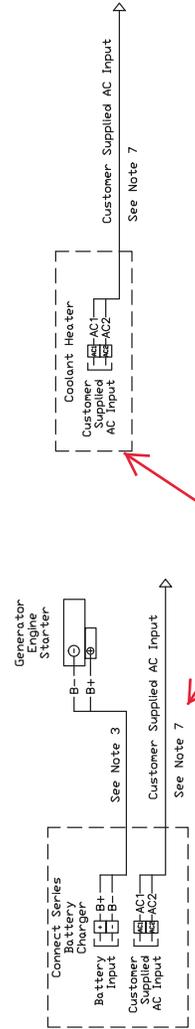
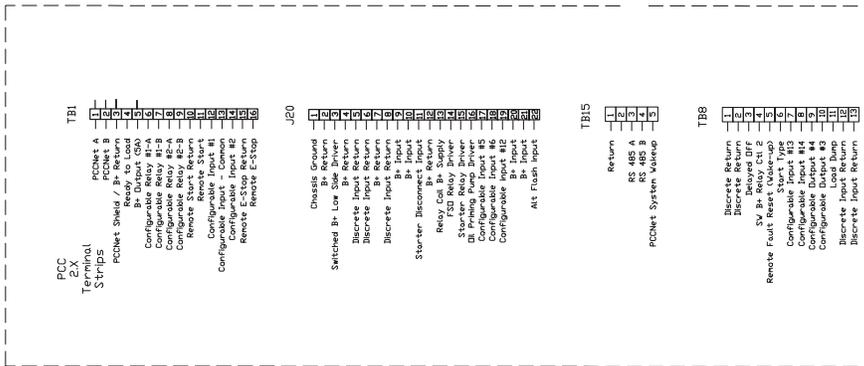
Manston Park Columbus Ave.
Manston Ramsgate
Kent CT 12 5BF United Kingdom
Phone 44 1843 255000
Fax 44 1843 255902

Asia Pacific

10 Toh Guan Road #07-01
TT International Tradepark
Singapore 608838
Phone 65 6417 2388
Fax 65 6417 2399

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.

Warning: For professional use only. Must be installed by a qualified service technician. Improper installation presents hazards of electrical shock and improper operation, resulting in severe personal injury and/or property damage.



see page 33 for termination point(s)



Project:
Title:
AUTHOR: D. Fields Date:

Revision: M
Sheet: 1 of 1

- Notes:
1. FTT-10 network cable use Belden 8471 or equivalent. Run cable between devices in a 'Daisy Chain' configuration. See FTT-10 manual for max distances and further detail.
 2. PCC NET network cable use Belden 9729 or equivalent. See Cummins documentation for max distances and further detail.
 3. See size chart in battery charger installation manual or NEC guide.
 4. See instruction sheet I6730 for Modem II Gateway Kit pinout and further detail.
 5. See instruction sheet I6730 for Modem II Gateway Kit pinout and further detail.
 6. See AUX 101 / 102 Operator Manual for pinout and further detail.
 7. See BDM for voltage.

Limited Warranty

Commercial Generating Set

This limited warranty applies to all Cummins Power Generation® branded commercial generating sets and associated accessories (hereinafter referred to as "Product").

This warranty covers any failures of the Product, under normal use and service, which result from a defect in material or factory workmanship.

Warranty Period:

The warranty start date[†] is the date of initial start up, first rental, demonstration or 18 months after factory ship date, whichever is sooner. See table for details.

Continuous Power (COP) is defined as being the maximum power which the generating set is capable of delivering continuously whilst supplying a constant electrical load when operated for an unlimited number of hours per year. No overload capability is available for this rating.

Prime Power (PRP) is defined as being the maximum power which a generating set is capable of delivering continuously whilst supplying a variable electrical load when operated for an unlimited number of hours per year. The permissible average power output over 24 hours of operation shall not exceed 70% of the PRP. For applications requiring permissible average output higher than stated, a COP rating should be used.

Limited-Time Running Power (LTP) is defined as the maximum power available, under the agreed operating conditions, for which the generating set is capable of delivering for up to 500 hours of operation per year.

Emergency Standby Power (ESP) is defined as the maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 500 hours of operation per year. The permissible average power output over 24 hours of operation shall not exceed 70% of the ESP.

