Specification sheet

Transfer switch OTEC and OTECSE open transition

125-600 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.

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.

UL	All switches are UL 1008 Listed with UL Type Rated cabinets and UL Listed CU-AL terminals.
CSA	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.
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

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 (on SE models) – Square D UL-Listed 489 molded case circuit breaker.

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 3-pole switches. This design allows control of the operating speed of the transfer switch for proper transfer of motor and rectifier-based loads (programmed transition feature).
- 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

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 oF (-30 oC) to 140 oF (60 oC)
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.

Options

Available through Accessories specification sheet AC-170.

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.

	MCCB protection			Special circuit breaker protection		
Transfer switch ampere	WCR at volts max with specific manufacturers MCCBs	Max MCCB rating	Drawing reference	With specific current limiting breakers (CLB)	Max CLB rating	Drawing reference
125	14,000 at 600 V	225 A	098-6885	200,000 @ 600 V	225 A	098-6918
225	30,000 at 600 V	400 A	098-6886	200,000 @ 600 V	400 A	098-6919
400, 600	65,000 at 600 V	1200 A	098-6887	200,000 @ 600 V	1200 A	098-6920

Fuse protection

Transfer switch ampere	WCR at volts max. with current limiting fuses	Max fuse, size and type	Drawing reference
125	200,000 at 600 V	200 A Class, J, RK1, RK5, T	098-6885
225	200,000 at 600 V	1200 A Class L or T, or 600 A class J, RK1, RK5	098-6886
400, 600	200,000 at 600 V	1200 A Class L or T, or 600 A Class, J, RK1, RK5	098-6887

Enclosures

The transfer switch and control are wall-mounted in a key-locking enclosure. Wire bend space complies with 2011 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	
125	27.0	686	20.5	521	12.0	305	31.5	800	82	37	0310-0544
225	35.5	902	26.0	660	16.0	406	41.0	1042	165	75	0310-0414
400, 600	54.0	1372	25.5	648	18.0	457	42.0	1067	225	102	0310-1307

Dimensions – transfer switch in UL type 3R enclosure

	Height		Width		Depth				Weight		Cabinet type	Outline drawing
					Door closed		Door open					
Amp rating	in	mm	in	mm	in	mm	in	mm	lb	kg		
125	34.0	864	26.5	673	12.5	318	36.5	927	125	57	3R	0310-0453
225	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R	0310-0454
400, 600	59.0	1499	27.5	699	16.5	419	41.5	1054	275	125	3R	0310-1315
											4	0310-1316

Dimensions for SE models– 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, 100, 125	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

Dimensions for SE models – 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, 100, 125	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

Transfer switch lug capacities

All lugs accept copper or aluminum wire unless indicated otherwise.

Transfer switch ampere	Cables per phase	Size
125	1	#12 AWG-2/0
225	1	#6 AWG – 300 MCM
400	1	3/0 – 600 MCM
400	2	3/0 - 250 MCM
600	2	250 - 500 MCM

Submittal detail

Amperage ratings
- ☐ 125
- ☐ 225
- ☐ 400
- ☐ 600

Voltage ratings
- ☐ R021 208
- ☐ R023 240
- ☐ R026 480

Pole configuration
- ☐ A028 Poles - 3 (solid neutral)

Frequency
- ☐ A044 60 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
- ☐ B002 Type 3R: intended for outdoor use, provides some protection from dirt, rain and snow (IEC Type IP34)

Standards
- ☐ A046 UL 1008/CSA certification

Control voltage
- ☐ M033 12V, Genset starting voltage
- ☐ M034 24V, Genset starting voltage

Warranty
- ☐ G009 1 year comprehensive

Accessories
- ☐ AC-170 Accessories specifications sheet (control options, battery chargers, aux relays, terminal blocks, guards)

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