



Fig. 2: Four pole, Closed Transition Transfer Switch rated 1000 amperes in Type 1 enclosure.

Delayed Transition Transfer Switching

ASCO Delayed Transition Transfer Switches are designed to provide transfer of loads between power sources with a timed load disconnect position for an adjustable period of time. Applications include older style variable frequency drives, rectifier banks, and load management applications.

- Available 150 through 4000 amperes.
- Utilizes reliable, field proven solenoid operating mechanisms.
- Mechanical interlocks to prevent direct connection of both sources.
- Indicator light (16mm, industrial grade type LED) for load disconnect position.
- Adjustable time delay for load disconnect position.

Closed Transition Transfer Switching

ASCO Automatic Closed Transition Transfer Switches feature main contacts that overlap, permitting the transfer of electrical loads without power interruption. The switch transfers in a make-before-break mode if both sources are within acceptable parameters. Control logic continuously monitors source conditions and automatically determines whether the load transfer should be open (conventional non-overlap mode) or closed transition. Available 150 through 4000 amperes.

Closed Transition Transfer within 5 electrical degrees is achieved passively, without control of engine generator set. Therefore, no additional control wire runs are required between the ATS and engine generator set governor. Plus, protective relaying may not be required under normal operation since the contact overlap time is less than 100 milliseconds (consult your local utility on protective relay requirements).

Failure to synchronize indication and extended parallel time protection is built-in to all 7000 SERIES closed transition controls to prevent abnormal operation.



Fig. 3: Four pole, Delayed Transition Transfer Switch rated 2000 amperes.

Non-Automatic Transfer Switching

ASCO Non-Automatic Transfer Switches are electrically operated units which are operated with manual control switches mounted locally or at remote locations.

- Sizes from 30 through 4000 amperes.
- Microprocessor based controller provides for addition of optional accessories.
- Controller prevents inadvertent operation under low voltage conditions.
- Low control circuit operating currents allow for long line runs between remotely mounted manual control switches and the transfer switch.
- Source acceptability lights inform operator if sources are available to accept load.
- Standard inphase monitor can be activated for transferring motor loads.



Fig. 4: Three pole Non-Automatic, electrically operated 400 ampere switch shown in Type 1 enclosure.

Withstand and Close-On Ratings for all 7000 SERIES Products⁽¹⁾⁽²⁾

Switch Rating (Amps)		UL 1008 Withstand and Close-On Ratings (RMS Symmetrical), A						Recommended Fuses		Short Time ⁴	
Transfer Switches	Bypass Switches	"Specific" Breaker	Volts Maximum	"Any" Breaker ³	Volts Maximum	Current - Limiting Fuse Rating	Volts Maximum	Max Size, A	Class	Ratings (RMS Sym), A	Duration (Cycles)
30	-	N/A	-	10,000	600V	100,000	480V	60	J	N/A	-
70, 100, 125, 150	-	22,000	480V	10,000	600V	200,000	480V	200	J	N/A	-
200, 230	-	22,000	480V	10,000	480V	200,000	480V	300	J	N/A	-
260, 400, 600	150, 200, 230 260, 400, 600	42,000	600V	35,000	600V	200,000	600V	600	J	N/A	-
				42,000 ⁷	480V			800	L		
260, 400, 600	150, 200, 230 260, 400, 600	50,000	480V	65,000	240V	200,000	600V	600	J	N/A	-
								800	L		
800, 1000, 1200	800 1000, 1200	65,000	600V	50,000	600V	200,000	600V	1600	L	36,000	18
1600, 2000 ⁵	1600, 2000 ⁵	N/A	-	100,000	600V	200,000	600V	3000	L	65,000 ⁶	30
2600, 3000	3000	N/A	-	100,000	600V	200,000	600V	4000	L	65,000 ⁶	30
4000	4000	N/A	-	100,000	600V	200,000	600V	6000	L	65,000 ⁸	18

- Notes: 1) All WCR values above are tested in accordance with the requirements of UL 1008. See ASCO Publication 1128 for more WCR information.
- 2) Application requirements may permit higher WCR for certain size switches. Contact ASCO for guidance if available short circuit current exceeds the WCR shown in the table.
- 3) "Any" Breaker Ratings are based on 3 cycles for 260 - 4000A and 1.5 cycles for 30 - 230A Switches. Applicable to the Circuit Breakers with the instantaneous trip elements.
- 4) Short-Time Ratings are provided for the applications involving Circuit Breakers that do not have instantaneous trips for system coordination. Applicable to transfer switch design only.
- 5) Optional front connected service for 1600 and 2000A switches is limited to 85,000 A for "Any" Breaker Rating.
- 6) Withstand (non UL) test ONLY.
- 7) Limited to 35kA on switches with overlapping neutral.
- 8) At 480V ; does not apply to Bypass designs.

