

**ADDENDUM NO. #1**

**Project:** Homer Library Emergency Generator Installation  
**Addendum Issue Date:** September 15, 2016  
**Bid Date:** September 22, 2016 @ 2:00 PM (Thursday)  
**Previous Addenda Issued:** None  
**Issued By:** Carey Meyer  
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Bidders must acknowledge receipt of this addendum prior to the date set for bid opening by one of the following methods:

- (1) By acknowledging receipt of this addendum in the bid submitted (**use addendum acknowledgement form provided in bid documents**).
- (2) By facsimile (fax) or email which will need to include a reference to the project and each of the addendum numbers.

The bid documents require acknowledgement individually of all addenda to the drawings and/or specifications. This is a mandatory requirement and any bid received without acknowledgment of receipt of addenda may cause the bid to be considered non-responsive.

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**ITEM 1** – Will the City be arranging for commissioning of the generator installation with the manufacturer?

Yes. The City will contract directly with Cummins and coordinate the commissioning. Contractor shall give the City one week notice of completion of work to allow for scheduling of commissioning activities. Expect commissioning to take two days (first day start-up and performance testing; second day training/final inspection). Contractor shall be available on-site the first day for 3 hours to assist in start-up.

**ITEM 2** – Could you supply information regarding specification of City provided generator, transfer switch and fuel tank?

Yes, see attached.

**ITEM 3** – Will the City support removal and salvaging of the existing fuel tank?

The City will remove fuel from the existing tank and have equipment at the Public Works yard to off load the salvaged tank. All other work necessary to remove tank will be responsibility of the Contractor.

**ITEM 4** – Can I amend by bid by fax?

Yes. Once a hard copy of your bid has been submitted to the City Clerk, you can amend the bid by fax.

END ADDENDUM #1

**Specification sheet**

# Diesel generator set

50 kW - 60 kW  
EPA emissions stationary standby



*Sub-base Fuel Tank Not Shown*

## 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 60 Hz		Prime Rating 60 Hz		Data sheets 60 Hz
	kW	kVA	kW	kVA	
<b>C50 D6</b>	50.0	62.5	45.0	56.25	NAD-5863
<b>C60 D6</b>	60.0	75.0	54.0	67.50	NAD-5864

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## Generator set specifications

Governor regulation class	TBC
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	TBD
Radio frequency emissions compliance	FCC code Title 47 Part 15 Class B

## Engine specifications

Design	Turbocharged and charge air cooled
Bore	95.0 mm (3.74 in)
Stroke	115.0 mm (4.53 in)
Displacement	3.26 litres (199 in <sup>3</sup> )
Cylinder block	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	50 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct 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
Rated speed	1800 rpm

## Alternator specifications

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

## Available voltages

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
- 120 V 1000 W coolant heater

### Alternator

- One size up alternator
- 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

### 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
- Coolant heater – 120 V, 1 Ph

### Exhaust system

- Exhaust connector – NPT

### Generator set application

- Battery rack
- Battery rack, heavy duty

### 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

- Coolant heater
- Extreme cold weather components
- 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 PMG
- Alternator heater
- Maintenance and service kit
- Engine lift kit

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- Various fuel tanks and accessories

## 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  $-40\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$  ( $-40\text{ }^{\circ}\text{F}$  to  $+158\text{ }^{\circ}\text{F}$ ) 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  $-40\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$
- 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):

