



Promega Corporation
2800 Woods Hollow Road
Madison, WI 53711-5399
United States

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August 22, 2017

Thomas Hoval
City Planner/Zoning Administrator
City of Fitchburg
5520 Lacy Road
Fitchburg, WI 53711

RE: 5500 Nobel Drive – Rezoning Application for Emergency Generator

Dear Mr. Hovel:

I am submitting the enclosed rezoning application and architecture & design review application for consideration in the September Plan Commission meeting. These applications are for installation of an emergency generator at Promega's 5500 Nobel Drive leased facility.

Please find attached to this cover letter the following:

- Letter from the property owner, Avante Properties
- Rezoning Application Form
- Architectural Design Review Application Form
- Operational Plan with attachments
 - Location Map
 - Sound Study
 - Emergency Generator Information

I have had email exchange with Mr. Robert Zorko and residents of the Quarry Hill neighborhood association briefing them on this application. We are scheduling a meeting to further discuss the details of the proposed emergency generator later this week.

Please feel free to contact me if you have any comments or questions,

Sincerely,

A handwritten signature in black ink that reads 'Daniel Motl'.

Daniel Motl
Facilities Director
Promega Corporation
2800 Woods Hollow Road
Madison, WI 53711
(608) 225-0261
dan.motl@promega.com




Mr. Thomas Hovel
City Planner/Zoning Administrator
City of Fitchburg
5520 Lacy Road
Fitchburg, WI 53711

RE: 5500 Nobel Drive Rezoning Application

Mr. Hovel:

Avante Properties and New Venture Center II, LLC authorize Promega Corporation to submit a rezoning application to add an emergency generator to the 5500 Nobel Drive building.

Best regards,



Chris Armstrong
President
Avante Properties



City of Fitchburg
 Planning/Zoning Department
 5520 Lacy Road
 Fitchburg, WI 53711
 (608-270-4200)

REZONING APPLICATION

The undersigned owner, or owner's authorized agent, of property herein described hereby petitions to amend the zoning district map of the Fitchburg zoning ordinance by reclassifying from the PDD-SIP district to the PDD-SIP district the following described property:

1. **Location of Property/Street Address:** 5500 Nobel Drive

Legal Description - (Metes & Bounds, or Lot No. And Plat):

A parcel of land located in the Southwest Quarter of the Northwest Quarter of Section 15, Township 6 North, Range 9 East, City of Fitchburg, Dane County, Wisconsin, more fully described as follows:
 Lot 21, First Addition to Fitchburg Technology Campus, as recorded in Volume 58-025A of Plats, on pages 135-139, as Document Number 3708613, Dane County Registry. This description contains approx. 141,949 sf or 3.2587 acres.

***Also submit in electronic format (MS WORD or plain text) by email to: planning@fitchburgwi.gov

2. **Proposed Use of Property - Explanation of Request:**

Promega Corporation on behalf of the Property Owner proposes to install a 30KW outdoor generator for the purpose of providing backup electrical power for equipment located in the leased space of this facility. See attached operational plan, sound study and generator information.

3. **Proposed Development Schedule:** See attached operational plan

***Pursuant to Section 22-3(b) of the Fitchburg Zoning Ordinance, all Rezoning shall be consistent with the currently adopted City of Fitchburg Comprehensive Plan.

***Attach three (3) copies of a site plan which shows any proposed land divisions, plus vehicular access points and the location and size of all existing and proposed structures and parking areas. Two (2) of the three (3) copies shall be no larger than 11" x 17". Submit one (1) electronic pdf document of the entire submittal to planning@fitchburgwi.gov. Additional information may be requested.

Type of Residential Development (If Applicable): N/A

Total Dwelling Units Proposed: N/A

No. Of Parking Stalls: N/A

Type of Non-residential Development (If Applicable): Fitchburg Technology Campus

Proposed Hours of Operation: see operational schedule

No. Of Employees: N/A

Floor Area: N/A

No. Of Parking Stalls: N/A

Sewer: Municipal Private **Water:** Municipal Private

Current Owner of Property: Avante Properties

Address: 120 E. Lakeside Street, Madison, Wisconsin 53715

Phone No: 608-294-4080

Contact Person: Dan Motl, Facilities Director, Promega Corp.

Email: dan.motl@promega.com

Address: 2800 Woods Hollow Rd., Madison, WI 53711

Phone No: 608-225-0261

Respectfully Submitted By: *Daniel Motl* 08/22/17
 Owner's or Authorized Agent's Signature

Daniel Motl
 Print Owner's or Authorized Agent's Name

PLEASE NOTE - Applicants shall be responsible for legal or outside consultant costs incurred by the City. Submissions shall be made at least four (4) weeks prior to desired plan commission meeting.

For City Use Only: **Date Received:** 8/22/2017 **Publish:** _____ and _____

Ordinance Section No. _____ **Fee Paid:** \$850.00

Permit Request No. R2-2168-17



City of Fitchburg
 Planning/Zoning Department
 5520 Lacy Road
 Fitchburg, WI 53711
 (608-270-4200)

ARCHITECTURAL & DESIGN REVIEW APPLICATION

Applicant/Contact Person: Dan Motl, Facilities Director, Promega Corporation

Address: 2800 Woods Hollow Road **Phone Number of Contact Person:** 608-225-0261

City, State, Zip Code: Madison, WI 53711 **Email of Contact Person:** dan.motl@promega.com

Project Address: 5500 Nobel Drive **Lot:** 21 **Subdivision:** 1st Add to Fitchburg Tech

Project Type: **Multi-Family** **Commercial** **Industrial** **Emergency Generator** **Other**
 New **Addition**

Impervious Surface Ratio (ISR): No Change (City Standard: maximum 65% ISR)

All items listed below must be included with the application to be considered complete. If an item is not included with the application, the applicant must provide in writing the basis for not including it. Building and site plans submitted to the Fitchburg Plan Commission for architectural and design review shall contain the following information:

Site Data:

- 1. Lot or property dimensions.
- 2. Orientation (to north).
- 3. Adjacent highways, roads, drive, etc.
- 4. Existing natural features (rivers, ponds, wetlands).
- 5. Existing buildings and/or improvements.
- 6. Existing and proposed site drainage.
- 7. Utility plans, including main/lateral sizes and existing fire hydrants on site or within 300 feet of the site
- 8. ISR shall be indicated on all plans.
- 9. Stormwater management plans and details, including grading plan.
- 10. Lighting plan in footcandles and light fixture cut sheets.

