

Operations & Maintenance Manual



Overview

The Littelfuse POWRSwitch[®] LPS series disconnect switch is an integrated power controller designed to meet the requirements of NFPA[®]70 (National Electrical Code[®]), NFPA 72 (National Fire Alarm Code[®]), ANSI/ASME A17.1 (Safety Code for Elevators and Escalators), NFPA 13 (Installation of Sprinkler Systems) and other state and local jurisdiction requirements with regard to AC power for elevators.

The Littelfuse POWRSwitch[®] LPS series disconnect switch may be ordered in 30A, 60A, 100A, 200A or 400A configurations, for 208, 240, 480 or 600VAC (60 Hz), 3 or 4 wire systems. The Littelfuse POWRSwitch[®] LPS series disconnect switch may be configured for use as Service Equipment with the addition of a 2-port ground lug and the appropriate label per NEC 230.66 (option S).

Enclosures are available for the Littelfuse POWRSwitch[®] LPS series disconnect switches which meet NEMA1, NEMA 3R, NEMA 4/4X and NEMA 12 standards.

The Littelfuse POWRSwitch[®] LPS series disconnect switch is designed to interrupt the source of incoming AC power for a single cable or hydraulic elevator, upon a signal from the Fire Alarm Control Panel (FACP). This is primarily to minimize the risk of electric shock, and to prevent impact to the mechanical safety features of an elevator, caused by water released from the fire sprinkler system.

LPS Series POWRSwitch Data Sheet



Standard Features

- 600V 3-pole fuse power switch
- 200,000 RMS interrupting rating
- Shunt trip 120V
- Control power terminal block
- Ground lug per NEC
- Class J fuse block
- NEMA 1 enclosures
- Lockable operating handle

Optional Features

- Control power transformer with fuses and blocks
- Fire safety interface relay
- Key to test switch
- Pilot light "On"
- Isolated neutral lug
- Mechanical interlock auxiliary contact for hydraulic elevators with automatic recall (5 amp 120 VAC rated)
- Fire alarm voltage monitoring relay
- NEMA 3R, 4, and 12 enclosures

Benefits

- Optional features offer flexibility for a variety of applications
- UL Listed package
- Lower installation costs than systems with many separate components
- Pre-wired control circuits lower installation time
- Lockable Operating handle meets all code and safety requirements
- No confusion over which building trade is supplying the components
- POWR-Switch is a single unit, which makes procurement easier than systems with multiple components

The Littelfuse POWR-Switch provides a simple and economical solution for applications that require selective coordination and shunt trip capabilities. Common applications include elevator circuits, data processing rooms, and building emergency systems.

By utilizing Class J time-delay fuses, the POWR-Switch is easily coordinated with other system overcurrent devices. The shunt trip capability allows the POWR-Switch to meet the ANSI/ASME standard that requires power to be automatically disconnected before water is turned on by the fire safety system.

The POWR-Switch also features pre-wired control circuits that can help reduce installation costs. By providing the Littelfuse POWR-Switch, labor costs can be reduced up to 66% and total installation costs lowered by over 30%.

Littelfuse LPS Disconnect Switch



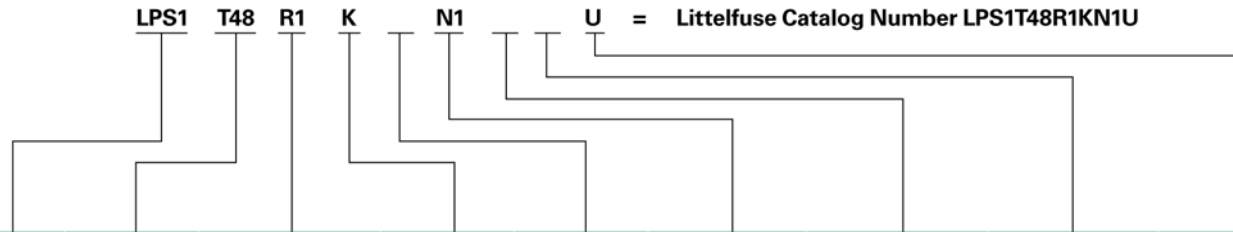
Expertise Applied | Answers Delivered

LPS Series POWRSwitch Data Sheet

Ordering Information

Complete catalog numbers consist of switch catalog numbers and the desired options. See example below.

