LSE | LAKESHORE ELECTRIC

Automatic Transfer Switch

AFP Molded Case Fire Pump

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Lake Shore Electric's Automatic Fire Pump Transfer Switch (AFP) was designed exclusively for use in a fire protection circuit and meets the requirements of NFPA 20 (Section 10.8.2.2 Arrangement II) as well as UL 1008. As an individually listed power transfer switch, the AFP can be used in both new and existing installations that have a standalone fire pump controller, ensuring seamless integration with any system.

Standard Features:

- 8600 Transfer Switch Controller
- Molded Case Switches
- Mechanically Interlocked Sources
- Externally Operable Isolation Switch
- Automatic & Manual Operation
- Engine Starting Contacts
- Audible & Visual Indicators
- Surge Suppression
- NEMA 3R Enclosure with Gray Powder Coat Finish
- Space Heater

Optional Features:

- Mechanical Lug Sizes
- 861 Ethernet Communication Gateway

Technical Data

Standard & Optional Features

8600 Transfer Switch Controller
The 8600 Transfer Switch Controller monitors the voltage and frequency of the power on the Normal Source (Source 1) and Alternate Source (Source 2). The factory programmed monitoring set points can be adjusted on the display screen or with the Controller software on a PC to meet specific application requirements. The Controller can also be PIN protected to ensure no unauthorized changes can be made. See page 4 for more information.

Molded Case Switches
The AFP utilizes two UL 489-listed molded case switches which are constructed using circuit breaker components and are of the high instantaneous automatic type, tripping at 10X the frame rating.

Mechanically Interlocked Sources
A walking beam-style mechanical interlock is used to prevent the unintentional paralleling of the Normal Source (Source 1) and Alternate Source (Source 2). Strategically located on the rear side of the back pan, the restricted access to the walking beam ensures a touch-free and tamper-resistant interlock. See drawing on page 11.

Externally Operable Isolation Switch
An externally operable isolation switch is provided within the enclosure ahead of the input terminals of the Alternate source. This switch is lockable in the open and closed position and includes auxiliary contacts for remote annunciation of the switch position.

Automatic & Manual Operation
The AFP Transfer Switch is an electrically operated and mechanically held self-contained power switching assembly that is dedicated exclusively to the fire pump load. The transfer switch can be operated automatically or manually by selecting the desired mode on the 8600 Controller. Motor operators and handles are located on the front of the Normal Source (Source 1) and Alternate Source (Source 2) molded case switches for safe manual transfer under load.

Engine Starting Contacts
The 8600 Transfer Switch Controller provides one form "C" dry contact output that is acutated upon sensing the loss of the Normal source.

Audible & Visual Indicators
- Source 1 (Normal Source) Available LED
- Source 2 (Alternate Source) Available LED
- Source Connected LED
- Not in Auto LED
- Load Demand Inhibit LED
- Source 1 Failed in the Last 72 Hours LED
- Generator Exercising LED
- Isolation Switch Open Position: Amber Indicator Light with Intermittent Audible Alarm

Surge Protection Device
A surge protection device (SPD) with replaceable module is included on the Normal Source to protect the control circuity from transient voltage surges. The SPD is rated 50kA max/20kA nominal; phase to ground and is equipped with LEDs to indicate status.

NEMA 3R Enclosure with Gray Powder Coat Finish
All AFP Transfer Switch enclosures come standard with an environmental rating of NEMA Type 3R, exceeding the NFPA minimum of NEMA Type 2, and have a textured gray powder coat finish.

Space Heater
A 50W heater is provided on a constant circuit to aid in the regulation of the interior temperature and mitigate the formation of condensation in the enclosure and on the internal components.

Standard & Optional Lug Sizes
Mechanical lugs are provided for all incoming and outgoing connections. See table on page 9 for available lug sizes.

861 USB to Ethernet Communication Device (Optional)
The 861 USB to Ethernet Communication Device is an optional accessory that allows for the monitoring of an 8600 Controller with USB connectivity over a LAN (network) or WAN (internet) connection. The device includes an LED indicator that shows the operation and connection status of the ATS and allows up to four users to simultaneously monitor the Controller's status remotely. See page 7 for more information.