Building:

- 1. Building size, configuration and orientation.
- 2. Distance from lot lines.
- 3. Distance from other buildings, improvements and natural features.
- 4. Location of well, septic tank, drainfield, etc. (if applicable)
- 5. Additional proposed additions or new structures, including trash/recycling enclosure(s).
- 6. Construction type (wood frame, structural steel, etc.).
- 7. Foundation type (full basement, slab on grade, etc.).
- 8. Number of levels.
- 9. Siding/exterior covering type, color, texture, etc.
- 10. Roof type (gable, hip, shed, flat, etc.) and pitch.
- 11. Roofing material type, color, texture, etc.
- 12. Exterior door and window location, size, type, etc.
- 13. Fire protection sprinklers or fire alarm systems.

Ingress, Egress, Parking:

- 1. Location of highway and road access points.
- 2. Location, size, configuration of drivers and walks.
- 3. Number, size, location of parking spaces.
- 4. Location of handicapped parking and accessible building entrances.
- 5. Bicycle rack(s).

Landscaping:

- 1. Location, species, size of existing trees, shrubs, and plantings.
- 2. Location, species, size of proposed plantings.
- 3. Location and size of all paved, seeded/sodded and gravelled areas.
- 4. Location of all retaining walls, fences, berms and other landscape features.

***It is highly recommended that an applicant hold at least one neighborhood meeting prior to submitting an ADR application to identify any concerns or issues of surrounding residents.**

The preceding information is considered to be the minimum information for submission, and the City may require additional information for its review. Any interpretations provided by city officials as the result of submitting the attached information are based on the submitted plans, and any plan changes, may affect the interpretations.

It is the responsibility of the owner/applicant to insure compliance with all local and state requirements. The below signed applicant acknowledges the above information and hereby submits the attached information for the City's Architectural and Design Review Process.

Signed: _____  _____ Date: 08/22/17
Applicant or Authorized Agent

***** Application shall be accompanied by one (1) sets of full-size plans, two (2) sets no larger than 11"x17", and one (1) pdf document of the complete submittal to planning@fitchburgwi.gov. Applications are due at least 4 weeks prior to the desired Plan Commission Meeting. The time frame assumes a complete set of plans is provided, and if it is not provided the Plan Commission date will be adjusted.**

FOR CITY USE ONLY

Date Received: _____ Plan Commission Date: _____

Comments:

August 21, 2017

**PROPOSED OPERATIONAL PLAN for
30KW GENERATOR SERVING PROMEGA LEASED SPACE IN 5500 NOBEL DR.**

General

Promega is proposing installation of a backup generator at the 5500 Nobel Drive facility to support its business needs in leased space at this location.

The generator selected is a Cummins 30KW unit that will run on diesel fuel. The generator will be installed inside an existing fenced enclosure on the NE corner of the 5500 Nobel Drive facility. The existing base material inside the enclosure is impervious concrete slab. This location housed air cooled chilling equipment for the previous tenant, Cameca.

The generator was selected with features to provide the maximum amount of sound attenuation. A sound enclosure will be provided as well as an optional critical environment muffler, the best this vendor has to offer for sound reduction.

Using the manufacturer's sound data with the specified attenuation features, Promega hired an acoustical consultant, Wise & Associates, to perform a sound analysis with respect to neighboring residential lot lines. The attached sound report indicates that the generator may produce up to 45 dBA. A plot of the sound spectrum is included in the report as is the sound data from the previous tenant's equipment in this same location for reference. Wise & Associates performed a similar study for that equipment previously.

If necessary, Promega is willing to look into options that could reduce the sound by an additional estimated 3dBA by installing attenuating material on the building wall inside the fenced enclosure, an approach that could limit the reflective sound that is a significant factor in the report.

Operational Plan

Promega requires backup power capability for approximately 12 refrigerators and freezers in its leased lab space as well as several general use outlets for a technical services group who interact with customers by computer on a daily basis.

The generator will run only during electrical power outages and during weekly test runs as part of its preventative maintenance. The weekly test runs will be conducted one day per week with a maximum duration of 30 minutes. Promega is flexible with scheduling the preferred day and time for the test runs to best accommodate neighbors.

Attachments:

- Location Map
- Sound Report
- Cummins Generator Information



Proposed location of generator inside fenced enclosure

Location Map NORTH

Wise Associates

1409 E. Skyline Drive
Madison, WI 53705 USA
(608) 233-7683
steve wise@att.net

Date: August 18, 2017
To: Dan Motl
From: Steve Wise
Subject: Noise Evaluation for New Generator on Nobel Drive

Dan –

We used the Cummins generator noise data (attached page 2) to estimate the noise impact to the nearest residences north of the site.


To our knowledge, the Fitchburg noise ordinance is 42.5 dBA for that location. It appears to us that the new generator may produce 45 dBA, with the plot at lower right indicating the nature of the noise relative to a 42.5 dBA spectrum where all frequencies contribute equally.