Example Catalog Number:



Littelfuse Switch Catalog Number		Control Power Transformer Std. 100VA with PRI & SEC Fuse (120V Sec.)			Fire Safety Interface Relay (3PDT, 10amp, 120V)		Key to Test Switch		Pilot Light "ON"		Isolated Neutral Lug		Mechanical Interlock Auxilliary Contact for Hydraulic Elevators w/ Automatic Recall (5 amp 120 VAC rated)		Fire Alarm Voltage Monitoring Relay (To Monitor Shunt Trip Voltage)		Optional Enclosures		
Catalog No.	Rating	Rating	Option Code	Rating	Option Code	Rating	Option Code	Rating	Option Code	Rating	Option Code	Rating	Option Code	Rating	Option Code	Rating	Option Code		
LPS3	30A	208V	T20	24 VDC Coil	R2	120V	K	Red	R	30-60A	N6	1 NO & 1 NC	A	Single Pole	F1	NEMA 3R	U		
LPS6	60A	240V	T24	120 VAC Coil	R1			Green	G	100A	N1	2 NO & 2 NC	B	Three Pole	F3	NEMA 4	Y		
LPS1	100A	480V	T48					White	W	200A	N2							NEMA 12	Z
LPS2	200A	600V	T60							400A	N4								
LPS4	400A																		

Note: Desired options must appear in the order shown above. Typical options include Control Power Transformer, Fire Safety Interface Relay, Mechanical Interlock Auxiliary Contact and Fire Alarm Voltage Monitoring Relay.

Enclosure Dimensions

Catalog Series	Amp Rating	NEMA 1 Dimensions	NEMA 3R Dimensions	NEMA 4, 12 Dimensions	Lug Size
LPS3	30	24"H x 20"W x 9"D	24"H* x 20"W x 8"D	24"H x 20"W x 10"D	#14 - #8 AL or CU
LPS6	60	24"H x 20"W x 9"D	24"H* x 20"W x 8"D	24"H x 20"W x 10"D	#14 - #2 AL or CU
LPS1	100	24"H x 20"W x 9"D	24"H* x 20"W x 8"D	24"H x 20"W x 10"D	#8 - 1/0 AL or CU
LPS2	200	30"H x 20"W x 9"D	30"H* x 20"W x 8"D	30"H x 20"W x 10"D	#6 - 250kcmil AL or CU
LPS4	400	48"H x 36"W x 12"D	Contact Factory	Contact Factory	3/0 AL or CU

Note: Over-size enclosures used to accommodate control power transformer, interface relay and terminal blocks.

*For NEMA 3R enclosures add 2 inches to height for mounting tabs.

Specifications

Approvals: UL Listed and CSA Certified
Rating: 30A, 60A, 100A, 200A, 400A
Shunt Trip Ratings:

Amp Rating	Voltage Rating	Max Inrush	Max Ontime	Momentary Inrush
30-400A	120V, 60Hz	4A	1.5 cycles	140VA

Shunt-Trip Operation

Disconnecting means it is a shunt-trip operated switch. The control power source for the shunt-trip operator is a 120VAC supply originating in the Littelfuse POWRSwitch[®] LPS series disconnect. Current to the shunt-trip device is switched by an isolation relay, which is in turn controlled by the FACP.

The control signal may be either 24VDC from the FACP (option R2) or a “dry” contact closure in the FACP (option R1). In the case of a “dry” contact closure, the sensing voltage is 120VAC originating in the Littelfuse POWRSwitch[®] LPS series disconnect.

CAUTION: When using the “dry” contact closure, option 1, DO NOT supply 120VAC from the FACP, as equipment damage or personnel injury may occur.

A key test option (option K) is available to test the shunt-trip circuit.

Supervisory Indication

Additionally, an optional separate relay can be specified to monitor the 120VAC control power source in the Littelfuse POWRSwitch[®] LPS series disconnect. This relay (option FR) is used to provide supervisory indication of “Control Power Available” as required by NFPA 72 Section 6.15.4.4.