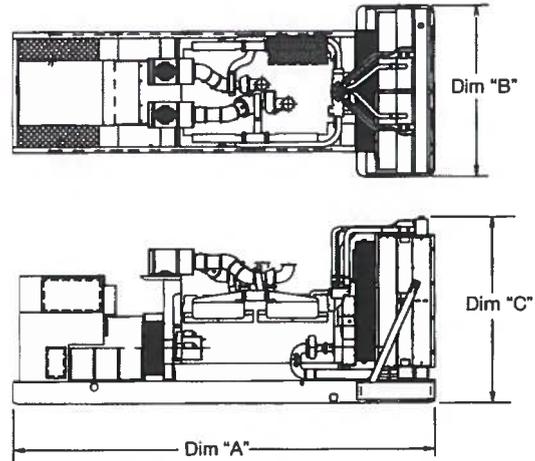
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### 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) 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)
<b>Open Set</b>					
<b>C50 D6</b>	2224 (87.5)	864 (34)	1121 (44.13)	648 (1434)	669 (1480)
<b>C60 D6</b>	2224 (87.5)	864 (34)	1121 (44.13)	701 (1550)	721 (1596)
<b>Sound Attenuated Enclosure Level 1</b>					
<b>C50 D6</b>	2384 (93.8)	864 (34)	1156 (45.5)	695 (1538)	716 (1584)
<b>C60 D6</b>	2384 (93.8)	864 (34)	1156 (45.5)	748 (1654)	768 (1700)
<b>Sound Attenuated Enclosure Level 2</b>					
<b>C50 D6</b>	2629 (103.5)	864 (34)	1156 (45.5)	714 (1580)	735 (1626)
<b>C60 D6</b>	2629 (103.5)	864 (34)	1156 (45.5)	767 (1696)	787 (1742)

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

## Codes and standards

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

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

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

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 **Power Generation**

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# OTPC transfer switch open and closed transition



## Description

OTPC 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 switch monitors both power sources, signals generator set startup, automatically transfers power, and returns the load to the primary power source when the utility returns and stabilizes.

OTPC transfer switches are available with closed transition transfer. By briefly connecting the two sources (for 100 msec or less), the transfer from the alternate source back to the normal source occurs without interruption in the power supply to loads.



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

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.

## Features

**PowerCommand® control** - A fully featured microprocessor-based control with digital display. Controls allow operator to enter settings and make adjustments to software-enabled features easily and accurately. Accommodates up to eight event schedules.

**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 smooth, continuous transfer switch action during automatic operation.

**Robust control system design** - Optically isolated logic inputs and isolation transformers for AC power inputs provide high-voltage surge protection.

**Main contacts** - Heavy-duty silver alloy contacts with 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.

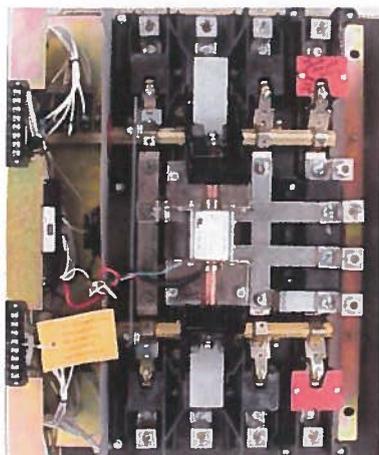
**Communications capability** - The transfer switch is capable of communicating with other transfer switches, SCADA and remote monitoring systems, or Cummins Power Generation generators utilizing LonWorks® protocol.

**Easy service/access** - Single-plug harness connection and compatible terminal markings simplify servicing. Access space is ample. Door-mounted controls are field-programmable; not 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.
- 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

