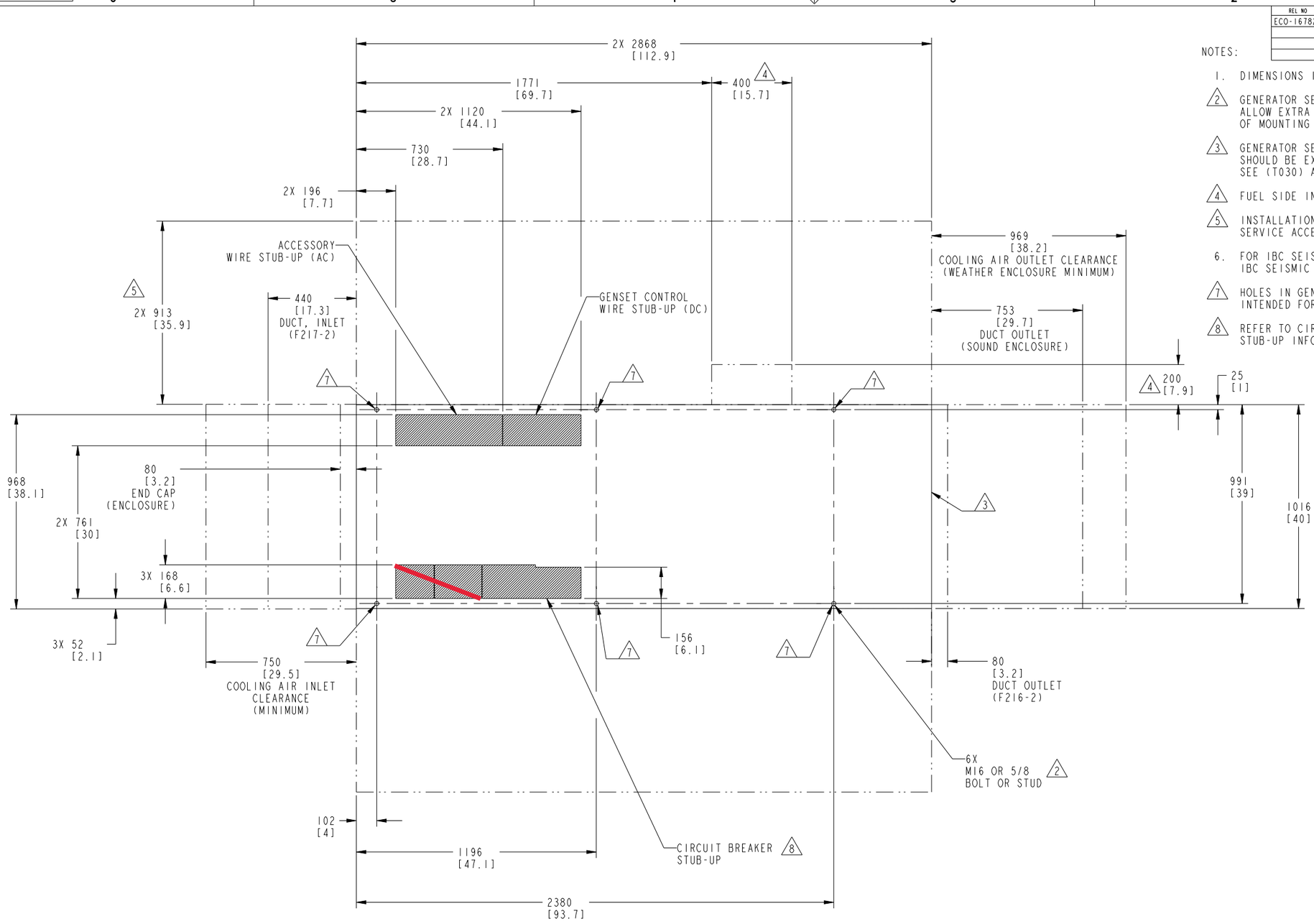
PTC® Creo® Parametric

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-167824	B	1	PRODUCTION_RELEASE	AGJ	AGJ	CHINTHALURI	06FEB17
		2	ZONE D4; RMV DIM 217.1 [85.5]	AGJ	AGJ	CHINTHALURI	06FEB17

NOTES:

1. DIMENSIONS IN [ ] ARE IN INCHES.
2. GENERATOR SET BASE HAS A FLANGE THICKNESS OF 3.42 MM. ALLOW EXTRA LENGTH ON HARDWARE FOR UNEVENESS OF MOUNTING SURFACE.
3. GENERATOR SET BASE PERIMETER IS SHOWN. FOUNDATION SHOULD BE EXTENDED BEYOND THIS PERIMETER. SEE (T030) APPLICATION MANUAL.
4. FUEL SIDE INLET CLEARANCE.
5. INSTALLATION AND REMOVAL LIFTING AND SERVICE ACCESS CLEARANCE (SUGGESTED MINIMUM).
6. FOR IBC SEISMIC CERTIFIED INSTALLATION. SEE GENSET IBC SEISMIC INSTALLATION REQUIREMENTS DRAWING.
7. HOLES IN GENERATOR SET BASE AT THESE LOCATIONS ARE INTENDED FOR ATTACHMENT TO THE MOUNTING SURFACE.
8. REFER TO CIRCUIT BREAKER OUTLINE DRAWING FOR COMPLETE ELECTICAL STUB-UP INFORMATION FOR SPECIFIC BREAKERS AND BREAKER POSITIONS.



GENSET MODEL APPLICATION
C125 N6
C150 N6

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS	SIM TO .	DWN A_JOHNSON		CUMMINS POWER GENERATION	
DIM: X ±1, .X ±0.8, .XX± 0.38 — HOLE: 0.00- 4.99 +0.15/-0.08, 5.00- 9.99 +0.20/-0.10, 10.00-17.49 +0.25/-0.13, 17.50-24.99 +0.30/-0.13	DO NOT SCALE PRINT	CKD A_JOHNSON		OUTLINE, GENSET FOUNDATION	
		APVD A_CHINTHALURI			
		DATE 21SEP16		SITE CODE	
ANG TOL ± 1.0°	SCALE 1:10	FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009	FIRST USED ON ARROW	PGF	SIZE D — A055J590 — CAD SHEET 1 OF 1

Generator Package Weight

	Weight in Pounds	Weight in Kilograms
Generator Wet Weight (oil & coolant)	3,375.00	1,530.87
Enclosure & Exhaust Silencer	136.00	61.69
Accessories	51.70	23.45

	Weight in Pounds	Weight in Kilograms
Total Weight	**3,562.70**	**1,616.01**

Generator Package Dimensions

	Length	Width	Height
Overall Dimensions (Inches)	112.9	40	55.3

	Length	Width
Footprint On Pad (Inches)	112.9	40

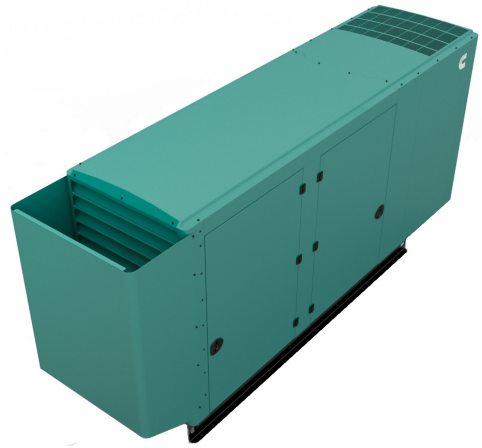
*The overall pad dimensions must be greater than the equipment footprint and shall be determined by others.

**These dimensions do not include door swing clearances or inlet/outlet air clearances, which must be accounted for.

Specification sheet

Spark-ignited generator set

125 & 150 kW standby
EPA emissions



Description

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

Features

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

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

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

Cooling system - Standard cooling package provides reliable running at up to 50 ℃ (122 ℉) ambient temperature.

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

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

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

	Natural Gas		
	Standby (60 Hz)		Data sheets
Model	kW	kVA	60 Hz
C125 N6	125	156	NAD-6303
C150 N6	150	188	NAD-6304

Generator set specifications

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

Engine specifications

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

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	120 ºC (248 °F) standby
Exciter type	Torque match (shunt) with PMG as option
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3%

Available voltages

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

Generator set options

Fuel system
- ☐ Low fuel gas pressure warning

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

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

Control
- ☐ AC output analog meters
- ☐ Stop switch – emergency
- ☐ Auxiliary output relays (2)
- ☐ Auxiliary configurable signal inputs (8) and relay outputs (8)

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

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

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

Exhaust system
- ☐ Exhaust connector NPT
- ☐ Exhaust muffler mounted

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

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

Generator set accessories

- ☐ Coolant heaters – 1000W / 1500W
- ☐ Battery rack, single or dual battery
- ☐ Battery heater kit
- ☐ Engine oil heater
- ☐ Remote control displays
- ☐ Auxiliary output relays (2)
- ☐ Auxiliary configurable signal inputs (8) and relay outputs (8)
- ☐ Annunciator – RS485
- ☐ Remote monitoring device – PowerCommand 500/550
- ☐ Battery charger – stand-alone, 12V
- ☐ Circuit breakers
- ☐ Enclosure Sound Level 1 to Sound Level 2 upgrade kit
- ☐ Base barrier – elevated generator set
- ☐ Mufflers – industrial, residential, or critical
- ☐ Alternator PMG
- ☐ Alternator heater

Control system PowerCommand 2.3

PowerCommand® 2.3 control - An integrated generator set control system providing voltage regulation, engine protection and operator interface.
Control - Provides battery monitoring and testing features and smart-starting control system.

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

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

Control boards - Potted for environmental protection.

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

AC Protection

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

Engine protection

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

Operator/display panel

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

Alternator data

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

Engine data

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

Other data

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

Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

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

Control functions

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

Options

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

Ratings definitions

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

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

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

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

Codes and standards

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

	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.		This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.
			The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.
International Building Code	The generator set is certified to International Building Code (IBC) 2012.		All low voltage models are CSA certified to product class 4215-01.
		U.S. EPA	Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.

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

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Minneapolis, MN 55432
USA

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Fax 763 574 5298

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NAS-6298-EN (11/17) A057Y417

power.cummins.com

Generator Set Data Sheet

Model: C150 N6
Frequency: 60 Hz
Fuel type: Natural gas
kW rating: 150 Natural gas standby

Emissions level: EPA Emissions

Fuel consumption

	Natural gas Standby				
	kW (kVA)				
Ratings	150 (188)				
Load	**1/4**	**1/2**	**3/4**	**Full**	
scfh	750.2	1175.7	1545.7	1907.9	
m^3/hr	21.25	33.30	43.77	54.03	

Engine

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

Fuel supply pressure

Minimum operating pressure, kPa (in H_2O)	1.5 (6)
Maximum operating pressure, kPa (in H_2O)	3.5 (13)

Air

Combustion air, m^3/min (scfm)	13.4 (474)
Maximum normal duty air cleaner restriction, kPa (in H_2O)	0.37 (1.5)
Maximum heavy duty air cleaner restriction, kPa (in H_2O)	3.7 (15.0)

Exhaust

Exhaust flow at set rated load, m^3/min (cfm)	39.2 (1386)
Exhaust temperature at set rated load, °C (°F)	635 (1175)
Maximum back pressure, kPa (inH_2O)	9 (36.1)

Standard set-mounted radiator cooling	Natural gas Standby rating
Ambient design, ℃ (℉)	45 (113)
Fan load, kWm (HP)	10.3 (13.8)
Coolant capacity (with radiator), L (US gal)	26 (6.9)
Cooling system air flow, m^3/min (scfm)	249.2 (8800)
Maximum cooling air flow static restriction, kPa (inH_2O)	0.125 (0.5)

Derating factors

Natural gas

Standby	Engine power available up to 885 m (2900 ft) at ambient temperatures up to 40 ℃ (104 ℉). Above these elevations derate at 4.5% per 300 m (985 ft) and 1.5% per 10 ℃ (18 ℉).

Ratings definitions

Emergency standby power (ESP)	Limited-time running power (LTP)	Prime power (PRP)	Base load (continuous) power (COP)
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

Alternator data

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

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

Formulas for calculating full load currents:

Three phase output

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

Single phase output

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

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NAS-6304-EN (04/18) A058H646

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Alternator data sheet

Frame size: UC3F

Characteristics

Weights:	Wound stator assembly:	337 lb	153 kg
	Rotor assembly:	419 lb	190 kg
	Complete alternator:	1175 lb	533 kg
Maximum speed:		2250 rpm	
Excitation current:	Full load:	2 Amps	
	No load:	0.5 Amps	
Insulation system:	Class H throughout		

1 Ø Ratings (1.0 power factor)		60 Hz				50 Hz		
(Based on specific temperature rise at 40 ℃ ambient temperature)		Double delta		4 lead		Double delta		
		120/240		120/240		110-120 220-240		
125 ℃ rise ratings	kW/kVA	109/109		135/135		96/96		
105 ℃ rise ratings	kW/kVA	98/98		125/125		87/87		
3 Ø Ratings (0.8 power factor)		Upper broad range		LBR*	347/600	Broad range		
(Based on specified temperature rise at 40 ℃ ambient temperature)		120/208 240/416	139/240 277/480	190-208 380-416	347/600	110/190 220/380	120/208 240/415	127/220 254/440
150 ℃ Rise ratings	kW	150	170	148	170	136	136	128
	kVA	188	213	185	213	170	170	160
125 ℃ Rise ratings	kW	145	165	144	165	128	128	120
	kVA	181	206	180	206	160	160	150
105 ℃ Rise ratings	kW	130	150	128	150	116	116	108
	kVA	163	188	160	188	145	145	135
80 ℃ Rise ratings	kW	112	128	110	128	101	101	94
	kVA	140	160	138	160	126	126	118
3 Ø Reactances (per unit, ±10%)								
(Based on full load at 105 ℃ rise rating)								
Synchronous		2.21	1.92	1.68	1.97	2.04	1.71	1.42
Transient		0.18	0.15	0.14	0.16	0.17	0.15	0.12
Subtransient		0.13	0.11	0.09	0.10	0.12	0.10	0.09
Negative sequence		0.14	0.12	0.10	0.11	0.13	0.11	0.09
Zero sequence		0.08	0.07	0.07	0.07	0.08	0.07	0.06
3 Ø Motor starting								
Maximum kVA	(Shunt)	516		516	516	367		
(90% sustained voltage)	(PMG)	607		607	607	458		
Time constants (Sec)								
Transient		0.035		0.035	0.035	0.035		
Subtransient		0.011		0.011	0.011	0.011		
Open circuit		0.900		0.900	0.900	0.900		
DC		0.009		0.009	0.009	0.009		

Alternator data sheet

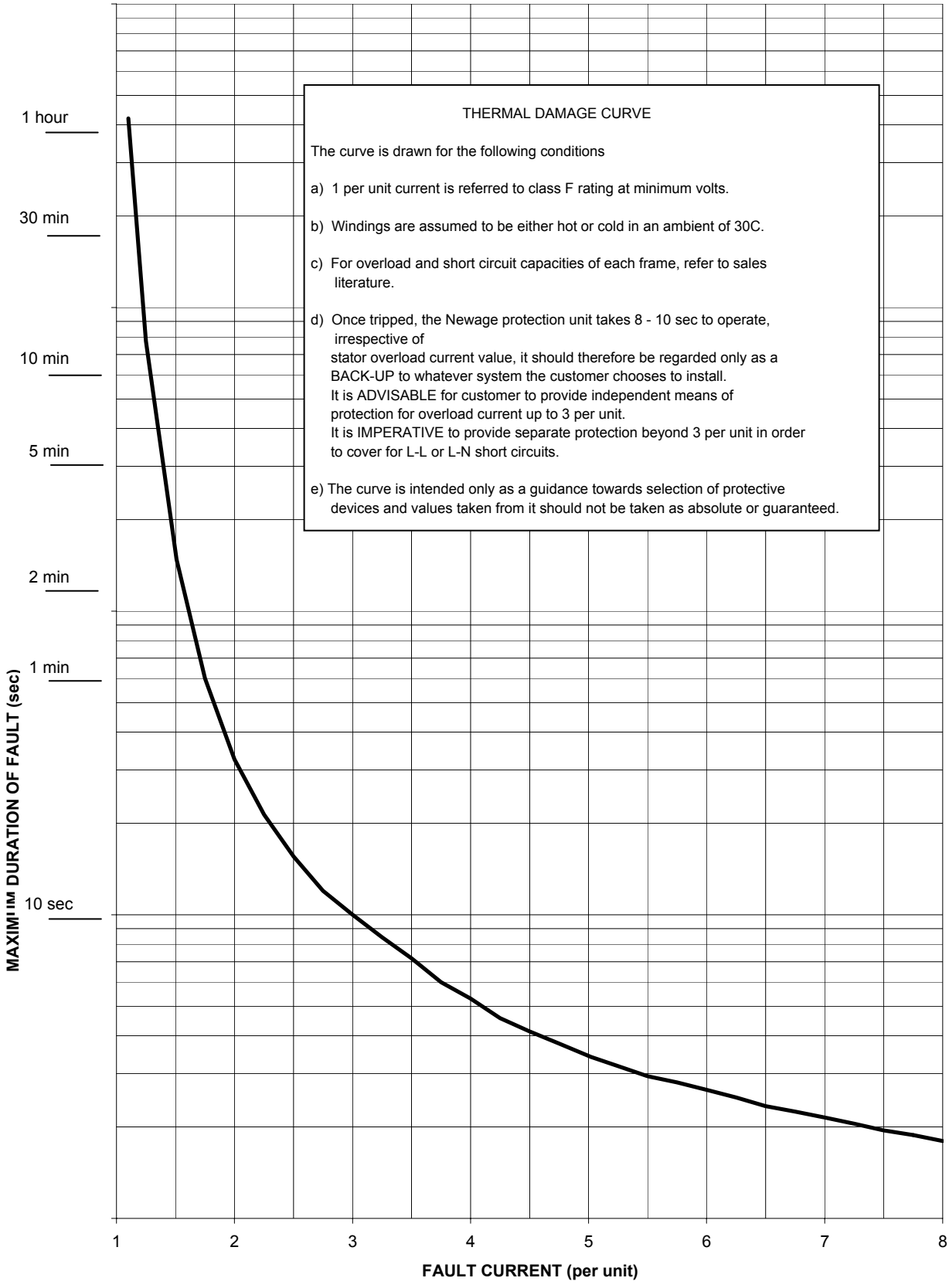
Frame size: UC3F

Windings	(@ 20° C)				
Stator resistance	(Line to Line, Ohms)	0.0480	0.0400	0.0700	0.0480
Rotor resistance	(Ohms)	0.0480	0.0400	0.0700	0.0480
Number of leads		12	12	6	12

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

NEWAGE INTERNATIONAL

THERMAL DAMAGE CURVE



Prototype Test Supported Emergency/Standby Generator Sets Certification

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

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

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

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

1. Confirm the engine and generator have reserve capacity beyond rating to minimize the potential of damage or shutdown during steady state or transient loading conditions, including momentary overloads.

2. Demonstrate generator set, controls and accessories capability to perform reliably and compatibly in service during disturbances common in actual load circuits.

3. Verify the integrity of the generator and excitation system insulation systems and electrical components to withstand heating under rated load and transient overcurrent conditions.

4. Evaluate generator set mechanical and electrical strength to perform without damage during abnormal operating conditions, such as short circuits or out-of-phase paralleling. While operating at rated load, the generator set must be subjected to several 3-phase short circuits of 20 second duration. After the tests, the generator set is inspected to verify that no electrical or mechanical damage was incurred by any components.

5. Determine by endurance testing that no resonance conditions exist in the generator set or accessories that will cause premature failure of components on production units.

6. Investigate and identify failure modes to minimize the risk of any single component failure or human error that could lead to lack of essential electrical supply.

7. Provide a margin of safety, by actual trials, between the generator set component design and protection systems so that the components are not damaged before the protective devices activate a shutdown.

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

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

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

PROTOTYPE TEST SUPPORT
(PTS)
60 Hz TEST SUMMARY

	REPRESENTATIVE PROTOTYPE	
C125 N6	Model:	C150 N6
C150 N6	Engine:	QSJ8.9G
	Alternator:	UC27J

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

Maximum Surge Power: 156.4 kW

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

Maximum Motor Starting: 220 kVA

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

Alternator Temperature Rise:

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

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

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 1650 to 1950 RPM.

Cooling System: 50 ℃ Ambient
0.5 in. H2O restriction

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

Durability:

The generator set was subjected to a minimum 1500 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

Steady State Performance:

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

Voltage Regulation:	± 1%
Random Voltage Variation:	± 1%
Frequency Regulation:	± Isochronous
Random Frequency Variation:	± 0.5%

Transient Performance:

The generator set was tested to verify single step loading capability as required by NFPA 110 and verify acceptable voltage and frequency response on load addition or rejection.
The following results were recorded at 0.8 power factor :

Full Load Acceptance:		
Voltage Dip:	27.8	%
Recovery Time:	3.6	Sec
Frequency Dip:	21.2	%
Recovery Time:	4.3	sec
Full Load Rejection:		
Voltage Rise:	31.3	%
Recovery Time:	0.8	sec
Frequency Rise:	14.9	%
Recovery Time:	4.1	sec

Harmonic Analysis:

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

	Line to Line		Line to Neutral	
Harmonic	No Load	Full Load	No Load	Full Load
3	0.0	0.1	0.0	0.1
5	0.8	1.2	0.8	1.2
7	0.7	2.2	0.7	2.1
9	0.0	0.0	0.0	0.0
11	0.2	0.3	0.2	0.3
13	0.2	0.4	0.2	0.4
15	0.0	0.0	0.0	0.1

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.

Sound Data
C150 N6 60 Hz
Engine: QSJ8.9G

Sound Pressure Level @ 7 meters, dB(A)
See Notes 1-6 listed below

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

Sound Power Levels dB(A)
See Notes 2-4, 7, 8 Listed Below

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

Exhaust Sound Power Level, dB(A)
See Note 2 & 9 listed below

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

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

Data and Specification Subject to Change Without Notice

Cooling System Data
C150 N6
Engine- QSJ8.9G

High Ambient Air Temperature Radiator Cooling System

	Fuel Type	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	F216	F231	F217
				Maximum Allowable Ambient Temperature, Degree C							
60Hz	Natural Gas	Standby	150	55	55	55	N/A	N/A	47	46	45

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. Refer generator set data sheet for derate schedules.
4. Cooling performance may be reduced due to several factors including but not limited to: Incorrect installation, improper operation, fouling of the cooling system, and other site installation variables.

Specification May Change Without Notice

 MCP-2032-EN (8/17) A058G419

2018 EPA Exhaust Emission Compliance Statement
C150 N6
Standby
60 Hz Spark Ignited Generator Set

Compliance Information:

The engine used in this generator set complies with U.S. EPA emissions regulations under the provisions of 40 CFR Part 60, Stationary Emergency Spark-Ignited emissions limits when tested per ISO 8178 D1.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	JCEXB08.9ALB-007
Effective Date:	9/28/2017
Date Issued:	9/28/2017
EPA Engine Family (Cummins Emissions Family):	JCEXB08.9ALB

Engine Information:

Model:	QSJ8.9G	Bore:	4.49 in. (114 mm)
Engine Nameplate HP:	240	Stroke:	4.69 in. (145 mm)
Type:	4 Cycle, In-Line, 6 Cylinder	Displacement:	543.0 cu. in. (8.9 liters)
Aspiration:	Turbocharged and Aftercooled	Compression Ratio:	9.7:1
Emission Control Device:	Electronic Air/Fuel Ratio Control and Closed-Loop Breather System		

U.S. Environmental Protection Agency Station Emergency SI Emission Limits

	Grams per BHP-hr			Grams per kW_m-hr		
Natural Gas	**NOx**	**NMHC**	**CO**	**NOx**	**NMHC**	**CO**
Test Results	1.1	0.6	1.9	1.5	0.8	2.6
EPA Emissions Limit	2.0	1.0	4.0	2.7	1.3	5.4

	Grams per BHP-hr			Grams per kWm-hr		
Propane (LP)	**NOx**	**NMHC**	**CO**	**NOx**	**NMHC**	**CO**
Test Results	N/A	N/A	N/A	N/A	N/A	N/A
EPA Emissions Limit	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

Tests conducted using alternate methods, instrumentation, fuel or reference conditions can yield different results.

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Exhaust Emission Data Sheet
C150 N6
60 Hz Spark Ignited Generator Set
EPA Emissions

Engine Information:

Model:	Cummins QSJ8.9G	Bore:	4.49 in. (114.1 mm)
Type:	4 cycle, in-line, 6 cylinder diesel	Stroke:	5.69 in. (144.5 mm)
Aspiration:	Turbocharged and Aftercooled	Displacement:	543 cu. in. (8.9 liters)
Compression Ratio:	9.7:1		
Emission Control Device:	Electronic Air/Fuel Ratio & Closed-Loop Breather System		

Performance Data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby
BHP @ 1800 RPM (60 Hz)	63.5	107.9	153.2	205.0
Fuel Consumption (gal/Hr)	680.7	1038.1	1362.2	1660.9
Exhaust Gas Flow (CFM)	460.0	750.0	995.0	1200.0
Exhaust Gas Temperature (°F)	1182.0	1206.0	1209.2	1196.6
Air to Fuel Ratio	22.8	23.8	24.2	24.0
Exhaust Emission Data				
HC (Total Unburned Hydrocarbons)*	0.7	0.8	0.7	0.6
NOx (Oxides of Nitrogen as NO_2)	0.7	0.5	0.6	1.0
CO (Carbon Monoxide)	2.3	2.2	2.1	1.9
				All values above are cited: g/BHP-hr
HC (Total Unburned Hydrocarbons)*	269.5	320.2	298.9	247.0
NOx (Oxides of Nitrogen as NO_2)	117.6	85.9	107.0	203.0
CO (Carbon Monoxide)	426.9	426.8	425.2	420.0
				All values above are cited: ppmvd

*HC includes NMHC, VOC, POC, and ROC constituents (Non-Methane HC, Volatile Organic Compounds, Precursor Organic Compounds and Reactive Organic Compounds.

