



St Lukes – East Campus

(1) Cummins DQCB 750kW Emergency Diesel Generator

1. Generator Set
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5. Interconnection DWG
6. Pre-inspection Form

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**Furnish with two (2)
remote annunciators**



Diesel generator set QSK23 series engine

600 kW - 800 kW 60 Hz
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.

Circuit breakers - Option for manually-and/or electrically-operated circuit breakers.

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.

Peer-to-peer paralleling - For applications where two or more generators with PowerCommand 3.3 control can be combined with an electrically operated circuit breaker and a combination of transfer switch(s).

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.

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.

providing oversized 750kW in lieu of 650KW

Model	Standby rating	Prime rating	Continuous rating	Data sheets
	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz kW (kVA)	60 Hz
DQCA	600 (750)	545 (681)		D-3352
DQCB	750 (938)	680 (850)		D-3353
DQCC	800 (1000)	725 (906)		D-3354

Generator set specifications

Governor regulation class	ISO8528 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%
Radio frequency emissions compliance	IEC 61000-4-2: Level 4 electrostatic discharge IEC 61000-4-3: Level 3 radiated susceptibility

Engine specifications

Bore	169.9 mm (6.69 in)
Stroke	169.9 mm (6.69 in)
Displacement	23.15 liters (1413 in ³)
Configuration	Cast iron, in line 6 cylinder
Battery capacity	1400 amps minimum at ambient temperature of 0 °C to 10 °C (32 °F to 50 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element with restriction indicator
Lube oil filter type(s)	Fleet guard dual venturi spin-on, combination full flow and bypass filters
Standard cooling system	High ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Single bearing flexible disc
Insulation system	Class H
Standard temperature rise	125 °C Standby at 40 °C ambient
Exciter type	Permanent Magnet Generator (PMG)
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	• 127/220	• 230/380	• 277/480
• 115/200	• 139/240	• 240/416	• 347/600
• 120/208	• 220/380	• 255/440	

Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- Fuel/water separator
- Heavy duty air cleaner

Alternator

- 80 °C rise
- 105 °C rise
- 125 °C rise

- 120/240 V anti-condensation heater
- Temperature sensor - alternator bearing RTD

Control panel

- PC3.3
- PC3.3 with MLD
- 120/240 V 100 W control anti-condensation heater
- Ground fault indication
- Remote fault signal package
- Run relay package

- Run time display

Cooling system

- 50 °C ambient

Generator set options and accessories (continued)

Exhaust system

- Industrial grade exhaust silencer (12 to 18 dBA)
- Residential grade exhaust silencer (18 to 25 dBA)
- **Critical grade exhaust silencer (25 to 35 dBA)**
- Super critical exhaust silencer (35 to 45 dBA)

Generator set

- AC entrance box
- **Battery**
- **Battery rack with hold-down**
- **Circuit breaker - set mounted**
- **Remote annunciator panel**
- Spring isolators

- 2 year warranty
- 5 year warranty
- 10 year major components warranty

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

PowerCommand 2.3 – control system



PowerCommand 2.3 control - 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 °C to +70 °C 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 (over crank) 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 generator set running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C

Alternator data

- Line-to-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

Other data

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

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

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

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.

Ratings definitions

Emergency Standby Power (ESP):

Applicable for supplying power to varying electrical loads for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):

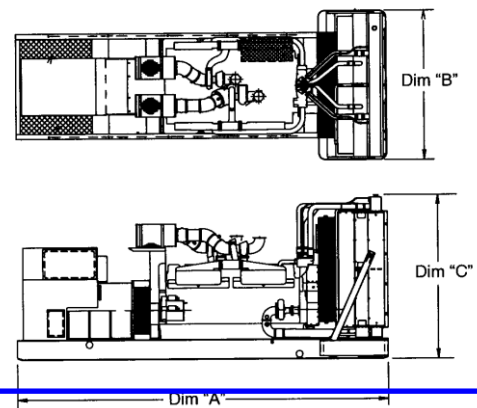
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):

Applicable for supplying power to varying electrical loads for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Dimensions and weights with standard cooling system

Model	Dim 'A' (mm) (in.)	Dim 'B' (mm) (in.)	Dim 'C' (mm) (in.)	Set weight* dry (kg) (lbs)	Set weight* wet (kg) (lbs)
DQCA	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)
DQCB	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)
DQCC	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)





Dimensions and weights with optional cooling system with seismic feature codes L228-2 and/or L225-2

Model	Dim 'A' (mm) (in.)	Dim 'B' (mm) (in.)	Dim 'C' (mm) (in.)	Set weight* dry (kg) (lbs)	Set weight* wet (kg) (lbs)
DQCA	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)
DQCB	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)
DQCC	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)

*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.

	<p>This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.</p>		<p>The generator set is available listed to UL 2200 for all 60 Hz low voltage models, Stationary Engine Generator Assemblies. 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.</p>
	<p>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.</p>	<p>U.S. EPA</p>	<p>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.</p>
	<p>All low voltage models are CSA certified to product class 4215-01.</p>	<p>International Building Code</p>	<p>The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009, and IBC2012.</p>

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

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

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Generator Set Data Sheet



Model: **DQCB**
Frequency: 60 Hz
Fuel Type: Diesel
kW Rating: 750 Standby
 680 Prime
Emissions Level: EPA NSPS Stationary Emergency Tier 2

Exhaust Emission Data Sheet:	EDS-1087
Exhaust Emission Compliance Sheet:	EPA-1121
Sound Data Sheet:	MSP-1159
Sound Data Sheet – with Seismic Feature Codes L228-2 (IBC) and/or L225-2 (OSHDPD):	MSP-1013
Cooling System Data in various Ambient Conditions:	MCP-248
Cooling System Data in various Ambient Conditions – with Seismic Feature Codes L228-2 (IBC) and/or L225-2 (OSHDPD):	MCP-174
Prototype Test Summary Data Sheet:	PTS-160

Fuel Consumption	Standby				Prime				Continuous
	kW (kVA)				kW (kVA)				kW (kVA)
Ratings	750 (938)				680 (850)				
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full	Full
US gph	16.0	28.0	40.0	51.0	15.0	25.0	36.5	48.0	
L/hr	60.6	106.0	151.4	193.1	56.8	94.6	138.2	181.7	

Engine	Standby Rating	Prime Rating	Continuous Rating
Engine manufacturer	Cummins Inc.		
Engine model	QSK23-G7 NR2		
Configuration	Cast Iron, in line, 6 cylinder		
Aspiration	Turbocharged and low temperature after-cooled		
Gross engine power output, kWm (bhp)	910 (1220)	808 (1085)	
BMEP at set rated load, kPa (psi)	2435 (353)	2214 (321)	
Bore, mm (in.)	170 (6.69)		
Stroke, mm (in.)	170 (6.69)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	10.21 (2010)		
Compression ratio	16:1		
Lube oil capacity, L (qt)	102 (108)		
Overspeed limit, rpm	2100		
Regenerative power, kW	93		

Fuel Flow		
Maximum fuel flow, L/hr (US gph)	685 (181)	
Maximum fuel inlet restriction, kPa (in Hg)	13.44 (4)	
Maximum fuel inlet temperature, °C (°F)	71 (160)	

Air

	Standby Rating	Prime Rating	Continuous Rating
Combustion air, m³/min (scfm)	64 (2242)	62 (2189)	
Maximum air cleaner restriction, kPa (in H ₂ O)	6.2 (25)		
Alternator cooling air, m³/min (cfm)	117 (4156)		

Exhaust

Exhaust flow at set rated load, m³/min (cfm)	152 (5358)	146 (5147)	
Exhaust temperature, °C (°F)	476 (888)	458 (856)	
Maximum back pressure, kPa (in H ₂ O)	10.1 (40.8)		

Standard Set-Mounted Radiator Cooling (Non-Seismic)

Ambient design, °C (°F)	50 (122)		
Fan load, kW _m (HP)	24 (32)		
Coolant capacity (with radiator), L (US gal)	109.5 (29)		
Cooling system air flow, m³/min (scfm)	1069.8 (37779.6)		
Total heat rejection, MJ/min (Btu/min)	32.3 (30655)	29.6 (28065)	
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction kPa (in Hg)	30.47 (9)		

Optional Set-Mounted Radiator Cooling (with Seismic Feature Codes L228-2 (IBC) and/or L225-2 (OSHPD))

Ambient design, °C (°F)	50 (122)		
Fan load, kW _m (HP)	27 (36)		
Coolant capacity (with radiator), L (US gal)	89 (23.5)		
Cooling system air flow, m³/min (scfm)	1252 (44183)		
Total heat rejection, MJ/min (Btu/min)	32.3 (30655)	29.6 (28065)	
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction, kPa (in Hg)	30.47 (9)		

Optional Heat Exchanger Cooling

Set coolant capacity, L (US gal)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, aftercooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US gal/min)			
Maximum raw water flow, aftercooler circuit, L/min (US gal/min)			
Maximum raw water flow, fuel circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min)			
Raw water delta P at min flow, jacket water circuit, kPa (psi)			

	Standby rating	Prime rating	Continuous rating
Raw water delta P at min flow, aftercooler circuit, kPa (psi)			
Raw water delta P at min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			
Maximum fuel return line restriction, kPa (in Hg)			

Optional Remote Radiator Cooling¹

Set coolant capacity, L (US gal)			
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)			
Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum friction head, jacket water circuit, kPa (psi)			
Maximum friction head, aftercooler circuit, kPa (psi)			
Maximum static head, jacket water circuit, m (ft)			
Maximum static head, aftercooler circuit, m (ft)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum fuel flow, L/hr (US gph)			
Maximum fuel return line restriction, kPa (in Hg)			

Weights²

Unit dry weight kgs (lbs)	6075 (13395)
Unit wet weight kgs (lbs)	6337 (13973)

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	Engine power available up to 1371 m (4497 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 4.4% per 305 m (1000 ft). Above 40 °C (104 °F), derate 10% per 10 °C (18 °F).
Prime	Engine power available up to 1084 m (3555 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 4.5% per 305 m (1000 ft). Above 40 °C (104 °F), derate 20.9% per 10 °C (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. No sustained overload capability is available at this rating.

Alternator Data

Voltage	Connection ¹	Temp Rise Degrees C	Duty ²	Single Phase Factor ³	Max surge kVA ⁴	Winding No.	Alternator Data Sheet	Feature Code
380-480	Wye	125/105	S/P		3313	312	ADS-310	B282-2
220/380	Wye	105/80	S/P		4234	311	ADS-312	B599-2
480	Wye	105/80	S/P		3313	312	ADS-310	B600-2
480	Wye	80	S		3866	312	ADS-311	B601-2
600	Wye	105/80	S/P		3313	7	ADS-310	B603-2
600	Wye	80	S/P		3866	7	ADS-311	B604-2
380	Wye	80	S		4234	312	ADS-312	B660-2
480	Wye	125	P		2944	312	ADS-309	B718-2
600	Wye	125	P		2944	7	ADS-309	B720-2
190-480	Wye	125/105	S/P		2944	311	ADS-309	B720-2
380-480	Wye	125/105	S/P		3313	311	ADS-310	B731-2
208/416	Wye	105/80	S/P		3866	311	ADS-311	B733-2
208/416	Wye	80	S		4234	311	ADS-312	B734-2
400	Wye	105	S		3866	312	ADS-311	B735-2
480	Wye	125	S		2944	312	ADS-309	B738-2
600	Wye	125	S		2944	7	ADS-309	B739-2
416	Wye	125/105	S/P		3313	312	ADS-310	B741-2

Notes:

¹ Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multiply the three phase kW rating by the Single Phase Factor³. All single phase ratings are at unity power factor.

² Standby (S), Prime (P) and Continuous ratings (C).

³ Factor for the *Single phase output from Three phase alternator* formula listed below.

⁴ Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

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

Our energy working for you.™





PowerCommand® 2.3 Control System



Control System Description

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

Features

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

PowerCommand Digital Genset Control PCC 2300



Description

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

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

Features

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

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

Base Control Functions

HMI Capability

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

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

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

Fault history - Provides a record of the most recent fault conditions with control date and time stamp. Up to 32 events are stored in the control non-volatile memory.

Alternator data

- Voltage (single or three phase Line-to-Line and Line-to-Neutral)
- Current (single or three phase)
- kW, kVar, power factor, kVA (three phase and total)
- Frequency

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

Engine data

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

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

Service adjustments (continued)

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

Engine Control

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

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

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

Isochronous governing - (where applicable) Capable of controlling engine speed within $\pm 0.25\%$ for any steady state load from no load to full load. Frequency drift will not exceed $\pm 0.5\%$ for a $33\text{ }^{\circ}\text{C}$ ($60\text{ }^{\circ}\text{F}$) 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 $\pm 1.0\%$ for any loads between no load and full load. Voltage drift will not exceed $\pm 1.5\%$ for a $40\text{ }^{\circ}\text{C}$ ($104\text{ }^{\circ}\text{F}$) change in temperature in an eight hour period. On engine starting or sudden load acceptance, voltage is controlled to a maximum of 5% overshoot over nominal level. The automatic voltage regulator feature can be disabled to allow the use of an external voltage regulator.

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

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

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

Protective Functions

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

Protective functions include:

Battle Short Mode

When enabled and the *battle short* switch is active, the control will allow some shutdown faults to be bypassed. If a bypassed shutdown fault occurs, the fault code and description will still be annunciated, but the genset will not shutdown. This will be followed by a *fail to shutdown* fault. Emergency stop shutdowns and others that are critical for proper operation are not bypassed. Please refer to the control application guide or manual for list of these faults.

Derate

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

Configurable Alarm and Status Inputs

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

Emergency Stop

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

Full Authority Electronic Engine Protection

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

General Engine Protection

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

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

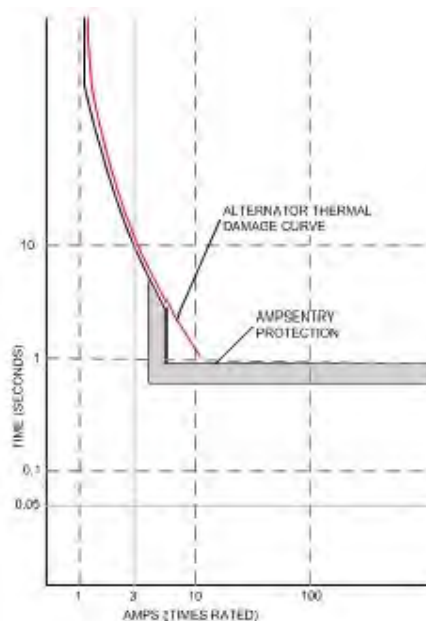
Fail to start (overcrank) shutdown - The control system will indicate a fault if the generator set fails to start by the completion of the engine crank sequence.

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

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

Alternator Protection

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



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

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

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

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

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

Over frequency shutdown/warning (81 o) - Generator set is operating at a potentially damaging frequency level. Settings are adjustable from 2-10 Hz above nominal governor set point for a 1-20 second time delay. Default: 6 Hz, 20 seconds, disabled.

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

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

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

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

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

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

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

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

Field Control Interface

Input signals to the PowerCommand control include:

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

Output signals from the PowerCommand control include:

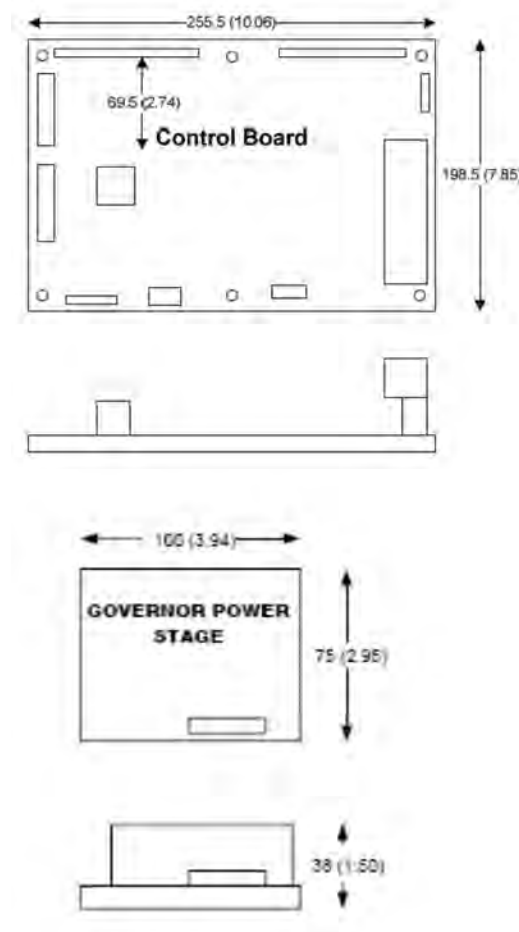
- Load dump signal: Operates when the generator set is in an overload condition.
- Delayed off signal: Time delay based output which will continue to remain active after the control has removed the run command. Adjustment range: 0 – 120 seconds. Default: 0 seconds.

- Configurable relay outputs: Control includes (4) relay output contacts (3 A, 30 VDC). These outputs can be configured to activate on any control warning or shutdown fault as well as ready to load, not in auto, common alarm, common warning and common shutdown.
- Ready to load (generator set running) signal: Operates when the generator set has reached 90% of rated speed and voltage and latches until generator set is switched to off or idle mode.

Communications Connections Include:

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

Mechanical Drawings



PowerCommand Human Machine Interface HMI320



Description

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

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

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

Features

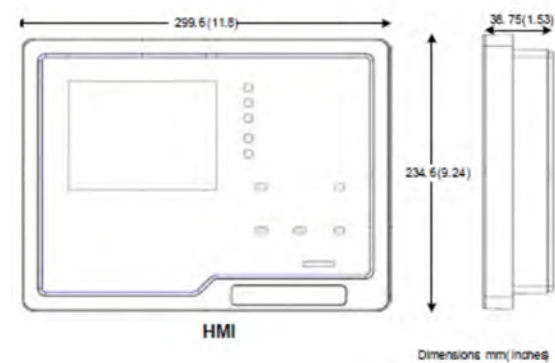
- LED indicating lamps:
 - Genset running
 - Remote start
 - Not in auto
 - Shutdown
 - Warning
 - Auto
 - Manual and stop
- 320 x 240 pixels graphic LED backlight LCD.
- Four tactile feel membrane switches for LCD defined operation. The functions of these switches are defined dynamically on the LCD.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

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

Communications connections include:

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

Mechanical Drawing



Software

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

Environment

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

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

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

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

Certifications

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

- NFPA 110 for level 1 and 2 systems.
- ISO 8528-4: 1993 compliance, controls and switchgear.
- CE marking: The control system is suitable for use on generator sets to be CE-marked.
- EN50081-1,2 residential/light industrial emissions or industrial emissions.
- EN50082-1,2 residential/light industrial or industrial susceptibility.
- ISO 7637-2, level 2; DC supply surge voltage test.
- Mil Std 202C, Method 101 and ASTM B117: Salt fog test.
- UL 6200 recognized and suitable for use on UL 2200 Listed generator sets.
- CSA C282-M1999 compliance
- CSA 22.2 No. 14 M91 industrial controls.
- PowerCommand control systems and generator sets are designed and manufactured in ISO 9001 certified facilities.

Warranty

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



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

Our energy working for you.™



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PDS-1569 | PD00000157 | (12/19)



Alternator data sheet

Frame size: HC6G

Characteristics

Weights:	Wound stator assembly:	1998 lb	900 kg
	Rotor assembly:	1689 lb	761 kg
	Complete alternator:	4240 lb	1910 kg
Maximum speed:		2250 rpm	
Excitation current:	Full load:	2.5 Amps	
	No load:	0.5 Amps	
Insulation system:	Class H throughout		

3 Ø Ratings (0.8 power factor)		60 Hz				50 Hz		
(Based on specific temperature rise at 40° C ambient temperature)		110/190* 220/380	120/208* 240/416	139/240* (277/480)	347/600	110/190* 220/380	120/208* 240/415	127/220* 254/440
150° C rise ratings	kW	665	730	837	837	656	656	656
	kVA	831	913	1046	1046	820	820	820
125° C rise ratings	kW	640	700	800	800	640	640	640
	kVA	800	875	1000	1000	800	800	800
105° C rise ratings	kW	580	650	730	730	600	600	600
	kVA	725	813	913	913	750	750	750
80° C rise ratings	kW	520	568	632	632	520	520	520
	kVA	650	710	790	790	650	650	650
Reactances (per unit ± 10%)		110/190* 220/380	120/208* 240/416	139/240* 277/480	347/600	110/190* 220/380	120/208* 240/415	127/220* 254/440
(Based on full load at 125° C rise rating)								
Synchronous		3.87	3.53	3.03	2.96	3.14	2.63	2.34
Transient		0.31	0.28	0.24	0.22	0.25	0.21	0.19
Subtransient		0.23	0.21	0.18	0.16	0.17	0.15	0.13
Negative sequence		0.27	0.24	0.21	0.20	0.21	0.18	0.16
Zero sequence		0.03	0.03	0.03	0.03	0.03	0.02	0.02
Motor starting		<u>Broad range</u>			<u>600</u>	<u>Broad range</u>		
Maximum kVA (90% sustained voltage)		<u>2944</u>			2944	2000		
Time constants (sec)		<u>Broad range</u>			<u>600</u>	<u>Broad range</u>		
Transient		0.185			0.185	0.185		
Subtransient		0.025			0.025	0.025		
Open circuit		2.350			2.350	2.350		
DC		0.040			0.040	0.040		
Windings (@ 20° C)		<u>Broad range</u>			<u>600</u>	<u>Broad range</u>		
Stator resistance (Ohms per phase)		0.0074			0.0110	0.0074		
Rotor resistance (Ohms)		1.3700			1.3700	1.3700		
Number of leads		6 (12 optional)			6	6 (12 optional)		

* 12 lead reconnectable option is required to obtain low (parallel wye) voltages.