Automatic Transfer Bypass-Isolation Switching

ASCO Automatic Transfer & Bypass-Isolation Switches are available in open transition, closed transition and delayed transition designs. The bypass and isolation features allow power transfer switches to be inspected, tested, and maintained without any interruption of power to the load.

- Available 150 to 4000 amperes.
- Allows bypass-isolation without load interruption.
- Bypass switch and transfer switch have identical electrical ratings.
- Heavy duty mechanical interlocks prevent undesirable operation.
- Bypass contacts carry current only during bypass mode.
- Transfer switch is drawout design for ease of maintenance.
- Bypass and isolation handles are permanently mounted. The bypass switch has dead front quick-make, quick-break operation for transferring of loads between live sources.
- Bypass switch is fully rated for use as a manual 3-position transfer switch.
- Bypass and isolation functions are simple, requiring a total of two operating handles.
- No toggle switches, push buttons, selector switches or levers are required for bypass-isolation operation.
- Mechanical indicators show bypass and transfer switch positions.
- 800 -1200 ampere available in shallow depth, front connected or rear connected designs.



Fig. 5: J-Design Bypass-Isolation Transfer Switch Rated 600 Amps

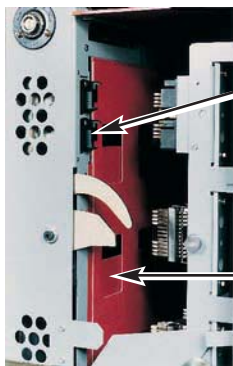


Fig. 6: Three Pole 7000 SERIES Automatic Bypass-Isolation Transfer Switch Rated 1000 Amps



Fig. 7: Three Pole 7000 SERIES Automatic Bypass-Isolation Transfer Switch Rated 3000 Amps

Transfer Switch Drawout Features (150-3000 amperes)



Automatic Secondary Disconnects

Automatic Shutters (optional)

Fig. 8: Bypass-Isolation Transfer Switch secondary disconnects and optional automatic shutters.

- Automatic secondary disconnects remove all control power as switch is withdrawn.
- Drawout carriage provides for easy transfer switch maintenance and/or removal via commercially available breaker hoists.
- Optional transfer switch lifting yoke kit available
- Optional automatic shutters which close when the transfer switch is withdrawn to provide bus isolation, specify accessory 82C.(1000-3000A only)



Self Aligning Jaws

Fig. 9: Bypass-Isolation Transfer Switch self aligning power jaws.