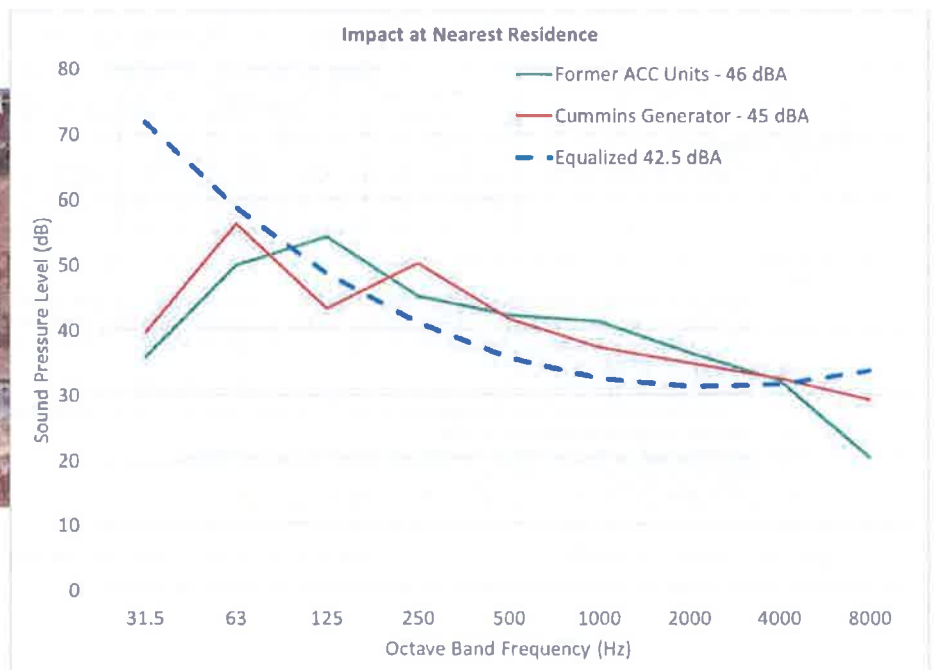
The Air-Cooled-Condensers that resided in this space previously had 2 units with variable numbers of fans running, usually not all of them at once, but the data set graphed below was for all fans running. You can see that the noise was similarly above 42.5 dBA.

We made a fairly conservative analysis of noise reduction provided by the fence around the generator. Items to consider:

1. As it stands now, the analysis indicates that the new generator is no louder than the maximum that had been established earlier by the now-removed ACC units.
2. Some of the noise reflects off the back wall and over the fence. This limiting factor could be addressed with post-installation improvements of the fence and the wall behind it, as necessary.

Regards,

 Steve Wise





Sound Pressure Level @ 7 meters, dB(A)

See Notes 1-6 listed below

Configuration		Position (Note 1)								8 Position Average
		1	2	3	4	5	6	7	8	
Standard -Unhoused	Infinite Exhaust	78.8	80.5	77.9	80.8	78.4	80.1	79.7	78.5	79.4
F217-2 Sound Attenuated Level 2	Mounted	68.4	69.2	65.7	68.1	67.3	68.5	68.1	67.6	67.5
F231-2 Sound Attenuated Level 1	Mounted	73.6	70.0	68.0	67.0	67.9	69.3	68.2	71.5	69.7

Sound Power Level, 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	
Standard -Unhoused	Infinite Exhaust	47.3	67.9	74.9	85.4	97.4	98.9	100.3	96.3	89.8	105.2
F217-2 Sound Attenuated Level 2	Mounted	50.8	80.2	77.2	81.1	88.6	87.2	85.8	83.5	78.2	95.3
F231-2 Sound Attenuated Level 1	Mounted	49.8	80.0	76.2	82.4	89.3	87.8	86.9	84.3	78.9	96.2

Exhaust Sound Power Level, dB(A)

See Notes 2, 9 listed below

Open Exhaust (No Muffler) @ Rated Load	Octave Band Center Frequency (Hz)									Overall Sound Power Level
	31.5	63	125	250	500	1000	2000	4000	8000	
	45.9	82.2	85.8	94.6	101.3	106.4	108.6	107.5	103.4	113.4

Note:

1. Position 1 faces the Generator front per ISO 8628-10. 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 8628-10, as applicable.
8. Reference power = 1 mW (10⁻¹² W)
9. Exhaust Sound Power Levels are per ISO 6798, as applicable.

Specification sheet



Diesel generator set

25 kW - 40 kW
EPA emissions stationary
standby



Description

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

Features

Cummins heavy-duty engine - Rugged 4-cycle, liquid-cooled, industrial diesel engine delivers reliable power, low emissions and fast response to load changes.

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

Control system - The PowerCommand® 1.1 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 provide reliable running at up to 50 °C (122 °F) ambient temperature.

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

Fuel tanks - Two dual wall sub-base fuel tank series are offered as optional features, providing economical and flexible solutions to meet extensive code requirements on diesel fuel tanks.

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

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

Model	Standby rating		Prime Rating		Data sheets
	60 Hz		60 Hz		60 Hz
	kW	kVA	kW	kVA	
C25 D6	25	31.25	22.7	28.4	NAD-5859
C30 D6	30	37.5	27	33.75	NAD-5860
C35 D6	35	43.75	32	40	NAD-5861
C40 D6	40	50	36	45	NAD-5862

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Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G2
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 0.5% - 3 Phase only
Frequency regulation	Isochronous
Random frequency variation	± 0.5%
Radio frequency emissions compliance	FCC code Title 47 part 15 Class B

Engine specifications

Bore	95.0 mm (3.74 in)
Stroke	115.1 mm (4.53 in)
Displacement	3.3 litres (199 in ³)
Configuration	Cast iron, in-line, 4 cylinder
Battery capacity	550 amps at ambient temperature of 0 °F to 32 °F (-18 °C to 0 °C)
Battery charging alternator	40 amps
Starting voltage	12 volt, negative ground
Fuel system	Indirect injection, number 2 diesel fuel, fuel filter, electric fuel shut off
Fuel filter	Single element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow
Standard cooling system	50 °C (122 °F) ambient cooling system

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	120 °C (248 °F) standby
Exciter type	Torque match (shunt) with PMG/EBS 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)	0.03

Available voltages

Single phase	3 phase
• 120/240	• 120/208
	• 120/240 delta
	• 277/480
	• 347/600

Note: Consult factory for other voltages.