Sound Data

DQCB

QSK23, 60Hz Diesel

A-weighted Sound Pressure Level @ 7 meters, dB(A)

See notes 2, 5 and 7-11 Listed Below

Configuration	Exhaust	Applied Load	Position (Note 2)								8 Position Average
			1	2	3	4	5	6	7	8	
Standard – Unhoused	Infinite Exhaust	0% Prime	84.3	90.4	90.3	92.3	90.6	92.7	91.6	90.0	90.8
		75% Prime	86.8	92.3	93.1	94.4	91.6	94.1	93.5	92.0	92.7
		100% Prime	87.9	93.2	94.4	95.4	91.7	94.9	94.2	92.7	93.5
		110% Prime	88.4	93.6	94.7	95.5	92.1	94.9	94.3	92.9	93.7
F200 – Weather	Genset Mounted Muffler	0% Prime	89.7	88.0	81.4	89.4	92.6	89.1	78.4	88.4	88.7
		75% Prime	91.7	89.5	83.2	91.0	93.4	90.7	80.5	90.1	90.2
		100% Prime	93.0	90.7	84.2	91.7	94.1	91.4	81.6	91.0	91.1
		110% Prime	92.9	90.9	84.4	91.8	93.8	91.5	81.9	91.3	91.1
F201 – Quiet Site II First Stage	Genset Mounted Muffler	0% Prime	82.4	76.0	70.9	70.0	74.6	70.5	69.6	76.1	76.1
		75% Prime	84.4	79.1	74.9	73.5	77.1	75.1	73.5	78.7	78.7
		100% Prime	85.4	80.1	75.7	75.0	78.0	76.1	75.1	79.6	79.7
		110% Prime	85.4	80.2	76.3	75.5	78.4	76.9	75.5	80.0	79.9
F202 – Quiet Site II Second Stage	Genset Mounted Muffler	0% Prime	67.5	68.5	69.5	70.6	73.3	70.1	68.1	67.0	69.8
		75% Prime	70.3	72.1	74.3	73.9	74.2	75.7	74.0	72.1	73.6
		100% Prime	72.2	73.2	75.3	75.3	74.8	76.9	75.5	73.4	74.8
		110% Prime	72.9	73.8	75.9	76.0	75.1	77.1	76.2	74.0	75.3

Average A-weighted Sound Pressure Level @ 1 meter, dB(A)

See notes 1, 5 and 7-14 Listed Below

Configuration	Exhaust	Applied Load	Octave Band Center Frequency (Hz)											Overall Sound Pressure Level
			16	31.5	63	125	250	500	1000	2000	4000	8000	16000	
Standard – Unhoused	Infinite Exhaust	0% Prime	N/A	47.4	62.6	84.5	89.6	93.6	95.7	95.0	91.1	81.7	69.5	100.7
		75% Prime	N/A	48.9	66.0	85.4	90.4	94.5	97.3	97.2	92.9	88.1	75.7	102.4
		100% Prime	N/A	50.0	67.5	85.8	90.5	95.2	98.0	97.9	94.1	89.3	77.1	103.2
		110% Prime	N/A	50.7	68.1	86.3	90.7	95.2	98.1	98.1	94.3	90.2	77.9	103.4
F200 – Weather	Genset Mounted Muffler	0% Prime	N/A	52.0	72.5	81.5	84.7	87.8	90.2	88.2	83.0	72.4	57.9	94.7
		75% Prime	N/A	50.2	77.7	84.0	85.0	88.4	91.5	89.9	85.0	79.0	68.5	96.2
		100% Prime	N/A	50.5	78.5	84.7	85.6	89.1	92.2	90.8	86.2	81.6	71.4	97.0
		110% Prime	N/A	50.5	78.9	85.0	85.9	89.6	92.3	90.9	86.6	82.3	71.9	97.2
F201 – Quiet Site II First Stage	Genset Mounted Muffler	0% Prime	N/A	50.7	70.9	76.6	73.9	75.5	76.4	75.8	71.2	62.2	49.2	83.3
		75% Prime	N/A	50.1	76.5	80.8	76.3	78.0	79.8	79.1	76.1	69.7	59.5	87.0
		100% Prime	N/A	49.5	77.4	81.8	77.3	80.3	80.9	80.4	77.8	72.7	62.2	88.3
		110% Prime	N/A	49.1	78.0	82.3	77.5	81.2	81.4	80.4	78.5	73.9	63.2	88.8
F202 – Quiet Site II Second Stage	Genset Mounted Muffler	0% Prime	N/A	42.8	60.4	71.4	73.3	69.6	71.0	71.1	65.8	57.7	43.0	78.8
		75% Prime	N/A	43.0	65.4	73.1	74.1	70.9	76.6	80.6	77.1	66.5	52.0	84.4
		100% Prime	N/A	43.4	67.2	74.2	74.9	72.1	78.2	81.5	78.7	70.2	54.8	85.7
		110% Prime	N/A	43.8	68.1	74.8	75.1	72.5	78.8	81.8	79.1	71.2	55.7	86.1

Exhaust Sound Power Level, dB(A)

See notes 4 and 6-14 Listed Below

Configuration	Applied Load	Octave Band Center Frequency (Hz)											Overall Sound Power Level
		16	31.5	63	125	250	500	1000	2000	4000	8000	16000	
Open Exhaust (No Muffler)	0% Prime	N/A	67.2	97.1	102.3	108.1	106.3	104.7	101.1	98.7	90.7	76.3	112.6
	75% Prime	N/A	67.0	107.8	113.1	122.7	124.9	121.3	119.9	116.4	111.9	97.9	129.1
	100% Prime	N/A	68.1	108.4	114.8	123.1	124.5	122.3	121.1	118.2	115.7	100.1	129.7
	110% Prime	N/A	68.3	108.7	117.7	125.4	125.0	123.7	122.2	119.3	116.7	100.2	131.0

Global Notes:

1. Sound pressure levels at 1 meter are measured per the requirements of ISO 3744, ISO 8528-10, and European Communities Directive 2000/14/EC as applicable. The microphone measurement locations are 1 meter from a reference parallelepiped just enclosing the generator set (enclosed or unenclosed).
2. Seven-meter measurement location 1 is 7 meters (23 feet) from the generator (alternator) end of the generator set, and the locations proceed counter-clockwise around the generator set at 45° angles at a height of 1.2 meters (48 inches) above the ground surface.
3. Sound Power Levels are calculated according to ISO 3744, ISO 8528-10, and or CE (European Union) requirements.
4. Exhaust Sound Levels are measured and calculated per ISO 6798, Annex A.
5. Reference Sound Pressure Level is 20 µPa.
6. Reference Sound Power Level is 1 pW (10^{-12} Watt).
7. Sound data for remote-cooled generator sets are based on rated loads without cooling fan noise.
8. Sound data for the generator set with infinite exhaust do not include the exhaust noise contribution.
9. Published sound levels are measured at CE certified test site and are subject to instrumentation, measurement, installation and manufacturing variability.
10. Unhoused/Open configuration generator sets refers to generator sets with no sound enclosures of any kind.
11. Housed/Enclosed/Closed/Canopy configuration generator sets refer to generator sets that have noise reduction sound enclosures installed over the generator set and usually integrally attached to the skid base/base frame/fuel container base of the generator set.
12. Published sound levels meet the requirements India's Central Pollution Control Board (Ministry of Environment & Forests), vide GSR 371 (E), which states the A-weighted sound level at 1 meter from any diesel generator set up to a power output rating of 1000kVA shall not exceed 75dB(A)
13. For updated noise pollution information for India see website: <http://www.envfor.nic.in/legis/legis.html>
14. Sound levels must meet India's Ambient Air Noise Quality Standards detailed for Daytime/Night-time operation in Noise Pollution (Regulation and Control) Rules, 2000



Prototype Test Support (PTS) 60 Hz test summary



Generator set models

600DQCA
800DQCC
750DQCB

Representative prototype

Model: 800DQCC
Alternator: HC6H
Engine: QSK23-G7 NR2
Rated
voltage: 480 V

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: 833 kW

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

Torsional analysis and testing:

The generator set was tested to verify that the design is not subjected to harmful torsional stresses. A spectrum analysis of the transducer output was conducted over the speed range of 1350 to 1950 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: $\pm 0.50\%$
Random voltage variation: $\pm 0.50\%$
Frequency regulation: Isochronous
Random frequency variation: $\pm 0.25\%$

Transient performance:

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

Full load acceptance:

Voltage dip: 30.0%
Recovery time: 2.3 seconds
Frequency dip: 9.3%
Recovery time: 3.9 seconds

Full load rejection:

Voltage rise: 23.7%
Recovery time: 2.6 seconds
Frequency rise: 4.6%
Recovery time: 3.4 seconds

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

<u>Harmonic</u>	<u>Line to Line</u>		<u>Line to Neutral</u>	
	<u>No load</u>	<u>Full load</u>	<u>No load</u>	<u>Full load</u>
3	0.036	0.245	0.093	0.169
5	0.083	2.081	0.112	2.171
7	0.824	0.609	0.820	0.597
9	0.023	0.042	0.021	0.074
11	0.600	0.355	0.613	0.397
13	0.307	0.300	0.295	0.308
15	0.009	0.017	0.009	0.094



Cooling System Data

DQCB

EPA NSPS Stationary Emergency: Tier 2

High Ambient Air Temperature 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)	Weather	Sound Level1	Sound Level2
			Maximum Allowable Ambient Temperature, Degree C							
60 Hz	Standby	750	65.3	62.8	60.7	56.4	53.2	56.7	56.0	54.7
	Prime	680	63.6	61.3	57.9	53.3	50.2	55.5	54.7	53.7

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 de-rate 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.

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			
QSK19-G8	DQPAA	DQPAB		
QSK23-G7	DQCA	DQCB	DQCC	
QST30-G5	DQFAA	DQFAB	DQFAC	DQFAD
QST30-G17	DQFAE	DQFAF	DQFAG	DQFAH
QSK50-G5	DQGAE	DQGAF		
QSK50-G4	DQGAA	DQGAB		
QSK50-G8	DQGAR	DQGAS		
QSK60-G6	DQKAD	DQKAE	DQKAA	DQKAB
QSK60-G14	DQKAF			
QSK60-G16	DQKAK	DQKAL		
QSK60-G17	DQKAM			

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 pages
P and R	0612CT0101 http://www.schneiderelectric.us/en/download/document/0612CT0101/	16-17
L	0611CT1001 http://www.schneiderelectric.us/en/download/document/0611CT1001/	8-9
MasterPact NT/NW	http://www.schneider-electric.us/en/faqs/FA231180/	Please refer to PLS007 Rev 25

*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.

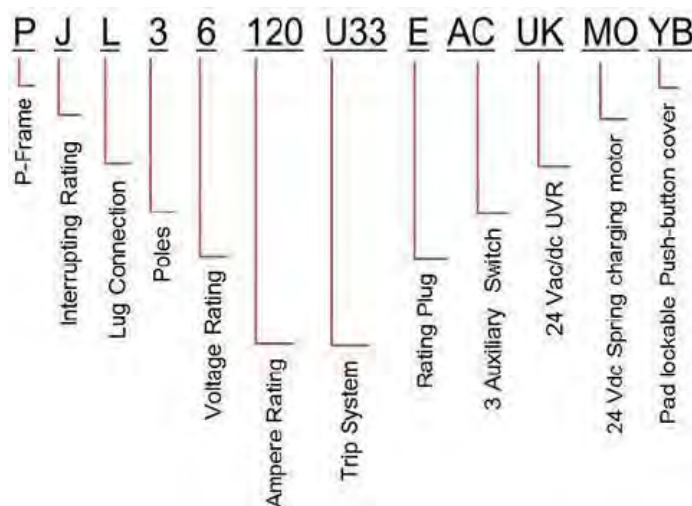
*If the first 3 letters are "PJP," the search will not work. You will need to start with just "PJ" and use the description pages to obtain the information you are looking for on the "PJP."

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."



The following link is another way to decode the Schneider products

https://www.productinfo.schneider-electric.com/portals/ui/digest/viewer/561d5d65e4b0c5c41a243b12/561d5f9ae4b0c5c41a24480c/r/ 17707021_83351# 17707021_83351

For decoding the ABB breakers, see the decoder sheet, titled "T8 Catalog number explanation"

Mechanically operated breakers							
Feature Code	Breaker box description	Cummins part #	Engine	Manufacturer	Breaker catalog number	Trip unit	Plug type
KP82-2	CB-2500, Right, 3P, UL600, IEC 415, UL Serv Ent, 100%	0320-2164-01	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36250U31F	MicroLogic 3.0 LI	F
		A054K364	QSK19-G8, QSK23-G7		RLF36250U33F	MicroLogic 5.0 LSI	
KP83-2	CB-2500A, Left, 3P, 600, IEC 415, UL Serv Ent, 100%	0320-2164-01	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36250U31F	MicroLogic 3.0 LI	F
		A054K364	QSK19-G8, QSK23-G7		RLF36250U33F	MicroLogic 5.0 LSI	
KP84-2	CB-2000, Right, 3P, UL 600, IEC 415, UL Serv Ent 100%	0320-2164-02	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36200U31F	MicroLogic 3.0 LI	F
		A054K366	QSK19-G8, QSK23-G7		RLF36200U33F	MicroLogic 5.0 LSI	
KP85-2	CB-2000, Left, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2164-02	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36200U31F	MicroLogic 3.0 LI	F
		A054K366	QSK19-G8, QSK23-G7		RLF36200U33F	MicroLogic 5.0 LSI	
KP86-2	CB-1600A, Right, 3P, UL 600, IEC 415, UL Serv Ent 100%	0320-2164-03	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, 50L, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36160U31F	MicroLogic 3.0 LI	F
		A054K368	QSK19-G8, QSK23-G7		RLF36160U33F	MicroLogic 5.0 LSI	
KP87-2	CB-1600, Left, 3P, UL 600, IEC 415, UL Serv Ent 100%	0320-2164-03	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36160U31F	MicroLogic 3.0 LI	F
		A054K368	QSK19-G8, QSK23-G7		RLF36160U33F	MicroLogic 5.0 LSI	
KP88-2	CB-1200, Right, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2183	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	PJP36120U31E	MicroLogic 3.0 LI	E
		A054K408	QSK19-G8, QSK23-G7		PJP36120U33F	MicroLogic 5.0 LSI	
KP89-2	CB-1200, Left, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2183	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	PJP36120U31E	MicroLogic 3.0 LI	E
		A054K408	QSK19-G8, QSK23-G7		PJP36120U33F	MicroLogic 5.0 LSI	
KP90-2	CB-800A, Right, 3P, UL 600, IEC 415, UL Serv Ent 100%	0320-2182	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	PJP36080U31F	MicroLogic 3.0 LI	F
		A054K405	QSK19-G8, QSK23-G7		PJP36080U33F	MicroLogic 5.0 LSI	
KP91-2	CB-800A, Left, 3P, UL 600, IEC 415, UL Serv Ent, 100%	0320-2182	QST30-G5, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	PJP36080U31F	MicroLogic 3.0 LI	F
		A054K405	QSK19-G8, QSK23-G7		PJP36080U33F	MicroLogic 5.0 LSI	
KP92-2	CB-600A, Right, 3P, UL 600, IEC 690, UL Serv Ent 100%	A044T468	QSK19-G8, QSK23-G7, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	NLGL36600U33X-600A	MicroLogic 3.3S LSI	N/A
KP93-2	CB-600A, Left, 3P, UL 600, IEC 690, UL Serv Ent, 100%	A044T468	QSK19-G8, QSK23-G7, 30L, QSK50-G4, QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	NLGL36600U33X-600A	MicroLogic 3.3S LSI	N/A
KU62-2	CB-3000A, 3P, 600/690V, UL/IEC, ServEnt, 100%UL, Right	A029B150	QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36300U31A	MicroLogic 3.0 LI	F
KU68-2	CB-3000A, 3P, 600/690V, UL/IEC, ServEnt, 100%UL, Left	A029B150	QSK50-G5, QSK50-G7, QSK60-G6, QSK60-G11 QSK60-G14, QSK60-G18	Schneider Electric	RLF36300U31A	MicroLogic 3.0 LI	F

T8 Catalog number explanation

T 8 V

Locking provisions:

X = None; A = Keylock
B = Button guard; C = Padlock provision; D = A+B; E = A+C
T = Heavy duty padlock;
9 = Extra heavy duty padlock

Accessories

X = None; A = Mechanical counter; B = Bell Alarm
C = Bell Alarm w/remotes reset, 24..30 VAC/DC
D = Bell Alarm w/remotes reset 110..130 VAC/DC
E = Bell Alarm w/remotes reset 220..240 VAC/DC
F = A+B; G = A+C; H = A+D; J = A+E

Undervoltage

0 = None
A = 24 VDC; B = 30 VAC/DC
C = 48 VAC/DC; D = 60 VAC/DC
E = 110..120 VAC/DC; F = 125..127 VAC/DC
G = 220..240 VAC/DC; H = 250 VAC/DC
J = 380..400 VAC; K = 440 VAC

Second shunt trip:

L = 24 VDC; M = 30 VAC/DC
N = 48 VAC/DC; P = 60 VAC/DC
Q = 110..120 VAC/DC; R = 125..127 VAC/DC
S = 220..240 VAC/DC; T = 250 VAC/DC
U = 380..400 VAC; V = 440..480 VAC

Shunt trip

0 = None
A = 24 VDC; B = 30 VAC/DC; C = 48 VAC/DC;
D = 60 VAC/DC; E = 110..120 VAC/DC
F = 120..127 VAC/DC; G = 220..240 VAC/DC;
H = 240..250 VAC/DC; J = 380..400 VAC;
K = 440 VAC

Spring charging motor:

0 = None
A = 24..30 VAC/DC; B = 48..60 VAC/DC;
C = 100..130 VAC/DC; D = 220..250 VAC/DC

Contacts:

0 = None
A = 4 aux contacts; (supplied as standard for breakers with PR332 trip units)
B = 4 aux contacts digital (24V)
D = UV energ NO; E = UV energ NC;
F = A+D; G = A+E; H = B+D; J = B+E

Closing Coil:

0 = None
A = 24 VDC; B = 30 VAC/DC; C = 48 VAC/DC; D = 60 VAC/DC; E = 110..120 VAC/DC;
F = 120..127 VAC/DC; G = 220..240 AC/DC; H = 240..250 VAC/DC; J = 380..400 VAC; K = 440VAC

Trip Unit Accessories: PR332/P ONLY

0 = None
B = Voltage measuring module; C = Modbus module

Trip Unit:

C = PR331/P-TB-LSI; D = Non-Automatic (MCS); E = PR331/P-LSIG;
P = PR332/P-LI; R = PR332/P-LSI; S = PR332/P-LSIG; H = PR332/P-LSIRc (IEC)

Rating Plug:

D = 1000; E = 1200; F = 1600; G = 2000; H = 2500; J = 3000, 3200; 0 = Non-Automatic (MCS)

Frame Amp Rating:

C3 = 1600 (3P UL only); D3 = 2000 (3P); E3 = 2500 (3P); F3 = 3000 UL/3200 IEC (3P)
C4 = 1600 (4P UL only); D4 = 2000 (4P); E4 = 2500 (4P); F4 = 3000 UL/3200 IEC (4P)

Version:

B = UL Fixed; Q = UL Fixed 100% Rated; F = IEC Fixed; 0 = Fixed Non-Automatic (MCS)

Breaking capacity:

V = Very High; L (IEC only. Call factory for IEC breaker pricing.)

