

Transfer switch CHPC closed transition



> Specification sheet

125 - 800 Amp

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Power Generation

Description

The Cummins Power Generation series CHPC PowerCommand® automatic transfer switch monitors the primary power source, signals the generator to start upon loss or destabilization of utility power, and then automatically transfers the load to the generator. Once the utility power source becomes available and stable, the CHPC will return the load to the primary source without power interruption by temporarily paralleling both sources for less than 100 msecs.

Designed and constructed specifically for closed transition operation, this clean sheet, revolutionary design incorporates the innovative High Endurance Mechanism (HEM) for uncompromising reliability with the proven PowerCommand Microprocessor Control.



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

Equipment shall be suitable for use in systems compliant to 700, 701 and 702.



All switches comply with NFPA 70, 99 and 110.



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 standard, fully featured microprocessor-based control. Software-enabled features, settings, and adjustments are available for ease of setup and accuracy. Optically isolated logic inputs and high isolation transformers for AC power inputs provide high-voltage surge protection.

Manual operation - Manual operating handles and stored energy transfer mechanism allow effective, manual operation of the CHPC. An external operator is available as an option for dead front manual operation. Manual operation of the CHPC can only be performed in the open transition transfer mode.

Main contacts - Heavy-duty silver allow contacts and multi-leaf arc chutes are rated for total system transfer.

Easy service/access - Plug connections, door-mounted controls, ample access space, and compatible terminal markings allow for easy service.

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.

Transfer switch mechanism



- Blow-on contactor allows for high survivability in fault current conditions.
- Simultaneous make-before-break contactor action is used for 2-pole, 3-pole, and 4-pole switches. On 4-pole/switched neutral switches, this action also prevents the objectionable ground currents and nuisance ground fault tripping that can result from overlapping neutral designs.
- The CHPC will operate as an open transition transfer switch when transferring a load from a dead source to a live source. A mechanical interlock eliminates the possibility of source-to-source connection when the switch is manually operated.
- When operated in closed transition mode the mechanical interlock is disabled by the controller. This allows the CHPC to connect both sources together for a period not to exceed 100 msecs, providing a seamless transfer of the load between two live sources.
- 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 up to 600 VAC.
Amperage rating	Transfer switches are rated from 125 to 800 amperes.
Frequency rating	Transfer switches are rated to operate at 50 or 60 Hertz.
Neutral bar	A full current-rated neutral bar with lugs is standard on enclosed 2 and 3-pole transfer switches.
Auxiliary contacts	Two contacts rated at 10A continuous and 250 VAC maximum (one for each source) are provided for customer use.
Operating temperature	-40 °F (-40 °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 de-rating
Surge withstand ratings	Control system surge-tested for Location Category B3, per IEEE C62.41 and IEEE C62.45. Also meets European standard EN 61000-4-5.
Total transfer time (source-to-source)	Will not exceed 6 cycles at 60 Hz when operated as an in-phase monitor based open transition transfer switch

