

Transfer Switches

OTEC

40 - 1000 Amp
3 Pole and 4 Pole



Description

OTEC series transfer switches provide normal and generator set source monitoring, generator set starting, and load transfer functions for emergency, standby, and optional standby applications. OTEC transfer switches are continuously rated, so they can be applied in applications up to their nameplate rating.

The transfer switch power contacts are silver alloy composition with high-pressure design that can withstand thousands of switching cycles without burning, pitting, or welding. They require no routine contact maintenance and provide 100% continuous current ratings.

The transfer switch control is reliable and easy to understand, utilizing LED lamps for status indications, and push-button controls for operator functions. The control is field-programmable without use of service tools.

Features

- **Microprocessor Control** - A fully featured microprocessor control is standard. All features, settings, and adjustments are software-enabled for ease of setup and accuracy.
- **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.
- **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.
- **Certifications** - Cummins Power Generation OTEC Transfer Switches are certified to a wide range of standards.
- **Warranty** - Cummins Power Generation offers single-source responsibility at both the factory and distributor levels for warranty, service, and parts support.

Microprocessor-based 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 phase check or programmed transition operation.
- Integral exerciser clock
- Control is prototype-tested to withstand voltage surges per EN 60949-6-1.
- Gold flashed generator start contacts



Control Functions

Voltage Sensing: All phases on the normal source, and single phase on the 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 phase check monitor and programmed transition backup; Exercise mode; and Test mode.

Phase Check: 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 activate the programmed transition function.

Exerciser Clock: Integral exerciser configurable for operation on 7, 14, 21, or 28-day cycle. Includes 12-hr offset for more convenient setting of exercise time. Fixed 20 minute exercise duration.

Time-Delay Functions

Engine Start: Prevents nuisance genset starts due to momentary power system variation or loss. Adjustable set-points, 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 set-points, 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 set-points, 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. Not included in utility-to-utility systems. Adjustable set-points, 0-30 minutes, default 10 minutes.

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. Transfer switch and control design prevents the device from being "stuck in neutral" position. Adjustable set-points, 0-10 seconds, default 0 seconds.

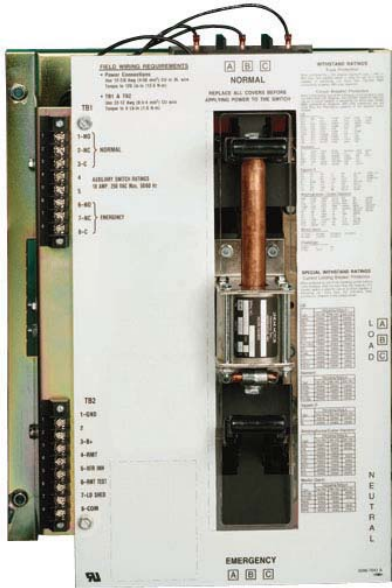
Elevator Signal: Provides an adjustable time delay to prevent interruption of power during elevator operation or as a load disconnect signal. Adjustable set-points, 0-300 seconds, default 0 seconds. Configurable for pre-transfer only, or pre-transfer through post-transfer. (Requires optional elevator signal relay for use.)

Options

Elevator Signal Relay: Provides 2 N/O and 2 N/C contacts for the elevator signal function. Contact rating is 10A @ 600VAC.

Programmable Exerciser Clock: Provides a fully-programmable 7 day clock to provide greater flexibility in scheduling exercise periods and exercise duration, than standard integral exerciser.

Transfer Switch Mechanism



- A bi-directional linear motor actuator powers OTEC 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.
- Electrical interlocks prevent simultaneous closing signals to normal and emergency contacts and interconnection of normal and emergency sources through the control wiring.
- 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.

Specifications: Transfer Switch Mechanism

Voltage Rating	Transfer switches rated from 40 A through 1000 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 programmed 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.