Fuse Table

POWR-Switch Voltage / Transformer Type	Primary Fuses (2)		Secondary Fuse (1)	
	Fuse Type	Fuse Rating	Fuse Type	Fuse Rating
208/120	KLDR.001	1	FLM1.12	1-1/8
240/120	KLDR.500	1/2	FLM1.12	1-1/8
480/120	KLDR.400	4/10	FLM1.12	1-1/8
600/120	KLDR.250	1/4	FLM1.12	1-1/8

Other Options

Optional features include contact closure for control of auxiliary power, i.e. battery lowering/door opening system (options A and B). Support for state of Arizona, Oregon and Texas requirements to prevent “nuisance” fire alarms by over-riding the “Control Power *not* Available” signal when the Littelfuse POWRSwitch[®] LPS series disconnect is manually (intentionally) turned off, and distinctive signaling for ON-OFF-TRIPPED conditions (option AZ).

All Littelfuse POWRSwitch[®] LPS series disconnect switches are UL-Listed and designed for safe access by qualified personnel. When maintenance or shutdown service is required, no energized parts are exposed inside the enclosure when the disconnect switch is manually turned to the OFF position. For proper maintenance safety precautions, always turn off incoming power to the Littelfuse POWRSwitch[®] LPS series switch when possible. When servicing any live electrical equipment, always wear appropriate personal protective equipment.

Power Wiring Torque Specifications

CHARACTERISTICS	LPS3	LPS6	LPS1	LPS2	LPS4
Amps	30	60	100	200	400
AWG	10	6	3	3/0	(2) 3/0
MCCB Mfr.	ABB	ABB	ABB	ABB	ABB
MCCB Catalog No.	S3H150DBBS4	S3H150DBBS4	S3H150DBBS4	S3H225DDDS4	S5H400DWS4
MCCB Lug Type	K4TB	K4TB	K4TB	K4TD	K5TG
MCCB Lug Torque (in lbs)	50 IN LB ¹	50 IN LB ¹	50 IN LB ¹	200 IN LB ¹	275 IN LB ¹
Fuse Block Mfr.	LITTELFUSE	LITTELFUSE	LITTELFUSE	LITTELFUSE	LITTELFUSE
Fuse Block Catalog No.	LJ60030-3	LJ60060-3	LJ60100-3	LJ60200-3	LJ60400-3
Fuse Lug Torque (in lbs)	25 IN LB ²	45 IN LB ²	120 IN LB ²	275 IN LB ²	275 IN LB ²
Neutral Lug Mfr.	LITTELFUSE	LITTELFUSE	LITTELFUSE	LITTELFUSE	LITTELFUSE
Neutral Lug Catalog No.	LS21211	LS21211	LS21211	LS31231	LS455712
Neutral Lug Torque	35 IN LB ²	45-120 IN LB ²	120 IN LB ²	275 IN LB ²	500 IN LB ²
Ground Lug Mfr.	PANDUIT	PANDUIT	PANDUIT	PANDUIT	PANDUIT
Ground Lug Catalog No.	LAMA 1/0-14-Q	LAMA 1/0-14-Q	LAMA 1/0-14-Q	LAMA 250-56-Q	LAMA-350-38-Q
Ground Lug Torque	35 IN LB ³	45 IN LB ³	50 IN LB ³	375 IN LB ³	375 IN LB ³