Test Conditions

Data is representative of steady-state engine speed (± 25 RPM) with full load (±2%). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	Natural Gas: Dry gas received from Supplier (1000 BTU/SCF)
Fuel Temperature:	60 ± 9 °F at flow transmitter
Fuel Pressure:	14.73PSIA ± 0.5 PSIA at Flow Transmitter
Intake Air Temperature:	77 ± 9 °F
Barometric Pressure:	22.92 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H_2O/lb dry air

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

THE VMC GROUP
The Power of Together™

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certification No.

VMA-51070-01C (REVISION 06)

Expiration Date: 01/31/2020

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED[1] FOR SEISMIC APPLICATIONS in accordance with the following building code[2] releases.

IBC 2012, 2015

The following model designations, options, and accessories are included in this certification. Reference report number **VMA-51070-01** as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Cummins Power Generation, Inc.
Gas Generator Sets, C20-150N6 Series

The above referenced equipment is **APPROVED** for seismic application when properly installed[3], used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance[4]. 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 Dynamic Certification Laboratories under the review of the ISO Accredited Product Certification Agency, The VMC Group.

Certified Seismic Design Levels			
Certified **IBC**	**Importance I_P ≤ 1.5** Soil Classes A-E Risk Categories I-IV Design Categories A-F	**S_{DS} ≤ 2.500 g**	**S_{DS} ≤ 2.500 g**
		z/h = 0.0	**z/h ≤ 1.0**
		Horizontal Design[5] $\frac{F_p}{W_p} = 0.4 S_{DS} I_p \frac{a_p}{R_p}\left(1 + 2\frac{z}{h}\right) \leq$ **1.875 g**	
Test Datum **AC156**	ISO 17025 Laboratory Pre/Post-Shake Functionality Tri-axial, 5% Damping SRS	**A_{FLEX-H} ≤ 4.000 g**	**A_{FLEX-V} ≤ 1.667 g**
		A_{RIG-H} ≤ 3.000 g	**A_{RIG-V} ≤ 0.667 g**
		ZPA_H ≤ 2.700 g	**ZPA_V ≤ 0.600 g**

Certified Seismic Installation Methods
Rigid mounting from unit base to rigid structure

THE VMC GROUP
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CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Model	Max Rating [kW]	Max Dimensions [in]			Max Weight [lbs]
		Depth	Width	Height	
C20N6	20	82	34	46	1110
C22N6	22	82	34	46	1150
C25N6	25	82	34	46	1150
C30N6H	30	82	34	46	1120
C30N6	30	104	34	46	1300
C36N6H	36	104	34	46	1270
C36N6	36	104	34	46	1380
C40N6H	40	104	34	46	1420
C40N6	40	104	34	46	1400
C45N6H	45	104	34	46	1420
C45N6	45	136	40	58	2580
C50N6H	50	104	34	46	1420
C50N6	50	136	40	58	2600
C60N6H	60	104	34	46	1540
C60N6	60	136	40	58	2900
C70N6	70	136	40	58	2870
C80N6	80	136	40	58	3030
C100N6	100	136	40	58	3170
C125N6	125	160	40	72	3770
C150N6	150	160	40	72	4350

Note: “H” indicates high speed (3600RPM, as opposed to the standard 1800RPM)
Note: Dimensions and Weight include sound level 2 (SL2) enclosure baffle

This certification **includes** the open generator set and the enclosed generator set. The generator set and included options shall be a catalogue design and factory supplied. The generator set and applicable options shall be installed an attached to the building structure per the manufacturer supplied seismic installation instructions. This certification **excludes** 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.

IBC CERTIFIED
THE VMC GROUP

VMA-51070-01C (Revision 06)
Issue Date: July 03, 2015
Revision Date: September 19, 2018
Expiration Date: January 31, 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 2015 – referencing ASCE7-10 and ICC AC-156
   IBC 2012 – 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

John P. Giuliano, PE
President, The VMC Group

VMA-51070-01C (Revision 06)
Issue Date: July 03, 2015
Revision Date: September 19, 2018
Expiration Date: January 31, 2020

Specification sheet

PowerCommand® 2.3 control system

Control system description

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

Features

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

Engine data

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

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

Service adjustments (continued)

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

Engine control

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

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

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

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

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

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

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

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

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

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

Time delay start and stop (cooldown) - Configurable for time delay of 0-300 seconds prior to starting after receiving a remote start signal and for time delay of 0-600 seconds prior to shut down after signal to stop in normal operation modes. Default for both time delay periods is 0 seconds.

Alternator control

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

Major system features include:

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

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

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

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

Protective functions

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

Protective functions include:

Battle short mode

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

Derate

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

Configurable alarm and status inputs

The control accepts up to four alarm or status inputs (configurable contact closed to ground or open) to indicate a configurable (customer-specified) condition.

The control is programmable for warning, shutdown or status indication and for labeling the input.

Emergency stop

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

Full authority electronic engine protection

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

General engine protection

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

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

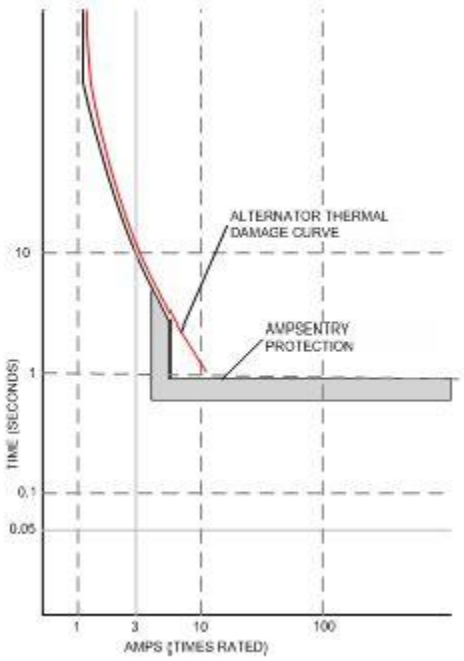
Fail to start (overcrank) shutdown - The control system will indicate a fault if the generator set fails to start by the completion of the engine crack sequence.

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

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

Alternator protection

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



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:

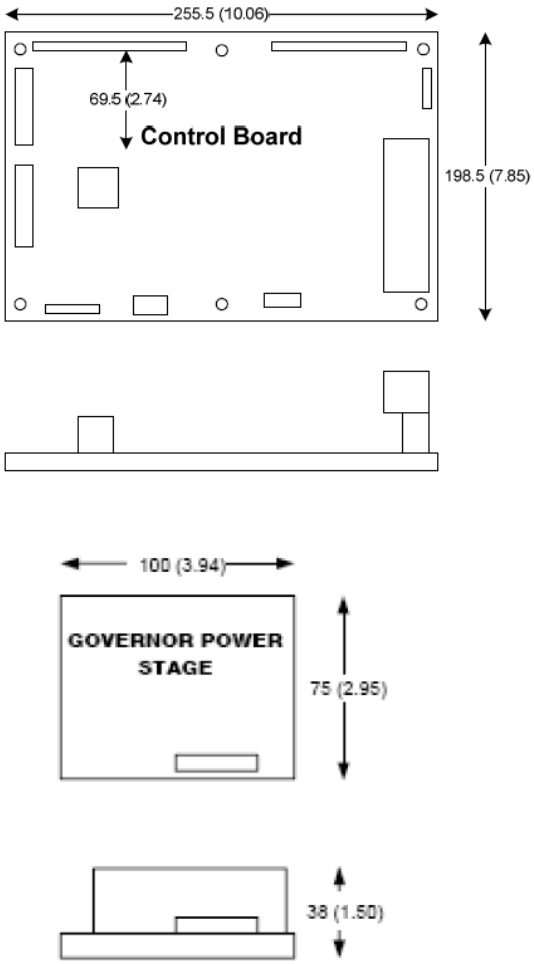
- Load dump signal: Operates when the generator set is in an overload condition.
- Delayed off signal: Time delay based output which will continue to remain active after the control has removed the run command. Adjustment range: 0 – 120 seconds. Default: 0 seconds.
- Configurable relay outputs: Control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

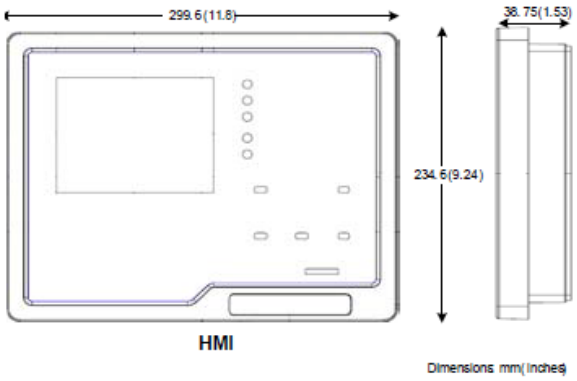
Features

- 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



Environment

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

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

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

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

Certifications

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

- NFPA 110 for level 1 and 2 systems.
- ISO 8528-4: 1993 compliance, controls and switchgear.
- CE marking: The 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 508 recognized or Listed and suitable for use on UL 2200 Listed generator sets.
- CSA C282-M1999 compliance
- CSA 22.2 No. 14 M91 industrial controls.
- PowerCommand control systems and generator sets are designed and manufactured in ISO 9001 certified facilities.

Warranty

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

PCCNet COMPATIBLE

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

Our energy working for you.™

S-1569 (08/17)

Data sheet

Circuit breakers

Description

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

Applicable models

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

Instructions

1. Locate the circuit breaker feature code or part number and use the charts below to find the corresponding manufacturer circuit breaker catalog number.

2. Use the first letter of the circuit breaker catalog number to determine the "frame" of the breaker. If the first letter is an “N”, use the second letter. Then follow the corresponding website link from the table below to find the breaker catalog number description.

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

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

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

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

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

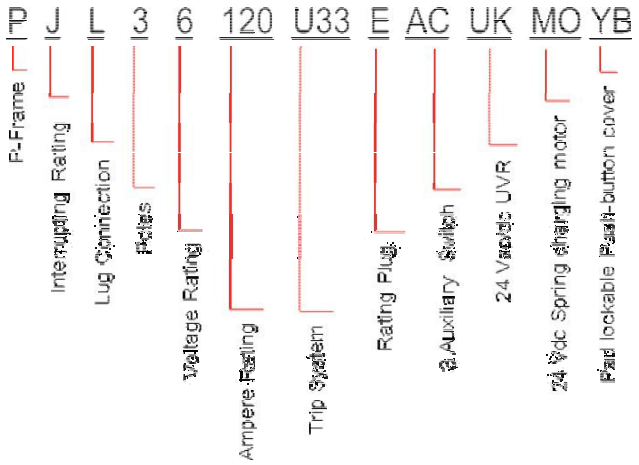
*If the first 3 letters are “PJP,” the search will not work. You will need to start with just “PJ” and use the description pages to obtain the information you are looking for on the “PJP.”

Example

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

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

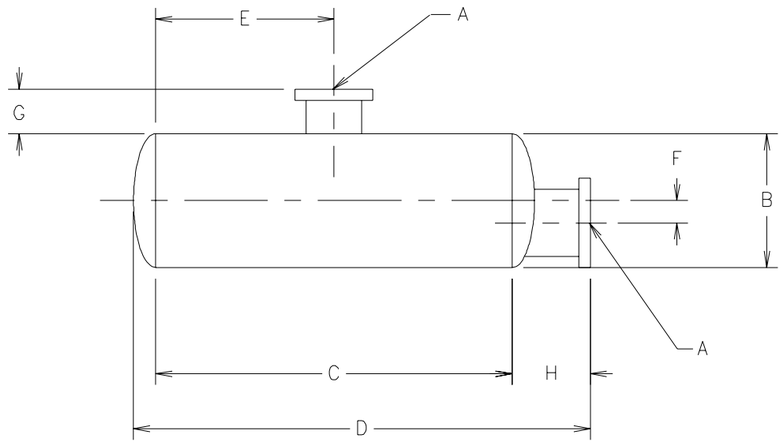
Search the P-frame spec sheet using the search "PJL36120.”



Feature Code	Breaker Box Description	Cummins Part #	Manufacturer	Breaker Catalog Number	Trip Unit	Plug Type
KV35-2	CB,Loc A,50A,3P,600VAC,80%,UL	A043L461	Schneider Electric	HDL36050	Thermal Magnetic	N/A
KV36-2	CB,Loc A,60A,3P,600VAC,80%,UL	A043L459	Schneider Electric	HDL36060	Thermal Magnetic	N/A
KV37-2	CB,Loc A,70A,3P,600VAC,80%,UL	A043L451	Schneider Electric	HDL36070	Thermal Magnetic	N/A
KV38-2	CB,Loc A,80A,3P,600VAC,80%,UL	A043L012	Schneider Electric	HDL36080	Thermal Magnetic	N/A
KV39-2	CB,Loc A,90A,3P,600VAC,80%,UL	A043K997	Schneider Electric	HDL36090	Thermal Magnetic	N/A
KV40-2	CB,Loc A,100A,3P,600VAC,80%,UL	A043L024	Schneider Electric	HDL36100	Thermal Magnetic	N/A
KV41-2	CB,Loc A,125A,3P,600VAC,80%,UL	A043K994	Schneider Electric	HDL36125	Thermal Magnetic	N/A
KV42-2	CB,Loc A,150A,3P,600VAC,80%,UL	A043K991	Schneider Electric	HDL36150	Thermal Magnetic	N/A
KV43-2	CB,Loc A,175A,3P,600VAC,80%,UL	A043L619	Schneider Electric	JDL36175	Thermal Magnetic	N/A
KV44-2	CB,Loc A,200A,3P,600VAC,80%,UL	A043L520	Schneider Electric	JDL36200	Thermal Magnetic	N/A
KV45-2	CB,Loc A,225A,3P,600VAC,80%,UL	A043L517	Schneider Electric	JDL36225	Thermal Magnetic	N/A
KV46-2	CB,Loc A,250A,3P,600VAC,80%,UL	A043L510	Schneider Electric	JDL36250	Thermal Magnetic	N/A
KV47-2	CB,Loc A,250A,3P,600VAC,100%,UL	A044C640	Schneider Electric	JDL36250U31XLC	MicroLogic 3.2S	N/A
KV55-2	CB,Loc B,15A,2P,600VAC,80%,UL	A043E189	Schneider Electric	HDL26015	Thermal Magnetic	N/A
KV57-2	CB,Loc B,25A,2P,600VAC,80%,UL	A043E191	Schneider Electric	HDL26025	Thermal Magnetic	N/A
KV58-2	CB,Loc B,30A,2P,600VAC,80%,UL	A043E185	Schneider Electric	HDL26030	Thermal Magnetic	N/A
KV59-2	CB,Loc B,40A,2P,600VAC,80%,UL	A043E183	Schneider Electric	HDL26040	Thermal Magnetic	N/A

155-2696 C

ER NO.	LTR	NO.	REVISION	ZONE	DR	CHKR	APPROVED	DATE
62528	A	1	PRODUCTION RELEASE	-	SB	DS	GFK	01-22-92
63391	B	1	REVISED -01 THRU -07 TAB DIMS PER ER	-	CC	BG		07-27-92



NOTES:

1. PART NAME: NELSON
   CRITICAL "300" LEVEL
   EXHAUST SILENCERS

2. VENDOR: NELSON INDUSTRIES INC.
   P.O. BOX 428
   STOUGHTON, WISCONSIN 53589

3. FLANGES DRILLED TO 125#ASA STANDARD.

TABULATION

ITEM DASH NO.	NELSON PART NO.	FLANGE "A"	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F	DIM. G	DIM. H	WIEGHT (LBS)
-01	44748	4" NPT	12.12	55.0	64.2	27.5	1.82	3.0	4.5	90
-02	44750	5" ASA FLANGE	14.12	60.0	67.5	30.0	2.56	4.0	5.7	136
-03	44760	6" ASA FLANGE	18.12	69.0	78.4	34.5	3.00	4.0	5.9	148
-04	44780	8" ASA FLANGE	22.12	72.1	82.3	36.0	0.0	4.0	6.9	326
-05	44782	10" ASA FLANGE	26.12	72.1	83.4	36.0	0.0	4.0	7.4	484
-06	44784	12" ASA FLANGE	30.12	96.0	108.4	48.0	0.0	4.0	8.0	702
-07	44786	14" ASA FLANGE	42.25	96.0	111.5	48.0	0.0	4.0	9.4	780

REVISIO DWG

DO NOT SCALE PRINT

TOLERANCE UNLESS OTHERWISE SPECIFIED

DIM	mm	Inch
	X ±	.X ± ---
	.X ±	.XX ± ---
	.XX ±	.XXX ± ---
HOLE	0.09- 4.99 ±0.15/-0.08	.004-.200 +.006/-.003
	5.00- 9.99 ±0.20/-0.10	.201-.421 +.008/-.004
	10.00-17.49 ±0.25/-0.13	.422-.703 +.010/-.005
	17.50-24.99 ±0.30/-0.13	.704-.999 +.012/-.005

ANG TOL ± ---

DRAWN TO SCALE OF NONE

SIM TO 155-2340 C

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THIRD ANGLE PROJECTION

QTY	ITEM	PART NO.	DWG SIZE	DESCRIPTION OR MATERIAL	REF DES

	NAME	DATE
DR	S. BROSE	1-20-92
CHKR MFG	DIANE SCHULTZ	1-22-92
APPROVED	GREG KVIDERA	1-22-92

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

MODEL FIRST USED ON DG & EN

Cummins Onan

MINNEAPOLIS, MINNESOTA 55432

TITLE MUFFLER (CRITICAL)

DWG NO. 155-2696 SHEET 1 or 1 DWG SIZE C

Specification Sheet

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	730	420	Dry	12	20.7	10.8	9.5	110	16.0
0416-1105	8D	1400	430	Wet	12	20.8	10.8	9.5	125	16.0

Application – Gas Continued

Model	Current Spec	Battery Size*	Supported Part Number*	Battery CCA*	Genset Minimum CCA	Battery Voltage	Starting (Genset) Voltage	Required Battery Quantity*
C125 N6	A	34	A045P632 A045P632	850 850	850	12	12	1 2
C150 N6	A	34	A045P632 A045P632	850 850	850	12	12	1 2
GGHG	N	30H-31	0416-0796 0416-0823 0416-0980	725 725 1000	600	12	12	1
GGHH	N	30H-31	0416-0796 0416-0823 0416-0980	725 725 1000	600	12	12	1
GGHJ	A	30H-31	0416-0796 0416-0823 0416-0980	725 725 1000	600	12	12	1

***** First line refers to *standby* battery size and the second line refers to *cold starting* battery size for C20 N6 – C150 N6. Reference for battery size, supported part number, battery cold cranking amps, and required battery quantity.

Battery Accessories

Battery Racks (not recommended for mounting on skids).

Part Number	Description
0416-0527	20.5” x 11.0” (includes how down brackets)
0416-0475	14.5” x 9.3” (loose rack, not intended for anchoring)
0541-0798	13.7” x 9.7” (includes hold down bracket
A034F027	21.8” x 14.3” (includes hold down brackets)

Battery Heater

Increases battery starting capability in lower ambient temperatures.

Heater Kit	Temperature Range	Voltage AC	Watts	Instruction Sheet	Critical Component
0333-0469	Pre-set to maintain 80º F	120	200	N/A	0333-0469-01
0333-0770	65 o F on; 80º F off	120	50	G744	NA – as purchased
0541-0555	40º F / 70º F setting	120	120	C587	0333-0636

Image 1: 0333-0469

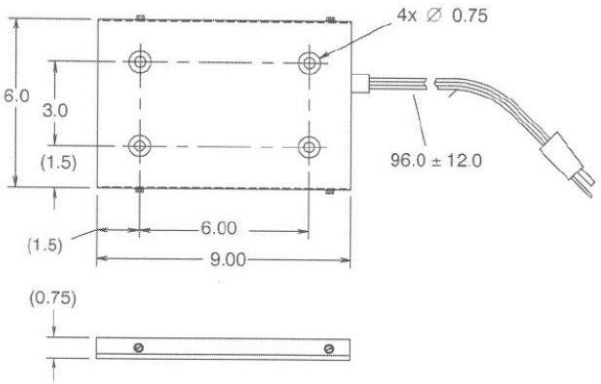


Image 2: 0333-0770

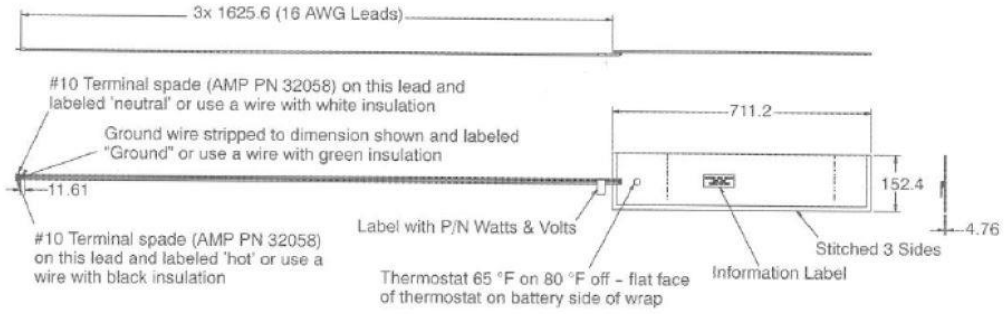
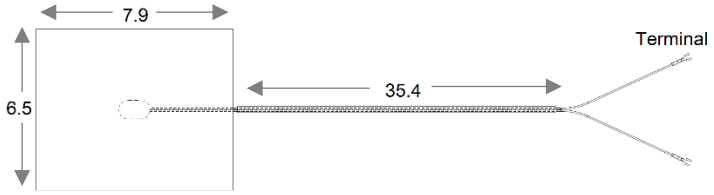


Image 3: 0541-0555



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

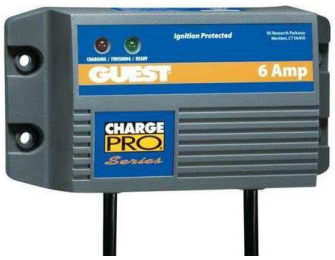
Our energy working for you.™

Specification sheet

Power Generation

Battery charger-6 amp

A045D925 60Hz/50Hz



Description

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

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

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

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

Features

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

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

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

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

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

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

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

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

Warranty – This product has a two year warranty

Specifications

Performance and physical characteristics

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

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

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

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

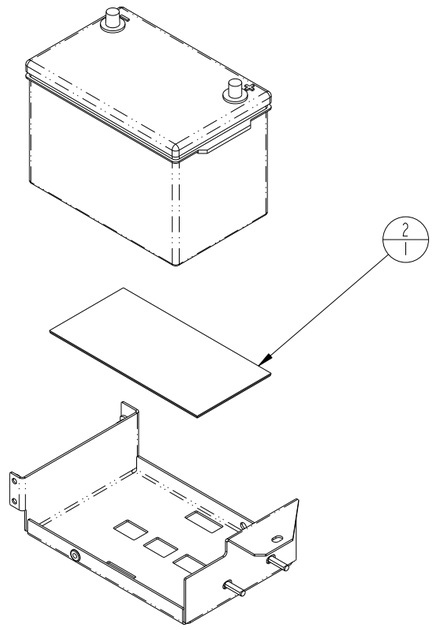
Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.

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

Cummins Power Generation

Creo Parametric

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-137826	B	1	PRODUCTION_RELEASE	AM	SD	D_GILLETT	12SEP13



UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

DIM: X ± 1 | .X ± 0.8 | .XX± 0.38

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

ANG TOL: ± 1.0°

SCALE: 1/4

SIM TO .

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DWN A_JOHNSON
CKD A_JOHNSON
APVD S_DULAM
DATE 29MAY13

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994

FIRST USED ON ARROW

SITE CODE PGF

CUMMINS POWER GENERATION

KIT,HEATER

DWG SIZE C | A046G494 | SHEET 1 OF 1 | DWG REV B

Drawing Name: A046G495 Revision: B
Part Name: A046G494 Revision: B
Sheet 1 of 2

PowerCommand® Annunciator Discrete Input or PCCNet

> Specification sheet

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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.

