

SAVING TIME & MONEY WHILE MEETING NEC® CODES & STANDARDS

WITH LITTELFUSE PRE-ENGINEERED SOLUTIONS

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How important is saving time and money to you? How important and how challenging is it to meet all of the ever-changing codes, standards, and other requirements involved in your various electrical systems and applications?

How beneficial would it be to learn about a product or solution that would help solve these problems for you? How about an entire family of pre-engineered solutions, all designed to help simplify your life?

PRE-ENGINEERED SOLUTIONS

Littelfuse offers pre-engineered solutions to help answer these questions. Pre-engineered solutions are pieces of equipment that have been designed as UL Listed, pre-built products, specifically designed to meet the National Electrical Code® (NEC®) requirements involved in many of the systems and applications you are working on. These all-in-one products make procurement easier and quicker, while helping fulfill project specification requirements by offering many flexible options.

All of this makes it considerably easier for consulting engineers, electrical contractors, and electrical inspectors to do their jobs. For the consulting engineer, these products help reduce your system design time with consolidated component selection. Instead of multiple components, a single part number will help solve your problems.

For the electrical contractor, these devices will decrease your installation times by use of their pre-wired circuits.

For the electrical inspector, your inspections can now be simplified with the agency approvals that are inherent to the products' designs.

These pre-engineered solutions can really be a win-win-win for all parties involved.

SOLUTION #1

Elevator Disconnect Switches

Elevator disconnect switches are remote trip disconnects meant for critical distribution circuits such as elevator power supplies, feeders for data processing equipment rooms, and building emergency systems. This solution is the **LPS Series Shunt Trip Disconnect Switch**. These switches are compact and come as pre-assembled, pre-wired single devices for applications requiring selective coordination and shunt trip capabilities.

The LPS Series was designed to provide the user with multiple performance and convenience benefits.

FEATURES AND BENEFITS

- Designed and tested as a UL Listed unit to simplify the inspection and specification process. Gone are the days of individual component testing.
- Control circuits that are already pre-wired will help lower installation times, which in turn, will reduce labor costs.
- Standard enclosure type is NEMA 1, but also available in NEMA Types 3R, 4, and 12.
- Color coded control power terminal blocks offer ease of wiring.
- The listed switch with shunt trip is available on all 30 to 400 amp LPS Series and meets all shunt trip requirements.
- Installed with indicating Class J (JTD_ID) fuses and fuse blocks which allows the LPS Series to be easily coordinated with other system overcurrent protective devices and provides maximum protection with an interrupting rating of 200,000 amperes.
- Has the ability to control the power transformer where multiple options and voltage ratings are available to offer flexibility for a wide variety of applications.
- Saves time and simplifies the ordering process by using just one part number compared to building one of these systems from the ground up with multiple components from multiple suppliers.

As the concept of the elevator disconnect switch caught on and as more and more elevators switches were being used in buildings, the need increased for more switches and functionality in less space.

LPS Series Options & Benefits

OPTION	BENEFIT
Control Power Transformers (208V, 240V, 480V, 600V)	Offers flexibility for a wide variety of applications.
Fire Safety Interface Relay (24VDC Coil & 120VAC Coil)	Allows power to be turned on and off at the Fire Command Center of a building.
Key to Test Switch	Enables personnel the ability to test the circuit.
Pilot Light "On"	Used as a monitoring device to notify personnel that the power is on.
Isolated Neutral Lug	Used to minimize "noise" in the circuit and reduce the risk of harmonics.
Mechanical Interlock Auxiliary Contacts for hydraulic elevators with automatic recall (5 amp 120 VAC rated)	Typically used for lighting circuits or signaling.
Fire Alarm Voltage Monitoring Relay	Used to monitor shunt trip voltage.
NEMA 3R, 4, & 12 Enclosures	Protection for different degrees of environmental conditions.

APPLICATIONS

Many of the typical applications center around the product's ability to provide shunt trip disconnecting to special distribution circuits. This is found on elevator power supplies circuits and feeders for data processing rooms where shunt tripping and selective coordination is desired and/or required. Building emergency systems requiring selective coordination is also a perfect application for these switches.

To better illustrate the sequence of just how and where these products are used in a typical building application, we've developed a brief application animation.