Four-stage battery charger

15 amp @ 12 volt

12 amp @ 24 volt



> Specification sheet

Our energy working for you.™



Description

Cummins Power Generation fully automatic battery chargers - using switched mode power electronics - 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 trickle, bulk, absorption and float. The trickle stage safely charges overly discharged batteries. It protects a damaged or shorted battery from excessive current. During bulk charge a constant current is applied to quickly restore the maximum battery charge level in the shortest amount of time. The absorption stage applies a constant voltage to the battery to bring the battery to 100% capacity. The float stage tailors the constant voltage output to maintain the battery at full capacity while serving DC operated loads.

An optional temperature sensor may be used to adjust charging rate based on internal battery temperature in the absorption and float stages. Use of a battery temperature sensor helps to increase battery life by preventing over or under charging of the battery. The battery temperature sensor also protects the battery from overheating. Temperature compensation is recommended in all applications, but is particularly valuable for generator sets in outdoor applications.

Battery chargers are field-configurable for charging either 12 or 24 VDC battery systems and for operation at 50 or 60 Hz. Output voltage and battery type selection is done through the alphanumeric display.

Features

Protection - All models include a 20 amp DC output breaker. Re-settable breakers are used for input voltages 240 VAC and lower. For over 240 VAC branch circuit rated fuses are used.

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 configuration options are indicated on the alphanumeric display.

Monitoring - An LED indicates the condition of the charger. Green indicates normal charging operation, amber indicates equalizing and red indicates a fault condition.

Adjustable float voltage - Float voltage can be set through the alpha-numeric display for optimum battery performance and life.

Temperature compensation - An optional external sensor is available for temperature compensated battery charging.

Faults - The charger senses and annunciates the following fault conditions: Input overvoltage, input undervoltage, AC power loss, battery overvoltage, battery undervoltage, charger circuitry over temperature, battery over temperature, unrecoverable battery and overload/overcurrent. Includes 30 volt/2 amp isolated contact for common alarm.

Parallel redundant operation - Chargers can be operated in parallel for redundant reliability or additional charging capacity.

Vibration resistant design - complies with UL 991 vibration resistance requirements.

UL 1236 (BBHH) Listing - for use with lead acid batteries in generator set installations. Also suitable for use with NiCad, gel and AGM batteries.

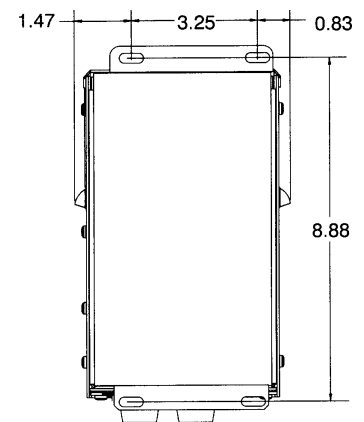
Specifications

Performance and physical characteristics

Output:	Nominal voltage	12 or 24 VDC
	Float voltage – 12 V batteries	12.8, 13.0, 13.3, 13.5, 13.6, 14.3
	Float voltage – 24 V batteries	25.7, 26.1, 26.6, 27.0, 27.2, 28.6
	Equalize-voltage	15.5 or 31.0 VDC
	Output voltage regulation	±1%
	Maximum output current	15 A @ 12 VDC or 12 A @ 24 VDC
Input:	Equalize charger time	0-12 hrs
	Voltage AC	120, 208, 240, 277, 380, 416, 480, 600
	Frequency	50 or 60 Hz
Approximate net weights:		11.6 lbs (5.3 Kg)
Approximate dimensions: height x width x depth - in (mm)		9.75 x 5.56 x 6.14 (248 x 141 x 156)
Ambient temperature operation:		-22 °F to 122 °F (-30 °C to 50 °C)



Input volts	Genset kit part number	ATS kit part number
120/208/240	0300-5878-01	0300-5878-13
277	0300-5878-02	0300-5878-14
380	0300-5878-03	0300-5878-15
416	0300-5878-04	0300-5878-16
480	0300-5878-05	0300-5878-17
600	0300-5878-06	0300-5878-18
Temperature sensor kit	0541-0918	0541-0918



Enclosure

The NEMA 1, corrosion resistant, aluminum enclosure is designed for wall mounting. When wall mounted, louvers protect cooling holes in the sides of the enclosure. Use 1/4 in (6.35 mm) diameter bolts for mounting.

Mounting dimensions – inches
Bottom view

RFI/EMI and voltage surge compliance

Charger complies with the requirements of EN61000-4-5 for voltage surge resistance, EN50082-2 (heavy industrial) for immunity, EN61000-4-2 for ESD, EN61000-4-3 for radiated immunity, ANSI/IEEE C62.41 Category B & EN 61000-4-4 for electrically fast transient, EN61000-4-6 for conducted, and FCC Part 15 Class A for emissions.

Americas

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Minneapolis, MN 55432 USA
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Europe, CIS, Middle East and Africa

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

Asia Pacific

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

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

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

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S-1470d (5/08) Page 2 of 2



PowerCommand® Annunciator Discrete Input or PCCNet

Furnish with two(2) remote
annunciators



> Specification sheet

Our energy working for you.™



**Power
Generation**

Description

The Universal Annunciator Module provides visual and audible indication of up to 20 separate alarm or status conditions, based on discrete (relay) inputs or network inputs. Each LED can be controlled by either a discrete wire input or by a signal on the PCCNet network sent from an external device, such as a PCC1301 or PCC2100 (version 2.4 or later) control.

In addition to the LEDs, the annunciator can control four custom relays based on signals received over the PCCNet. When one of the annunciator's discrete inputs is activated, the annunciator will broadcast that information over the network. By taking advantage of the network, discrete inputs and custom relays, the annunciator can be used as expanded I/O for a genset controller.

Easily installed in a location to give immediate notification of an alarm or warning status. Designed to give operating/monitoring personnel quick-glance status information. The module directly senses battery voltage to provide green/yellow/red alarm and status information for that parameter.

Genset controller complies with NFPA level two requirements when used with the display but without the annunciator panel. When used with the annunciator it meets NFPA level one requirements (emergency and standby power systems). The annunciator module can also be used for monitoring of transfer switch or other equipment status.

Features

- Visual and audible warnings of up to 20 separate alarm or status conditions.
- LEDs can be controlled either via PCCNet or discrete input.
- Status of discrete inputs is broadcast on network.
- Four custom relays can be controlled over the PCCNet network.
- Configurable LED color (red, yellow or green) and selectable horn operation allows maximum flexibility.
- Standard NFPA 110 label, field configurable for other alarm status and conditions.
- Each audible alarm is annunciated, regardless of the number of existing alarm conditions displayed.
- Sealed membrane panel design provides environmental protection for internal components and is easy to clean.
- Configurable for negative (ground) input or positive input.
- Integral DC voltage sensing.
- Flush or surface mount provisions.
- UL Listed and labeled; CSA certified; CE marked.

Specifications

Signal requirements

Positive - Input impedance is 1.82 kOhms to ground; maximum input voltage = 31 VDC.

Negative - Input impedance is 1.82 kOhms to Bat+: inputs are at Bat+ level when open.

Sink/source current threshold for detection - 150 uA minimum, 3 mA maximum.

Typical conductor size: 16 ga for 304.8 m (1000 ft)

Max conductor size for terminal: 12 ga

Relay outputs

0.2 A at 125 VAC and 1 A at 30 VDC

Network connections

Use Belden 9729 two pair, stranded, shielded 24 AWG twisted pair cable for all PCCNet connections. Total network length can not exceed 1219 m (4000 ft). Up to 20 nodes can be connected to the network.

Note: Any communications wire connected to the generator set should be stranded cable.

Power

Maximum consumption: 15 watts

Battery voltage

Functional range - Audible and visual conditions operational from 6.5 to 31 VDC.

Low voltage setting - 12.0 VDC for 12 Volt nominal systems; 24.0 for 24 Volt nominal systems.

High voltage setting - 16.0 Volt for 12 Volt nominal systems; 32.0 Volt for 24 Volt nominal systems.

Alarm horn

Sound level: 90 dB at 30 cm

Physical

Weight (with enclosure): 1.4 kg (3.0 lbs)

Temperature

-20 °C to +70 °C (-4 °F to +158 °F)

Humidity

10% to 95% RH (non-condensing)

Default lamp configurations

Can be configured for current NFPA 110 standard or as a replacement for Legacy (pre-2001) NFPA 110 annunciator (300-4510 or 300 4511)

Lamp	Description	NFPA 110		
		Color	Horn	Flash
DS1	Customer fault 1	Green	No	No
DS2	Customer fault 2	Amber	No	No
DS3	Customer fault 3	Red	No	No
DS4	Genset supplying load	Amber	No	No
DS5	Charger AC failure	Amber	Yes	No
DS6	Low coolant level	Amber	Yes	No
DS7	Low fuel level	Red	Yes	No
DS8	Check generator set	Amber	No	No
DS9	Not in auto	Red	Yes	Yes
DS10	Generator set running	Amber	No	No
DS11	High battery voltage	Amber	Yes	No
DS12	Low battery voltage	Red	Yes	No
DS13	Weak battery	Red	Yes	No
DS14	Fail to start	Red	Yes	No
DS15	Low coolant temp	Red	Yes	No
DS16	Pre-high engine temp	Amber	Yes	No
DS17	High engine temp	Red	Yes	No
DS18	Pre-low oil pressure	Red	Yes	No
DS19	Low oil pressure	Red	Yes	No
DS20	Overspeed	Red	Yes	No

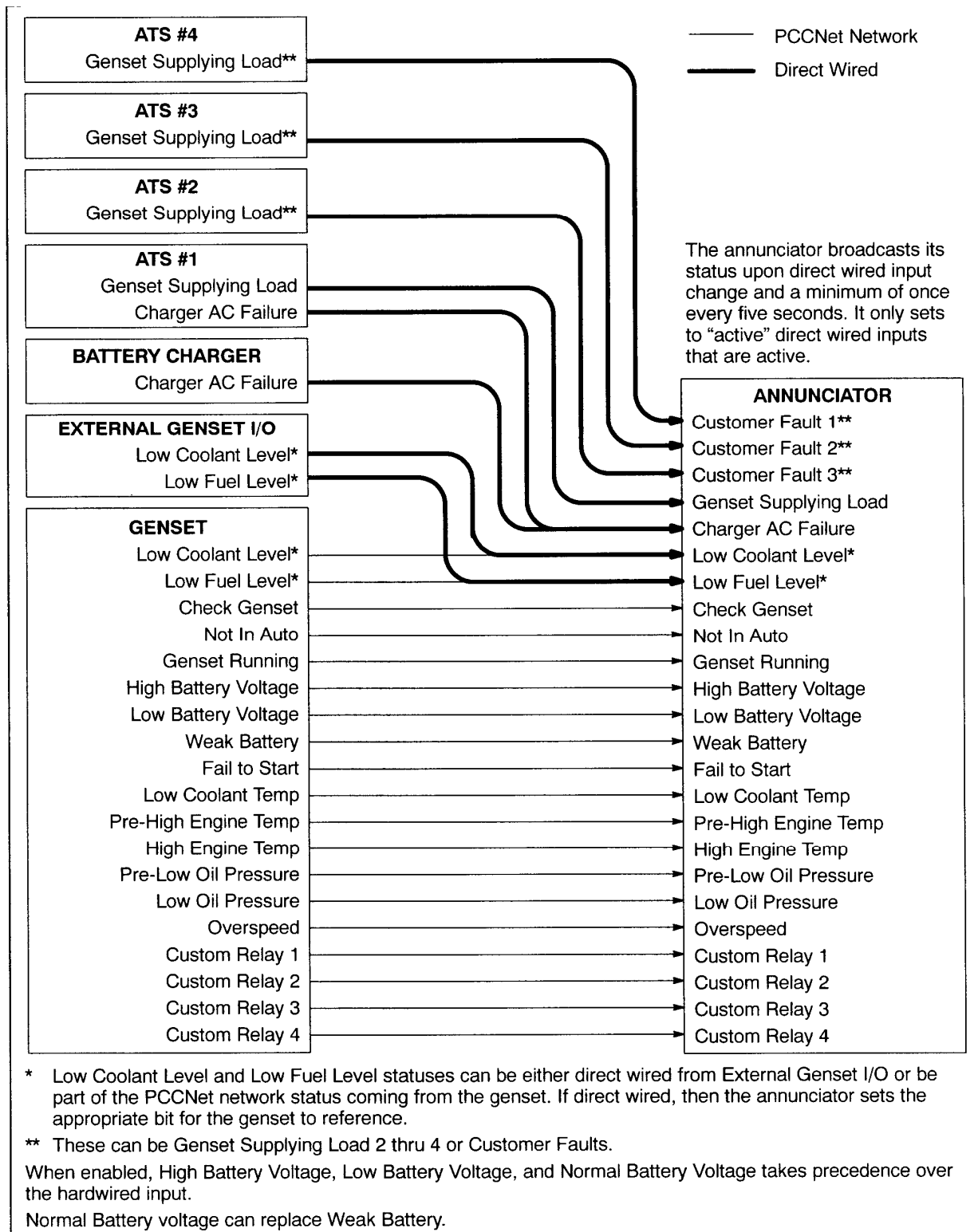
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www.cumminspower.com

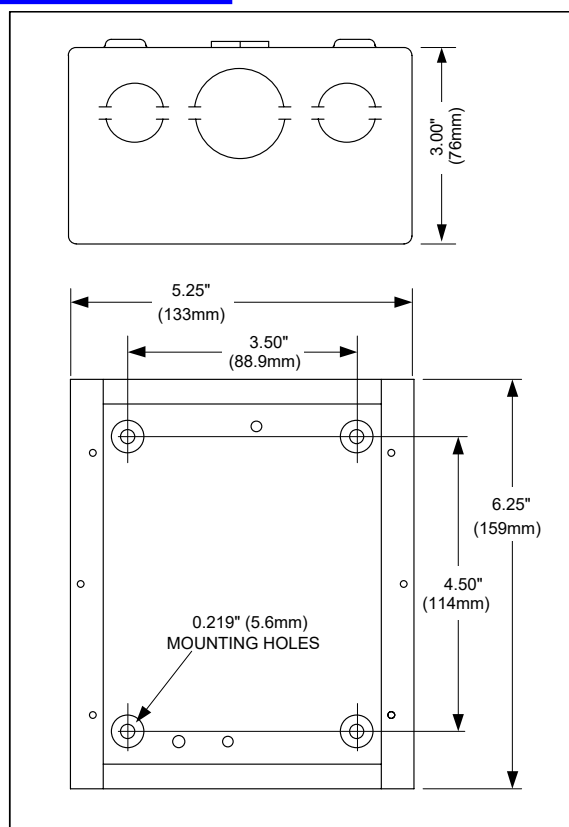
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Typical installation



Dimensions



Dimensions: in (mm)

Ordering information

Part number	Description
0300-5929-01	Panel mount
0300-5929-02	Panel with enclosure

PCCNet

COMPATIBLE

See your distributor for more information.

Cummins Power Generation

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

Europe, CIS, Middle East and Africa
 Manston Park Columbus Ave.
 Manston Ramsgate
 Kent CT 12 5BF United Kingdom
 Phone 44 1843 255000
 Fax 44 1843 255902

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

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Battery and Accessories



Battery Specifications

Battery Part Number	Group Size	CCA	Reserve Capacity	Battery	Voltage	Length	Width	Height	Ship Weight lbs	Quarts Electrolyte
0416-1332	22NF	420	60	Dry	12	9.0	8.8	5.4	19	4.0
0416-0579	24	420	70	Dry	12	10.2	6.6	8.9	20	6.0
0416-0579-01	24	420	70	Wet	12	10.2	6.6	8.9	36	6.0
0416-1330	24XL	810	146	Wet	12	10.3	9.0	6.6	43	5.9
0416-1051	26	530	80	Wet	12	8.2	6.8	8.1	31	3.7
0416-0823	30H	725	150	Dry	12	13.0	6.8	9.3	42	4.2
0416-1040	31	800	160	Dry	12	13.0	6.8	9.4	65	4.2
0416-0796	31	725	150	Wet	12	12.7	6.0	9.3	62	4.2
0416-0980	31	1000	185	Wet	12	13.0	6.8	9.5	59	4.2
A045P632	34	850	NA	Wet	12	10.3	6.6	8.0	NA	NA
0416-1291	34	800	100	Sealed	12	10.0	6.9	7.9	38	4.0
A030Y976	4D	1050	290	Wet	12	20.7	8.7	10.0	100	NA
0416-0848	4D	1080	270	Dry	12	20.8	8.6	9.6	85	13.0
0416-0439	8D	1400	430	Dry	12	20.8	10.7	9.5	110	16.0
0416-1264	8D	750	420	Dry	12	20.7	10.6	9.5	110	16.0
0416-1105	8D	1400	430	Wet	12	20.8	10.8	9.5	125	16.0

Application – Diesel

Listed below, by set model, is the specific battery size designed to fit the skid mounted battery rack (larger batteries, if required, may not fit the standard skid mounted rack.)

Model	Current Spec	Battery Size*	Supported Part Number*	Battery CCA*	Genset Minimum CCA	Battery Voltage	Starting (Genset) Voltage	Required Battery Quantity
C10 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C15 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C20 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C25 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C30 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C35 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C40 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C50 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C50 D6C	B	34	0416-1291	810	1700	12	12	2
C60 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C60 D6C	B	34	0416-1291	810	1700	12	12	2
C80 D6C	B	34	0416-1291	810	1700	12	12	2
C100 D6C	B	34	0416-1291	810	1700	12	12	2
C125 D6C	B	34	0416-1291	810	1700	12	12	2
C3000 D6	A	8D	0416-0439	1400	1400	12	24	6
C3000 D6E	A	8D	0416-0439	1400	1400	12	24	6
C3250 D6	A	8D	0416-0439	1400	1400	12	24	6
C3250 D6E	A	8D	0416-0439	1400	1400	12	24	6
C3500 D5	A	8D	0416-0439	1400	1400	12	24	6
C3500 D5E	A	8D	0416-0439	1400	1400	12	24	6
C3500 D6	A	8D	0416-0439	1400	1400	12	24	6
C3500 D6E	A	8D	0416-0439	1400	1400	12	24	6
C3750 D5	A	8D	0416-0439	1400	1400	12	24	6
C3750 D5E	A	8D	0416-0439	1400	1400	12	24	6
DFEJ	N	8D	0416-0439	1400	1400	12	24	2
DFEK	N	8D	0416-0439	1400	1400	12	24	2
DQCA	P	8D	0416-0439	1400	1400	12	24	2
DQCB	P	8D	0416-0439	1400	1400	12	24	2
DQCC	P	8D	0416-0439	1400	1400	12	24	2
DQDAA	L	4D	A030Y976	1050	750	12	24	2
DQDAB	K	4D	A030Y976	1050	750	12	24	2
DQDAC	K	4D	A030Y976	1050	750	12	24	2
DQFAA	J	8D	0416-0439	1400	1800	12	24	2
DQFAB	J	8D	0416-0439	1400	1800	12	24	2
DQFAC	J	8D	0416-0439	1400	1800	12	24	2
DQFAD	J	8D	0416-0439	1400	1800	12	24	2
DQFAH	D	8D	0416-0439	1400	1800	12	24	2
DQGAA	C	8D	0416-0439	1400	1400	12	24	4
DQGAB	C	8D	0416-0439	1400	1400	12	24	4
DQGAH	E	8D	0416-0439	1400	1800	12	24	4
DQGAF	E	8D	0416-0439	1400	1800	12	24	4
DQHAB	H	8D	0416-0439	1400	1400	12	24	4

* First line refers to *standby* battery size and the second line refers to *cold starting* battery size for C10 D6 – C60 D6.