<b>Voltage rating</b>	600 VAC, 50 or 60 Hz.
<b>Arc interruption</b>	Multiple leaf arc chutes provide dependable arc interruption.
<b>Neutral bar</b>	A full current-rated neutral bar with lugs is standard on enclosed 3-pole transfer switches.
<b>Auxiliary contacts</b>	Two isolated contacts (one for each source) indicating switch position are provided for customer use. Contacts are normally open, and close to indicate connection to the source. Wired to terminal block for easy access. Rated at 10 amps continuous and 250 VAC maximum. UL recognized, and CSA-certified.
<b>Operating temperature</b>	-40 °F (-40 °C) to 140 °F (60 °C)
<b>Storage temperature</b>	-40 °F (-40 °C) to 140 °F (60 °C)
<b>Humidity</b>	Up to 95% relative, non-condensing
<b>Altitude</b>	Up to 10,000 ft (3,000 m) without derating
<b>Surge withstand ratings</b>	Voltage surge performance and testing in compliance with the requirements of IEEE C62.41 (Category B3) and IEEE C62.45.
<b>Total transfer time (source-to-source)</b>	Will not exceed 6 cycles at 60 Hz with normal voltage applied to the actuator and without programmed transition enabled.
<b>Manual operation handles</b>	Transfer switches rated through 1000 amps are equipped with permanently attached operating handles and quick-break, quick-make contact mechanisms suitable for manual operation. Transfer switches over 1000 amps are equipped with manual operators. All switches must be de-energized before manual operation is attempted.

## 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 0-60 seconds, default 0 seconds. Programmed transition is standard on 150-1200 amp switches, and optional on 1600-4000 amps.

**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 back-up. If sources are not in phase within 120 seconds, switches from 40-1200 amps will transfer using programmed transition (not available on open transition switches over 1200 amps).

**Closed transition:** Used in applications where loads are sensitive to the momentary power interruption that occurs when performing open transition between sources. Closed transition is accomplished by briefly (<100 msec) paralleling two good sources to eliminate the momentary break in the power supply. Closed transition is only available as an option on OTPC models from 1000-4000 amps.

**Genset-to-genset:** Either genset can be designated as the lead genset. If the lead genset goes down or is taken offline, the transfer switch starts the second genset and transfers the load. The control can be programmed to alternate between the two gensets at a set interval up to 336 hours (2 weeks).

## PowerCommand control

PowerCommand controls are microprocessor based and developed specifically for automatic transfer switch operation. The control includes all of the features and options required for most applications.

- LED lamps indicate source availability, source connected, exercise mode and test mode.
- Flash memory stores the control settings.
- Contents of the memory are not lost even if power to the controller is lost.
- On-board battery maintains the real-time clock setting and the engine start time delay.
- Choice of two control packages allows selection of the most suitable control for the application.

### Control functions

#### Level 1 control (C023)

**Open transition** (in-phase)

**Open transition** (programmed)

**Utility-to-genset applications**

**Software adjustable time delays:**

Engine start: 0 to 120 sec

Transfer normal to emergency: 0 to 120 sec

Re-transfer emergency to normal: 0 to 30 min

Engine stop: 0 to 30 min

Programmed transition: 0 to 60 sec

**Undervoltage sensing:** 3-phase normal, 1-phase emergency

Accuracy: +/- 2%

Pickup: 85% to 100% of nominal voltage

Dropout: 75% to 98% of pickup setting

Dropout time delay: 0-4 sec

**Overvoltage sensing:** 3-phase normal, 1-phase emergency

Accuracy: +/- 2%

Pickup: 95% to 99% of dropout setting

Dropout: 105% to 135% of nominal voltage

Dropout time delay: 0 to 120 sec

**Over/under frequency sensing:**

Accuracy:  $\pm 0.05$  Hz

Pickup:  $\pm 5\%$  to  $\pm 20\%$  of nominal frequency

Dropout: 1-5% beyond pickup

Dropout time delay: 0.1 to 15.0 sec

**Programmable genset exerciser:** One event/schedule with or w/o load

**Basic indicator panel:**

Source available/connected LED indicators

Test/exercise/override buttons

Digital display – optional (M018)

Analog bar graph meter display – optional (D009)

**Date/time-stamped event recording:** 50 events

**Load sequencing:** Optional with network communications module M031. Provides control for eight steps of load with an adjustable time delay for each step on transfer, re-transfer or both.

