SUBMITTAL PACKAGE

CSDG - MOUNTAINBROOK SENIOR GENERATOR (NEGOTIATED)

Prepared For:

Central States Diesel Generators
2001 S PRAIRIE AVE
WAUKESHA, Wisconsin 53189-7307
United States

· PLEASE READ:

For your convenience, Cummins is providing as much information as is possible regarding this project. A preliminary submittal is presented due to some details and drawings not being available at the date of creation. Lead-times for delivery, labor, and services from Cummins' sub-suppliers or subcontractors, as well as custom engineering work, may require more research. After all information is available and approved, the Cummins Project Manager will send the completed, final submittal package for your approval.

Date: 10/30/2025

Opportunity # O-679909

BMS# 470213

Customer PO# Mountainbrook

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IMPORTANT: *The critical power solution information and specifications included in this pdf can be used by the site contractor(s) and/or engineer(s) to assist with planning for and accomplishing the overall power solution installation. Please forward this document to the appropriate personnel, as necessary.*

It is the obligation of the electrical contractor and reviewing engineer to determine that the item quantities and accuracy of this submittal is correct as required for the job. Any inaccuracies or deviations must be addressed with Cummins Inc. before release to manufacturing. Any releases of material to manufacturing by the above parties constitute an acceptance of the accuracy of the submittal. Any changes after release will be viewed as a change order, subject to pricing changes. Please take the time to review this package for accuracy to prevent any after-shipment problems that could cause delay in energization.

Cummins certifies that these drawings, material lists, specification and datasheets have been checked prior to submittal and they:

- *accurately depict the proposed equipment*
- *provide current information to the date of the submittal and*
- *present true and accurate equipment information.*

This Approval Drawing Package is submitted as our interpretation of the project requirements and/or the specifications for this job. Please note that issuance of these submittals shall not be deemed or interpreted as performance nor acceptance of your purchase order terms and conditions.

For questions or comments regarding this submittal, please contact the Cummins Project Manager listed on the title page.

TABLE OF CONTENTS

SECTION 1

Project Information

Bill of Material

Feature Code	Description	Qty
DFEJ	**DFEJ Commercial Diesel Generator Set, 450kW Standby 60Hz**	**1**
450DFEJ	450DFEJ, Diesel Genset, 60Hz, 450kW-Standby Rating	
Install-US-Stat	U.S. EPA, Stationary Emergency Application	
A331-2	Duty Rating - Standby Power (ESP)	
L170-2	Emission Certification, EPA, Tier 2, NSPS CI Stationary Emergency	
L090-2	Listing - UL 2200	
R098-2	Voltage - 120/208, 3 Phase, Wye, 4 Wire	
B252-2	Alternator - 60Hz, 12 Lead, Broad Range, 125/105C	
F202-2	Steel Sound Attenuated Level 2 Enclosure, with Exhaust System	
P175-2	Enclosure Color - Green, Steel	
C209-2	Fuel Tank - Sub Base, 1700 Gallon, UL142 Compliant	
L163-2	Listing, ULC - S601-07	
C127-2	Fuel Water Separator	
H609-2	Control Mounting - Left Facing	
H703-2	PowerCommand 2.3 Controller	
H678-2	LCD Control Display	
H536-2	Control Display Language - English	
KU94-2	Circuit Breaker or Entrance Box or Terminal Box - Right Only	
3250	Circuit Breaker or Entrance Box or Terminal Box, Left - None	
KC60-2	Circuit Breaker - 1200A, Right Circuit Breaker on Right side, 3 - Pole, UL 600, IEC 690, 100%	
3251	Circuit Breaker or Entrance Box or Terminal Box, Left - None	
KB72-2	Circuit Breaker or Entrance Box - Bottom Entry,Right Side	
H550-2	Indication - Ground Fault	
4980	Engine Exhaust Connection - None	
D041-2	Engine Air Cleaner - Normal Duty	
E082-2	Engine Cooling - Radiator, 40C Ambient	
H527-2	Warning - Low Coolant Level	
H557-2	Coolant Heater - 208/240/480 Volts AC, Below 40F Ambient Temperature	
L028-2	Genset Warranty - 2 Years Base	
L050-2	Literature - English	
A412-2	Packing - None, Base Mounted Housing	
A048G602	**Battery Charger-10Amp, 120/208/240VAC, 12/24V, 50/60Hz**	**1**

SECTION 2

Generator Specifications

Specification sheet

Diesel generator set QSX15 series engine

450 kW – 500 kW Standby

Description

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

Features

Cummins heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions 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.

Permanent Magnet Generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

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

Enclosures - Optional weather protective and sound attenuated enclosures are available.

Fuel tanks - Dual wall sub-base fuel tanks are also available.

NFPA - The genset 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 network.

	Standby rating	Prime rating	Continuous rating	Data sheets
Model	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz
DFEJ	450 (563)	410 (513)		D-3400
DFEK	500 (625)	455 (569)		D-3401

Generator set specifications

Governor regulation class	ISO 8528 part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
EMS compatibility	IEC 61000-4-2: Level 4 Electrostatic discharge IEC 61000-4-3: Level 3 Radiated susceptibility

Engine specifications

Design	Turbocharged with air-to-air charge air-cooling
Bore	136.9 mm (5.39 in.)
Stroke	168.9 mm (6.65 in.)
Displacement	14.9 L (912.0 in^3)
Cylinder block	Cast iron with replaceable wet liners, in-line 6 cylinder
Battery capacity	1400 Amps minimum at ambient temperature 0 ℃ (32 ℉)
Battery charging alternator	35 Amps
Starting voltage	24 volt, negative ground
Fuel system	Full authority electronic (FAE) Cummins HPI-TP
Fuel filter	
Air cleaner type	
Lube oil filter type(s)	Single spin-on combination full flow and bypass filters
Standard cooling system	40 ºC (104 ºF) ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip-proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 ℃ standby at 40 ℃ ambient
Exciter type	PMG (Permanent Magnet Generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50% per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3%

Available voltages

60 Hz Line – Neutral/Line - Line

- 110/190
- 120/208
- 230/400
- 347/600
- 110/220
- 127/220
- 240/416
- 115/200
- 139/240
- 255/440
- 115/230
- 220/380
- 277/480

Note: Consult factory for other voltages.

Generator set options

Engine

- 208/240/480 V thermostatically controlled coolant heater for ambient above 4.5 ℃ (40℉)
- 208/240/480 V thermostatically controlled coolant heater for ambient below 4.5 ℃ (40℉)
- 120 V 300 W lube oil heater
- Heavy duty air cleaner with safety element

Alternator

- 80 ℃ rise
- 125 ℃ rise
- 150 ℃ rise
- 120/240 V 200 W anti-condensation heater

Exhaust system

- Critical grade exhaust silencer
- Exhaust packages
- Industrial grade exhaust silencer
- Residential grade exhaust silencer

Fuel system

- 1022 L (270 gal) sub-base tank
- 1136 L (300 gal) sub-base tank
- 1514 L (400 gal) sub-base tank
- 1893 L (500 gal) sub-base tank
- 2271 L (600 gal) sub-base tank
- 2498 L (660 gal) sub-base tank
- 3218 L (850 gal) sub-base tank
- 6435 L (1700 gal) sub-base tank
- 9558 L (2525 gal) sub-base tank

Cooling system

- High ambient 50 ℃ radiator

Control panel

- PC 3.3
- PC 3.3 with MLD
- 120/240 V 100 W control anti-condensation heater
- Ground fault indication
- Remote fault signal package
- Run relay package

Generator set

- AC entrance box
- Battery
- Battery charger
- Export box packaging
- UL 2200 Listed
- Main line circuit breaker
- Paralleling accessories
- Remote annunciator panel
- Spring isolators
- Enclosure: aluminium, steel, weather protective or sound attenuated
- 2 year standby power warranty
- 2 year prime power warranty
- 5 year basic power warranty
- 10 year major components warranty

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

Control system 2.3

The PowerCommand 2.3 control system - An integrated generator set control system providing voltage regulation, engine protection, generator protection, operator interface and isochronous governing (optional).

Control – 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 ℃ to +70 ℃ and altitudes to 13,000 feet (5000 meters). Prototype tested - UL, CSA and CE compliant.

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
- Fuel-in-rupture-basin warning or shutdown

Operator/display panel

- Manual off switch
- 128 x 128 Alpha-numeric display with push button access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- 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 ºC to +70 ºC

Alternator data

- Line-to-Neutral AC volts
- Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kVA, kW, power factor

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature

Control functions

- Time delay start and cool down
- Glow plug control (some models)
- Cycle cranking
- PCCNet interface
- (4) Configurable inputs
- (4) Configurable outputs
- Remote emergency stop
- Battle short mode
- Load shed
- Real time clock with exerciser
- Derate

Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 3-phase Line-to-Line sensing
- Configurable torque matching
- Fault current regulation under single or three phase fault conditions

Other data

- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)
- Total kilowatt hours
- Load profile

Options

- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand for Windows® remote monitoring software (direct connect)
- AC output analogue meters
- PowerCommand 2.3 and 3.3 control with AmpSentry protection

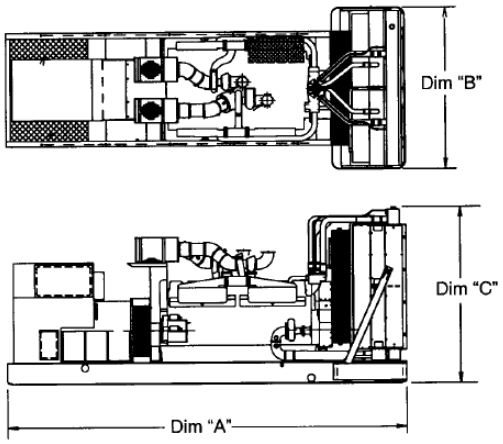
For further detail on PC 2.3 see document S-1569.
For further detail on PC 3.3 see document S-1570.

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 if 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 dry* kg (lbs)	Set weight wet* kg (lbs)
DFEJ	3864 (152.1)	1524 (60.0)	1812 (71.3)	4098 (9035)	4234 (9335)
DFEK	3864 (152.1)	1524 (60.0)	1812 (71.3)	4325 (9535)	4461 (9835)

*Weights represent a set with standard features. 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 in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	**U.S EPA**	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
	All low voltage models are CSA certified to product class 4215-01.	**International Building Code**	The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012.

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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S-1582 (08/17)

Generator set data sheet

Model:	**DFEJ**
Frequency:	**60 Hz**
Fuel type:	**Diesel**
kW rating:	**450 Standby** **410 Prime**
Emissions level:	**EPA NSPS Stationary Emergency Tier 2**

Exhaust emission data sheet:	**EDS-184**
Exhaust emission compliance sheet:	**EPA-1025**
Sound performance data sheet:	**MSP-183**
Cooling performance data sheet:	**MCP-106**
Prototype test summary data sheet:	**PTS-145**
Standard set-mounted radiator cooling outline:	**0500-3326**
Optional set-mounted radiator cooling outline:	
Optional heat exchanger cooling outline:	
Optional remote radiator cooling outline:	

Fuel consumption	**Standby**				**Prime**				**Continuous**
	kW (kVA)				**kW (kVA)**				**kW (kVA)**
Ratings	450 (563)				410 (513)				
Load	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**	**Full**
US gph	10.8	17.4	23.4	30.1	10.2	16.2	21.9	27.7	
L/hr	41	66	89	114	39	61	83	105	

Engine	**Standby rating**	**Prime rating**	**Continuous rating**
Engine manufacturer	Cummins Inc.		
Engine model	QSX15-G9		
Configuration	Cast iron with replaceable wet cylinder liners, In-Line 6 cylinder		
Aspiration	Turbocharged and air-to-air after-cooled		
Gross engine power output, kW_m (bhp)	563.0 (755.0)	507.3 (680.0)	
BMEP at set rated load, kPa (psi)	2192.5 (318.0)	2006.4 (291.0)	
Bore, mm (in.)	136.9 (5.39)		
Stroke, mm (in.)	168.9 (6.65)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	10.1 (1995.0)		
Compression ratio	17.0:1		
Lube oil capacity, L (qt)	83.3 (88.0)		
Overspeed limit, rpm	2150 ± 50		
Regenerative power, kW	52.00		

Fuel flow	Standby rating	Prime rating	Continuous rating
Maximum fuel flow, L/hr (US gph)	423.9 (112.0)		
Maximum fuel inlet restriction, mm Hg (in Hg)	127.0 (5.0)		
Maximum return restriction, mm Hg (in Hg)	165.1 (6.5)		

Air			
Combustion air, m^3/min (scfm)	38.3 (1355.0)	36.8 (1300.0)	
Maximum air cleaner restriction, kPa (in H_2O)	6.2 (25.0)		
Alternator cooling air, m^3/min (cfm)	62.0 (2190.0)		

Exhaust			
Exhaust flow at set rated load, m^3/min (cfm)	87.9 (3105.0)	82.4 (2910.0)	
Exhaust temperature, °C (°F)	462.8 (865.0)	440.6 (825.0)	
Maximum back pressure, kPa (in H_2O)	10.2 (41.0)		

Standard set-mounted radiator cooling			
Ambient design, °C (°F)	40 (104)		
Fan load, kW_m (HP)	19 (25.5)		
Coolant capacity (with radiator), L (US gal)	57.9 (15.3)		
Cooling system air flow, m^3/min (scfm)	707.5 (25000.0)		
Total heat rejection, MJ/min (Btu/min)	19.6 (18485.0)	17.7 (16680.0)	
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)		

Optional set-mounted radiator cooling			
Ambient design, °C (°F)	50 (122)		
Fan load, kW_m (HP)	19 (25.5)		
Coolant capacity (with radiator), L (US gal)	57.9 (15.3)		
Cooling system air flow, m^3/min (scfm)	707.5 (25000.0)		
Total heat rejection, MJ/min (Btu/min)	19.6 (18485.0)	17.7 (16680.0)	
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)		

Weights[2]

Unit dry weight kgs (lbs)	**Refer to drawings for specific weights & dimensions**
Unit wet weight kgs (lbs)	

Notes:

[1] For non-standard remote installations contact your local Cummins representative.

[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

Derating factors

Standby	Genset may be operated at up to 2100 m (6889 ft) and 40°C (104°F) without power deration. For sustained operation above these conditions, derate by 3.0% per 305 m (1000 ft), and 9.5% per 10°C (9% per 18°F). Genset may be operated at up to 1350 m (4429 ft) and 50°C (122°F) without power deration. For sustained operation above these conditions, derate by 3.2% per 305 m (1000 ft), and 9.5% per 10°C (9% per 18°F).
Prime	Genset may be operated at up to 3200 m (10500 ft) and 40°C (104°F) without power deration. For sustained operation above these conditions, derate by 3% per 305 m (1000 ft), and 16.6% per 10°C (16.6% per 18°F). Genset may be operated at up to 2260 m (7414.7 ft) and 50°C (122°F) without power deration. For sustained operation above these conditions, derate by 3.2% per 305 m (1000 ft), and 16.6% per 10°C (16.6% per 18°F).
Continuous	

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

Three phase table[1]		105 °C	105 °C	125 °C	125 °C	125 °C	125 °C	125 °C	150 °C	150 °C	150 °C
Feature code		B259	B301	B258	B252	B414	B246	B300	B426	B424	B419
Alternator data sheet number		308	306	307	306	307	305	305	307	305	305
Voltage ranges		110/190 thru 139/240 220/380 thru 277/480	347/600	110/190 thru 139/240 220/380 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	277/480	347/600	110/190 thru 139/240 220/380 thru 277/480	277/480	347/600
Surge kW		515	516	513	512	515	513	511	513	513	511
Motor starting kVA (at 90% sustained voltage)	Shunt										
	PMG	2429	1896	2208	1896	2208	1749	1749	2208	1749	1749

Full load current amps at Standby rating		110/190 1711	120/208 1563	110/220 1478	115/230 1414	139/240 1355	220/380 856	230/400 813	240/416 782	277/480 677	347/600 542

Notes:

[1] Single phase power can be taken from a three phase generator set at up to 2/3 set rated 3-phase kW at 1.0 power factor. Also see Note 3 below.

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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D-3400 PDD-3400 (05/25)

Specification Sheet

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, UKCA 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 ºC (104 ºF) 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.

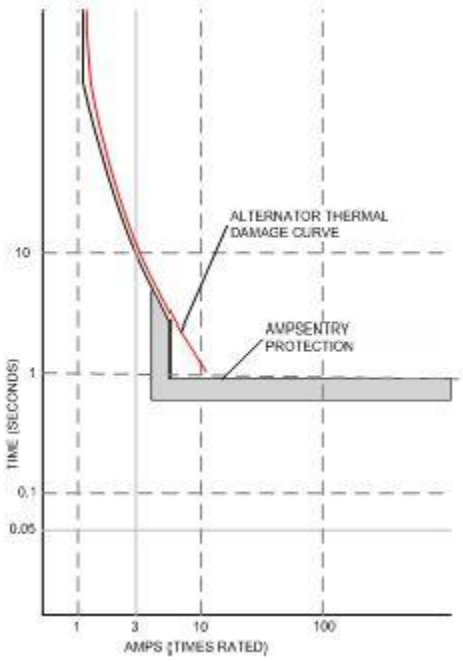
Fail to start (overcrank) shutdown - The control system will indicate a fault if the generator set fails to start by the completion of the engine crack sequence.

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:

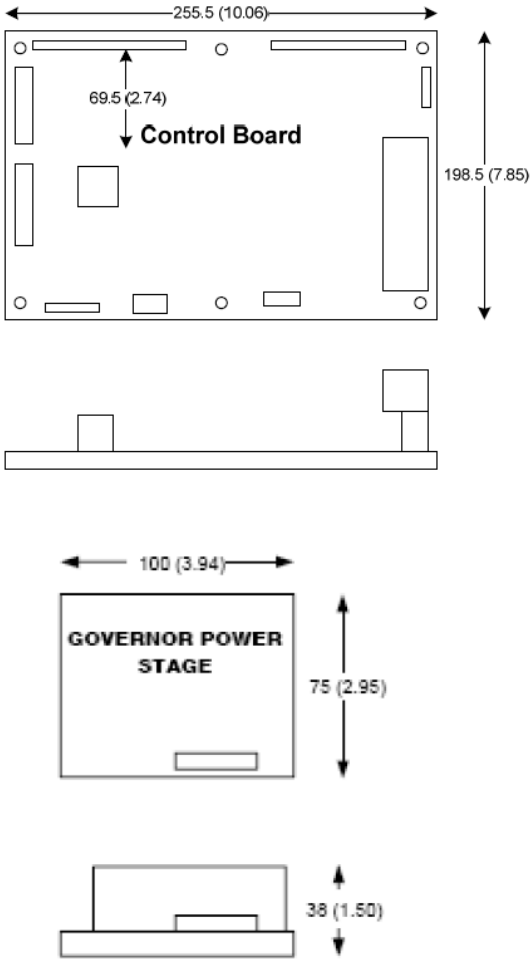
- Load dump signal: Operates when the generator set is in an overload condition.
- Delayed off signal: Time delay based output which will continue to remain active after the control has removed the run command. Adjustment range: 0 – 120 seconds. Default: 0 seconds.
- Configurable relay outputs: Control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

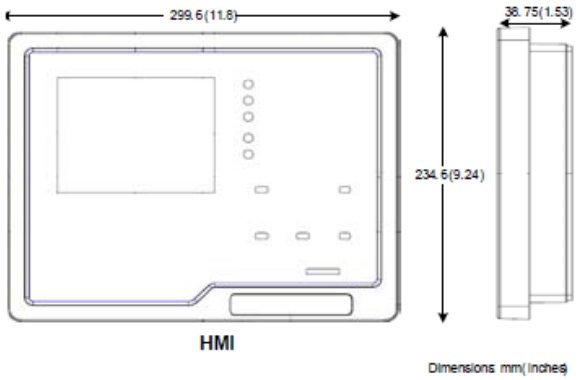
Features

- 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 ºC to +70º C (-40 ºF to 158 ºF) and for storage from -55 ºC to +80 ºC (-67 ºF to 176 ºF). Control will operate with humidity up to 95%, non-condensing.

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

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: 1993 compliance, controls and switchgear.
- CE marking: The CE marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
- UKCA marking: The UKCA marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
- 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.