S-1472e (8/09)

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)

		NFPA 110		
Lamp	Description	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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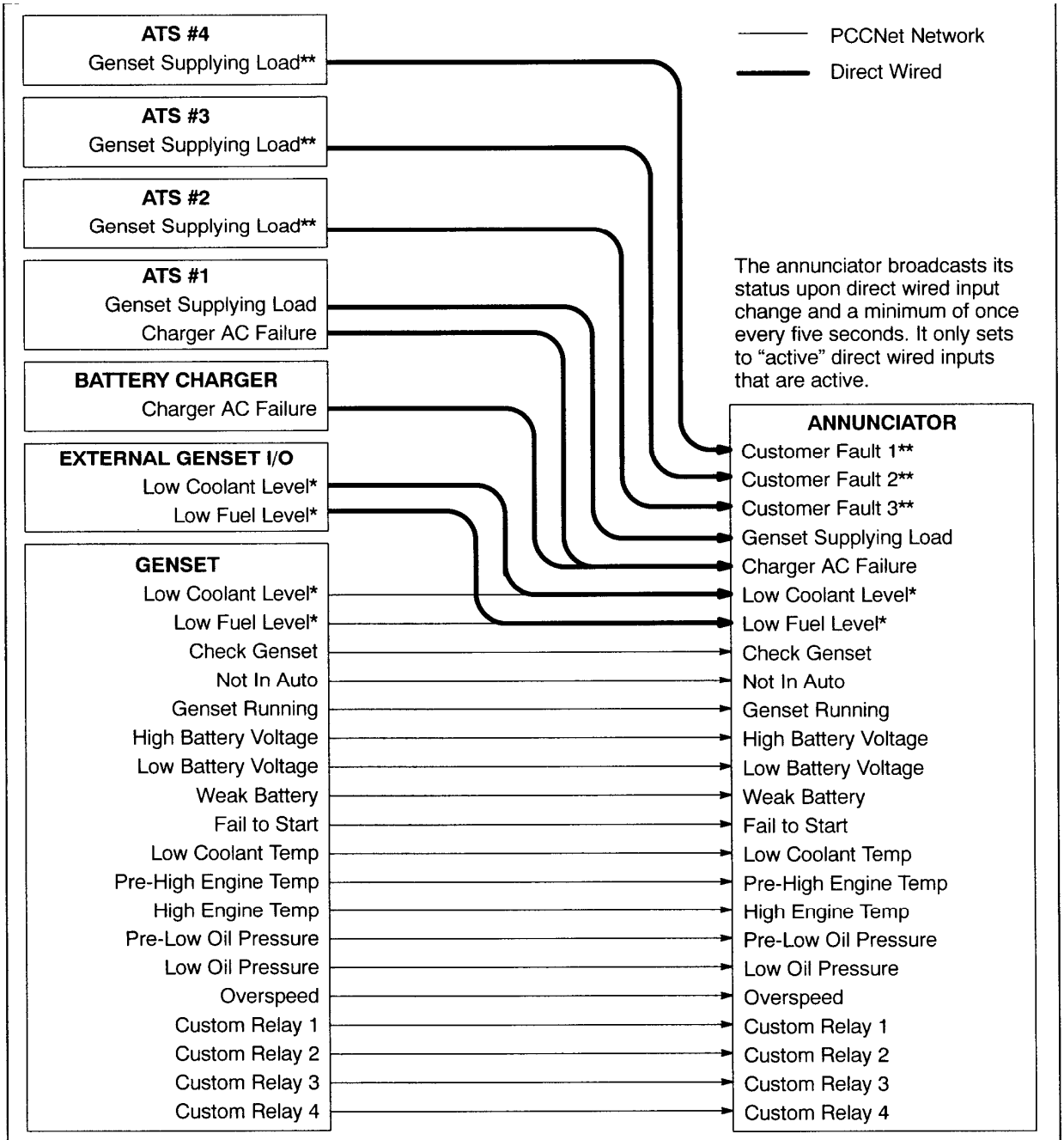
S-1472e (8/09)

Cummins Power Generation

Typical installation



* Low Coolant Level and Low Fuel Level statuses can be either direct wired from External Genset I/O or be part of the PCCNet network status coming from the genset. If direct wired, then the annunciator sets the appropriate bit for the genset to reference.

** These can be Genset Supplying Load 2 thru 4 or Customer Faults.

When enabled, High Battery Voltage, Low Battery Voltage, and Normal Battery Voltage takes precedence over the hardwired input.

Normal Battery voltage can replace Weak Battery.

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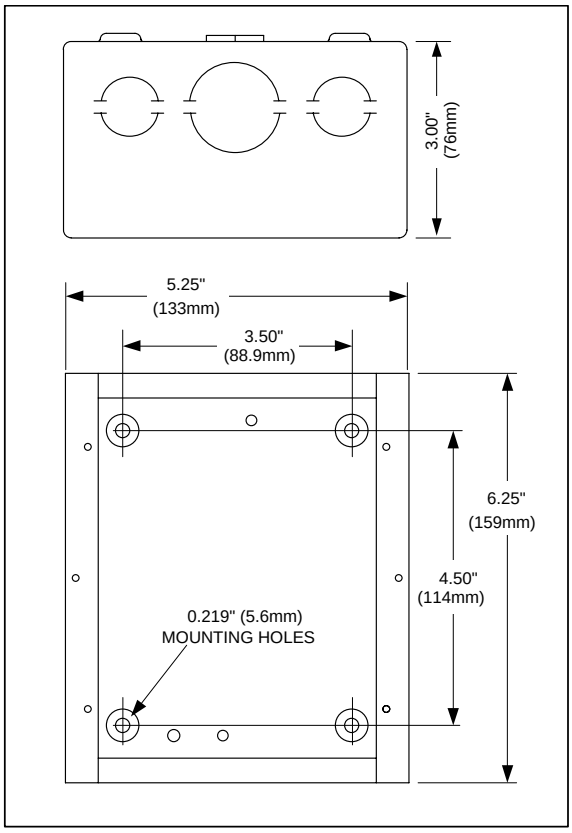
S-1472e (8/09)

Cummins Power Generation

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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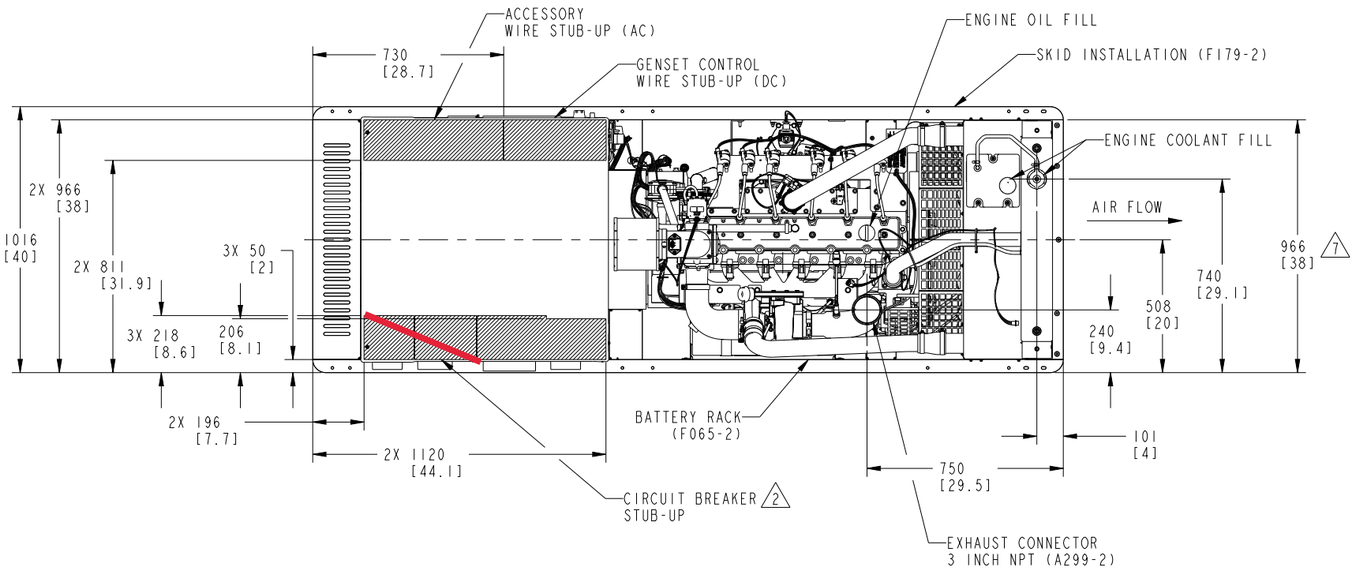
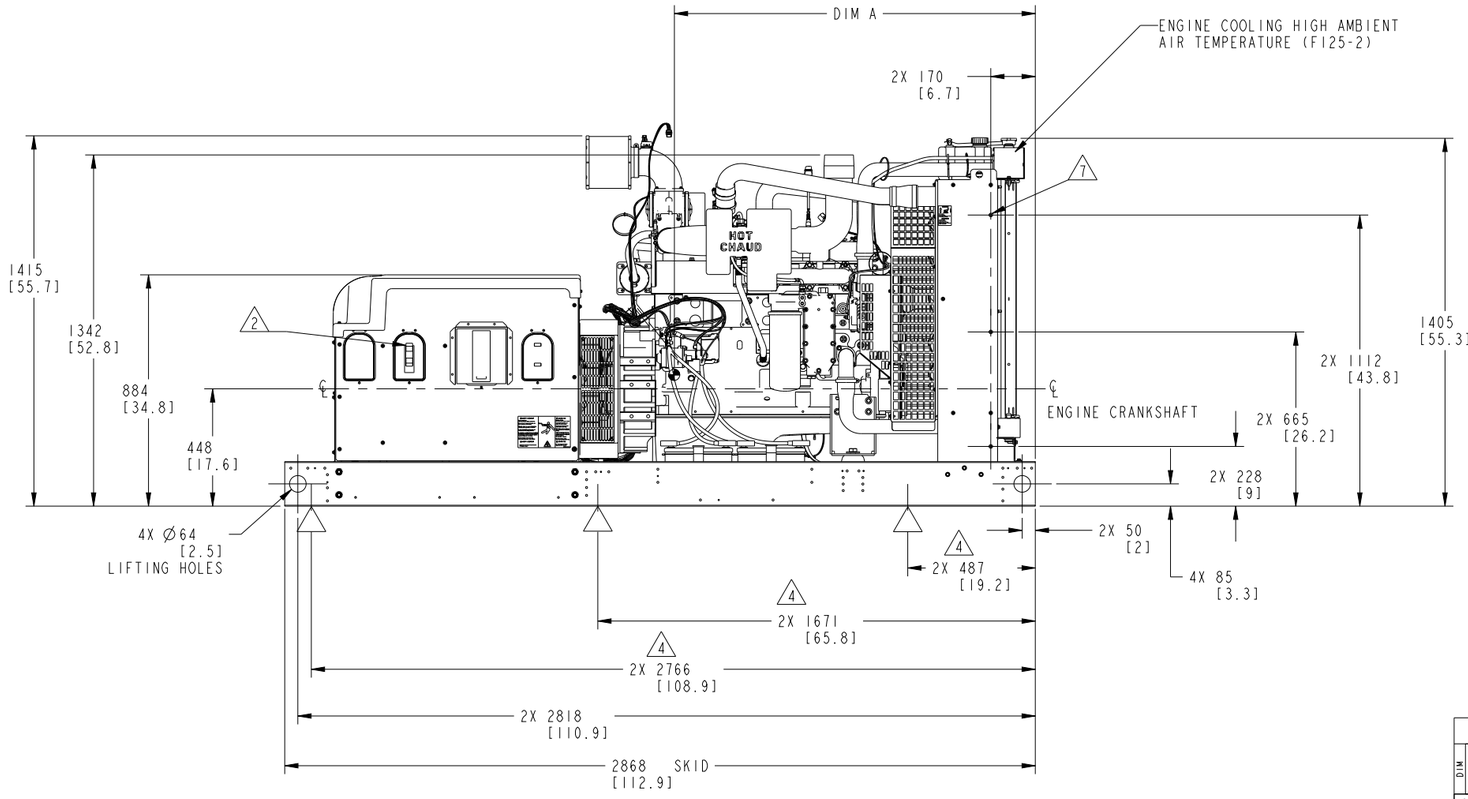
S-1472e (8/09)

Cummins Power Generation

PTC® Creo® Parametric

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-167824	B	1	PRODUCTION_RELEASE	AGJ	AGJ	CHINTHALURI	06FEB17
		2	SEE SHEET 2	AGJ	AGJ	CHINTHALURI	06FEB17

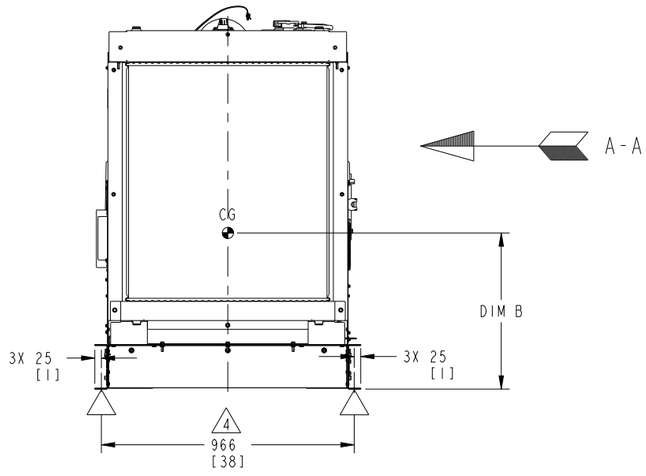




NOTES:

1. DIMENSIONS SHOWN IN [ ] ARE IN INCHES.
2. REFER TO CIRCUIT BREAKER OUTLINE DRAWING FOR COMPLETE ELECTRICAL STUB-UP INFORMATION FOR SPECIFIC BREAKERS AND BREAKER POSITIONS.
3. CONTROL INTERFACE CONNECTION SHOULD BE MADE WITH FLEXIBLE CONNECTIONS.
4. Ø21 [0.8] HOLES MARKED BY △ FOR SECURING TO MOUNTING SURFACE.
5. OIL DRAIN EXTENSION: I5.8 [0.62] INCH ID HOSE.
6. FOR IBC SEISMIC CERTIFIED INSTALLATION, SEE GENSET IBC SEISMIC INSTALLATION REQUIREMENT DRAWING.
7. Ø7.3 [0.28] HOLES FOR OPTIONAL COOLING EXHAUST AIR DUCT ADAPTER.
8. REFER TO GENSET FOUNDATION OUTLINE FOR ELECTRICAL AND OTHER FOUNDATION SPECIFICS.

TABULATION				
ALT DATA SHEET #	DIM A	DIM B	GENSET WET WEIGHT	
			KG	LB
ADS-208	1400	540	1485	3267
ADS-209	1421	544	1534	3375
ADS-210	1445	541	1571	3457
ADS-211	1467	538	1610	3543
ADS-212	1495	533	1698	3735



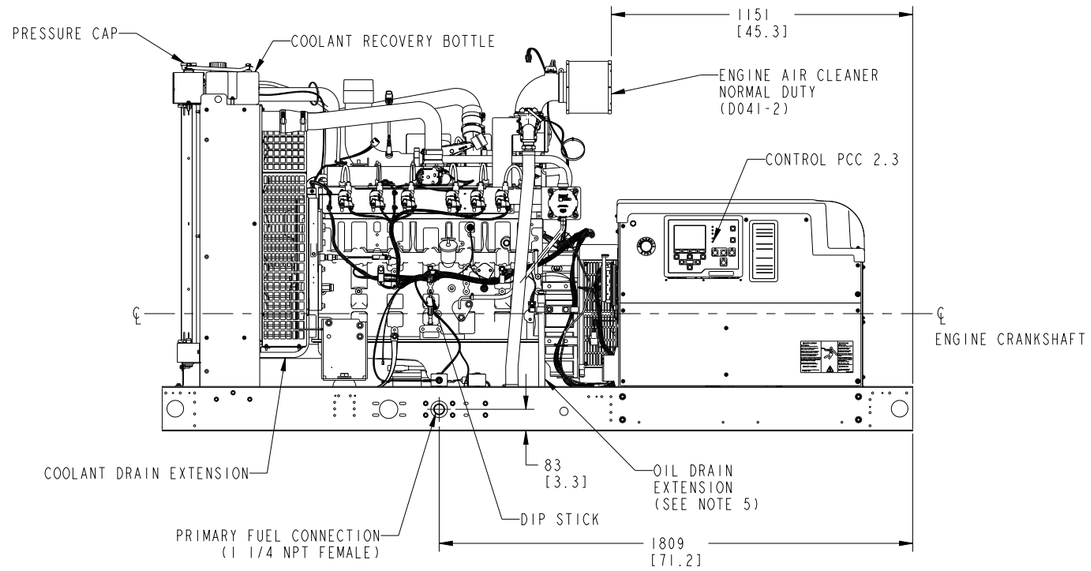
C125 N6, C150 N6

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS			SIM TO .	DWN A_JOHNSON	CUMMINS POWER GENERATION
DIM: X ±1, .X ±0.8, .XX± 0.38	HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13		DO NOT SCALE PRINT	CKD A_JOHNSON	OUTLINE,GENSET
				APVD A_CHINTHALURI	
				DATE 08SEP16	SITE CODE .
ANG TOL ± 1.0°	SCALE 3:32	THIS DOCUMENT AND THE INFORMATION SHOWN THEREON IS CONFIDENTIAL AND PROPRIETARY AND SHALL NOT BE DISCLOSED TO OTHERS IN HARD COPY OR ELECTRONIC FORM, REPRODUCED BY ANY MEANS, OR USED FOR ANY PURPOSE WITHOUT WRITTEN CONSENT OF CUMMINS INC.	FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009	FIRST USED ON ARROW	PGF	DWG SIZE D A055J588	CAD SHEET 1 OF 2

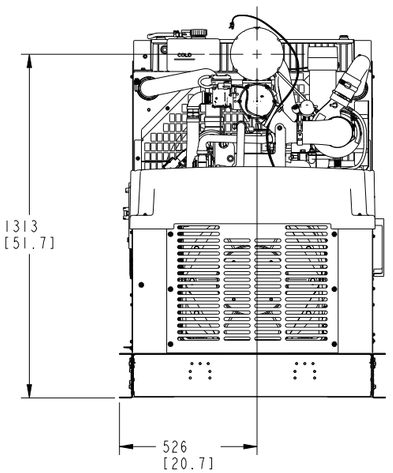
Drawing Name: A055J589 Revision: B
Part Name: A055J588 Revision: B
ECO-167824 Sheet 1 of 3

PTC® Creo® Parametric

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-167824	B	1	PRODUCTION_RELEASE	AGJ	AGJ	CHINTHALURI	06FEB17
		2	ZONE C4; CONTROL PCC 2.3 WAS CONTROL PC1.1	AGJ	AGJ	CHINTHALURI	06FEB17



VIEW A-A

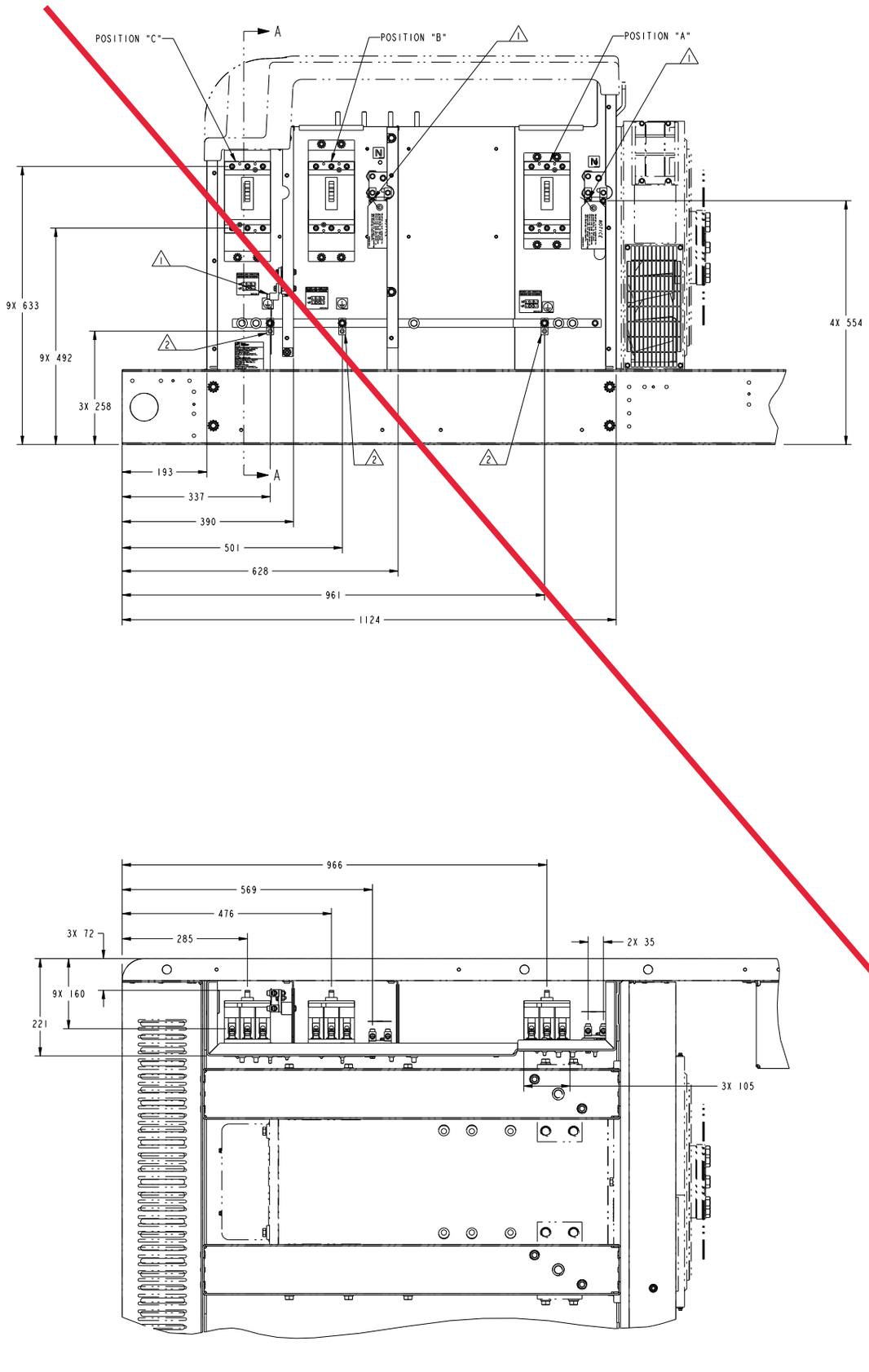


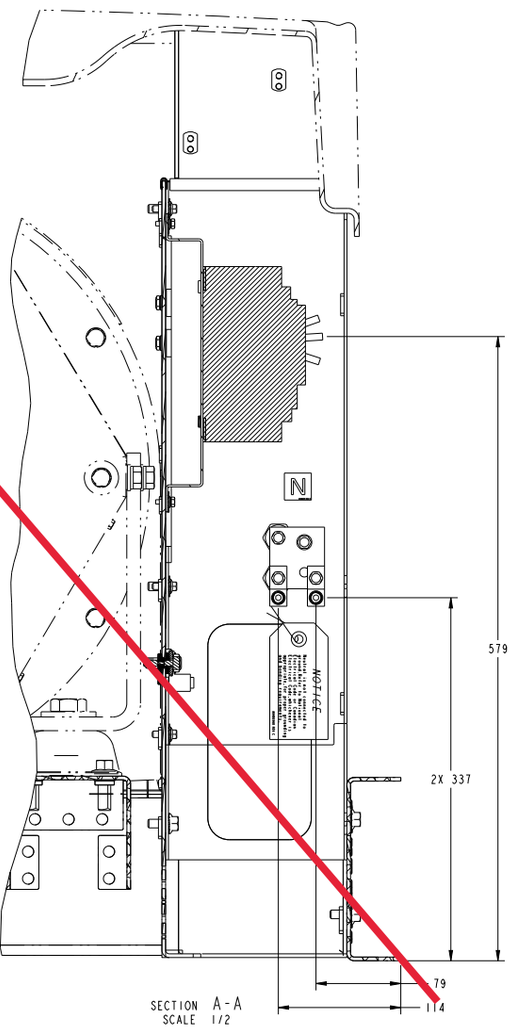
C125 N6, C150 N6

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS			SIM TO .	DWN A_JOHNSON	CUMMINS POWER GENERATION	
DIM	WHOLE		DO NOT SCALE PRINT	CKD A_JOHNSON		
X ±1	0.00- 4.99 +0.15/-0.08			APVD A_CHINTHALURI	OUTLINE,GENSET	
.X ±0.8	5.00- 9.99 +0.20/-0.10			DATE 08SEP16	SITE CODE .	
.XX± 0.38	10.00-17.49 +0.25/-0.13					
	17.50-24.99 +0.30/-0.13					
ANG TOL ± 1.0°	SCALE 3:32	THIS DOCUMENT (AND THE INFORMATION SHOWN THEREON) IS CONFIDENTIAL AND PROPRIETARY AND SHALL NOT BE DISCLOSED TO OTHERS IN HARD COPY OR ELECTRONIC FORM, REPRODUCED BY ANY MEANS, OR USED FOR ANY PURPOSE WITHOUT WRITTEN CONSENT OF CUMMINS INC.	FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009	FIRST USED ON ARROW	PGF	DWG SIZE D A055J588	CAD SHEET 2 OF 2

REL NO	REV	NO	REVISION	DRN	CKD	APVD	DATE
ECO-181477	E	1	ADD SHEET 6	RT	MT	M.TULADHAR	05NOV18
		2	ZONE (A1) ADD TABLE	RT	MT	M.TULADHAR	05NOV18
		3	ZONE (B1) UPDATE "CIRCUIT BREAKER ACCESSORIES" TABLE	RT	MT	M.TULADHAR	05NOV18

"H" FRAME SHOWN (15 - 150 amp)





NOTES:

1. NEUTRAL LUG (1) #14-2/0.
2. GROUND LUG (1) #14-1/0.
3. NEUTRAL LUG (1) #6-350 kcmil.
4. NEUTRAL LG (2) #2-600 kcmil OR (4) 1/0-250 kcmil.