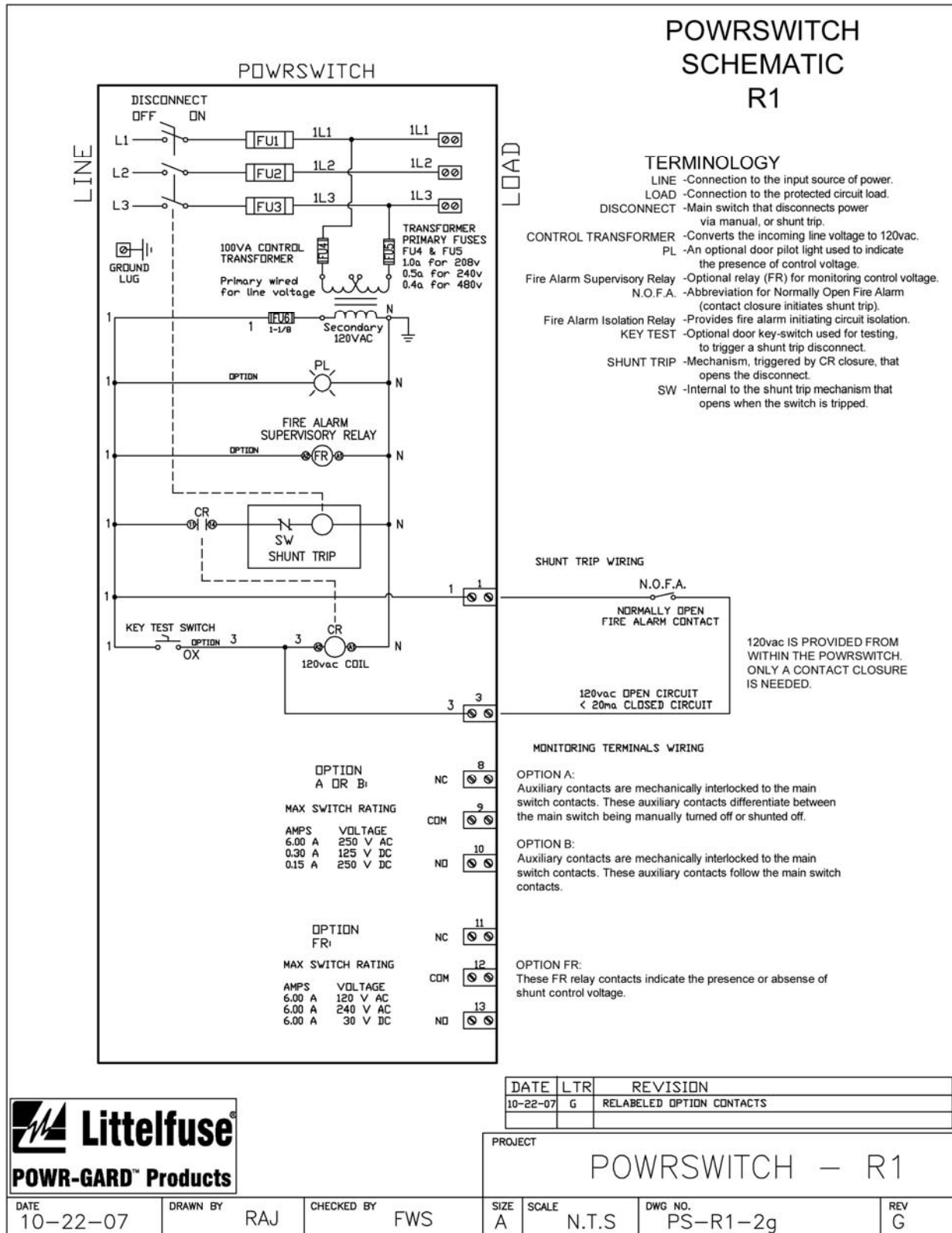
*Torque specs apply only to wire compression screws. Other requirements may exist for attachment of lugs and accessories to these devices. See manufacturer data.