PCCNet COMPATIBLE

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

Our energy working for you.™

PDS-1569 | PD00000157 | (02/22)

Alternator Data Sheet
Frame Size: HC5E

Characteristics		1-bearing weight		2-bearing weight	
Weights:	Stator assembly:	1592 lb	722 kg	1592 lb	722 kg
	Rotor assembly:	1360 lb	617 kg	1296 lb	588 kg
	Complete assembly:	3402 lb	1543 kg	3384 lb	1535 kg
Maximum speed:		2250 rpm			
Excitation current:	Full load:	2.6 Amps			
	No load:	0.6 Amps			
Insulation system:	Class H throughout				

3 Ø Ratings (0.8 power factor)			60 Hz (winding no)					
			190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
150° C rise ratings	@40C	kW	525	575	600	640	575	616
		kVA	656	719	750	800	719	770
125° C rise ratings	@40C	kW	498	545	570	600	545	580
		kVA	623	681	713	750	681	725
105° C rise ratings	@40C	kW	456	500	520	540	500	526
		kVA	570	625	650	675	625	658
80° C rise ratings	@40C	kW	400	440	456	475	440	456
		kVA	500	550	570	594	550	570

3 Ø Reactances (per unit ± 10%)	190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
(Based on full load at 125° C rise rating)						
Synchronous	3.87	3.53	3.30	2.92	3.53	2.98
Transient	0.19	0.17	0.16	0.14	0.17	0.14
Subtransient	0.13	0.12	0.11	0.10	0.12	0.10
Negative sequence	0.25	0.23	0.22	0.19	0.23	0.19
Zero sequence	0.11	0.10	0.09	0.08	0.10	0.08

3 Ø Motor Starting (90% sustained voltage)	190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
Maximum kVA	2208	2208	2208	2208	2208	2208

Time Constants (sec)	190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
Transient	0.08	0.08	0.08	0.08	0.08	0.08
Subtransient	0.012	0.012	0.012	0.012	0.012	0.012
Open circuit	2.5	2.5	2.5	2.5	2.5	2.5
DC	0.019	0.019	0.019	0.019	0.019	0.019

Windings (@22° C)		190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
Stator resistance	(Ohms L-L)	0.0086	0.0086	0.0086	0.0086	0.0086	0.0136
Rotor resistance	(Ohms)	1.96	1.96	1.96	1.96	1.96	1.96
Number of leads		12	12	12	12	12	12

Sound data
450DFEJ
60Hz Diesel

Sound pressure level @ 7 meters, dB(A)

See notes 1-8 listed below

Configuration		Measurement location number								Average
		1	2	3	4	5	6	7	8	
Standard – unhoused	Infinite exhaust	89	92	92	91	88	91	91	93	91
F183 – residential muffler	Mounted muffler	87	90	90	88	87	88	87	90	89
F200 – weather	Mounted muffler	88	89	84	87	89	87	84	90	88
F201 – quiet site II first stage	Mounted muffler	87	88	83	82	78	80	82	89	85
F202 – quiet site II second stage	Mounted muffler	73	73	72	74	75	75	75	74	74

Sound power level, dB(A)

See notes 2-6, 9, 10 listed below

Configuration		Octave band center frequency (Hz)								Overall sound power level
		63	125	250	500	1000	2000	4000	8000	
Standard – unhoused	Infinite exhaust	85	100	103	110	112	113	108	105	118
F183 – residential muffler	Mounted muffler	104	114	113	110	108	107	101	103	119
F200 – weather	Mounted muffler	102	108	104	108	110	109	106	101	116
F201 – quiet site II first stage	Mounted muffler	102	108	104	107	109	107	105	98	115
F202 – quiet site II second stage	Mounted muffler	83	92	95	95	97	99	96	90	104

Exhaust sound power level, dB(A)

Open exhaust (no muffler) @ rated load	Octave band center frequency (Hz)								Overall sound power level
	63	125	250	500	1000	2000	4000	8000	
	103	119	125	123	125	126	127	121	133

Note:

1. Position 1 faces the engine front. The positions proceed around the generator set in a counter-clockwise direction in 45° increments. All positions are at 7 m (23 ft) from the surface of the generator set and 1.2 m (48 in.) from floor level.
2. Sound levels are subject to instrumentation, measurement, installation and manufacturing variability.
3. Sound data with remote-cooled generator sets are based on rated loads without cooling fan noise.
4. Sound levels for aluminum enclosures are approximately 2 dB(A)s higher than listed sound levels for steel enclosures.
5. Sound data for generator set with infinite exhaust do not include exhaust noise.
6. Data is based on full rated load with standard radiator-cooling fan package.
7. Sound pressure levels are measured per ANSI S1.13 and ANSI S12.18, as applicable.
8. Reference sound pressure is 20 µPa.
9. Sound power levels per ISO 3744 and ISO 8528-10, as applicable.
10. Reference power = 1 pw (10^{-12} W).
11. Exhaust sound power levels are per ISO 6798, as applicable.

Cooling system data
DFEJ

40 Degree C ambient radiator cooling system

Duty		Rating (kW)	Max cooling @ air flow static restriction, unhoused (inches water/mm water)					Housed in free air, no air discharge restriction			
			0.0/0.0	0.25/6.4	0.5/12.7	0.75/19.1	1.0/25.4	F183	F200	F201	F202
			Maximum allowable ambient temperature, degree C								
60 Hz	Standby	450	43	43	43	43	43	43	43	43	43
	Prime	410	43	43	43	43	43	N/A	N/A	N/A	N/A
50 Hz	Standby	400	43	43	43	43	43	N/A	N/A	N/A	N/A
	Prime	364	43	43	43	43	43	N/A	N/A	N/A	N/A

50 Degree C ambient radiator cooling system

Duty		Rating (kW)	Max cooling @ air flow static restriction, unhoused (inches water/mm water)					Housed in free air, no air discharge restriction			
			0.0/0.0	0.25/6.4	0.5/12.7	0.75/19.1	1.0/25.4	F183	F200	F201	F202
			Maximum allowable ambient temperature, degree C								
60 Hz	Standby	450	55	55	55	49	45	55	55	55	55
	Prime	410	55	54	53	48	44	N/A	N/A	N/A	N/A
50 Hz	Standby	400	55	55	55	55	54	N/A	N/A	N/A	N/A
	Prime	364	55	55	55	55	53	N/A	N/A	N/A	N/A

Notes:

1. Data shown are anticipated cooling performance for typical generator set.
2. Cooling data is based on 1000 ft (305 m) site test location.
3. Generator set power output may need to be reduced at high ambient conditions. Consult generator set data sheet for derate schedules.
4. Cooling performance may be reduced due to several factors including but not limited to: Incorrect installation, improper operation, fouling of the cooling system, and other site installation variables.

2025 EPA Tier 2 Exhaust Emission Compliance Statement
450DFEJ
Stationary Emergency
60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with Tier 2 emissions limit of U.S. EPA New Source Performance Standards for stationary emergency engines under the provisions of 40 CFR 60 Subpart IIII.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	SCEXL015.AAJ-017
Effective Date:	11/12/2024
Date Issued:	11/12/2024
EPA Engine Family (Cummins Emissions Family):	SCEXL015.AAJ

Engine Information:

Model:	QSX/QSX15/QSX15-G/QSX15-G9	Bore:	5.39 in. (137 mm)
Engine Nameplate HP:	755	Stroke:	6.65 in. (169 mm)
Type:	4 Cycle, In-line, 6 Cylinder Diesel	Displacement:	912 cu. in. (15 liters)
Aspiration:	Turbocharged and CAC	Compression ratio:	17.0:1
Emission Control Device:	Electronic Control	Exhaust stack diameter:	8 in. (203 mm)

Diesel Fuel Emission Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kWm-hr		
	NO_X + NMHC	CO	PM	NO_X + NMHC	CO	PM
EPA Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20

Test methods: EPA emissions recorded per 40 CFR Part 60, 89, 1039, 1065 and weighted at load points prescribed in the regulations for constant speed engines.

Diesel fuel specifications: Cetane number: 40-50, Reference: ASTM D975 No. 2-D, 300-500 ppm Sulfur

Reference conditions: Air Inlet Temperature: 25 °C (77 °F), Fuel Inlet Temperature: 40 °C (104 °F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for NOx correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit..

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Exhaust Emission Data Sheet
450DFEJ
60 Hz Diesel Generator Set
EPA NSPS Stationary Emergency

Engine Information:

Model:	Cummins Inc. QSX15-G9 NR 2	Bore:	5.39 in. (137 mm)
Nameplate BHP @ 1800 RPM:	755	Stroke:	6.65 in. (169 mm)
Type:	4 cycle, in-line, 6 cylinder diesel	Displacement:	912 cu. in. (14.9 liters)
Aspiration:	Turbocharged with air-to-air charge air cooling		
Compression Ratio:	17:1		
Emission Control Device:	Turbocharged with charge air-cooled		

Performance Data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
Engine HP @ Stated Load (1800 RPM)	185	344	502	661	605
Fuel Consumption (gal/Hr)	10.6	17.4	23.6	30.3	28.0
Exhaust Gas Flow (CFM)	1360	2000	2605	3110	2920
Exhaust Gas Temperature (°F)	735	820	810	865	825
Exhaust Emission Data					
HC (Total Unburned Hydrocarbons)	0.22	0.08	0.06	0.12	0.11
NOx (Oxides of Nitrogen as NO_2)	2.97	3.31	4.20	4.00	3.66
CO (Carbon Monoxide)	0.52	0.31	0.37	0.35	0.32
PM (Particulate Matter)	0.08	0.05	0.04	0.02	0.02
Smoke (Pierburg)	0.47	0.40	0.38	0.19	0.18

All values (except smoke) are cited: g/BHP-hr

Test Methods and Conditions

Steady-state emissions recorded per ISO8178-1 during operation at rated engine speed (+/- 2%) and stated constant load (+/- 2%) with engine temperatures, pressures and emission rated stabilized.

Fuel specification:	40-48 Cetane Number, 0.05 Wt.% max. Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.
Air Inlet Temperature:	25 °C (77 °F)
Fuel Inlet Temperature:	40 °C (104 °F)
Barometric Pressure:	100 kPa (29.53 in Hg)
Humidity:	10.7 g/kg (75 grains H_2O/lb) of dry air (required for NOx correction)
Intake Restriction:	Set to maximum allowable limit for clean filter
Exhaust Back Pressure:	Set to maximum allowable limit

Data was taken from a single engine test according to the test methods, fuel specification and reference conditions stated above and is subjected to instrumentation and engine-to-engine variability. Tests conducted with alternate test methods, instrumentation, fuel or reference conditions can yield different results.

PROTOTYPE TEST SUPPORT (PTS)
60 HZ TEST SUMMARY

GENERATOR SET MODELS	REPRESENTATIVE PROTOTYPE	
450DFEJ	Model:	500DFEK
500DFEK	Engine:	QSX15-G9
	Alternator:	HC5F

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: 516 KW

The generator set was evaluated to determine the stated maximum surge power.

Maximum Motor Starting: 2429 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

Torsional Analysis and Testing:

The generator set was tested to verify that the design is not subjected to harmful torsional stresses in excess of 5000psi. A spectrum analysis of the transducer output was conducted over the
speed range of 1200 to 2000 RPM.

Cooling System: 50 °C Ambient
0.50 in. H2O restriction

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

Durability:

The generator set was subjected to a minimum 500 hour endurance test operating at variable load up to the standby rating based upon MIL-STD-705 to verify structural soundness and durability of the design.

Electrical and Mechanical Strength:

The generator set was tested to several single phase and three phase faults to verify that the generator can safely withstand the forces associated with short circuit conditions. The generator set was capable of producing full rated output at the conclusion of the testing.

Steady State Performance:

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

Voltage Regulation:	±0.5%
Random Voltage Variation:	±0.3%
Frequency Regulation:	Isochronous
Random Frequency Variation:	±0.25%

Transient Performance:

The generator set was tested with the standard alternator to verify single step loading capability as required by NFPA 110. Verify acceptable Voltage and frequency response on load addition or rejection were evaluated. The following results were recorded:

Full Load Acceptance:		
Voltage Dip:	30.1	%
Recovery Time:	3.6	Second
Frequency Dip:	9.9	%
Recovery Time:	3.8	Second
Full Load Rejection:		
Voltage Rise:	12.8	%
Recovery Time:	3.8	Second
Frequency Rise:	3.2	%
Recovery Time:	1.5	Second

Harmonic Analysis:

(per MIL-STD-705B, Method 601.4)

	Line to Line		Line to Neutral	
Harmonic	No Load	Full Load	No Load	Full Load
3	0.1	0.1	0.1	0.1
5	0.3	1.2	0.3	1.1
7	0.4	1.1	0.4	1.0
9	0.0	0.0	0.0	0.0
11	0.7	0.9	0.6	0.8
13	0.2	0.3	0.1	0.2
15	0.0	0.0	0.0	0.0

SECTION 3

Generator Accessories

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	C175N6B	C200N6B		
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.

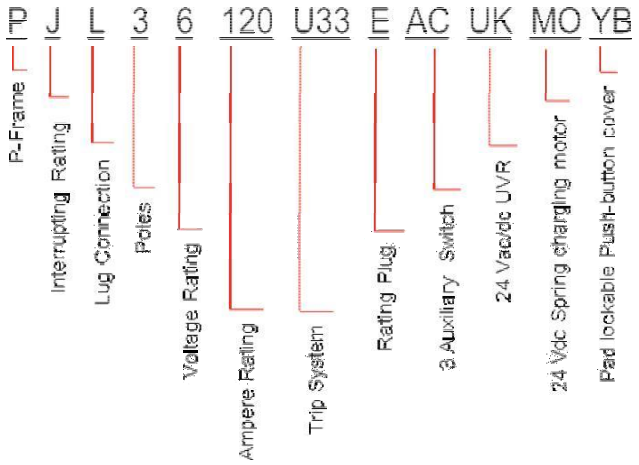
*If the first 3 letters are “PJP,” the search will not work. You will need to start with just “PJ” and use the description pages to obtain the information you are looking for on the “PJP.”

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.”



Mechanically Operated Breakers						
Feature Code	**Breaker Box Description**	**Cummins Part #**	**Manufacturer**	**Breaker Catalog Number**	**Trip Unit**	**Plug Type**
KC60-2	Circuit Breaker-1200A,Right CB on Right side,3-Pole, UL 600,IEC 690, 100%	0320-2183	Schneider Electric	PJP36120U31E	MicroLogic 3.0 LI	E
KC61-2	Circuit Breaker-1200A,Left CB on Right side,3-Pole, UL 600,IEC 690, 100%	0320-2183	Schneider Electric	PJP36120U31E	MicroLogic 3.0 LI	E
KC62-2	Circuit Breaker-800A,Right CB on Right side,3-Pole,UL 600,IEC 690 100%	0320-2182	Schneider Electric	PJP36080U31F	MicroLogic 3.0 LI	F
KC63-2	Circuit Breaker-800A,Left CB on Right side,3-Pole, UL 600,IEC 690 100%	0320-2182	Schneider Electric	PJP36080U31F	MicroLogic 3.0 LI	F
KC64-2	Circuit Breaker-600A,Right CB on Right side,3-Pole, UL 600,IEC 690, 100%	A044T468	Schneider Electric	NLGL36600U33X-600A	MicroLogic 3.3S	N/A
KC65-2	Circuit Breaker-600A,Left CB on Right side,3-Pole, UL 600,IEC 690, 100%	A044T468	Schneider Electric	NLGL36600U33X-600A	MicroLogic 3.3S	N/A
KC66-2	Circuit Breaker-400A,Right CB on Right side,3-Pole,UL 600,IEC 690 100%	A045U083	Schneider Electric	NLGL36400U33XLY-400A	MicroLogic 3.3S	N/A
KC67-2	Circuit Breaker-400A,Left CB on Right side,3-Pole, UL 600,IEC 690 100%	A045U083	Schneider Electric	NLGL36400U33XLY-400A	MicroLogic 3.3S	N/A
KS80-2	CircuitBreaker-15A,Right,3P,600VAC,80%,UL	0320-2346-72	Schneider Electric	HGL36015	Thermal Magnetic	N/A
KS81-2	CircuitBreaker-15A,Left,3P,600VAC,80%,UL	0320-2346-72A	Schneider Electric	HGL36015	Thermal Magnetic	N/A
KS84-2	CircuitBreaker-20A,Right,3P,600VAC,80%,UL	0320-2346-71	Schneider Electric	HGL36020	Thermal Magnetic	N/A
KS85-2	CircuitBreaker-20A,Left,3P,600VAC,80%,UL	0320-2346-71A	Schneider Electric	HGL36020	Thermal Magnetic	N/A
KS88-2	CircuitBreaker-30A,Right,3P,600VAC,80%,UL	0320-2346-70	Schneider Electric	HGL36030	Thermal Magnetic	N/A
KS89-2	CircuitBreaker-30A,Left,3P,600VAC,80%,UL	0320-2346-70A	Schneider Electric	HGL36030	Thermal Magnetic	N/A
KS94-2	CircuitBreaker-40A,Right,3P,600VAC,80%,UL	0320-2346-69	Schneider Electric	HGL36040	Thermal Magnetic	N/A
KS95-2	CircuitBreaker-40A,Left,3P,600VAC,80%,UL	0320-2346-69A	Schneider Electric	HGL36040	Thermal Magnetic	N/A

Product data sheet

Specifications

Circuit breaker, PowerPacT P, unit mount, Micrologic 3.0, 1200A, 3 pole, 25kA, 600VAC,

PJP36120U31E

Main

Range	PowerPact
Product name	PowerPact P
Product or Component Type	Circuit breaker
Device Application	Distribution

Complementary

Line Rated Current	1200 A
Number of Poles	3P
Control type	Toggle
Breaking capacity code	J
Breaking capacity	AIR 100 kA 240 V AC 50/60 Hz UL 489 AIR 65 kA 480 V AC 50/60 Hz UL 489 AIR 25 kA 600 V AC 50/60 Hz UL 489 Icu 65 kA 240 V AC 50/60 Hz IEC 60947-2 Icu 50 kA 380/415 V AC 50/60 Hz IEC 60947-2
[Ue] rated operational voltage	600 V AC 50/60 Hz UL 489
Network Frequency	50/60 Hz
[Ics] rated service breaking capacity	35 kA 240 V AC 50/60 Hz IEC 60947-2 25 kA 380/415 V AC 50/60 Hz IEC 60947-2
[Uimp] rated impulse withstand voltage	8 kV IEC 60947-2
Trip unit technology	Electronic, standard, Micrologic 3.0, LI
[Ui] rated insulation voltage	750 V IEC 60947-2
Trip unit name	Micrologic 3.0
AWG gauge	Please see CB outline drawing for lug and termination details
Local signalling	Overload 1 1 LED amber) 1 trip indicator green)
Mounting mode	Unit mount lug)
Mounting Support	Lug
Electrical connection	Terminal nut line Lugs load

Terminal identifier	Please see CB outline drawing for lug and termination details
Long time pick-up adjustment range	0.4...1 x Ir
Tightening torque	442.54 lbf.in (50 N.m) 0.15…0.37 in² (95…240 mm²) (4 x AWG 3/0...500 kcmil) 8.85…11.51 lbf.in (1.0…1.3 N.m)
Number of slots	2 auxiliary switch OF plug-in) 1 alarm switch SD plug-in) 1 overcurrent trip switch SDE plug-in) 1 voltage release MN or MX plug-in)
Power wire stripping length	1.18 in (30 mm)
Height	16.16 in (410.46 mm)
Width	8.27 in (210.06 mm)
Depth	8.05 in (204.47 mm)
Net Weight	32 lb(US) (14.51 kg)
Quantity per Set	1

Environment

Quality labels	CE
Standards	UL CSA NEMA NOM-003-SCFI-2000 IEC 60947-2
Product certifications	UL CSA NOM
IP degree of protection	Front cover IP40
Pollution degree	3 IEC 60947-1
Ambient Air Temperature for Operation	28…158 °F (-2…70 °C)
Ambient Air Temperature for Storage	-58…185 °F (-50…85 °C)
Operating altitude	< 6561.68 ft (2000 m) without derating 13123.36 ft (4000 m) with derating

Ordering and shipping details

Category	01215-PG,H,J,K,L,N UNIT MT BREAKERS
Discount Schedule	DE2
GTIN	NULL
Nbr. of units in pkg.	1
Package weight(Lbs)	32.00 lb(US) (14.515 kg)
Returnability	Yes
Country of origin	US

Packing Units

Unit Type of Package 1	PCE
Package 1 Height	11.75 in (29.845 cm)
Package 1 width	11.63 in (29.528 cm)
Package 1 Length	20.25 in (51.435 cm)

Offer Sustainability

Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: DINP, which is known to the State of California to cause cancer, and DIDP, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
REACh Regulation	REACh Declaration
EU RoHS Directive	Compliant EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration Product out of China RoHS scope. Substance declaration for your information.
Environmental Disclosure	Product Environmental Profile
Circularity Profile	End of Life Information
PVC free	Yes

Micrologic™ 3.0 Electronic Trip Unit

ENGLISH

Instruction Bulletin

48049-207-05
Rev. 01, 07/2012

Retain for future use.

Schneider Electric™

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Section 1—General Information

Introduction

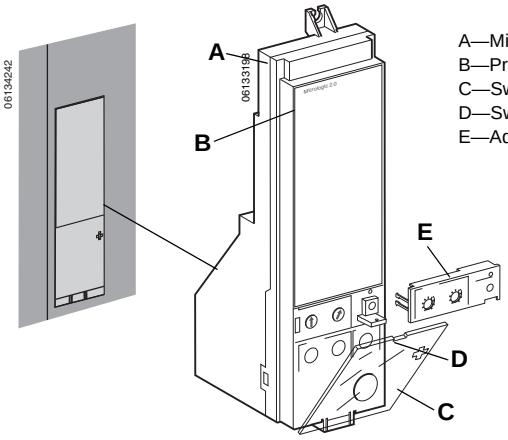
Micrologic™ trip units (A) provide adjustable tripping functions on electronic trip circuit breakers. The product name (B) specifies the level of protection provided by the trip unit.

Micrologic 3.0 Trip Unit

- Type of protection
  - 2—Basic IEC protection (LS0)
  - 3—Basic UL protection (LI)
  - 5—Selective protection (LSI)
- Trip unit series
  - 0—Indicates the first version

Micrologic trip units are field replaceable to allow for upgrading of the trip unit in the field. For complete information on available circuit breaker models, frame sizes, interrupting ratings, sensor plugs, rating plugs and trip units, see the product catalog.

Figure 1: Micrologic Trip Unit



A—Micrologic Trip Unit
B—Product Name
C—Switch Cover
D—Switch Cover Opening Slot
E—Adjustable Rating Plug

Trip Unit Settings

On the face of the trip unit are adjustable switches to allow changing of trip characteristics. Trip units are shipped with the long-time pickup switch set at 1.0 and all other trip unit adjustments set at their lowest settings.

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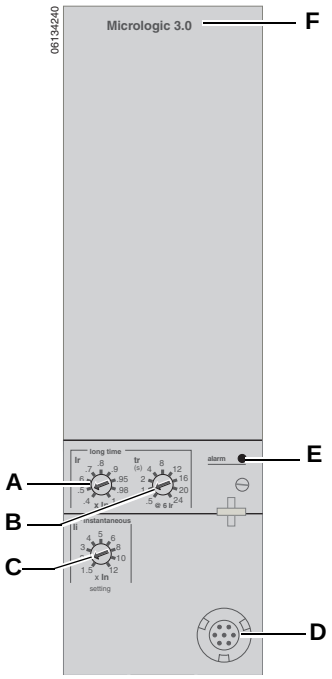
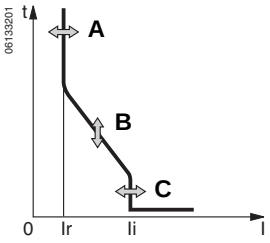
Micrologic 3.0 Trip Unit

The Micrologic 3.0 trip unit provides basic (LI) protection.

A. Long-time pickup (Ir) switch
B. Long-time delay (tr) switch
C. Instantaneous pickup (Ii) switch
D. Test plug receptacle
E. Overload indicator light
F. Trip unit name

Figure 3: Micrologic 3.0 Trip Unit





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Trip Unit Switches

Long-Time Protection

Long-time protection protects equipment against overloads.