Environmental Protection Agency – Stationary Emergency (EPA-SE) is defined as being the maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generator set is capable of delivering in the event of a utility power outage or under test conditions and used in strict accordance with the EPA NSPS for stationary engines, 40 CFR part 60, subparts IIII and JJJJ, where a reliable utility must be present. The permissible average power output over 24 hours of operation shall not exceed 70% of the EPA-SE.

Data Center Continuous (DCC) is defined as the maximum power which the generator is capable of delivering continuously to a constant or varying electrical load for unlimited hours in a data center application.

**Base Warranty Coverage Duration
(Whichever occurs first)**

Rating	Months	Max. Hours
COP	12	Unlimited
PRP	12	Unlimited
LTP	12	500 hrs
ESP	24	1000 hrs
EPA-SE	24	Unlimited
DCC	24	Unlimited

[†] Warranty start date for designated rental and oil and gas model Products is determined to be date of receipt of Product by the end customer.

Cummins Power Generation® Responsibilities:

In the event of a failure of the Product during the warranty period due to defects in material or workmanship, Cummins Power Generation® will only be responsible for the following costs:

- All parts and labor required to repair the Product.
- Reasonable travel expenses to and from the Product site location.
- Maintenance items that are contaminated or damaged by a warrantable failure.

Owner Responsibilities:

The owner will be responsible for the following:

- Notifying Cummins Power Generation® distributor or dealer within 30 days of the discovery of failure.
- Installing, operating, commissioning and maintaining the Product in accordance with Cummins Power Generation®'s published policies and guidelines.
- Providing evidence for date of commissioning.
- Providing sufficient access to and reasonable ability to remove the Product from the installation in the event of a warrantable failure.
- Incremental costs and expenses associated with Product removal and reinstallation resulting from non-standard installations.
- Costs associated with rental of generating sets used to replace the Product being repaired.
- Costs associated with labor overtime and premium shipping requested by the owner.
- All downtime expenses, fines, all applicable taxes, and other losses resulting from a warrantable failure.

Limitations:

This limited warranty does not cover Product failures resulting from:

- Inappropriate use relative to designated power rating.
- Inappropriate use relative to application guidelines.
- Inappropriate use of an EPA-SE application generator set relative to EPA's standards.
- Normal wear and tear.
- Improper and/or unauthorized installation.
- Negligence, accidents or misuse.
- Lack of maintenance or unauthorized repair.
- Noncompliance with any Cummins Power Generation® published guideline or policy.
- Use of improper or contaminated fuels, coolants or lubricants.
- Improper storage before and after commissioning.
- Owner's delay in making Product available after notification of potential Product problem.
- Replacement parts and accessories not authorized by Cummins Power Generation®.
- Use of Battle Short Mode.
- Owner or operator abuse or neglect such as: operation without adequate coolant or lubricants; overfueling; overspeeding; lack of maintenance to lubricating, cooling or air intake systems; late servicing and maintenance; improper storage, starting, warm-up, run-in or shutdown practices, or for progressive damage resulting from a defective shutdown or warning device.

- Damage to parts, fixtures, housings, attachments and accessory items that are not part of the generating set.

This limited warranty does not cover costs resulting from:

- Difficulty in gaining access to the Product.
- Damage to customer property.

A "Data center" is defined as a dedicated facility that house computers and associated equipment for data storage and data handling.

Reliable utility is defined as utility power without routine or regularly scheduled black-outs.

Please contact your local Cummins Power Generation® Distributor for clarification concerning these limitations.

CUMMINS POWER GENERATION® RIGHT TO FAILED COMPONENTS:

Failed components claimed under warranty remain the property of Cummins Power Generation®. Cummins Power Generation® has the right to reclaim any failed component that has been replaced under warranty.

Extended Warranty:

Cummins Power Generation® offers several levels of Extended Warranty Coverage. Please contact your local Cummins Power Generation® Distributor for details.

www.power.cummins.com

THE WARRANTIES SET FORTH HEREIN ARE THE SOLE WARRANTIES MADE BY CUMMINS POWER GENERATION® IN REGARD TO THE PRODUCT. CUMMINS POWER GENERATION® MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT IS CUMMINS POWER GENERATION® LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

This limited warranty shall be enforced to the maximum extent permitted by applicable law. This limited warranty gives the owner specific rights that may vary from state to state or from jurisdiction to jurisdiction.

Product Model Number: _____
 Product Serial Number: _____
 Date in Service: _____