#### → Level 2 control (C024)

**Open transition** (in-phase)

**Open transition** (programmed)

**Closed transition** (includes fail-to-disconnect timer to prevent extended paralleling with the utility)

**Utility-to-genset applications**

**Utility-to-utility applications**

**Genset-to-genset applications**

**Software adjustable time delays:**

Engine start: 0 to 120 sec

Transfer normal to emergency: 0 to 120 sec

Re-transfer emergency to normal: 0 to 30 min

Engine stop: 0 to 30 min

Programmed transition: 0 to 60 sec

**Undervoltage sensing:** 3-phase normal, 3-phase emergency

Accuracy: +/- 2%

Pickup: 85% to 100% of nominal voltage

Dropout: 75% to 98% of pickup setting

Dropout time delay: 0-4 sec

**Overvoltage sensing:** 3-phase normal, 3-phase emergency

Accuracy:  $\pm 2\%$

Pickup: 95% to 99% of dropout setting

Dropout: 105% to 135% of nominal voltage

Dropout time delay: 0 to 120 sec

**Over/under frequency sensing:**

Accuracy: +/- 0.05 Hz

Pickup:  $\pm 5\%$  to  $\pm 20\%$  of nominal frequency

Dropout: 1-5% beyond pickup

Dropout time delay: 0.1 to 15.0 sec

**Voltage imbalance sensing:**

Dropout: 2% to 10%

Pickup: 90% of dropout

Time delay: 2.0 to 20.0 sec

**Phase rotation sensing:**

Time delay: 100 msec

**Loss of single phase detection:**

Time delay: 100 msec

**Programmable genset exerciser:** Eight events/schedules with or w/o load

**Basic indicator panel:**

Source available/connected LED indicators

Test/exercise/override buttons

Digital display – standard

Analog bar graph meter display – optional (D009)

**Date/time-stamped event recording:** 50 events

**Load sequencing:** Optional with network communications module M031. Provides control for eight steps of load with an adjustable time delay for each step on transfer, re-transfer, or both.

**Genset-to-genset:** Same functions as above, for lead and secondary generators.

**Utility-to-utility:** Same functions as above, for preferred and alternate source.

## Time-delay functions

**Engine start:** Prevents nuisance genset starts due to momentary power system variation or loss. Not included in utility-to-utility systems.

**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. For genset-to-genset applications, delays transfer of load from lead to secondary generator.

**Re-transfer emergency to normal:** Allows the utility to stabilize before re-transfer of load. Prevents needless power interruption if return of normal source is momentary. Allows staggered transfer of loads in multiple transfer switch systems. For genset-to-genset applications, delays re-transfer of load from secondary back to lead generator.

**Engine stop:** Maintains availability of the genset for immediate reconnection if the normal source fails shortly after retransfer. Allows gradual genset cool down by running unloaded. Not included in utility-to-utility systems.

**Elevator pre-transfer signal:** Requires optional relay signal module (M023). Signals elevator system that transfer is pending and delays transfer for pre-set interval of 0-60 seconds to prevent a power interruption during elevator operation.

## User interfaces

### Basic interface panel

LED indicators provide at-a-glance source and transfer switch status for quick summary of system conditions. Test and override buttons allow delays to be bypassed for rapid system checkout.

### Digital display (M018)

The digital display provides a convenient method for monitoring load power conditions, adjusting transfer switch parameters, monitoring PowerCommand network status or reviewing transfer switch events. Password protection limits access to adjustments to authorized personnel. The digital display is optional with the PowerCommand Level 1 control and comes standard with the Level 2 control.

## User interface options

### Front panel security key (M017)

Locks front panel to prohibit access to digital control settings. Prevents unauthorized activation of transfer or test functions.

### Bar graph meter display (D009)

An LED bar graph display provides an easy-to-read indicator of the level of power being supplied to the load. Information displayed includes: 3-phase voltage and current, frequency, power factor, and kilowatts. Green, amber, and red LEDs provide at-a-glance indication of system acceptability. Available as an option with the Level 2 PowerCommand microprocessor control.