- Long-time protection is standard on all trip units.
- The long-time pickup (Ir) (A) sets maximum current level (based on sensor plug rating In) which circuit breaker will carry continuously. If current exceeds this value, circuit breaker will trip after the preset time delay. The long-time pickup (Ir) is adjustable from 0.4–1.0 times the sensor plug rating (In).
- The long-time delay (tr) (B) sets the length of time that the circuit breaker will carry an overcurrent below the short-time or instantaneous pickup current level before tripping. See Table 1 for long-time delay settings.
- The overload indicator light (C) indicates that the Ir long-time pickup threshold has been exceeded.
- Both long-time pickup and long-time delay are on the field-replaceable adjustable rating plug. To change settings to more precisely match the application, various rating plugs are available. For instructions on replacing the rating plug, see Section 4—Adjustable Rating Plug Replacement.
- The In value can be changed by replacing the sensor plug below the trip unit. For further information, see the instructions packed with the sensor plug replacement kit.
- Long-time protection uses true RMS measurement.

Thermal imaging provides continuous temperature rise status of the wiring, both before and after the device trips. This allows the circuit breaker to respond to a series of overload conditions which could cause conductor overheating, but would go undetected if the long-time circuit was cleared every time the load dropped below the pickup setting or after every tripping event.

NOTE: If checking trip times, wait a minimum of 15 minutes after circuit breaker trips before resetting to allow the thermal imaging to reset completely to zero.

Figure 5: Long-Time Protection Switches

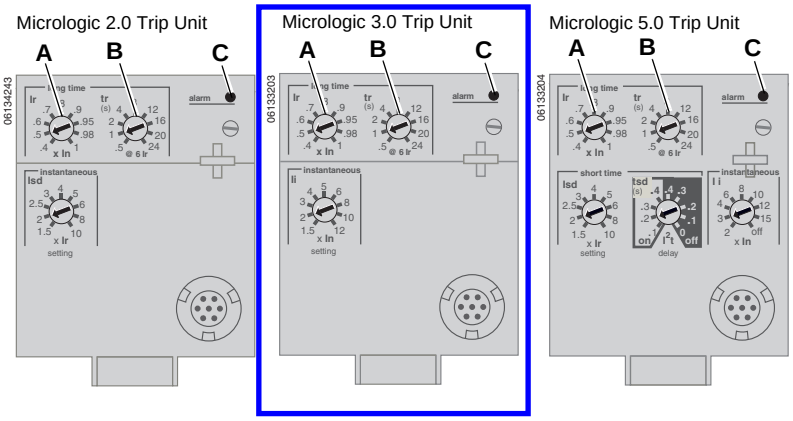

Table 1: Micrologic Trip Unit Long-Time Delay Values

Setting[1]	Long-Time Delay in Seconds[2]								
tr at 1.5 x Ir	12.5	25	50	100	200	300	400	500	600
tr at 6 x Ir	0.5	1	2	4	8	12	16	20	24
tr at 7.2 x Ir	0.34[3]	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6

[1]In = sensor rating. Ir = In x long-time pickup. Trip threshold between 1.05 and 1.20 Ir.
[2]Time-delay accuracy +0/-20%
[3]For Micrologic 5.0 trip units, when tsd is set to 0.4 off or 0.4 on, then tr = 0.5 instead of 0.34.

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Instantaneous Protection

Instantaneous protection protects equipment against short circuits with no intentional time delay.

- Instantaneous protection (Ii) (A) is standard on 3.0 and 5.0 trip units.*
- Instantaneous protection for 2.0 trip units is based on the circuit breaker sensor rating (Ir).
- Instantaneous protection for 3.0 and 5.0 trip units is based on the long-time delay pickup (In).
- Circuit breaker open command is issued as soon as threshold current is exceeded.
- Instantaneous protection for 3.0 and 5.0 trip units use peak current measurement. Instantaneous protection for 2.0 trip units use RMS current measurement.
- When instantaneous protection switch is set to off, the instantaneous protection is disabled.

*Instantaneous protection on 2.0 trip units is achieved by using short-time protection (Isd) with short-time delay factory set to 0 (zero).

Figure 7: Instantaneous Protection Switches

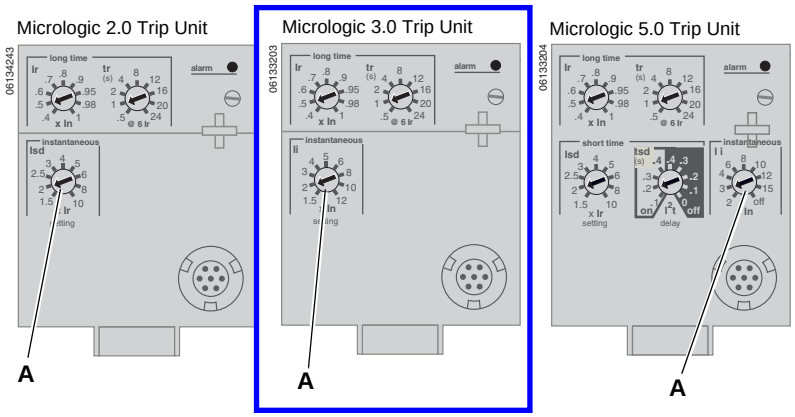


Table 3: Micrologic Instantaneous Values

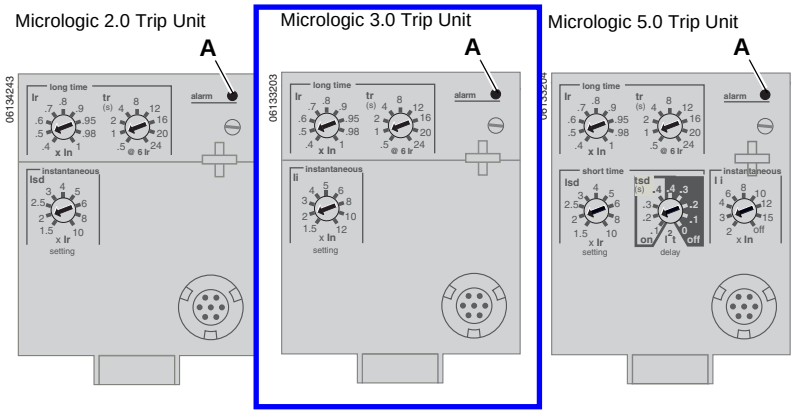
Setting	Interruption Current								
2.0 Isd (= Ir x..)	1.5	2	2.5	3	4	5	6	8	10
3.0 Ii (= In x..)	1.5	2	3	4	5	6	8	10	12
5.0 Ii (= In x..)	2	3	4	6	8	10	12	15	off

Ii = UL and ANSI instantaneous
Isd = IEC instantaneous (short-time with zero delay)
In = sensor rating
Ir = long-time pickup

Overload Indicator Light

The overload indicator light (A) lights when the Ir long-time pickup level has been exceeded.

Figure 8: Overload Indicator Lights



Trip Unit Testing

Trip unit functions can be tested using primary injection testing or secondary injection testing.

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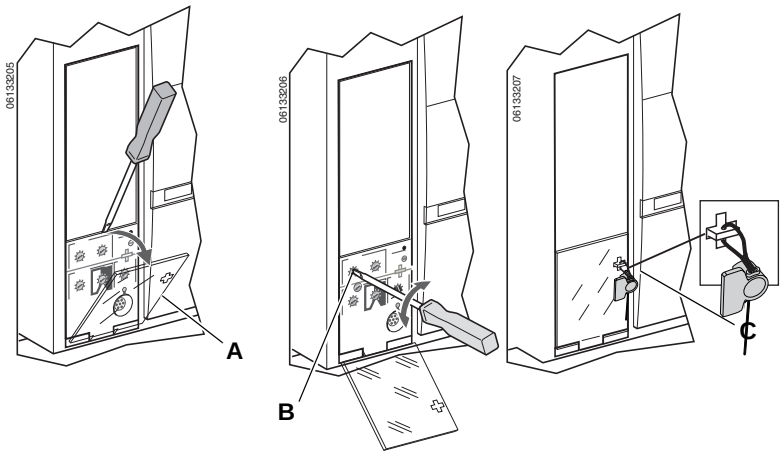
Section 2—Operation

Switch Adjustment

1. Open switch cover (A).
2. Adjust the appropriate switches (B) to desired values.
3. Replace switch cover. Use wire seal MICROTUSEAL (C), if necessary, to provide tamper evidence.

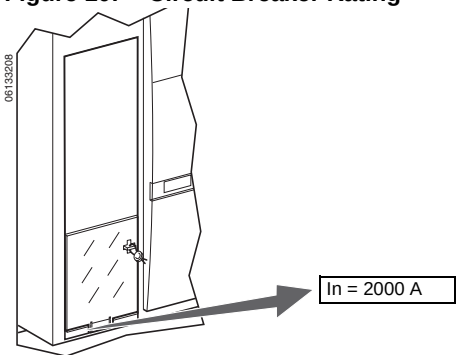
Figure 9: Adjust Switch Settings



Examples

Circuit breaker is rated 2000 A.

Figure 10: Circuit Breaker Rating

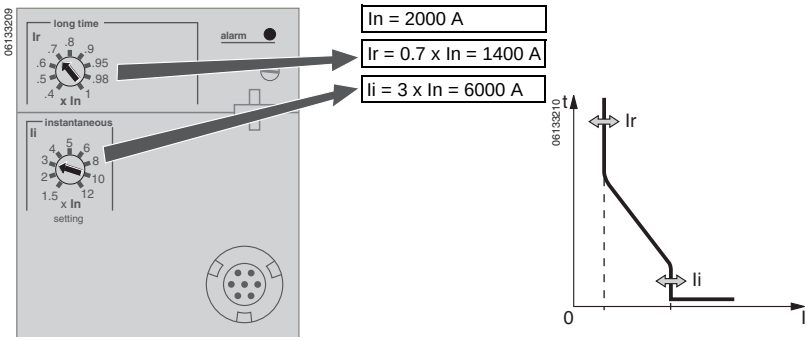


ENGLISH

Micrologic 3.0 Trip Unit

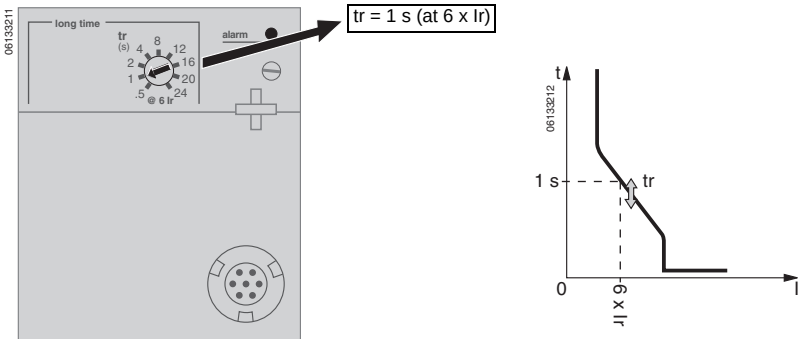
1. Set pickup levels.

Figure 13: Set Pickup Levels



2. Set time delay.

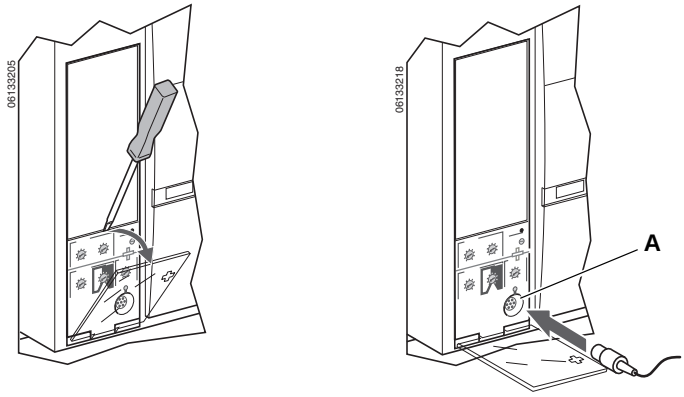
Figure 14: Set Time Delay

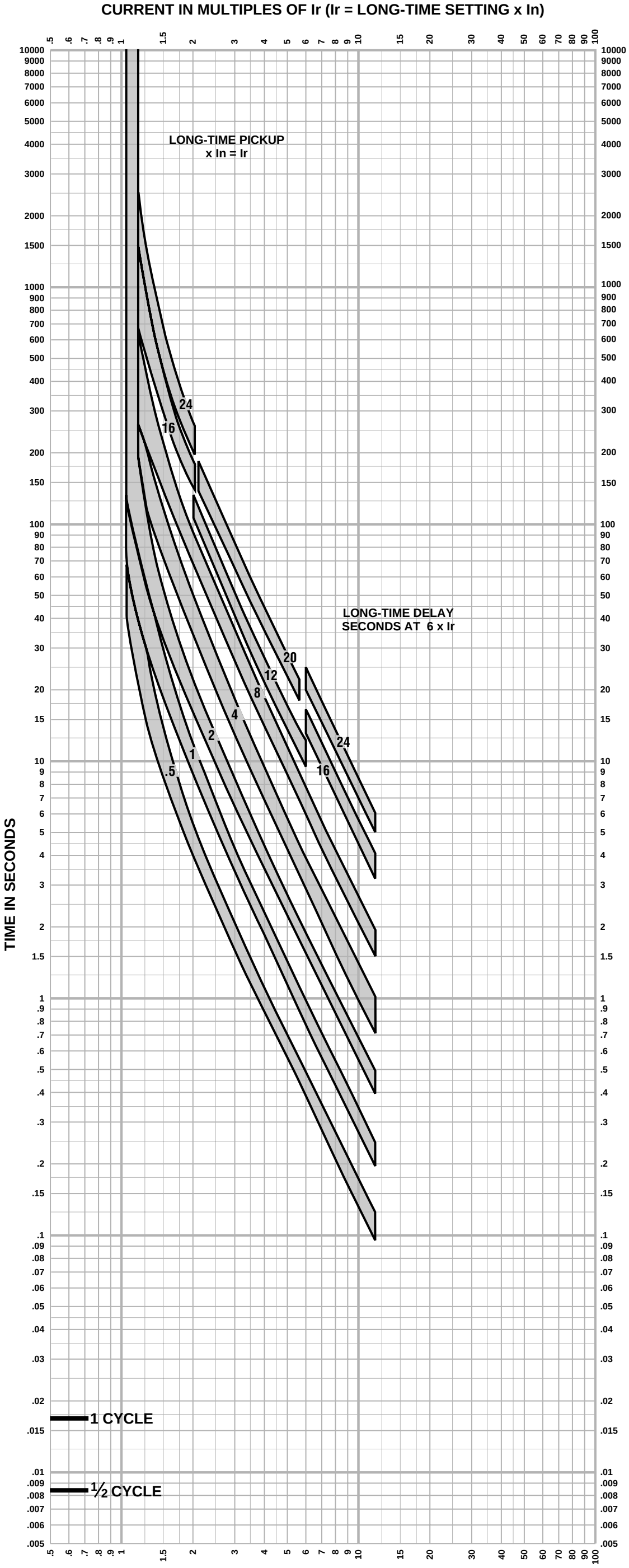


Trip Unit Operation Verification

Use a test kit connected to the trip unit test plug receptacle (A) to verify trip unit is functioning as desired. See instructions shipped with test kit to perform verification tests.

Figure 17: Verify Trip Unit Operation





MICROLOGIC® 3.0 A TRIP UNIT CHARACTERISTIC TRIP CURVE NO. 613-6

Long-time Pickup and Delay

The time-current curve information is to be used for application and coordination purposes only.

Curves apply from -30°C to +60°C ambient temperature.

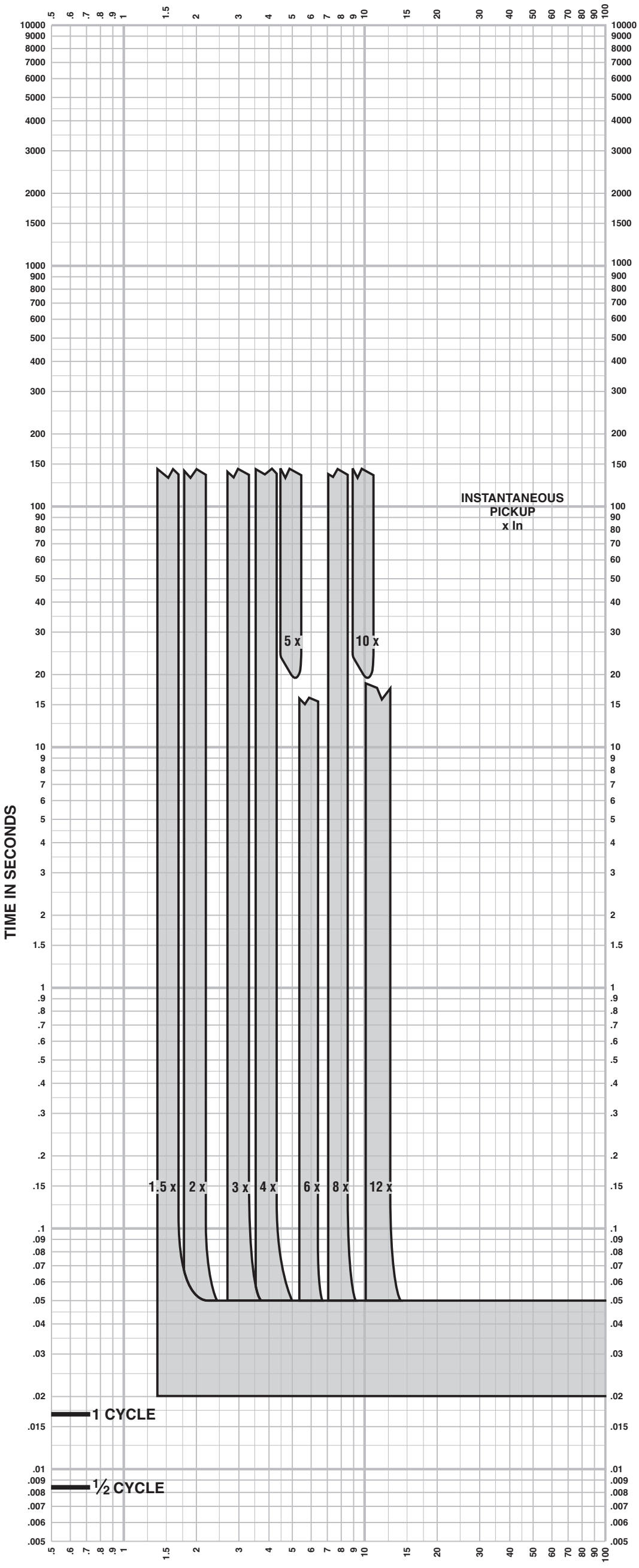
Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal-imaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermal-imaging.
2. The end of the curve is determined by the instantaneous setting.
3. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
4. See 613-8 for instantaneous pickup trip curve.

Merlin Gerin
Modicon
Square D
Telemecanique
Federal Pioneer
Federal Pacific
Schneider Electric Brands

Schneider Electric

Curve No. 0613TC0006
December 2000
Drawing No. B48095-613-06



MICROLOGIC® 3.0 A TRIP UNIT CHARACTERISTIC TRIP CURVE NO. 613-8

Instantaneous Pickup
1.5x-12x

The time-current curve information is to be used for application and coordination purposes only.

Curves apply from -30° to +60°C ambient temperature.

Instantaneous override values are given on 613-10.

