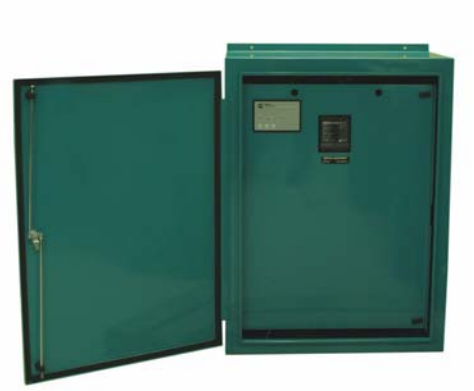
Transfer switch
Service Entrance OTEC



> Specification sheet

40 - 600 Amp

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Description

Cummins Power Generation's Service Entrance 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 Service Entrance Transfer Switches are Listed under UL 1008, the Standard for Transfer Switch Safety. The service entrance switches adhere to all National Electrical Code (NEC) and National Fire Protection Association (NFPA).

The Service Entrance transfer switch monitors utility power 24 hours a day and 7 days a week. When utility power becomes unsatisfactory or fails; the genset is signaled to start, then automatically transfers the load. When stable utility voltage returns, the transfer switch will automatically switch electrical load from the generator to the utility.

UL	All switches are UL 1008 Listed with UL Type Rated cabinets and UL Listed CU-AL terminals.
NEC	Equipment shall be suitable for use in systems compliant to 700, 701 and 702.
NFPA	All switches comply with NFPA 70, 99 and 110.
NEMA	All switches comply with NEMA ICS 10.
IEEE	All switches comply with IEEE 446 Recommended Practice for Emergency and Standby Power Systems.
ISO 9001	This transfer switch is designed and manufactured in facilities certified to ISO9001.

Features

PowerCommand® control - A standard, fully featured microprocessor-based control. Software-enabled features, settings, and adjustments are available for ease of setup and accuracy.

Overcurrent disconnect device - UL Listed 489, Square D breaker.

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 type 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 separate arcing surfaces and multi-leaf arc chutes are rated for total system transfer including overload interruption.

Easy service/access - Plug connections, door-mounted controls, ample access space, and compatible terminal markings. The control is field programmable.

Product lines, accessories and services - Cummins Power Generation offers a wide range of accessories and services to suit your requirements.

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

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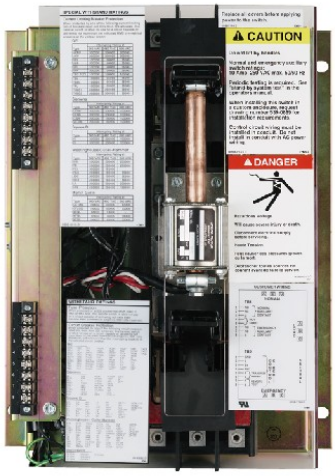
Transfer switch mechanism



- A bi-directional linear motor actuator powers Service Entrance Transfer Switches. This design provides virtually friction-free, constant force, straight-line transfer switch action with no complex gears or linkages.
- Independent break-before-make action is used for both 3-pole and 4-pole/switched neutral switches. On 3-pole/switched neutral switches, this action also prevents the objectionable ground currents and nuisance ground fault tripping that can result from overlapping designs.
- A mechanical interlock prevents simultaneous closing of normal and emergency contacts.
- Long-life, high pressure, silver alloy contacts resist burning and pitting. Separate arcing surfaces further protect the main contacts. Contacts are mechanically held in both normal and emergency positions for reliable, quiet operation.
- Superior arc interruption is accomplished through multiple leaf arc chutes that cool and quench the arcs. Barriers separate the phases and prevent inter-phase flashover

Specifications

Voltage rating	Transfer switches rated from 40 A through 600 A are rated up to 480 VAC, 50 or 60 Hz.
Arc interruption	Multiple leaf arc chutes cool and quench the arcs. Covers prevent interphase flashover and are transparent for visual inspection.
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 and storage temperature	-13 °F (-25 °C) to 140 °F (60 °C)
Humidity	Up to 95% relative, non-condensing
Altitude	Up to 10,000 ft (3,000 m) without derating
Surge withstand ratings	Surge-tested for location category B3, per IEEE C 62.41. Testing per IEEE 62.45. Control tested to European Surge Test EN 61000-4-5.
Total transfer time (source-to-source)	Will not exceed 6 cycles at 60 Hz with normal voltage applied to the actuator and without programmed transition installed.
Manual operation handles	Transfer switches rated through 1000 A are equipped with permanently attached operating handles and quick-break, quick-make contact mechanisms suitable for manual operation. Transfer switches over 1000 A are equipped with manual operators for service use only under de-energized conditions.