ASCO® 7000 SERIES Power Switching Solutions

Bypass and Isolation Handles - Simple as 1, 2, 3

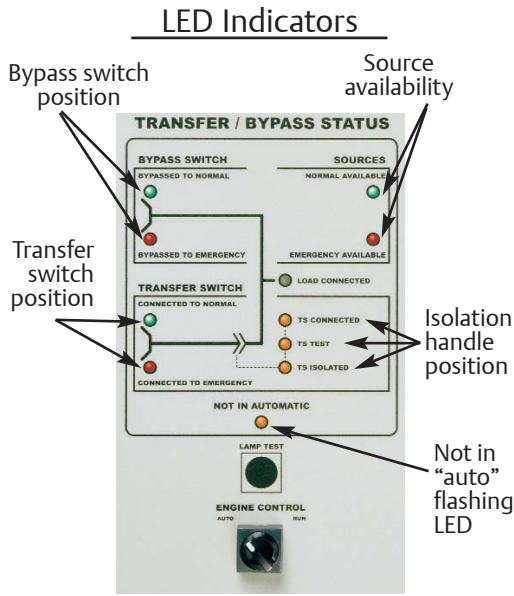
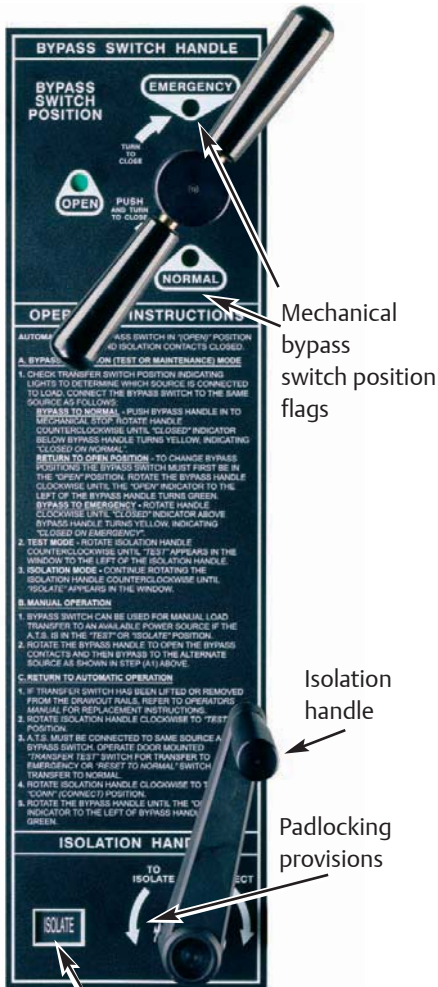


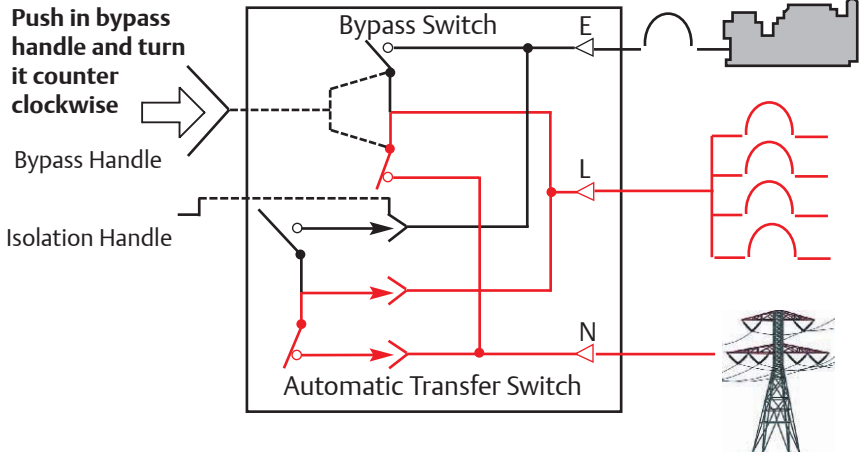
Fig. 10: Transfer Bypass Status Panel



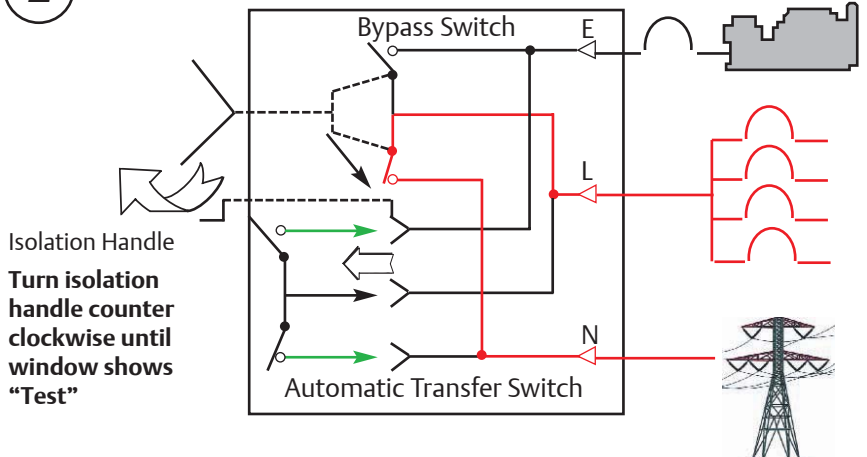
Mechanical isolation handle position window (connected/test/isolate)