Notes:

1. The end of the curve is determined by the interrupting rating of the circuit breaker.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
3. The instantaneous region of the trip curve shows maximum total clearing times. Actual clearing times in this region can vary depending on the circuit breaker mechanism design and other factors. The actual clearing time can be considerably faster than indicated. Contact your local Sales Office for additional information.
4. See 613-6 for long-time pickup and delay trip curves.

a brand of Schneider Electric

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Curve No. 0613TC0808
January 2008
Drawing No. 48095-0613-08
(Replaces 0613TC0008)

INSTANTANEOUS OVERRIDE VALUES NO. 613-10

MASTERPACT NW/NT

ANSI CB Model No.	Inst. Override (kA RMS) +/- 10%
NW08N1 ★	24
NW08N1	None
NW16N1	None
NW08H1 ★	24
NW08H1	None
NW16H1	None
NW20H1	None
NW32H1	None
NW08H2 ★	24
NW08H2	None
NW16H2	None
NW20H2	None
NW32H2	None
NW40H2	None
NW50H2	None
NW08H3 ★	24
NW08H3	85
NW16H3	85
NW20H3	85
NW32H3	85
NW40H3	85
NW50H3	85
NW08L1 ★	24
NW08L1	35
NW08L1F	24
NW16L1	35
NW16L1F	24
NW20L1	35
NW20L1F	24
NW32L1	117
NW40L1	117
NW50L1	117
NW08HA	None
NW16HA	None
NW20HA	None
NW32HA	None
NW40HA	None
NW50HA	None
NW08HF	85
NW16HF	85
NW20HF	85
NW32HF	85
NW40HF	85
NW50HF	85
NW08HC	35
NW16HC	35
NW20HC	35
NW32HC	117
NW40HC	117
NW50HC	117
NT08N1 ★	24
NT08N1	None
NT08H1 ★	24
NT08H1	None
NT08L1F	10
NT08NA	None

MASTERPACT NW/NT

UL CB Model No.	Inst. Override (kA RMS) +/- 10%
NW08N ★	24
NW08N	40
NW12N	40
NW16N	40
NW20N	40
NW08H ★	24
NW08H	40
NW12H	40
NW16H	40
NW20H	40
NW25H	65
NW30H	65
NW40H	75
NW50H	75
NW60H	75
NW08L ★	24
NW08L	35
NW08LF	24
NW12L	35
NW12LF	24
NW16L	35
NW16LF	24
NW20L	65
NW20LF	24
NW25L	65
NW30L	65
NW40L	75
NW50L	75
NW60L	75
NW08HF	40
NW12HF	40
NW16HF	40
NW20HF	40
NW25HF	65
NW30HF	65
NW40HF	75
NW50HF	75
NW60HF	75
NW08HB	35
NW12HB	35
NW16HB	35
NW20HB	65
NW25HB	65
NW30HB	65
NW40HB	75
NW50HB	75
NW60HB	75
NT08N ★	24
NT08N	40
NT12N	40
NT16N	40
NT08H ★	24
NT08H	40
NT12H	40
NT16H	40
NT08L1	10
NT12L1	10
NT16L1	10
NT08L	10
NT08LF	10
NT12L	10
NT16L	10
NT12LF	10
NT08HF	40
NT12HF	40

★ Maximum sensor plug 250 A

MASTERPACT NW/NT

IEC CB Model No.	Inst. Override (kA RMS) +/- 10%
NW08N1	None
NW10N1	None
NW12N1	None
NW16N1	None
NW08H1	None
NW10H1	None
NW12H1	None
NW16H1	None
NW20H1	None
NW25H1	None
NW32H1	None
NW40H1	None
NW50H1	None
NW63H1	None
NW08H2 ★	24
NW08H2	85
NW10H2	85
NW16H2	85
NW20H2	85
NW25H2	85
NW32H2	85
NW40H2	85
NW50H2	117
NW63H2	117
NW20H3	65
NW25H3	65
NW32H3	65
NW40H3	65
NW08L1 ★	24
NW08L1	35
NW10L1	35
NW12L1	35
NW16L1	35
NW20L1	35
NW08H10	None
NW10H10	None
NW12H10	None
NW16H10	None
NW20H10	None
NW25H10	None
NW32H10	None
NW40H10	None
NW08NA	None
NW10NA	None
NW16NA	None
NW08HA	None
NW10HA	None
NW12HA	None
NW16HA	None
NW20HA	None
NW25HA	None
NW32HA	None
NW40HA	None
NW50HA	None
NW63HA	None
NW08HF	85
NW10HF	85
NW12HF	85
NW16HF	85
NW20HF	85
NW25HF	85
NW32HF	85
NW40HF	85
NW08HA10	None
NW10HA10	None
NW12HA10	None
NW16HA10	None
NW20HA10	None
NW25HA10	None
NW32HA10	None
NW40HA10	None
NT08H1	None
NT10H1	None
NT12H1	None
NT16H1	None
NT08L1	10
NT08H10	None
NT10H10	None
NT12H10	None
NT16H10	None
NT08HA	None
NT10HA	None
NT12HA	None
NT16HA	None
NT08HA10	None
NT10HA10	None
NT12HA10	None
NT16HA10	None

POWERPACT / HORIZON / SELECT / COMPACT

UL/IEC CB Model No.	Inst. Override (kA RMS) +/- 10%
RG 600	57
RG 800	57
RG 1000	57
RG 1200	57
RG 1600	57
RG 2000	57
RG 2500	57
RJ 600	48▲
RJ 800	48▲
RJ 1000	48▲
RJ 1200	48▲
RJ 1600	48▲
RJ 2000	48▲
RJ 2500	48▲
RK 600	57
RK 800	57
RK 1000	57
RK 1200	57
RK 1600	57
RK 2000	57
RK 2500	57
RL 600	48▲
RL 800	48▲
RL 1000	48▲
RL 1200	48▲
RL 1600	48▲
RL 2000	48▲
RL 2500	48▲
PG 250	24
PG 400	24
PG 600	24
PG 800	24
PG 1000	24
PG 1200	24
PJ 250	7
PJ 400	10
PJ 600	10
PJ 800	10
PJ 1000	10
PJ 1200	10
PK 250	24
PK 400	24
PK 600	24
PK 800	24
PK 1000	24
PK 1200	24
PL 250	7
PL 400	10
PL 600	10
PL 800	10
PL 1000	10
PL 1200	10
MG 300	12▲
MG 350	12▲
MG 400	12▲
MG 450	12▲
MG 500	12▲
MG 600	12▲
MG 700	12▲
MG 800	12▲
MJ 300	12▲
MJ 350	12▲
MJ 400	12▲
MJ 450	12▲
MJ 500	12▲
MJ 600	12▲
MJ 700	12▲
MJ 800	12▲

IEC CB Model No.	Inst. Override (kA RMS) +/- 10%
NS 800b N	57
NS 1000b N	57
NS 1250b N	57
NS 1600b N	57
NS 2000 N	57
NS 2500 N	57
NS 3200 N	57
NS 800b H	48▲
NS 1000b H	48▲
NS 1250b H	48▲
NS 1600b H	48▲
NS 2000 H	48▲
NS 2500 H	48▲
NS 3200 H	48▲
NS 630b N	24
NS 800 N	24
NS 1000 N	24
NS 1250 N	24
NS 1600 N	24
NS 630b H	24
NS 800 H	24
NS 1000 H	24
NS 1250 H	24
NS 1600 H	24
NS 630b L	24
NS 800 L	24
NS 1000 L	24
NS 1250 L	24
NS 1600 L	24

▲ Tolerance +/- 15%

Note:

Faults at or above instantaneous override value will be cleared at 25 msec or less.

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Merlin Gerin
Square D
Telemecanique

Schneider Electric

Curve No. 0613TC0610
February 2006
Drawing No. 48095-0613-10
(Replaces 0613TC0410)

Specification Sheet

Enclosures and Tanks

250-1000 kW Gensets

Enclosure Standard Features

- 14-gauge steel construction (panels)
- Stainless steel hardware
- Zinc phosphate pretreatment, e-coat primer and super durable powder topcoat paint minimize corrosion and color fade
- Package listed to UL 2200
- Designed to satisfy national electrical code installation requirements
- Fuel and electrical stub-up area within enclosure perimeter
- Fixed louvers
- Cambered roof prevents water accumulation
- Recessed, lockable doors in two sides
- Retainers hold doors open for easy access
- Enclosed exhaust silencer ensures safety and protects against rust
- Rain cap
- Exterior oil and coolant drains with interior valves for ease of service
- Rodent barriers on inlet
- Non-hydroscopic sound attenuating material
- Side mounted controls and circuit breakers
- Easy access lifting points for spreader bars
- Dual vibration isolation system (250-500 kW)
- Spring vibration isolation system (600-1000 kW)
- Enclosure mounts to lifting base or fuel tank (250-500 kW)
- Enclosure mounts to lifting base (600-1000 kW)
- Factory pre-assembled package
- Designed for outdoor use only
- Externally mounted emergency stop button for operator safety (optional on 250-500 kW)
- Horizontal air discharge to prevent leaf and snow accumulation (600-1000 kW)

Options

- Three levels of sound attenuation
- Motorized louvers to protect from ice and snow accumulation (available on air inlet for all models and on air outlet on level II, 250-500 kW enclosures only)
- Horizontal air discharge, sound level 2 only (250-500 kW)
- Aluminium construction with roll-coated polymer paint
- Wind rated to 150 mph
- Neutral sandstone paint color
- Factory mounted battery charger
- External 120 VAC service outlet
- Rain hoods for air inlet (250-500 kW)
- Lifting base in lieu of a sub-base tank (250-500 kW)
  - Pre-wired AC distribution package
  - 100 amp (250-500 kW) or 150 amp (600-1000 kW) main circuit breaker; connected to 120 VAC Line-Neutral and 208 or 240 VAC Line-Line, spare breaker positions and capacity for future upgrades (600-1000 kW)
  - GFCI protected internal 120 VAC service receptacle
  - GFCI protected weather proof external 120 volt service receptacle
  - All factory installed AC powered features pre-wired into load center
- Interior lights – 120 volt (600-1000 kW)
- Rain hoods for air inlet (250-500 kW)
- Seismic isolators available (600-1000 kW)

Fuel Tanks

Standard sub-base tank features

- UL 142 Listed
- ULC-S601-07 Listed
- NFPA37 compliant
- Dual walled, steel construction
- Emergency tank and rupture basin vents
- Tank mounted mechanical fuel gauge
- Fuel supply and return tubes
- Top mounted leak detection float switch
- Low and high level fuel switches
- Mounting brackets for optional pump and control (250-500 kW)
- Integral lifting points

Sub-base tank options

- Pre-wired fuel pump and control
- Fuel overfill alarm – internal or external
- Overflow and tank fill plugs
- Five gallon spill fill box – internal or external
- Fill pipe extender
- Local code approvals available

200-500 kW Dual Wall Sub-base Fuel Tanks – usable operating hours

Genset model (60 Hz)	Gallons /hour at full load	270 gallon tank	300 gallon tank	400 gallon tank	500 gallon tank	600 gallon tank	660 gallon tank	720 gallon tank	850 gallon tank	1420 gallon tank	1470 gallon tank	1700 gallon tank	2050 gallon tank	2525 gallon tank
250 DQDAA	20	14	15	20	25	30	33	36		72	74		104	
275 DQDAB	21	13	14	19	24	29	31	34		66	70		96	
300 DQDAC	23	12	13	17	22	26	29	31		61	64		88	
300 DQHAB	23	12	13	17	22	26	29		37			74		
450 DFEJ	30	9	10	13	17	20	22		28			57		84
500 DFEK	34	8	9	11	15	18	19		25			50		74

Operating hours are measured at 60 Hz, standby rating.

600-1000 kW Dual Wall Sub-base Fuel Tanks – usable operating hours

Genset model	Gallons /hour at full load	200 gallon tank	660 gallon tank	1000 gallon tank	1500 gallon tank	2000 gallon tank	2400 gallon tank
600 DQCA	42	5	16	24	36	48	57
600 DQPAA	45	4	15	22	33	44	53
650 DQPAB	50	4	13	20	30	40	48
750 DQCB	51	4	13	20	29	39	47
750 DQFAA	53	4	12	19	28	38	45
800 DQCC	53	4	12	19	28	38	45
800 DQFAB	56	4	12	18	27	36	43
900 DQFAC	64	3	10	16	23	31	38
1000 DQFAD	72	3	9	14	21	28	33

*3000 gallon tank offered as an accessory kit – refer to NAAC-5853 spec sheet.

- Operating hours are measured at 60 Hz, standby rating.
- Up to 90% fill alarm to comply with NFPA30, operating capacity is reduced by 10%.

Enclosure Package Sound Pressure Levels @ 7 meters dB(A)

Genset model	Weather protective enclosure (F200, F203)	QuietSite level 1 sound attenuated enclosure (F201, F204)	QuietSite level 2 sound attenuated enclosure (F202, F205)
250 DQDAA	90	88	72
275 DQDAB	90	88	73
300 DQDAC	90	88	73
300 DQHAB	89	88	76
450 DFEJ	88	85	74
500 DFEK	89	87	73
600 DQCA	90.6/86*	79.3/78*	74.1/73*
600 DQPAA	89.10	80.70	74.70
650 DQPAB	89.70	81.40	75
750 DQCB	91.1/87*	79.9/79*	75.3/74*
750 DQFAA	87.8	77.8	73.8
800 DQCC	91.3/87*	80.2/79*	75.7/74*
800 DQFAB	88.1	78.3	74
900 DQFAC	88.8	79.1	74.6
1000 DQFAD	89.6	80.1	75.3

- All data is 60 Hz, full load standby rating, steel enclosures only.
- Data is a measured average of 8 positions.
- Sound levels for aluminium enclosures are approximately 2 dB(A) higher than listed sound levels for steel enclosures.

* Sound data with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD)

Package Dimensions of Enclosure, Exhaust System, and UL Tank

250-500 kW

Tank size (gal)	Weather protective package length (in)	QuietSite level I package length (in)	QuietSite level 2 package length (in)	Width (in)	Height (in)	Weather protective package weight (lbs)	QuietSite level 1 package weight (lbs)	QuietSite level 2 package weight (lbs)
270	188	188	222	82	106	4991	5471	6711
300	188	188	222	82	104	5648	6073	6991
400	188	188	222	82	106	5833	6258	7176
500	188	188	222	82	108	5956	6381	7299
600	188	188	222	82	111	6116	6541	7459
660	188	188	222	82	113	6235	6660	7578
720	188	188	222	82	114	6174	6599	7517
850	188	188	222	82	118	6529	6954	7872
1420	200	200	222	82	128	6863	7343	8583
1470	192	192	222	82	128	7253	7733	8973
1700	234	234	234	82	128	7982	8407	9325
2050	284	284	284	82	128	8383	8863	10103
2525	346	346	346	82	128	9391	9871	11111
Lifting base	188	188	222	82	100	4335	4760	5678

600-1000 kW

Tank size (gal)	Weather protective package length (in)	QuietSite level I package length (in)	QuietSite level 2 package length (in)	Width (in)	Height (in)	Weather protective package weight (lbs)	QuietSite level 1 package weight (lbs)	QuietSite level 2 package weight (lbs)
200	260	303	315	98	137	10194	13074	14954
660	260	303	315	98	137	9586	12466	14346
1000	260	303	315	98	141	10117	12997	14877
1500	260	303	315	98	146	10677	13557	15437
2000	292	327	327	98	143	11959	14839	16719
2400	338	338	338	98	143	12961	15841	17721

- This weight does not include the generator set. Consult your local Cummins distributor or the appropriate generator specification sheet.
- Width is 86” lifting eye to lifting eye (250-500 kW), 102” lifting eye to lifting eye (600-1000 kW).
- Height - Florida, Michigan, and Suffolk add 6.4” (250-500 kW) or 2” (600-1000 kW) for bottom space.
- Maximum length emergency vent removed.

	CSA - The generator set is CSA certified to product class 4215-01.
	UL - The generator set is available listed to UL 2200, stationary engine generator assemblies. The PowerCommand® control is listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

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

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S-1443 (11/18)

Specification Sheet

Battery Charger

A048G602 10 A 50/60 Hz
A051H785 20 A 50/60 Hz

Description

Cummins® fully automatic battery chargers are constant voltage/constant current chargers incorporating a 4-stage charging algorithm. Designed for use in applications where battery life and reliability are important; these chargers, complete with built-in equalize charge capability, are ideal for stationary or portable starting battery charging service.

To achieve optimum battery life, a 4-stage charging cycle is implemented. The four charging stages are constant current, high-rate taper charge, finishing charge, and maintaining charge. During the constant current cycle the charger operates at maximum possible output in the fast charge mode. During the high-rate taper charge cycle the charger stays at fast charge voltage level until battery current acceptance falls to a portion of the chargers rated output. During the finishing charge cycle the charger operates at the float voltage and completes the battery charge. During the maintaining charge cycle the charger supplies only a few milliamps required by the battery to stay at peak capability.

An optional temperature sensor (A043D534) may be used to adjust charging voltage based on temperature of the battery. Use of a battery temperature sensor helps to increase battery life by preventing over or under charging. The battery temperature sensor also protects the battery from overheating. Temperature compensation sensor is required for all applications when battery charger and battery are located in different temperature or battery heater is being used.

Battery chargers are field-configurable for charging either 12 or 24 VDC battery systems at 50/60 Hz operation. Simple jumper selectors enable selection of output voltage and battery type.

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.

Easy Installation – Clearly marked terminal blocks and panel knockouts provide convenient connections of input and output leads.

User Display – Output voltage and current, fault information and status are indicated on the front panel. Includes precision ammeter and voltmeter.

Monitoring – Status LED indicators are provided to show the condition of the charger. LED's on the right side of the monitor indicate operational functions for Temperature Compensation active (Green), AC on (Green), Float (Green) or Boost (Amber) mode, as well as Battery Fault (Red). LED's on the left side of the monitor illuminate (in Red) when Charger fail, High or Low VDC or AC fail occur.

Adjustable Float Voltage – Float voltage can be set, using easy to understand jumpers, for optimum battery performance and life.

Construction – NEMA-1 (IP20) corrosion resistant aluminium enclosure designed for wall mounting.

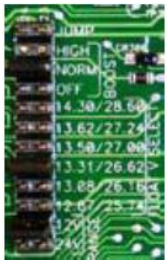
Faults – The charger senses and annunciates the following fault conditions: AC power loss, battery overvoltage, battery under voltage, battery fault conditions and charger failure. Includes an individual 30 volt/2 amp isolated contact for each alarm.

Vibration Resistant Design – complies with UL991 class B vibration resistance requirements.

Listed – C-UL listed to UL 1236 CSA standard 22.2 No 107.2-M89. Suited for flooded and AGM lead acid and NiCd batteries in generator set installations.

Warranty – 5 year CPG warranty.

Status and Fault LED



Field Selectable Jumper

Specifications

Performance and Physical Characteristics

Output:	Nominal voltage	12VDC* or 24VDC
	Float voltage – 12VDC batteries	12.87, 13.08, 13.31, 13.50*, 13.62, 14.30
	Float voltage – 24VDC batteries	25.74, 26.16, 26.62, 27.00*, 27.24, 28.60
	Equalize-voltage	6.5% above float voltage sensing
	Output voltage regulation	±0.5% (1/2%) line and load regulation
	Maximum output current	10 or 20 amps nominal
	Equalize charging	Battery interactive auto-boost
Input:	Voltage AC	120, 208, 240 ±10%
	Frequency	60/50 Hz +5%
Approximate net weight:		10A: 25 lbs. (11.36 Kg) 20A: 50 lbs. (22.68 Kg)
Approximate dimensions: height x width x depth-in		10A: 12.50" x 7.66" x 6.50"(318 x 195 x 165 mm) 20A: 13.06" x 13.95" x 6.83"(332 x 354 x1 73 mm)
Ambient temperature operation: At full rated output -		- 4 ℉ to 104 ℉ (-20 ℃ to 45 ℃)

Note:

1. Battery charger comes with default settings of 12VDC and 13.50/27.00VDC float voltage and can be changed to the battery manufacture recommendations. Replacement printed circuit board and f uses are identified in the Owner's Manual (10A: A050S537 and 20A: A051X126) which resides in Quick Serve On-Line. Service parts can be purchased through the Memphis Distribution Center. The PC board replacement instruction sheet (10A: A052N073, 20A: A053W929) and service manual (A050D829) is also available.
2. Installation and application must comply with "section 4.5.3 batteries and battery charger" of application guide T-030 (Liquid Cooled Generator Set Application Manual A040S369).

Caution:

1. Higher input voltages (i.e. 480VAC or 600VAC) can be applied if a transformer with a 120VAC-240VAC output is installed. Higher input voltages (i.e. 480VAC or 600VAC) can be applied if a transformer with a 120VAC-240VAC output is installed. For voltages higher than 240 VAC, stepdown transformer must be used. Review the respective Owner/Installation manual A050S537 for 10Amp and A051X126 20A chargers for supplier recommended stepdown transformer requirements.
2. 10Amp battery charger is recommended for genset applications with 1 or 2 factory provided batteries. 20Amp battery charger is recommended for Cummins Genset applications with 3 or 4 factory provided batteries. Please consider the auxiliary DC loads connected to the genset batteries and size this charger as per the T-030 application guide to prevent misapplication issues.
3. 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.
4. 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.
5. Use this charger for charging LEAD-ACID or LIQUID ELECTROLYTE NICKEL-CADMIUM batteries only. Do not use this battery charger for charging dry cells, alkaline, lithium, nickel-metal hydride, or sealed nickel-cadmium batteries that are commonly used with home appliances. These batteries may burst and cause injuries to persons and damage to property.
6. Do not parallel these battery chargers with any other charging system.

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

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NAAC-5602-EN (03/19) A059Y464

SECTION 4

Generator Drawings

TABULATION								
FEATURE CODE		TANK CAPACITY	WEIGHTS KG [LBS]		DIM_D MM [IN]	DIM_E MM [IN]	DIM_F MM [IN]	DIM_H MM [IN]
			LIFT BASE	FUEL TANK DRY				
LIFT BASE	F214	---	576 [1270]	---	2146 [84.5]	87 [3.4]	203 [8]	351 [13.8]
FUEL TANK	C201	300	---	1060 [2338]	2248 [88.5]	187 [7.4]	305 [12]	452 [17.8]
	C202/C242	400/270	---	1106 [2438]	2298 [90.5]	237 [9.4]	356 [14]	502 [19.8]
	C203	500	---	1172 [2584]	2350 [92.5]	288 [11.4]	406 [16]	554 [21.8]
	C204	600	---	1254 [2765]	2426 [95.5]	364 [14.4]	483 [19]	630 [24.8]
	C205	660	---	1296 [2857]	2464 [97]	403 [15.9]	521 [20.5]	668 [26.3]
	C207	850	---	1447 [3189]	2604 [102.5]	542 [21.4]	660 [26]	808 [31.8]
	C209	1700	---	2097 [4622]	2856 [112.4]	771 [30.4]	914 [36]	1060 [41.7]
	C211	2525	---	2965 [6536]	2856 [112.4]	771 [30.4]	914 [36]	1060 [41.7]

TABULATION				
TANK/LIFT BASE FEATURE CODE	TANK CAPACITY	DIM_G QSX15 L-FRAME	DIM_G QSX15 P-FRAME
C201	300	1707.9 [67.24]	1560 [61.42]
C202/C242	400/270	1758.7 [69.24]	1610.9 [63.42]
C203	500	1809.5 [71.24]	1661.7 [65.42]
C204	600	1885.7 [74.24]	1737.9 [68.42]
C205	660	1923.8 [75.74]	1776 [69.92]
C207	850	2063.5 [81.24]	1915.7 [75.42]
F214	N/A	1606.3 [63.24]	1458.5 [57.42]
C209	1700	2317.5 [91.24]	2169.7 [85.42]
C211	2525	2317.5 [91.24]	2169.7 [85.42]

TABULATION						
WEIGHT, BASE AND GENSET						
FEATURE CODES	MODEL	ALT DATA SHEET	WEIGHT KG [LBS]	CG_DIM "A" MM [IN]	CG_DIM "B" MM [IN]	CG_DIM "C" MM [IN]
F214 W/F215	DFEJ, DFEK	305	4625 [10196]	2088 [82.2]	1041 [41]	617 [24.3]
	DFEJ, DFEK	306	4755 [10482]	2116 [83.3]		620 [24.4]
	DFEJ, DFEK	307	4905 [10813]	2141 [84.3]		622 [24.5]
	DFEJ, DFEK	308	5045 [11122]	2174 [85.6]		625 [24.6]
WEIGHT, DRY TANK AND WET GENSET						
FEATURE CODES	MODEL	ALT DATA SHEET	WEIGHT KG [LBS]	CG_DIM "A" MM [IN]	CG_DIM "B" MM [IN]	CG_DIM "C" MM [IN]
C201 W/F215	DFEJ, DFEK	305	5259 [11595]	2091 [82.3]	1041 [41]	538 [21.2]
	DFEJ, DFEK	306	5389 [11881]	2114 [83.2]		543 [21.4]
	DFEJ, DFEK	307	5539 [12212]	2136 [84.1]		547 [21.5]
	DFEJ, DFEK	308	5679 [12521]	2166 [85.3]		552 [21.7]
C202 / C242	DFEJ, DFEK	305	5305 [11695]	2094 [82.4]	1041 [41]	532 [20.9]
W/ F215	DFEJ, DFEK	306	5434 [11981]	2117 [83.3]		537 [21.1]
	DFEJ, DFEK	307	5585 [12312]	2139 [84.2]		540 [21.3]
	DFEJ, DFEK	308	5725 [12621]	2169 [85.4]		546 [21.5]
C203 W/F215	DFEJ, DFEK	305	5371 [11841]	2085 [82.1]	1041 [41]	515 [20.3]
	DFEJ, DFEK	306	5501 [12127]	2108 [83.0]		521 [20.5]
	DFEJ, DFEK	307	5651 [12458]	2130 [83.9]		525 [20.7]
	DFEJ, DFEK	308	5791 [12767]	2160 [85.0]		530 [20.9]
C204 W/F215	DFEJ, DFEK	305	5453 [12022]	2081 [81.9]	1041 [41]	498 [19.6]
	DFEJ, DFEK	306	5583 [12308]	2103 [82.8]		504 [19.8]
	DFEJ, DFEK	307	5733 [12639]	2126 [83.7]		508 [20.0]
	DFEJ, DFEK	308	5873 [12948]	2155 [84.8]		514 [20.2]
C205 W/F215	DFEJ, DFEK	305	5495 [12114]	2079 [81.9]	1041 [41]	489 [19.3]
	DFEJ, DFEK	306	5625 [12400]	2101 [82.7]		495 [19.5]
	DFEJ, DFEK	307	5775 [12731]	2123 [83.6]		499 [19.6]
	DFEJ, DFEK	308	5915 [13040]	2152 [84.7]		505 [19.9]
C207 W/F215	DFEJ, DFEK	305	5645 [12446]	2072 [81.6]	1041 [41]	454 [17.9]
	DFEJ, DFEK	306	5775 [12732]	2093 [82.4]		461 [18.1]
	DFEJ, DFEK	307	5925 [13063]	2115 [83.3]		466 [18.3]
	DFEJ, DFEK	308	6065 [13372]	2144 [84.4]		472 [18.6]
C209 W/F215	DFEJ, DFEK	305	6295 [13879]	2574 [101.3]	1041 [41]	360 [14.2]
	DFEJ, DFEK	306	6425 [14165]	2598 [102.3]		369 [14.5]
	DFEJ, DFEK	307	6575 [14496]	2624 [103.3]		376 [14.8]
	DFEJ, DFEK	308	6715 [14805]	2654 [104.5]		384 [15.1]
C211 W/F215	DFEJ, DFEK	305	7164 [15793]	5653 [222.6]	1041 [41]	274 [10.8]
	DFEJ, DFEK	306	7293 [16079]	5687 [223.9]		283 [11.1]
	DFEJ, DFEK	307	7443 [16410]	5722 [225.3]		291 [11.5]
	DFEJ, DFEK	308	7584 [16719]	5761 [226.8]		300 [11.8]
***WEIGHT & CG'S ARE SHOWN WITH FUEL TANK AND STANDARD WET GENSET. ADDITION OF OTHER FEATURES MAY CHANGE THE WEIGHT.						

