



PLT

Breaker-based transfer switch
open, closed or soft transition
800–3000 amps



Description

PLT breaker-based transfer switches are designed for operation and switching of electrical loads between utility 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 startup, automatically transfers power, and returns the load to the primary power source when the utility returns and stabilizes.

Power transfer switching is accomplished using power circuit breakers with integral overcurrent protection and drawout functionality. The result is a system that is suitable for use in applications requiring selective coordination and a high level of serviceability, at moderate cost.

Features

Flexible operating modes: Models available for open transition (with programmed transition), momentary closed transition, soft load (ramping) closed transition.

High short-time withstand current rating: UL 489 listed circuit breakers can withstand a fault condition for up to 60 cycles, facilitating selective coordination.

Service entrance: Power breakers are available in a standard service entrance transfer switch configuration.

PowerCommand® control: A fully featured microprocessor-based control with digital display. Controls allow operator to enter settings and make adjustments to software-enabled features easily and accurately.

PLT breaker-based transfer switch

- **Soft load:** Closed transition with pre-programmed gradual ramping to minimize transients during transfer is available.
- **Service entrance rated:** With the optional ground fault sensor, PLT meets the UL standard for service entrance applications.
- **InPower service tool:** Facilitates simple, quick field configuration and troubleshooting.
- **Protective relays:** IEEE 86 lockout relay is standard. Multifunction relay is available as an option with closed transition configurations.
- **Reverse power protective relay:** protects the utility from reverse current flow (optional)
- **Load power and load current monitoring:** 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. Minimum current level detection is 3%.
- **Three-phase monitoring:** Monitors line to neutral voltage of all sources, for over/ under voltage, loss of phase, and over/under frequency.
- **Robust control system design:** Optically isolated logic inputs and isolation transformers for AC power inputs provide high-voltage surge protection.
- **Communications capability:** The transfer switch is capable of communicating with other transfer switches, SCADA-networked accessories, or Cummins® generators utilizing LonWorks® protocol.
- **Standard programmable time delays:** Provides time delay start/stop, transfer and re-transfer functions, and programmed open transition.
- **Warranty and service:** Products are backed by a comprehensive warranty and a worldwide network of distributors with factory-trained service technicians.



Exterior view of a PLT breaker-based transfer switch

Power circuit breakers

PLT transfer switches utilize electrically-operated drawout power air circuit breakers for the transfer of power from source to source. Power circuit breakers combine the durability of traditional automatic transfer switches with high withstand ratings. The circuit breaker can maintain service for up to 60 cycles during a fault condition.

Square D Masterpact® circuit breakers are electrically-operated with long, short and instantaneous trips.

- Breaker close and trip circuits are 24V DC. Breaker charging power is derived from the connected AC source.
- Breaker tripping causes that breaker's source to be considered failed. When the breaker is tripped, the control system initiates transfer to the alternate source. The control system logs this as a fault condition separate from a source failure.
- Breakers are bus-connected to load lugs with silver-plated copper bus. Bracing is per UL standards and rated at 100 kA.
- Drawout breaker configuration facilitates service and maintenance of the power transfer contacts without extended service interruptions.
- The circuit breaker can maintain service for up to 60 cycles during fault conditions, which simplifies selective coordination.



Interior view of a PLT breaker-based transfer switch

Power command control

PowerCommand controls are microprocessor based and developed specifically for automatic transfer switch operation. The control includes the features and options required for most applications.

- Flash memory stores the control settings.
- Contents of the memory are not lost even if power to the controller is lost.
- On-board battery maintains the real-time clock setting and the engine start time delay. Allows network communication with the controller to continue, where applicable.
- Control is field-configurable using the operator panel, and can be programmed by Cummins service personnel using the InPower™ electronic service tool.