Fig. 11: Bypass-Isolation Switch user interface

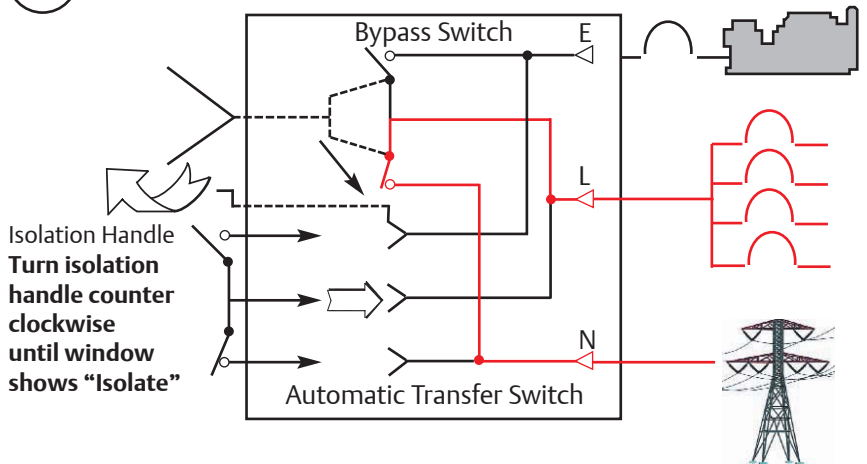
1 Bypass to Normal



2 Test Position



3 Isolation Position



Key:

- Red line: Represents Current Flow
- Green line: In test position control panel remains energized to allow for electrical operation of a transfer switch.

ASCO[®] 7000 SERIES Service Entrance Power Transfer Switches

The ASCO Service Entrance Power Transfer Switch combines automatic power switching with a disconnect and overcurrent protective device on the utility source. The power transfer switch meets all National Electric Code requirements for installation at a facility's main utility service entrance. Service entrance rated transfer switches generally are installed at facilities that have a single utility feed and a single emergency power source. A circuit breaker serves as the utility disconnect and links are provided to disconnect both neutral and ground connections.

This product is either UL 1008 or UL 891 listed and is available up to 600V and 4000A in Standard, Delayed, Closed Transition, Soft Load, and Bypass Isolation Configurations.

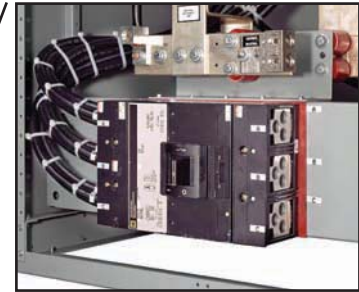
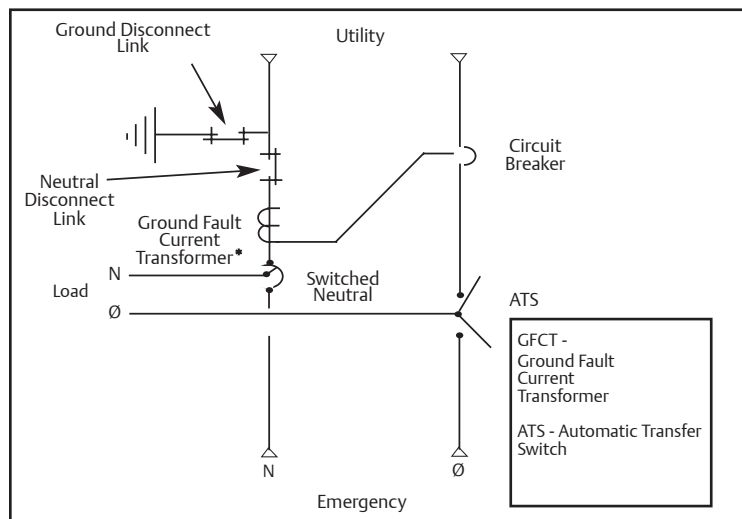