NOTES:

1. DIMENSIONS SHOWN IN [ ] ARE INCHES.
2. FOUNDATION REFERENCE POINT (—▷◁—). SEE FOUNDATION DRAWING FOR DETAILS.
3. FOR FEATURE CODE L116 & L120 (FLORIDA & MICHIGAN TANKS) ADD 162.6 [6.4] TO DIMS D-J.
4. SEE SHEET 2 FOR TANK VENT LOCATIONS.
5. SUBBASE FUEL TANK MOUNTING.
   THE TANK SHOULD BE MOUNTED SUCH THAT AN AIR SPACE IS PROVIDED BETWEEN THE BOTTOM OF THE TANK AND THE FOUNDATION UNDERNEATH. VIBRATION MOUNTING PADS P/N 0402-0202 MAY BE USED TO PROVIDE AN AIR SPACE.

   EXCESSIVE TWISTING OF THE FUEL TANK, WHEN FASTENING IT TO A FOUNDATION, MAY RESULT IN STRUCTURAL FAILUE OF THE TANK. TO INSURE THE INSTALLATION DOES NOT EXCESSIVELY TWIST THE FUEL TANK, THE FOLLOWING PROCEDURE MUST BE OBSERVED:

   5.1 REFER TO ONAN APPLICATION MANUAL TO30 FOR GENERAL GENSET/TANK MOUNTING GUIDELINES.

   5.2 AFTER PLACING SET ON FOUNDATION, VERIFY ALL MOUNTING PADS CONTACT FOUNDATION.

   5.3 THERE ARE 8 SHIMS (.0747 INCH THK) ATTACHED TO EACH FUEL TANK. THESE ARE INTENDED TO FILL ANY GAP BETWEEN THE MOUNTING PADS AND FOUNDATION. IF MORE SHIMS ARE REQUIRED OBTAIN ADDITIONAL P/N 0232-3552-02 FUEL TANK SHIMS.

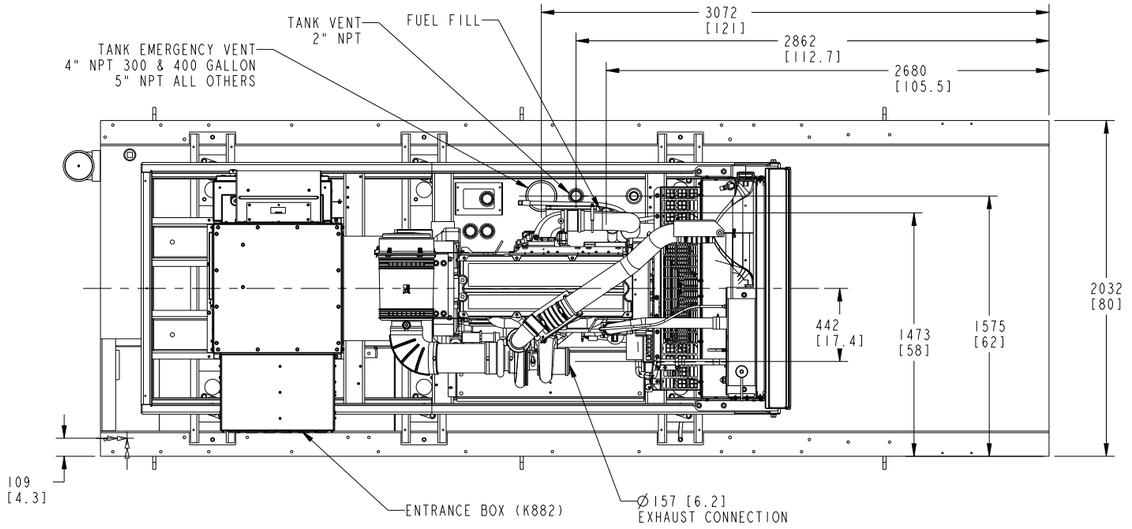
   5.4 INSERT THE MAXIMUM HEIGHT STACK OF SHIMS THAT WILL SLIDE INTO THE GAP.

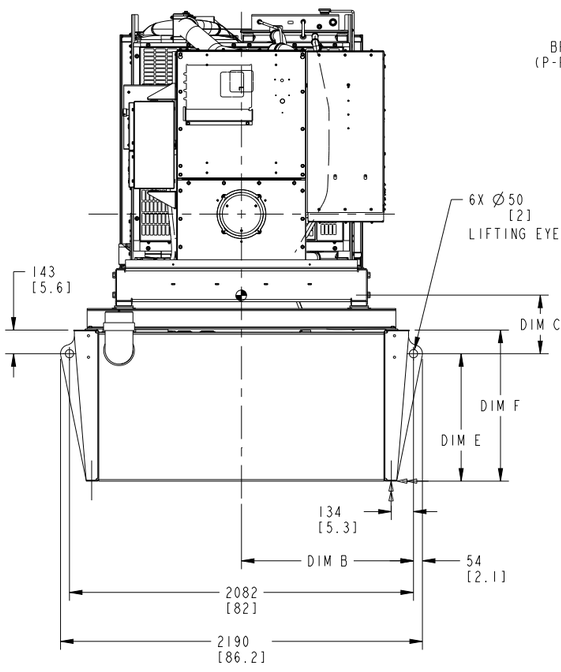
   5.5 TIGHTEN TANK HOLD DOWN MOUNTING FASTENERS.
6. GENSET SUPPLIED WITH FLEXIBLE FUEL LINES THAT CAN BE CONNECTED TO GENERATOR SET INTERFACE POINTS.

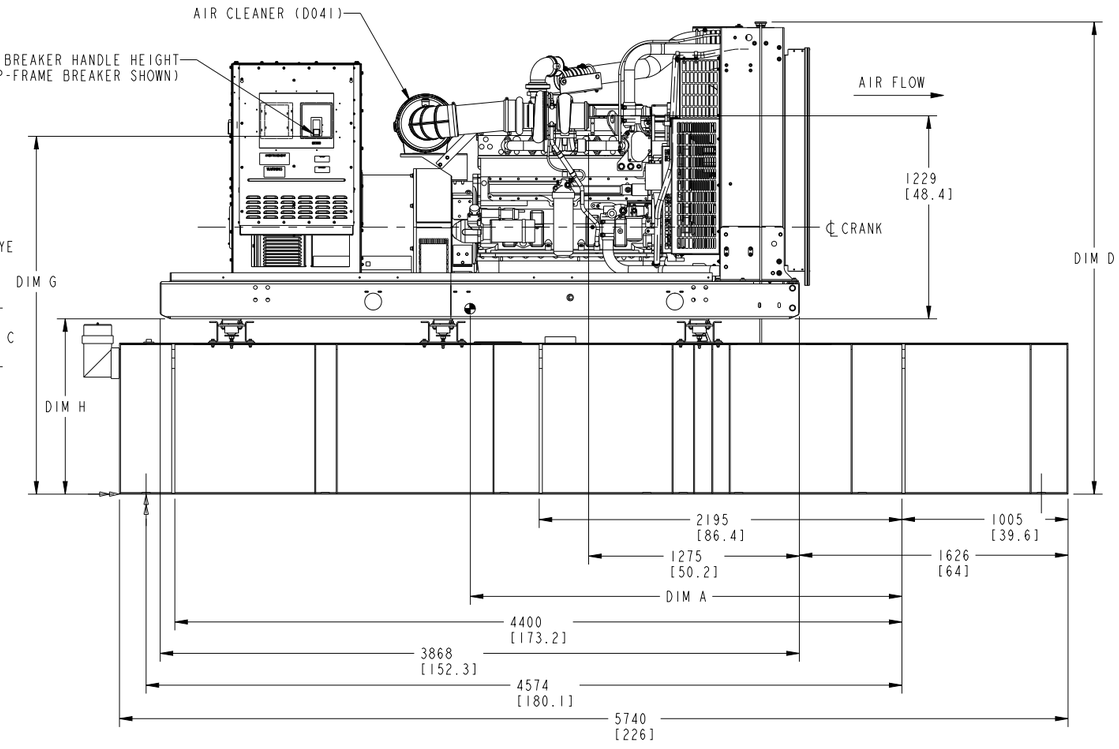
   6.1 SPEC A-N
   FUEL SUPPLY LINE: 1600 [63] LONG WITH 1/2-14NPT (MALE) TERMINATION.
   FUEL RETURN LINE: 2166 [85] LONG WITH 1/2-14NPT (MALE) TERMINATION.

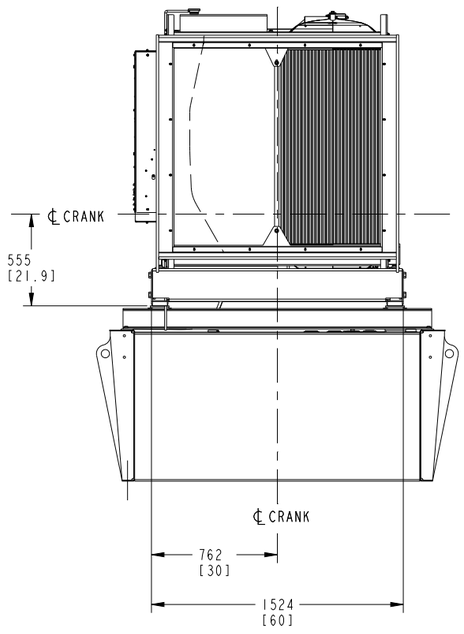
   6.2 SPEC P+
   FUEL SUPPLY LINE: 1700 [67] LONG WITH 1/2-14NPT (MALE) TERMINATION.
   FUEL RETURN LINE: 1500 [59] LONG WITH 1/2-14NPT (MALE) TERMINATION.
7. TABULATED WEIGHT AND CG IS FOR GENERATOR SET WITH NO OPTIONS.
8. REFER TO CIRCUIT BREAKER OUTLINE DRAWING FOR ELECTRICAL STUB-UP AREA FOR SPECIFIC BREAKERS.
9. REFER TO SUBBASE FUEL TANK OUTLINE DRAWING FOR ELECTRICAL STUB-UP AREA AVAILABLE WITH FUEL TANKS.
10. FUEL STUB-UP AREA: REFER TO SUBBASE FUEL TANK OUTLINE OR GENSET FOUNDATION OUTLINE FOR AVAILABLE STUB-UP AREAS.
11. DIMENSION IS △2 AS INDICATED ON CIRCUIT BREAKER OUTLINE DRAWING (0500_4233).
12. CONTROL INTERFACE CONNECTIONS SHOULD BE MADE WITH FLEXIBLE CONNECTIONS. NOT RIGID CONDUIT.
13. ENTRANCE BOX (SHOWN) OR OPTIONAL BREAKER BOX (NOT SHOWN) WILL BE MOUNTED ON THE RIGHT SIDE AS VIEWED FROM THE CONTROL.

Cummins Inc.		
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: -	SIZE: D	SCALE:1/16
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION	CAD SYSTEM PTC® Creo® Parametric









HOUSING READY SUBBASE F215 WITH FUEL TANK C209

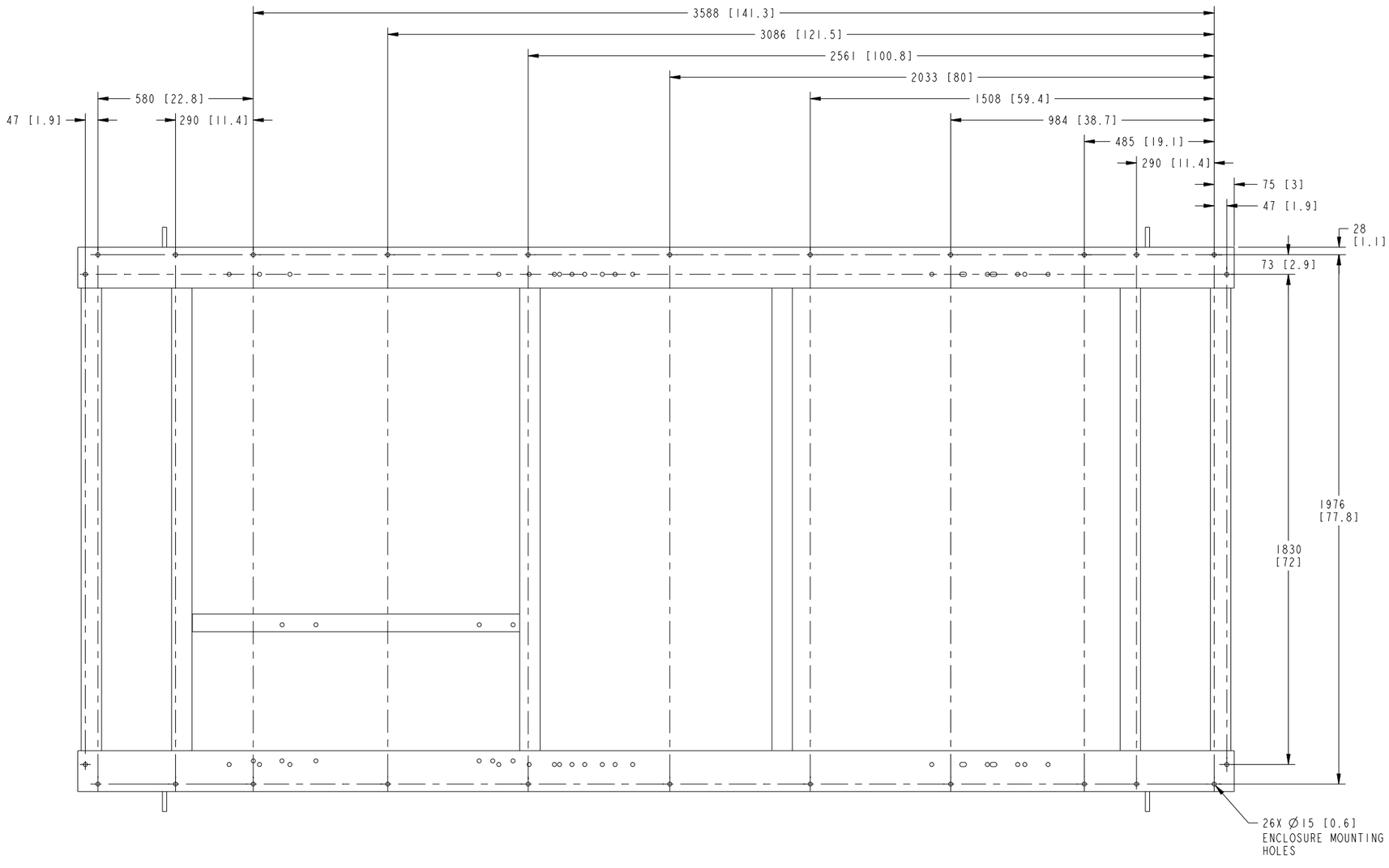
Cummins Inc.		
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: -	SIZE: D	SCALE: 1/16
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION	CAD SYSTEM PTC® Creo® Parametric

Document Generated: **30OCT2019 14:53 GMT**

Part Number: **A052W382** Part Revision: **B**

Part Name: **OUTLINE,GENSET**

Drawing Category: **Detail** State: **Released**



ENCLOSURE MOUNTING PROVISIONS
HOUSING READY FUEL TANK SUBBASE
OR LIFTING BASE

Cummins Inc.		
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: -	SIZE: D SCALE:13/160	
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION	CAD SYSTEM PTC® Creo® Parametric

Document Generated: **30OCT2019 14:53 GMT**

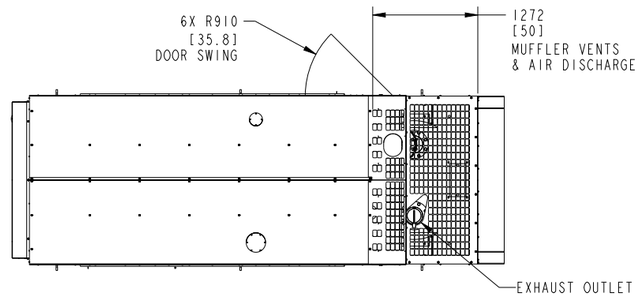
Part Number: **A052W382** Part Revision: **B**
Part Name: **OUTLINE,GENSET**
Drawing Category: **Detail** State: **Released**

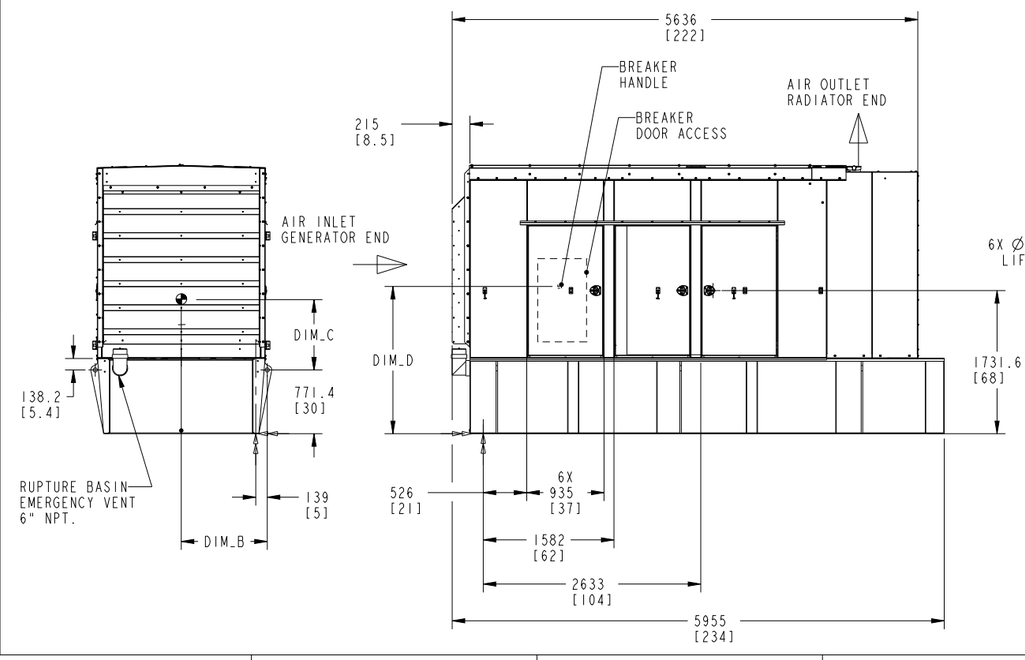
TABULATION		
TANK/LIFT BASE FEATURE CODE	TANK CAPACITY	TANK WEIGHT DRY KG (LBS)
C209	1700	2168 (4780)

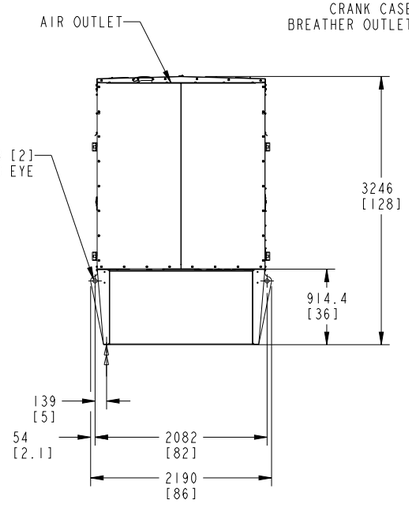
TABULATION						
MODEL	KW	CG_DIM "A"	CG_DIM "B"	CG_DIM "C"	IBC-STEEL ENCLOSURE WEIGHT KG (LBS) ±5%	IBC-ALUMINUM ENCLOSURE WEIGHT KG (LBS) ±5%
DFEG	350	2159 [85]	1041 [41]	676 [26.6]	8276 (18246)	7786 (17156)
DFEH	400	2139 [84.2]			8406 (18532)	7916 (17442)
DFEJ	450	2118 [83.4]		681 [26.8]	8558 (18870)	8069 (17780)
DFEK	500	2093 [82.4]			8695 (19170)	8205 (18080)
DQHAA	275	2154 [84.9]		709 [29.9]	6638 (14635)	6148 (13545)
DQHAB	300	2144 [84.4]		714 [28.1]	6752 (14885)	6262 (13795)
***WEIGHT & CG'S ARE SHOWN WITH 1700 GALLON FUEL TANK, ENCLOSURE, AND STANDARD WET GENSET. ADDITION OF OTHER FEATURES MAY CHANGE THE WEIGHT.						