Generator set options

Fuel system

- Basic fuel tanks
- Regional fuel tanks

Engine

- Engine air cleaner – normal or heavy duty
- Shut down – low oil pressure
- Extension – oil drain

Alternator

- 120 °C (248 °F) temperature rise alternator
- 105 °C (221 °F) temperature rise alternator
- Excitation boost system (EBS) or PMG
- Alternator heater, 120 V

Control

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

Electrical

- Single circuit breaker
- Dual circuit breakers
- 80% rated circuit breakers
- 100% rated circuit breakers

Enclosure

- Aluminum enclosure Sound Level 1 or Level 2, with muffler installed, sandstone or green color
- Open set

Cooling system

- Shutdown – low coolant level
- Warning – low coolant level
- Extension – coolant drain
- Cold weather option for operating at <4 ° (40 °F)

Exhaust system

- Exhaust connector – NPT
- Open set with muffler mounted

Generator set application

- Battery rack, larger battery
- Radiator outlet duct adapter

Warranty

- Base warranty – 2 year, 400 hour, standby
- Standby, 3 year, 900 hour, parts
- Standby, 5 year, 1500 hour, parts
- Standby, 3 year, 900 hour, parts and labor
- Standby, 5 year, 1500 hour, parts and labor
- Standby, 3 year, 900 hour, parts, labor and travel
- Standby, 5 year, 1500 hour, parts, labor and travel

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

Generator set accessories

- Extreme cold weather kit
- Battery rack, larger battery
- Battery heater kit
- HMI211RS in-home display, including pre-configured 12" harness
- HMI211 remote display, including pre-configured 12" harness
- HMI220 remote display
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)
- Annunciator – RS485
- Remote monitoring device – PowerCommand 500

- Battery charger – stand-alone, 12 V
- Circuit breakers
- Enclosure Sound Level 1 to Sound Level 2 upgrade kit
- Enclosure paint touch up kit
- Mufflers – industrial, residential or critical
- Alternator excitation boost system (EBS) or PMG
- Alternator heater
- Maintenance and service kit
- Engine lift kit
- Various fuel tanks and accessories

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Control system PowerCommand 1.1



PowerCommand control is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

Operator/display panel

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating generator set running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -40 °C to +70 °C
- Bargraph display (optional)

AC protection

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

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

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):

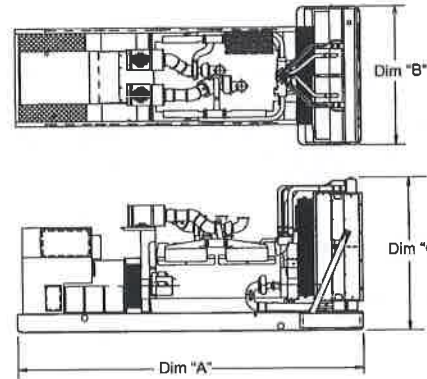
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



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






Do not use for installation design

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
Open Set					
C25 D6	2224 (87.5)	864 (34)	1121 (44.13)	504 (1115)	525 (1161)
C30 D6	2224 (87.5)	864 (34)	1121 (44.13)	533 (1178)	553 (1224)
C35 D6	2224 (87.5)	864 (34)	1121 (44.13)	552 (1221)	573 (1267)
C40 D6	2224 (87.5)	864 (34)	1121 (44.13)	566 (1252)	587 (1298)
Sound Attenuated Enclosure Level 1					
C25 D6	2384 (93.8)	864 (34)	1156 (45.5)	551 (1219)	572 (1265)
C30 D6	2384 (93.8)	864 (34)	1156 (45.5)	580 (1282)	600 (1328)
C35 D6	2384 (93.8)	864 (34)	1156 (45.5)	599 (1325)	620 (1371)
C40 D6	2384 (93.8)	864 (34)	1156 (45.5)	613 (1356)	634 (1402)
Sound Attenuated Enclosure Level 2					
C25 D6	2629 (103.5)	864 (34)	1156 (45.5)	570 (1261)	591 (1307)
C30 D6	2629 (103.5)	864 (34)	1156 (45.5)	599 (1324)	619 (1370)
C35 D6	2629 (103.5)	864 (34)	1156 (45.5)	618 (1367)	639 (1413)
C40 D6	2629 (103.5)	864 (34)	1156 (45.5)	632 (1398)	653 (1444)

* Weights represent a set with standard features. See outline drawings for weights of other configurations.

Codes and standards

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

	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 for seismic application in accordance with 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.

North America
1400 73rd Avenue N.E.
Minneapolis, MN 55432
USA

Phone 763 574 5000

Fax 763 574 5298

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NAS-5872d-EN (8/15)



power.cummins.com



Generator set data sheet

Model: C30 D6
Frequency: 60 Hz
Fuel type: Diesel
KW rating: 30 standby
 27 prime
Emissions level: EPA Emission Stationary Standby

Exhaust emission data sheet:	EDS-1183
Exhaust emission compliance sheet:	EPA-1252
Sound performance data sheet:	MSP-1181
Cooling performance data sheet:	MCP-263
Prototype test summary data sheet:	PTS-322

Fuel consumption	Standby				Prime			
	kW (kVA)				kW (kVA)			
Ratings	30 (37.5)				27 (33.75)			
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full
US gph	1.06	1.62	2.20	2.81	0.96	1.47	2.00	2.55
L/hr	4.01	6.13	8.33	10.64	3.63	5.56	7.57	9.65

Engine	Standby rating	Prime rating
Engine manufacturer	Cummins Inc.	
Engine model	4BT3.3-G5	
Configuration	Cast iron, in-line, 4 cylinder	
Aspiration	Turbocharged	
Gross engine power output, kWm (bhp)	51 (69)	45 (60)
BMEP at set rated load, kPa (psi)	750.14 (108.8)	681.89 (98.9)
Bore, mm (in)	95 (3.74)	
Stroke, mm (in)	115 (4.53)	
Rated speed, rpm	1800	
Piston speed, m/s (ft/min)	6.9 (1359)	
Compression ratio	20.8:1	
Lube oil capacity, L (qt)	7.9 (8.35)	
Overspeed limit, rpm	2250	