FRAME	LUG	LUG WIRE RANGE	WIRE STRIP LENGTH	CB LUG TORQUE
H-FRAME THERMAL-MAGNETIC 15-150 AMP 80% RATED	AL150HD	(1) AL #14 - 3/0 AWG (1) CU #14 - 3/0 AWG	0.65 inch	#14 - #10 50 lb-in (6.0 Nm) #8 - 3/0 120 lb-in (14.0 Nm)
J-FRAME THERMAL-MAGNETIC 175 AMP 80% RATED	AL175HD	(1) AL #4 - 4/0 AWG (1) CU #4 - 4/0 AWG	1.00 inch	225 lb-in (26.0 Nm)
J-FRAME THERMAL-MAGNETIC 200-250 AMP 80% RATED	AL250JD	(1) AL 3/0 - 350 kcmil (1) CU 3/0 - 350 kcmil	1.00 inch	225 lb-in (26.0 Nm)
J-FRAME LSI ELECTRONIC TRIP ADJUSTABLE TRIP 70-250 AMP 100% RATED, COPPER CONDUCTORS ONLY	CU250JD	(1) CU 1/0 - 300 kcmil	1.00 inch	250 lb-in (28.0 Nm)
L-FRAME (400) LSI ELECTRONIC TRIP ADJUSTABLE TRIP 125-400 AMP 80% RATED	AL400L61K3	(1) AL #2 - 500 kcmil (1) CU #2 - 600 kcmil	1.20 inch	442 lb-in (50 Nm)
L-FRAME (400) LSI ELECTRONIC TRIP ADJUSTABLE TRIP 125-400 AMP 100% RATED, COPPER CONDUCTORS ONLY	AL600LS52K3	(2) CU 2/0 - 500 kcmil	(1) 1.20 inch (1) 2.40 inch	442 lb-in (50 Nm)
L-FRAME (600) LSI ELECTRONIC TRIP ADJUSTABLE TRIP 200-600 AMP 80% RATED 100% RATED, COPPER CONDUCTORS ONLY	AL600LS52K3	(2) AL 2/0 - 500 kcmil (2) CU 2/0 - 500 kcmil	(1) 1.20 inch (1) 2.40 inch	442 lb-in (50 Nm)
P-FRAME MANUAL & AUTOMATIC LSI ELECTRONIC TRIP ADJUSTABLE TRIP 400, 600 & 800 AMP 80% AND 100% RATED	AL800LS52K3	(3) AL 3/0 - 500 kcmil (3) CU 3/0 - 500 kcmil	(3) 1.20 inch	442 lb-in (50 Nm)

CIRCUIT BREAKER ACCESSORIES	
1	SHUNT TRIP (MX) P/N A043X760 12 VDC COIL BURDEN < 5 WATTS 10 AMP IN-RUSH
2	AUXILIARY CONTACTS P/N A043X785 OPEN/CLOSED (OF) TRIP INDICATION (SD) FORM C CONTACTS RATING: 6 AMPS AT 24 VAC, 48 VAC, 110 VAC 6 AMPS AT 24 VDC, 2.5 AMPS AT 48 VDC 0.6 AMPS AT 110 VDC H & J FRAME, MAXIMUM OF 4 CONTACTS PER CIRCUIT BREAKER L FRAME, MAXIMUM OF 5 CONTACTS PER CIRCUIT BREAKER P FRAME, MAXIMUM OF 5 CONTACTS PER CIRCUIT BREAKER
3	ACCESSORY KIT P/N A060M822 FOR TOP ENTRY LOAD CABLE ENTRY APPLICABLE FOR MODEL AND BREAKER CONFIGURATION AS PER "TABLE 1"

TABLE 1

KIT PART NUMBER	MODELS AFFECTED		ENCLOSURES AFFECTED
A060M822	C125 N6-C150 N6		OPEN ONLY
	C125 D6D- C200 D6D		
KIT PART NUMBER	NUMBER OF CB'S	LIMITATION	
		POS A	POS B	POS C
A060M822	1	ANY RATING	-	-
	2	ANY RATING	600A OR BELOW	-
	3	ANY RATING	400A OR BELOW	250A OR BELOW

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DIM: X ±1 | .X ±0.8 | .XX± 0.38
ANG TOL ± 1.0° | SCALE 1/4
DECIMAL: 0.00- 4.99 ±0.15/-0.08; 5.00- 9.99 ±0.20/-0.10; 10.00-17.49 ±0.25/-0.13; 17.50-24.99 ±0.30/-0.13
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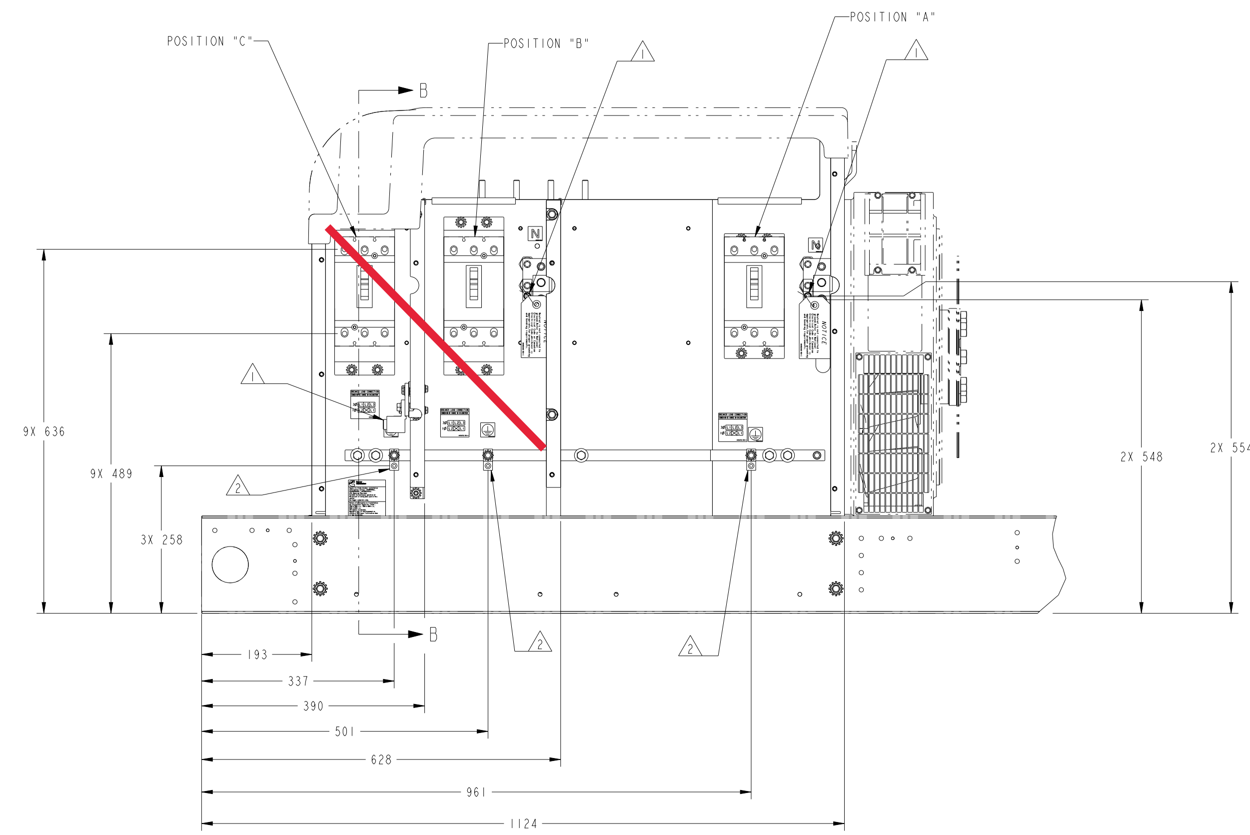
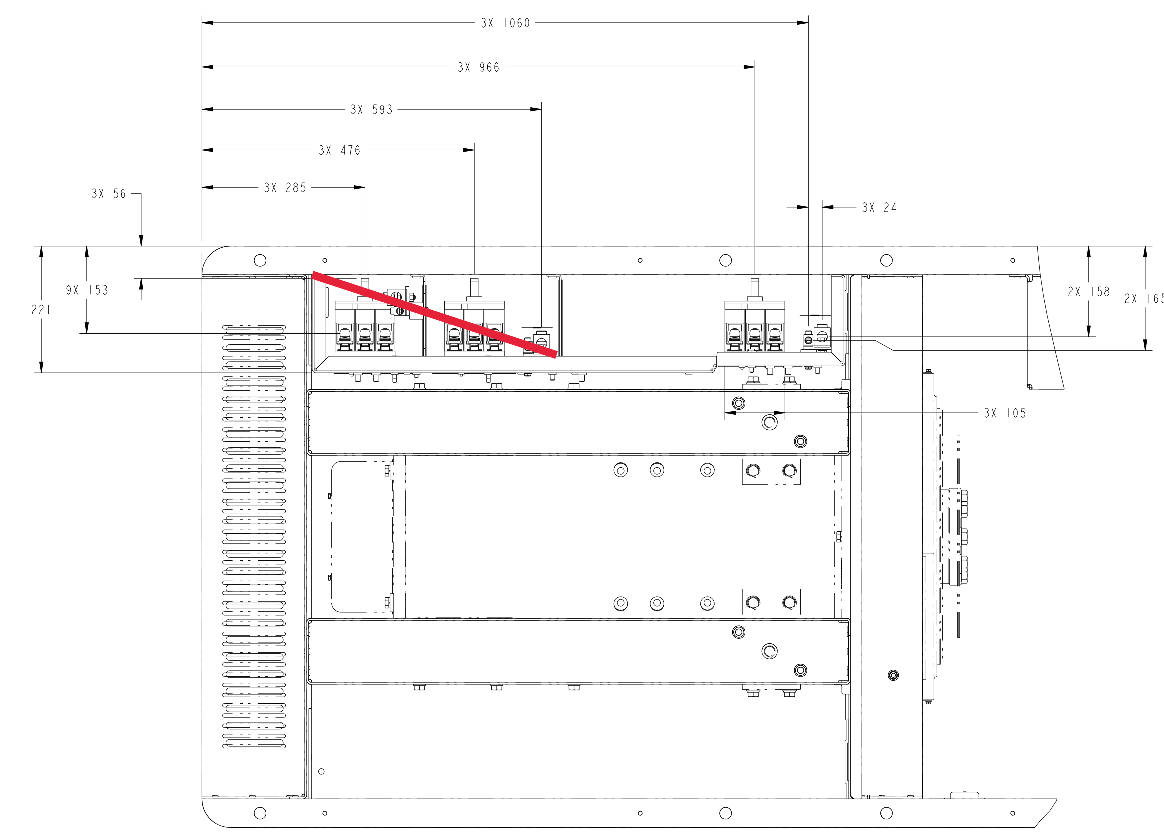
SIM TO . DO NOT SCALE PRINT
DRN A_JOHNSON | CKD A_JOHNSON | APVD P_LARSON | DATE 02MAY16
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009
FIRST USED ON ARROW
CUMMINS POWER GENERATION
OUTLINE,CIRCUIT BREAKER
SITE CODE PGF
DWG SIZE E | A055B603 | CAD SHEET 1 OF 6

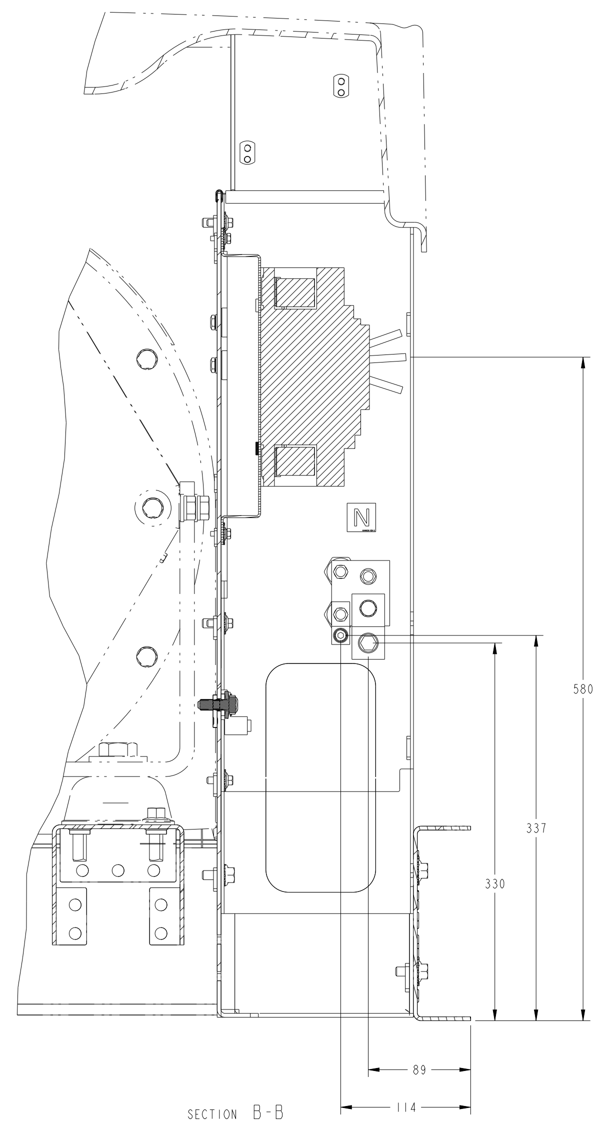
Regulatory Review and Approval is required prior to changing this item per PGG 1-01-01-116. This item impacts compliance with these External Regulations: UL,CSA

Drawing Name: A055B604 Revision: E
Part Name: A055B603 Revision: E
ECO-181477 Sheet 1 of 7

"J" FRAME SHOWN (175 - 250 amp)







SECTION B-B
SCALE 1/2

ECO-181477	E
DWN	A.JOHNSON
CHD	A.JOHNSON
APVD	P.LARSON
DATE	02MAY16

CUMMINS POWER GENERATION

OUTLINE,CIRCUIT BREAKER

PGF E A055B603 2 of 6

DO NOT SCALE PRINT

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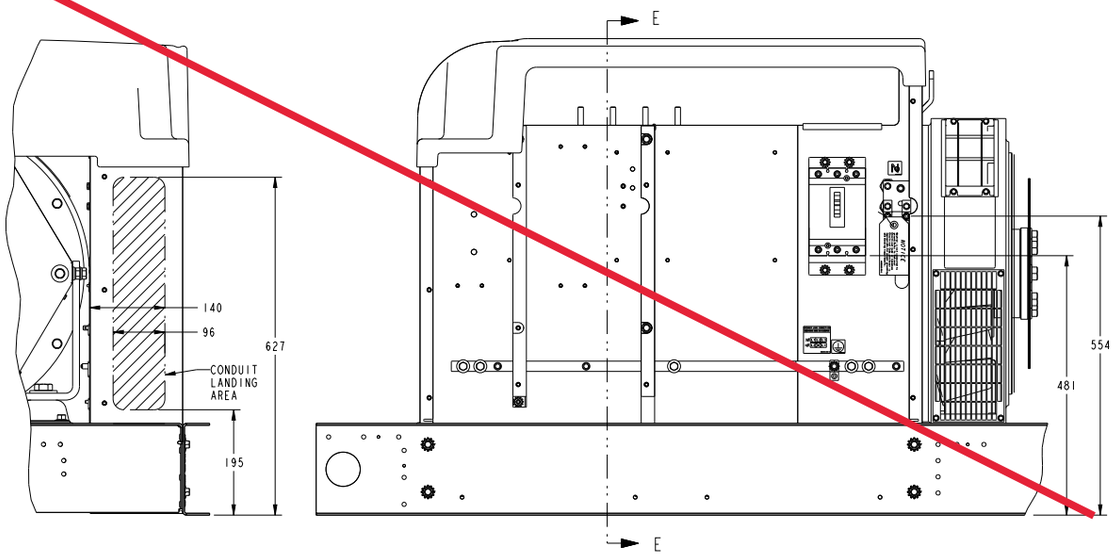
PGG 1-01-01-116. This item impacts compliance with these External Regulations:
UL,CSA

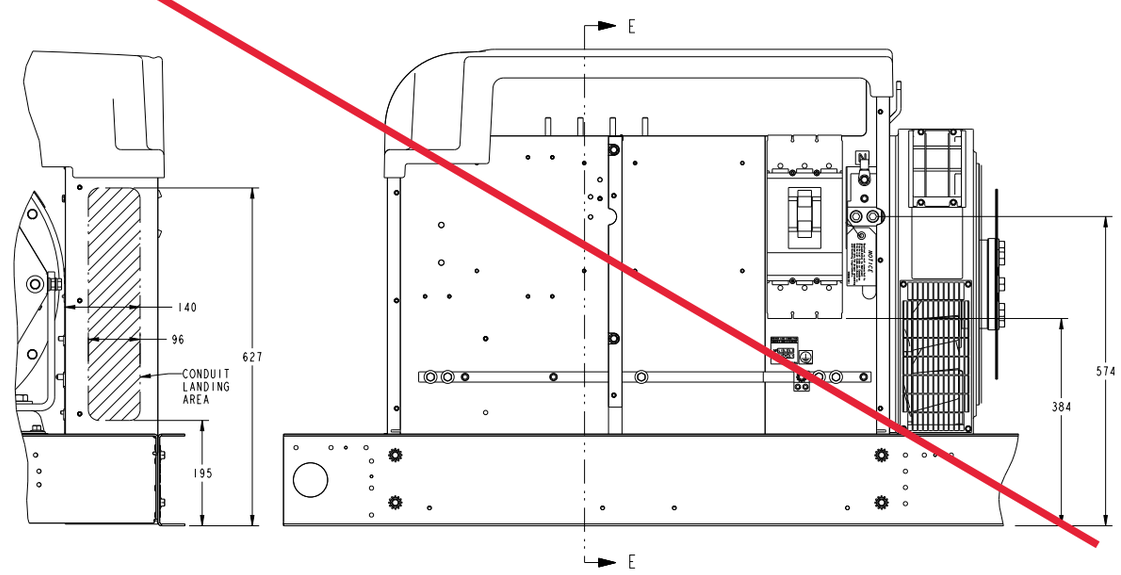
PTC® Creo® Parametric

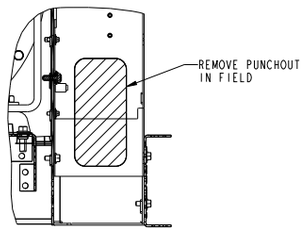
REL NO	REV	NO	REVISION	DRN	CKD	APVD	DATE
ECO-181477	E	-	---	RT	MT	M_TULADHAR	05NOV18

"H" FRAME SHOWN (15 - 150 amp)



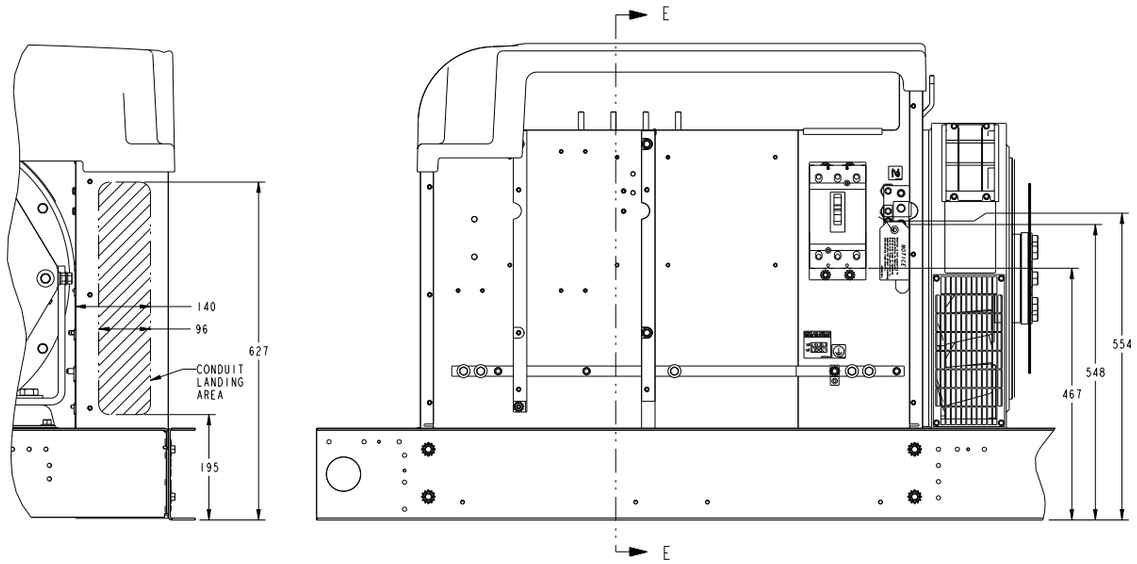
"L" FRAME SHOWN (400 - 600 amp)



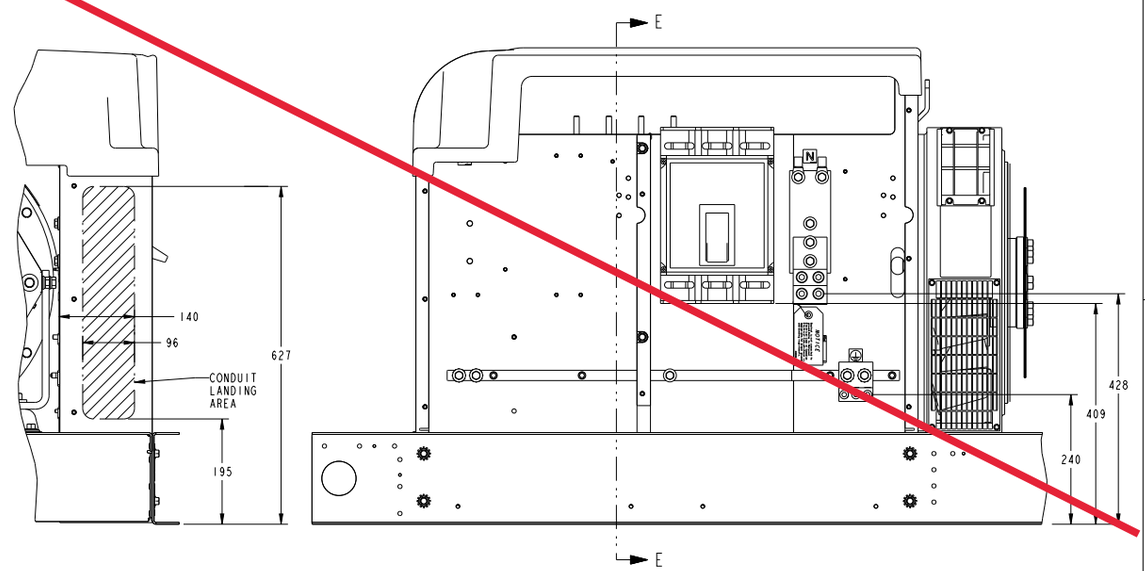


SECTION E-E

"J" FRAME SHOWN (175 - 250 amp)



"P" FRAME SHOWN (400-800 amp)



UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS			DO NOT SCALE PRINT	DRN A_JOHNSON	CUMMINS POWER GENERATION
DIM X ±1 .X ±0.8 .XX± 0.38	DECIMAL	0.00- 4.99 ±0.15/-0.08 5.00- 9.99 ±0.20/-0.10 10.00-17.49 ±0.25/-0.13 17.50-24.99 ±0.30/-0.13		CKD A_JOHNSON APVD P_LARSON DATE 02MAY16	OUTLINE,CIRCUIT BREAKER
ANG TOL ± 1.0°	SCALE 1/4	THIS DOCUMENT AND THE INFORMATION SHOWN THEREON IS CONFIDENTIAL AND PROPRIETARY TO CUMMINS INC. AND IS NOT TO BE REPRODUCED OR USED FOR ANY PURPOSE WITHOUT WRITTEN CONSENT OF CUMMINS INC.	FOR INTERPRETATION OF DIMENSIONS AND TOLERANCES, SEE ASME Y14.5-2009	FIRST USED ON ARROW	SITE CODE PGF	DWG SIZE E	A055B603	CAD SHEET 5 of 6

Regulatory Review and Approval is required prior to changing this item per
PGG 1-01-01-116. This item impacts compliance with these External Regulations:
UL,CSA

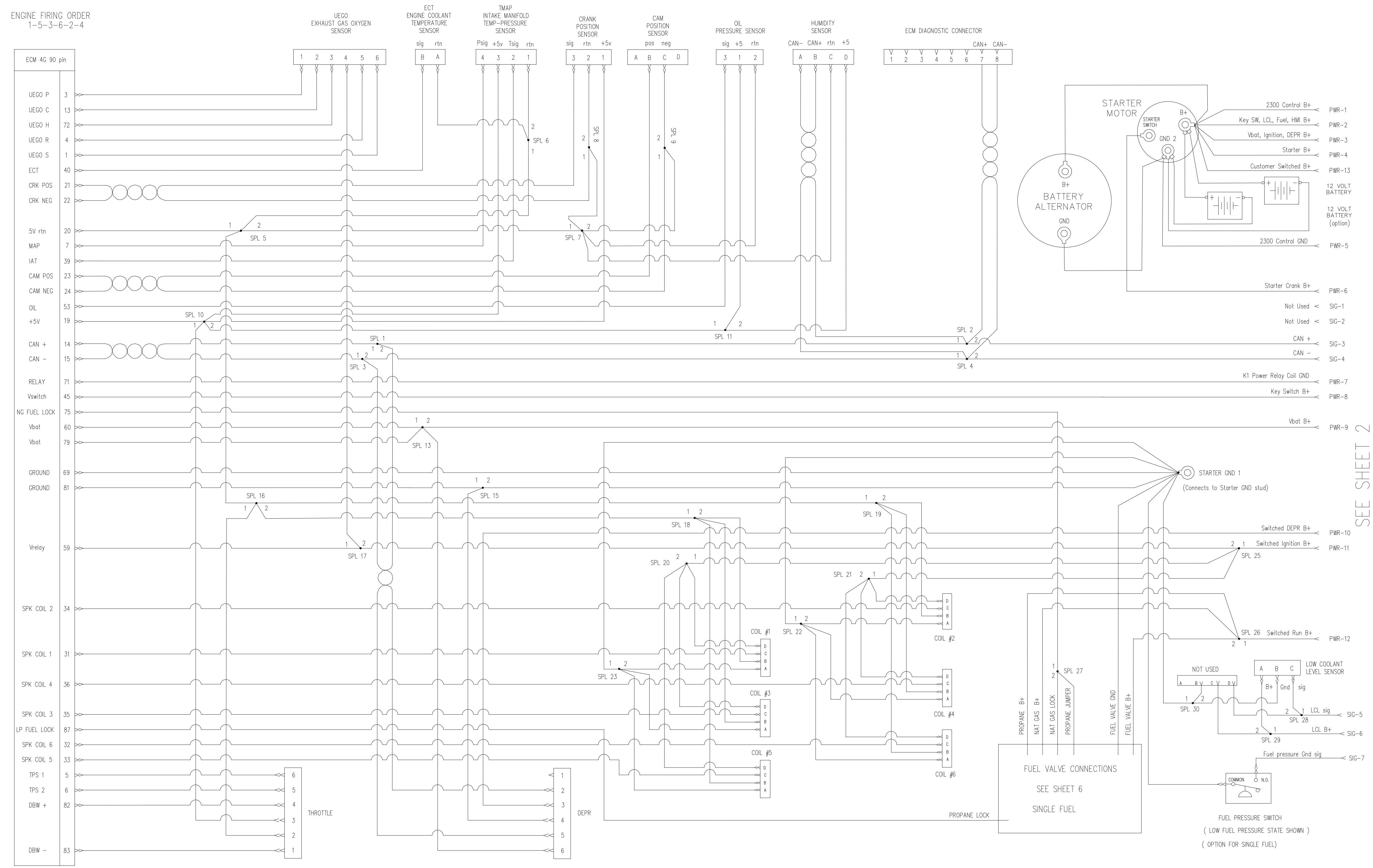
Drawing Name: A055B604 Revision: E
Part Name: A055B603 Revision: E
ECO-181477 Sheet 5 of 7