## Control Options

### Relay signal module (M023)

Provides relay output contacts for sending information to the building monitoring and control system. Relay outputs include: Source 1 connected/available, Source 2 connected/available, not in auto, test/exercise active, failed to disconnect, failed to synchronize, failed to transfer/re-transfer, and elevator control pre-transfer signal.

### Loadshed (M007)

Removes the load from the emergency power source by driving the transfer switch to the neutral position when signaled remotely. Transfers load back to the emergency source when the signal contacts open. Immediately re-transfers back to the primary source when available. Available for utility-to-genset applications only.

### PowerCommand network interface (M031)

Provides connection to the PowerCommand network. LonWorks compatible for integration with building monitoring and control system.

### Load power and load current monitoring (M022)

Measures load phase and neutral current, power factor, real power (kW) and apparent power (kVA). Warns of excessive neutral current resulting from unbalanced or nonlinear loads. Minimum current level detection is 3%.

## UL withstand and closing ratings

OTPC transfer switches 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 rating	Drawing reference	With specific current limiting breakers (CLB)	Max CLB rating	Drawing reference
40, 70, 125 3-pole	14,000 at 480	225 A	A050J441	200,000 at 480	225 A	A048J566
	14,000 at 600			100,000 at 600		
40, 70, 125 4-pole	30,000 at 480	400 A	A048E949	200,000 at 480	400 A	A051D533
	30,000 at 600			100,000 at 600		
150, 225, 260	30,000 at 480	400 A	A048E949	200,000 at 480	400 A	A051D533
	30,000 at 600			100,000 at 600		
<del>300, 400</del> , 600	65,000 at 480	1200 A	A048E951	200,000 at 480	1200 A	A048J564
	65,000 at 600			100,000 at 600		
800, 1000 open	65,000 at 480	1400 A	A048E953	150,000 at 480	1400 A	A048J562
	50,000 at 600			100,000 at 600		
1000, 1200 closed	85,000 at 480	1600 A	A052L319			
	65,000 at 600*					
1200 open, delayed	85,000 at 480	1600 A	A048E947	200,000 at 480	1600 A	A048P186
	65,000 at 600			200,000 at 600		
1600, 2000, 3000, 4000	These amperages don't have specific circuit breaker ratings. See 3 cycle ratings table.					

## 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 480	200 A Class, J, RK1, RK5, T	A050J441
	200,000 at 600		
150, 225, 260	200,000 at 480	600 A Class, J, RK1, RK5 1200 A Class L or T	A048E949
	200,000 at 600		
<del>300, 400</del> , 600	200,000 at 480	600 A Class, RK1 or RK5 1200 A Class L or T	A048E951
	200,000 at 600		
800, 1000 open	200,000 at 480	600 A Class, J, RK1 or RK5 1200 A Class T 2000 A Class L	A048E953
	200,000 at 600		
1000, 1200 closed	200,000 at 480**	3000 A Class L	A052L319
1200 open	200,000 at 480	600A Class J, RK1 or RK5 1200 A Class T 2000 A Class L	A048E947
	200,000 at 600		
1600, 2000	200,000 at 480**	2500 A Class L	A052L322
3000	200,000 at 480**	4000 A Class L	A052L322
4000	200,000 at 480**	6000 A Class L	A052L324
	200,000 at 600*		

\*CSA only

\*\*UL only

**3-cycle ratings**

Transfer switch ampere	WCR @ volts max 3-cycle rating	Max MCCB rating	Drawing reference
1000, 1200 closed	50,000 at 480	1600 A	A052L319
	42,000 at 600*		
1200 open	50,000 at 480	1600 A	A048E947
	42,000 at 600		
1600, 2000	100,000 at 480	4000 A	A052L322
	65,000 at 600*		
3000	100,000 at 480	4000 A	A052L322
	65,000 at 600*		
4000	100,000 at 480	5000 A	A052L324
	85,000 at 600*		