Technical Data

Molded Case Switches

Table 1: Molded Case Technical Details, Non-SER

kAIC @ 480V	Rated Current (A)	Normal & Alternate Source (Switches)		
		2 Pole	3 Pole	4 Pole
35	225	KD2400KW02	KD3400KW02	KD4400KW02
	400	KD2400KW02	KD3400KW02	KD4400KW02
65	225	HKD2400KW04	HKD3400KW04	HKD4400KW04
	400	HKD2400KW04	HKD3400KW04	HKD4400KW04

Table 2: Molded Case Technical Details, Isolation Switch

kAIC @ 480V	Rated Current (A)	Isolation Switch		
		2 Pole	3 Pole	4 Pole
35	225	KD2400KW02	KD3400KW02	KD4400KW02
	400	KD2400KW02	KD3400KW02	KD4400KW02
65	225	HKD2400KW04	HKD3400KW04	HKD4400KW04
	400	HKD2400KW04	HKD3400KW04	HKD4400KW04

- Models stated above are Eaton C Series Molded Case Switches
- 3-pole variant with the center phase open may be used in place of a 2-pole at LSE discretion
- A higher withstand rating and/or frame rating may be used in place of a lesser rating at LSE discretion
- Contact factory for technical information on switching devices or withstand ratings not listed in Table
- Data subject to change without notice

Technical Data

Controller Features & Accessories

Controller Description & Overview

The 8600 Automatic Transfer Switch Controller monitors the voltage and frequency of the AC supply from two potential sources, such as a generator, utility, or a combination of both. If the supply from Source 1 (S1) fails, the Controller will issue a start command to Source 2 (S2). The 8600 Automatic Transfer Switch Controller will transfer the load to S2 once it produces an output that meets the required limits. When S1's supply returns and meets the specified limits, the load will then be switched back, and S2 will be shut down. To prevent unnecessary start commands, the 8600 offers various timing sequences.

- Standard Features:
- 4-Line Back-Lit LCD Text Display
- Five Key Menu Navigation
- Front Panel Editing with PIN Protection
- LED & LCD Alarm Indication
- Source 1/Source 2 Control
- Engine Test and Start Contact
- Load Inhibit
- Single Phase Protection
- Manual Restore to S1
- Configurable Timers & Alarms
- Event Log
- Multiple Date & Time Scheduler
- USB Connectivity
- Backed Up Real Time Clock
- Configurable Display Languages
- RS485 Communications
- Load Shedding Outputs (Requires Metering Accessory)

861 USB to Ethernet Communication Device (Optional)

The 861 USB to Ethernet Communication Device is an optional accessory that is used in conjunction with the 8600 Automatic Transfer Switch Controller to allow for remote monitoring of an ATS over a LAN (network) or WAN (internet) connection. The device includes an LED indicator that shows the operation and connection status of the ATS and allows up to four users to simultaneously monitor the Controller's status remotely.

- Converts Controller's USB port to an Ethernet port
- Built-In web server for use over an internal network and the internet
- Simple configuration via an internet browser
- Remote control and monitoring of the connected controller
- User access permission/restrictions available
- Supports MODBUS TCP via Ethernet port
- LED status indication on the device to aid fault finding