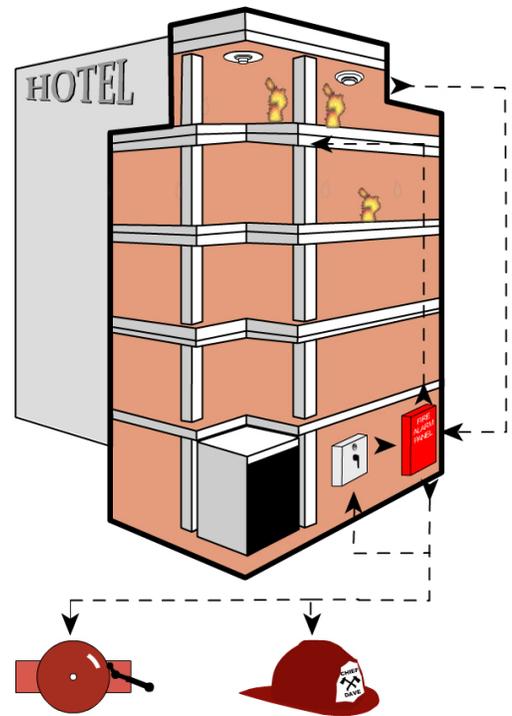
<http://www.littelfuse.com/lps-animation>

First - Fire detection devices detect a fire and send a signal to the fire command center.

Second - The fire command center sends signals out to trigger the fire alarm, contact the Fire Department, return the elevator to the ground floor, and tell the elevator disconnect switch to wait for the elevator to descend to the ground or otherwise designated floor.

Third - Once the elevator reaches the ground floor and opens the door to release any passengers, the LPS Series turns off the power to the elevator.

And Finally - The fire command center then sends a signal to turn on the sprinklers to extinguish the fire.



MEETING CODES & STANDARDS

The LPS Series has been designed to meet all of the necessary Codes and Standards involved with elevators. Included in this list are UL Standards 50, 67, 98, and 891, the National Electrical Code®, NFPA 72 National Fire Alarm Code, ANSI, and ASME.

- UL 50 and UL 98 Standards
- UL 67 Panelboards
- UL 891 Dead Front Switches
- National Electrical Code® (NEC®)
- NFPA 72 – National Fire Alarm Code
- ANSI / ASME A17.1 – Safety Code for Elevators & Escalators

The table to the right briefly shows a few of the more specific codes and standards involved for the switches and panels. For example, ANSI / ASME Standards A17.1 requires power to be automatically disconnected before water is turned on in the building. In the National Fire Alarm Code NFPA 72, various parts of standard 6.15 cover general requirements including voltage monitoring. And the articles listed for the National Electrical Code® provide some of the requirements for system coordination, disconnect means, selective coordination, and emergency and standby power systems.

CODE/STANDARD	REQUIREMENT
ASME / ANSI A17.1	Elevator Shutdown
NFPA 72 - 6.15.4.4	Voltage Monitoring
NFPA 72 - 6.15.2.2, 3, 4	General
NEC 240.12	Electrical System Coordination
NEC 620.51	Disconnecting Means
NEC 620.62	Selective Coordination
NEC 620.91	Emergency & Standby Power Systems

SOLUTION #2

Fuses/Breaker Coordination Panel

The Littelfuse Coordination Panel - or LCP Series - provides a simple, time-saving solution and is designed to help electrical system designers and electrical contractors meet the mandatory requirements for systems required to be selectively coordinated systems. Available in thousands of different configurations, this product provides the user with the design flexibility necessary for ever-changing project schedules. The coordination panel is a UL Listed product that saves time and money, and increases safety by minimizing system downtime.

Why is the coordination panel even needed?

By being a UL Listed product, this panel provides safe and efficient selective coordination to electrical systems. In the event of a fault, only the overcurrent protective device immediately on the line side of an overcurrent opens. As a result, you do not experience a 'domino effect' all the way upstream taking out all of the other protective devices. This added level of protection is required in multiple articles within the NEC®.

LCP SERIES - COORDINATION PANEL

FEATURE	BENEFIT
2 - 42 circuits	Flexibility for multiple applications
120/208, 120/240, 277/480 Volt Ratings	Meets requirements for typical applications
100k Amps Short Circuit Rating	High interrupting rating to accommodate many applications – refer to the datasheet
400 Amp Bus Rating	Meets requirements for typical applications
Branch Circuit Breakers coordinated with Class CC Fuses	Class CC fuses are easily coordinated with upstream circuit protection
Blown Fuse Indication	Assists with troubleshooting
Multiple NEMA Enclosures	Panel board construction to fit needs
Configurable Design	Most requirements can be met

Coordination Panel. The chart shown below was designed to illustrate just what some of those options are. The size of the panel's enclosure allows for flexible wiring configurations for systems containing anywhere from 2 to 42 circuits. In order

to provide your system with the selective coordination required, be sure to select one of the three voltage ratings available, an enclosure type, and the appropriate UL Class CC or Class J fuses to use in conjunction with the feeder circuit breakers.