Panels

Basic indicator panel: Source available/connected LED indicators

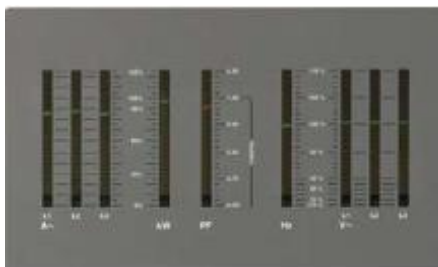
Test/exercise/bypass buttons

Analog bar graph meter display: Standard

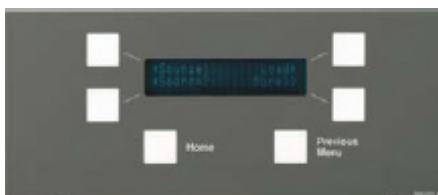
Digital display: Standard



Basic indicator panel



Analog bar graph meter display



Digital display

Control functions

Utility-to-genset applications

Utility-to-utility applications

Programmable genset exerciser:

- Eight events/schedules with or w/o load

Date/time-stamped event recording:

- 50 events

Software adjustable time delays:

- Engine start: 0 to 120 sec
- Transfer normal to emergency: 0 to 120 sec
- Re-transfer 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

- Accuracy: $\pm 2\%$
- 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

- Accuracy: $\pm 2\%$
- Pickup: 95% to 99% of dropout setting
- Dropout: 105% to 135% of nominal voltage
- Dropout time delay: 0.5 to 120 sec

Over/under frequency sensing:

Normal and emergency

- Accuracy: $\pm 0.05\text{Hz}$
- 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

Load sequencing:

- Optional with network communications module M031. Provides control for eight steps of load with and adjustable time delay for each step on transfer, re-transfer or both. Staging loads on in sequence helps minimize the required generator size.

Power command control (continued)

Time-delay functions

Engine start: Prevents nuisance genset starts due to momentary power variation or loss

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.

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.

Engine stop: Maintains availability of the genset for immediate reconnection if the normal source fails shortly after transfer. Allows gradual genset cool-down by running unloaded.

Elevator pre-transfer signal: Requires optional relay signal module (M023). Delays transfer for pre-set interval of 0-60 seconds to prevent a power interruption during elevator operation.

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: 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.

Control options

Front panel security key (M017): Locks front panel to prevent access to digital control settings. Prevents unauthorized activation of transfer or test functions.

Relay signal module (M023): Provides relay output contacts for sending information to an external monitoring and control system. Relay outputs include: Source 1 connected/available, Source 2 connected/available, not in auto, test/exercise active, failed to disconnect, failed to synchronize, failed to transfer/re-transfer, and elevator control pre-transfer signal.

PowerCommand network interface (M031): Provides connection to the PowerCommand network.

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. Minimum current level detection is 3%.

Utility protective relay

Some utilities require closed transition transfer switches be provided to protect the utility service if the transfer switch malfunctions. All transfer switches include standard failure mode effect logic, which diagnoses failure of the switch to open or close when commanded, and provides appropriate alarm and response.

Closed transition PLT transfer switches are available with optional protective relay(s), suitable for many utility applications.

Soft load PLT transfer switches include a multifunction relay which provides reverse power protection and other utility protection functions.

Specifications

Voltage rating:	208 or 480 VAC, 50 or 60 Hz
Operating temperature:	-40° F (-40° C) to 140° F (60° C)
Storage temperature:	-40° F (-40° C) to 140° F (60° C)
Altitude:	Up to 6,600 ft (2,000 m) without derating
Surge withstand ratings:	Voltage surge performance and testing in compliance with the requirements of IEEE C62.41 (Category B3) and IEEE C62.45.
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.

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.



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 (Level 1 systems).



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

Transition modes

PLT models available: The open transition model does open transition and programmed transition in each direction. Momentary (fast) closed, soft load ramping modes perform open transition when transferring from a failed source and closed transition when transferring between two good sources.

Open transition – programmed: Switches from source to source over a pre-programmed time period, 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.

Closed transition – momentary: Used in applications where loads are sensitive to the brief power interruption that occurs when performing open transition between sources. Closed transition is accomplished by briefly (<100 msec) paralleling two good sources to eliminate the momentary interruption in the power supply.

Closed transition – soft load: Similar to momentary closed transition, but when two sources are available, the system actively synchronizes the generator set to the utility service, connects the two sources, ramps the load to the oncoming source over a pre-programmed time period, then disconnects the initial source. This allows transfer of loads from one source to another with minimum disturbance to the loads. Performs open transition when only one source is available. (This transition mode requires a Cummins paralleling generator set.)