Fig. 12: Ground and neutral disconnect links

Standard Features

- Available from 150 to 4000 amperes
- ASCO 7000 SERIES Power Transfer Switch, UL 1008 Listed
- Standard UL Type 1 Enclosure
- Disconnect and overcurrent protective device on the utility source: molded case circuit breaker 150 to 2000 Amp; insulated case 3000 to 4000 Amp
- Disconnect link on Neutral
- Disconnect link on Ground
- Ground and Neutral Bus, all silver-plated copper
- Solderless screw type terminals for External Power Connections
- Meets all NEC requirements for use as service entrance
- Internet Enabled Command and control available with optional ASCO 5500 SERIES Thin Web Server
- Service entrance breakers rated 100% for 1000 Amps and above; 80% below 1000Amps



One line diagram of a typical service entrance rated transfer switch available in Solid, Switched or Overlapping Neutral

* Ground fault trip protection provided on sizes of 1000 amperes and above

Optional Features

- Enclosures - Secure Double Door
 - UL Type 3R w/strip heater & thermostat
 - UL Type 4 or 4X
 - UL Type 12
- Connections
 - Crimp lugs
 - Bus Riser on Normal, Emergency or Load
- Protective Relays/Metering
 - Accessory 85L , see page 15
- Surge Suppression
 - Accessory 73, 80KA Surge protector (see pg. 14)
- Communications
 - ASCO 72A Communication interface module
 - ASCO POWERQUEST[®], see page 18
 - ASCO 5500 SERIES Thin Web Server for internet connection , see page 21
- Additional Breaker(s)
 - Circuit Breaker on Emergency
 - Load Distribution Panel
- Optional high AIC ratings on breakers

Consult ASCO for additional features

ASCO[®] 7000 SERIES Microprocessor Controller



Fig. 13: 7000 SERIES Microprocessor Controller.

The 7000 SERIES Microprocessor Based Controller is used with all sizes of Power Transfer Switches from 30 through 4000 amperes. It represents the most advanced digital controller in the industry and includes, as standard, all of the voltage, frequency, control, timing and diagnostic functions required for most emergency and standby power applications.

Because of severe voltage transients frequently encountered with industrial distribution systems, the microprocessor logic board is separated and isolated from the power board as shown below. This improves electrical noise immunity performance and helps assure compliance with the rigorous transient suppression standards highlighted below.

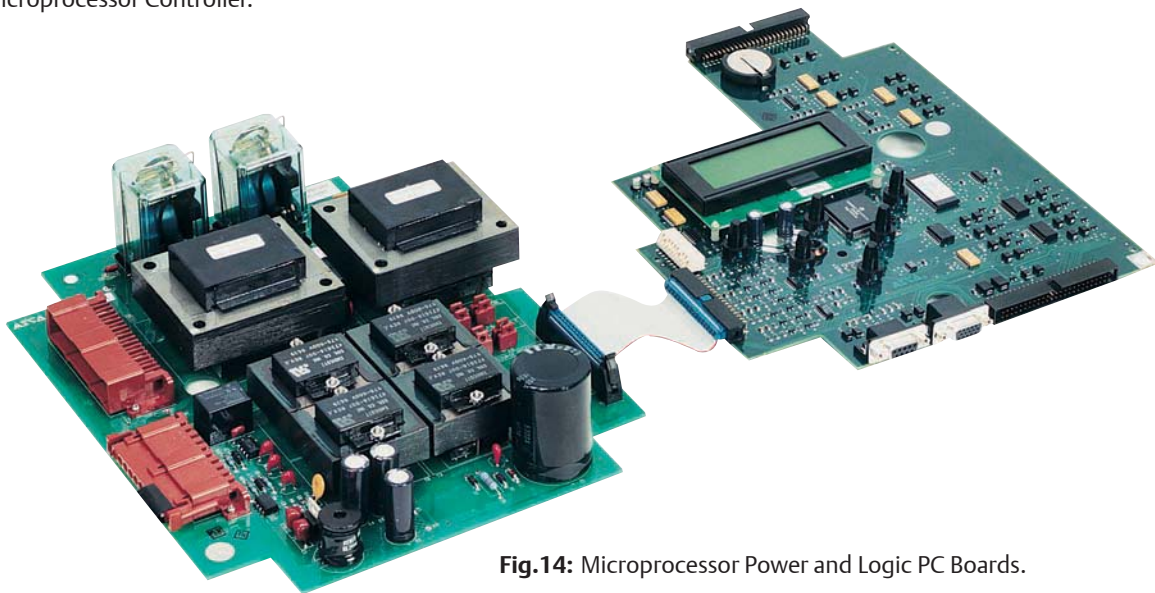


Fig.14: Microprocessor Power and Logic PC Boards.