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-181411	G	1	SEE SHEET 5	PT	MT	M_TULADHAR	01NOV18
		2	SEE SHEET 5	PT	MT	M_TULADHAR	01NOV18
		3	SEE SHEET 5	PT	MT	M_TULADHAR	01NOV18

NOTES:

1. CONTROL HARNESS = A053S093

2. ENGINE HARNESS = A054B187



ENGINE FIRING ORDER
1-5-3-6-2-4
ECM 4G 90 pin
UEGO P 3
UEGO C 13
UEGO H 72
UEGO R 4
UEGO S 1
ECT 40
CRK POS 21
CRK NEG 22
5V rtn 20
MAP 7
IAT 39
CAM POS 23
CAM NEG 24
OIL 53
+5V 19
CAN + 14
CAN - 15
RELAY 71
Vswitch 45
NG FUEL LOCK 75
Vbat 60
Vbat 79
GROUND 69
GROUND 81
Vrelay 59
SPK COIL 2 34
SPK COIL 1 31
SPK COIL 4 36
SPK COIL 3 35
LP FUEL LOCK 87
SPK COIL 6 32
SPK COIL 5 33
TPS 1 5
TPS 2 6
DBW + 82
DBW - 83
UEGO EXHAUST GAS OXYGEN SENSOR
ECT ENGINE COOLANT TEMPERATURE SENSOR
TMAP INTAKE MANIFOLD TEMP-PRESSURE SENSOR
CRANK POSITION SENSOR
CAM POSITION SENSOR
OIL PRESSURE SENSOR
HUMIDITY SENSOR
ECM DIAGNOSTIC CONNECTOR
STARTER MOTOR
BATTERY ALTERNATOR
12 VOLT BATTERY
12 VOLT BATTERY (option)
2300 Control B+ PWR-1
Key SW, LCL, Fuel, HMI B+ PWR-2
Vbat, Ignition, DEPR B+ PWR-3
Starter B+ PWR-4
Customer Switched B+ PWR-13
2300 Control GND PWR-5
Starter Crank B+ PWR-6
Not Used SIG-1
Not Used SIG-2
CAN + SIG-3
CAN - SIG-4
K1 Power Relay Coil GND PWR-7
Key Switch B+ PWR-8
Vbat B+ PWR-9
STARTER GND 1
(Connects to Starter GND stud)
Switched DEPR B+ PWR-10
Switched Ignition B+ PWR-11
Switched Run B+ PWR-12
SEE SHEET 2
NOT USED
LOW COOLANT LEVEL SENSOR
LCL sig SIG-5
LCL B+ SIG-6
Fuel pressure Gnd sig SIG-7
FUEL PRESSURE SWITCH
(LOW FUEL PRESSURE STATE SHOWN)
(OPTION FOR SINGLE FUEL)
FUEL VALVE CONNECTIONS
SEE SHEET 6
SINGLE FUEL
PROPANE LOCK
THROTTLE
DEPR
COIL #1
COIL #2
COIL #3
COIL #4
COIL #5
COIL #6

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS	SIM TO .	DWN P_THEVAR		CUMMINS POWER GENERATION
DIM X ± 1, .X ± 0.8, .XX ± 0.38 / HOLE 0.00- 4.99 +0.15/-0.08, 5.00- 9.99 +0.20/-0.10, 10.00-17.49 +0.25/-0.13, 17.50-24.99 +0.30/-0.13	DO NOT SCALE PRINT	CKD P_LARSON		SCHEMATIC,GENSET
		APVD P_LARSON		8.9 LTR LEAN BURN
		DATE 01NOV16	SITE CODE	
ANG TOL ± 1.0° / SCALE 1/1	THIS DOCUMENT (AND THE INFORMATION SHOWN THEREON) IS CONFIDENTIAL AND PROPRIETARY AND SHALL NOT BE DISCLOSED TO OTHERS IN HARD COPY OR ELECTRONIC FORM, REPRODUCED BY ANY MEANS, OR USED FOR ANY PURPOSE WITHOUT WRITTEN CONSENT OF CUMMINS INC.	FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009 / FIRST USED ON ARROW	PGF	DWG SIZE E A054N480 CAD SHEET 1 OF 6

PTC® Creo® Parametric

REL NO	REV	NO	REVISION	DRN	CKD	APVD	DATE
ECO-181411	G	---	---	PT	MT	M_TULADHAR	01NOV18

SEE SHEET 1

PWR-1 2300 Control B+ — F1 FUSE 20AMP
PWR-2 Key SW,Alt flash,Fuel,HMI B+ — F2 FUSE 10AMP
PWR-3 Vbat, Ignition B+ — SPLICE 30
PWR-4 Starter B+
PWR-13 Customer Switched B+ — F6 FUSE 10AMP
PWR-5 2300 Control GND — F3 FUSE 20AMP
PWR-6 Starter Crank B+ — K4 STARTER RELAY
SIG-1 Battery Alt Flash B+
SIG-2 CAN Shield
SIG-3 CAN +
SIG-4 CAN –
PWR-7 K1 Power Relay Coil GND
PWR-8 Key Switch B+ — K3 KEY-SWITCH RELAY
PWR-9 Vbat B+
PWR-10 Switched B+ — K1 POWER RELAY — F4 FUSE 5AMP — SPLICE 34
PWR-11 Switched Ignition B+ — F5 FUSE 20AMP
D1 DIODE
PWR-12 Switched Run B+ — K2 RUN RELAY
SIG-5 LCL sig
SIG-6 LCL B+
SIG-7 Fuel Pressure Switch gnd sig

SPLICE 31 — SPLICE 32 — SPLICE 33 — SPLICE $5 — R1 120 ohm — SPLICE 36

GND

J20-9	B +	CONTROL B+	
J20-10	B +	CONTROL B+	
J20-20	B +	CONTROL B+	
J20-21	B +	CONTROL B+	
J20-1	B –	CHASSIS GROUND	
J20-2	B –	CONTROL GROUND	
J20-4	B –	CONTROL GROUND	
J20-7	B –	CONTROL GROUND	
J20-12	B –	CONTROL GROUND	
J20-15		STARTER RELAY LS DRIVER	
J20-13		RELAY COIL B+	
J11-17		CAN SHIELD	
J11-20		CAN HIGH	
J11-19		CAN LOW	
J11-21		KEY SWITCH LS DRIVER	
J20-3		RUN RELAY, LS DRIVER	
J20-17		LOW COOLANT LEVEL SIGNAL	(configurable input #3)
J20-18		LOW FUEL PRESSURE SIGNAL	(configurable input #4)
J11-11		TEMPERATURE SENSE	
J11-12		TEMPERATURE RETURN	

PCC 2300
CONTROL BOARD

AMBIENT TEMPERATURE SENSOR (A, B)

LOCAL E-STOP INPUT	J25-2	
GND	J25-6	
RELAY CNTL B+	J11-22	
GND	TB15-1	
DATA A	TB15-3	
DATA B	TB15-4	
WAKEUP	TB15-5	
PCC NET-A	J25-4	
PCC NET-B	J25-3	
WAKE-UP	J25-5	
RETURN	J25-8	
MANUAL	J25-10	
AUTO	J25-11	
B+	J25-12	

PE-1 PE-2 JE-1 JE-2

K3-6
J25-2 J25-6 J11-22
1-1 1-2 2-1 2-2
LOCAL E-STOP
(OPTION)

P3
SERVICE CONNECTOR
FOR AUTHORIZED
PERSONNEL ONLY

SPLICE 37 SPLICE 38 SPLICE 39 SPLICE 40

P1 J1

J29
1 RS485+
2 RS485–
3 WAKE-UP
4 AUTO
5 RTN
6 RUN
7
8
9 LAMP
10
11
12
13
14
15
320 OPERATOR PANEL (4-BUTTON)

J28
1 B +
2
3 B –
4

J1
1
2
3 RS485+
4 RS485–
5 WAKEUP
HMI 114 BARGRAPH (OPTION)
J6
1 B +
2 B –

PANEL LIGHT
P40 J40
PL-2 PL-1

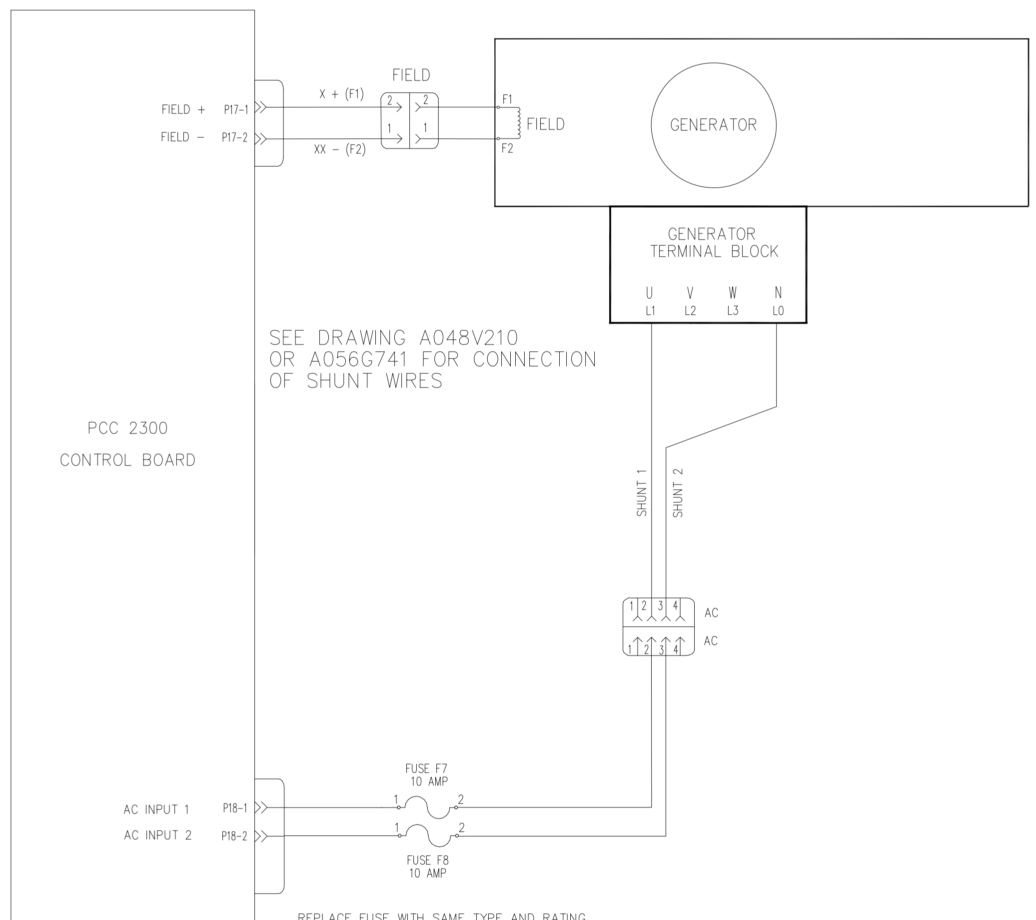
SPLICE 41

Customer Switched B+
10 amp

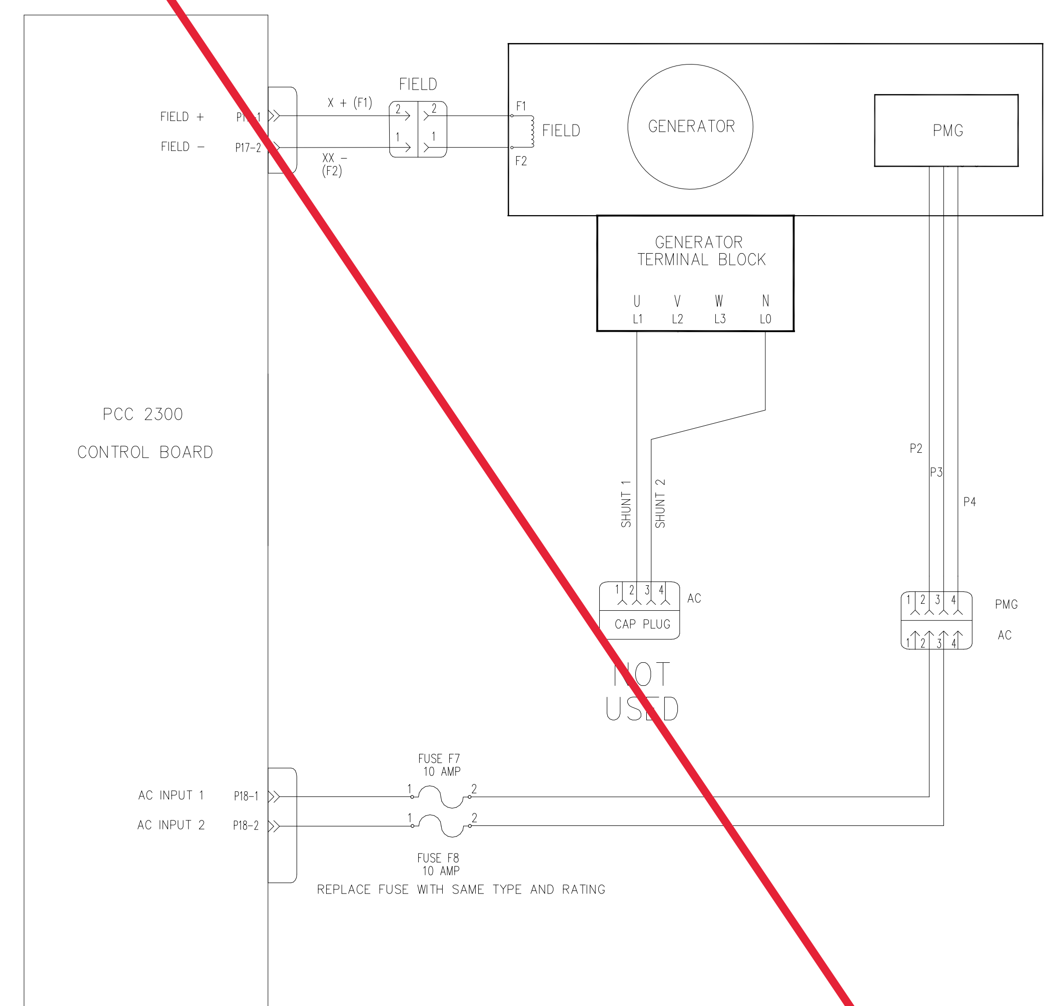
See Sheet 4

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS					
DIM	SCALE		DO NOT SCALE PRINT	DRN P_THEVAR	CUMMINS POWER GENERATION
X ± 1	0.00– 4.99 +0.15/–0.08			CKD P_LARSON	
.X ± 0.8	5.00– 9.99 +0.20/–0.10			APVD P_LARSON	SCHEMATIC,GENSET
.XX ± 0.38	10.00–17.49 +0.25/–0.13			DATE 01NOV16	8.9 LTR LEAN BURN
ANG TOL ± 1.0	SCALE 1/1	THIS DOCUMENT AND THE INFORMATION SHOWN THEREON IS CONFIDENTIAL AND PROPRIETARY AND SHALL NOT BE USED TO OTHERS OR REPRODUCED IN ANY FORM WITHOUT PRIOR WRITTEN CONSENT OF CUMMINS INC.	FOR INTERPRETATION OF DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009	FIRST USED ON ARROW	SITE CODE PGF	SIZE D	DWG NO A054N480	CHD SHEET 2 OF 6

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-181411	G	-	---	PT	MT	M_TULADHAR	01NOV18



SHUNT EXCITATION CONFIGURATION



PERMANENT MAGNET GENERATOR EXCITATION CONFIGURATION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

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

ANG TOL ± 1.0° | SCALE 1/1

SIM TO .

DO NOT SCALE PRINT

DWN P_THEVAR
CKD P_LARSON
APVD P_LARSON
DATE 01NOV16

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009

FIRST USED ON ARROW

SITE CODE PGF

CUMMINS POWER GENERATION

SCHEMATIC,GENSET

8.9 LTR LEAN BURN

DWG SIZE E | A054N480 | CAD SHEET 3 OF 6

REL NO	REV	NO	REVISION	DRN	CKD	APVD	DATE
ECO-181411	G	---	---	PT	MT	M_TULADHAR	01NOV18

CUSTOMER CONNECTIONS

TB1 — TB1-10 (GND)
TB2 — TB1-12 (CUSTOMER INPUT 1)
TB3 — TB1-13 (GND)
TB4 — TB1-14 (CUSTOMER INPUT 2)
TB5 — TB1-11 (REMOTE START INPUT)
TB6 — TB1-6 (OUTPUT 1 NO)
TB7 — TB1-7 (OUTPUT 1 COM)
TB8 — TB1-5 (PROTECTED 12V B+)
TB9 — TB1-4 (READY-TO-LOAD)
TB10 — SW B+

REMOVE JUMPER BETWEEN TB1-15 & TB1-16 WHEN REMOTE E-STOP IS INSTALLED

TB1-16 (REMOTE E-STOP)
TB1-15 (GND)

Customer Switched B+
10 amp fused

See Sheet 2

PCC 2300 CONTROL BOARD

CURRENT SENSING
P12-1 BROWN
P12-4 RED
P12-2 ORANGE
P12-5 YELLOW
P12-3 BLUE
P12-6 WHITE

CURRENT SENSOR HIGH-LOW RATIO SELECTION CONNECTOR *

* CONNECTED FOR LESS THAN 300V L-L
* NOT CONNECTED FOR GREATER THAN 300V L-L

GENERATOR
GROUND
POLARITY DOT FACES GENERATOR
CURRENT SENSOR

GENERATOR TERMINAL BLOCK
U L1 V L2 W L3 N L0

GEN-L1 P22-1
GEN-L2 P22-2
GEN-L3 P22-3
GEN-L0 P22-4

VOLTAGE SENSING

USE OUTER CIRCUIT BREAKER POLES FOR SINGLE PHASE

SEE CIRCUIT BREAKER LABEL FOR LUG TORQUE

MAIN CIRCUIT BREAKER
NEUTRAL
EQUIPMENT GROUND

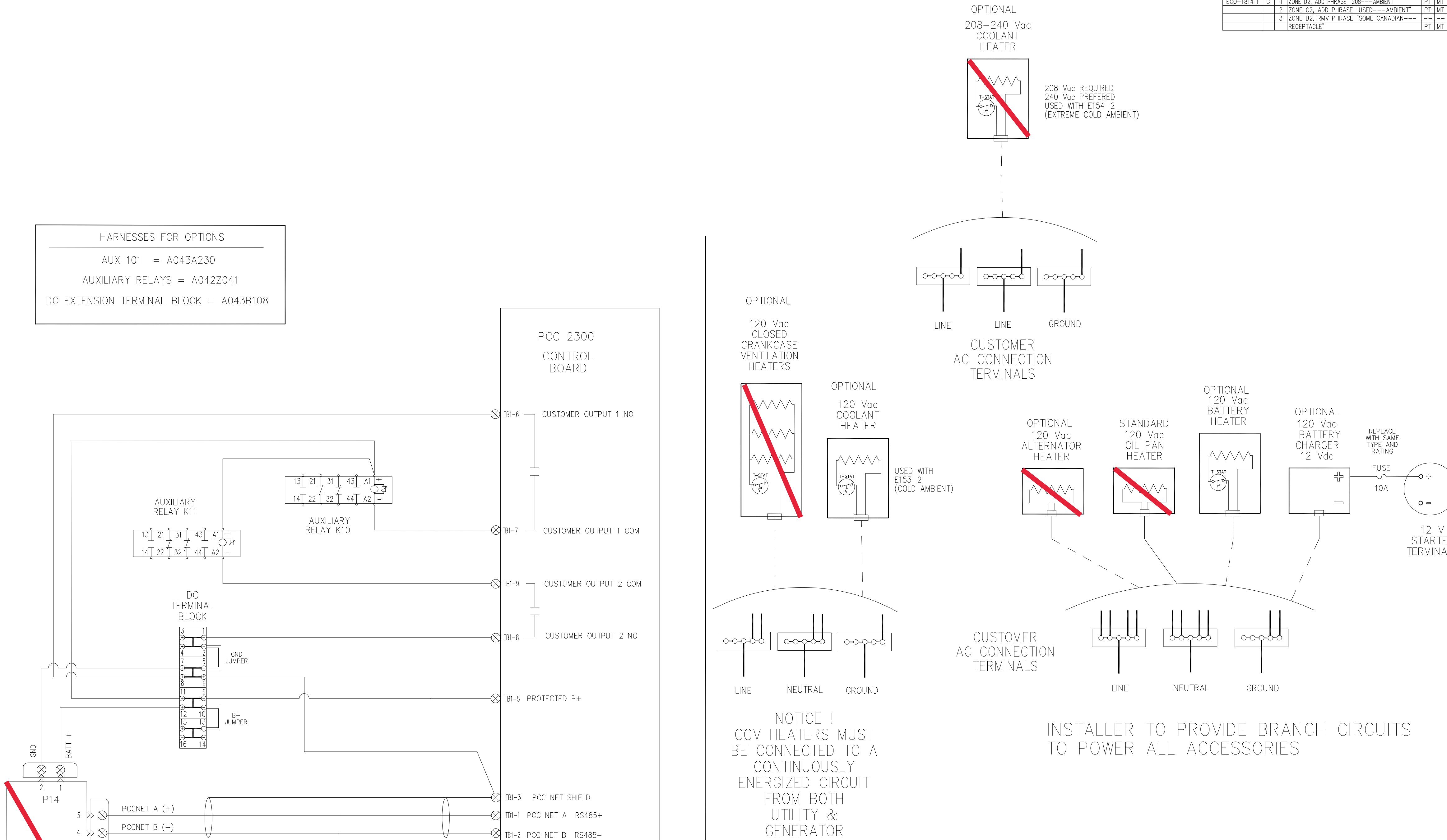
U L1 V L2 W L3 N L0
OPTIONAL SECOND AND THIRD CIRCUIT BREAKER
NEUTRAL
EQUIPMENT GROUND

SEE DRAWING A048V210 OR A056G741 FOR:
- VOLTAGE SENSING CONNECTION
- GENERATOR CONNECTION
- CURRENT SENSOR INSTALLATION

CUSTOMER CONNECTIONS		
TERMINAL NAME	SIGNAL NAME	DESCRIPTION
TB1	CUSTOMER GROUND	GROUND (3A MAX)
TB2	CUSTOMER INPUT 1	DISCRETE INPUT, ACTIVE BY GROUND SIGNAL FROM (TB3)
TB3	GROUND FOR CUSTOMER INPUTS	GROUND SIGNAL FOR CUSTOMER INPUT 1 (TB2) and INPUT 2 (TB4)
TB4	CUSTOMER INPUT 2	DISCRETE INPUT, ACTIVE BY GROUND SIGNAL FROM (TB3)
TB5	REMOTE START	ACTIVATED BY APPLYING GROUND SIGNAL FROM (TB1)
TB6	CUSTOMER OUTPUT 1	RELAY COMMON CONNECTION. CONTACT RATING: 3.5A, 30VDC
TB7	CUSTOMER OUTPUT 1	RELAY NORMALLY OPEN CONNECTION. CONTACT RATING: 3.5A, 30VDC
TB8	PROTECTED B+	12VDC, 3A PROTECTED
TB9	READY TO LOAD	LOW SIDE DRIVER GROUND OUPUT. ACTIVE WHEN GENERATOR IS READY TO ACCEPT LOAD. RATINGS: 250mA, 1A INRUSH, 30VDC 100 uA LEAKAGE IN OFF STATE.
TB10	SWITCHED B+	12VDC, ACTIVE WHEN GENERATOR IS IN RUN STATE (10A FUSED).