Technical Data

Adjustable Controller Features & Factory Defaults

Set Point	Description	Factory Default	Range
TDES	Time Delay Engine Start	3 Sec.onds	0 Seonds - 10 Hours
TDNE	Time Delay Normal to Alternate	3 Seconds	0 Seconds - 5 Hours
TDEN	Time Delay Alternate to Normal	3 Seconds	0 Seconds - 5 Hours
TDEC	Time Delay Engine Cool-Off	3 Seconds	0 Seconds - 1 Hours
TDN	Time Delay Neutral	3 Seconds	0 Seconds - 5 Hours
TDEF	Time Delay Alternate Fail Timer	3 Seconds	0 Seconds - 1 Hour
TPRE	Pre-Transfer Delay Timer	10 Seconds	0 Seconds - 5 Minutes
S1 UV DROP	S1 Undervoltage Dropout	80% of the Nominal Voltage	
S1 UV PICK	S1 Undervoltage Pickup	90% of the Nominal Voltage	
S2 UV DROP	S2 Undervoltage Dropout	80% of the Nominal Voltage	
S2 UV PICK	S2 Undervoltage Pickup	90% of the Nominal Voltage	
Check Sync	Synchronization	Off	0 Seconds - 10 Minutes
TD	Transient Dely	Off	0 Seconds - 30 Seconds
PHASES	Three-Phase or Single-Phase	Refer to Model Code or Schematic	
PLANT EXER	Plant Exerciser Programming	Off	Week/Day/Time/Duration
PHASE ROT	Phase Rotation	Off	(L1, L2, L3) OR (L3, L2, L1)

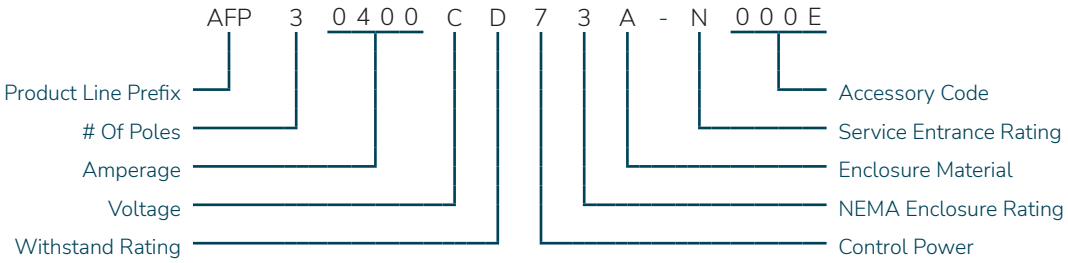
Available Contacts	Contact Type	Contact Position	Rating
Audible Alarm	Dry	Form C	10A @250VAC
Pretransfer Contact	Dry	Form C	10A @250VAC
S1 Available	Dry	Form C	10A @250VAC
S2 Available	Dry	Form C	10A @250VAC
Engine Start	Dry	Form C	8A @ 250VAC
S1 Switch Position	Dry	Auxiliary	6A @ 250VAC
S2 Switch Position	Dry	Auxiliary	6A @ 250VAC
Isol Switch Position	Dry	Auxiliary	6A @ 250VAC

Selection Guide

Characters & Designations

All Lake Shore Electric Transfer products are designed by using a structured, smart-style model code ordering system. The complete model code is composed of 18 customer-selected characters. Each character identifies a feature or function of the design. The first thirteen characters of the model code define the basic configuration. The five characters that follow identify the controller type as well as any additional accessories.

Sample Model Code:



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Selection Guide

Model Code Configuration

Number of Poles

Following the AFP prefix of the model code is the number of poles. Available in configurations of 2–pole, 3–pole, and 4–pole, this character is what distinguishes between a solid or switched neutral.

Table 3: Number of Poles

Poles	Alpha Numeric
2	2
3	3
4	4

Amperage

The AFP product line uses molded case switches and is available in sizes ranging from 225A - 400A.

Table 4: Amperage Codes

Amps	Alpha Numeric
225A	0225
400A	0400

* Please contact factory for ampacities greater than 400A

Voltage

Identification of the system voltage determines the number of phases as well as the presence of a neutral wire.

Table 5: Voltage Codes

Voltage	Phase/Wire	Alpha Numeric
120/240VAC	1 Ph 3W	A
208Y/120VAC	3 Ph 4W	B
480Y/277VAC	3 Ph 4W	C
120/240VAC	3 Ph 4W	G
480VAC	3 Ph 3W	K

Withstand Rating

The withstand rating is based on UL 489 Switching Device Ratings at 480VAC; Lower voltages offer higher kAIC ratings within the same alphanumeric code. Contact the factory for these ratings.