\*CSA only

**Transfer switch lug capacities**

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

Amp rating	Cables per phase	Size
40, 70, 125 3-pole	1	#12 AWG-2/0
40 4-pole	1	#14 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	Two hole lug, one accepts 3/0 – 600 MCM and the other accepts #4 AWG – 250 MCM
600	2	250 - 500 MCM
800	4	250 - 500 MCM
1000 open, delayed		
1000 closed	4	#2 AWG to 600 MCM
1200 closed		
1200 open, delayed	4	#2 AWG to 600 MCM, standard (feature N045) 1/0 AWG to 750 MCM, optional (feature N066) Compression Lug Adapter, optional (feature N032)**
1600, 2000	8	#2 AWG to 600 MCM (lugs optional)
3000	8	#2 AWG to 600 MCM (lugs optional)
4000	12	1/0 AWG to 750 MCM (lugs optional)

\*\*Recommended Compression Lugs (1/2" stud, 1-3/4" centers) Lug mounting hardware included.

750 MCM	600 MCM	500 MCM	Manufacturer
CRA-750L2	CRA-600L2	CRA-500L2	ILSCO
2ACL-750	2ACL-600	2ACL-500	
2IACL-750	2IACL-600	2IACL-500	
54223	54289	54286	THOMAS & BETTS
60278	60275	60273	
60278N	60278N	60278N	
LCN75	LCN600	LCN500	
ATL502	ATL6002	ATL5002	
YA39-2LN	YA36-2LN	YA34-2LN	BURNDY
YA39-2N	YA36-2N	YA34-2N	
YA44L-2NTC-LD	-	YA38L-2NTC-FX	
YAG44L-2NTC-LD	-	YAG38L-2NTC-LD	
YA44-2N-FXB	-	YA38-2N-FXB	
YA39A5 and YA39AM2	YA36A3	YA34A3	

## Enclosures

### 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 open	68.0	1727	30.0	762	20.6	524	48.5	1232	360	163	0310-0417
1000, 1200 closed	76.3	1937	36.0	915	22.7	577	54.0	1372	450	204	0310-0482
1200 open	90.0	2290	39.0	991	27.5	699	64.7	1644	730	331	A030L605
1600, 2000*	90.0	2290	36.0	915	48.0	1219	84.0	2134	1100	499	0310-0483
3000*	90.0	2290	36.0	915	48.0	1219	84.0	2134	1250	567	0310-0484
4000*	90.0	2290	46.5	1180	60.0	1520	106	2700	1850	839	0500-4485

### Dimensions - transfer switch in UL type 3R, 4 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
40, 70, 125 4-pole	42.5	1080	30.5	775	16.0	406	44.0	1118	190	86	3R, 12	0500-4896
											4	0500-4896
150, 225	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R, 12	0310-0454
											4	0310-0446
260	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	3R, 12	0310-0455
											4	0310-0447
300, 400, 600	59.0	1499	27.5	699	18.5	419	41.5	1054	290	132	3R, 12	0310-1315
											4	0310-1316
800, 1000 open	73.5	1867	32.5	826	20.8	529	49.5	1257	410	186	3R, 12	0310-0457
											4	0310-0449
1000, 1200 closed	76.3	1937	36.0	915	22.7	577	54.0	1372	450	204	3R, 12, 4	0310-0482
1200 open	90.0	2290	39.0	991	27.5	699	64.7	1644	730	331	3R, 12	A030L605
1600, 2000*	90.0	2290	38.0	826	50.9	1293	80.0	2032	1100	499	3R, 12, 4	0310-0744
3000*	90.0	2290	38.0	965	51.0	1295	84.5	2146	1250	567	3R	0310-0745
4000*	90.0	2290	49.0	1244	60.0	1524	105	2654	1850	839	3R	0500-4486

### Dimensions - transfer switch in UL type 4X stainless steel 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	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
40, 70, 125 4-pole	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4896
150, 225	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
260	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
300, 400, 600	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	4X	0500-4185
800, 1000 open	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	4X	0500-4185
1000, 1200 closed	70.0	1778	40.0	1016	19.8	502	59.0	1499	450	204	4X	0310-0482
1200 open	90.0	2290	39.0	991	27.5	699	64.7	1644	730	331	4X	A041N372
1600, 2000	90.0	2290	35.5	826	50.9	1293	80.0	2032	1100	499	4X	0310-0744

\* Rear and side access is required for installation. Dimensions shown are for 4-pole. For information on 3-pole switches, call factory.