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DO NOT SCALE PRINT
DRN P_THEVAR
CKD P_LARSON
APVD P_LARSON
DATE 01NOV16
ANG TOL ± 1.0
SCALE 1/1
NEXT USED ON ARROW
SITE CODE PGF

CUMMINS POWER GENERATION
SCHEMATIC,GENSET
8.9 LTR LEAN BURN
SIZE E
A054N480
CAD SHEET 4 OF 6



NOTICE !
CCV HEATERS MUST BE CONNECTED TO A CONTINUOUSLY ENERGIZED CIRCUIT FROM BOTH UTILITY & GENERATOR

INSTALLER TO PROVIDE BRANCH CIRCUITS TO POWER ALL ACCESSORIES

AUXILIARY 101 BOARD

AUXILIARY RELAYS

DC EXTENSION TERMINAL BLOCKS

FOLLOW REGIONAL REGULATIONS AND APPLICABLE ELECTRIC CODES FOR ACCESSORIES WIRING INSTALLATION

Coolant heater (1) 1500 Watts, 120Vac, 12.5 amps

~~Coolant heater (2) 2000 Watts, 240Vac, 8.4 amps /~~
1500 Watts, 208Vac, 7.2 amps

Battery heater 125 Watts, 120Vac, 1.1 amps

~~Oil pan heater 150 Watts, 120Vac, 1.3 amps~~

~~Alternator heater 100 Watts, 120Vac, 0.9 amps~~

Battery charger 192 Watts, 120Vac, 1.7 amps

~~CCV heaters 120 Watts, 120Vac, 1.0 amps~~

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-181411	G	1	ZONE D2, ADD PHRASE "208---AMBIENT"	PT	MT	M_TULADHAR	01NOV18
		2	ZONE C2, ADD PHRASE "USED---AMBIENT"	PT	MT	M_TULADHAR	01NOV18
		3	ZONE B2, RMV PHRASE "SOME CANADIAN---	--	--	--	--
			RECEPTACLE"	PT	MT	M_TULADHAR	01NOV18

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS
DIM: X ± 1; .X ± 0.8; .XX ± 0.38
HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13
ANG TOL ± 1.0° SCALE 1/1
SIM TO .
DO NOT SCALE PRINT
DWN P_THEVAR
CKD P_LARSON
APVD P_LARSON
DATE 01NOV16
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5-2009
FIRST USED ON ARROW
SITE CODE PGF
CUMMINS POWER GENERATION
SCHEMATIC,GENSET
8.9 LTR LEAN BURN
DWG SIZE E A054N480
CAD SHEET 5 OF 6

PTC® Creo® Parametric

REL NO	REV	NO	REVISION	DRN	CKD	APVD	DATE
ECO-181411	G	---	---	PT	MT	M_TULADHAR	01NOV18

SINGLE FUEL C002-2 Natural Gas

PRIMARY FUEL VALVE

NAT GAS B+
(RED)

NAT GAS LOCK
(YELLOW)

PROPANE LOCK
(WHITE)

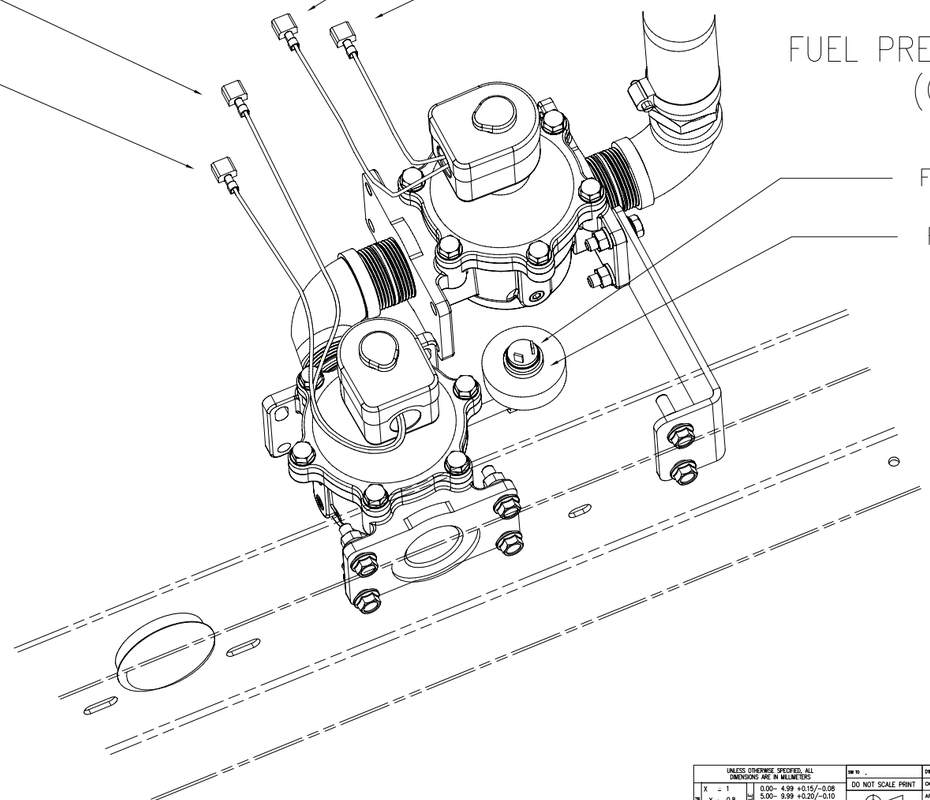
PROPANE JUMPER
(WHITE)

PROPANE B+
(RED) NOT USED

FUEL VALVE

FUEL VALVE B+
(RED)

FUEL VALVE GND
(ORANGE)



FUEL PRESSURE SWITCH
(Optional)

FUEL SW COM

FUEL SW N.O.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS			DIM TO :	DRN P_THEVAR
DIM: X ± 1, X ± 0.8, XX± 0.38	DECS: 0.00= 4.99 ±0.15/-0.08; 5.00= 9.99 ±0.20/-0.10; 10.00=17.49 ±0.25/-0.13; 17.50=24.99 ±0.30/-0.13		DO NOT SCALE PRINT	CKD P_LARSON; APVD P_LARSON; DATE 01NOV16
ANG TOL ± 1.0	SCALE 1/1	THIS DOCUMENT AND THE INFORMATION CONTAINED IS CONFIDENTIAL AND PROPRIETARY TO CUMMINS INC. ANY REPRODUCTION IN WHOLE OR IN PART OR ANY DISTRIBUTION TO OTHERS IN HARD COPY OR ELECTRONIC FORM, DISCLOSURE OF ANY DETAIL OR USED FOR ANY PURPOSE WITHOUT WRITTEN CONSENT OF CUMMINS INC.	FOR INTERPRETATION OF DIMENSIONS AND TOLERANCING, SEE ASME Y14.5-2009	PART USED IN ARROW

CUMMINS POWER GENERATION

SCHEMATIC,GENSET

SITE CODE PGF

R.G. LTR LEAN BURN

SIZE F | DWG NO A054N480 | CAD SHEET 6 OF 6

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-165950	A	1	PRODUCTION RELEASE	AGJ	AGJ	M_WICKMANN	07NOV16

SEISMIC INSTALLATIONS NOTES:

1. THE DESIGN OF POST-INSTALLED ANCHORS IN CONCRETE USED FOR THE COMPONENT ANCHORAGE IS PRE-QUALIFIED FOR SEISMIC APPLICATIONS IN ACCORDANCE WITH "ACI 355.2-07" AND DOCUMENTED IN A REPORT BY A REPUTABLE TESTING AGENCY. (EX. THE EVALUATION SERVICE REPORT ISSUED BY THE INTERNATIONAL CODE COUNCIL)

2. ANCHORS MUST BE INSTALLED TO AN EMBEDMENT DEPTH AS RECOMMENDED IN THE PRE-QUALIFICATION TEST REPORT AS DEFINED IN NOTE 1. FOR "CBC 2016" APPLICATIONS.

3. ANCHORS MUST BE INSTALLED IN MINIMUM 3000 PSI COMPRESSIVE STRENGTH NORMAL WEIGHT STRUCTURAL CONCRETE. CONCRETE AGGREGATE MUST COMPLY WITH "ASTM C33".

4. ANCHORS MUST BE INSTALLED TO THE TORQUE SPECIFICATION AS RECOMMENDED BY THE ANCHOR MANUFACTURER.

5. ANCHORS MUST BE INSTALLED IN LOCATIONS SPECIFIED ON THIS INSTALLATION DRAWING.

6. WASHERS MUST BE INSTALLED AT EACH ANCHOR LOCATION BETWEEN THE ANCHOR HEAD AND EQUIPMENT FOR TENSION LOAD DISTRIBUTION. WASHERS MUST BE TYPE A OR B PLAIN WASHERS MEETING ASME B18.21.1-2009. WASHER SIZE TO MATCH ANCHOR DIAMETER.

7. CONCRETE FLOOR SLAB AND CONCRETE HOUSEKEEPING PADS MUST BE DESIGNED FOR SEISMIC APPLICATIONS IN ACCORDANCE WITH "ACI 318-11".

8. ALL HOUSEKEEPING PAD THICKNESSES MUST BE DESIGNED IN ACCORDANCE WITH THE PRE-QUALIFICATION TEST REPORT AS DEFINED IN NOTE 1 OR A MINIMUM OF 1.5X THE ANCHOR EMBEDMENT DEPTH, WHICHEVER IS LARGEST (UNLESS NOTED OTHERWISE).

9. ALL HOUSEKEEPING PADS MUST BE DOWELLED OR CAST INTO THE BUILDING STRUCTURAL FLOOR SLAB AND DESIGNED FOR SEISMIC APPLICATION PER "ACI 318-11" AND AS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.

10. FLOOR MOUNTED EQUIPMENT (WITH OR WITHOUT A HOUSEKEEPING PAD) MUST BE INSTALLED TO A STEEL REINFORCED STRUCTURAL CONCRETE FLOOR THAT IS SEISMICALLY DESIGNED AND APPROVED BY THE ENGINEER OF RECORD TO RESIST ALL LOADS FROM EQUIPMENT BEING ANCHORED TO THE FLOOR.

11. COORDINATE REINFORCEMENT OF SUPPORT STRUCTURE WITH EQUIPMENT ANCHOR LOCATIONS.

12. ATTACHING SEISMIC CERTIFIED EQUIPMENT TO FLOOR OTHER THAN THOSE DESIGNED TO ACCEPT THE SEISMIC LOADS FROM CERTIFIED EQUIPMENT BY THE STRUCTURAL ENGINEER OF RECORD IS PROHIBITED.

13. INSTALLATION ONTO A STEEL ROOF STRUCTURE OR MANUFACTURED STEEL CURB SHALL BE COORDINATED WITH THE STRUCTURAL ENGINEER OF RECORD.

14. CONNECTIONS TO THE EQUIPMENT, INCLUDING BUT NOT LIMITED TO CONDUIT, WIRING FROM CABLE TRAYS, OTHER ELECTRICAL SERVICES OR OTHER CONNECTIONS, ARE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR AND BEYOND THE SCOPE OF THIS DOCUMENT. FLEXIBLE ATTACHMENTS MUST BE USED FOR SEISMIC CONNECTIONS TO ISOLATED COMPONENTS OR ISOLATED EQUIPMENT. THE FLEXIBLE ATTACHMENT MUST PROVIDE FOR ENOUGH RELATIVE DISPLACEMENT TO REMAIN CONNECTED TO THE EQUIPMENT AND FUNCTIONAL DURING AND AFTER A SEISMIC EVENT.

15. REFER TO GENSET OUTLINE DRAWINGS FOR WEIGHT, CG AND CONFIGURATION SPECIFICS.

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

SIM TO NONE
DO NOT SCALE PRINT
- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP

DWN A_JOHNSON
CKD A_JOHNSON
APVD M_WICKMANN
DATE 07NOV16
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994. FIRST USED ON ARROW

SITE CODE PGF

CUMMINS POWER GENERATION
INSTALLATION, GENSET
SEISMIC REQUIREMENTS
DWG SIZE D | A056M541 | SHEET 1 of 4 | DWG REV A

Regulatory Review and Approval is required prior to changing this item per PGG 1-01-01-116. This item impacts compliance with these External Regulations: IBC,OSHPD

Drawing Name: A056M542 Revision: A
Part Name: A056M541 Revision: A
ECO-165950 Sheet 1 of 5

PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-165950	A	1	PRODUCTION RELEASE	AGJ	AGJ	M_WICKMANN	07NOV16

GRADE MOUNTED GENERATOR SETS

CUMMINS GENSET MODEL	CONFIGURATION	ATTACHMENT TO CONCRETE					
		EVALUATION PARAMETERS	CONCRETE ANCHORS	ANCHOR EMBEDMENT	ANCHOR SPACING	DISTANCE TO NEAREST EDGE	CONCRETE SLAB THICKNESS
C125 N6 C150 N6	GENERATOR SET WITH OR WITHOUT ENCLOSURE	CBC 2016/IBC 2015 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h = 1.0 Ω = 2.5	SEE NOTE				

NOTE: TYPE OF ANCHOR, ANCHOR ATTACHMENT SPECIFICS AND MINIMUM SLAB THICKNESS TO BE DESIGNED BY ENGINEER OF RECORD.

GRADE/ROOF MOUNTED GENERATOR SETS

CUMMINS GENSET MODEL	CONFIGURATION	ATTACHMENT TO STEEL	
		EVALUATION PARAMETERS	STEEL BOLTS
C125 N6 C150 N6	GENERATOR SET WITH OR WITHOUT ENCLOSURE	CBC 2016/IBC 2015 Sds <= 2.5 Ip <= 1.5 ap/Rp <= 2.5/2.0 z/h <= 1.0	(QTY 6) 5/8" DIAMETER ASTM A325N OR A490 BOLTS WITH WASHERS THROUGH THE BASE RAIL MOUNTING HOLES.

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

SIM TO NONE
DO NOT SCALE PRINT
- CONFIDENTIAL -
PROPERTY OF CUMMINS POWER GENERATION GROUP

DWN A_JOHNSON
CKD A_JOHNSON
APVD M_WICKMANN
DATE 07NOV16
FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING REF ASME Y14.5M-1994
FIRST USED ON ARROW

SITE CODE PGF

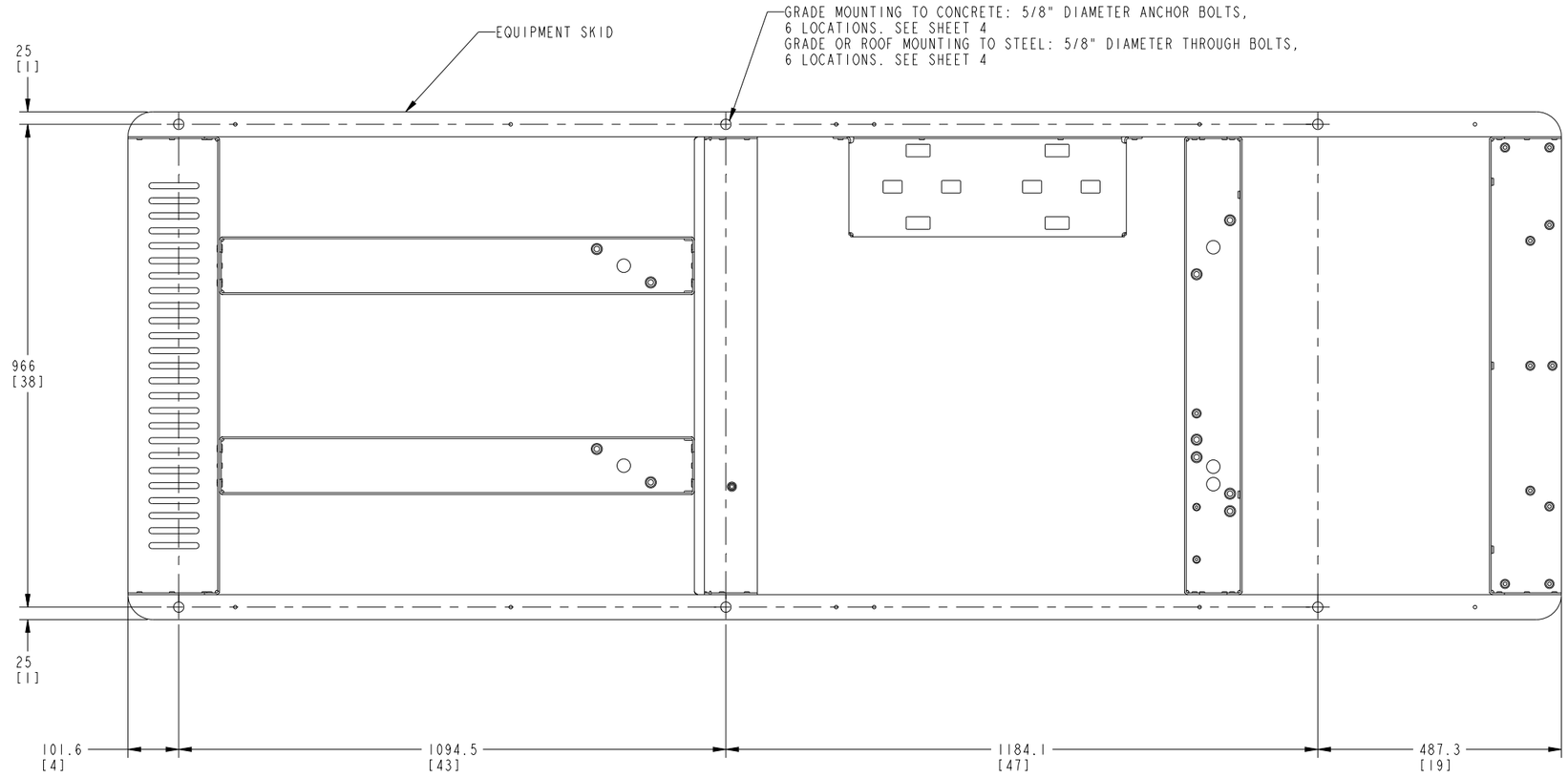
CUMMINS POWER GENERATION
INSTALLATION, GENSET
SEISMIC REQUIREMENTS
DWG SIZE D | A056M541 | SHEET 2 OF 4 | DWG REV A

Regulatory Review and Approval is required prior to changing this item per PGG 1-01-01-116. This item impacts compliance with these External Regulations: IBC,OSHPD

Drawing Name: A056M542 Revision: A
Part Name: A056M541 Revision: A
ECO-165950 Sheet 2 of 5

PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-165950	A	1	PRODUCTION RELEASE	AGJ	AGJ	M_WICKMANN	07NOV16



SCALE 3/16

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

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

ANG TOL: ± 1.0° SCALE: 1/1

SIM TO NONE

DO NOT SCALE PRINT

- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP

DWN A_JOHNSON
CKD A_JOHNSON
APVD M_WICKMANN
DATE 07NOV16

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

SITE CODE PGF

CUMMINS POWER GENERATION

INSTALLATION, GENSET
SEISMIC REQUIREMENTS

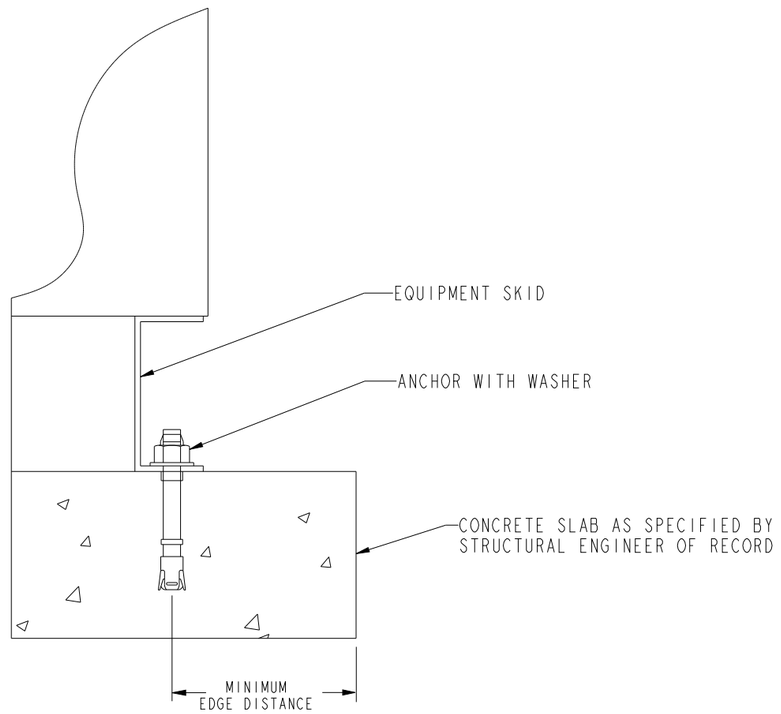
DWG SIZE D | A056M541 | SHEET 3 of 4 | DWG REV A

Regulatory Review and Approval is required prior to changing this item per PGG 1-01-01-116. This item impacts compliance with these External Regulations: IBC,OSHPD

Drawing Name: A056M542 Revision: A
Part Name: A056M541 Revision: A
ECO-165950 Sheet 3 of 5

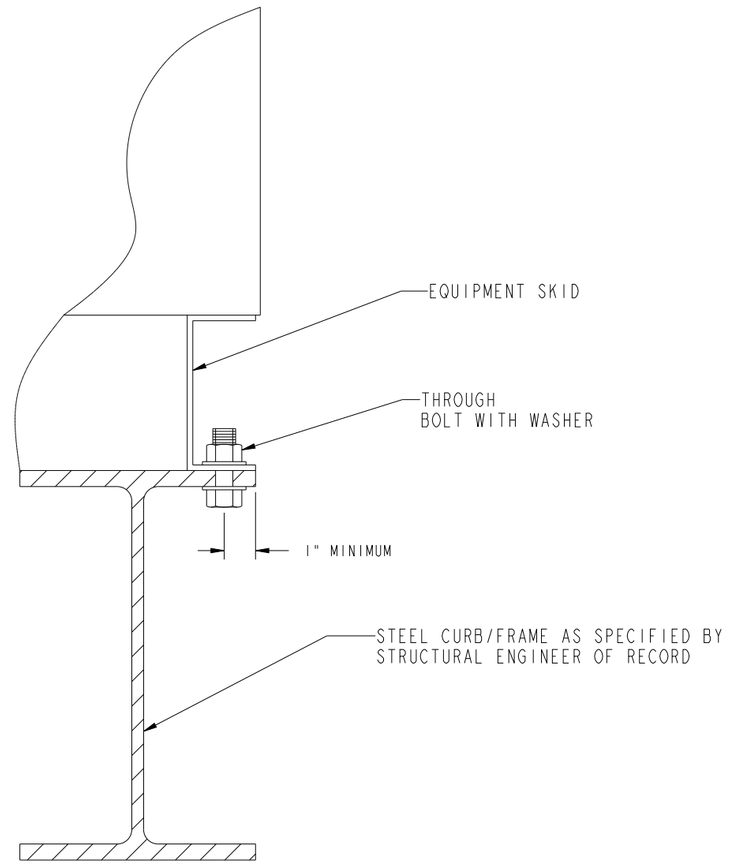
PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-165950	A	1	PRODUCTION RELEASE	AGJ	AGJ	M_WICKMANN	07NOV16



TO BE DESIGNED BY ENGINEER OF RECORD

CONCRETE CONNECTION



STEEL CONNECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

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

ANG TOL: ± 1.0° SCALE: 1/1

SIM TO NONE

DO NOT SCALE PRINT

- CONFIDENTIAL -
PROPERTY OF CUMMINS POWER GENERATION GROUP

DWN	A_JOHNSON
CKD	A_JOHNSON
APVD	M_WICKMANN
DATE	07NOV16

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, REF ASME Y14.5M-1994 — FIRST USED ON: ARROW

SITE CODE: PGF

CUMMINS POWER GENERATION

INSTALLATION, GENSET
SEISMIC REQUIREMENTS

DWG SIZE: D | A056M541 | SHEET 4 OF 4 | DWG REV: A

Regulatory Review and Approval is required prior to changing this item per PGG 1-01-01-116. This item impacts compliance with these External Regulations: IBC,OSHPD

Drawing Name: A056M542 Revision: A
Part Name: A056M541 Revision: A
ECO-165950 Sheet 4 of 5

Specification sheet

OTEC Transfer Switch Open Transition

40 – 1200 amp

Description

OTEC transfer switches are designed for operation and switching of electrical loads between primary power and Standby generator sets. They are suitable for use in emergency, legally required, and optional Standby applications. The switches monitor both power sources, signal generator set startup, automatically transfer power, and return the load to the primary power source once a stable utility is available. The fully integrated controller is designed for practical functionality, with LED indicators and digital pushbuttons for ease of operator use.

Features

Microprocessor control - Easy-to-use, standard control. LEDs display transfer switch status; pushbuttons allow operator to activate control test, exercise timing and transfer mode.

Programmed transition – Open transition timing can be adjusted to completely disconnect the load from both sources for a programmed time period, as recommended by NEMA MG-1 for transfer of inductive loads.

Advanced transfer switch mechanism – Unique bi-directional linear actuator provides virtually frictionfree, constant force, straight-line transfer switch action during automatic operation.

Manual operation - Manual operating handles, shielded termination, and over-center contact mechanisms allow effective manual operation under deenergized conditions.

Positive interlocking - Mechanical and electrical interlocking prevent source-to-source connection through the power or control wiring.

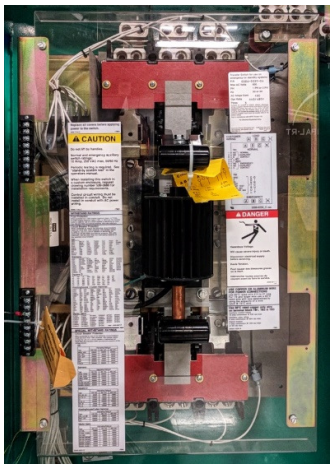
Main contacts - Heavy-duty silver alloy contacts and multi-leaf arc chutes are rated for motor loads or total system load transfer. They require no routine contact maintenance. Continuous load current not to exceed 100% of switch rating and Tungsten loads not to exceed 30% of switch rating.

Easy service/access - Single-plug harness connection and compatible terminal markings simplify servicing. Access space is ample. Door-mounted controls are field-programmable; no tool is required.

Complete product line - Cummins offers a wide range of equipment, accessories and services to suit virtually any backup power application.

Warranty and service - Products are backed by a comprehensive warranty and a worldwide network of distributors with factory-trained service technicians.