Fuel flow

Maximum fuel flow, L/hr (US gph)	49.5 (13.1)
Maximum fuel inlet restriction with clean filter, mm Hg (in Hg)	58.42 (2.3)
Maximum return restriction, mm Hg (in Hg)	375.92 (14.8)

Air	Standby rating	Prime rating
Combustion air, m ³ /min (scfm)	3.56 (126)	3.48 (123)
Maximum air cleaner restriction with clean filter, kPa (in H ₂ O)	1.25 (5)	
Alternator cooling air, m ³ /min (cfm)	11.41 (403)	

Exhaust

Exhaust flow at set rated load, m ³ /min (cfm)	8.91 (315)	8.49 (300)
Exhaust temperature, °C (°F)	470.5 (879)	453 (847)
Maximum back pressure, kPa (in H ₂ O)	10.22 (41)	10.22 (41)
Actual exhaust back pressure with CPG fitted muffler, kPa (in H ₂ O)	4.04 (16.2)	3.71 (14.9)

Standard set-mounted radiator cooling

Ambient design, °C (°F)	50 (122)	
Fan load, kW _m (HP)	2.79 (3.8)	
Coolant capacity (with radiator), L (US Gal)	14.8 (3.9)	
Cooling system air flow, m ³ /min (scfm)	93.2 (3290)	
Total heat rejection, MJ/min (Btu/min)	1.85 (1747.5)	1.72 (1631.25)
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)	

Weights²

Unit dry weight kgs (lbs)	581 (1282)
Unit wet weight kgs (lbs)	602 (1328)

Notes:

¹ For non-standard remote installations contact your local Cummins Power Generation representative.

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

Derating factors

Standby	Engine power available up to 3050m (10,000ft) and ambient temperatures up to 50C (122F). Above these conditions, derate at 3% per 300m (985ft) and 6% per 10C (18F).
Prime	Engine power available up to 2200m (7,220ft) and ambient temperatures up to 50C (122F). Above these conditions, derate at 5% per 300m (985ft) and 9% per 10C (18F).

Ratings definitions

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

Alternator data

Standard Alternators		Single phase table		Three phase table		
Maximum temperature rise above 40 °C ambient		120 °C	120 °C	120 °C	120 °C	120 °C
Feature code		B949-2	B946-2	B986-2	B943-2	B952-2
Alternator data sheet number		ADS-576	ADS-574	ADS-574	ADS-574	ADS-574
Voltage ranges		120/240	120/208	120/240	277/480	347/600
Voltage feature code		R104-2	R098-2	R106-2	R002-2	R114-2
Surge kW		39.04	39.49	39.49	39.49	39.49
Motor starting kVA (at 90% sustained voltage)	Shunt	57	71	71	71	71
	EBS	93	113	113	113	113
Full load current amps at standby rating		125	104.2	90.3	45	36.1

Optional alternators for Improved motor starting capability		Single phase table		Three phase table		
Maximum temperature rise above 40 °C ambient		105 °C	105 °C	105 °C	105 °C	105 °C
Feature code		BB96-2	BB93-2	BB94-2	BB95-2	BB92-2
Alternator data sheet number		ADS-579	ADS-577	ADS-577	ADS-577	ADS-577
Voltage ranges		120/240	120/208	120/240	277/480	347/600
Voltage feature code		R104-2	R098-2	R106-2	R002-2	R114-2
Surge kW		39.72	39.76	39.76	39.99	39.76
Motor starting kVA (at 90% sustained voltage)	Shunt	68	86	86	86	86
	EBS	112	135	135	135	135
Full load current amps at standby rating		125	104.2	90.3	45	36.1

Notes:

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

² The broad range alternators can supply single phase output up to 2/3 set rated 3-phase kW at 1.0 power factor.

³ The extended stack (full single phase output) and 4 lead alternators can supply single phase output up to full set rated 3-phase kW at 1.0 power factor.

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

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

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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NAD-5861b-EN (10/14)



cumminspower.com



ALTERNATOR DATA SHEET

Frame Size CA115-P14

CHARACTERISTICS		No of Bearings 1				
WEIGHTS:		Stator Assembly:	215 lb	97.5 kg		
		Rotor Assembly:	114 lb	51.7 kg		
		Complete Assembly:	329 lb	149 kg		
MAXIMUM SPEED:			2250	rpm		
INSULATION SYSTEM: Class H Throughout						
		60 Hz Voltage				(winding no)
		<u>208</u> (311)	<u>480</u> (41)	<u>600</u> (17)	<u>240</u> (311)	
EXCITATION CURRENT:	Full load	1.91	1.93	1.98	1.91	
EXCITATION CURRENT:	No load	0.50	0.52	0.55	0.50	
3 Ø RATINGS (0.8 power factor) (Based on specific temperature rise at 40°C ambient temperature)		<u>208</u> (311)	<u>480</u> (41)	<u>600</u> (17)	<u>240</u> (311)	
120°C Rise Peak Standby Ratings	kW	30	30	30	30	
	kVA	37.5	37.5	37.5	37.5	
REACTANCES (per unit ± 30%) (Based on full load at 105°C Rise Rating)		<u>208</u> (311)	<u>480</u> (41)	<u>600</u> (17)	<u>240</u> (311)	
Synchronous		1.86	1.89	1.89	1.86	
Transient		0.11	0.12	0.12	0.11	
Subtransient		0.08	0.08	0.08	0.08	
Negative Sequence		0.15	0.15	0.15	0.15	
Zero Sequence		0.09	0.08	0.08	0.09	
MOTOR STARTING		<u>208</u> (311)	<u>480</u> (41)	<u>600</u> (17)	<u>240</u> (311)	
Maximum kVA (90% Sustained Voltage) (At 20°C nominal generator & ambient temperature)	(EBS)	113	113	113	113	
	(Shunt)	71	71	71	71	
TIME CONSTANTS (Sec)		<u>208</u> (311)	<u>480</u> (41)	<u>600</u> (17)	<u>240</u> (311)	
Transient		0.024	0.024	0.024	0.024	
Subtransient		0.006	0.006	0.006	0.006	
Open Circuit		0.57	0.57	0.57	0.57	
DC		0.005	0.005	0.005	0.005	
WINDINGS (@20°C)		<u>208</u> (311)	<u>480</u> (41)	<u>600</u> (17)	<u>240</u> (311)	
Stator Resistance (Ohms per phase)		0.388	0.488	0.768	0.388	
Rotor Resistance (Ohms)		0.779	0.779	0.779	0.779	
Number of Leads		12	12	12	12	