**Submittal detail****Amperage ratings**

- 40
- 70
- 125
- 150
- 225
- 260
- 300
- 400
- 600
- 800
- 1000
- 1200
- 1600
- 2000
- 3000
- 4000

**Voltage ratings**

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

\* Single phase connection (not available on 1200-4000 amps)

**Pole configuration**

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

**Frequency**

- A044 60 Hertz
- A045 50 Hertz

**Transfer mode**

- A077 Open transition/in-phase
- A078 Open transition/programmed
- A079 Closed transition (available 1000-4000 amps, for closed transition below 1000 amps, see CHPC spec sheet S-1437)

**Application**

- A035 Utility to genset
- A036 Utility to utility
- A037 Genset to genset

**System options**

- A041 Single Phase, 2-wire or 3-wire (not available 1200-4000 amps)
- A042 Three Phase, 3-wire or 4-wire

**Enclosure**

- B001 Type 1: Indoor use, provides some protection against dirt (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)
- B004 Open Construction: No enclosure - includes automatic transfer switch and controls (call factory for dimensions)
- 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
- A064 NFPA 20 compliant (not available on 1200-4000 amp switches)
- A080 Seismic certification

**Controls**

- C023 PowerCommand control - Level 1
- C024 PowerCommand control - Level 2

**Control options**

- M017 Security key - front panel
- M018 Digital display
- M022 Load monitoring (min current level 3%)
- M023 Relay signal module. Includes pre-transfer module for elevator control
- M031 LonWorks network communications module (FTT-10)

**Meter**

- D009 Analog bar graph meter

**Battery chargers**

- K001 2 amps, 12/24 volts
- KB59 15 amps, 12 volts
- KB60 12 amps, 24 volts

**Protective relays (closed transition)**

- M045 Paralleling timer and lock-out relays, ANSI/IEEE 62PL and 86
- M046 Paralleling timer, lock-out and reverse power relays, single phase, ANSI/IEEE 62PL, 86 and 32R
- M047 Paralleling timer, lock-out and reverse power relays, three phase, ANSI/IEEE 62PL, 86 and 32R

Auxiliary relays - Relays are UL listed and factory installed. All relays provide two normally closed isolated and two normally open contacts rated 10 amps at 600 VAC. Relay terminals accept from one 18 gauge to two 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
- 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**

- M003 Terminal block - 30 points (not wired)
- N020 Terminal block - re-transfer inhibit
- M007 Load shed - from emergency - drives switch to neutral position when remote signal contact closes
- N009 Power connect - bus stabs (150-1200 amp open construction only)
- N013 Extension harness (open construction only)

**Lug kits (select one)**

- N008 Mechanical Lugs, 600 MCM (1000A closed, 1200A closed, 1600A-3000A only)
- N032 Compression Lug Adapters (1200A open/delayed only)
- N045 Mechanical Lugs, 600 MCM (1200A open/delayed only)
- N056 Mechanical Lugs, 750 MCM (4000A only)
- N066 Mechanical Lugs, 750 MCM (1200A open/delayed only)

**Warranty**

- G010 Years 0-2: Parts, labor and travel  
Years 3-5: Parts only  
Years 6-10: Main contacts only
- G013 Years 0-5: Comprehensive  
Years 6-10: Main contacts only

**Shipping**

- A051 Packing - export box

**Accessories**

- AC-167 Accessories specifications sheet