Table 6: Withstand Rating Codes

kAIC	Alpha Numeric
35kAIC @ 480V (65kAIC @ 240V)	D
65kAIC @480V (100kAIC @ 240V)	G

Control Power Supply

Control power is externally derived from the engine generator battery system. If external power is not available, internally derived power can be provided via DC Uninterrupted Power Supply (UPS) which includes a 2 mAH battery.

Table 7: DC Power Supply

Source	Alpha Numeric
Externally Derived (12VDC - 24VDC)	5
Internally Derived (UPS)	8

NEMA Enclosure Rating

The AFP transfer switch is built with a minimum enclosure rating of NEMA Type 3R, making it also suitable for NEMA Type 1 applications.

Table 8: NEMA Code

Environmental Rating	Alpha Numeric
NEMA Type 3R	3

Enclosure Material

The standard enclosure material of the AFP Transfer Switch is hot rolled steel with a textured ANSI-61 gray powder coat finish. Additional material options are listed below.

Table 9: Enclosure Code

Material	Alpha Numeric
Hot Rolled Steel (Powder Coat Finish)	A
Stainless Steel – 304 (#4 Brushed Finish)	C
Stainless Steel – 316 (#4 Brushed Finish)	D

Selection Guide

Accessory Code Configuration

Service Entrance Rating Code

The AFP is currently only available in a non-service entrance rated configuration, making N a fixed character for this position within the model code.

Table 10: Service Entrance Rating Code

Rating	Alpha Numeric
Non-Service Entrance Rated	N

Accessory Code Position 1

The first character after the hyphen specifies the Transfer Switch Controller, with the Standard Controller Package (Alpha Numeric 1) being the default selection for all Automatic Transfer Switches. See page 4 for Controller and Ethernet Communication Module details.

Table 11: Accessory Code 1

Controller Package	Alpha Numeric
Standard Controller Package	1
Standard Controller Package with Ethernet	2

Accessory Code Position 2

The second position of the four-digit accessory code is reserved for future expansion to the AFP product line with 0 being the only available character at this time.

Table 12: Accessory Code 2

Description	Alpha Numeric
No Option	0

Accessory Code Position 3

The third position of the four-digit accessory code is used to specify the need for an Alternate lug size. See page 9 for available lug options.

Table 13: Accessory Code 3

Lugs	Alpha Numeric
No Option (Standard Lug Size)	0
Optional Lug Size	1

Accessory Code Position 4

The fourth position of the four-digit accessory code is a fixed character with no selection required.

