



OTEC-SE Service Entrance Transfer Switch Open Transition

40 – 1000 Amp



Description

OTEC 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 switch monitors both power sources, signals generator set start-up, automatically transfers power, and returns the load to the primary power source when the utility returns and stabilizes.

The service entrance transfer switch meets UL 1008 standards for service entrance applications. The switch contains an UL-listed overcurrent disconnect device on the main incoming utility source.

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.

Overcurrent disconnect device – Square D UL-Listed 489 molded case circuit breaker.

Advanced transfer switch mechanism - Unique bi-directional linear actuator provides smooth, Continuous 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 and multi-leaf arc chutes for motor loads or total system load transfer. They require no routine contact maintenance. Continuous load current not to exceed 80% of switch rating and Tungsten loads not to exceed 30% of switch rating.

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

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

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

Transfer Switch Mechanism



- A bi-directional linear motor actuator powers the transfer switch. 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 4-pole/switched neutral switches, this action prevents 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.
- 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. Contacts are mechanically held in both normal and emergency positions for reliable, quiet operation.
- 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.

Specifications

Voltage rating	480 VAC, 50 or 60 Hz.
Arc interruption	Multiple leaf arc chutes provide dependable arc interruption.
Neutral bar	A full current-rated neutral bar with lugs is standard on enclosed 3-pole transfer switches.
Auxiliary contacts	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 at 250 VAC maximum. UL recognized, and CSA-certified.
Operating 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	Control tested to withstand voltage surges per EN60947-6-1.
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 operating handle	Transfer switches are equipped with permanently attached operating handles and quick-break, quick-make contact mechanisms suitable for manual operation under de-energized conditions
Overcurrent disconnect device	Service entrance switches have a Square D UL 489 listed molded case circuit breaker. 1000 amp switches also have a current transformer and integral residual ground fault protection

Certifications



All switches are UL 1008 listed and labelled, with UL type rated cabinets and UL Listed CU-AL terminals.



All switches comply with NEMA ICS 10.

NEC

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



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



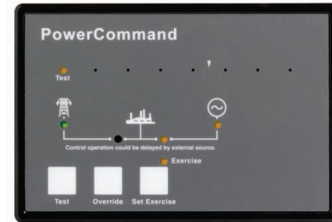
All switches comply with NFPA 70, 99 and 110.



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

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.
- 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

Exercise mode: The control exerciser clock can be set to operate on a 7, 14, 21 or 28-day cycle with a fixed exercise period duration of 20 minutes. A convenient 12-hour offset feature offsets the exercise time by 12 hours, without having to reprogram the time. The control can be programmed to exercise the generator with or without load.

Test mode: When manually or remotely activated from the control panel, the control will start the generator and run until stopped. Can be configured to test with or without load.

Transition Modes

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

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

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.

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.

Adjustable 0-30 minutes, default 10 minutes.

Engine 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.

Elevator signal: Requires optional elevator signal relay (M032). Delays transfer for specified interval to prevent a power interruption during elevator operation.

Options

Elevator signal relay (M032): Provides relay output contacts for sending a load-disconnect warning signal to the elevator control. Transfer/re-transfer delay time is selectable for 0, 1, 2, 3, 5, 30, 120 or 300 seconds.

Programmable exerciser clock (J030): 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.

UL Withstand and Closing Ratings

Withstand and closing ratings (WCR) are stated in symmetrical RMS amperes.

Transfer switch ampere	WCR at volts max with specific manufacturers MCCBs	Breaker provided	Trip unit
40, 70, 100, 125, 3-pole only	35,000 at 480	Square D type HG	Standard fixed trip unit
150, 200, 225, 250	65,000 at 480	Square D type LJ	Micrologic 3.3
300, 400, 600	65,000 at 480	Square D type PJ	Micrologic 3.0
800	65,000 at 480	Square D type RJ	Micrologic 3.0A
1000	65,000 at 480	Square D type RJ	Micrologic 6.0A

Transfer Switch Lug Capacities

All lugs accept copper or aluminium wire unless indicated otherwise.

Amp rating	Emergency and load power cables		Emergency and load neutral cable		Service power cables		Service neutral	
	Cables per phase	Cable size	Number of cables	Cable size	Cables per phase	Cable size	Number of cables	Cable size
40, 70, 100, 125	1	#12 AWG-2/0 CU/AL Emerg #14 AWG-2/0 CU/AL Load	2	#14 AWG-2/0 CU/AL	1	#14 AWG-3/0 CU/AL	1	#14 AWG-2/0 CU/AL
150, 200, 225, 250	1	#6 AWG - 400 MCM CU/AL	2	#6 AWG-400 MCM CU/AL	1	#2 AWG – 600 MCM CU or #2 AWG – 500 MCM AL	1	#6 AWG – 400 MCM CU/AL
300, 400, 600	2	250 - 500 MCM CU/AL	4	250-500 MCM CU/AL	3	3/0 – 500 MCM CU/AL	2	250 – 500 MCM CU/AL
800, 1000	4	250 – 500 MCM CU/AL	8	250 – 500 MCM CU/AL	4	#2 AWG – 600 MCM CU/AL	4	250 – 500 MCM CU/AL

Enclosures

The transfer switch and control are mounted in a key-locking enclosure. Wire bend space complies with 2011 NEC. The 3R enclosure has double doors; no safety cover is required. 40-600 amp switches are wall-mounted; 800-1000 amp switches are floor-mounted. All can be top, bottom, left or right connected.

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, 100, 125 3-pole	45.8	1164	32.0	814	16.3	413.0	45.9	1165	300	136	0500-4721
150, 200, 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
800, 1000	90	2286	39	991	26.3	667	61.8	1570	920	417	0500-4608

Dimensions - transfer switch in UL type 3R or 12 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, 100, 125 3-pole	45.8	1164	32.0	814	16.3	413.0	45.9	1165	340	154	0500-4721
150, 200, 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
800, 1000	90	2286	39	991	26.3	667	61.8	1570	920	417	0500-4608

Submittal Detail - Options

Current ratings:

- 40
- 70
- 100
- 125
- 150
- 200
- 225
- 260
- 300
- 400
- 600
- 800
- 1000

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)

Control voltage:

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

Control options:

- J030 Add-on programmable 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 two normally closed isolated contacts rated 10A @ 600 VAC. Relay terminals accept 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 (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

- M003 Terminal block - 30 points (not wired)

Warranty

- G004 2 year comprehensive
- G007 5 year comprehensive
- G009 1 year comprehensive

Shipping

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

Accessories

- AC-170 Accessories specifications sheet

Specifications are subject to change without notice.

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

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