Transfer Switch Lug Capacities

All lugs accept copper or aluminum wire unless indicated otherwise. Do not run control wiring through power cable conduit or raceway.

Amp Rating	Cables Per Phase	Size
40, 70, 125	1	#12 AWG-2/0
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 - 1000	4	250 - 500 MCM

UL Withstand and Closing Ratings

The transfer switches listed below must be protected by circuit breakers or fuses. Reference 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			CURRENT LIMITED BREAKER PROTECTION		
	Max WCR@Volts with Specific MCCBs	Max MCCB Rating	Drawing Reference	With Specific Current Limiting Breakers (CLB)	Max CLB Rating	Drawing Reference
40 - 125	14,000 @ 600	225 A	098-6885	200,000 @ 600	225 A	098-6918
150 - 260	30,000 @ 600	400 A	098-6886	200,000 @ 600	400 A	098-6919
300 - 600	65,000 @ 600	1200 A	098-6887	200,000 @ 600	1200 A	098-6920
800 - 1000	65,000 @ 480 50,000 @ 600	1400 A	098-6888	200,000 @ 600	1400 A	098-6921

Transfer Switch Ampere	FUSE PROTECTION		
	Max WCR@Volts with Current Limiting Fuses	Max Fuse, Size and Type	Drawing Reference
40 - 125	200,000 @ 600	200 A Class, J, RK1, RK5, T	098-6885
150 - 260	200,000 @ 600	1200 A Class L or T, or 600 A Class J, RK1, RK5	098-6886
300 - 600	200,000 @ 600	1200 A Class L or T, or 600 A Class J, RK1, RK5	098-6887
800 - 1000	200,000 @ 600	2000 A Class L or 1200 A Class T or 600 A Class J, RK1, RK5	098-6888

Enclosures

The transfer switch and control are mounted in a single-door key-locking enclosure. Enclosures are all UL tested and type-rated. Wire bend space complies with 2002 NEC.

Enclosure Dimensions - Transfer Switch in U.L. Type 1 Enclosure

Amp Rating	Outline Drawing	Height		Width		Depth Door Closed		Depth Door Open		Weight	
		in	mm	in	mm	in	mm	in	mm	lb	kg
40, 70, 125	310-0544	27.0	686	20.5	521	12.0	305	31.5	800	82	37
150, 225	310-0414	35.5	902	26.0	660	16.0	406	41.0	1042	165	75
260	310-0540	43.5	1105	28.5	724	16.0	406	43.0	1093	170	77
300, 400, 600	310-1307	54.0	1372	25.5	648	18.0	457	42.0	1067	225	102
800, 1000	310-0417	68.0	1727	30.0	762	19.5	495	48.5	1232	360	163

Enclosure Dimensions - Transfer Switch in U.L. Type 3R, 4 or 12 Enclosure

Amp Rating	Cabinet Type	Outline Drawing	Height		Width		Depth, Door Closed		Depth, Door Open		Weight	
			in	mm	in	mm	in	mm	in	mm	lb	kg
40, 70, 125	3R, 12	310-0453	34.0	864	26.5	673	12.5	318	36.5	927	125	57
	4	310-0445										
150, 225	3R, 12	310-0454	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97
	4	310-0446										
260	3R, 12	310-0455	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102
	4	310-0447										
300, 400, 600	3R, 12	310-1315	59.0	1499	27.5	699	16.5	419	41.5	1054	275	125
	4	310-1316										
800, 1000	3R, 12	310-0457	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186
	4	310-0449										