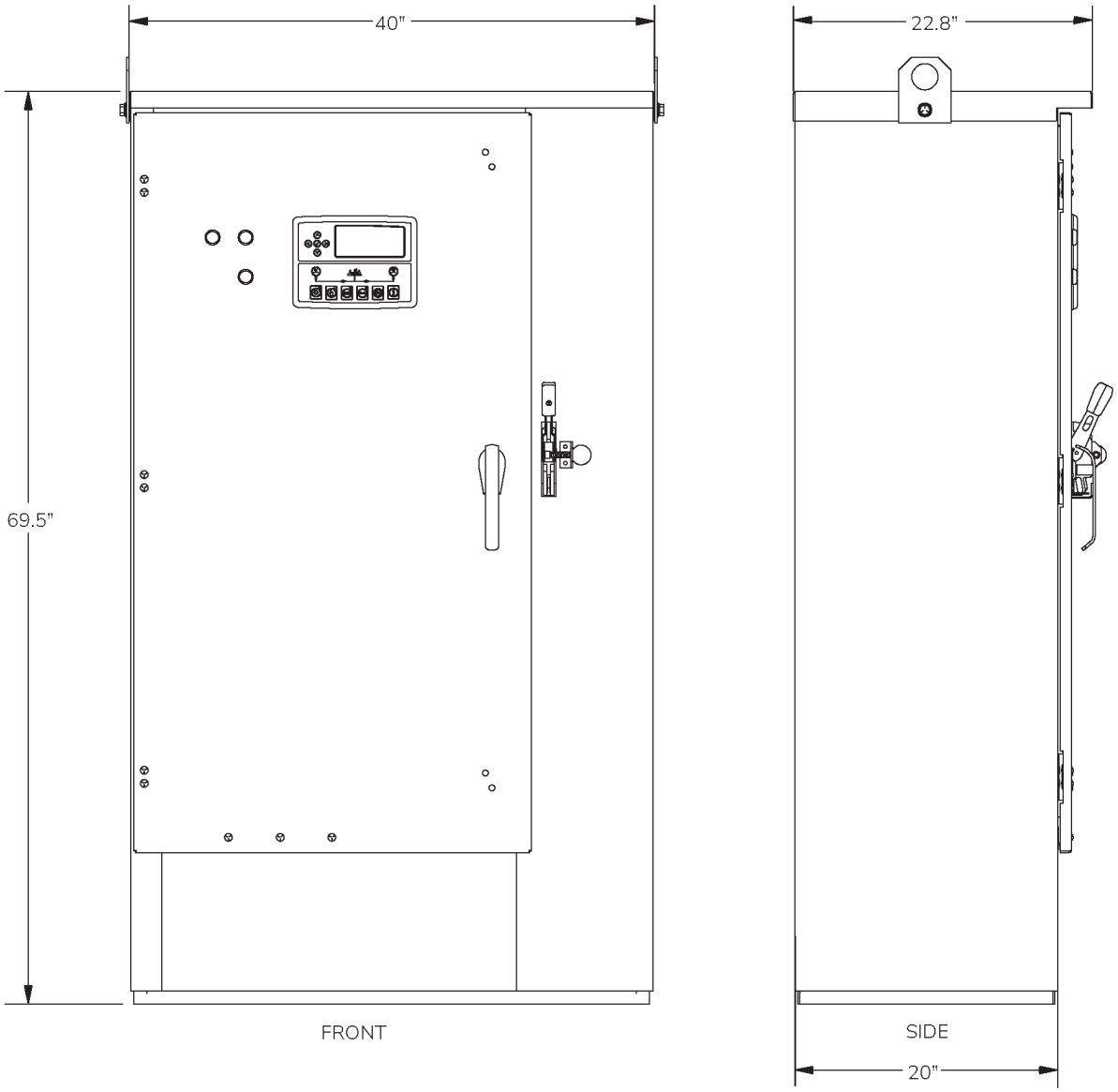
Table :

Description	Alpha Numeric
Manufacturer Code	E

Weights & Dimensions

Molded Case Fire Pump (225A - 400A)

Exterior Layout & Dimensions



Recommended Cable Access (Top or Bottom)

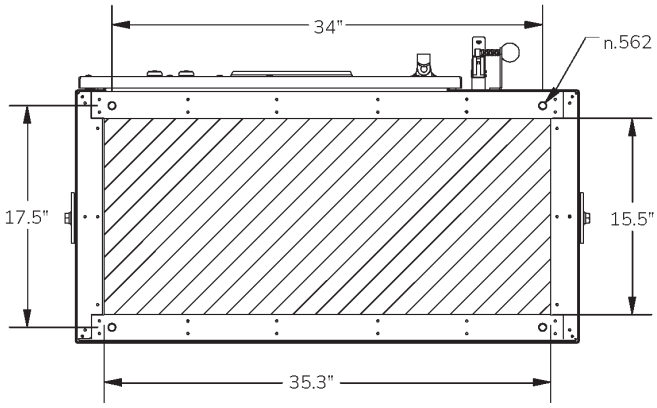


Table 16: Enclosure Dimensions

Height	69.5”
Width	40”
Depth	20”
Approximate Weight	575 lbs.
Cable Entry Dimensions	35.3” x 15.5”