Transfer switch mechanism



- Transfer switch mechanism is electrically operated and mechanically held in the Source 1 and Source 2 positions. The transfer switch incorporates electrical and mechanical interlocks to prevent inadvertent interconnection of the sources.
- Independent break-before-make action is used for both 3-pole and 4-pole/switched neutral switches. This design allows use of sync check operation when required, or control of the operating speed of the transfer switch for proper transfer of motor and rectifier-based loads (programmed transition feature).
- True 4-pole switching allows for proper ground (earth) fault sensing and consistent, reliable operation for the life of the transfer switch. The neutral poles of the transfer switch have the same ratings as the phase poles and are operated by a common crossbar mechanism, eliminating the possibility of incorrect neutral operation at any point in the operating cycle, or due to failure of a neutral operator.
- Electrical interlocks prevent simultaneous closing signals to normal and emergency contacts and interconnection of normal and emergency sources through the control wiring
- High pressure silver alloy contacts resist burning and pitting. Separate arcing surfaces further protect the main contacts. Contact wear is reduced by multiple leaf arc chutes that cool and quench the arcs. Barriers separate the phases to prevent interphase flashover. A transparent protective cover allows visual inspection while inhibiting inadvertent contact with energized components.
- Switch mechanism, including contact assemblies, is third-party certified to verify suitability for applications requiring high endurance switching capability for the life of the transfer switch. Withstand and closing ratings are validated using the same set of contacts, further demonstrating the robust nature of the design.

Specifications

Voltage rating	Transfer switches rated from 40 A through 1200 A are rated up to 600 VAC, 50 or 60 Hz.
Arc interruption	Multiple leaf arc chutes cool and quench the arcs. Barriers prevent interphase flashover.
Neutral bar	A full current-rated neutral bar with lugs is standard on enclosed 3-pole transfer switches.
Auxiliary contacts	Two contacts (one for each source) are provided for customer use. Wired to terminal block for easy access. Rated at 10A Continuous and 250 VAC maximum.
Operating temperature	-22 ˚F (-30 ˚C) to 140 ˚F (60 ˚C)
Storage temperature	-40 ˚F (-40 ˚C) to 140 ˚F (60 ˚C)
Humidity	Up to 95% relative, non-condensing
Altitude	Up to 10,000 ft (3,000 m) without derating
Total transfer time (source-to-source)	Will not exceed 6 cycles at 60 Hz with normal voltage applied to the actuator and without delayed transition enabled.
Manual operation handles	Transfer switches are equipped with permanently attached operating handles and quickbreak, quick-make contact mechanisms suitable for manual operation under de-energized conditions.

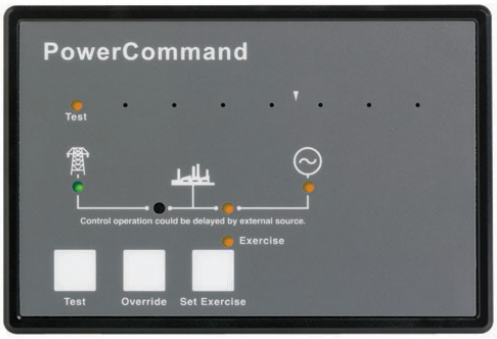
Transition Modes

Open transition/programmed – Controls the time required for the device to switch from source to source, so that the load-generated voltages decay to a safe level before connecting to an energized source. Recommended by NEMA MG-1 to prevent nuisance tripping breakers and load damage. Adjustable 0-10 seconds, default 0 seconds.

Open transition/in-phase – Initiates open transition transfer when in-phase monitor senses both sources are in phase. Operates in a break-before-make sequence. Includes ability to enable programmed transition as a backup. If sources are not in phase within 120 seconds, the system will transfer using programmed transition.

Microprocessor control

- Simple, easy-to-use control provides transfer switch information and operator controls
- LED lamps for source availability and source connected indication, exercise mode, and test mode. LED status lamps also provided for control set-up and configuration.
- Pushbutton controls for initiating test, overriding time delays and setting exercise time.
- Field-configurable for in-phase open or programmed open transition.
- Integral exerciser clock
- Control is prototype-tested to withstand voltage surges per EN60947-6-1.
- Gold-flashed generator start contacts



Control functions

Voltage sensing: All phases on the normal source and single phase on generator source. Normal Source Pickup: adjustable 90-95%, Dropout: adjustable 70-90% of nominal voltage; Generator Source Pickup: 90%, dropout: 75% of nominal voltage.

Frequency sensing: Generator Source Pickup: 90% of nominal frequency; Dropout: 75% of nominal frequency.

Exerciser clock: Switch is furnished with an integral engine exerciser configurable for operation on a 7, 14, 21, or 28-day cycle with a fixed exercise period duration of 20 minutes. A 12-hr exerciser time offset allows for the convenient setting of exercise time without the need to activate the timer at the exact time that you need to schedule the generator exercise for. Software selectable capability allows for the exercising of the generator with or without load.

Time-delay functions

Engine start: Prevents nuisance genset starts due to momentary power system variation or loss. Adjustable: 0-10 seconds; default: 3 seconds

Transfer normal to emergency: Allows genset to stabilize before application of load. Prevents power interruption if normal source variation or loss is momentary. Allows staggered transfer of loads in multiple transfer switch systems. Adjustable 0-300 seconds, default 5 seconds.

Retransfer emergency to normal: Allows the utility to stabilize before retransfer of load. Prevents needless power interruption if return of normal source is momentary. Allows staggered transfer of loads in multiple transfer switch systems. Adjustable 0-30 minutes, default 10 minutes.

Genset stop: Maintains availability of the genset for immediate reconnection in the event that the normal source fails shortly after transfer. Allows gradual genset cool down by running unloaded. Adjustable 0-30 minutes, default 10 minutes.

Delayed (programmed) transition: Controls the speed of operation of the transfer switch power contacts to allow load generated voltages from inductive devices to decay prior to connecting a live source. Adjustable 0-10 seconds, default 0 seconds.

Elevator signal: Provides a relay output contact for the elevator signal relay (load disconnect). The signal can also be configured to provide a post transfer delay of the same duration. Adjustable: 0-300 seconds (requires optional elevator signal relay for use).

Options

Elevator signal relay: Provides a relay output contact for the signal relay function

Programmable exerciser clock: Provides a fully-programmable 7-day clock to provide greater flexibility in scheduling exercise periods than standard integral exerciser. Time-of-day setting feature operates generator during periods of high utility rates.

UL withstand and closing ratings

The transfer switches listed below must be protected by circuit breakers or fuses. Referenced drawings include detailed listings of specific breakers or fuse types that must be used with the respective transfer switches. Consult with your distributor/dealer to obtain the necessary drawings. Withstand and Closing Ratings (WCR) are stated in symmetrical RMS amperes..

Transfer switch ampere	MCCB protection			Special circuit breaker protection		
	WCR @ volts max with specific manufacturers MCCBs	Max MCCB ratings	Drawing reference	With specific current limiting breakers (CLB)	Max CLB rating	Drawing reference
40, 70, 125 3-pole	14,000 at 600	225 A	A050J441	200,000 @ 600	225 A	A048J566
40, 70, 125 4-pole	30,000 at 600	400 A	A048E949	200,000 @ 600	400 A	A051D533
150, 225, 260	30,000 at 600	400 A	A048E949	200,000 @ 600	400 A	A051D533
300, 400, 600	65,000 at 600	1200 A	A056M829	200,000 @ 600	1200 A	A048J564
800, 1000	65,000 @ 480 50,000 @ 600	1400 A	A056M821	200,000 @ 600	1400 A	A048J562
1200	85,000 @ 480 65,000 @ 600	1600 A	A056M825	200,000 @ 600	1600 A	A048P186

Fuse Protection

Transfer switch ampere	WCR @ volts max. with current limiting fuses	Max fuse, size and type	Drawing reference
40, 70, 125 3- and 4-pole	200,000 at 600	200 A Class, J, RK1, RK5, T	A050J441
150, 225, 260	200,000 at 600	1200 A Class L or T, or 600 A class J, RK1, RK5	A048E949
300, 400, 600	200,000 at 600	1200 A Class L or T, or 600 A Class, J, RK1, RK5	A056M829
800, 1000	200,000 at 600	2000 A Class L or 1200 A class T or 600 A class J, RK1, RK5	A056M821
1200	200,000 at 600	2000 A Class L or 1200 A class T or 600 A class J, RK1, RK5	A056M825

3-cycle ratings

Transfer switch ampere	WCR @ volts max 3 cycle rating	Max MCCB rating	Drawing reference
300, 400, 600	25,000 at 600	1200 A	A056M829
800, 1000	35,000 at 600	1400 A	A056M821
1200	42,000 at 600 50,000 at 480	1600 A	A056M825

Enclosures

The transfer switch and control are wall-mounted in a key-locking enclosure. Wire bend space complies with 2008 NEC.

Dimensions - transfer switch in UL type 1 enclosure

Amp rating	Height		Width		Depth				Weight		Outline drawing
					Door closed		Door open				
	in	mm	in	mm	in	mm	in	mm	lb	kg	
40, 70, 125 3-pole	27.0	686	20.5	521	12.0	305	31.5	800	82	37	0310-0544
40, 70, 125 4-pole	35.5	902	26.0	660	16.0	406	41.0	1042	165	75	0500-4896
150, 225	35.5	902	26.0	660	16.0	406	41.0	1042	165	75	0310-0414
260	43.5	1105	28.5	724	16.0	406	43.0	1093	170	77	0310-0540
300, 400, 600	54.0	1372	25.5	648	18.0	457	42.0	1067	225	102	0310-1307
800, 1000	68.0	1727	30.0	762	19.5	495	48.5	1232	360	163	0310-0417
1200	90.0	2286	39.0	991	27.0	698	63.0	1600	730	331	A030L411

Dimensions - transfer switch in UL type 3R, 4, 4x, or 12 enclosure

Amp rating	Height		Width		Depth				Weight		Cabinet type	Outline drawing
					Door closed		Door open					
	in	mm	in	mm	in	mm	in	mm	lb	kg		
40, 70, 125 3-pole	34.0	864	26.5	673	12.5	318	36.5	927	125	57	3R, 12	0310-0453
											4	0310-0445
	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
40, 70, 125 4-pole	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R, 12	0500-4896
											4	0500-4896
	46.0	1168	32.0	813	16.0	406	46.0	1168	215	102	4X	0500-4184
150, 225	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R, 12	0310-0453
											4	0310-0446
	46.0	1168	32.0	813	16.0	406	46.	1168	255	102	4X	0500-4184
260	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	3R, 12	0310-0455
											4	0310-0447
											4X	0500-4184
300, 400, 600	59.0	1499	27.5	699	16.5	419	41.5	1054	275	125	3R, 12	0310-1315
											4	0310-1316
	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	4X	0500-4185
800, 1000	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	3R, 12	0310-0457
											4	0310-0449
											4X	0500-4185
1200	90.0	2286	39.0	991	27.0	698	63.0	1600	730	331	3R, 12	A030L411
											4, 4X	A041N370

Transfer switch lug capacities

All lugs 90˚C rated and accept copper or aluminum wire unless indicated otherwise.

Transfer switch ampere	Cables per phase	Size
40, 70, 125 3-pole	1	#12 AWG-2/0
40 4-pole	1	#12 AWG-2/0
70, 125 4-pole	1	#6 AWG - 300 MCM
150, 225	1	#6 AWG - 300 MCM
260	1	#6 AWG - 400 MCM
300, 400	2	One accepts 3/0 AWG - 600 MCM and One #4 AWG - 250 MCM
600	2	250 - 500 MCM
800, 1000	4	250 - 500 MCM
1200	4	#2 AWG to 600 MCM standard (feature N045) 1/0 AWG to 750 MCM optional (feature N066) Compression Lug Adapter optional (feature N032)

Certification

All switches are UL 1008 Listed with UL Type Rated cabinets and UL Listed CU-AL terminals.

All switches are certified to CSA 282 Emergency Electrical Power Supply for Buildings, up to 600 VAC.

Suitable for use in emergency, legally required and Standby applications per NEC 700, 701 and 702.

All switches comply with NFPA 70, 99 and 110 (Level 1).

All switches comply with NEMA ICS 10.

All switches comply with IEEE 446 Recommended Practice for Emergency and Standby Power Systems.

This transfer switch is designed and manufactured in facilities certified to ISO9001.

Submittal detail

Amperage ratings

- 40
- 70
- 125
- 150
- 225
- 260
- 300
- 400
- 600
- 800
- 1000
- 1200

Voltage ratings

- R020 120
- R038 190
- R021 208
- R022 220
- R023 240
- R024 380
- R025 416
- R035 440
- R026 480
- R027 600

Pole configuration

- A028 Poles - 3 (solid neutral)
- A029 Poles - 4 (switched neutral)

Frequency

- A044 60 Hertz
- A045 50 Hertz

Application

- A035 Utility-to-genset

System options

- A041 Single phase, 2-wire or 3-wire
- A042 Three phase, 3-wire or 4-wire

Enclosure

- B001 Type 1: general purpose indoor (similar to IEC
- Type IP30)
- B002 Type 3R: intended for outdoor use, provides some protection from dirt, rain and snow (similar to IEC Type IP34)
- B003 Type 4: indoor or outdoor use, provides some protection from wind-blown dust and water spray (similar to IEC Type IP65)
- B010 Type 12: indoor use, some protection from dust (similar to IEC Type IP61)
- B025 Type 4X: stainless steel, indoor or outdoor use, provides some protection from corrosion (similar to IEC Type IP65)

Standards

- A046 UL 1008/CSA certification
- A080 Seismic certification

Control voltage

- M033 12V, Genset starting voltage
- M034 24V, Genset starting voltage

Control options

- J030 External exercise clock
- M032 Elevator signal relay

Battery chargers

- K001 2 Amps, 12/24 Volts
- KB59 15 Amps, 12 Volts
- KB60 12 Amps, 24 Volts

Auxiliary relays

Relays are UL Listed and factory installed. All relays provide (2) normally closed isolated contacts rated 10A @ 600 VAC. Relay terminals accept (1) 18 gauge to (2) 12 gauge wires per terminal.

- L101 24 VDC coil - installed, not wired (for customer use).
- L102 24 VDC coil - emergency position – relay energized when switch is in source 2 (emergency) position.
- L103 24 VDC coil - normal position - relay energized when switch is in source 1 (normal) position
- L201 12 VDC coil installed, not wired (for customer use)
- L202 12 VDC coil - emergency position – relay energized when switch is in source 2 (emergency) position
- L203 12 VDC coil - normal position - relay energized when switch is in source 1 (normal) position

Miscellaneous options

- C027 Cover - guard
- M003 Terminal block - 30 points (not wired)

Optional lug kits

- N032 Lug adapters, compression, ½ stab (1200A only)
- N045 Cable lugs, mechanical, 600 MCM, 4 per pole (1200A only)
- N066 Cable lugs, mechanical, 750 MCM, 4 per pole (1200A only)

Warranty

- G009 1 year comprehensive
- G004 2 year comprehensive
- G006 5 year basic
- G007 5 year comprehensive
- G008 10 year major components

Shipping

- A051 Packing – export box (800-1000 A)

Accessories

- AC-170 Accessories specifications sheet

Specifications are subject to change without notice.

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

Our energy working for you.™

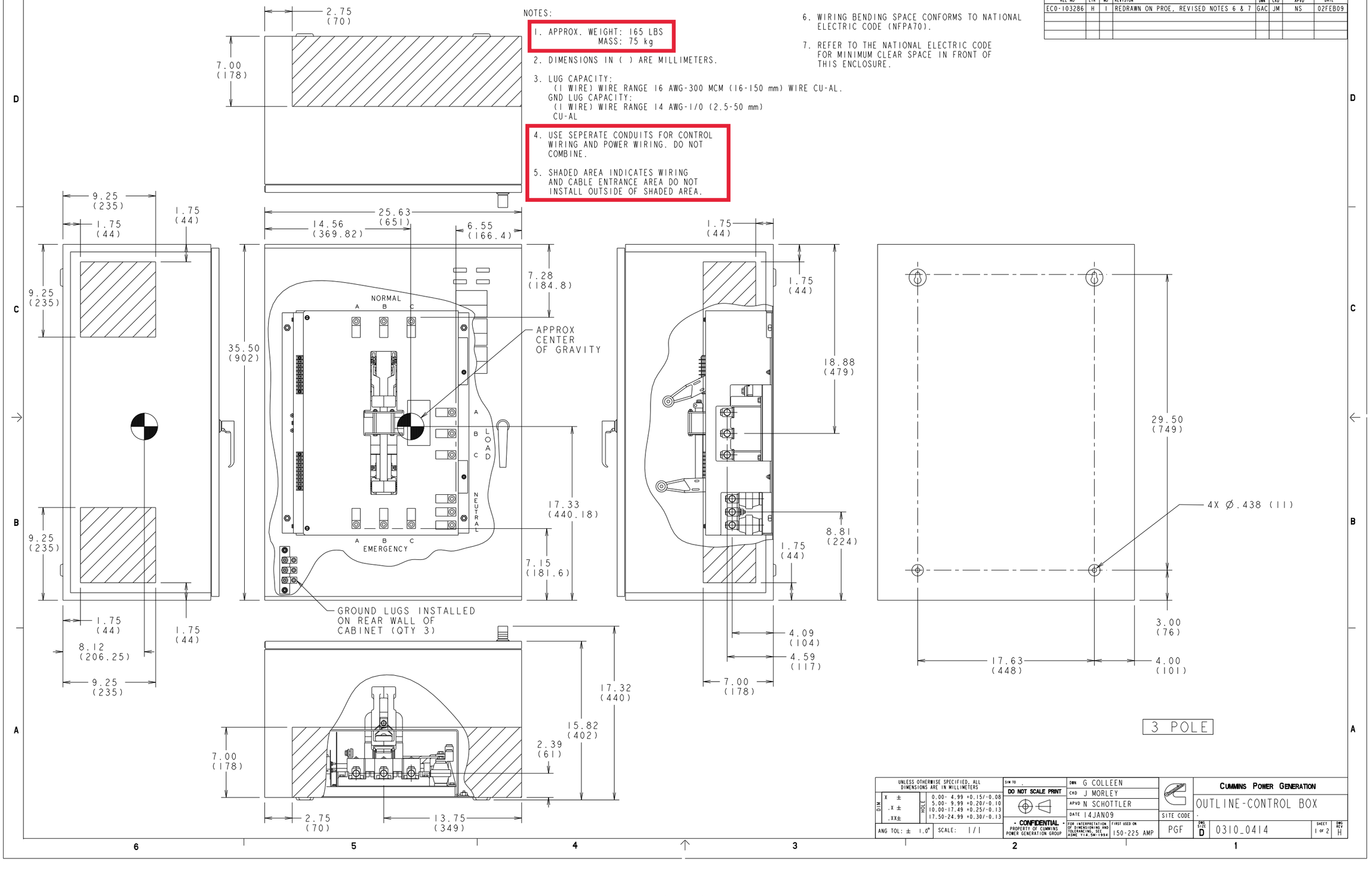
S-1464 (06/18)

Pro/ENGINEER

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
EC0-103286	H	1	REDRAWN ON PROE, REVISED NOTES 6 & 7	GAC	JM	NS	02FEB09

NOTES:

1. APPROX. WEIGHT: 165 LBS
   MASS: 75 kg
2. DIMENSIONS IN ( ) ARE MILLIMETERS.
3. LUG CAPACITY:
   (1 WIRE) WIRE RANGE 16 AWG-300 MCM (16-150 mm) WIRE CU-AL.
   GND LUG CAPACITY:
   (1 WIRE) WIRE RANGE 14 AWG-1/0 (2.5-50 mm)
   CU-AL
4. USE SEPERATE CONDUITS FOR CONTROL WIRING AND POWER WIRING. DO NOT COMBINE.
5. SHADED AREA INDICATES WIRING AND CABLE ENTRANCE AREA DO NOT INSTALL OUTSIDE OF SHADED AREA.
6. WIRING BENDING SPACE CONFORMS TO NATIONAL ELECTRIC CODE (NFPA70).
7. REFER TO THE NATIONAL ELECTRIC CODE FOR MINIMUM CLEAR SPACE IN FRONT OF THIS ENCLOSURE.



3 POLE

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS			SIM TO .	DWN G COLLEEN	CUMMINS POWER GENERATION
DIM: X ±, .X ±, .XX±	HOLE: 0.00- 4.99 +0.15/-0.08; 5.00- 9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13		DO NOT SCALE PRINT	CKD J MORLEY	OUTLINE-CONTROL BOX
ANG TOL: ± 1.0°	SCALE: 1/1		- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP	APVD N SCHOTTLER	
			FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994	DATE 14JAN09	SITE CODE ·
			FIRST USED ON 150-225 AMP	PGF	DWG SIZE D 0310_0414 SHEET 1 of 2 DWG REV H

UNLESS OTHERWISE SPECIFIED, ALL DIMS ARE IN INCHES

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

REFERENCES:

PREP. BY:	JRVD
CHKD BY:	
MODIFIED BY:	
FINISH: N/A	
ENGINE FAMILY:	10/10/14

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED

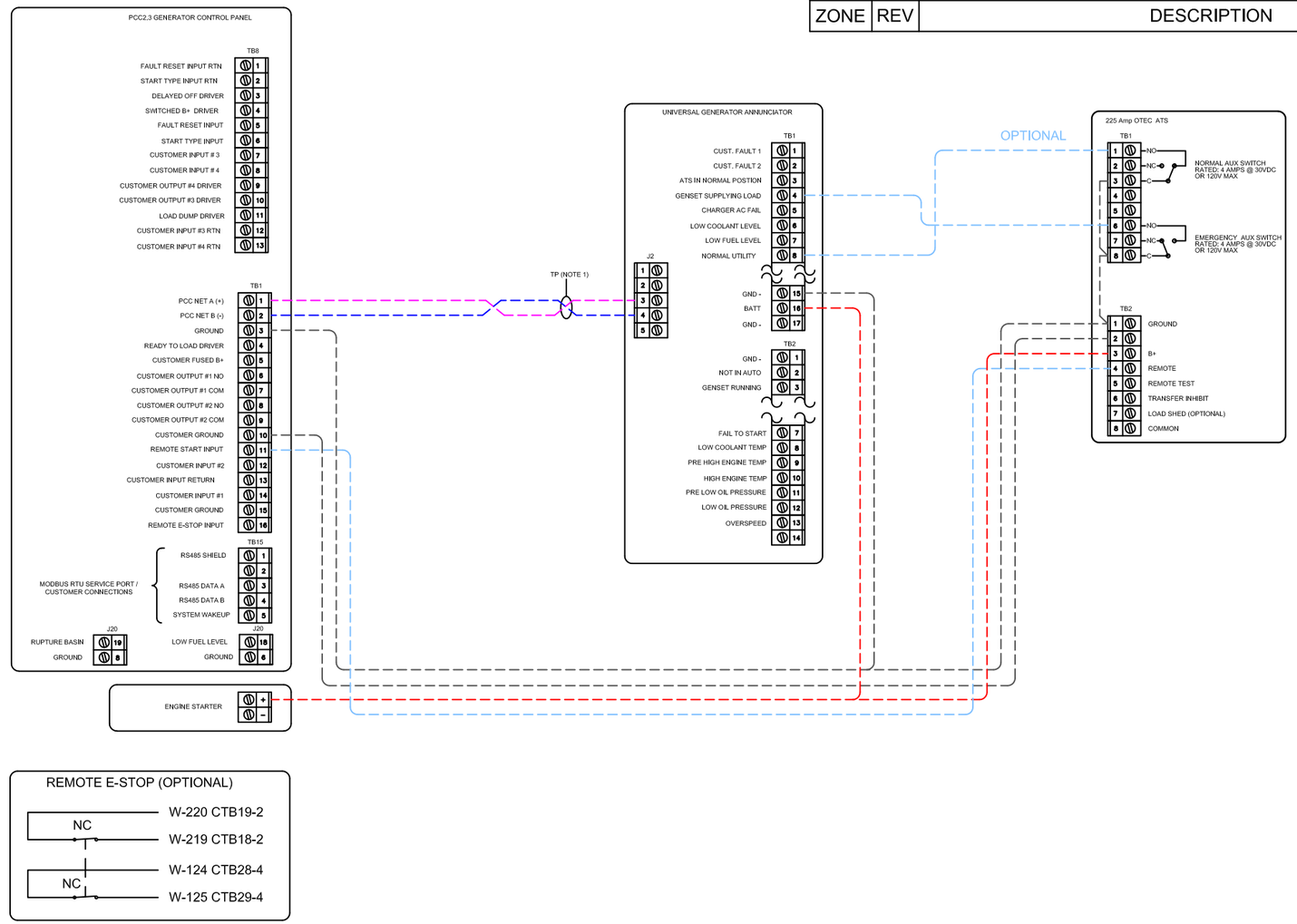


TABLE 1

WIRE SIZE (AWG)	DISTANCE IN FEET
16	1000
14	1600
12	2400
10	4000

NOTES:
1. PCCNET RS485 Cabling requirements.Twin power conductors, stranded twisted pair, shielded network cable.(Belden 9729)
2. Wire sizes are indicative only, final wire size needs to be determined by table 1.
3. Install shielded cables and other communication cables into separate conduit for proper operation.
4. Install AC circuit wires in separate conduit.
5. Install DC circuit wires in separate conduit.
6. Network items are provided loose to be remotely mounted by others.