Test mode: Allows the operator to simulate a power failure in the utility service, and verify proper system operation. System is configurable for open or closed transition operation in this mode.

UL withstand and closing ratings

Withstand and Closing Ratings (WCR) are stated in symmetrical RMS amperes.

Transfer switch ampere	Breaking interrupt rating	Breaker short-time withstand rating (1 sec)	Breaker provided	Trip unit
800	65,000 at 480 V	42,000	Square D Masterpact	MicroLogic 6.0
1200	65,000 at 480 V	42,000	Square D Masterpact	MicroLogic 6.0
1600	65,000 at 480 V	42,000	Square D Masterpact	MicroLogic 6.0
2000	65,000 at 480 V	42,000	Square D Masterpact	MicroLogic 6.0
2500	100,000 at 480 V	25,000	Square D Masterpact	MicroLogic 6.0
3000	100,000 at 480 V	25,000	Square D Masterpact	MicroLogic 6.0

Enclosures

The transfer switch and control are floor-mounted in a key-locking enclosure. Wire bend space complies with 2008 NEC. NEMA Type 1 enclosure is standard. For outdoor applications, consult factory for available alternatives.

Note: Auxiliary section is required for 2500-3000 amp switches.

Amp rating	Height		Width		Depth (Door closed)		Depth (Door open)		Weight		Drawing reference	
	in.	mm	in.	mm	in.	mm	in.	mm	lb	kg	Top utility	Bottom utility
800-3000												
Without AUX section	90	2286	36	915	48	1220	82	2068	2000	908	0500-3959 0500-3526	0500-3960 0500-3527
With AUX section (AUX Left, No Bus)	90	2286	60	1524	48	1220	82	2068	2600	1180	0500-3963 0500-3526	0500-3964 0500-3527
With AUX section (AUX Left, Bussed)	90	2286	60	1524	48	1220	82	2068	2600	1180	0500-3513 0500-3530	A034S248 0500-3531
With AUX section (AUX Right, No Bus)	90	2286	60	1524	48	1220	82	2068	2600	1180	0500-3961 0500-3526	0500-3962 0500-3527
With AUX section (AUX Right, Bussed)	90	2286	60	1524	48	1220	82	2068	2600	1180	0500-3511 0500-3528	0500-3512 0500-3529

Transfer switch lug capacities

All lugs accept copper or aluminium wire unless indicated otherwise.

Amp rating	Cables per phase	Size
800	3	#2-500MCM
1200	4	#2-500MCM
1600	5	#2-500MCM
2000	6	#2-500MCM
2500	7	#2-500MCM
3000	8	#2-500MCM

Submittal detail

Amperage ratings:

- 800
- 1200
- 1600
- 2000
- 2500
- 3000

Voltage ratings:

- R021 208V
- R026 480V

Pole configuration:

- A028 3 poles (solid neutral)
- A029 4 poles (switched neutral)

Frequency:

- A044 60 Hz
- A045 50 Hz

Transfer mode:

- A078 Open – programmed
- A079 Closed – momentary
- A081 Closed – soft load

Application:

- A035 Utility-to-genset

System options:

- A042 Three phase, 3-wire or 4-wire

Enclosure:

- B001 Cabinet Type 1
- N068 Utility entrance – top
- N069 Utility entrance – bottom

Auxiliary sections:

- N021 Auxiliary section – mounted right
- N022 Auxiliary section – mounted left
- N065 Auxiliary section – additional bus

Standards:

- B024 Service entrance rating
- S043 UL 1008 certification

Control options:

- M017 Security key – front panel
- M023 Relay signal module
- M031 PowerCommand network communications module
- M022 Load power and load current monitoring

Meter:

- D009 Analog bar graph meter

Protective relays:

- M051 Multifunction relay
- M038 Lockout relay
- M049 Additional lockout relay
- M050 Ground fault sensing

Warranty:

- G010 Years 0-2: Parts, labor and travel Years 3-5: Parts only Years 6-10: Main contacts only
- G013 Years 0-5: Parts, labor and travel Years 6-10: Main contacts only

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

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