Image 2: 0333-0770

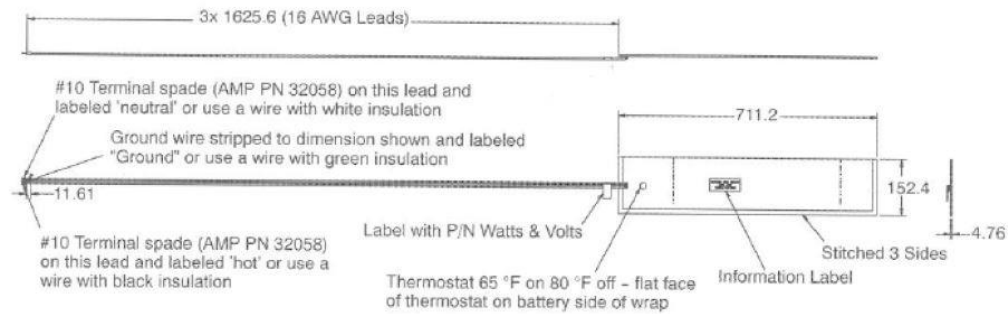
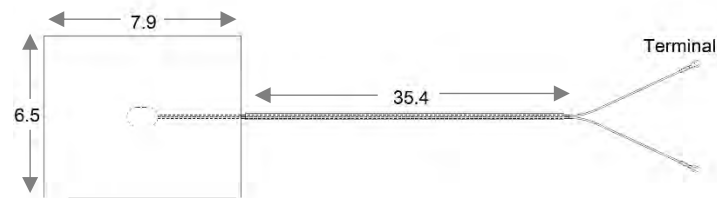


Image 3: 0541-0555



Battery Box

Battery box has approximate inside dimensions of 21.125" long x 11.75" wide x 10.5" high. Box is constructed of black plastic with 4 mounting feet and a cover held on by 2 thumb screws. The box also has 2 slots on each side to accommodate battery cables. Note: Box material will become soft and pliable around 240°F.

Image: 0416-1263



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

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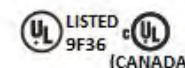
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GS120 w/PILCLHCOV1-EMERGENCY GENERATOR STOP

Page 26

Pilla Electrical Products, Inc.



DESCRIPTION:

Maintained, push-pull mushroom operator, 40mm dia. red, with engraved white lettering:

"PULL TO RESET"

Bold luminous legends.

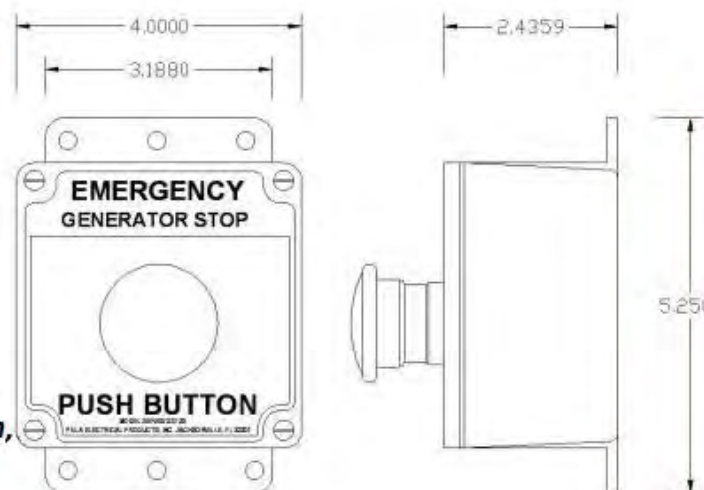
External mounting feet top & bottom.

NEMA 4, 4X, 12.

Contact block capacity:

for standard depth 1-3 per station,
for XD version 6 per station.

COVER PILCLM WILL CLOSE WHETHER
BUTTON IS PUSHED IN OR PULLED OUT.



GS120 w/PILCLHCOV1-EMERGENCY GENERATOR STOP



RATED OPERATIONAL CHARACTERISTICS CONFORMING TO EC/EN 60947-5-1	AC SUPPLY: UTILIZATION CATEGORY AC-15	STANDARD BLOCKS (SINGLE OR DOUBLE) WITH SCREW CLAMP TERMINALS: A600: Ue=600Vac AND Ie=1.2 A OR Ue=240 Vac AND Ie= 3 A OR Ue = 120 Vac AND Ie = 6 A CONTINUOUS THERMAL CURRENT 10 A	
	DC SUPPLY: UTILIZATION CATEGORY DC-13	STANDARD SINGLE OR DOUBLE BLOCKS WITH SCREW CLAMP TERMINALS: Q600: Ue= 600Vdc AND Ie = 0.1 A	
		24 Vdc	0.5 A

474 Series 240 Volt Dual Heat Fan Forced Portable Heater



- 2000W & 4000W heat settings
- Temperature control thermostat
- Manual reset type limit control
- 6' long - 3 conductor cord

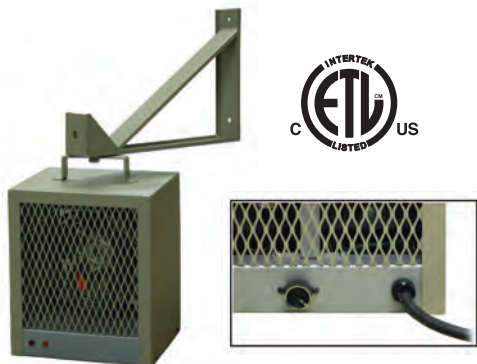
Width: 16"
Height: 16"
Depth: 8-1/2"



20 AMP Plug
NEMA #6-20P

UPC# 686334	MODEL	WATTS	MAX BTU's	VOLTS	AMPS	PHASE	WT.	LIST
446181	H474 TMC	2000 / 4000	13652	240	8.3 / 16.6	1	20 lbs.	229

Garage/Workshop 240/208 Volt Fan Forced Portable Heater



- 4000/3000 Watts at 240/208 V
- 43°F temperature rise
- Built in bi-metal double pole thermostat - 50° to 90° range.
- Steel tubular heating element
- Wall/Ceiling bracket included
- Manual reset thermal limit
- Power on and overheat pilot lights

ITEM	WIDTH	HEIGHT	DEPTH
Heater	10 1/4"	12"	7 1/2"
Bracket	14 1/4"	10"	----

UPC# 686334	MODEL	WATTS	MAX BTU's	VOLTS	AMPS	PHASE	WT.	LIST
450850	GCH-4000	4000 / 3000	13648	240 / 208	16.6 / 14.4	1	15 lbs.	297

ICH Series 240/208 Volt Construction Site/Utility Fan Forced Portable Heater

- Operates on 240V or 208V
- Steel tubular heating element
- 43°F air heat rise
- Internal overheat thermostat
- Temperature control thermostat
- 6' long cordset

Width: 10 5/8"
Height: 12 3/4"
Depth: 10"



20 AMP Plug
NEMA #6-20P



UPC# 686334	MODEL	WATTS	MAX BTU's	VOLTS	AMPS	PHASE	WT.	LIST
450874	ICH-240C	4000 / 3000	13648	240 / 208	16.7 / 14.4	1	15 lbs.	247

680 Series "Bulldog" 240/208 Volt Fan Forced Portable Unit Heater



Swivel base allows unit to be wall, floor, or ceiling mounted.

- Operates on 240V or 208V
- Finned steel tubular heating element
- Internal manual reset thermal cut-out
- 6' long cord with molded plug
- Temperature control thermostat with 35°F to 85°F range
- 10' air throw - 262 CFM



20 AMP Plug
NEMA #6-20P



30 AMP Plug
NEMA #6-30P

Width: 13 1/2"
Height: 17 1/2"
Depth: 11 1/2"

UPC# 686334	MODEL	WATTS	MAX BTU's	VOLTS	PHASE	AMPS	TEMP RISE	WT.	LIST
446280	*HF684TC	4000/3000	13652/10239	240/208	1	16.7/14.5	48 °F	20 lbs	377
446297	HF685TC	4800/3600	16384/12288	240/208	1	20.0/17.4	58°F	20 lbs.	395
446303	HF686TC	5600/4200	19107/14330	240/208	1	23.4/20.2	75 °F	20 lbs.	443
683500	A1560	OPTIONAL WALL CEILING BRACKET FOR HF680 & ICH 240c SERIES HEATERS							73

* HF684TC UL listed only



THE VMC GROUP
The Power of Together™



CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS



Certification No.

VMA-50999-01C (REVISION 09)

Expiration Date: 06/30/2020

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are **CERTIFIED¹** FOR SEISMIC APPLICATIONS in accordance with the following building code² releases.

IBC 2006, 2009, 2012, 2015

The following model designations, options, and accessories are included in this certification. Reference report number **VMA-50999-01** as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Cummins Power Generation, Inc. Diesel Generator Sets
DQCA-C, DQFA-H, DQGAA-B, DQKAA-B, DQLC-H, DQPAA-B 600kW – 2750kW

The above referenced equipment is **APPROVED** for seismic application when properly installed³, used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance⁴. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as $I_p=1.5$. The equipment is qualified by successful seismic shake table testing at the nationally recognized University of California Berkley Pacific Earthquake Engineering Research Center under the review of the ISO Accredited Product Certification Agency, The VMC Group.

Certified Seismic Design Levels⁸

Certified IBC	Importance $I_p \leq 1.5$ Soil Classes A-E Risk Categories I-IV Design Categories A-F	$S_{DS} \leq 1.940 \text{ g}$ $z/h = 0.0$	$S_{DS} \leq .647 \text{ g}$ $z/h \leq 1.0$
		Horizontal Design ⁵	$\frac{F_p}{W_p} = 0.4 S_{DS} I_p \frac{a_p}{R_p} \left(1 + 2 \frac{z}{h}\right) \leq 1.455 \text{ g}$
Test Datum AC156	ISO 17025 Laboratory Pre/Post-Shake Functionality Tri-axial, 5% Damping SRS	$A_{FLEX-H} \leq 1.940 \text{ g}$	$A_{FLEX-V} \leq 1.293 \text{ g}$
		$A_{RIG-H} \leq 0.776 \text{ g}$	$A_{RIG-V} \leq 0.518 \text{ g}$
		$ZPA_H \leq 0.698 \text{ g}$	$ZPA_V \leq 0.466 \text{ g}$

Certified Seismic Installation Methods⁹

Rigid mounting from unit base to rigid structure	External isolation mounting from unit base to rigid structure
Rigid mounting from unit base to fuel tank	External isolation mounting from unit base to fuel tank



THE VMC GROUP

The Power of Together™



CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Series	Model	Max Rating [kW]	Max Dimensions [in]			SDS Level [g]		Tank Range [gal]	Enclosure*	Mounting Configuration
			Length	Width	Height	z/h = 0.0	z/h = 1.0			
DQCx (QSK23)	A, B, C	600, 750, 800	338	102	142	1.94	0.64	200- 2400	F200, F201, F202, F203, F204, F205	External isolation from unit base to rigid structure / fuel tank
DQFx (QST30)	A, B, C, <u>D</u> , H	750, 800, 900, <u>1000</u> , 1000	338	102	142	1.94	0.64			Rigid mounting from unit base to rigid structure / fuel tank
DQPAX (QSK19)	A, B	600, 650	338	101.6	142	1.94	0.64			External isolation from unit base to rigid structure / fuel tank
DQGAx (QSK50)	A, B	1250, 1500	278	104	125	1.94	1.44	N/A	N/A	External isolation from unit base to rigid structure / fuel tank
DQKAx (QSK60)	A, <u>B</u>	1750, <u>2000</u>	244	100	120	1.94	1.44			
DQLx (QSK78)	C, D, E, <u>F</u> , H	2500, 2750, <u>2500</u> , <u>2750</u> , 2750	292	125	153	2.10	2.00			

Note: DQPAA-B, DQCA-C, DQGAA-B, DQKAA-B, DQLC-H, and DQFAA-D,H generator sets are certified for the configuration that allows the use of remote radiators. However, the seismic certification of said remote radiators is the responsibility of others and is not covered under this certification.

Note: This certification includes the use of the breather stand on the ECO generator set models. All other generator set models are not certified for use with the breather stand.

*Note: The F201, F202, F204, & F205 are certified in the tested mineral wool foam configuration, as well as the analyzed PU foam configuration highlighted in the FEA section of Certification Report VMA-50999-01

This certification **includes** the open generator set and the enclosed generator set when installed with or without the sub-base tank. The generator set and included options shall be a catalogue design and factory supplied. The generator set and applicable options shall be installed and attached to the building structure per the manufacturer supplied seismic installation instructions. This certification **excludes** After Treatment Units (ATUs), all non-factory supplied accessories, including but not limited to mufflers, isolation/restraint devices, remote control panels, remote radiators, pumps and other electrical/mechanical components.



VMA-50999-01C (Revision 9)
Issue Date: March 02, 2017
Revision Date: February 06, 2019
Expiration Date: June 30, 2020



THE VMC GROUP
The Power of Together™



CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes and Comments:

1. All equipment listed herein successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The units cited in this certification were representative sample(s) of a contingent of models and all remained captive and structurally sound after the seismic shake simulation. The units also remained functionally operational after the simulation testing as functional testing was completed by the equipment manufacturer before and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.
2. The following building codes are addressed under this certification:
IBC 2006 – referencing ASCE7-05 and ICC AC-156
IBC 2009 – referencing ASCE7-05 and ICC AC-156
IBC 2012 – referencing ASCE7-10 and ICC AC-156
IBC 2015 – referencing ASCE7-10 and ICC AC-156
3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for observing the installation detailed in the seismic installation drawings and the proper installation of all anchors and mounting hardware.
4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit by the factory. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, The VMC Group, and meets the seismic design levels claimed by this certificate.
5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification does not guarantee the equipment will remain compliant to NEMA, IP, UL, or CSA standards after a seismic event.
6. This certificate applies to units manufactured at:
Cummins Power Generation, Inc., 1400 73rd Ave NE, Minneapolis, MN 55432
7. This project follows The VMC Group's ISO-17065 Scheme for Product Certification of Nonstructural Components.
8. The qualified seismic design level stated is the lowest for all series this certificate covers, for more detailed ranges of qualified seismic design levels, see the certified product tables.
9. The certified seismic installation methods states are a summary for all series this certificate covers, for more detailed information on the certified seismic installation methods, see the certified product tables.



John P. Giuliano, PE
President, The VMC Group



VMA-50999-01C (Revision 9)
Issue Date: March 02, 2017
Revision Date: February 06, 2019
Expiration Date: June 30, 2020





2019 EPA Tier 2 Exhaust Emission Compliance Statement

750DQCB

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: KCEXL023.AAB-044
Effective Date: 11/27/2018
Date Issued: 11/27/2018
EPA Engine Family (Cummins Emissions Family): KCEXL023.AAB

Engine Information:

Model: QSK23-G7 NR2 Bore: 6.69 in. (170 mm)
Engine Nameplate HP: 1220 Stroke: 6.69 in. (170 mm)
Type: 4 Cycle, In-line, 6 Cylinder Diesel Displacement: 1413 cu. in. (23.2 liters)
Aspiration: Turbocharged and CAC Compression ratio: 16.0:1
Emission Control Device: Engine Design Modification Exhaust stack diameter: 10 in.

Diesel Fuel Emission Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kWm-hr		
	<u>NO_x + NMHC</u>	<u>CO</u>	<u>PM</u>	<u>NO_x + NMHC</u>	<u>CO</u>	<u>PM</u>
Test Results	4.3	0.4	0.07	5.7	0.6	0.09
EPA Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20

Test methods: EPA nonroad emissions recorded per 40 CFR 89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for constant speed engines (ref. ISO8178-4, D2)

Diesel fuel specifications: 40-48 Cetane number, Reference: ASTM D975 No. 2-D, 300-500 ppm Sulphur

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 NO_x 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.



Sound Data

DQCB

QSK23, 60Hz Diesel

A-weighted Sound Pressure Level @ 7 meters, dB(A)

See notes 2, 5 and 7-11 Listed Below

Configuration	Exhaust	Applied Load	Position (Note 2)								8 Position Average
			1	2	3	4	5	6	7	8	
Standard – Unhoused	Infinite Exhaust	0% Prime	84.3	90.4	90.3	92.3	90.6	92.7	91.6	90.0	90.8
		75% Prime	86.8	92.3	93.1	94.4	91.6	94.1	93.5	92.0	92.7
		100% Prime	87.9	93.2	94.4	95.4	91.7	94.9	94.2	92.7	93.5
		110% Prime	88.4	93.6	94.7	95.5	92.1	94.9	94.3	92.9	93.7
F200 – Weather	Genset Mounted Muffler	0% Prime	89.7	88.0	81.4	89.4	92.6	89.1	78.4	88.4	88.7
		75% Prime	91.7	89.5	83.2	91.0	93.4	90.7	80.5	90.1	90.2
		100% Prime	93.0	90.7	84.2	91.7	94.1	91.4	81.6	91.0	91.1
		110% Prime	92.9	90.9	84.4	91.8	93.8	91.5	81.9	91.3	91.1
F201 – Quiet Site II First Stage	Genset Mounted Muffler	0% Prime	82.4	76.0	70.9	70.0	74.6	70.5	69.6	76.1	76.1
		75% Prime	84.4	79.1	74.9	73.5	77.1	75.1	73.5	78.7	78.7
		100% Prime	85.4	80.1	75.7	75.0	78.0	76.1	75.1	79.6	79.7
		110% Prime	85.4	80.2	76.3	75.5	78.4	76.9	75.5	80.0	79.9
F202 – Quiet Site II Second Stage	Genset Mounted Muffler	0% Prime	67.5	68.5	69.5	70.6	73.3	70.1	68.1	67.0	69.8
		75% Prime	70.3	72.1	74.3	73.9	74.2	75.7	74.0	72.1	73.6
		100% Prime	72.2	73.2	75.3	75.3	74.8	76.9	75.5	73.4	74.8
		110% Prime	72.9	73.8	75.9	76.0	75.1	77.1	76.2	74.0	75.3

Average A-weighted Sound Pressure Level @ 1 meter, dB(A)

See notes 1, 5 and 7-14 Listed Below

Configuration	Exhaust	Applied Load	Octave Band Center Frequency (Hz)											Overall Sound Pressure Level
			16	31.5	63	125	250	500	1000	2000	4000	8000	16000	
Standard – Unhoused	Infinite Exhaust	0% Prime	N/A	47.4	62.6	84.5	89.6	93.6	95.7	95.0	91.1	81.7	69.5	100.7
		75% Prime	N/A	48.9	66.0	85.4	90.4	94.5	97.3	97.2	92.9	88.1	75.7	102.4
		100% Prime	N/A	50.0	67.5	85.8	90.5	95.2	98.0	97.9	94.1	89.3	77.1	103.2
		110% Prime	N/A	50.7	68.1	86.3	90.7	95.2	98.1	98.1	94.3	90.2	77.9	103.4
F200 – Weather	Genset Mounted Muffler	0% Prime	N/A	52.0	72.5	81.5	84.7	87.8	90.2	88.2	83.0	72.4	57.9	94.7
		75% Prime	N/A	50.2	77.7	84.0	85.0	88.4	91.5	89.9	85.0	79.0	68.5	96.2
		100% Prime	N/A	50.5	78.5	84.7	85.6	89.1	92.2	90.8	86.2	81.6	71.4	97.0
		110% Prime	N/A	50.5	78.9	85.0	85.9	89.6	92.3	90.9	86.6	82.3	71.9	97.2
F201 – Quiet Site II First Stage	Genset Mounted Muffler	0% Prime	N/A	50.7	70.9	76.6	73.9	75.5	76.4	75.8	71.2	62.2	49.2	83.3
		75% Prime	N/A	50.1	76.5	80.8	76.3	78.0	79.8	79.1	76.1	69.7	59.5	87.0
		100% Prime	N/A	49.5	77.4	81.8	77.3	80.3	80.9	80.4	77.8	72.7	62.2	88.3
		110% Prime	N/A	49.1	78.0	82.3	77.5	81.2	81.4	80.4	78.5	73.9	63.2	88.8
F202 – Quiet Site II Second Stage	Genset Mounted Muffler	0% Prime	N/A	42.8	60.4	71.4	73.3	69.6	71.0	71.1	65.8	57.7	43.0	78.8
		75% Prime	N/A	43.0	65.4	73.1	74.1	70.9	76.6	80.6	77.1	66.5	52.0	84.4
		100% Prime	N/A	43.4	67.2	74.2	74.9	72.1	78.2	81.5	78.7	70.2	54.8	85.7
		110% Prime	N/A	43.8	68.1	74.8	75.1	72.5	78.8	81.8	79.1	71.2	55.7	86.1

Exhaust Sound Power Level, dB(A)

See notes 4 and 6-14 Listed Below

Configuration	Applied Load	Octave Band Center Frequency (Hz)										Overall Sound Power Level	
		16	31.5	63	125	250	500	1000	2000	4000	8000		16000
Open Exhaust (No Muffler)	0% Prime	N/A	67.2	97.1	102.3	108.1	106.3	104.7	101.1	98.7	90.7	76.3	112.6
	75% Prime	N/A	67.0	107.8	113.1	122.7	124.9	121.3	119.9	116.4	111.9	97.9	129.1
	100% Prime	N/A	68.1	108.4	114.8	123.1	124.5	122.3	121.1	118.2	115.7	100.1	129.7
	110% Prime	N/A	68.3	108.7	117.7	125.4	125.0	123.7	122.2	119.3	116.7	100.2	131.0

Global Notes:

1. Sound pressure levels at 1 meter are measured per the requirements of ISO 3744, ISO 8528-10, and European Communities Directive 2000/14/EC as applicable. The microphone measurement locations are 1 meter from a reference parallelepiped just enclosing the generator set (enclosed or unenclosed).
2. Seven-meter measurement location 1 is 7 meters (23 feet) from the generator (alternator) end of the generator set, and the locations proceed counter-clockwise around the generator set at 45° angles at a height of 1.2 meters (48 inches) above the ground surface.
3. Sound Power Levels are calculated according to ISO 3744, ISO 8528-10, and or CE (European Union) requirements.
4. Exhaust Sound Levels are measured and calculated per ISO 6798, Annex A.
5. Reference Sound Pressure Level is 20 µPa.
6. Reference Sound Power Level is 1 pW (10⁻¹² Watt).
7. Sound data for remote-cooled generator sets are based on rated loads without cooling fan noise.
8. Sound data for the generator set with infinite exhaust do not include the exhaust noise contribution.
9. Published sound levels are measured at CE certified test site and are subject to instrumentation, measurement, installation and manufacturing variability.
10. Unhoused/Open configuration generator sets refers to generator sets with no sound enclosures of any kind.
11. Housed/Enclosed/Closed/Canopy configuration generator sets refer to generator sets that have noise reduction sound enclosures installed over the generator set and usually integrally attached to the skid base/base frame/fuel container base of the generator set.
12. Published sound levels meet the requirements India's Central Pollution Control Board (Ministry of Environment & Forests), vide GSR 371 (E), which states the A-weighted sound level at 1 meter from any diesel generator set up to a power output rating of 1000kVA shall not exceed 75dB(A)
13. For updated noise pollution information for India see website: <http://www.envfor.nic.in/legis/legis.html>
14. Sound levels must meet India's Ambient Air Noise Quality Standards detailed for Daytime/Night-time operation in Noise Pollution (Regulation and Control) Rules, 2000



Prototype Test Support (PTS) 60 Hz test summary



Generator set models

600DQCA

800DQCC

750DQCB

Representative prototype

Model: 800DQCC

Alternator: HC6H

Engine: QSK23-G7 NR2

Rated

voltage: 480 V

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: 833 kW

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

Torsional analysis and testing:

The generator set was tested to verify that the design is not subjected to harmful torsional stresses. A spectrum analysis of the transducer output was conducted over the speed range of 1350 to 1950 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:	± 0.50%
Random voltage variation:	± 0.50%
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. Voltage and frequency response on load: addition and rejection were evaluated. The following results were recorded at 0.8 PF:

Full load acceptance:

Voltage dip:	30.0%
Recovery time:	2.3 seconds
Frequency dip:	9.3%
Recovery time:	3.9 seconds

Full load rejection:

Voltage rise:	23.7%
Recovery time:	2.6 seconds
Frequency rise:	4.6%
Recovery time:	3.4 seconds

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

<u>Harmonic</u>	<u>Line to Line</u>		<u>Line to Neutral</u>	
	<u>No load</u>	<u>Full load</u>	<u>No load</u>	<u>Full load</u>
3	0.036	0.245	0.093	0.169
5	0.083	2.081	0.112	2.171
7	0.824	0.609	0.820	0.597
9	0.023	0.042	0.021	0.074
11	0.600	0.355	0.613	0.397
13	0.307	0.300	0.295	0.308
15	0.009	0.017	0.009	0.094



Warranty Statement

Generator Sets

Commercial Standby Extended Warranty

Limited Standby 3 Year or 1,500 Hour Parts + Labor + Travel Extended Warranty – L188

Commercial Generating Set

When purchased, this limited extended 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. The coverage duration is 3 years from warranty start date or 1,500 hours, whichever occurs first.

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. The permissible average power output over 24 hours of operation shall not exceed 70% of the ESP.

Cummins Power Generation® Responsibilities:

In the event of a failure of the Product during the extended 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.

In addition, the owner will be responsible for:

- 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 extended warranty does not cover Product failures resulting from:

- Inappropriate use relative to designated power rating.
- Inappropriate use relative to application guidelines.
- Failures due to normal wear, corrosion, varnished fuel system parts, lack of reasonable and necessary maintenance, unauthorized modifications and/or repair, and use of add-on or modified parts.
- Improper and/or unauthorized installation.
- Owner's or operator's negligence, accidents or misuse.
- 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

Limitations Continued:

- 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 extended warranty does not cover costs resulting from:

- Difficulty in gaining access to the Product.
- Damage to customer property.
- Repair of cosmetic damage to enclosures.

Items not covered by this limited extended warranty:

- Batteries
- Enclosures
- Coolant heaters
- Exhaust systems and aftertreatment components
- Maintenance items

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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.

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

Product Model Number: 750DQCB

Product Serial Number: TBD

Date in Service: TBD

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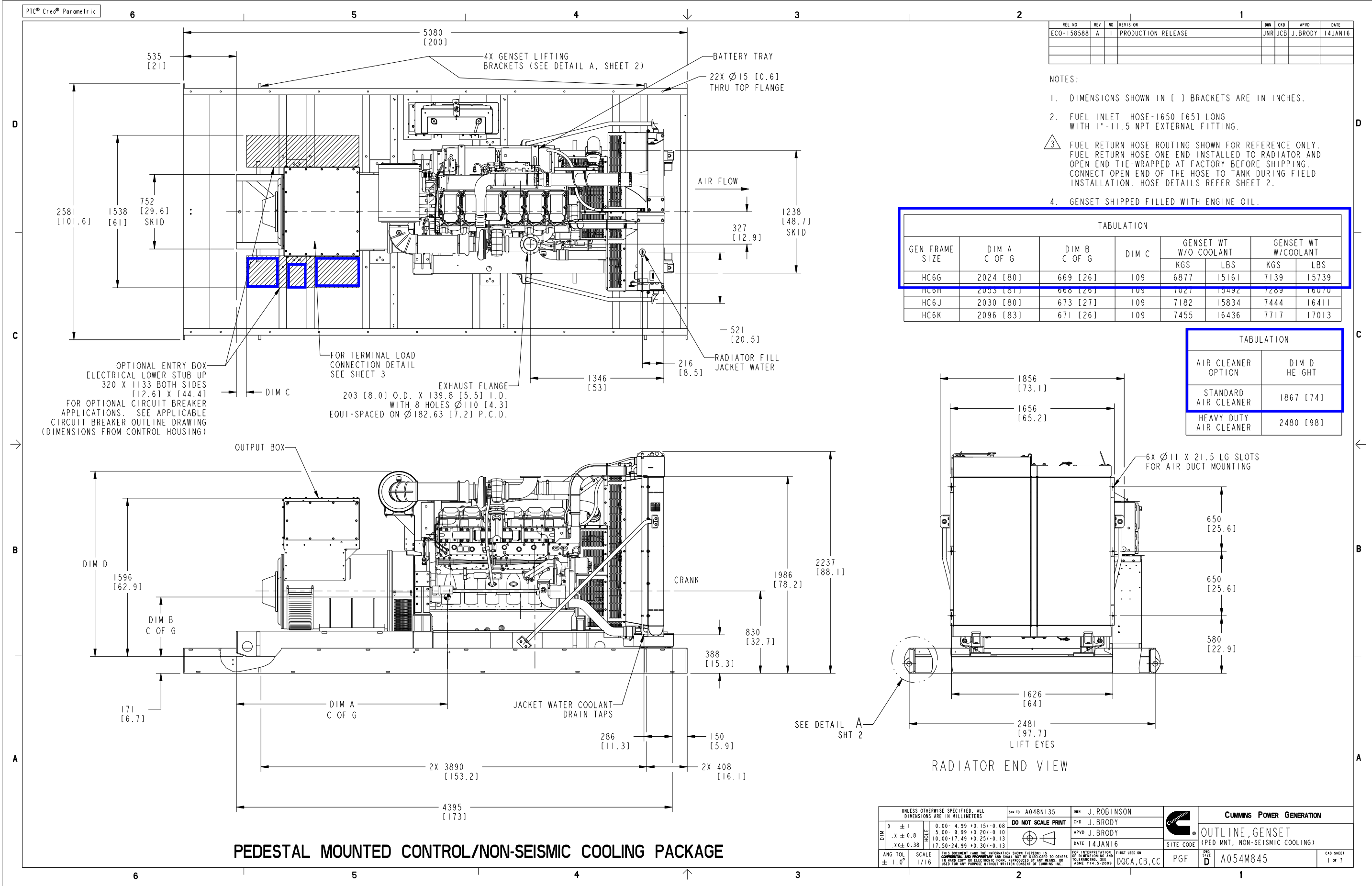
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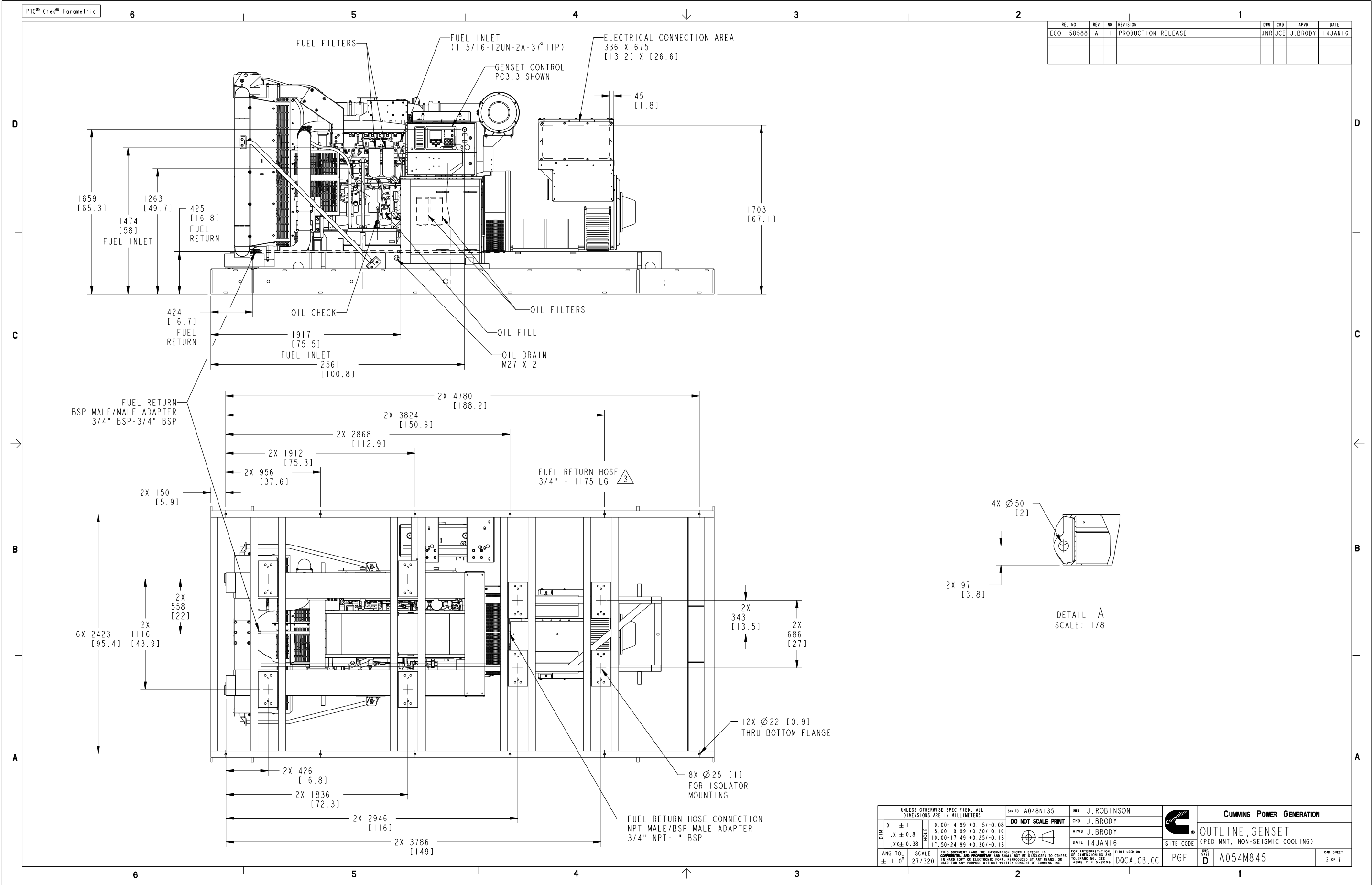
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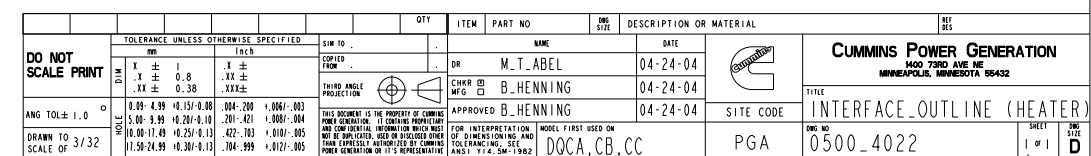
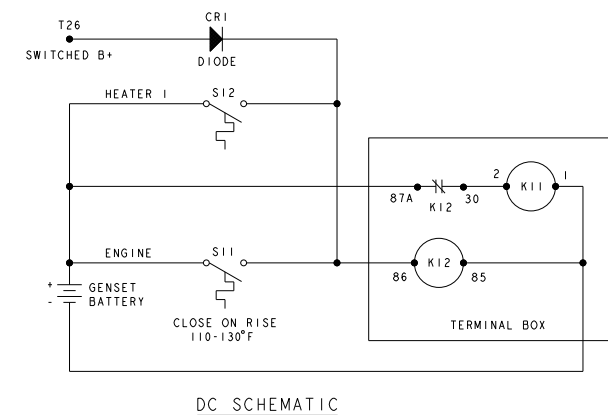
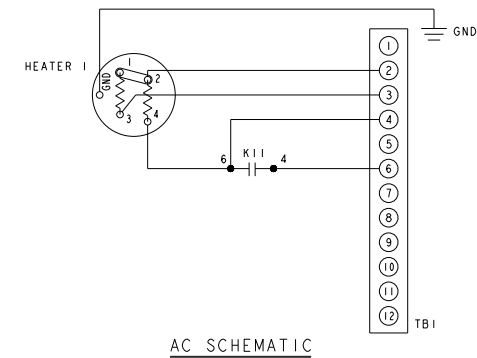
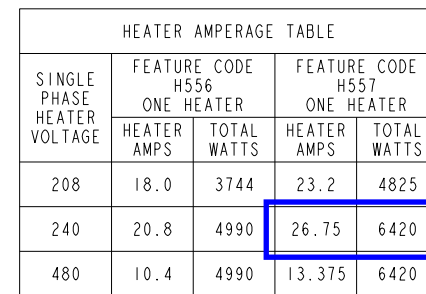
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Specifications are subject to change without notice.









REL. NO.	REV.	NO.	REVISION	DWN.	CKD.	APVD.	DATE
ECO-174108	D	1	ZONE D4, ADD DIM 34.7 [1.37]	NAS	JBP	J.BUTLER	14DEC17
		2	ZONE C4, ADD DIM 1248.7 [49.16]	NAS	JBP	J.BUTLER	14DEC17

NOTE:

1. DIMENSIONS SHOWN IN [] ARE IN INCHES.
2. COMMON REFERENCE POINT ON GENSET SKID (→→). POINTS TO ANCHORING HOLE ON SKID. SEE GENSET_OUTLINE (FOUNDATION) FOR DETAILS.
3. LISTED TORQUE VALUES ARE FOR MAXIMUM CONDUCTOR SIZES ACCOMMODATED. CONSULT UL 486 TABLE 7-4, 7-5 AND 7-6 FOR SMALLER CONDUCTOR SIZES.
4. ALL ITEMS SHOWN IN ILLUSTRATION ARE FOR REFERENCE ONLY.
5. ELECTRICAL CONDUITS MUST:
 - PROVIDE FLEXIBLE CONNECTION (USING FLEXIBLE CONDUIT AND CABLES).
 - INSTALLED IN A WAY THAT IT WILL ABSORB OR REDUCE VIBRATION CONDITIONS, FOR EXAMPLE: ADD OFF-SET BENDS, BETWEEN THE MOUNTING SURFACE OF THE CIRCUIT BREAKER ENCLOSURE AND THE STUB AREA ORIGINATING IN CONCRETE OR THE TYPE OF BASE FLOORING.
6. FLEXIBILITY IN CONDUIT AND CABLE INSTALLATION SHOULD BE PROVIDED TO ACCOUNT FOR MOVEMENT BETWEEN GENSET AND GROUND.
7. AREA SHOWN INDICATES APPROXIMATE OFFSET PLACEMENT OF THE ELECTRICAL FLEXIBLE CONDUIT STUB-UP AREA ORIGINATING IN CONCRETE OR OTHER TYPE OF BASE FLOORING RELATIVE TO CIRCUIT BREAKER LOCATION WITHIN ENCLOSURE TO PROVIDE VIBRATION PROTECTION.
8. 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.
9. SHUNT TRIP UNITS CAN BE OPERATED AT 75% OF NOMINAL VOLTAGE AND WILL ACCEPT MOMENTARY OR CONTINUOUS APPLIED VOLTAGE.
10. SHUNT TRIP UNITS CAN BE OPERATED AT 70% TO 100% OF NOMINAL VOLTAGE AND WILL ACCEPT MOMENTARY OR CONTINUOUS APPLIED VOLTAGE.
11. ALL DIMENSIONS SHOWN FOR RIGHT SIDE ENTRY ALSO APPLY TO LEFT SIDE ENTRY IN MIRROR ORIENTATION.
12. ALTERNATOR MODEL HC634G & R-FRAME CIRCUIT BREAKER ARE BEING SHOWN FOR DRAWING SIMPLICITY.
13. "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.
14. 800 AMP BREAKER:
A LUG ACCEPTING (2) 3/0-600 kcmil CONDUCTORS IS AVAILABLE THRU ACCESSORIES. PGA PART NUMBER 0332-4278.
15. 1200 AMP BREAKER:
A LUG ACCEPTING (3) 3/0-600 kcmil CONDUCTORS IS AVAILABLE THRU ACCESSORIES. PGA PART NUMBER 0332-4279.
16. STANDARD FEATURE ON SCHNEIDER ELECTRIC NW BREAKER.