7000 SERIES Microprocessor Based Controller	
Emission Standard - Group 1, Class A	EN 55011:1991
Generic Immunity Standard, from which:	EN 50082-2:1995
Electrostatic Discharge (ESD) Immunity	EN 61000-4-2:1995
Radiated Electromagnetic Field Immunity	ENV 50140:1993
Electrical Fast Transient (EFT) Immunity	EN 61000-4-4:1995
Surge Transient Immunity	EN 61000-4-5:1995
Conducted Radio-Frequency Field Immunity	EN 61000-4-6:1996
Voltage Dips, Interruptions and Variations Immunity	EN 61000-4-11:1994

Features

- Digital microprocessor.
- Touch pad programming of features and settings without the need for meters, or variable power supplies.
- Sixteen (16) selectable operating voltages available in a single Controller.
- On-board diagnostics provide control panel and ATS status information to analyze system performance.
- Displays and counts down active timing functions.
- Selectable multi-language display (English, German, Portuguese, Spanish, or French. For others contact ASCO).
- Password protection to prevent unauthorized tampering of settings.
- Remote monitoring and control with ASCO POWERQUEST[®] communications products. Specify optional accessory 72A or 72E.
- Load shed option for SYNCHROPOWER[®] bus optimization applications. Specify optional accessory 30B.
- Historical event log
- Statistical ATS systems monitoring information

Voltage and Frequency Sensing

- 3-Phase under and over voltage settings on normal and emergency sources.
- Under and over frequency settings on normal and emergency.
- True RMS Voltage Sensing with +/- 1% accuracy; Frequency Sensing Accuracy is +/- 0.2%.
- Selectable settings: single or three phase voltage sensing on normal and emergency; 50 or 60Hz.
- Phase sequence sensing for phase sensitive loads.
- Voltage unbalance detection between phases.

Status and Control Features

- Output contact (N/O or N/C) for engine-start signals.
- Selection between “commit/no-commit” on transfer to emergency after engine start and normal restores before transfer.
- Advanced inphase algorithm which automatically measures the frequency difference between the two sources and initiates transfer at appropriate phase angles to minimize disturbances when transferring motor loads.
- Event log displays 99 logged events with the time and date of the event, event type and event reason.
- Output signals for remote indication of normal and emergency source acceptability
- Statistical ATS/System monitoring data screens which provide:
 - Total number of ATS transfers.
 - Number of ATS transfers caused by power source failure.
 - Total number of days ATS has been in operation.
 - Total number of hours that the normal and emergency sources have been available.

Time Delays

- Engine start time delay - delays engine starting signal to override momentary normal source outages - adjustable 0 to 6 seconds.
- Transfer to emergency time delay - adjustable 0 to 60 minutes.
- Emergency source stabilization time delay to ignore momentary transients during initial generator set loading - adjustable 0 to 6 seconds.
- Retransfer to normal time delay with two settings:
 - Power failure mode - 0 to 60 minutes.
 - Test mode - 0 to 10 hours.
- Unloaded running time delay for engine cooldown - adjustable 0 to 60 minutes.
- Pre and post transfer signal time delay for selective load disconnect with a programmable bypass on source failures - adjustable 0 to 5 minutes. This signal can be used to drive a customer furnished relay, or for (2) sets of double throw contacts rated 3 amps at 480 volts AC, specify ASCO optional accessory 31Z.
- Fully programmable engine exerciser with seven independent routines to exercise the engine generator, with or without loads, on a daily, weekly, bi-weekly or monthly basis.
- Contains all alarm signals, logic and time delays for use with closed transition switches.
 - Insynch time delay - 0 to 3 seconds.
 - Failure to synchronize - 1 to 5 minutes.
 - Extended parallel - 0.1 to 1.0 seconds.
- Delayed transition load disconnect time delay - adjustable 0 to 5 minutes.