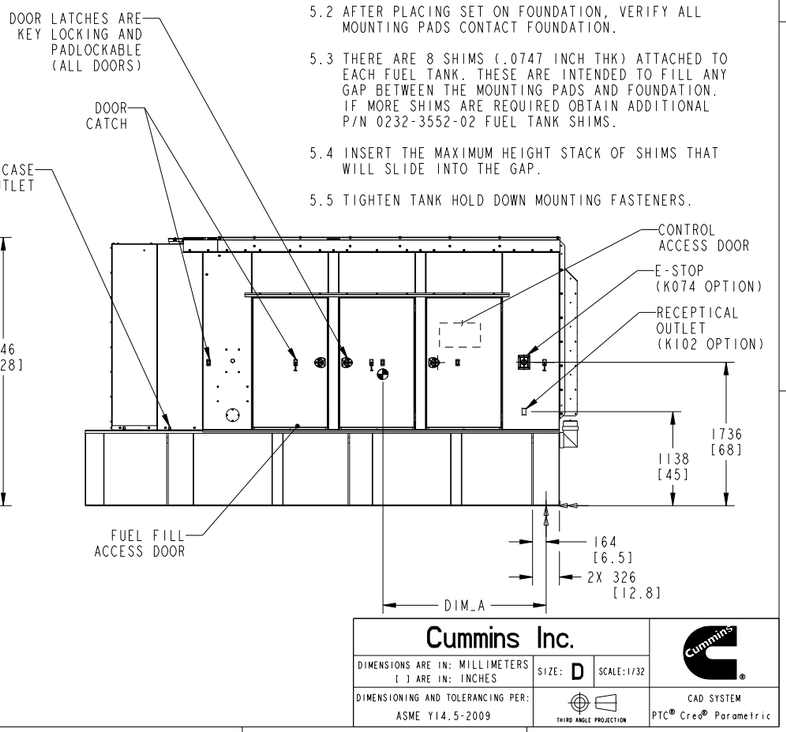
OPTIONAL FEATURE
F202,F205

TABULATION					
TANK/LIFT BASE FEATURE CODE	TANK CAPACITY	DIM_D QSMII L-FRAME	DIM_D QSMII P-FRAME	DIM_D QSXI5 L-FRAME	DIM_D QSXI5 P-FRAME
C209	1700	2104.9 [82.87]	1957.1 [77.05]	2317.5 [91.24]	2169.7 [85.42]
C211	2525	N/A	N/A	2317.5 [91.24]	2169.7 [85.42]









NOTES:

1. (NOTE REMOVED)
2. FOUNDATION REFERENCE POINT (⌐▷). SEE FOUNDATION DRAWING FOR DETAILS.
3. FOR FEATURE CODE LI16 & LI20 (FLORIDA & MICHIGAN TANKS) ADD 162.6 [6.4] TO DIMS FROM BOTTOM OF TANK
4. SEE SHEET 2 FOR TANK VENT LOCATIONS.
5. SUBBASE FUEL TANK MOUNTING.
   THE TANK SHOULD BE MOUNTED SUCH THAT AN AIR SPACE IS PROVIDED BETWEEN THE BOTTOM OF THE TANK AND THE FOUNDATION UNDERNEATH. VIBRATION MOUNTING PADS P/N 0402-0202 MAY BE USED TO PROVIDE AN AIR SPACE.

   EXCESSIVE TWISTING OF THE FUEL TANK, WHEN FASTENING IT TO A FOUNDATION, MAY RESULT IN STRUCTURAL FAILURE OF THE TANK. TO INSURE THE INSTALLATION DOES NOT EXCESSIVELY TWIST THE FUEL TANK, THE FOLLOWING PROCEDURE MUST BE OBSERVED:

   5.1 REFER TO ONAN APPLICATION MANUAL T030 FOR GENERAL GENSET/TANK MOUNTING GUIDELINES.

   5.2 AFTER PLACING SET ON FOUNDATION, VERIFY ALL MOUNTING PADS CONTACT FOUNDATION.

   5.3 THERE ARE 8 SHIMS (.0747 INCH THK) ATTACHED TO EACH FUEL TANK. THESE ARE INTENDED TO FILL ANY GAP BETWEEN THE MOUNTING PADS AND FOUNDATION. IF MORE SHIMS ARE REQUIRED OBTAIN ADDITIONAL P/N 0232-3552-02 FUEL TANK SHIMS.

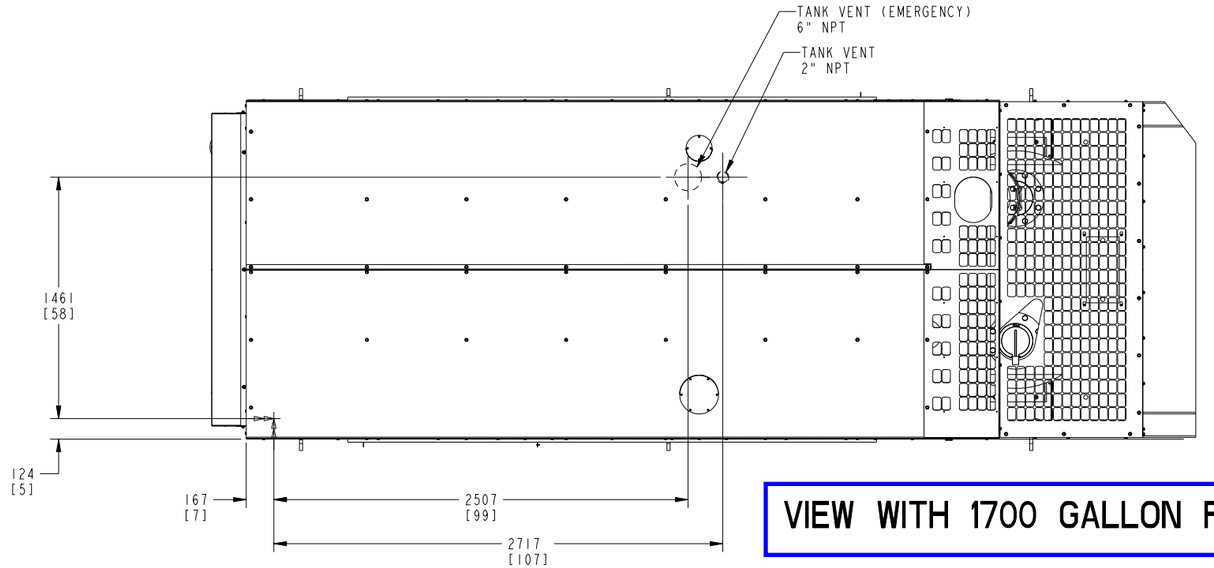
   5.4 INSERT THE MAXIMUM HEIGHT STACK OF SHIMS THAT WILL SLIDE INTO THE GAP.

   5.5 TIGHTEN TANK HOLD DOWN MOUNTING FASTENERS.

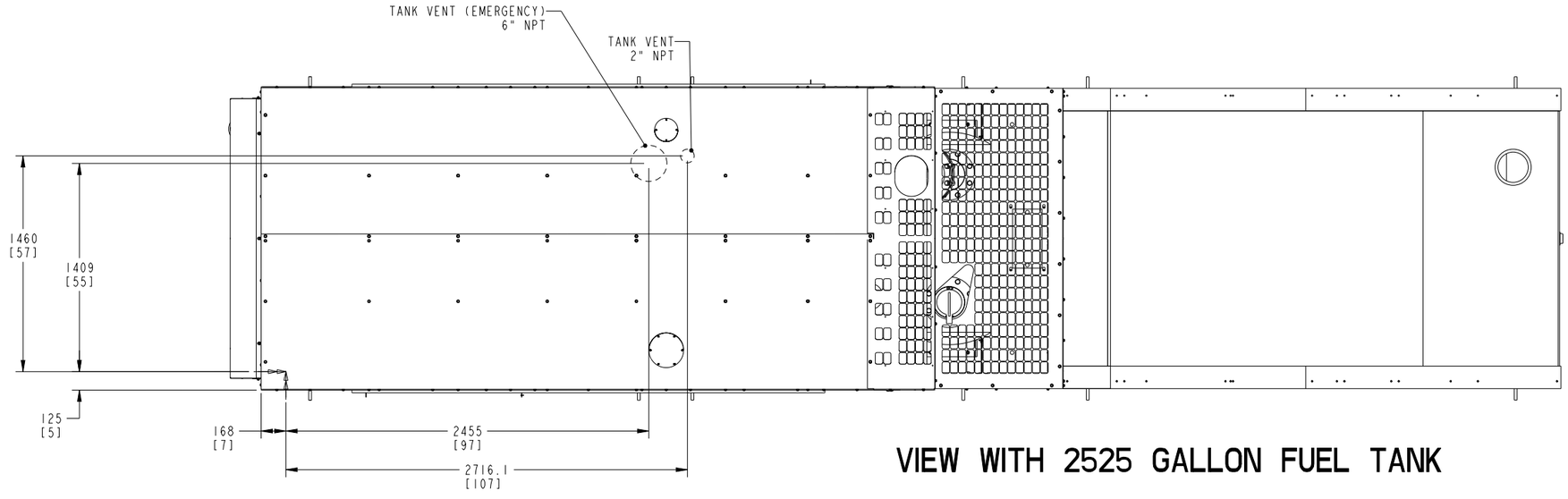
Cummins Inc.	
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: INCHES	SIZE: D SCALE: 1/32
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION
	CAD SYSTEM PTC® Creo® Parametric

Document Generated: **29OCT2019 15:32 GMT**

Part Number: **A034J593** Part Revision: **E**
Part Name: **OUTLINE,ENCLOSURE**
Drawing Category: **Outline** State: **Released**



VIEW WITH 1700 GALLON FUEL TANK



VIEW WITH 2525 GALLON FUEL TANK

Cummins Inc.	
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: INCHES	SIZE: D SCALE:3/32
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION
	CAD SYSTEM PTC® Creo® Parametric

Document Generated: **29OCT2019 15:32 GMT**

Part Number: **A034J593** Part Revision: **E**
Part Name: **OUTLINE,ENCLOSURE**
Drawing Category: **Outline** State: **Released**

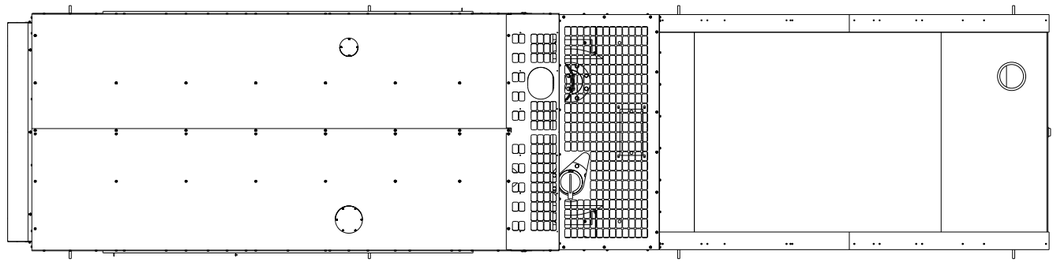
TABULATION						
ADS	GENSET MODEL	CG_DIM "A"	CG_DIM "B"	CG_DIM "C"	STEEL ENCLOSURE WEIGHT KG (LBS) ±5%	ALUMINUM ENCLOSURE WEIGHT KG (LBS) ±5%
305	DFEG, EH, EJ, EK	3064 [120.65]		1249 [49.17]	8720 (19223.76)	8230 (18133.76)
306	DFEG, EH, EJ, EK	3051 [120.11]	1008 [39.7]	1254 [49.38]	8850 (19510.36)	8360 (18420.38)
307	DFEH, EJ, EK	3036 [119.52]		1260 [49.62]	9000 (19841.06)	8510 (18751.06)
308	DFEJ, EK	3022 [118.98]		1266 [49.83]	9140 (20149.66)	8650 (19059.66)

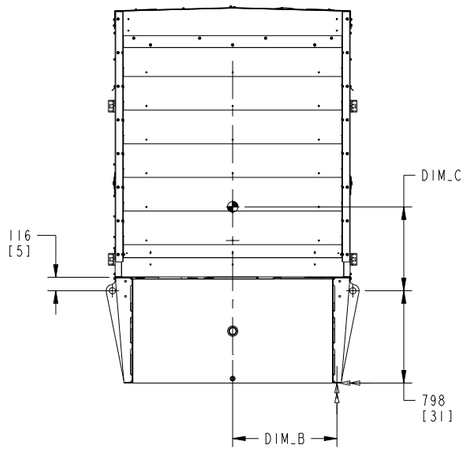
***WEIGHT & CG'S ARE SHOWN WITH 2525 GALLON FUEL TANK, (DRY WEIGHT), ENCLOSURE, AND STANDARD WET GENSET. ADDITION OF OTHER FEATURES MAY CHANGE THE WEIGHT.

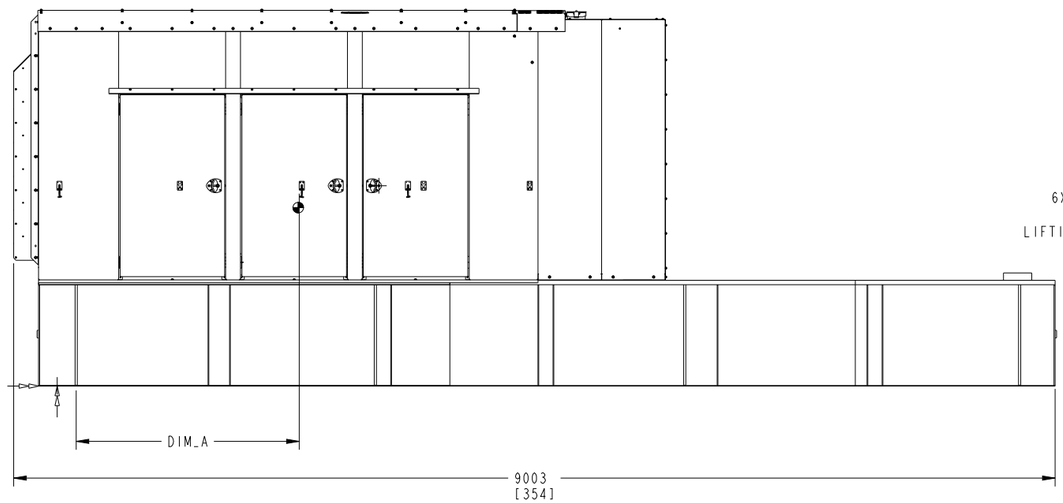
OPTIONAL FEATURE
F202,F205

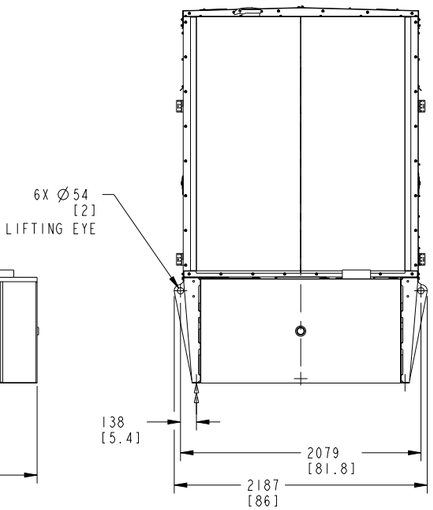
TABULATION						
TANK/LIFT BASE FEATURE CODE	TANK CAPACITY	DIM_D QSM11 L-FRAME	DIM_D QSM11 P-FRAME	DIM_D QSX15 L-FRAME	DIM_D QSX15 P-FRAME
C209	1700	2104.9 [82.87]	1957.1 [77.05]	2317.5 [91.24]	2169.7 [85.42]
C211	2525	N/A	N/A	2317.5 [91.24]	2169.7 [85.42]

TABULATION		
TANK/LIFT BASE FEATURE CODE	TANK CAPACITY	TANK WEIGHT DRY KG (LBS)
C211	2525	3028 (6675)







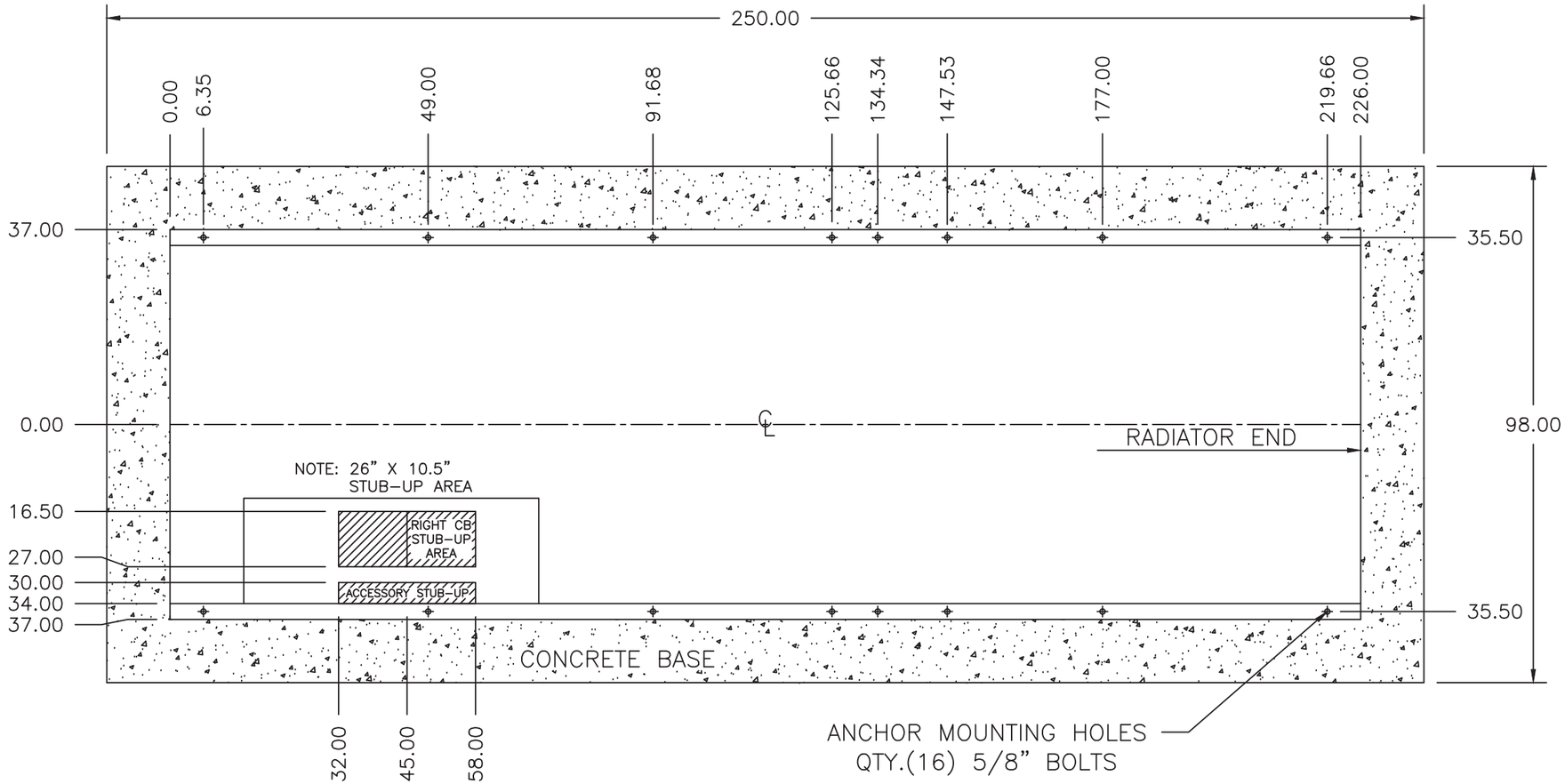


Cummins Inc.		
DIMENSIONS ARE IN: MILLIMETERS [ ] ARE IN: INCHES	SIZE: D	SCALE: 1/32
DIMENSIONING AND TOLERANCING PER: ASME Y14.5-2009	THIRD ANGLE PROJECTION	CAD SYSTEM PTC® Creo® Parametric

Document Generated: **29OCT2019 15:32 GMT**

Part Number: **A034J593** Part Revision: **E**
Part Name: **OUTLINE,ENCLOSURE**
Drawing Category: **Outline** State: **Released**

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



NOTE: SUGGESTED PAD LAYOUT SHOWN FOR REFFERENCE.
NOTE: SUGGESTED SERVICE ACCESS CLEARANCE 5 FEET.
ENCLOSURE INLET AIR FLOW SHALL BE UNOBSTRUCTED.
RADIATOR DISCHARGE AIR FLOW SHALL BE UNOBSTRUCTED.