Sound Pressure Level @ 7 meters, dB(A)

See Notes 1-6 listed below

Configuration		Position (Note 1)								8 Position Average
		1	2	3	4	5	6	7	8	
Standard –Unhoused	Infinite Exhaust	78.8	80.5	77.9	80.8	78.4	80.1	79.7	78.5	79.4
F217-2 Sound Attenuated Level 2	Mounted	66.4	69.2	65.7	68.1	67.3	68.5	66.1	67.6	67.5
F231-2 Sound Attenuated Level 1	Mounted	73.6	70.0	66.0	67.0	67.9	69.3	66.2	71.5	69.7

Sound Power Level, 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	
Standard –Unhoused	Infinite Exhaust	47.3	67.9	74.9	95.4	97.4	98.9	100.3	96.3	89.8	105.2
F217-2 Sound Attenuated Level 2	Mounted	50.6	80.2	77.2	91.1	88.6	87.2	85.8	83.5	78.2	95.3
F231-2 Sound Attenuated Level 1	Mounted	49.8	80.0	76.2	92.4	89.3	87.8	86.9	84.3	78.9	96.2

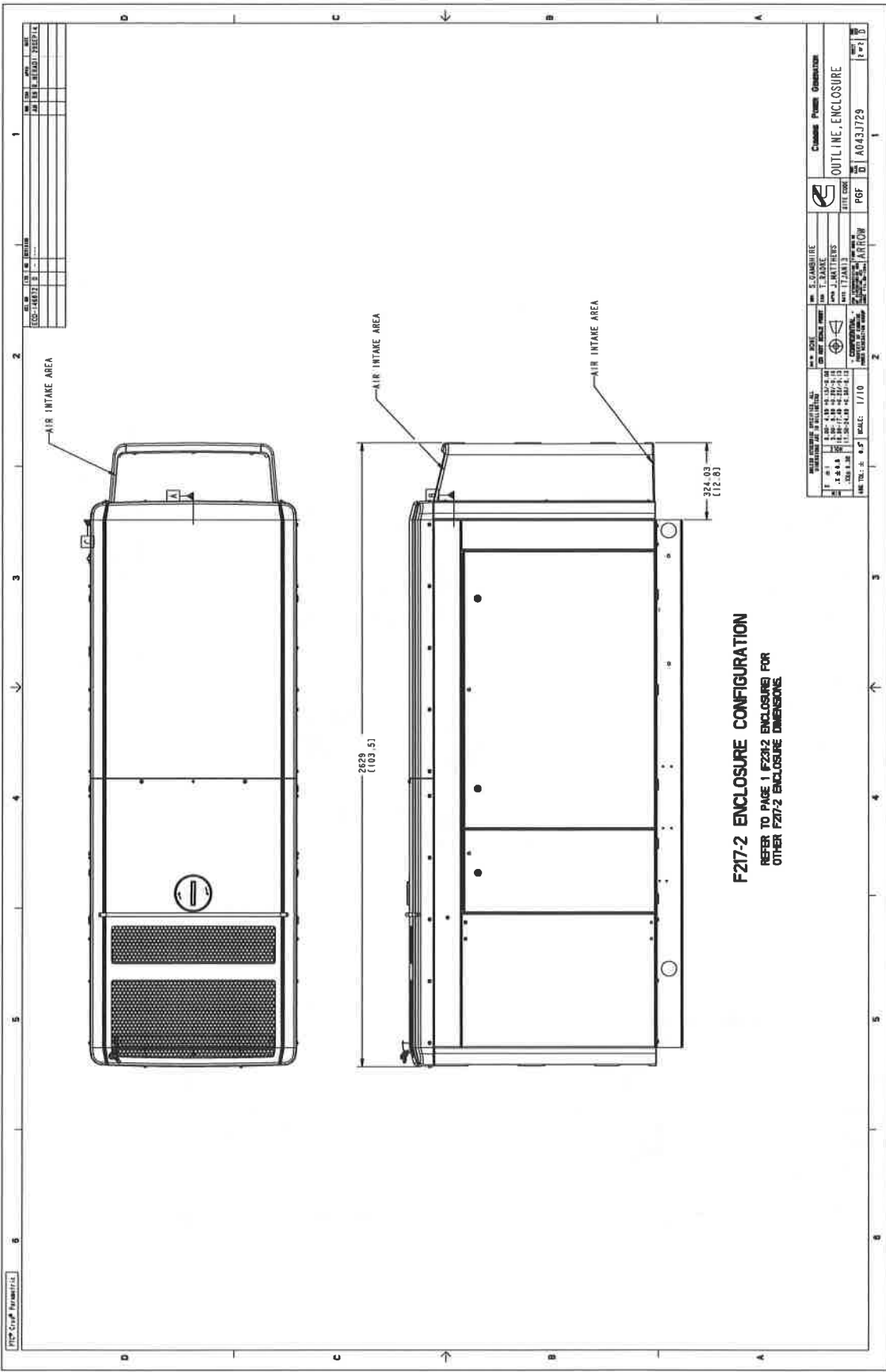
Exhaust Sound Power Level, dB(A)

See Notes 2, 9 listed below

Open Exhaust (No Muffler) @ Rated Load	Octave Band Center Frequency (Hz)									Overall Sound Power Level
	31.5	63	125	250	500	1000	2000	4000	8000	
	45.9	82.2	85.8	94.6	101.3	106.4	108.6	107.5	103.4	113.4

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 (10⁻¹²W)
9. Exhaust Sound Power Levels are per ISO 6798, as applicable.