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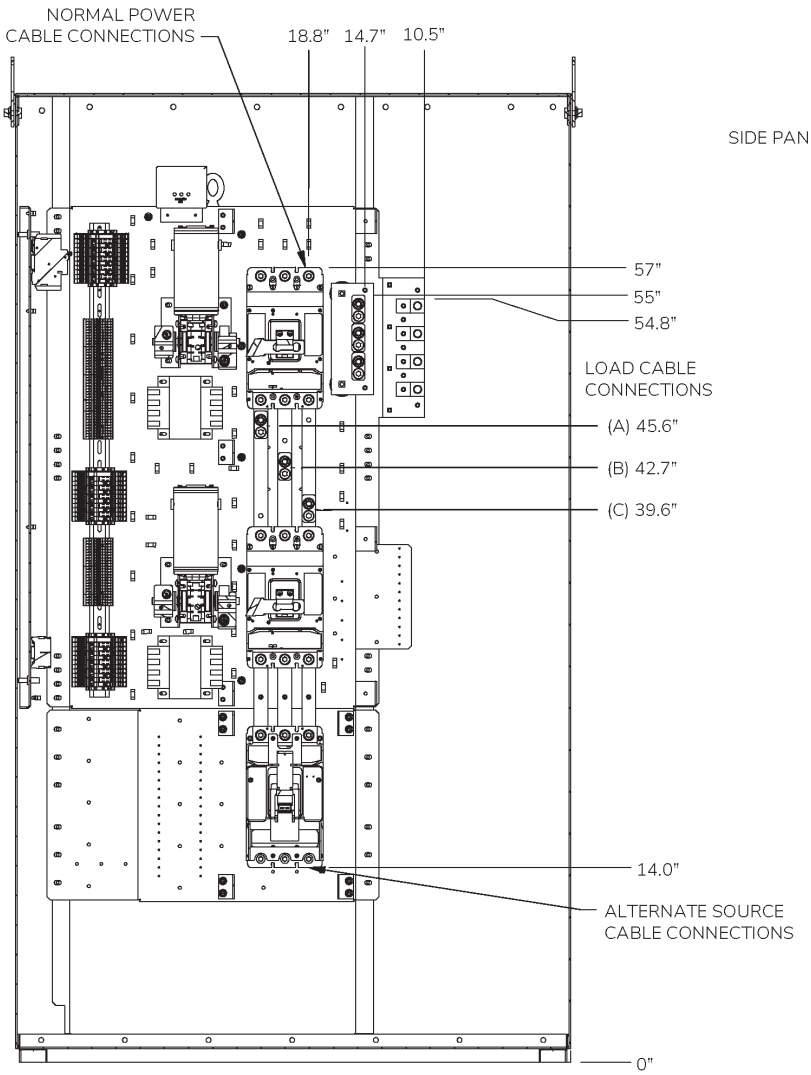
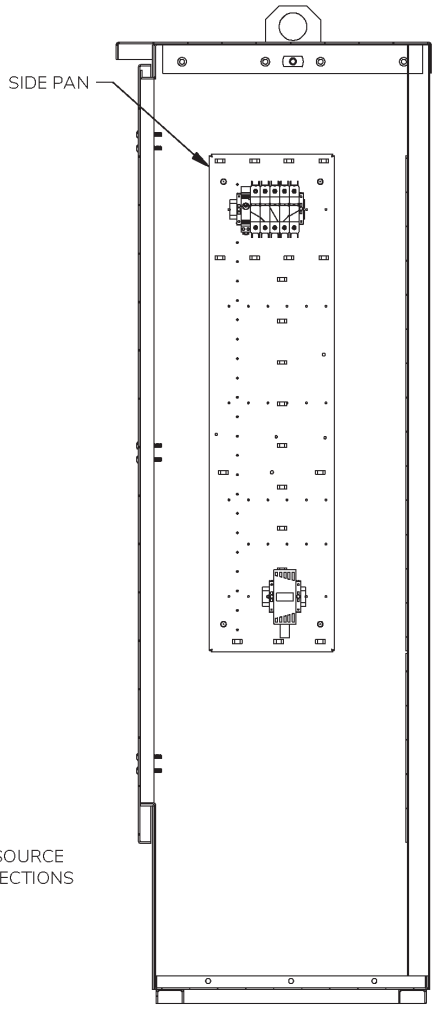
Weights & Dimensions