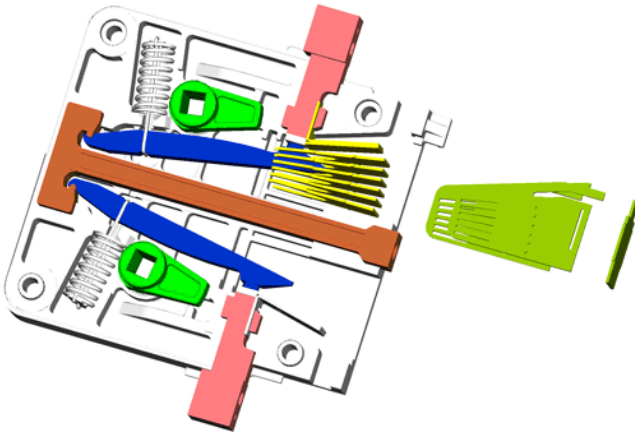
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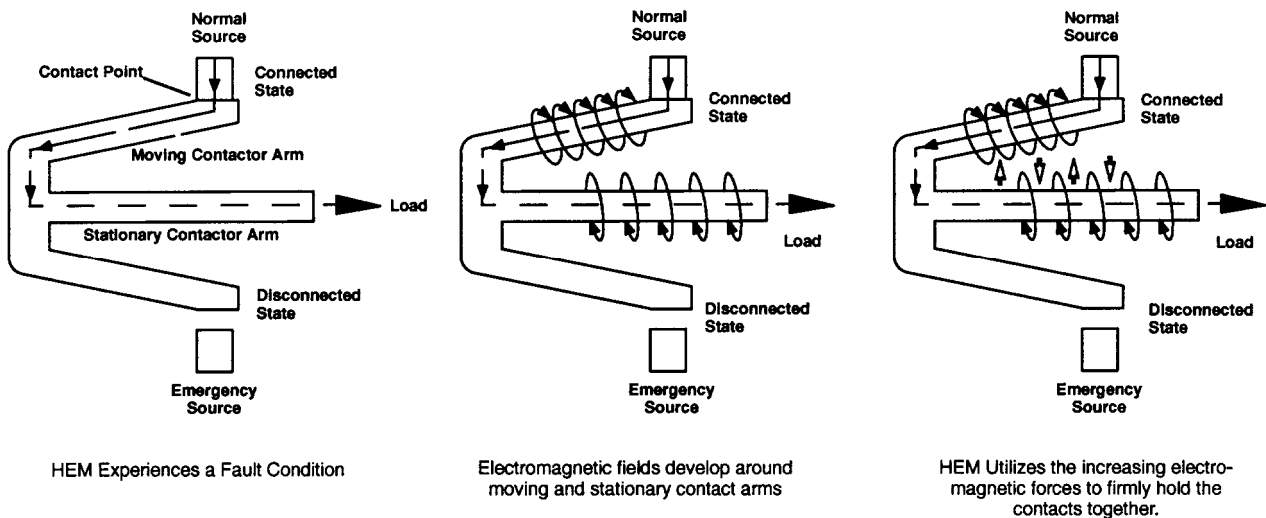


HEM power cassette



- Cassette design ensures that all phases and neutral are switched at the same speed, providing true four pole operation.
- Encapsulated contactor design increases phase to phase isolation and reduces possibility of arcing between phases.
- New design eliminates a common failure point in many transfer switches by not using electrical connections made of braided metal in the mechanism's current path.
- Simple design has fewer parts reducing the mechanism's potential for failure.

The innovative design of the High Endurance Mechanism



The High Endurance Mechanism (HEM) is designed to ride through a fault condition undamaged, retaining its capability to carry 100% of its rated load. Magnetic forces developed during a fault cause a conventional transfer switch's contacts to blow open, producing destructive arcing that often results in extensive internal damage to the switch. Typically after a conventional switch experiences a fault, its contacts, arc chutes and in some cases its controller needs to be replaced. The HEM uses that same magnetic energy to hold the contacts closed during a fault, practically eliminating arcing, contact damage, and performance degradation. That means the HEM does not require contact maintenance to continue to carry rated current without overheating. The HEM can survive multiple faults of the magnitude listed on the nameplate as the Withstand and Closing Current Ratings (WCR). This novel blow-on technology means that there will be no costly repairs or inconvenient downtime after a fault.

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PowerCommand microprocessor control

PowerCommand controls are microprocessor based and developed specifically for automatic transfer switch operation. The control provides features and options useful for most applications. Flash memory is used to store control settings. The contents of the memory are not lost even if power to the controller is lost. There is also an on-board battery to maintain the real-time clock setting and the engine start time delay. Control features include:

Level 2 control

Open transition (in-phase transition)

Delayed transition (programmed transition)

Closed transition (momentary overlap)

Utility-to-genset applications

Software adjustable time delays:

Engine start: 0 to 120 sec

Transfer normal to emergency: 0 to 120 sec

Retransfer 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

Pickup: 85% to 98% of nominal voltage

Dropout: 75% to 98% of pickup setting

Dropout time delay: 0.1 to 1.0 sec

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

Dropout: 105% to 135% of nominal voltage

Pickup: 95% to 99% of dropout setting

Dropout time delay: 0.5 to 120 sec

Over/under frequency sensing

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

Dropout: $\pm 1\%$ 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

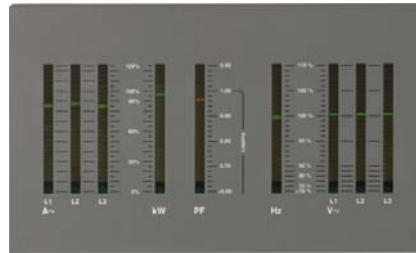
Test/exercise/bypass buttons

Digital display - standard

Analog bargraph metering - optional

Date/time-stamped event recording - 50 events

Load sequencing (optional with Network Communications Module)



Optional analog bargraph



Basic indicator panel



Digital display

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Time-delay functions

Engine start: Prevents nuisance genset starts in the event of 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.

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.

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

Delayed (programmed) transition: Transfers load to neutral position, disconnected from sources, to allow inductive load voltages to decay.

Fail to disconnect timer: Signals external device to disconnect either the genset or utility to prevent extended operation in parallel with the utility.

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 comes standard with the Level 2 PowerCommand microprocessor control, and is optional with the Level 1 Control.

User interface options

Front panel security key (M017)

Front panel access can be locked out using this option. Prevents unauthorized transfers or testing. Prevents unauthorized adjustments via the digital display.

Analog bar graph meter (D009)

An LED bar graph display provides easy to read indication for Normal and Emergency voltages and frequencies, load currents, power factor, and kilowatts. Green, amber, and red LED's provide at-a-glance indication of system acceptability. Available as an option with the Level 2 PowerCommand microprocessor control.

External operation handle (N038)

Dead-front manual operating handle for safe manual operation. Can be operated while the switch is energized. Manual operation of the CHPC can only be performed in the open transition transfer mode.

* Note: Some options may not be available on all models - consult factory for availability.

Control options

Relay signal module (M023)

Provides an adjustable transfer pre-signal time delay of 0 to 60 seconds to prevent interruption of power during elevator operation. Relay outputs include: Source 1 Connected and Available, Source 2 Connected and Available, Not in Auto, Test/Exercise Active, Failed to Disconnect, Failed to Synchronize, Failed to Transfer/Retransfer, and Transfer pre-signal (elevator 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. Immediate retransfer to the preferred source when it is re-established.

PowerCommand network interface (M031)

Provides connection to the PowerCommand network. LonWorks® compatible for integration into customer monitoring strategy.

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.

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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.

Transfer switch ampere	MCCB protection			Current limited breaker protection		
	WCR @ volts max with specific manufacturers MCCBs	Max MCCB ratings	Drawing reference	With specific current limiting breakers (CLB)	Max CLB rating	Drawing reference
125, 150, 225, 260	42,000 @ 480	500 A	098-7898	200,000 @ 480	500 A	098-7900
	30,000 @ 600			200,000 @ 600		
300, 400, 600	65,000 @ 480	1200 A	098-7899	200,000 @ 480	1200 A	098-7901
	50,000 @ 600			200,000 @ 600		
800	85,000 @ 480	1400 A	098-8164	200,000 @ 480	1400 A	098-8165
	65,000 @ 600			200,000 @ 600		

Fuse protection

Transfer switch ampere	WCR @ volts max. with current limiting fuses	Max fuse, size and type	Drawing reference
125, 150, 225, 260	200,000 @ 600	400 A Class J, T	098-7898
		200 A Class RK1	
		100 A Class RK5	
300, 400, 600	200,000 @ 600	1200 A Class, L, T	098-7899
		600 A Class, J, RK1, RK5	
800	200,000 @ 600	2000 A Class L	098-8164
		2000 A Class T	

3 cycle ratings

Transfer switch ampere	WCR @ volts max 3 cycle rating	Max MCCB rating	Drawing reference
125, 150, 225, 260	25,000 @ 480	500 A	0098-7898
	18,000 @ 600		
300, 400, 600	35,000 @ 480	1200 A	0098-7899
	22,000 @ 600		
800	65,000 @ 480	1400 A	0098-8164
	65,000 @ 600		

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Enclosures

The transfer switch and control are mounted in a key-locking enclosure. Wire bend space complies with 2005 NEC.