1 - ABB "<http://www.ssac.com/email/lisomax8A.pdf>", pp 2.82, 2.84

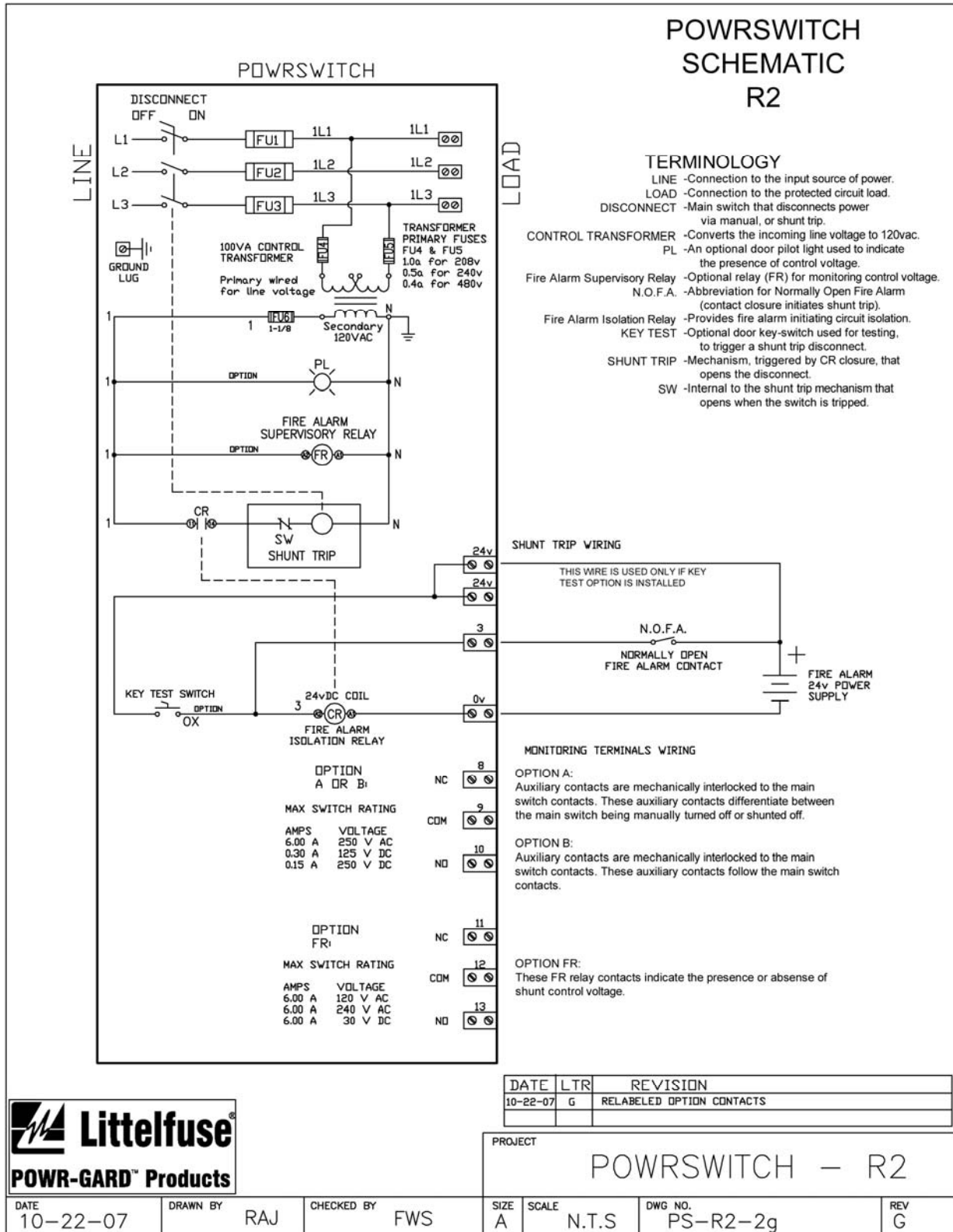
2 - Littelfuse Device nameplate data

3 - Panduit, "Torque Chart for Aluminum Mechanical Connectors"

R1 Wiring Diagram



R2 Wiring Diagram



Maintenance

Below are preventative maintenance measures users can take on the Littelfuse LPS Disconnect Switch.

- Periodically check torque on the wire compression screws in the power circuit. The chart included has the torque values for the various models.
- Annual review of POWRSwitch® is recommended. ABB has no specific maintenance recommendations. Otherwise, preventative maintenance could be done by thermal-scan, either with an IR imager or a non-contact temperature sensor.
- Any unexpected temperature increase, not related to load variations or ambient temperature could signal a problem with lug torque.
- Maximum temperature at any lug should never exceed 75 degrees C under any conditions.
- Clean and periodically dust product throughout the year.

Frequently Asked Questions

1. What UL-Listings does the Littelfuse POWRSwitch® have?

The POWRSwitch® unit is UL-Listed to UL 98. The molded case switch used within the POWRSwitch® is UL-Listed to UL 489.