D

D

C

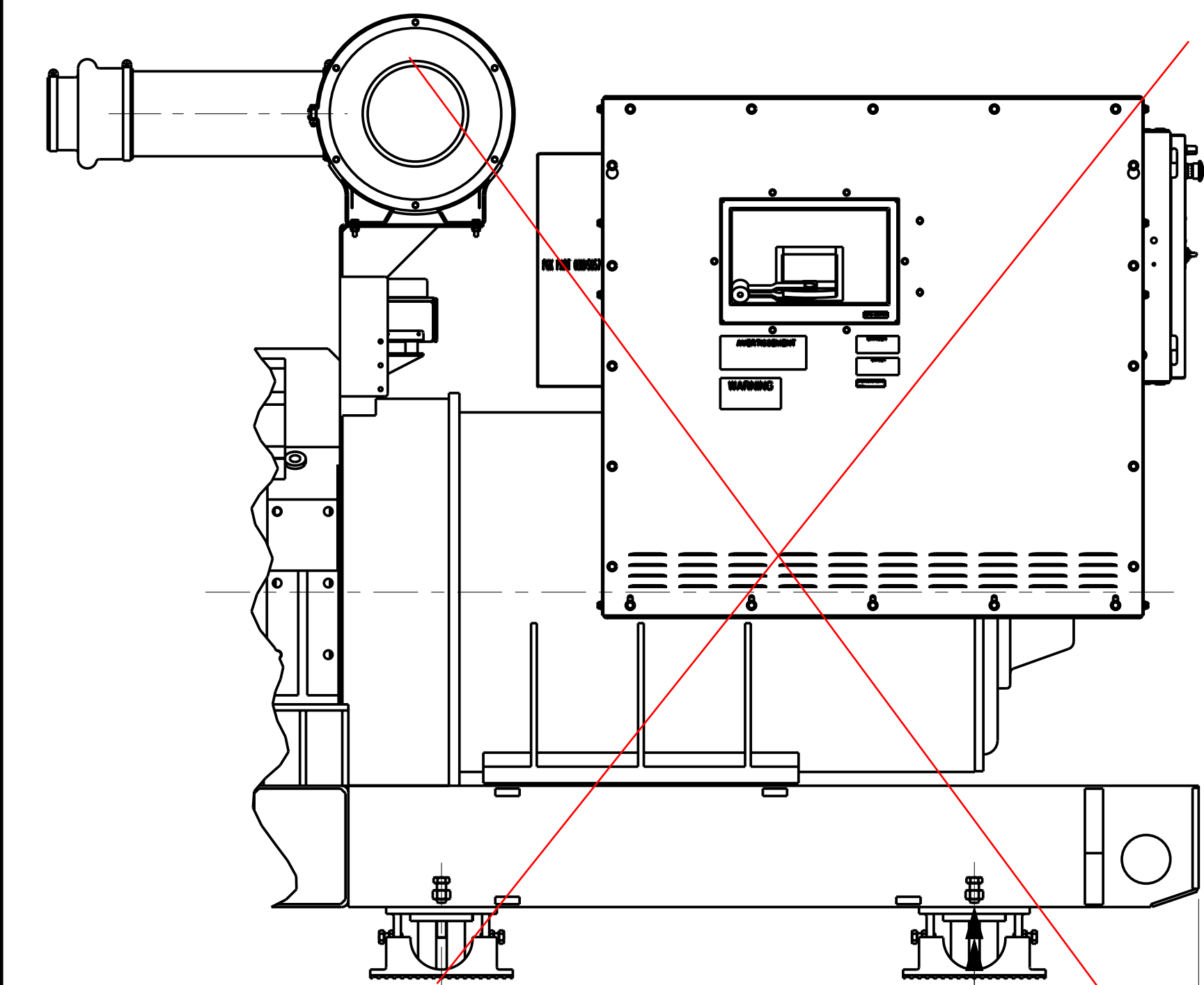
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B

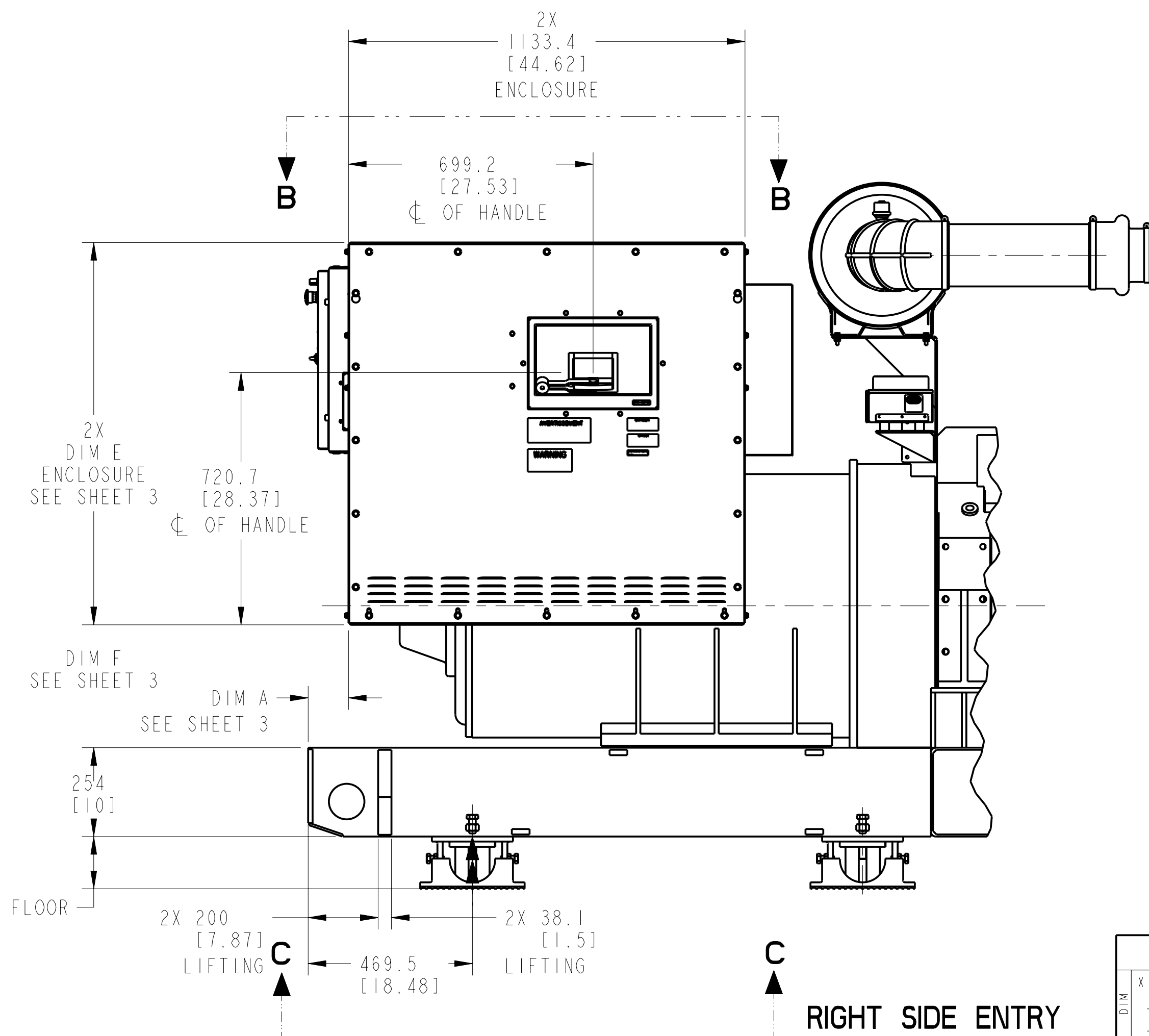
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A





VIEW A-A
(ROTATED 180°)

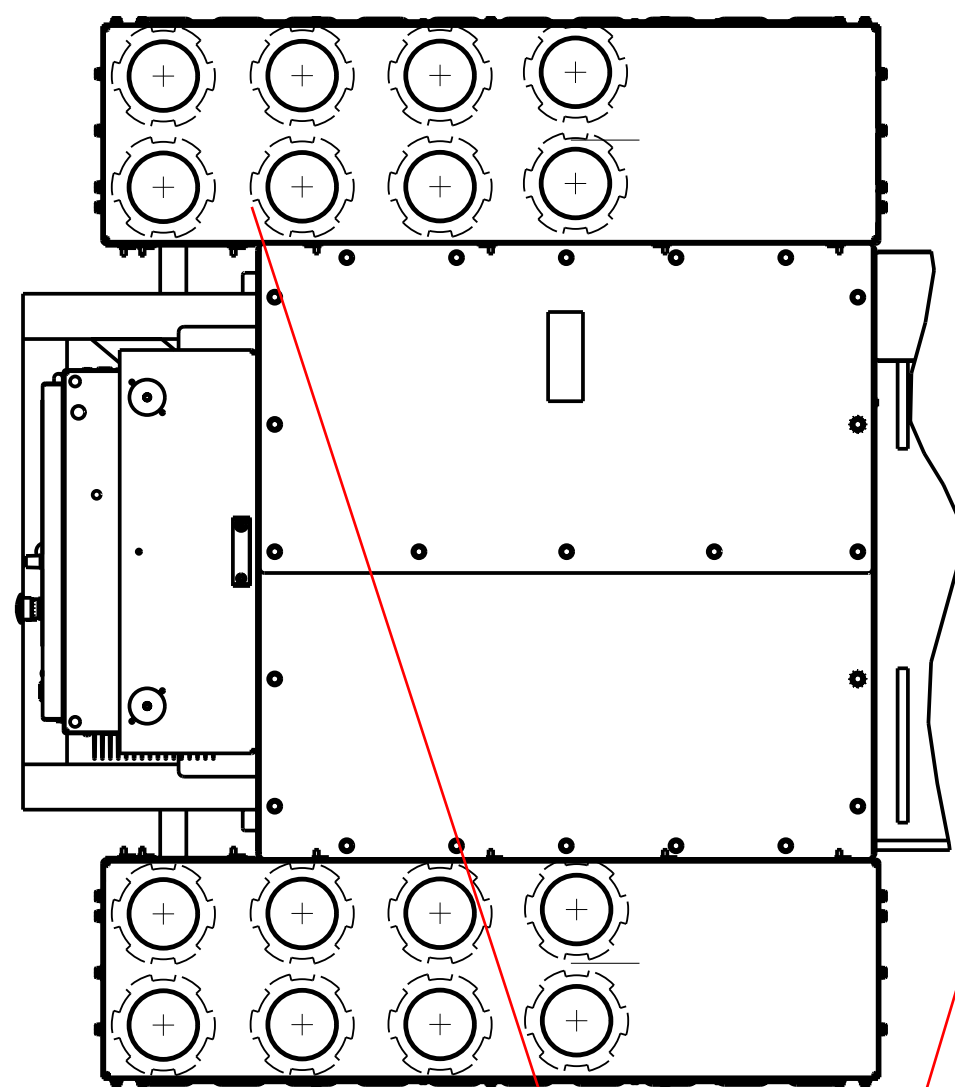
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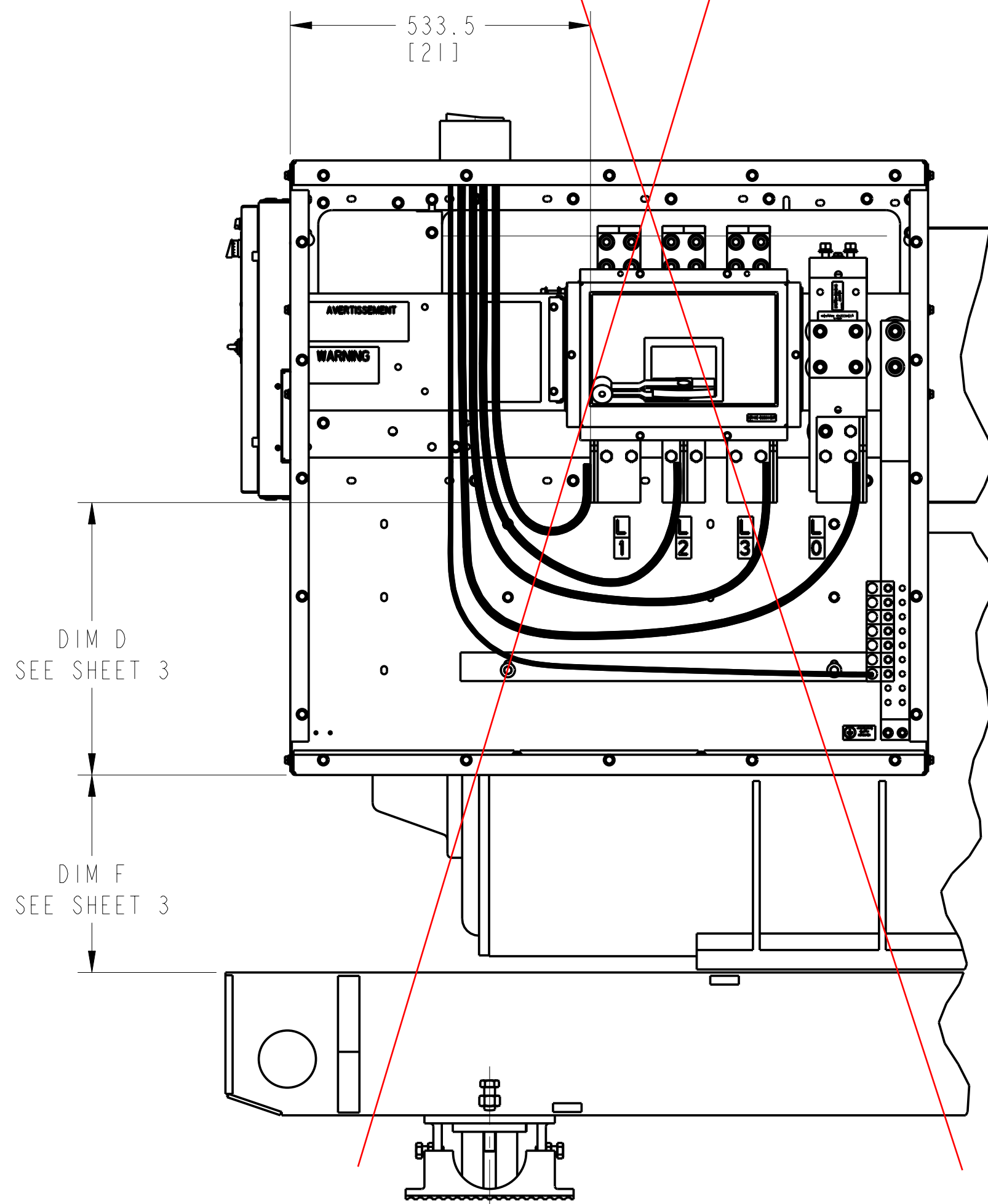
RIGHT SIDE ENTRY

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS				SIM TO: A040V225	DWN: R. PAUTZKE		CUMMINS POWER GENERATION		
DIM	X ± 1	HOLE	0.00 - 4.99 +0.15/-0.08	DO NOT SCALE PRINT	CKD P. HERRLEY			OUTLINE, GENSET (CIRCUIT BREAKER 23L)	CAD SHEET 1 OF 3
	.X ± 0.8		5.00 - 9.99 +0.20/-0.10		APVD J. BRODY				
	.XX ± 0.38		10.00 - 17.49 +0.25/-0.13		DATE 09SEP16				
	ANG TOL ± 1.0°				SCALE 3/32				
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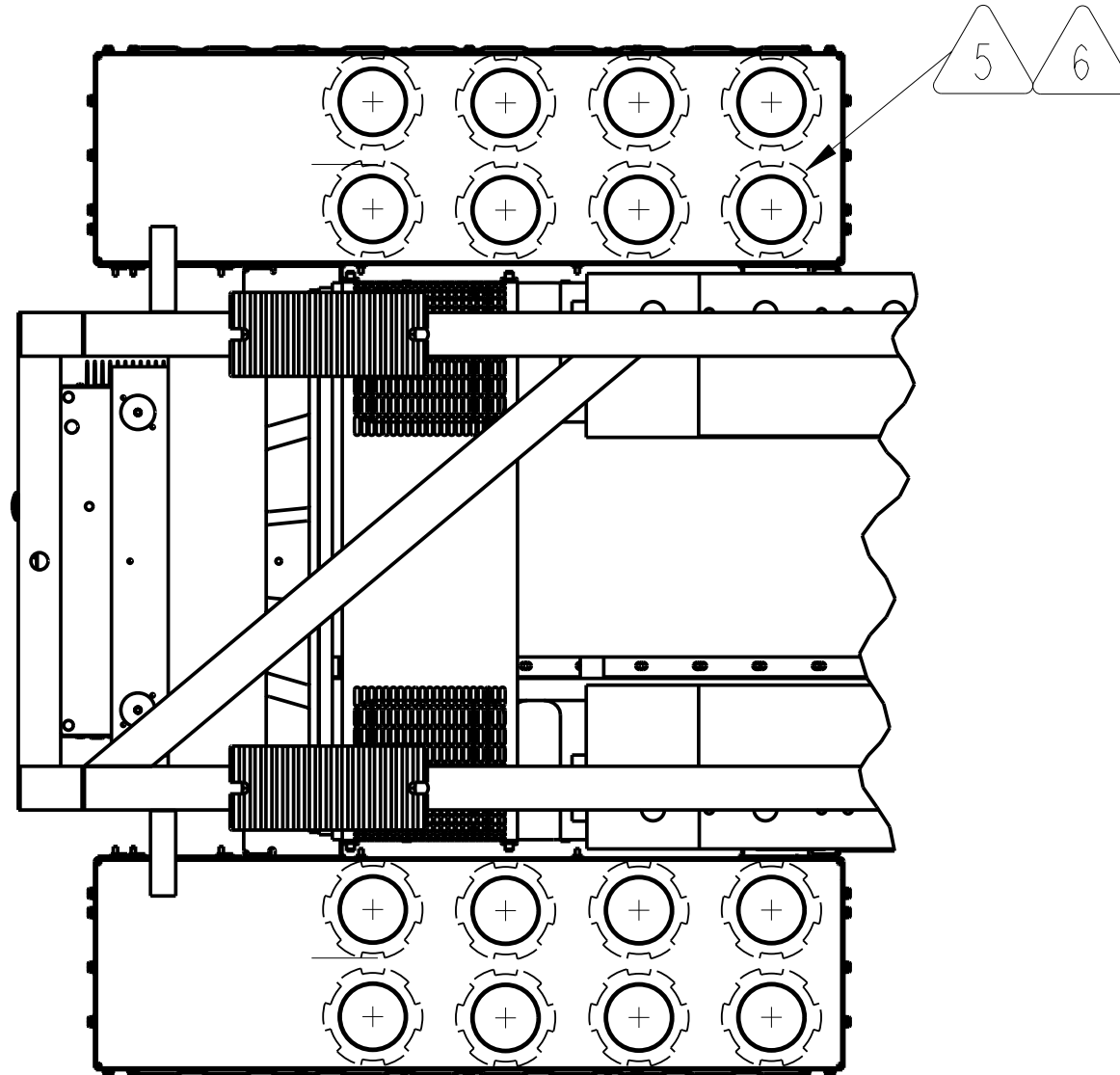
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ECO-174108	D	--	--	NAS	JBP	J.BUTLER	14DEC17



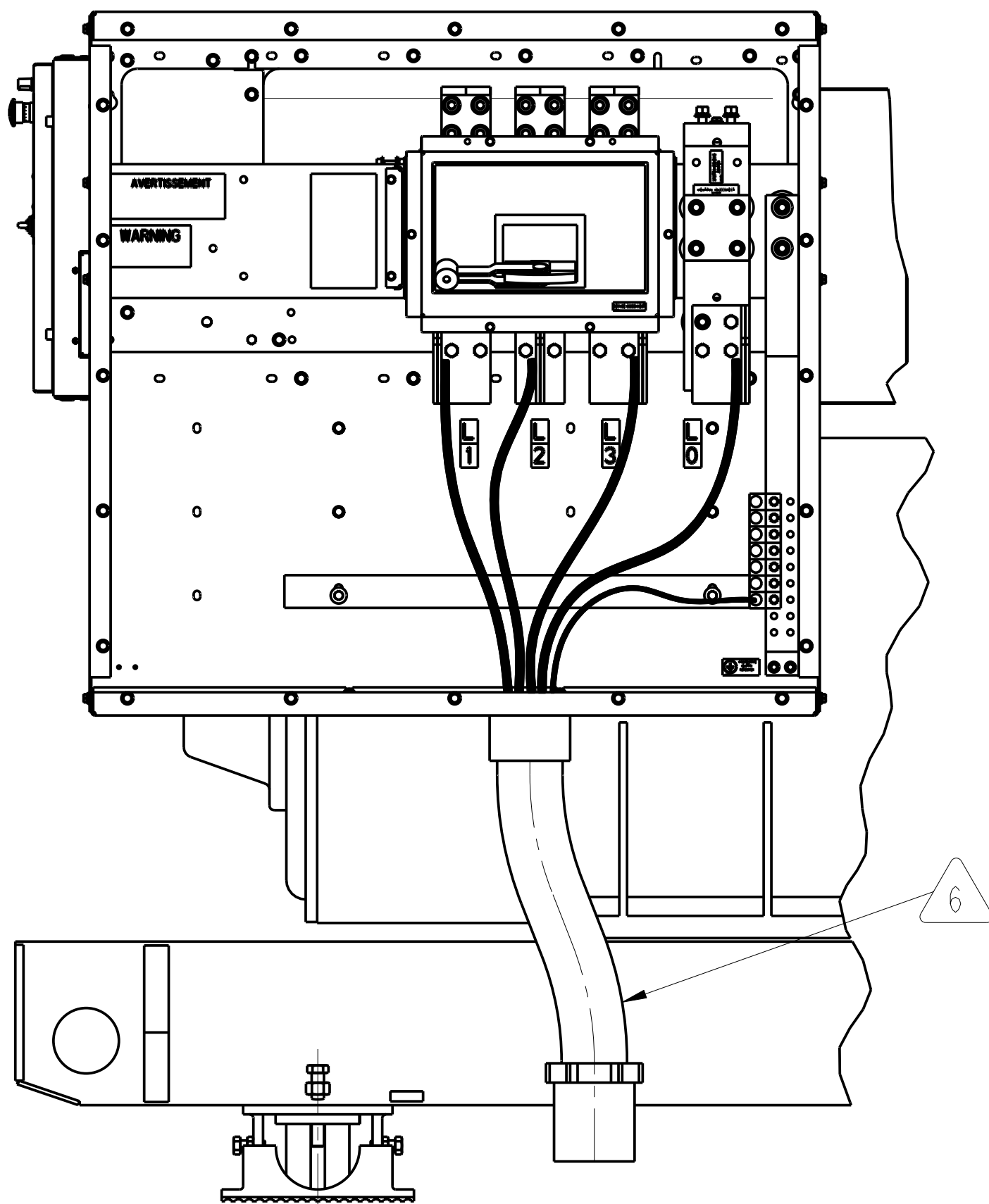
VIEW B-B
TOP ENTRANCE
SCALE 3/32



RIGHT SIDE
TOP ENTRY ROUTING EXAMPLE
SCALE 1/8



VIEW C-C
BOTTOM ENTRANCE
SCALE 3/32



RIGHT SIDE
BOTTOM ENTRY ROUTING EXAMPLE
SCALE 1/8


UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS				SIM TO: A040V225	DWN: R. PAUTZKE		CUMMINS POWER GENERATION	
DO NOT SCALE PRINT					CKD: P. HERRLEY		OUTLINE, GENSET (CIRCUIT BREAKER 23L)	
					APVD: J. BRODY			
					DATE: 09SEP16	SITE CODE:	PGF	DWG: A054F847
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TABLE 1