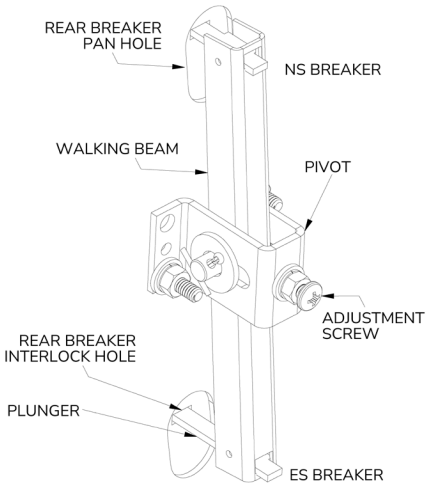
Molded Case Fire Pump (225A - 400A)

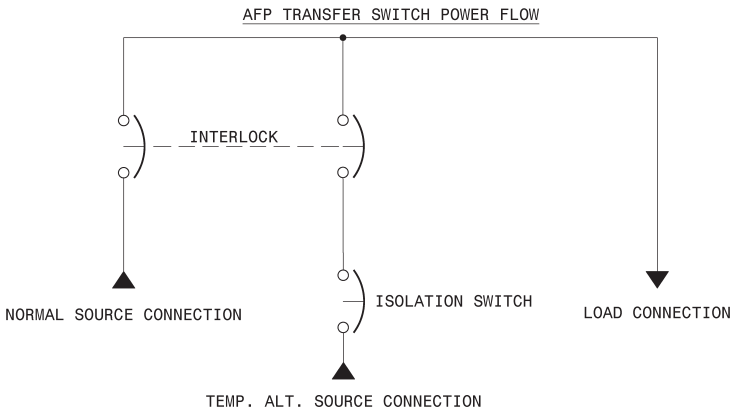
Interior Layout & Dimensions





Walking Beam Interlock & Power Flow Diagram





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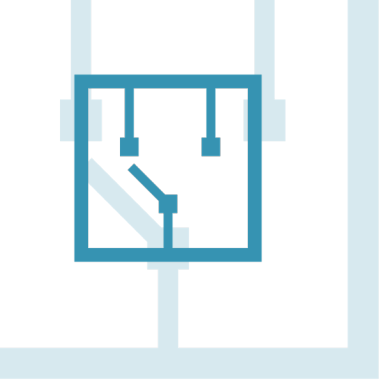
Connection Information

Mechanical Lug Size & Quantity

Table 15: Lug Size & Quantity

Ampacity	Location		Standard Lug	Optional Lug	Ground
225A	Normal Source	Per Phase	(1) #3-350 MCM		(1) #14-1/0
		Neutral	(1) 3/0-350MCM		
	Alternate Source	Per Phase	(1) #3-350 MCM		
		Neutral	(1) 3/0-350MCM		
	Load	Per Phase	(2) 3/0-350MCM		
		Neutral	(2) 3/0-350MCM		
400A	Normal Source	Per Phase	(2) 2/0-250MCM or (1) 2/0-500MCM	(1) 500-750MCM	(1) #6-250MCM
		Neutral	(1) #6-600MCM or (2) 2/0-250MCM	(2) 250-500MCM	
	Alternate Source	Per Phase	(2) 2/0-250MCM or (1) 2/0-500MCM	(1) 500-750MCM	
		Neutral	(1) #6-600MCM or (2) 2/0-250MCM	(2) 250-500MCM	
	Load	Per Phase	(1) #6-600MCM or (2) 2/0-250MCM	(2) 250-500MCM	
		Neutral	(1) #6-600MCM or (2) 2/0-250MCM	(2) 250-500MCM	



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Publication No. DG0100103 V2.08.24