REF: THOR F202 ENCLOSURE/FUEL TANK DRAWING A034J593
REF: GENERATOR SET/THOR FUEL TANK DRAWING A052W382-3
REF: THOR FUEL TANK DRAWING A030U410
REF: FOUNDATION DRAWING A035F951-1
REF: CIRCUIT BREAKER DRAWING A052W389

UNLESS OTHERWISE SPECIFIED,
ALL DIMENSIONS ARE IN INCHES

TOLERANCES:
FRACTIONAL: 1/4
X: .06
.XX: .03
.XXX: .01
ANGLES: .5°

REFERENCES

A050L815	
A034J593	A030U410
A035F951-1	A052W389

FINISH: N/A	MODIFIED BY: –	CHKD BY: –	PREP. BY: KDU
	–	–	07/10/25

THOR C209 FUEL TANK

ENGINE FAMILY: QSX15 ENGINE

CSSNA POWER GENERATON

SITE NAME: – –	CONTACT NAME: –	CUSTOMER PROJECT NO: –
CONTRACTOR NAME: –	CONTACT NO: –	CSSNA PROJECT NO: –

TITLE: DFEJ & DFEK DIESEL GENERATOR SETS
THOR C209 FUEL TANK

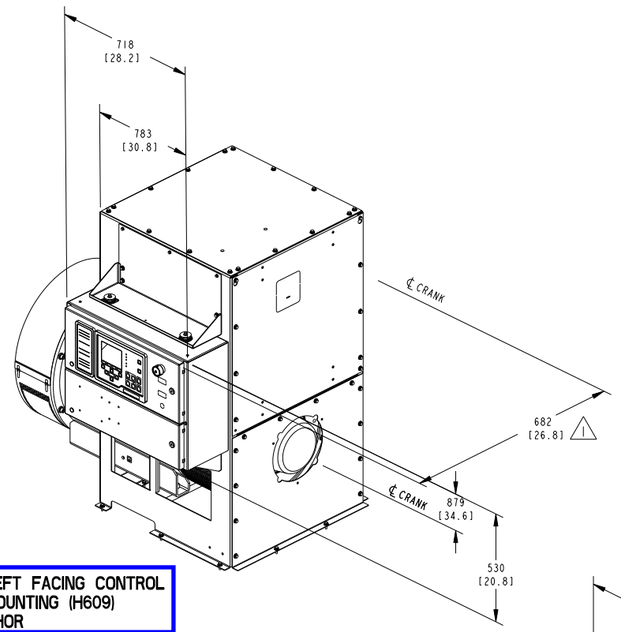
SIZE: C | DWG NO: QSX15 ELECTRICAL STUB-UP | REV A

SCALE: NONE | DO NOT SCALE PRINT | SHEET 1 OF 1

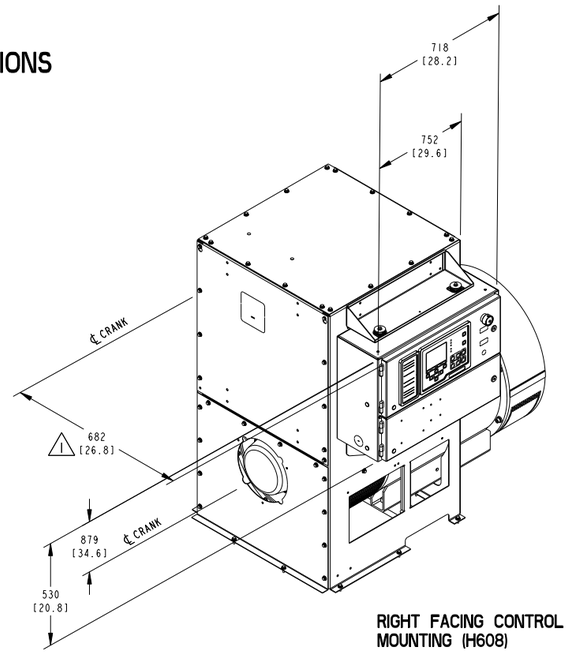
PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-152559	A	1	PRODUCTION_RELEASE	MLL	JCB	J_BRODY	19MAY15

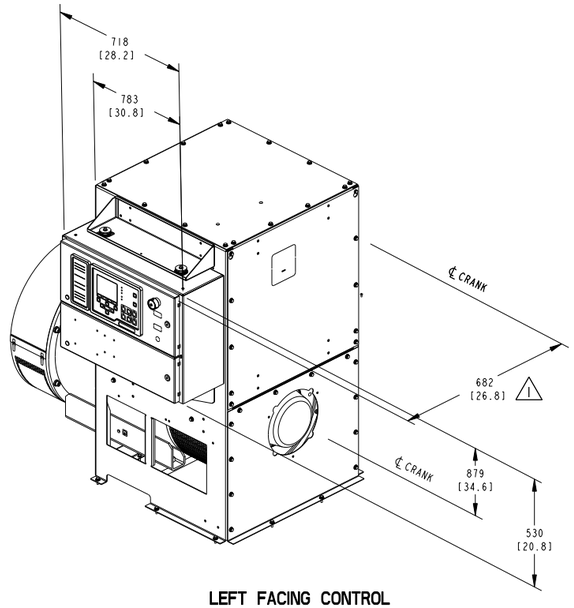
CONTROL BOX LOCATIONS



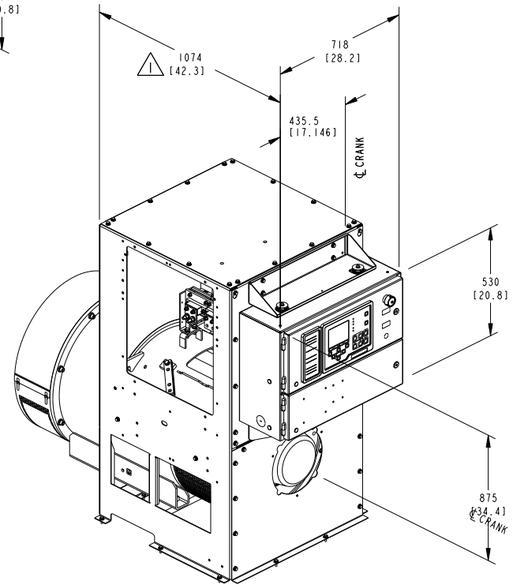
LEFT FACING CONTROL
MOUNTING (H609)
THOR



RIGHT FACING CONTROL
MOUNTING (H608)



LEFT FACING CONTROL
MOUNTING (H609)
NONTHOR



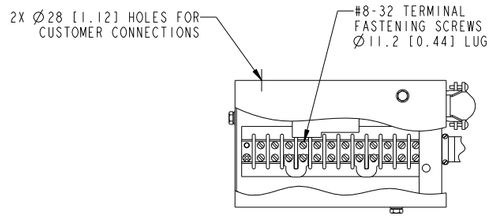
FRONT FACING CONTROL
MOUNTING (H679)

NOTE:
1. DIMENSION TO FACE OF CONTROL BOX. COMPONENTS ON FACE EXTEND 34.3 [1.35] BEYOND FACE.

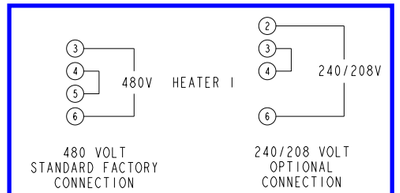
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS	SIM TO A041F617	DWN M_LEHR		CUMMINS POWER GENERATION	
DIM: X ±1, .X ±0.8, .XX± 0.38 — HOLE: 0.00- 4.99 +0.15/-0.08, 5.00- 9.99 +0.20/-0.10, 10.00-17.49 +0.25/-0.13, 17.50-24.99 +0.30/-0.13	DO NOT SCALE PRINT	CKD J_BRODY	SITE CODE	OUTLINE,GENSET	
	- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP	APVD J_BRODY			
ANG TOL: ± 1.0° SCALE: 3/32		DATE 19MAY15	PGF	DWG SIZE D — A052W391	SHEET 2 of 2 — DWG REV A
		FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994 — FIRST USED ON DFEJ,DFEK			

0500_3820	D	Pro/ENGINEER	METRIC DWG

REL NO	LTR	NO	REVISION	ZONE	DR	CHKR	APPROVED	DATE
ECO-153587	B	1	"HEATER" WAS "HETER"	C5	WGM	DJR	K.KISHORE	16JUL15



DETAIL OF HEATER TERMINAL BOX

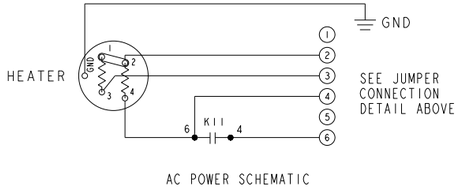


JUMPER CONNECTION DETAIL

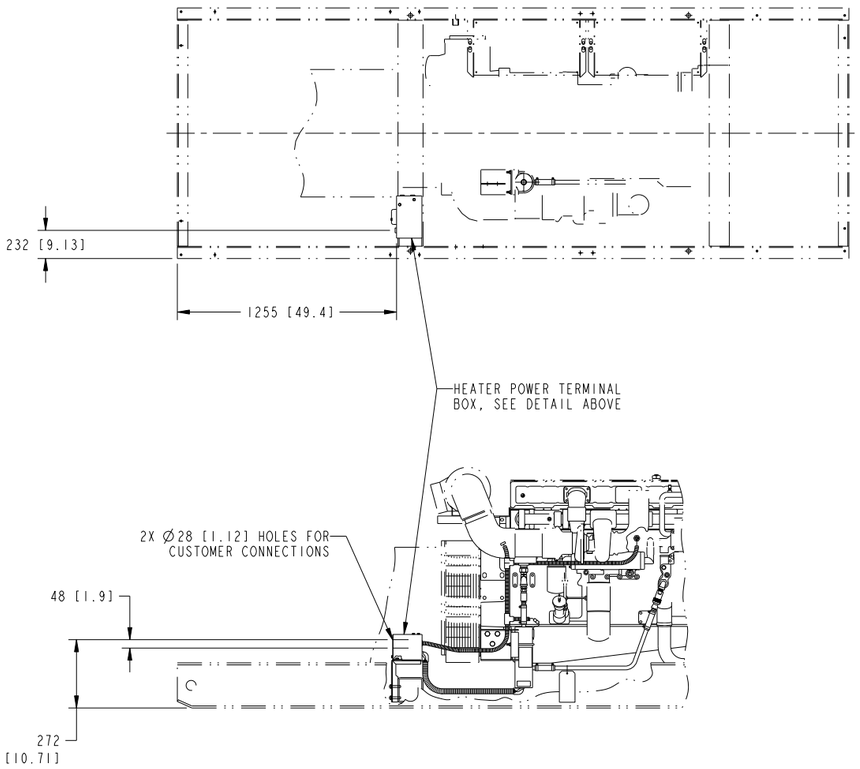
NOTES:

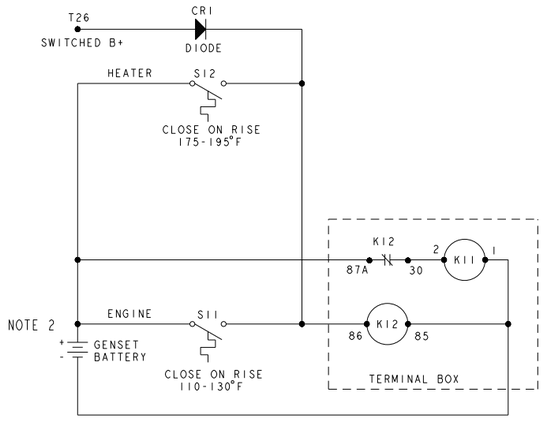
1. DIMENSIONS IN [ ] ARE INCHES.
2. THE HEATER CONTROL RELAY DRAWS 83mA OF CURRENT WHEN THE HEATERS ARE UNPOWERED. HEATERS ARE NOT POWERED WHEN:
   1) THE ENGINE HAS REACHED DESIGN TEMPERATURE OR
   2) THE ENGINE IS RUNNING.

⚠ A BATTERY CHARGER IS REQUIRED TO PREVENT BATTERY DISCHARGE.



AC POWER SCHEMATIC





DC CONTROL SCHEMATIC

HEATER AMPERAGE TABLE

SINGLE PHASE HEATER VOLTAGE	FEATURE CODE H556 ONE HEATER		FEATURE CODE H557 ONE HEATER	
	HEATER AMPS	TOTAL WATTS	HEATER AMPS	TOTAL WATTS
208	18.0	3744	23.2	4825
240	20.8	4990	26.75	6420
480	10.4	4990	13.375	6420

QTY	ITEM	PART NO	DWG SIZE	DESCRIPTION OR MATERIAL	REF DES

DO NOT SCALE PRINT

TOLERANCE UNLESS OTHERWISE SPECIFIED

DIM	mm	inch
X	± 1	±
.X	± 0.8	.X ±
.XX	± 0.38	.XX ±

HOLE			
0.00- 4.99	±0.15/-0.08	.004-.200	+.006/-.003
5.00- 9.99	±0.20/-0.10	.201-.421	+.008/-.004
10.00-17.49	±0.25/-0.13	.422-.703	+.010/-.005
17.50-24.99	±0.30/-0.13	.704-.999	+.012/-.005

ANG TOL± 1.0 °

DRAWN TO SCALE OF 1/1

sim to 0500-3312

COPIED FROM

THIRD ANGLE PROJECTION

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	NAME	DATE
DR	W_PELTIER	05-06-03
CHKR ☐ MFG ☐	W PELTIER	05-06-03
APPROVED	E KROHNFELDT	05-06-03

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ANSI Y14.5M-1982

MODEL FIRST USED ON: DFEH,EJ,EK

SITE CODE: PGA

CUMMINS POWER GENERATION
1400 73RD AVE NE
MINNEAPOLIS, MINNESOTA 55432

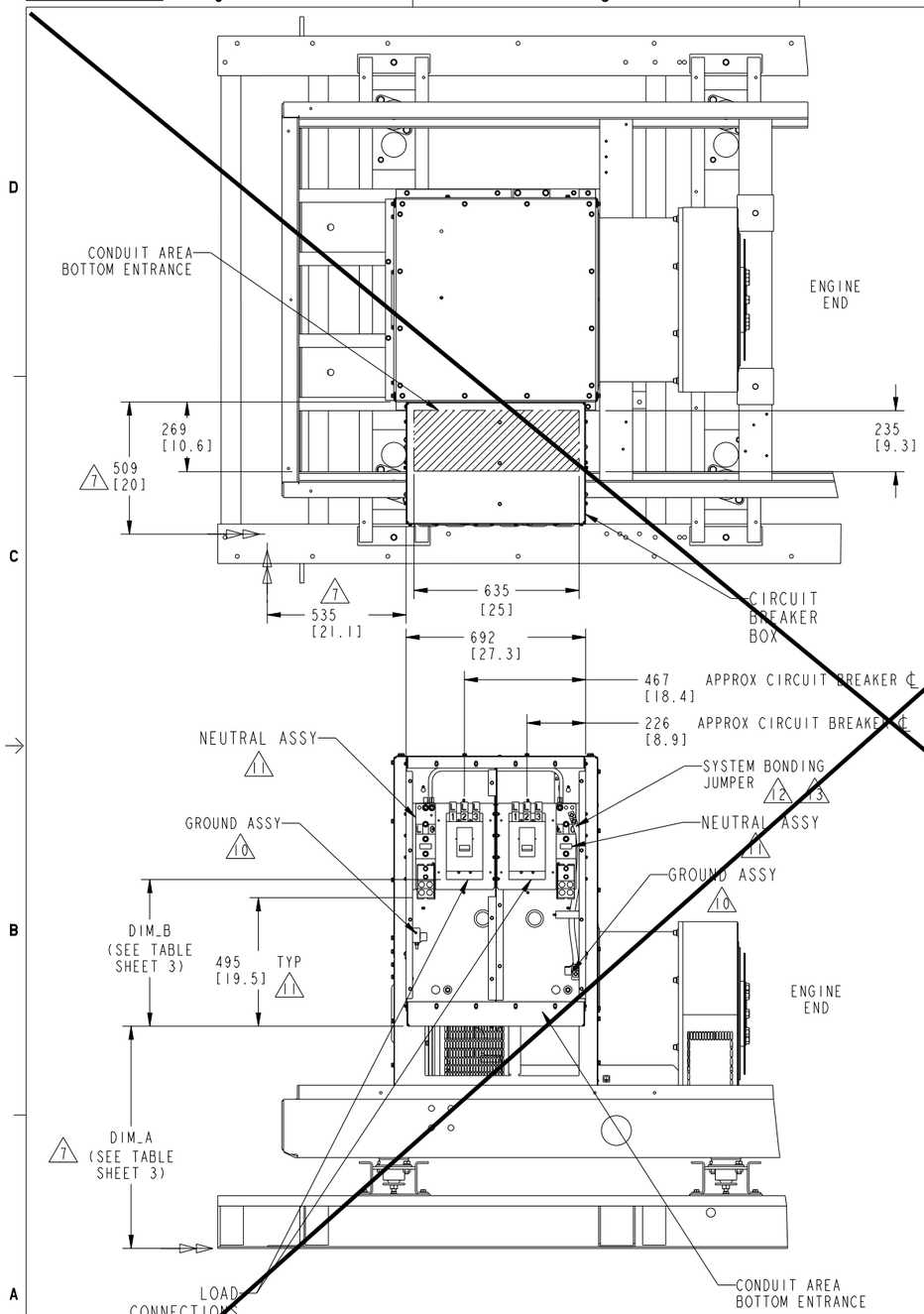
TITLE: INTERFACE_OUTLINE (HEATER)

DWG NO: 0500_3820 | SHEET 1 of 1 | DWG SIZE D

Drawing Name: 0500-3820 Revision: B
Part Name: 0500-3820 Revision: B
Sheet 1 of 2

PTC® Creo® Parametric

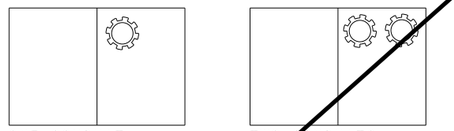
REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-180039	B	1	SEE SHEET 3	CJF	PA L CASSENS		31AUG18
		2	SEE SHEET 3	CJF	PA L CASSENS		31AUG18



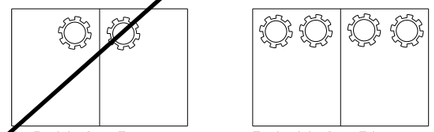
DFEJ/DFEK
CIRCUIT BREAKER BOX
(RIGHT HAND BOTTOM ENTRY CONFIGURATION
NSJ/NLG-FRAME BREAKERS SHOWN)

NSJ/NLG-FRAME 300-600A RECOMMENDED CONDUIT LOCATIONS

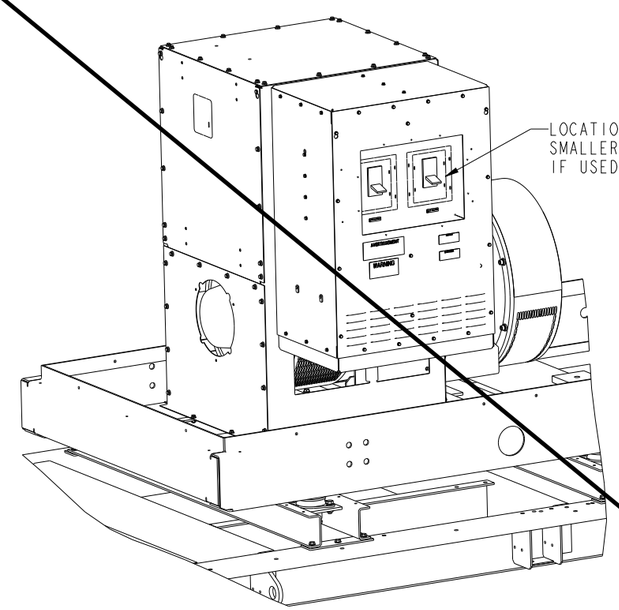
SINGLE BREAKER



DUAL BREAKER



BOTTOM COVER
(LOOKING DOWN AT BOTTOM
OF BREAKER BOX)



NOTES:

1 ALL DIMENSIONS ARE FOR REFERENCE ONLY

2 DIMENSIONS SHOWN IN [ ] ARE IN INCHES

3 BOTTOM COVER IS ADJUSTABLE VERTICALLY PLUS OR MINUS 6 [0.25] TO EASE CONDUIT ATTACHMENT

4 THESE WIRE-CONDUIT COMBINATIONS MEET NEC AND CEC. TO USE OTHER COMBINATIONS, REFER TO APPLICABLE CODES TO ENSURE THAT WIRE AMPACITY, BEND SPACE AND GUTTER SPACE MEET THE REQUIREMENTS

5 "NS" SHUNT TRIP HAS NO INTERNAL CONTACTS, IT MUST BE USED IN CONJUNCTION WITH AUXILIARY CONTACTS TO ACCEPT CONTINUOUS APPLIED VOLTAGE. IT CAN OPERATE AT 75% OF NOMINAL VOLTAGE

6 CONDUITS AND WIRING SHOULD BE DESIGNED AND INSTALLED TO ALLOW FOR NORMAL GENERATOR SET MOVEMENT DURING CRANKING SHUT DOWN OR EXPECTED SEISMIC DISTURBANCES

7 SEE FOUNDATION LAYOUT DRAWING (GENSET OUTLINE (FOUNDATION)) FOR THE LOCATION OF THE ELECTRICAL STUB UP AREAS AND FOUNDATION REFERENCE POINT (▷)

8 ON FLORIDA UNITS WITH TANKS (FEATURE CODE L116) ADD 106 [4.2] FOR RISER BEAMS THAT ARE REQUIRED ON THE UNDERSIDE OF THE TANK

9 BOX DIMENSIONS AND CONDUIT LOCATIONS ARE THE SAME FOR ENTRANCE BOX WITHOUT CONDUITS

10 EQUIPMENT GROUND AND GROUNDING ELECTRODE LUG IS MECHANICAL TYPE,
COPPER 400 MCM-6 AWG
SCREW 11/16"-16 UN-2B
5/16" HEX WRENCH
RECOMMENDED TORQUES:
250 MCM-1 AWG - 375 IN-LBS
2-6 AWG - 275 IN-LBS

11 NEUTRAL LUG IS MECHANICAL TYPE,
COPPER #2-600 MCM
SCREW 15/16"-16 UN-2B
3/8" HEX WRENCH
RECOMMENDED TORQUES:
600 MCM-4 AWG - 500 IN-LBS

12 TORQUE TO 9.8-11.9 Nm [7.2-8.8 FT-LBS]
HARDWARE IS PROVIDED WITH BONDING JUMPER.

13 250 MCM SYSTEM BONDING JUMPER SIZED PER NEC TABLE 250.122 USING COPPER CABLE FOR A MAXIMUM AMPACITY RATING OF 2000 AMPS.

14 CIRCUIT BREAKER LUGS - REFER TO RECOMMENDED TORQUE ON LABEL.

15 MINIMUM WIRE BENDING SPACE AT BREAKER TERMINALS CALCULATED PER NEC TABLE 312.6(B) USING 500 MCM CABLES (2 WIRES PER TERMINAL), MECHANICAL LUGS USED AS TERMINALS.

NUMBER OF CONDUCTORS PER PHASE CALCULATED PER TABLE 310.16 USING COPPER CABLES RATED AT 75° C ON A MAXIMUM AMBIENT TEMP OF 40° C.