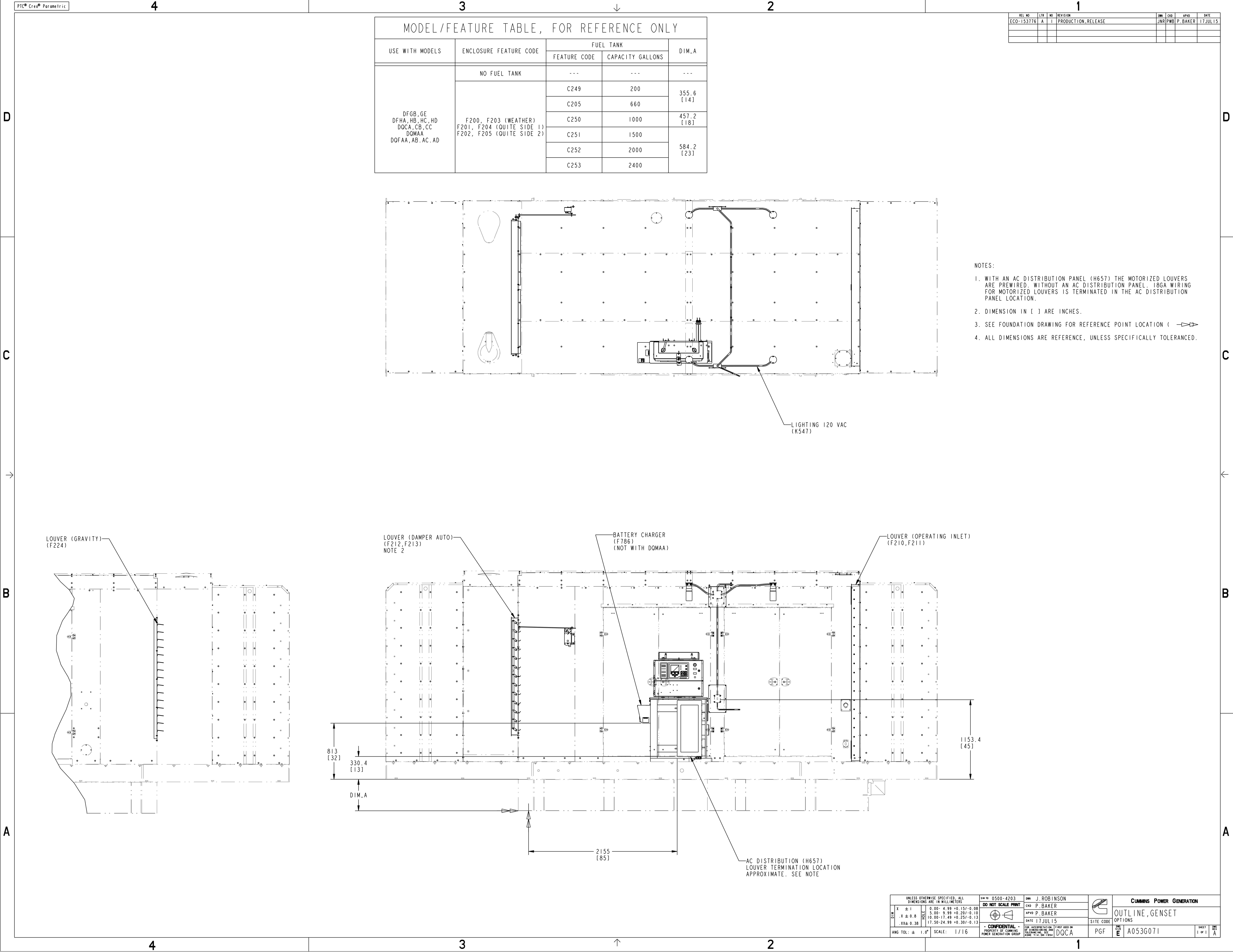
UL/IEC LUGS							ACCESSORY SPECIFICATIONS			
LUG	FRAME	MAX AMPS	WIRE RANGE COPPER	DIM D ±25 [1.0]	DIM E ±25 [1.0]	DIM F ±25 [1.0]	ACCESSORY DESCRIPTION	CONTACT RATING	INRUSH	CONNECTION TYPE
	SQUARE D NLGL W/ MICROLOGIC 3.3S TRIP UNIT	600A 3-POLE	2/0-350 KCMIL	554 [21.8]	1092 [43.02]	351.1 [13.82]	24 VDC SHUNT TRIP	-----	10A	COMPRESSION TERMINALS #20-16 AWG OR SMALLER TORQUE: 10 LB-IN
							1 EA. FORM C 1 AUX CONTACT + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125VDC, 0.3A AT 250 VDC	----	
	SQUARE D P 800 W/MICROLOGIC 5.0 TRIP UNIT	800A 3-POLE	3/0-500 KCMIL	599 [23.5]	1092 [43.02]	351.1 [13.82]	24 VDC SHUNT TRIP	-----	200VA	COMPRESSION TERMINALS FOR 1 OR 2 #18-14 AWG. TORQUE: 10 LB-IN
							1 EA. FORM C 1 AUX CONTACT + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125VDC, 0.3A AT 250 VDC	----	COMPRESSION TERMINALS FOR 1 OR 2 #18-16 AWG. TORQUE: 10 LB-IN
	1000AT/1200AF SQUARE D P 1200 W/MICROLOGIC 5.0 TRIP UNIT	1200A 3-POLE	3/0-500 KCMIL	556 [21.8]	1092 [43.02]	351.1 [13.82]	24 VDC SHUNT TRIP	-----	200VA	COMPRESSION TERMINALS FOR 1 OR 2 #18-14 AWG. TORQUE: 10 LB-IN
							1 EA. FORM C 1 AUX CONTACT + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125VDC, 0.3A AT 250 VDC	----	COMPRESSION TERMINALS FOR 1 OR 2 #18-16 AWG. TORQUE: 10 LB-IN
	SCHNEIDER ELECTRIC NW 3000/2500/2000/1600 (ELECTRICALLY OPERATED) 1600-3000 AMP BREAKERS BUS BARS STANDARD W/MICROLOGIC 5.0 TRIP UNIT	NEMA HOLE PATTERN		473.2 [18.63]	1242.6 [48.92]	201.1 [7.92]	24 VDC SHUNT TRIP	-----	200VA	PUSH-IN TERMINALS FOR 1 OR 2 #18-14 AWG.
							1 EA. FORM C 4 AUX CONTACT + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125VDC, 0.3A AT 250 VDC	----	PUSH-IN TERMINALS FOR 1 OR 2 #18-16 AWG.
	SQUARE D R 2500/2000/1600 3-POLE 1600-2500 AMP BUS BARS STANDARD W/MICROLOGIC 5.0 TRIP UNIT	NEMA HOLE PATTERN		490 [19]	1092 [43.02]	351.1 [13.82]	24 VDC SHUNT TRIP	-----	200VA	COMPRESSION TERMINALS FOR 1 OR 2 #18-14 AWG. TORQUE: 10 LB-IN
							1 EA. FORM C 4 AUX CONTACT + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125VDC, 0.3A AT 250 VDC	----	COMPRESSION TERMINALS FOR 1 OR 2 #18-16 AWG. TORQUE: 10 LB-IN
	SCHNEIDER ELECTRIC NW 3000/2500/2000/1600 (ELECTRICALLY OPERATED) W/OPTIONAL LUG 1600-3000AMP BREAKERS TORQUE 375 IN LBS [42 Nm]	#2-600 KCMIL		473.2 [18.63]	1242.6 [48.92]	201.1 [7.92]	24 VDC SHUNT TRIP	-----	200VA	PUSH-IN TERMINALS FOR 1 OR 2 #18-16 AWG.
							1 EA. FORM C 4 AUX CONTACT + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125VDC, 0.3A AT 250 VDC	----	PUSH-IN TERMINALS FOR 1 OR 2 #18-16 AWG.
	SQUARE D R 2500/2000/1600 W/OPTIONAL LUG 1600-2500 AMP BREAKERS TORQUE 375 IN LBS [42 Nm]	#2-600 KCMIL		490 [19]	1092 [43.02]	351.1 [13.82]	24 VDC SHUNT TRIP	-----	200VA	COMPRESSION TERMINALS FOR 1 OR 2 #18-14 AWG. TORQUE: 10 LB-IN
							1 EA. FORM C 4 AUX CONTACT + 1 TRIP ALARM	6A AT 240 VAC, 6A AT 480 VAC, 3A AT 600 VAC, 2.5A AT 48 VDC, 0.8A AT 125VDC, 0.3A AT 250 VDC	----	COMPRESSION TERMINALS FOR 1 OR 2 #18-16 AWG. TORQUE: 10 LB-IN

TABLE 2

TYPICAL CONDUIT AND WIRE SIZE BASED ON NEC 2014,ARTICLE 310.15, TABLES 310.15 (B)(16) AND 310.15 (B)(3)(a),FOR 90C TEMPERATURE RATED CONDUCTOR AT 30C AMBIENT, AND ANNEX C WITH 4 CURRENT-CARRYING CONDUCTORS IN EACH CONDUIT					
MAX BRKR AMPS	WIRE (COPPER)		CABLE AMPACITY	TOTAL NUMBER OF CONDUITS	
	QTY	SIZE		QTY	SIZE (IN INCHES)
3000A	8	600 KCMIL	380	8	4
2500A	7	600 KCMIL	380	7	4
2000A	6	500 KCMIL	344	6	4
1600A	6	350 KCMIL	280	6	3 1/2
1200A	4	400 KCMIL	304	4	3 1/2
800A	3	350 KCMIL	280	3	3
600A	3	4/0 AWG	208	3	3
TYPICAL CONDUIT AND WIRE SIZE BASED ON NEC 2014, ARTICLE 310.15 AND TABLE 310-16 FOR 90C TEMPERATURE RATED CONDUCTOR AT 40C AMBIENT AND ANNEX C					
MAX BRKR AMPS	WIRE (COPPER)		CABLE AMPACITY	TOTAL NUMBER OF CONDUITS	
	QTY	SIZE		QTY	SIZE (IN INCHES)
3000A	8	700 KCMIL	379	8	4
2500A	8	500 KCMIL	313	8	4
2000A	8	350 KCMIL	255	8	3
1600A	7	300 KCMIL	233	7	3
1200A	4	500 KCMIL	313	4	4
800A	4	250 KCMIL	211	4	3
600A	3	250 KCMIL	211	3	3

TABLE 3

GENSET MODEL	ALTERNATOR MODEL	DIM "A"
<input type="checkbox"/> DQCA <input type="checkbox"/> DQCB <input type="checkbox"/> DQCC	<input type="checkbox"/> HC634G	115.3 [4.54]
	<input type="checkbox"/> HC634H	115.3 [4.54]
	<input type="checkbox"/> HC634J	115.3 [4.54]
	<input type="checkbox"/> HC634K	14.3 [.56]



A034L228

FEATURE CODE
F202F205
OPTIONAL FEATURE
CODE K074,K102

Does not include fuel tank, see pg 58

TABULATION

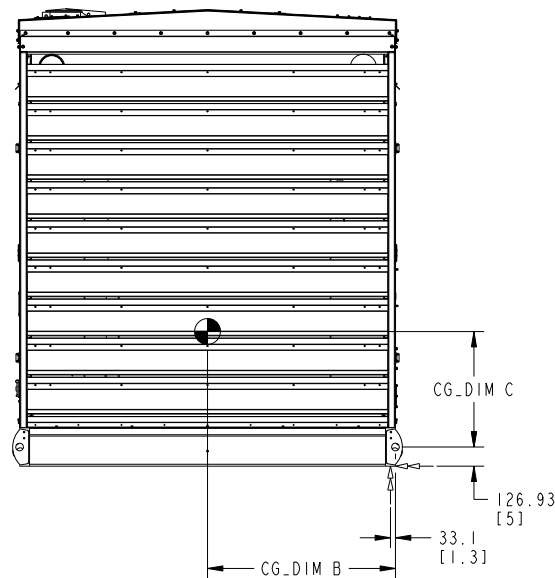
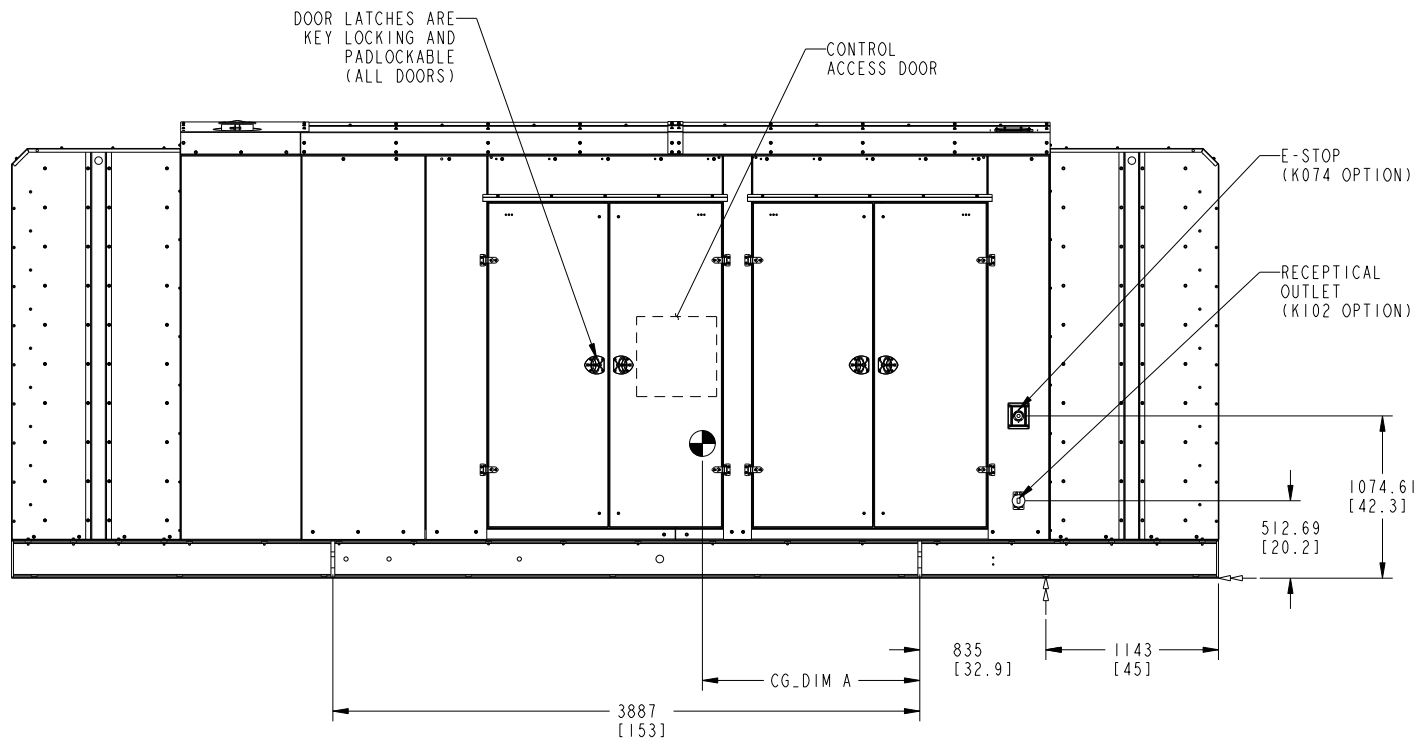
MODEL	GENERATOR	KW	STEEL ENCLOSURE WEIGHT KG (LBS) ±5%	ALUMINUM ENCLOSURE WEIGHT KG (LBS) ±5%	CG_DIM "A"	CG_DIM "B"	CG_DIM "C"	DIM.D ± 75 [3]
DQCA, DQCB DQCC	HC6G		12339 [27202]	10884 [23994]	2038 [80.2]	1244.7 [49]	846 [33.3]	1529 [60]
	HC6H		12489 [27533]	11034 [24325]	2021 [79.6]		845 [33.3]	
	HC6J		12644 [27875]	11189 [24667]	2019 [79.5]		844 [33.2]	
	HC6K		12917 [28477]	11462 [25269]	2031 [80]		842 [33.1]	
DFGB, DFGE	HC5E		11373 [25074]	9918 [21866]	2199 [86.6]		1093 [43]	1490 [59]
	HC5F		11555 [25474]	10097 [22260]	2126 [83.7]		1057 [41.6]	
	HC6G		12008 [26474]	10553 [23266]	2080 [81.9]		1054 [41.5]	
	HC6H		12076 [26624]	10621 [23416]	2052 [80.8]		1054 [41.5]	1599 [63]
	HC6J		12371 [27274]	10916 [24066]	2020 [79.5]		1053 [41.5]	
	HC6G		12634 [27853]	11179 [24645]	2065 [81.3]		794 [31.3]	
DFHA, DFHB DFHC, DFHD DQFAA, DQFAB DQFAC, DQFAD	HC6H		12872 [28377]	11417 [25169]	2041 [80.4]		791 [31.1]	1570 [62]
	HC6J		13095 [28869]	11640 [25661]	2017 [79.4]		788 [31]	
	HC6K		13170 [29034]	11715 [25826]	2009 [79.1]		787 [31]	
	P7B		13256 [29224]	11801 [26016]	1960 [77.2]		786 [30.9]	1698 [67]
	P7C		13514 [29794]	12059 [26586]	1945 [76.6]		784 [30.9]	
	HC5F		11101 [24474]	9646 [21266]	2043 [80.4]		827 [32.6]	
DQPAA, DQPAB	HC6G		11173 [24632]	9718 [21425]	2059 [81.1]		826 [32.5]	1438 [56.6]
	HC6H		11411 [25157]	9956 [21949]	2081 [81.9]		823 [32.4]	


*** WEIGHT & CG'S ARE SHOWN WITH F202 STEEL ENCLOSURE, AND
STANDARD WET GENSET. ADDITION OF OTHER FEATURES MAY CHANGE THE WEIGHT.

REL NO	LTR	NO	REVISION	OWN	CND	APVD	DATE
ECO-133125	C	1	ADD DQPAA, DQPAB INFO TO TABULATION	CJF	KK	K KISHORE	12MAR13
		2	SEE SHEET 2	CJF	KK	K KISHORE	12MAR13
		3	SEE SHEET 2	CJF	KK	K KISHORE	12MAR13
		4	SEE SHEET 2	CJF	KK	K KISHORE	12MAR13
		5	SEE SHEET 2	CJF	KK	K KISHORE	12MAR13
		6	TITLE "OUTLINE, ENCLOSURE" WAS "ENCLOSURE, OUTLINE"	CJF	KK	K KISHORE	12MAR13

NOTES:

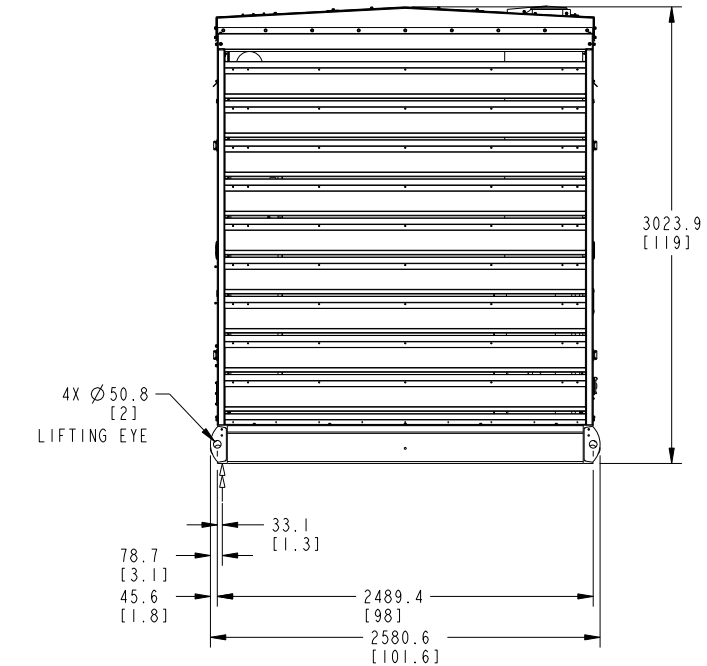
- DIMENSIONS SHOWN IN [] ARE INCHES.
- FOUNDATION REFERENCE POINT (—∞—).
SEE FOUNDATION DRAWING FOR DETAILS.