2. What codes and standards does the Littelfuse POWRSwitch® meet?

The POWRSwitch® meets several NEC, NFPA 72, and ANSI/ASME standards. Please refer to Littelfuse product literature for more details.

3. How does the Mechanical Auxiliary Contact Option (Option A) work?

The “A” Option is a set of auxiliary contacts that are mechanically interlocked to the main switch. These contacts are generally used for auxiliary power interface such as battery lowering. The contacts are used to signal initiation of auxiliary power in the event of power loss. The contact is a single pole, double throw (SPDT) contact. It is important to note that these contacts differentiate between manually turned off or shunted off (refer to the table below).

Main Switch	State of Aux Contacts	
	NO (9 & 10)	NC (8 & 9)
Off	O	X
On	X	O
Shunted	X	O

O = Off X = On

4. How does the Mechanical Auxiliary Contact Option (Option B) work?

The “B” Option is two sets of auxiliary contacts that are mechanically interlocked to the main switch. These contacts are generally used to monitor the status of the switch. The contacts are double pole, double throw (DPDT) contacts. It is important to note that these contacts will follow the state of the switch. (Refer to the table below).

Main Switch	State of Contacts	
	NO	NC
Off	O	X
On	X	O
Shunted	O	X

O = Off X = On

5. How does the AZ Option (Option -AZ) work?

Internal wiring between the molded case switch’s auxiliary contacts and the fire relay’s contacts implements a logic circuit that monitors the availability of shunt trip power. Terminals 15 - 16 close only if the main switch is ON and the shunt trip power fails. They will not close if the main switch is manually turned OFF for maintenance, thus preventing a false alarm. (Refer to table on the next page).

Main Switch	State of Contacts	
	NO (15 – 16)	NC (14 – 15)
Off, Power Avail	O	X
On, Power Avail	O	X
Off, No Power	O	X
On, No Power	X	O

O = Off X = On

6. **Does the instantaneous trip feature built into the molded case switch create the potential to strand passengers when used on circuits with hydraulic elevators and auxiliary battery lowering?**
 The shunt trip mechanism within the switch is utilized, not the instantaneous trip feature of the switch. Even in the event of an instantaneous trip condition, the alarm relay will respond the same as when the switch is shunted off. There is no potential for stranding passengers when Littelfuse POWRSwitch® units are installed with the Mechanical Interlock Auxiliary Contact Option (Option A, battery back-up feature).
7. **During a power loss, will the state of the switch change state?**
 The POWRSwitch® will not change state. However, units installed with the Mechanical Interlock Auxiliary Contact Option (Option A) will distinguish between turned off and shunted off and send a signal accordingly to the fire alarm controller.
8. **How does the POWRSwitch® decide when the elevator needs to be lowered?**
 The Littelfuse POWRSwitch® does not make that decision. The POWRSwitch® provides a signaling means to the fire alarm controller. The fire alarm controller makes all decisions regarding when and where the elevator is to be lowered.
9. **Does the fire safety relay monitor the voltage required by NFPA 72?**
 No, the fire safety relay option (Littelfuse option R1 or R2) does not monitor voltage. Littelfuse offers both a fire safety relay and fire alarm voltage monitoring relay options. The Littelfuse Fire Alarm Voltage Monitoring Relay (F1/F3 option) does meet NFPA 72 (National Fire Alarm Code) requiring control circuits to be monitored for presence of voltage. The Littelfuse unit is wired to sense the voltage available to initiate the shunt-trip. It will change state if a power loss occurs. It does not rely on the shunt-trip itself.
10. **Does the Littelfuse POWRSwitch® require any periodic maintenance?**
 No specific maintenance is required. However, like most electrical equipment, it is always a good idea to periodically check wire connections for proper torque and ensure fuse clips are clean and tight. Please refer to the *Maintenance* section of this document for more details.
11. **How do you hook up the dry contacts for the battery back-up option?**
 This will depend on how the Mechanical Auxiliary Contact (Option A) will be connected. The A Option will follow the ON/OFF of the switch when the handle is in the OFF position. Terminals 8 & 9 will be used when following the NC contacts. Terminals 9 & 10 will be used when following the NO contacts.
12. **Where do you land the power for the shunt trip on the terminal strip?**
 This will vary if using the R1 Option (120 VAC) or the R2 Option (24 VDC). Terminals 1 & 3 will be used for the R1 Option. Terminal 3, 7, & 24 will be used for the R2 Option.