16 MINIMUM WIRE BENDING SPACE AT GROUND TERMINALS CALCULATED PER NEC TABLE 312.6(A) USING [3/0-14] CABLES (1 WIRE PER TERMINAL), MECHANICAL LUGS USED AS TERMINALS.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

DIM		HOLE
X	±1	0.00- 4.99 +0.15/-0.08
.X	±0.8	5.00- 9.99 +0.20/-0.10
.XX	±0.38	10.00-17.49 +0.25/-0.13
		17.50-24.99 +0.30/-0.13

ANG TOL: ± 1.0° SCALE: 3/32

SIM TO A040J749
DO NOT SCALE PRINT
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PROPERTY OF CUMMINS POWER GENERATION group

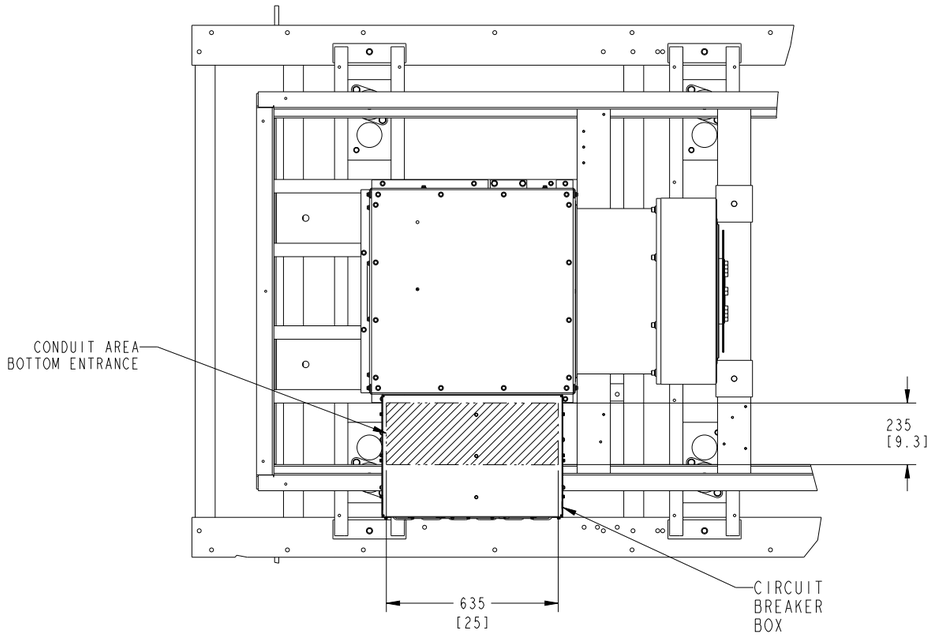
DWN M_LEHR
CKD J_BRODY
APVD J_BRODY
DATE 25MAY11
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994
FIRST USED ON DFEJ,DFEK

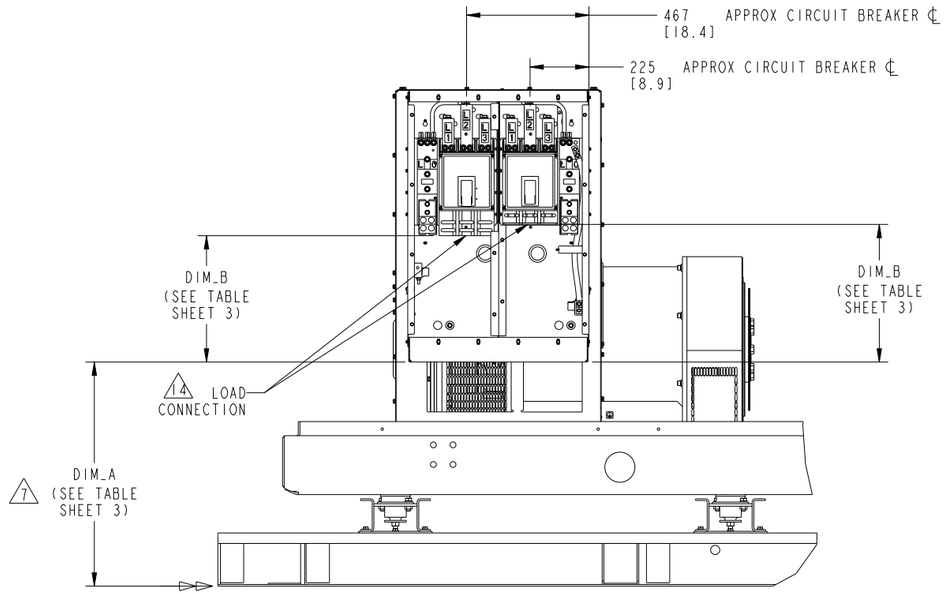
CUMMINS POWER GENERATION
OUTLINE,CIRCUIT BREAKER
SITE CODE
PGF
DWG SIZE D
A052W389
SHEET 1 OF 3
DWG REV B

Drawing Name: A052W390 Revision: B
Part Name: A052W389 Revision: B
ECO-180039 Sheet 1 of 4

PTC® Creo® Parametric

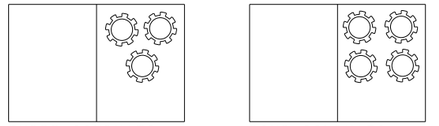
REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-180039	B	--	-----	CJF	PA L	CASSENS	31AUG18



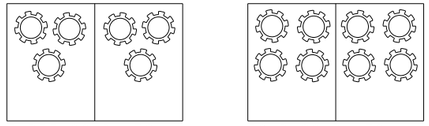


P-FRAME 800-1200A BREAKER RECOMMENDED CONDUIT LOCATIONS

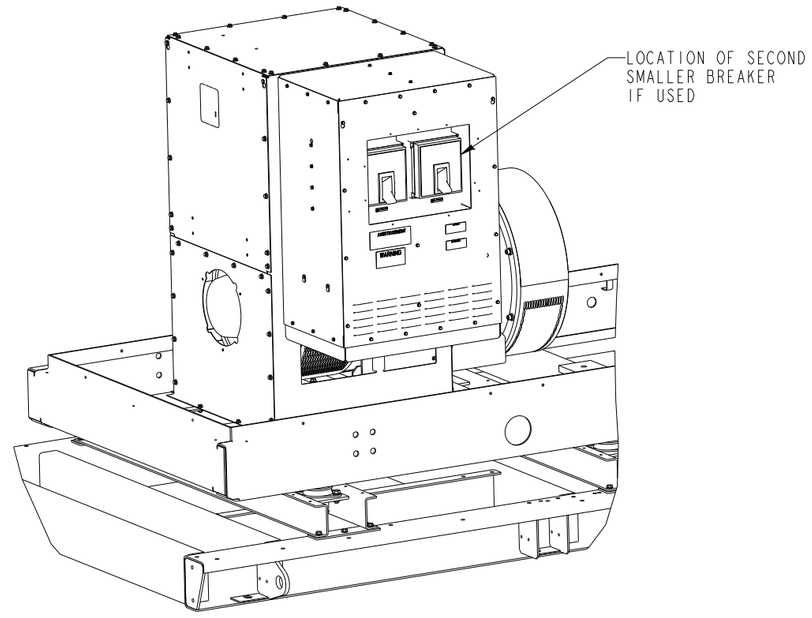
SINGLE BREAKER



DUAL BREAKER



BOTTOM COVER
(LOOKING DOWN AT BOTTOM
OF BREAKER BOX)



DFEJ/DFEK
CIRCUIT BREAKER BOX
(RIGHT HAND BOTTOM ENTRY CONFIGURATION
P-FRAME BREAKERS SHOWN)

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DIM: X ±1 | .X ±0.8 | .XX± 0.38
HOLE: 0.00- 4.99 +0.15/-0.08 | 5.00- 9.99 +0.20/-0.10 | 10.00-17.49 +0.25/-0.13 | 17.50-24.99 +0.30/-0.13
ANG TOL: ± 1.0° SCALE: 3/32

SIM TO A040J749
DO NOT SCALE PRINT
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DWN M_LEHR
CKD J_BRODY
APVD J_BRODY
DATE 25MAY11
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994
FIRST USED ON DFEJ,DFEK

CUMMINS POWER GENERATION
OUTLINE,CIRCUIT BREAKER
SITE CODE ·
PGF | DWG SIZE D | A052W389 | SHEET 2 OF 3 | DWG REV B

PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-180039	B	1	ZONE D-5: "#2---(400 AMPS)" WAS "#2---KCMIL"	CJF	PA	L CASSENS	31AUG18
		2	ZONE D-5: "2/0-500 KCMIL" WAS "2/0 350 KCMIL"	CJF	PA	L CASSENS	31AUG18

UL/IEC LUGS					ACCESSORY SPECIFICATIONS			
LUG	FRAME	MAX AMPS	WIRE RANGE COPPER	DIM_B	ACCESSORY DESCRIPTION	CONTACT RATING	INRUSH CURRENT	CONNECTION TYPE
	NSJ/NLG	400A 3 POLE	#2-600 KCMIL (250 AMPS) #2-500 KCMIL (400 AMPS)	565 [22.2]	24 VDC SHUNT TRIP	- △5	10A	COMPRESSION TERMINALS #20-16 AWG OR SMALLER TORQUE: 1.13 Nm [10 LB-IN]
		600A 3-POLE	2/0-500 KCMIL		1 EA. FORM C 1 AUX CONTACT + 1 TRIP ALARM	6A AT 690 VAC 2.5A AT 48 VDC, 0.3A AT 250 VDC	-	
	P	800A 3-POLE	3/0-500 KCMIL	18.9 [480]	24 VDC SHUNT TRIP	-	200VA	COMPRESSION TERMINALS FOR 1 OR 2 #18-16 AWG. TORQUE: 1.13 Nm [10 LB-IN]
					1 EA. FORM C 4 AUX CONTACTS + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125 VDC, 0.3A AT 250 VDC	-	
	P	1200A 3-POLE	3/0-500 KCMIL	17.2 [437]	24 VDC SHUNT TRIP	-	200VA	COMPRESSION TERMINALS FOR 1 OR 2 #18-16 AWG. TORQUE: 1.13 Nm [10 LB-IN]
					1 EA. FORM C 4 AUX CONTACTS + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125 VDC, 0.3A AT 250 VAC	-	

TYPICAL CONDUIT AND WIRE SIZE BASED ON NEC 2008, ARTICLE 310.15 AT 75C TEMPURATURE RATED CONDUCTOR AT 40C AMBIENT AND ANNEX C (LIQUID TIGHT FLEXIBLE METAL CONDUIT - LFCM) △4				
MAX BRKR AMPS	WIRE (COPPER)		CONDUIT	
	QTY	SIZE	QTY	SIZE
1200	4	500 KCMIL	4	4"
800	3	350 KCMIL	3	3 1/2"
600	2	350 KCMIL	2	3 1/2"
500	2	300 KCMIL	2	3 1/2"
450	2	300 KCMIL	2	3 1/2"
400	1	600 KCMIL	1	4"
350	1	600 KCMIL	1	4"
300	1	500 KCMIL	1	4"

DIM_A TABULATION			
MODEL NAME	TANK/LIFT BASE FEATURE CODE	TANK CAPACITY (GAL)	HEIGHT DIM_A
DFEJ,DFEK	C201	300	958[37.7]
	C202	400	1009[39.7]
	C203	500	1060[41.7]
	C204	600	1136[44.7]
	C205	660	1174[46.2]
	C207	850	1314[51.7]
	C209	1700	1568[61.7]
	C211	2525	1568[61.7]
	C242	270	1009[39.7]
	F214	NA	856[33.7]

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

DIM: X ±1 | .X ±0.8 | .XX± 0.38

HOLE: 0.00- 4.99 +0.15/-0.08 | 5.00- 9.99 +0.20/-0.10 | 10.00-17.49 +0.25/-0.13 | 17.50-24.99 +0.30/-0.13

ANG TOL: ± 1.0° | SCALE: 3/32

SIM TO A040J749

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DWN M_LEHR | CKD J_BRODY | APVD J_BRODY | DATE 25MAY11

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994 | FIRST USED ON DFEJ,DFEK

CUMMINS POWER GENERATION

OUTLINE,CIRCUIT BREAKER

SITE CODE · | PGF

DWG SIZE D | A052W389 | SHEET 3 of 3 | DWG REV B

Drawing Name: A052W390 Revision: B
Part Name: A052W389 Revision: B
ECO-180039 Sheet 3 of 4

CTB		POWERCOMMAND CONTROL PCC2.3
	CTB1–2	PCC NET A (+)
	CTB2–2	PCC NET B (–)
	CTB3–2	GROUND B–(SHIELD)
	CTB5–2	POWER B+
	CTB18–2	REMOTE E–STOP RETURN
	CTB19–2	REMOTE E–STOP INPUT
W09	CTB6–4	POWER B+
	CTB11–4	POWER B–
W11	CTB12–4	POWER B–
	CTB23–4	LOAD DUMP DRIVER
W05	CTB12–2	REMOTE START RETURN
W06	CTB13–2	REMOTE START INPUT
MODBUS RTU		
	TB15–1	RS485 (SHIELD)
	TB15–3	RS485 (+)
	TB15–4	RS485 (–)

		GENERIC TRANSFER SWITCH
W05	REMOTE START RETURN	
W11	POWER B–	
W09	POWER B+	
W06	REMOTE START	

- ALL INTERCONNECT WIRING AND DATA CABLING IS TO BE DONE WITH STRANDED WIRE PER NFPA 37.
- PCC NET CABLE: BELDEN 9729. (24 AWG, STRANDED, SHIELDED, TWISTED PAIR)
- MODBUS RS485 CABLE: BELDEN 3106A. (22 AWG, STRANDED, SHIELDED, TWISTED PAIR)
- TOTAL NETWORK LENGTH NOT TO EXCEED 4000 FT.
- ATS LOAD SHED WIRING IS SHOWN FOR REF.–––––

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

TOLERANCES:
FRACTIONAL:
.X: .06
.XX: .03
.XXX: .01
ANGLES: .5°

REFERENCES			
A065N785	–		
A052P382	–		
A054A430	–		

PREP. BY:	KDU	08/26/24	
CHKD BY:	–	–	
MODIFIED BY:	–	–	

FINISH: N/A

GENERIC ATS

ENGINE FAMILY: PCC2300

CSSNA POWER GEN

SITE NAME: – –	CONTACT NAME: –	CUSTOMER PROJECT NO: –	TITLE: PCC2.3 CONTROL / GENERIC ATS QSL9..QSX15..QSK23
CONTRACTOR NAME: –	CONTACT NO: –	CSSNA PROJECT NO: –	SIZE: B DWG NO: PCC2.3 INTERCONNECT REV: –
			SCALE: NONE DO NOT SCALE PRINT SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED,
ALL DIMENSIONS ARE IN INCHES

PREP. BY:	JPK	5/1/2024

CUSTOMER SUPPLIED
A/C POWER

COOLANT HEATER
208–240–480v
4825–6420W

SHIP LOOSE BATTERY
CHARGER
120–240V/800W

NOTES:
1. FOLLOW REGIONAL REGULATIONS AND APPLICABLE ELECTRIC CODES FOR INSTALLATION.
2. INSTALLER TO PROVIDE BRANCH CIRCUITS TO POWER ALL ACCESSORIES.
3. OUTLETS SHOWN FOR REFERENCE ONLY. ALL OUTLETS AND ASSOCIATED DASHED WIRING ARE THE RESPONSIBILITY OF THE INSTALLER.

CSSNA POWER GEN

TITLE:	DSHAD–DQFAD NO PANEL
SIZE: B	DWG NO: –
REV	0
SCALE:	DO NOT SCALE PRINT
SHEET	1 OF 1

SECTION 5

Startup & Warranty

Cummins Sales and Service

Customer / Contractor Pre Commissioning Inspection Form

The intent of this form is for the contractor to prepare for equipment to be commissioned by a certified Cummins Field Service Power Generation Technician. Filling out this form is required and will minimize delays due to equipment failing to meet requirements. Completing this checklist in its entirety should minimize the need for additional billing beyond the previously provided commissioning quote.

The items listed are the responsibility of the contractor and not Cummins Sales and Service.

Project Name/End User: _____

Contractor: _____

Address: _____ **Contact:** _____

Business Phone: _____ **Cell Phone:**_____

Email: _____

ON SITE INFORMATION

On-Site Contact Information: _____

Address: _____

Time Requested Onsite: _____

Sub location of Generator (ie. Roof, basement, floor): _____

Does the facility have the following: Loading Dock ☐ Elevator ☐

Access (from truck and load bank parking to generator in feet): _____

Parking: Is parking available on-site for service truck: Yes ☐ No ☐

Permits: Have all necessary air quality and local permits been secured: Yes ☐ No ☐ N/A ☐

Fuel Tank Testing: Is fuel tank testing required: Yes ☐ No ☐

If yes when is the inspector scheduled for: _____

Sales and Service

ON SITE INFORMATION CONTINUED

YES	NA	NO
☐	☐	☐
☐	☐	☐
☐	☐	☐

Is the facility occupied and is customer aware there will be power outages after generator is started?

Will there be any site safety training needed for technician prior to beginning? On site contact for training: _____

Will customer representative be on site for operator training?

On site contact for operator training: _____

MECHANICAL LOCATION AND PLACEMENT OF THE GENERATOR SET

YES	NA	NO
☐	☐	☐
☐	☐	☐
☐	☐	☐
☐	☐	☐

Generator is properly secured to pad or vibration isolators

Generator Enclosure and/or Room is free of all debris

No airflow obstructions to the engine or generator are present for cooling combustion (See Cummins T-030 or Installation manual of generator set)

Room is designed for adequate inlet and outlet airflow

GASEOUS FUEL Natural Gas/LP Vapor/LP Liquid

YES	NA	NO
☐	☐	☐
☐	☐	☐
☐	☐	☐
☐	☐	☐

Natural gas and/or LPG fuel supply is connected.

Fuel piping is the appropriate size based on full-load CFH/BTU requirement. Pipe size after service regulator: _____

Service regulator(s), (if supplied), fuel strainer(s), flexible fuel line(s) and manual shut off are installed

Fuel pressure after service regulator is:_____inches of H2O

I have read and fully understand the fuel requirements for this equipment, I am verifying that the piping and fuel supply meets or exceeds those requirements. I also understand failure to meet the requirements will result in additional charges.

_____ _____

Contractor "requestor" Signature ***Date***

Sales and Service

DIESEL FUELED GENERATORS

YES	NA	NO	
☐	☐	☐	Flexible fuel connections, (supply and return) are connected to generator and piping.
☐	☐	☐	Day tank installed, wired and plumbed (lines free of obstruction) to genset and main fuel tank if applicable. Only black iron pipe for fuel lines, never use copper or galvanized pipe.
☐	☐	☐	All tanks filled with enough fuel to perform startup and testing.
☐	☐	☐	A return line from engine to day tank and day tank to main tank should be in place

EXHAUST SYSTEM

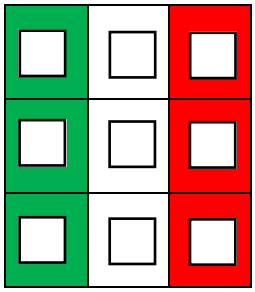
YES	NA	NO	
☐	☐	☐	Exhaust wrapped or isolated to prevent accidental activation of fire protection devices and sprinklers.
☐	☐	☐	Exhaust flex-pipe is installed at engine exhaust outlet (The silencer and flex-pipe are supplied with the generator set).
☐	☐	☐	Silencer is installed with appropriate supports (no weight should be placed on the exhaust outlet of the genset).
☐	☐	☐	Exhaust system has proper expansion joints and wall thimbles (Thimbles are required for wall or roof penetration).

GENERATOR ELECTRICAL CONNECTIONS

YES	NA	NO	
☐	☐	☐	Load conductors connected to breakers
☐	☐	☐	Flexible connections used on all conduit connections to the generator set output box
☐	☐	☐	Remote start interconnection **stranded** wiring is installed between the generator set and the automatic transfer switch(s) and annunciator.
☐	☐	☐	AC Power conductors in dedicated conduit separate from any DC control or network wiring
☐	☐	☐	Ground fault connected/functioning on generator, if supplied
☐	☐	☐	AC power wired to the coolant heaters (Do NOT energize)
☐	☐	☐	Check for AC oil pan heater, control heater or generator winding heater (Needing AC wiring)
☐	☐	☐	Generator is grounded in compliance with local codes
☐	☐	☐	If applicable, louver motors are operational and connected to generator controls

GENERATOR ELECTRICAL CONNECTIONS CONTINUED

YES NA NO



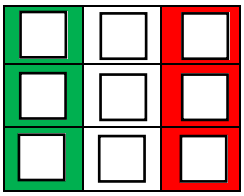
Annunciator mounted in a location where someone can observe a fault of the remote generator system
Where is annunciator located? _____

Are there additional ancillary devices/equipment that need to be integrated into the system? If yes, please define_____

Battery charger mounted (free of vibration, weather, accessible for an operator to observe easily) and connected to the appropriate AC and DC wiring to operate the charger.

TRANSFER SWITCH ELECTRICAL CONNECTIONS

YES NA NO



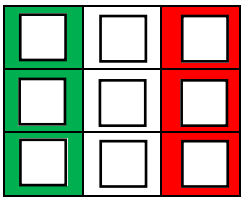
Conductors connected for Utility, Load and Emergency

Remote start interconnection **stranded** wiring is installed between the generator set and the automatic transfer switch(s).

Four Pole Transfer Switch: Is generator neutral grounded? ☐

DAY OF STARTUP

YES NA NO



Training of facility personnel will be done on the same day as start up. Additional trips for operational training will be an additional charge.

Can transfer switch be tested at time of generator startup? (There will be a power interruption) ***Note: After hours testing could result in additional charges.***

If the associated switchgear and/or ATS(s) are not provided by Cummins, will the manufacturer's representative be on site?

Exercise with or without load? ☐

If known, Transfer Time delay set recommendations Generator Set to exercise Day:_____ Time:_____

_____ _____

Contractor "requestor" Signature ***Printed Name***

Date: _____

Please complete this form and return to schedule start up, if not returned within 5 business days prior to scheduled startup it may be delayed. I understand that the start-up date may have to be rescheduled at my expense if the above items have not been completed properly.

Our energy working for you.™

Power Generation

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:_____