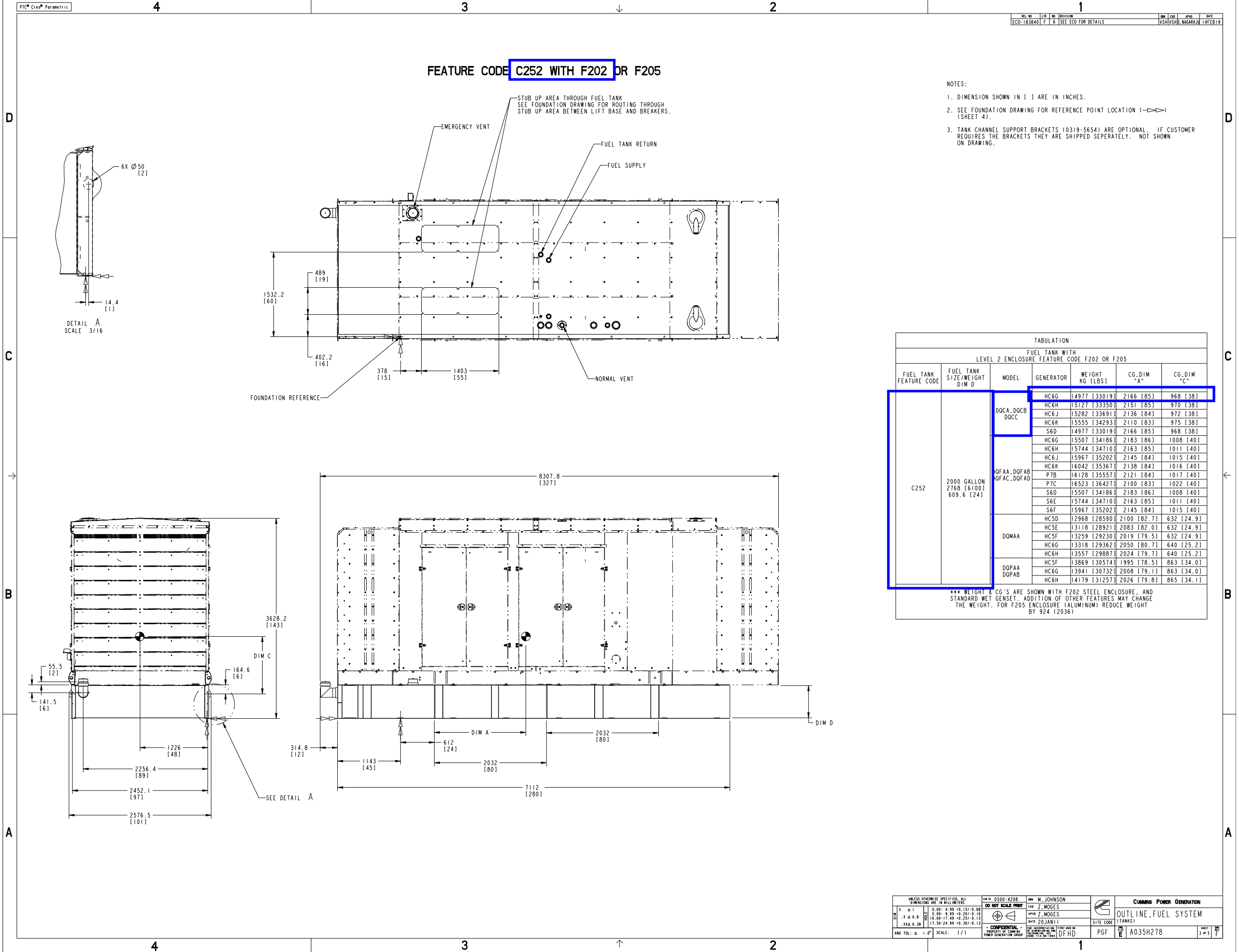
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS				SIN 10 0500-4147	DWN D.CARPENTER		CUMMINS POWER GENERATION				
DO NOT SCALE PRINT				CND Z.MOGES	APVD Z.MOGES		OUTLINE, ENCLOSURE (LEVEL 2)				
DATE 23JUL10				SITE CODE		PGF					
ANG TOL: ± 1.0°				SCALE: 3/64		DQCA					
FIRST USED ON POWER GENERATION GROUP				DQCA		A034L228					

REL NO	LTR	NO	REVISION	OWN	CND	APVD	DATE
ECO-133125	C	2	EXHAUST---DOPAB WAS EXHAUST---DOMAA	CJF	KK	K KISHORE	12MAR13
		3	RMV DOMAA FROM EXHAUST---DOPAB	CJF	KK	K KISHORE	12MAR13
		4	EXHAUST---DOFAD WAS EXHAUST---DOCC	CJF	KK	K KISHORE	12MAR13
		5	ADD DIMS 2X 1495.3 [59], 307.3 [12], 325.4 [13]	CJF	KK	K KISHORE	12MAR13

EXHAUST OUTLET
DFGB, DFGE, DFHA,
DFHB, DFHC, DFHD,
DOCA, DOCB, DOCC,
DOFAA, DOFAB, DOFAC,
DOFAD



UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS				SIM NO 0500-4147	OWN D.CARPENTER	CUMMINS POWER GENERATION	OUTLINE, ENCLOSURE (LEVEL 2)	SHEET 2 OF 2	REV C
CH	X ± 3	NOTE	0.00- 4.99 +0.15/-0.08	DO NOT SCALE PRINT	CND Z.MOGES				
	.X ± 0.8		5.00- 9.99 +0.20/-0.10		APVD Z.MOGES	SITE CODE	PGF	D	A034L228
	.XX ± 0.38		10.00-17.49 +0.25/-0.13		DATE 23JUL10				
			17.50-24.99 +0.30/-0.13						
ANG TOL: ± 1.0°				SCALE: 3/64	FOR INTERPRETATION OF DIMENSIONS AND TOLERANCING, SEE ASME Y14.5M-1994				

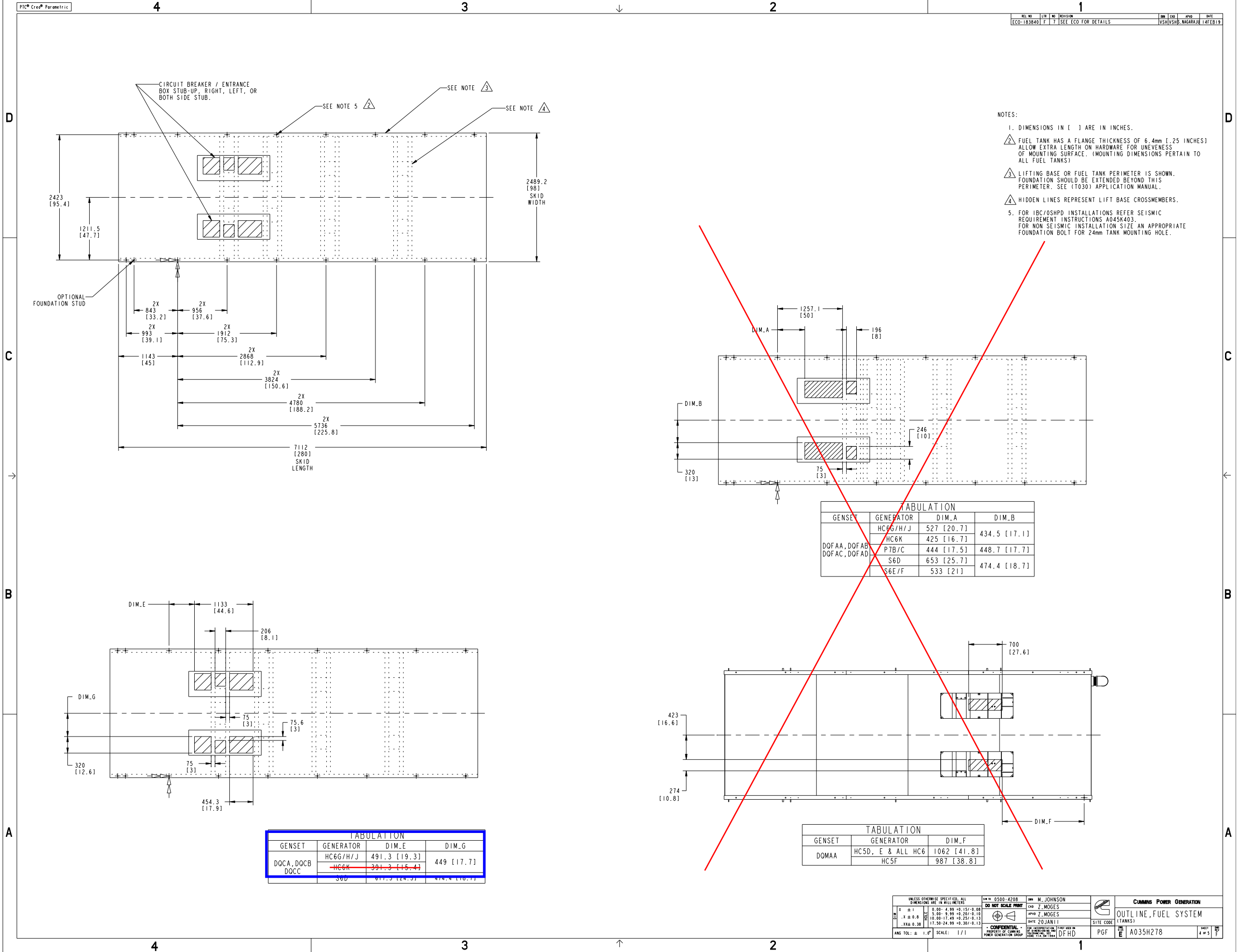


FEATURE CODE C252 WITH F202 OR F205

- NOTES:
1. DIMENSION SHOWN IN [] ARE IN INCHES.
 2. SEE FOUNDATION DRAWING FOR REFERENCE POINT LOCATION (—>—) (SHEET 4).
 3. TANK CHANNEL SUPPORT BRACKETS (0319-5654) ARE OPTIONAL. IF CUSTOMER REQUIRES THE BRACKETS THEY ARE SHIPPED SEPERATELY. NOT SHOWN ON DRAWING.

TABULATION						
FUEL TANK WITH LEVEL 2 ENCLOSURE FEATURE CODE F202 OR F205						
FUEL TANK FEATURE CODE	FUEL TANK SIZE/WEIGHT DIM D	MODEL	GENERATOR	WEIGHT KG [LBS]	CG_DIM "A"	CG_DIM "C"
C252	2000 GALLON 2768 [6100] 609.6 [241]	DOCA, DOCB DOCC	HC6G	14977 [33019]	2166 [85]	968 [38]
			HC6H	15127 [33350]	2151 [85]	970 [38]
			HC6J	15282 [33691]	2136 [84]	972 [38]
			HC6K	15555 [34293]	2110 [83]	975 [38]
			S6D	14977 [33019]	2166 [85]	968 [38]
			HC6G	15507 [34186]	2183 [86]	1008 [40]
		DOFAA, DOFAB DOFAC, DOFAD	HC6H	15744 [34710]	2163 [85]	1011 [40]
			HC6J	15967 [35202]	2145 [84]	1015 [40]
			HC6K	16042 [35367]	2138 [84]	1016 [40]
			P7B	16128 [35557]	2121 [84]	1017 [40]
			P7C	16523 [36427]	2100 [83]	1022 [40]
			S6D	15507 [34186]	2183 [86]	1008 [40]
		DOMAA	S6E	15744 [34710]	2163 [85]	1011 [40]
			S6F	15967 [35202]	2145 [84]	1015 [40]
			HC5D	12968 [28590]	2100 [82.7]	632 [24.9]
			HC5E	13118 [28921]	2083 [82.0]	632 [24.9]
			HC5F	13259 [29230]	2019 [79.5]	632 [24.9]
			HC6G	13318 [29362]	2050 [80.7]	640 [25.2]
		DOPAA DOPAB	HC6H	13557 [29887]	2024 [79.7]	640 [25.2]
			HC5F	13869 [30574]	1995 [78.5]	863 [34.0]
			HC6G	13941 [30732]	2008 [79.1]	863 [34.0]
			HC6H	14179 [31257]	2026 [79.8]	865 [34.1]
*** WEIGHT & CG'S ARE SHOWN WITH F202 STEEL ENCLOSURE, AND STANDARD WET GENSET. ADDITION OF OTHER FEATURES MAY CHANGE THE WEIGHT. FOR F205 ENCLOSURE (ALUMINUM) REDUCE WEIGHT BY 924 (2036)						

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS		REV NO 0500-4208	REV M. JOHNSON	CUMMINS POWER GENERATION	
DO NOT SCALE PRINT		CHK Z. MOGES	APPD Z. MOGES	OUTLINE, FUEL SYSTEM (TANKS)	
DATE 20 JAN 11		SITE CODE		PGF	
ANG TOL: ± 1.0°		SCALE: 1/1		E A035H278	
CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP		DATE 20 JAN 11		SHEET 3 OF 5	



- NOTES:
1. DIMENSIONS IN [] ARE IN INCHES.
 2. FUEL TANK HAS A FLANGE THICKNESS OF 6.4mm [.25 INCHES] ALLOW EXTRA LENGTH ON HARDWARE FOR UNEVENNESS OF MOUNTING SURFACE. (MOUNTING DIMENSIONS PERTAIN TO ALL FUEL TANKS)
 3. LIFTING BASE OR FUEL TANK PERIMETER IS SHOWN. FOUNDATION SHOULD BE EXTENDED BEYOND THIS PERIMETER. SEE (T030) APPLICATION MANUAL.
 4. HIDDEN LINES REPRESENT LIFT BASE CROSSMEMBERS.
 5. FOR IBC/OSHPD INSTALLATIONS REFER SEISMIC REQUIREMENT INSTRUCTIONS A04SK403. FOR NON SEISMIC INSTALLATION SIZE AN APPROPRIATE FOUNDATION BOLT FOR 24mm TANK MOUNTING HOLE.

TABULATION			
GENSET	GENERATOR	DIM.A	DIM.B
DOFAA, DOFAB DOFAC, DOFAD	HC6G/H/J	527 [20.7]	434.5 [17.1]
	HC6K	425 [16.7]	
	P7B/C	444 [17.5]	448.7 [17.7]
	S6D	653 [25.7]	474.4 [18.7]
	S6E/F	533 [21]	

TABULATION		
GENSET	GENERATOR	DIM.F
DOMAA	HC5D, E & ALL HC6	1062 [41.8]
	HC5F	987 [38.8]

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DO NOT SCALE PRINT
X ± 1 0.00-4.99 +0.15/-0.00
X ± 0.8 5.00-9.99 +0.20/-0.10
X ± 0.6 10.00-17.49 +0.25/-0.13
X ± 0.38 17.50-24.99 +0.30/-0.13
ANG TOL: ± 1.0°
SCALE: 1/1

REV NO 0500-4208
DESIGNED BY M. JOHNSON
CHECKED BY Z. MOGES
APPROVED BY Z. MOGES
DATE 20 JAN 11
CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP
FOR INTERPRETATION, FIRST USED ON 12/14/04
CUMMINS POWER GENERATION GROUP

CUMMINS POWER GENERATION

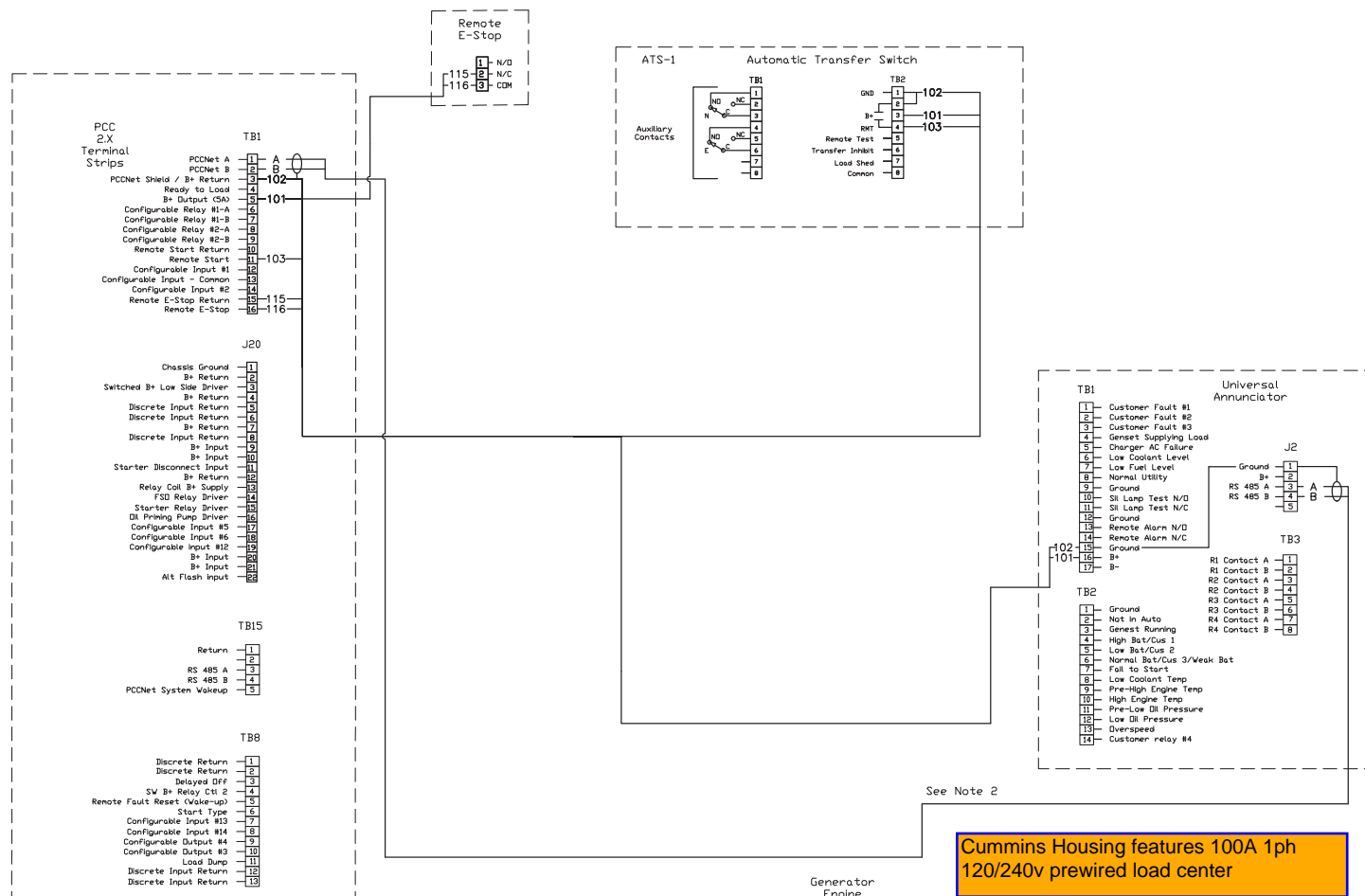
OUTLINE, FUEL SYSTEM (TANKS)

SITE CODE PGF E

REV E

A035H278

SHEET 4 OF 5



Project: Wiring Diagram

Title: Wiring Diagram

AUTHOR: D. Fields

Date: 28-JAN-2016

Revision: L

Sheet: 1 of 1



Cummins Sales and Service – Central Region

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: _____

Cell: _____ Phone: _____

Email: _____

EQUIPMENT INFORMATION

Generator Model: _____

Generator Serial Number: _____

ATS Model: _____

ATS Serial Number: _____

ON SITE INFORMATION

On-Site Contact Information: _____

Address: _____

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

Does the facility have the following: Loading Dock Elevator

Access (from vehicle parking to generator): _____

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 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

DIESEL FUELED GENERATORS

YES NA NO

YES	NA	NO
YES	NA	NO
YES	NA	NO
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

YES	NA	NO
YES	NA	NO
YES	NA	NO
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

YES	NA	NO
YES	NA	NO
YES	NA	NO
YES	NA	NO
YES	NA	NO
YES	NA	NO
YES	NA	NO
YES	NA	NO
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

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 Onan/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 within 10 business days prior to confirming schedule startup. I understand that the start-up date may have to be rescheduled at my expense if the above items have not been completed properly.