Dimensions - transfer switch in UL type 1 enclosure

Amp rating	Height		Width		Depth				Weight 3-pole type		Outline drawing
	in	mm	in	mm	Door closed		Door open		lb	kg	
					in	mm	in	mm			
125, 150, 225, 260	49	1245	25.05	635	19.6	497	44	1118	231	105	0500-3504
300, 400, 600	60	1524	30.00	762	19.6	497	49	1245	288	131	0500-3383
800	72	1828	34.40	875	21.0	532	53	1335	411	186	0500-3826

Dimensions - transfer switch in UL type 3R, 4, 4x, or 12 enclosure

Amp rating	Height		Width		Depth				Weight		Cabinet type	Outline drawing
	in	mm	in	mm	Door closed		Door open		lb	kg		
					in	mm	in	mm				
125, 150, 225, 260	51.5	1309	25.4	645	20.1	510	44.5	1130	231	105	3R, 4, 4x, 12	0500-3724
300, 400, 600	62.5	1588	30.4	773	20.1	510	49.5	1256	288	131	3R, 4, 4x, 12	0500-3725
800	72	1828	34.4	875	21.0	532	53.0	1335	411	186	3R, 4, 4x, 12	0500-3988

Transfer switch lug capacities

All lugs accept copper or aluminum wire unless indicated otherwise. Adapters that will accept compression lugs are available for 5/16", 3/8", 1/2" and 5/8" mounting hardware. Compression lugs are not furnished. Lugs are listed in the Installation Manual.

Amp rating	Cables per phase	Size
125, 150	1	#10 AWG-3/0
	2	#10 AWG-1/0
225, 260	1	#6 AWG - 400 MCM
	2	#6 AWG - 4/0
300, 400	1	1/0 - 750 MCM
	2	#6 AWG - 400 MCM
600	2	#4 AWG - 600 MCM
800	4	#2 AWG - 600 MCM

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Submittal detail – options

Amperage ratings

- 125
- 150
- 225
- 260
- 300
- 400
- 600
- 800

Voltage ratings

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

Pole configuration

- A065 Poles - 2 (solid neutral)
- A028 Poles - 3 (solid neutral)
- A029 Poles - 4 (switched neutral)

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)
- B003 Type 4: indoor or outdoor use (watertight) (similar to IEC type IP65)
- B004 Open construction: no enclosure - includes automatic transfer switch and controls.
- B010 Type 12: indoor use, dust-tight and drip-tight (similar to IEC type IP61)
- B025 Type 4x: stainless steel enclosure

Standards

- A046 UL 1008/CSA certification
- A064 NFPA 20 compliant
- A080 Seismic certification

Controls

- C024 Switch control - level 2

Control options

- M017 Security key - front panel
- M018 Display - digital
- M031 Communications - LonWorks network communications module
- M022 Monitoring - load
- M023 Module - relay signal

Meters

- D009 Digital bar graph meters

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 open and (2) normally closed isolated contacts rated 10A @ 600 VAC. Relay terminals accept (1) 18 Ga. to (2) 12 Ga. wires per terminal.

- L101 24 VDC coil - installed, not wired (for customer use).
- L102 24 VDC coil - emergency position - relay energized when ATS in source 2 (emergency) position.
- L103 24 VDC coil - normal position - relay energized when ATS in source 1 (normal) position
- L201 12 VDC coil - installed, not wired
- L202 12 VDC coil - emergency position - relay energized when ATS in source 2 (emergency) position
- L203 12 VDC coil - normal position - relay energized when ATS in source 1 (normal) position

Miscellaneous options

- M003 Terminal block - 30 points (not wired)
- M007 Load shed - from emergency - drives switch to neutral position when remote signal contact closes
- N038 Manual external operating handle

Optional lug kits

- N008 Terminal lugs - cable
- N030 Lug adapters - compression (5/16 Stud)
- N031 Lug adapters - compression (3/8 Stud)
- N032 Lug adapters - compression (1/2 Stud)
- N043 Lug adapters - compressions (5/8 Stud)

Warranty

- G002 One yr basic
- G004 Two yr comprehensive
- G006 Five yr basic
- G007 Five yr comprehensive
- G008 Ten yr major components

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