Control Switches and Indicating Lights for Conventional 2-Position Switches

- Switch position indicating lights (16 mm, industrial grade LEDs).
- Source acceptability indicating lights with true indication of the acceptability of each source, as determined by the voltage, frequency, voltage unbalance, and phase sequence settings of the control panel (16mm, industrial grade LEDs).
- Three position (16mm, industrial grade type) selector switch:
- Automatic: Normal maintained position.
- Test: Momentary position to simulate normal source failure for system test function.
- Reset Delay Bypass: Momentary position to bypass transfer and re-transfer time delay.



Fig. 15: 7000 SERIES User Controls and Indicators.

Control Switches and Indicating Lights for Closed Transition Switches

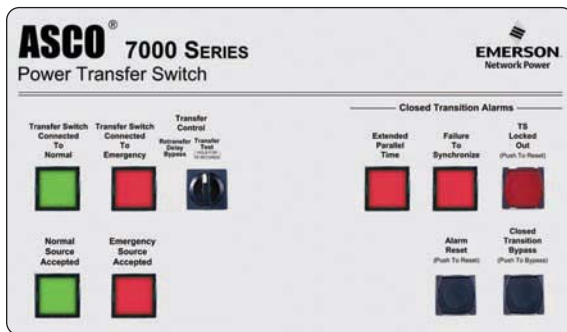


Fig. 16: 7000 SERIES User Controls and Indicators.

- Extended Parallel Time - Provides visual indication when the pre-set extended parallel time has been exceeded. The controls automatically open the emergency or normal main contacts. Separate contact also available to shunt trip external breaker.
- Failure To Synchronize - Visually displays a failure to synchronize alarm if the time delay settings is exceeded, during closed transition transfer operation.
- TS Locked Out - Prevents transfer in either direction if the extended parallel time is exceeded.
- Alarm Reset - Resets extended parallel and failure to synchronize alarms.
- Closed Transition Bypass - Pushbutton allows transfer between sources in an open transition mode.

7000 SERIES Power Control Center



Fig. 17: 7000 SERIES Power Control Center.

The 7000 SERIES microprocessor controller is a Power Control Center which allows the user to easily access detailed information on: system status; power source parameters; voltage, frequency and time delay settings; optional feature settings; historical event log; and system diagnostics. A four line, (20) character LCD has a backlit display which enables easy viewing under all conditions. The user can navigate through all screens using only six buttons, which also allows selection of: (18) different source parameter settings; (16) standard time delays; (12) standard feature settings; up to seven independent engine exercise routines; and even the language (English, German, Spanish, French, etc.) which appears on the display.

Since the Power Control Center must be visible and operable through the enclosure door, it has been qualified for use in industrial and outdoor applications. This includes installation in Type 3R (outdoor/rainproof), 4 (weatherproof) and 12 (indoor/industrial) enclosures.



Fig. 19: Serial Module 72A

5110 Serial Module

The 5110 Serial Module is used to allow local or remote communications with ASCO POWERQUEST® communication products.

The module is used to connect the 7000 SERIES transfer switches to a serial network via an RS-485 interface. The module has two port connectors used for ATS & Power Manager connectivity.

The serial connection is accomplished from a 5-pin terminal header/socket block. RS-485 serial networks allow for up to 32 modules to be set up in a daisy chain configuration to connect to POWERQUEST® systems.



Fig. 20: Connectivity Module 72E

5150 Connectivity Module

The 5150 Connectivity Module is used to bring several different serial devices that communicate at different baud rates and with different protocols to a common Ethernet media.

The module is used to connect 7000 SERIES transfer switches, and ASCO Remote Annunciators to a standard Ethernet TCP/IP network with standard 10base T(RJ-45) connectors. The module has customized embedded JAVA™ applets (program applications for an internet browser) for each monitored device that loads automatically to a standard Web Browser.

The module is designed to communicate with up to 8 clients such as Web applications (web pages), POWERQUEST®, or third party Modbus® devices simultaneously over an Ethernet connection.



Fig. 21: ASCO Remote Annunciator

5350 Remote Annunciator

The ASCO Power Transfer Switch Remote Annunciator is a stand-alone, industrial grade interface device providing you with the most critical transfer switch status indication and transfer/retransfer control for up to eight switches. Ethernet technology is built in for faster and more reliable communications. LEDs indicate switch status and position, while separate push buttons individually initiate transfer switch operation and testing. Transfer switch annunciators can be set up in multiple locations to monitor various transfer switches, allowing redundant and distributed annunciation.