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

REV	DATE	BY	CHKD
1	10/15/03	J. J. BROWN	
2	11/11/03	J. J. BROWN	
3	11/11/03	J. J. BROWN	
4	11/11/03	J. J. BROWN	
5	11/11/03	J. J. BROWN	
6	11/11/03	J. J. BROWN	

DATE	11/11/03	SCALE	17/10
PROJECT	F217-2 ENCLOSURE		
DESIGNER	J. J. BROWN	CHECKED	J. J. BROWN
APP'D	J. J. BROWN	DATE	11/11/03
COMPANY	CONVENTIONAL		
REV	DATE	BY	CHKD
1	11/11/03	J. J. BROWN	
2	11/11/03	J. J. BROWN	
3	11/11/03	J. J. BROWN	
4	11/11/03	J. J. BROWN	
5	11/11/03	J. J. BROWN	
6	11/11/03	J. J. BROWN	

Batteries and accessories

> Specification sheet



**Power
Generation**

Our energy working for you.™

Part number	Battery	Cold cranking amps	Voltage	Reserve capacity	Length	Width	Height	Group size	Ship weight lbs	Qts electrolyte
0416-0439	Dry	1400	12	430	20.75	11.00	9.63	8D	110	16.0
0416-0579	Dry	525	12	90	10.25	6.63	8.75	24C-675	20	6.0
0416-0579-01	Wet	525	12	90	10.25	6.63	8.75	24C-675	36	5.9
0416-0796	Wet	725	12	150	13.00	6.88	9.63	31-4	62	4.2
0416-0823	Dry	725	12	150	13.00	6.88	9.63	31-4	42	4.2
0416-0848	Dry	1080	12	270	20.75	8.63	9.63	4D	85	13.0
0416-0980	Wet	1000	12	200	13.00	6.88	9.63	31-5	65	4.2
0416-1040	Dry	800	12	160	13.00	6.88	9.44	31	65	4.2
0416-1051	Wet	530	12	80	8.13	6.63	7.50	26-775	31	3.7
0416-1105	Wet	1400	12	430	20.75	11.00	9.63	8D	125	16.0
0416-1138	Sealed	NA	12	NA	5.88	3.88	3.75	NP12-12	9	4.0
0416-1264	Dry	730	12	420	20.67	10.83	9.45	8D	110	16.0
0416-1291	Sealed	800	12	110	10.00	6.88	7.81	34	38	4.0
0416-1330	Wet	810	12	146	10.25	6.63	8.88	24XL	43	5.9
0416-1332	Dry	420	12	60	9.13	5.25	8.88	22NF	19	4.0

Battery racks (Not recommended for mounting on skids.)

Part number	Description
0416-0527	20.5" x 11" (includes hold down brackets)
0416-0475	14.5" x 9.25" (loose rack, not intended for anchoring)
0541-0798	13.725" x 9.725" (includes hold down brackets)

Battery heater Increases battery starting capability in lower than optimum ambient temperatures.

Part number	Description
0333-0469	Heater is a 6" x 9" pad installed in the battery rack directly under the battery case. Comes complete with an 8' cord and standard duplex plug. 200 Watts at 120 VAC.
0541-0555	Heater is a 6.5" x 8" pad with 3' cord, 120 Watts at 120 VAC, 40 °F/70 °F preset thermostat.

Battery box

Part number	Description
0416-1263	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. (see drawing on page 3). Note: Box material will become soft and pliable around 240 °F.



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)



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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.

Circuit breakers

Description

This data sheet provides circuit breaker manufacturer part numbers and specifications. Please refer to their website for more technical information.

Applicable models

Engine	Models					
Kubota	C10D6	C15D6	C20D6			
QSJ2.4	C20N6	C25N6	C30N6	C30N6H	C36N6	C36N6H
	C40N6	C40N6H	C45N6H	C50N6H	C60N6H	
B3.3	C25D6	C30D6	C35D6	C40D6	C50D6	C60D6
QSJ5.9G	C45N6	C50N6	C60N6	C70N6	C80N6	C100N6
QSB5	DSFAC	DSFAD	DSFAE	C50D6C	C60D6C	C80D6C
	C100D6C	C125D6C				
QSB7	DSGAA	DSGAB	DSGAC	DSGAD	DSGAE	
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	16-17
H, J, and L	0611CT1001	8-9
Q	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.

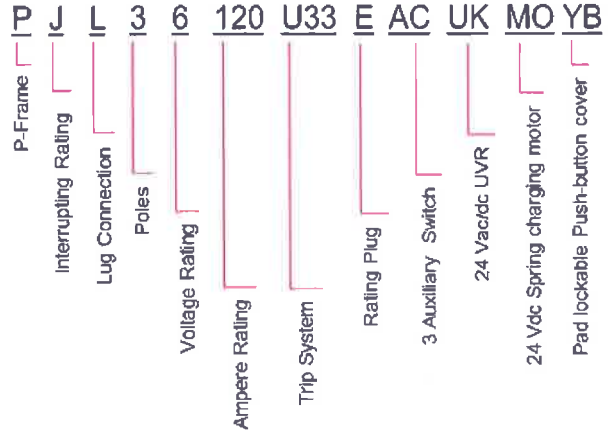
*If the first 3 letters are "PJP," the search will not work. You will need to start with just "PJ" and use the description pages to obtain the information you are looking for on the "PJP."

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 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 3.3S	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

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.



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.

NEC

Equipment shall be suitable for use in systems compliant to 700, 701 and 702.



All switches comply with NFPA 70, 99 and 110.

NEMA

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.

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 friction-free, 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 de-energized conditions.