Open transition - The Service Entrance automatic transfer switch, equipped with in-phase monitor, determines when to transfer the load from one source to another. The switch contacts operate in a break-before-make sequence.

Delayed (programmed) transition - The Service Entrance is also offered standard with programmed (delayed) transition. The delayed transition Service Entrance completely disconnects the load from both sources for an adjustable period of time to allow regenerative voltage to decay to a safe level prior to connecting to the new source. By allowing motor fields to decay, nuisance tripping breakers and load damage are prevented. Delayed transition transfer is recommended by NEMA MG-1.

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PowerCommand® 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.
- Control pushbuttons to initiate test, override time delays, and set exercise time.
- Field-configurable for in-phase or delayed (programmed) transition.
- Integral exerciser clock
- Control is prototype-tested to withstand voltage surges per EN 60947-6-1.
- Gold-flashed generator start contacts

EC control

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.

Operating modes: Open transition with programmed transition (adjustable 0-10 seconds); Open transition with in-phase monitor and delayed transition backup; Exercise mode; and Test mode.

In-phase: Configurable for initiation of transfer functions when sources are in phase, and including ability to enable a programmed transition backup to the function so that if sources are not in-phase within 120 seconds the system will retransfer with programmed transition function.

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. Peaking function feature allows for generator operation during periods of high utility rates.

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UL withstand and closing ratings

The transfer switches listed below must be protected by circuit breakers. Withstand and closing ratings (WCR) are stated in symmetrical RMS amperes.

Transfer switch ampere	WCR @ volts max with specific manufacturers MCCBs
40, 70, 125 3-pole only	35,000 @ 480
150, 225, 250	65,000 @ 480
300, 400, 600	65,000 @ 480

Transfer switch lug capacities

All lugs accept copper or aluminum wire unless indicated otherwise.

	Emergency and load		Service	
Amp rating	Cables per phase	Size	Cables per phase	Size
40, 70, 125	1	#12 AWG-2/0	1	#14 AWG-3/0
150, 225	1	#6 AWG - 300 MCM	1	#2 AWG-600 MCM
250	1	#6 AWG - 400 MCM		#2 AWG-500 MCM
300, 400	1	3/0 - 600 MCM	3	3/0 - 500 MCM
	2	3/0 - 250 MCM		
600	2	250 - 500 MCM	3	3/0 - 500 MCM

Enclosures

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

Dimensions - transfer switch in UL type 1 enclosure

	Height		Width		Depth				Weight		Outline drawing
					Door closed		Door open				
Amp rating	in	mm	in	mm	in	mm	in	mm	lb	kg	
40, 70, 125 3-pole	45.8	1164	32.0	814	16.3	413.0	45.9	1165	300	136	0500-4721
150, 225, 250	73.6	1869	32.3	820	19.7	499.0	49.6	1259	500	227	0500-4606
300, 400, 600	74.5	1892	34.4	873	20.1	510.4	50.9	1293	520	236	0500-4611

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

	Height		Width		Depth				Weight		Outline drawing
					Door closed		Door open				
Amp rating	in	mm	in	mm	in	mm	in	mm	lb	kg	
40, 70, 125 3-pole	45.8	1164	32.0	814	16.3	413.0	45.9	1165	340	154	0500-4721
150, 225, 250	73.6	1869	32.3	820	19.7	499.0	49.6	1259	580	263	0500-4606
300, 400, 600	74.5	1892	34.4	873	20.1	510.4	50.9	1293	600	272	0500-4611

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Submittal detail – options (accessories specification sheet AC-167)

Amperage ratings
- ☐ 40
- ☐ 70
- ☐ 125
- ☐ 150
- ☐ 225
- ☐ 260
- ☐ 300
- ☐ 400
- ☐ 600

Voltage ratings
- ☐ R020 120
- ☐ R038 190
- ☐ R021 208
- ☐ R022 220
- ☐ R023 240
- ☐ R024 380
- ☐ R025 416
- ☐ R035 440
- ☐ R026 480

Pole configuration
- ☐ A028 Poles - 3 (solid neutral)
- ☐ A029 Poles - 4 (switched neutral) (not available from 40-125 amp)

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 (dustproof and rainproof, similar to IEC type IP34)
- ☐ B010 Type 12: indoor use (dust-tight and drip-tight, similar to IEC type IP61)

Standards
- ☐ A046 UL 1008

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 10 A @ 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)

Warranty
- ☐ G002 1 year basic
- ☐ 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)

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