Submittal Detail

Feature Code	Current Ratings (Amps)	Feature Code	Listing
[] NA	40	[] A046	Listing - UL 1008/CSA Certification
[] NA	70		
[] NA	125		Control Voltage
[] NA	150	[] M033	12V, Genset Starting Voltage
[] NA	225	[] M034	24V, Genset Starting Voltage
[] NA	260		
[] NA	300		Control Options
[] NA	400	[] J030	Clock, External Exercise
[] NA	600	[] M032	Relay, Elevator Signal
[] NA	800		
[] NA	1000		Battery Chargers
	Voltage (Line-Line) Ratings	[] K001	Battery Charger - 2 Amps, 12/24 Volts
[] R020	120	[] KB59	Battery Charger - 15 Amps, 12 Volts
[] R038	190	[] KB60	Battery Charger - 12 Amps, 24 Volts
[] R021	208		Applications Modules
[] R022	220	[] M003	Terminal Block - 30 points (not wired)
[] R023	240	[] N002	Terminal Block - Battery Charger Alarms
[] R024	380		
[] R025	416		Shipping Option
[] R035	440	[] A051	Packing - Export Box (800-1000A)
[] R026	480		
[] R027	600		Warranty
	Pole Configuration	[] G002	Warranty, 1 year Basic
[] A028	Poles - 3 (Solid Neutral)	[] G004	Warranty, 2 year Comprehensive
[] A029	Poles - 4 (Switched Neutral, 150A +)	[] G006	Warranty, 5 year Basic
	Frequency	[] G007	Warranty, 5 year Comprehensive
[] A044	60 Hertz	[] G008	Warranty, 10 year Major Components
[] A045	50 Hertz		(See warranty documents for details of coverage.)
	Application		Auxiliary Relays
[] A035	Utility to Genset		Relays are UL-Listed and factory installed. All relays provide (2) normally open and (2) normally closed isolated contacts rated 10A @ 600 VAC Relay terminals accept (1) 18 Ga. to (2) 12 Ga. wires per terminal.
	System Options	[] L101	Aux. Relay - 24 VDC Coil -Installed, not wired (for customer use)
[] A041	Single Phase, 2-wire or 3-wire	[] L102	Aux. Relay - Emergency Position - Relay energized when OTEC in Source 2 (Emergency) position
[] A042	Three Phase, 3-wire or 4-wire	[] L103	Aux. Relay - Normal Position - Relay energized when OTEC in Source 1 (Normal) position
	Enclosure	[] L201	Aux. Relay - 12 VDC Coil -Installed, not wired (for customer use)
[] B001	Type 1: General purpose indoor (similar to IEC type IP30)	[] L202	Aux. Relay - Emergency Position - Relay energized when OTEC in Source 2 (Emergency) position
[] B002	Type 3R: Intended for outdoor use (dustproof and rainproof, similar to IEC type IP34)	[] L203	1 (Aux. Relay - Normal Position - Relay energized when OTEC in Source Normal) position
[] B003	Type 4: Indoor or outdoor use (watertight, similar to IEC type IP65)		
[] B010	Type 12: Indoor use (dust-tight and drip-tight, similar to IEC type IP61)		

Available Products and Services

A wide range of products and services is available to match your power generation system requirements. Cummins Power Generation products and services include:

- Diesel and Spark-Ignited Generator Sets
- Transfer Switches
- Bypass Switches
- Parallel Load Transfer Equipment
- Digital Paralleling Switchgear
- PowerCommand Network and Software
- Distributor Application Support
- Planned Maintenance Agreements

Warranty

All components and subsystems are covered by an express, limited one-year warranty. Extended factory warranties and local distributor maintenance agreements are also available.

Certifications

Transfer switches meet or exceed leading code requirements:

NEMA - All switches comply with NEMA ICS 10

ISO9001 - This transfer switch was designed and manufactured in facilities certified to ISO9001



CSA - All switches are CSA certified up to 600 VAC



NFPA Testing - A complete representative prototype transfer switch has been subjected to a number of demanding tests to verify the design integrity and performance under both normal and abnormal operating conditions per the requirements of NFPA 70, 99, and 110



UL - All switches are UL 1008 Listed, and factory or field installed switch accessories comply with UL Listing; UL Type Rated cabinets; UL Listed CU-AL terminals

See your distributor for more information



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Warning: Backfeed 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.