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

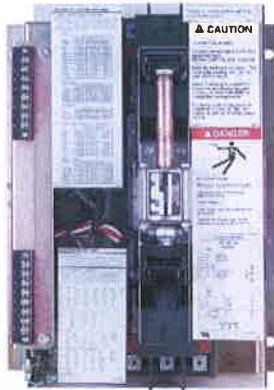
Main contacts - Heavy-duty silver alloy contacts with multi-leaf arc chutes are rated for 100% load interruption. They require no routine contact maintenance and provide 100% continuous current ratings.

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 Power Generation 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 quick-break, quick-make contact mechanisms suitable for manual operation under de-energized conditions.

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 0-60 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 EN 60947-6-1.
- 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	225 A	A050J441	200,000 @ 600	225 A	A048J566
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	A048E951	200,000 @ 600	1200 A	A048J564
800, 1000	65,000 @ 480 50,000 @ 600	1400 A	A048E953	200,000 @ 600	1400 A	A048J562
1200	85,000 @ 480 65,000 @ 600	1600 A	A048E947	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	A048E951
800, 1000	200,000 at 600	2000 A Class L or 1200 A class T or 600 A class J, RK1, RK5	A048E953
1200	200,000 at 600	2000 A Class L or 1200 A class T or 600 A class J, RK1, RK5	A048E947

3-cycle ratings

Transfer switch ampere	WCR @ volts max 3-cycle rating	Max MCCB rating	Drawing reference
1200	42,000 at 600 50,000 at 480	1600 A	A048E947

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
	In	mm	In	mm	Door closed		Door open		lb	kg	
					In	mm	In	mm			
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
	In	mm	In	mm	Door closed		Door open		lb	kg		
					In	mm	In	mm				
40, 70, 125 3-pole	34.0	864	26.5	673	12.5	318	36.5	927	125	57	3R, 12	0310-0453
	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4	0310-0445
40, 70, 125 4-pole	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R, 12	0500-4896
	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4	0500-4896
150, 225	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	4X	0500-4184
	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	3R, 12	0310-0454
260	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4	0310-0446
											4X	0500-4184
300, 400, 600	59.0	1499	27.5	699	16.5	419	41.5	1054	275	125	3R, 12	0310-0455
	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	4	0310-0447
800, 1000	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	4X	0500-4185
											3R, 12	0310-1315
1200	90.0	2286	39.0	991	27.0	698	63.0	1600	730	331	4	0310-1316
											4X	0500-4185
											3R, 12	0310-0457
											4	0310-0449
											4X	0500-4185
											3R, 12	A030L411
											4, 4X	A041N370

Transfer switch lug capacities

All lugs 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	1	3/0 - 600 MCM
300, 400	2	3/0 - 250 MCM
600	2	250 - 500 MCM
800	4	250 - 500 MCM
1000,1200	4	#2 AWG-750 MCM

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



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Specifications are subject to change without notice.

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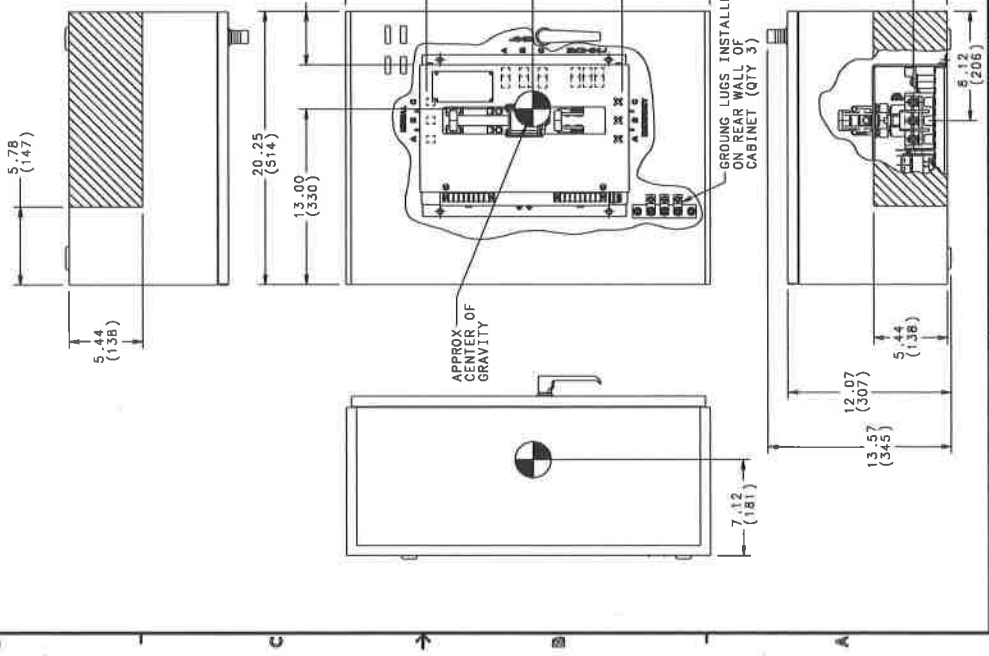
310-0544

NOTES:

1. APPROX. WEIGHT: 82 LBS
MASS: 37 kg
2. DIMENSIONS IN () ARE MILLIMETERS.
3. LUG CAPACITY:
NORMAL & EMERGENCY LUGS (QTY 1 WIRE)
12-2/0 MCM (4-50) CU-AL
LOAD & NEUTRAL LUGS (QTY 1 WIRE)
14-2/0 MCM (2.5-50) CU-AL
GND LUG CAPACITY
(1 WIRE) WIRE RANGE 14-1/0 (2.5-50) CU-AL.
4. USE SEPARATE 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. WIRE BENDING SPACE:

- 6.1. NORMAL & EMERGENCY LUGS:
CONFORMS TO NEC TABLE 373-6(B).
- 6.2. LOAD & NEUTRAL LUGS:
CONFORMS TO NEC TABLE 373-6(A).

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REVISION DWG

DATE: 11-11-83
 DRAWN BY: J.M.
 CHECKED BY: J.M.
 TITLE: 310-0544
 PROJECT: 310-0544
 SHEET NO.: 1-115

Omni

40-125 AMP
 310-0544

THE OUTLINE-CONTROL BOX