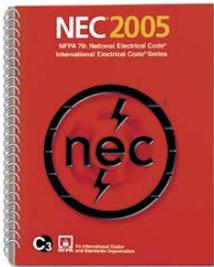
Customizable Options (select one from each column)

NUMBER OF CIRCUITS	VOLTAGE	MAIN DEVICES	NEUTRAL RATING	PANEL MOUNTING	PANEL DOOR	FUSE HOLDERS	BRANCH CIRCUIT PROTECTION DEVICES (1-3 POLE)†	PANEL FEED	OPTIONAL LUGS	STANDARD ENCLOSURE RATING
2 - 42	120/208 V 3P, 4 W	125, 225, 400 or 600 A MLO	100%	Surface	Standard	30 A Class CC	10 A- 60 A fused circuit breaker	Top Bottom	None	NEMA 1
	120/240 V 1P, 3 W	Up to 600 A MCB or Main Fuse Pullout	200%	Flush	Door-in-door	60 A Class J	60 A-200 A fused pullouts		Sub-Fed (MLO panels)	NEMA 3R
	277/480 V 3P, 4 W						Sub-fed circuit breakers >60 A (not fused)		Feed-Through	NEMA 4X

†Fuses quoted separately to meet panel specifications. Coordination for breakers >60 A depends on upstream and downstream devices. More specialized configurations are also available. Contact factory for more information.

CODE REQUIREMENTS

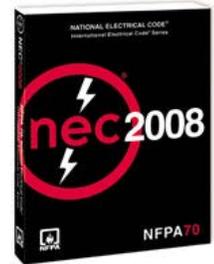
Below are the specific code requirements that are met by the LCP Coordination Panel.



NEC® Article 517.26 covering healthcare Essential Electrical Systems was introduced in the 2005 Code. This covers clinics, hospitals, nursing homes, and many other medical, dental, and healthcare offices and facilities.

NEC® Article 620.82 covering Electric Elevators has been in the Code for a number of years now, but has become more important as these other requirements have been added in recent editions. The elevators section also includes applications involving dumbwaiters, escalators, moving sidewalks, and various types of lifts.

NEC® Article 700.32 (formerly 700.27) involving Emergency Systems was also added in 2005. Based on interpretations by the local authority having jurisdiction, emergency systems would likely include emergency lighting, ventilation, fire detection and alarm systems, elevators, fire pumps, and any sort of industrial process where interruption of the electrical system would be hazardous to the workers or any other persons involved or nearby.



Also incorporated into the 2005 National Electrical Code® was Article 701.27 (formerly 701.18) for Legally Required Standby Systems. This includes heating and refrigeration systems, communications, ventilation and/or smoke removal, and even such applications as sewage disposal or waste water treatment plants.

In the 2008 version of the code, Article 708.54 covering COPS - or Critical Operations Power Systems - was added. These critical systems can add power systems, HVAC, fire alarms, and security systems to the list of possible opportunities for specifying and using coordination panels.

NEC® 2014



Misinterpretation of the Selective Coordination definition in previous versions of the NEC® caused engineers and electrical inspectors to disagree in claiming a circuit was or was not selectively coordinated, based on the type of overcurrent fault condition and the range of operation of overcurrent protection device (OCPD). To clarify this, the definition of Coordination, Selective (or Selective Coordination) in Article 100 of the 2014 NEC® was changed to specify that in order to claim a circuit selectively coordinated, the OCPD used in the circuit must offer full range of overcurrent (overload and short-circuit) protection, irrespective of the duration of operation of the device.

Also added to the 2014 NEC® was the inclusion that other qualified persons engaged primarily in the design, installation, or maintenance of electrical systems (other than the specifying engineer) be involved in selecting and documenting systems for selective coordination. This requirement is included

in Articles 700.32 (Emergency Systems), 701.27 (Legally Required Standby Systems) and 708.54 (Critical Operations Power Systems).

All of these Code sections are intended to limit any problems that may occur in critical circuits before things get out of hand. The last thing anyone wants is for elevators, emergency lighting, or other critical systems to be completely shut down before everyone can be safely evacuated or moved to a safer location.