PREWIRED BY CRM ————————
WIRING BY OTHERS - - - - - - - - - -

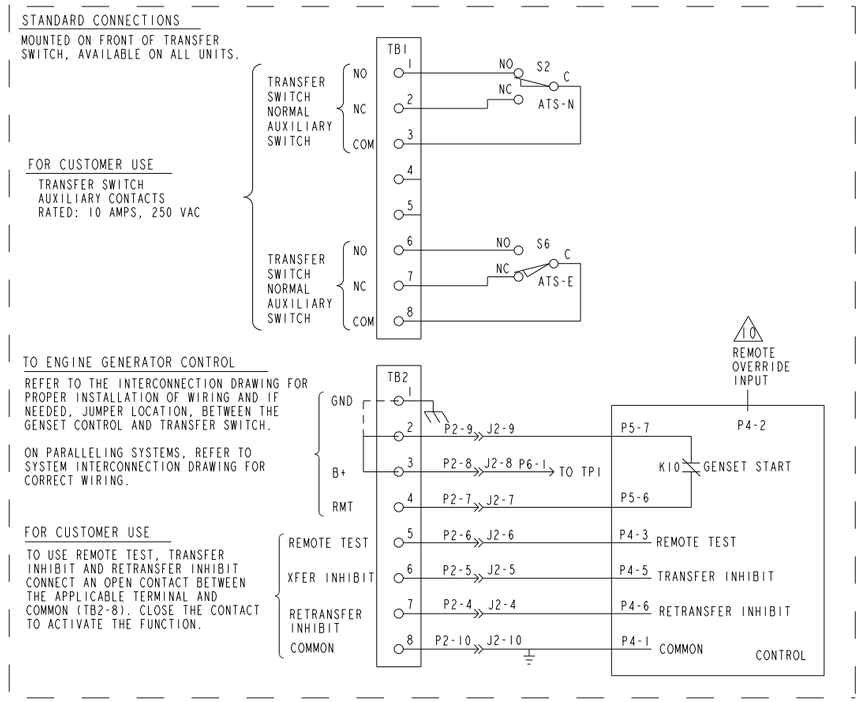
ALL INTERCONNECT WIRING AND DATA CABLING IS TO BE DONE WITH STRANDED WIRE PER NFPA 110 2013 EDITION. CHAPTER 7, PARAGRAPH 7.12.4.1

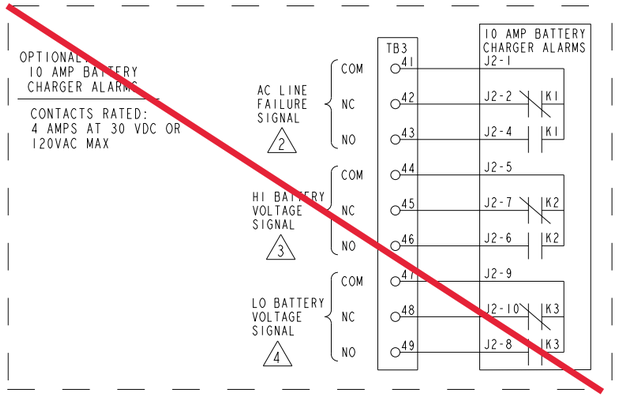
Cummins Rocky Mountain
8211 E 96th AVE
HENDERSON, COLORADO 80640
PH: 303-287-0201
FAX: 303-287-4837

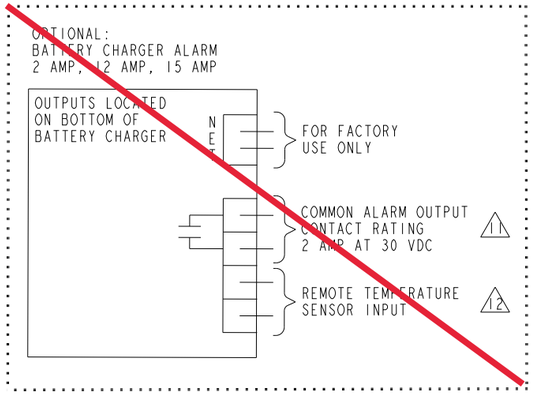
SITE NAME:	CONTACT NAME:	CUSTOMER PROJECT NO:	TITLE: ATS INTERCONNECT CONNECTIONS
CONTRACTOR NAME:	CONTACT NO:	CRM PROJECT NO:	SIZE B / DWG NO: PC2.3, OTEC, RS485 / REV: A
			SCALE: NONE / DO NOT SCALE / SHEET: 1 OF 1

PTC® Creo® Parametric

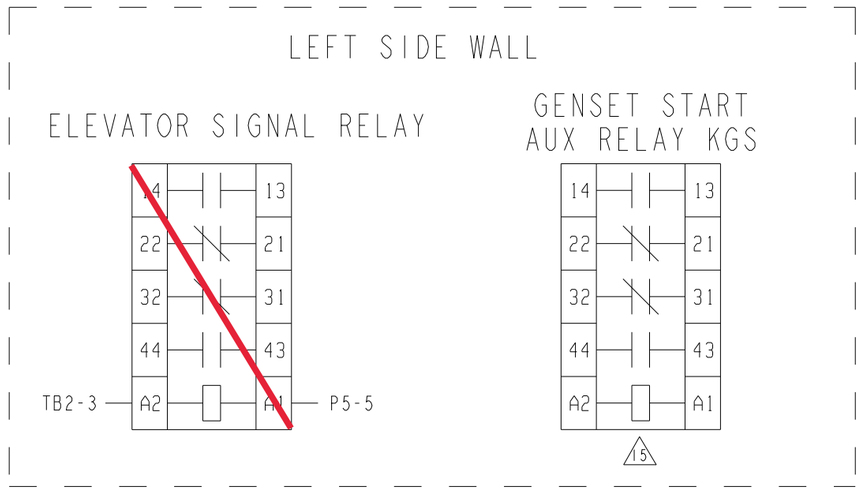
CUSTOMER CONNECTIONS







CUSTOMER CONNECTIONS



REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-178424	H	1	ZONE A5, ADD GENSET START AUX RELAY	-	-	-	-
			KGS TERMINALS	MSC	LNK	T.BEAUCAGE	28JUN18
		2	ADD NOTE "KGS---WIRING"	MSC	LNK	T.BEAUCAGE	28JUN18
		3	ZONE A5, ADD FLAG NOTE 15	MSC	LNK	T.BEAUCAGE	28JUN18
		4	ZONE A1, TEXT "EXERCISER" WAS "EXECISER"	MSC	LNK	T.BEAUCAGE	28JUN18
		5	SEE SHEET 2	MSC	LNK	T.BEAUCAGE	28JUN18
		6	SEE SHEET 3	MSC	LNK	T.BEAUCAGE	28JUN18

NOTES:

1. TB1 AND TB2 ARE MOUNTED ON THE FRONT OF THE TRANSFER SWITCH. TB3 IS MOUNTED ON THE LEFT INSIDE PANEL OF THE ENCLOSURE.
2. SHOWN WITH SOURCE NOT CONNECTED.
3. SHOWN UNDER NORMAL BATTERY VOLTAGE CONDITION. CONTACTS TRANSFER UNDER A HIGH BATTERY VOLTAGE CONDITION.
4. SHOWN UNDER A LOW BATTERY VOLTAGE CONDITION.
5. SEE SHEET 2
6. SEE SHEET 2
7. SEE SHEET 3.
8. SEE SHEET 4.
9. SEE SHEET 4.
10. REMOTE OVERRIDE INPUT CONNECT AN OPEN CONTACT BETWEEN P4-2 & TB2-8.
11. THE FOLLOWING WILL CAUSE A BATTERY CHARGER ALARM OUTPUT.
    LOW BATTERY VOLTAGE
    HIGH BATTERY VOLTAGE
    LOW AC INPUT VOLTAGE
    HIGH AC INPUT VOLTAGE
    OVERCURRENT
    HIGH CHARGER TEMPERATURE
    BATTERY FAILURE
    HIGH BATTERY TEMPERATURE:
    NOT AVAILABLE ON 2 AMP CHARGER
12. USE THE INVERTER REMOTE TEMPERATURE PROBE. (PART NO. 0193-0530)
13. SEE SHEET 2.
14. ELEVATOR SIGNAL RELAY SHOWN DE-ENERGIZED. RELAY CHANGES STATE WHEN THE ELEVATOR TRANSFER TIME DELAY (TDEL) STARTS.
15. KGS PROVIDED UNWIRED FOR ADDITIONAL GENSET START WIRING LOGIC TO MEET ANY LOCAL CODE OR INSTALLATION REQUIREMENTS. REFER TO THE INTERCONNECTION DRAWING FOR PROPER INSTALLATION OF WIRING.

UTILITY TO GENSET
3 AND 4 POLE
OTEC 40-600 AMP & OTECSE 40-125 AMP
120 VOLT 1 PHASE L-N
240 VOLT 1 PHASE
190 VOLT 3 PHASE
208 VOLT 3 PHASE
220 VOLT 3 PHASE
240 VOLT 3 PHASE
380 VOLT 3 PHASE
415 VOLT 3 PHASE
440 VOLT 3 PHASE
480 VOLT 3 PHASE

OPTIONS:
BATTERY CHARGER
BATTERY CHARGER ALARMS
EXERCISER CLOCK
ELEVATOR RELAY

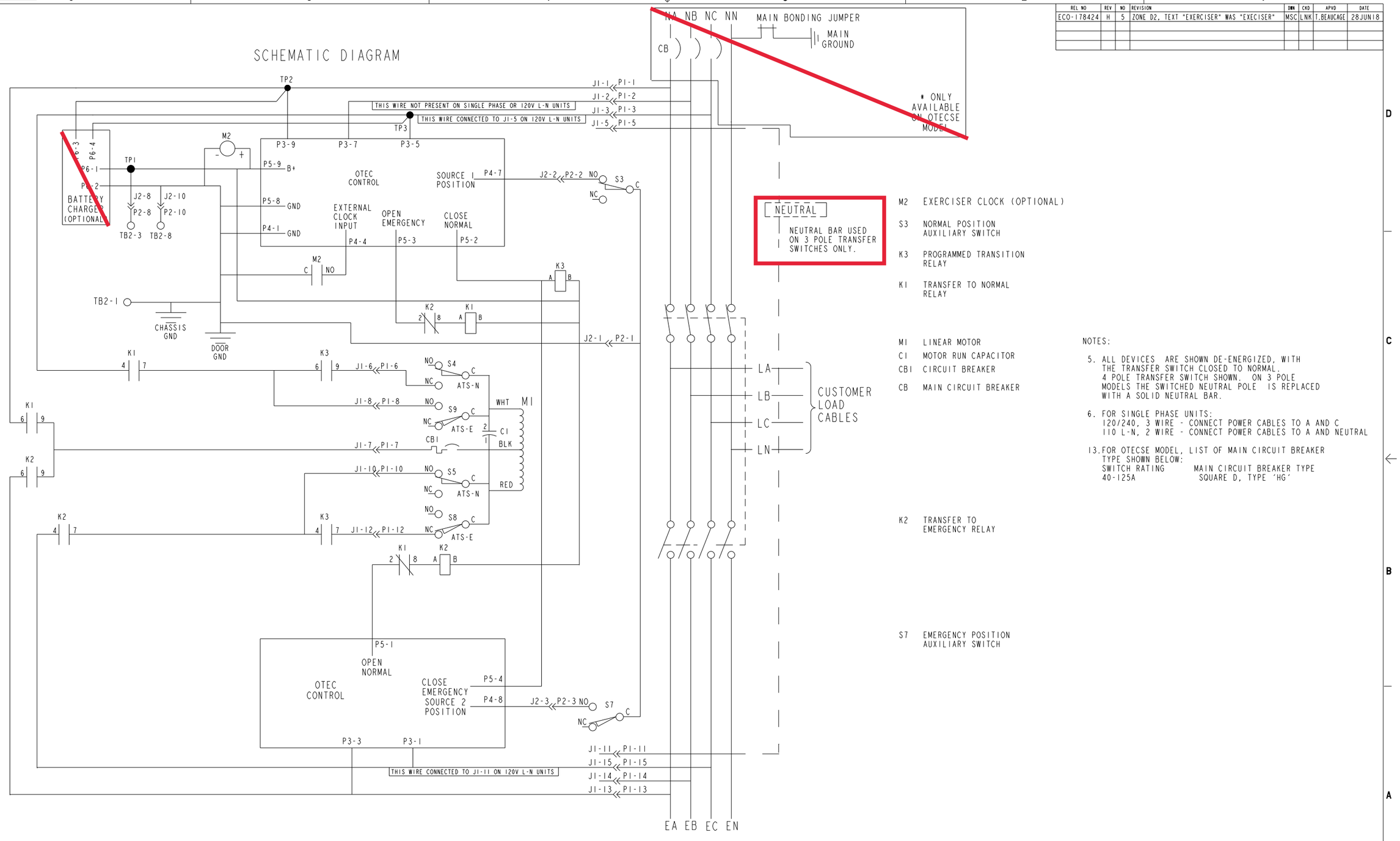
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS	SIM TO .	DWN S D MORE	Cummins	CUMMINS POWER GENERATION	
DIM: X ±1, .X ±0.8, .XX± 0.38 — HOLE: 0.00- 4.99 +0.15/-0.08, 5.00- 9.99 +0.20/-0.10, 10.00-17.49 +0.25/-0.13, 17.50-24.99 +0.30/-0.13	DO NOT SCALE PRINT	CKD I A MAHADESHWAR		WD-TRANSFER SWITCH	
		APVD MILLER	SITE CODE		
ANG TOL ± 1.0° — SCALE 1:1	THIS DOCUMENT (AND THE INFORMATION SHOWN THEREON) IS CONFIDENTIAL AND PROPRIETARY AND SHALL NOT BE DISCLOSED TO OTHERS IN HARD COPY OR ELECTRONIC FORM, REPRODUCED BY ANY MEANS, OR USED FOR ANY PURPOSE WITHOUT WRITTEN CONSENT OF CUMMINS INC.	DATE 26NOV04 — FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994 — FIRST USED ON OTEC	PGF	DWG SIZE D: 0630_2766	CAD SHEET 1 OF 4

Drawing Name: 0630-2766 Revision: H
Part Name: 0630-2766 Revision: H
ECO-178424 Sheet 1 of 5

PTC® Creo® Parametric

REL NO	REV	NO	REVISION	DWN	CKD	APVD	DATE
ECO-178424	H	5	ZONE D2, TEXT "EXERCISER" WAS "EXECISER"	MSC	LNK	T.BEAUCAGE	28JUN18

SCHEMATIC DIAGRAM



NEUTRAL

NEUTRAL BAR USED ON 3 POLE TRANSFER SWITCHES ONLY.

M2 EXERCISER CLOCK (OPTIONAL)

S3 NORMAL POSITION AUXILIARY SWITCH

K3 PROGRAMMED TRANSITION RELAY

K1 TRANSFER TO NORMAL RELAY

M1 LINEAR MOTOR

C1 MOTOR RUN CAPACITOR

CB1 CIRCUIT BREAKER

CB MAIN CIRCUIT BREAKER

K2 TRANSFER TO EMERGENCY RELAY

S7 EMERGENCY POSITION AUXILIARY SWITCH

NOTES:

5. ALL DEVICES ARE SHOWN DE-ENERGIZED, WITH THE TRANSFER SWITCH CLOSED TO NORMAL. 4 POLE TRANSFER SWITCH SHOWN. ON 3 POLE MODELS THE SWITCHED NEUTRAL POLE IS REPLACED WITH A SOLID NEUTRAL BAR.

6. FOR SINGLE PHASE UNITS:
   120/240, 3 WIRE - CONNECT POWER CABLES TO A AND C
   110 L-N, 2 WIRE - CONNECT POWER CABLES TO A AND NEUTRAL

13. FOR OTECSE MODEL, LIST OF MAIN CIRCUIT BREAKER TYPE SHOWN BELOW:

SWITCH RATING	MAIN CIRCUIT BREAKER TYPE
40-125A	SQUARE D, TYPE 'HG'

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

DIM: X ±1 | .X ±0.8 | .XX± 0.38

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

ANG TOL ± 1.0°

SCALE 1:1

SIM TO .

DO NOT SCALE PRINT

DWN S D MORE
CKD I A MAHADESHWAR
APVD MILLER
DATE 26NOV04

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994

FIRST USED ON OTEC

SITE CODE PGF

CUMMINS POWER GENERATION

WD-TRANSFER SWITCH

DWG SIZE D | 0630_2766 | CAD SHEET 2 OF 4

PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-147608	A	1	PRODUCTION_RELEASE	SGM	GRB	L.SMITH	07NOV14

-THIS IS A CONTROLLED ITEM-
PER POLICY-PROCEDURE PGG 1-01-01-116

TO MAINTAIN COMPLIANCE WITH REQUIREMENTS OF THE CODES, STANDARDS, OR AGENCIES LISTED BELOW

[X] CSA [X] UL [ ] CE [ ] RVIA [ ] ABYC
[ ] IBC [ ] OTHER _____ [ ] OTHER _____

CHANGES, DEVIATIONS, OR SUBSTITUTIONS OF MATERIAL, PROCESS, OR PERFORMANCE FOR THIS ITEM MUST BE APPROVED BY THE FOLLOWING CONTROLLED ITEM APPROVER

RESPONSIBLE CIA ROLE PE TRANSFER SWITCH CIA
RESPONSIBLE CIA ROLE _____
RESPONSIBLE CIA ROLE _____

73

185

Special Withstand Ratings

Circuit Breaker Protection

When protected by one of the following circuit breakers rated not more than 400 amperes, this transfer switch is rated for use on a circuit capable of delivering not more than the indicated RMS symmetrical amperes at the voltage shown.

GE

Type	Interrupting Rating at		
	240 VAC	480 VAC	600 VAC
AKRU, AKU	200000	200000	200000
FB, FC	200000	150000	42000
FE	200000	150000	-
FG	200000	150000	65000
SEL, SFL	100000	65000	25000
SEP, SFP	200000	100000	25000
SGL	100000	65000	65000
SGP	200000	100000	65000
TEC & TECL	100000	100000	100000
TEL, TEML, TFL	100000	65000	25000
THLC1, THLC2, THLC4	200000	200000	50000

Siemens

Type	Interrupting Rating at		
	240 VAC	480 VAC	600 VAC
CED6, CFD6	200000	200000	100000
CJD6, CLD6	200000	150000	100000
SCJD6, SCLD6	200000	150000	100000

Square D

Type	Interrupting Rating at		
	240 VAC	480 VAC	600 VAC
DG, HG, JG, LG	65000	35000	18000
DJ, HJ, JJ, LJ	100000	65000	25000
DL	125000	100000	25000
FI, KI, LI, HR, JR, LR	200000	200000	100000
HD, JD, LD	25000	18000	14000
HL, JL, LL	125000	100000	50000

Eaton

Type	Interrupting Rating at		
	240 VAC	480 VAC	600 VAC
DSL, LA, NB	200000	200000	200000
FDC, JDC, EGC	200000	100000	35000
KDC, LDC, JGC, LGC	200000	100000	50000
JGU	200000	150000	50000
JGX	200000	200000	35000
LCL	200000	200000	100000
LGU	200000	150000	65000
LGX	200000	200000	65000

Merlin Gerin

Type	Interrupting Rating at		
	240 VAC	480 VAC	600 VAC
CE106L	150000	100000	42000
CF250L, CJ400L	150000	150000	65000
CK1000L	150000	50000	42000
NSE100N	65000	18000	-
NSF150N, NSF250N	65000	35000	18000
NSF150H, NSF250H	100000	65000	25000
NSJ400N, NSJ600N	65000	35000	18000
NSJ400H, NSJ600H	100000	65000	25000
NSJ400L, NSJ600L	150000	100000	25000

A051D533.A

NOTES:

1. LABEL SHOWN ON PRINT IS NOT ARTWORK. VENDOR ARTWORK CREATED TO PRODUCE THIS LABEL MUST BE SIGNED OFF BY CUMMINS POWER GENERATION PURCHASING.
2. ALL TEXT TO BE HELVETICA SANS SERIF, OR EQUIVALENT.
3. BLACK TEXT AND WHITE BACKGROUND.
4. MATERIAL THICKNESS: 10 MIL.
5. SEE CUMMINS POWER GENERATION MATERIAL SPECIFICATIONS FOR APPLICATION INFORMATION.
6. IF CORNERS SHOWN SQUARE, RADIUS OPTIONAL.
7. IF CSA AGENCY APPROVAL REQUIRED LOCATE VENDOR CSA IDENTIFICATION MARK IN LOWER RIGHT HAND CORNER.
8. LOCATE LABEL PART NUMBER & REVISION LETTER WHERE SHOWN.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

DIM: X ±1 | .X ±0.8 | .XX± 0.38

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

ANG TOL: ± 1.0° SCALE: 1/1

SIM TO 0098-6919
DO NOT SCALE PRINT

- CONFIDENTIAL -
PROPERTY OF CUMMINS POWER GENERATION GROUP

DWN	S.MADARAKALL
CKD	G.BAIRAGI
APVD	L.SMITH
DATE	07NOV14

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994

FIRST USED ON BT/BTPC 150-260A

SITE CODE PGF

CUMMINS POWER GENERATION

LABEL, INFORMATION
(SPECIAL BREAKER)

DWG SIZE	DWG	SHEET	DWG REV
B	A051D533	1 OF 1	A

Drawing Name: A051D534 Revision: A
Part Name: A051D533 Revision: A
Sheet 1 of 2

PTC® Creo® Parametric

REL NO	LTR	NO	REVISION	DWN	CKD	APVD	DATE
ECO-146025	A	1	PRODUCTION_RELEASE	SGM	GRB	L.SMITH	22AUG14

73.2

130

SHORT-CIRCUIT WITHSTAND/CLOSING RATINGS

Specific Fuse Manufacturer and Type Listing

When protected by a fuse of the specific fuse class and up to the fuse amperes listed below, this transfer switch is suitable for use in a circuit capable of delivering up to the short circuit current and voltage listed below.

Short-Circuit Current RMS Symmetrical Amperes	Short Circuit AC Voltage	Fuse Class	Maximum Fuse Amperes
200000	600	J, RK1, RK5	600
200000	600	L, T	1200

Specific Circuit Breaker Manufacturer and Type Listing

When protected by a circuit breaker of a specific manufacturer and type, and up to the maximum breaker amperes listed below, this transfer switch is suitable for use in a circuit capable of delivering up to the short circuit current and voltage listed below, but not more than the rating of the specific circuit breaker.

Short-Circuit Current RMS Symmetrical Amperes	Short Circuit AC Voltage	Maximum Breaker Amperes
30000	600	400

GE

TEYD	TEYH	TEYL	THJK	TJK	TJJ	

Siemens

BQCH	FD6	HFD6	HJD6[1]	JXD2	NFGA	QJ2
BQD	FD6A	HFGA	HJGA	JXD6[1]	NGB	QJ2-H
CC	FXD6	HFXD6	HJXD6[1]	LDGA	NGDA	QJH2
CQD	FXD6A	HHFD6	HLGA	LFGA	NGG	
ED2	HDGA	HHFXD6	HLGB	LJGA	NJGA	
ED4	HED4	HHJD6[1]	HQJ2	LLGA	NLGA	
ED6	HED6	HHJXD6[1]	JD6[1]	LLGB	NLGB	

1 - 240 Volt Maximum

Eaton

BAB	EGE[3]	GHBGFEP	JGE	QBHW	QHCX
CHKD[2]	EGH[3]	GHBS	JGH	QC	QHPW
CKD[2]	EGS[3]	GHC	JGS	QCF	QHPX
DK	EHD	GHCGFEP	KD	QCGF	QPGF
ED	FD	HFD	KDB	QCGFEP	QPGFEP
EDB	FDB	HJD	QBGF	QCHGF	QPHGF
EDC	FDE	HKD	QBGFEP	QCHGFEP	QPHGFEP
EDH	GBHS	HQP	QBH	QCHW	QPHW
EDS	GD	JD	QBHGF	QCR	
EGB[3]	GHB	JDB	QBHGFEP	QHCW	

2 - 310 trip unit only
3 - Limited to 70 amps maximum

A048E949.A

NOTES:

1. LABEL SHOWN ON PRINT IS NOT ARTWORK. VENDOR ARTWORK CREATED TO PRODUCE THIS LABEL MUST BE SIGNED OFF BY CUMMINS POWER GENERATION PURCHASING.
2. ALL TEXT TO BE HELVETICA SANS SERIF, OR EQUIVALENT.
3. BLACK TEXT AND WHITE BACKGROUND.
4. MATERIAL THICKNESS: 10 MIL.
5. SEE CUMMINS POWER GENERATION MATERIAL SPECIFICATIONS FOR APPLICATION INFORMATION.
6. IF CORNERS SHOWN SQUARE, RADIUS OPTIONAL.
7. IF CSA AGENCY APPROVAL REQUIRED LOCATE VENDOR CSA IDENTIFICATION MARK IN LOWER RIGHT HAND CORNER.
8. LOCATE LABEL PART NUMBER & REVISION LETTER WHERE SHOWN.

-THIS IS A CONTROLLED ITEM-

PER CPG PROCEDURE FRE-1002

TO MAINTAIN COMPLIANCE WITH REQUIREMENTS OF THE CODES, STANDARDS, OR AGENCIES LISTED BELOW

☒ CSA ☒ UL ☐ CE ☐ RVIA ☐ ABYC

☐ IBC ☐ OTHER _____ ☐ OTHER _____

CHANGES, DEVIATIONS, OR SUBSTITUTIONS OF MATERIAL, PROCESS, OR PERFORMANCE FOR THIS ITEM MUST BE APPROVED BY THE FOLLOWING CONTROLLED ITEM APPROVER

RESPONSIBLE CIA ROLE PE TRANSFER SWITCH CIA

RESPONSIBLE CIA ROLE _____

RESPONSIBLE CIA ROLE _____

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

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

ANG TOL: ± 1.0° SCALE: 1/1

SIM TO 0098-6886

DO NOT SCALE PRINT

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PROPERTY OF CUMMINS POWER GENERATION GROUP

DWN	S.MADARAKALL
CKD	G.BAIRAGI
APVD	L.SMITH
DATE	22AUG14

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994

FIRST USED ON OT 150-260A

SITE CODE PGF

CUMMINS POWER GENERATION

LABEL, INFORMATION
(WITHSTAND RATING)

DWG SIZE		SHEET	DWG REV
B	A048E949	1 OF 1	A

Drawing Name: A048E950 Revision: A
Part Name: A048E949 Revision: A
Sheet 1 of 2