- 13. Where does the fire alarm get connected for monitoring the status of the switch?**
This will vary on which option is being utilized (A or B). Option A will use terminals 8, 9, & 10 (see FAQ answer # 2 for more detail). Option B will use terminals 14, 15, & 16.
- 14. How do I connect to the fire alarm voltage-monitoring relay?**
This is commonly referred to as the FR relay and is Littelfuse Option F1 or F3. Terminals 11, 12, & 13 are used for this purpose.
- 15. If a POWRSwitch[®] is ordered with a wrong component, can the component be changed in the field?**
No. To comply with UL guidelines, product modifications can only be completed by authorized factory personnel. Other modifications will void the Littelfuse UL listing.
- 16. Can the POWRSwitch[®] be used as a service entrance switch?**
The Littelfuse POWRSwitch[®] is UL-Listed per UL 98. Yes, it can be used as a service entrance if properly labeled as such.
- 17. Can the POWRSwitch[®] be fed in reverse with the line from the bottom and load out the top of the switch?**
No, the POWRSwitch[®] will not properly function.
- 18. When connecting the POWRSwitch[®] to the fire alarm, what do you do with the neutral?**
There is no need to tie into the neutral. POWRSwitch[®] units equipped with a Control Power Transformer (CPT) will supply 120 volts.
- 19. Can the POWRSwitch[®] be used in an application where no fire alarm exists and can a smoke detector be connected instead?**
No, this is not in accordance with the fire code.
- 20. Does the FR Relay (Option F1 or F3) change state during a power loss?**
Yes, the FR relay will always change state. The FR relay is designed to monitor voltage that is available for the shunt trip. This is a requirement of NFPA 72.
- 21. Is the operating handle of the POWRSwitch[®] lockable in the "OFF" position only?**
Yes, the handle can only be locked in the "OFF" position and can accommodate a maximum of three padlocks.
- 22. What enclosures are available for the POWRSwitch[®]?**
All ratings of the POWRSwitch[®] come standard with a UL (NEMA) type 1 enclosure. Optional enclosures include UL (NEMA) type 3R, 4, and 12.
- 23. Is a CPT always required in a POWRSwitch[®]?**
In most cases, a CPT will be required to supply the 120VAC for shunt tripping.
- 24. How is the Littelfuse POWRSwitch[®] typically shipped and how much do they weigh?**
The form of shipment will depend on the number of units ordered. Large quantities are typically shipped via truck and smaller quantities shipped via UPS. 30-100 amp units weigh approximately 70 pounds and 200 amp units weigh around 85 pounds. 400 amp units weigh over 200 pounds and can only be shipped via truck.

25. **What kind of fuses does Littelfuse recommend?**

JTD or JTD_ID fuses. The fuse holders installed in the panels are made to accommodate this type of fuse. These fuses afford good short circuit and motor load protection. For fuse sizing see NEC Article 430.52 which says “in a nutshell” motor branch circuit fuses of the time-delay type may be sized for up to 175% of the motor full load amps.

26. **What do I do if the door is stuck?**

If the handle is in the ON position, pointing straight down or at 270 degrees (i.e. south), there should be no problem opening the door after switching it to the OFF position.

If the handle seems to be in the down position, yet slightly to the right, it is a good indicator the MCCB has been shunted (See picture below).



This is easily corrected:

Step 1 – The technician should place their left hand just to the left of the handle with the handle between their index finger and thumb. Then, apply pressure with a majority of body weight.



Step 2 – Turn the handle to the OFF position while maintaining pressure on the door.



Step 3 – Turn the handle back to the ON position while maintaining pressure on the door.



Step 4 – Turn the handle back to the OFF position, while maintaining pressure on the door. At this point the MCCB should be reset in the correct position, with no further hindrances in opening the door.

For more information or if you have additional questions, please contact Justin Lee: jlee3@littelfuse.com.