CODES BY STATE

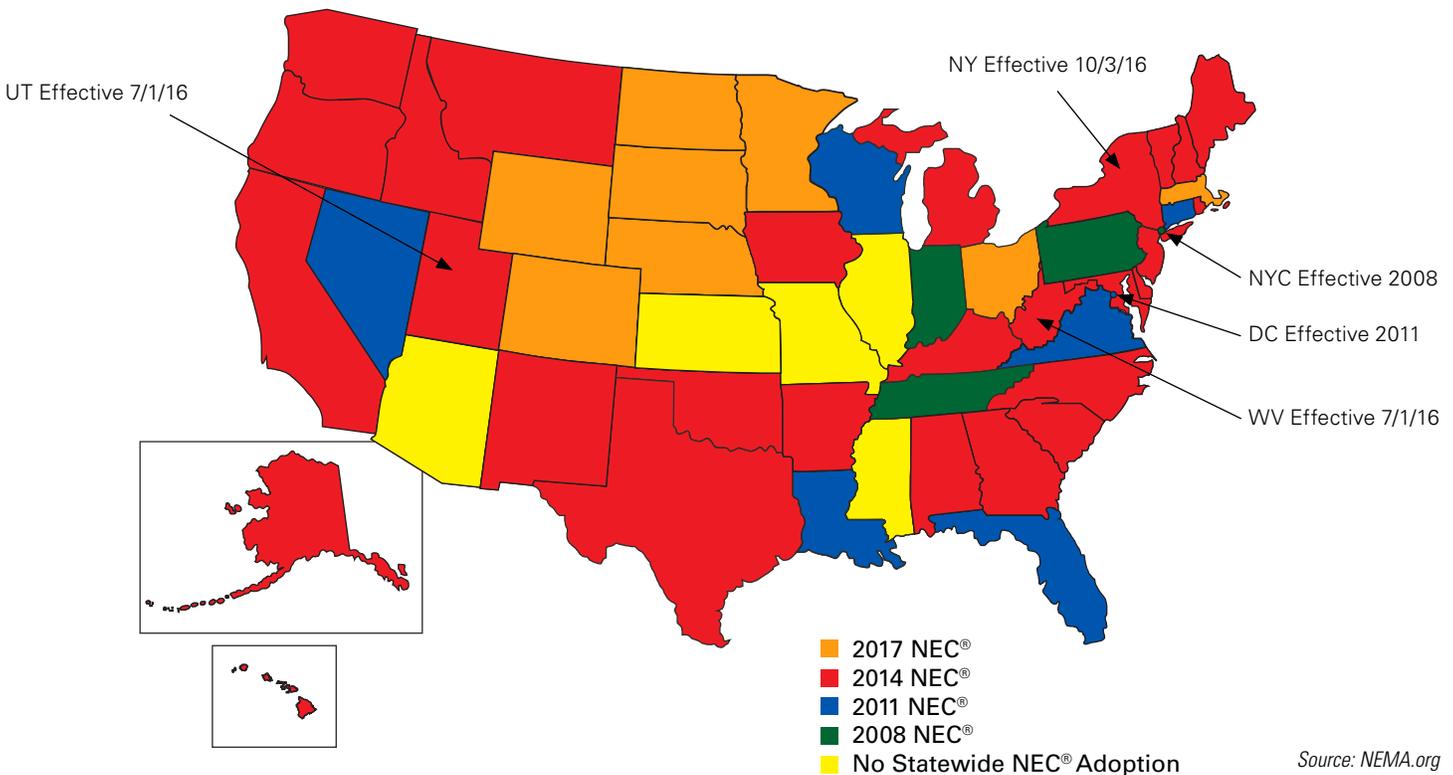
The National Electrical Code® has been adopted in most states or areas as shown by the map below. In many cases, local city, county, or municipality codes supersede the NEC®. However, as this graphic illustrates, most of the country has adopted at

least the 2014 NEC® to thereby include many of the newer Code requirements discussed in this document.

We've introduced you to all the features, benefits, and available options for the two pre-engineered solutions available from Littelfuse. Both of these products offer maximum protection in a package that can easily be coordinated with other system overcurrent protection devices. This helps make everyone's lives simpler and safer by saving time and money while meeting the appropriate and required codes and standards.

Contact Littelfuse technical experts at 800-TEC-FUSE or (techline@littelfuse.com) for questions or additional information. Please visit www.littelfuse.com/panels for complete product information.

NEC® in effect as of July 2017



Dave Scheuerman is the Technical Training Manager of Littelfuse's Industrial Business Unit. Based out of Chicago, IL with more than 26 years of experience in both Sales and Marketing at Littelfuse, he is responsible for all aspects of Littelfuse University including online training courses, videos and sales presentations. Dave is also active in NAED committees along with IEEE and NFPA codes and standards efforts.

Specifications, descriptions and illustrative material in this literature are as accurate as known at the time of publication, but are subject to changes without notice. Visit Littelfuse.com for the most up-to-date technical information.