



# MTS

Manual Transfer Switch

# SPKE

ELECTRIC CONTROLS



### Reliability:

The Spike Electric Controls MTS has double breaking per pole achieved through its sliding bar contacts system.

The quick opening and rapid closure provides simultaneous disconnecting or making of all power contacts.

### Function:

Spike Electric Controls MTS are heavy duty manual transfer switches. They ensure switching transfer of sources or transfer of two low voltage circuits on load as well as their safe disconnection.

These switches are extremely durable and are tested and approved for use in the most demanding applications, such as resistive load or total system applications.

### Conformity to Standards:

- UL 1008 guide WPHY file 317092
  - UL 98 guide WHTY file 201138
  - CSA 22.2#4 class 4651-02
- UL 98 and CSA from 600-1200 A. Specific reference from 100 to 400 A on request

### Typical Application:

The Spike Electric Controls MTS UL 98/1008 range provides safe transfer and disconnection within your LV installation for optional standby systems (as described in NEC Article 702).

Standard applications also include:

- Transfer from Normal power supply to the backup genset source
- (emergency supply).
- Safe on load transfer.
- Changing motor phase rotation and equipment grounding connection



The Spike Electric Controls MTS UL 98/1008 can also be used as switching means to a temporary power supply in emergency systems (systems needed for human safety) as described in article 700.3(F) of the NEC

(see example below "switching means and interlock").

## ADVANTAGES

### Stable Positions:

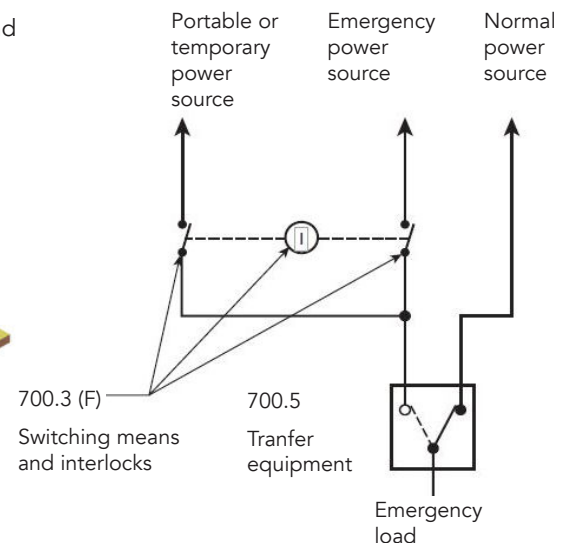
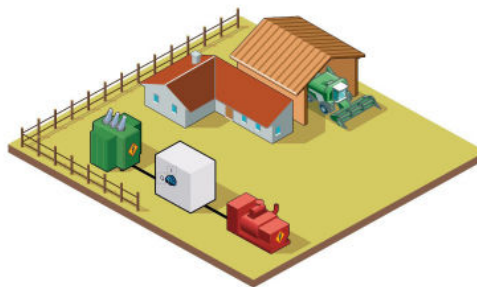
Spike Electric Controls have three stable positions which are not affected by voltage drops or vibrations, thus protecting your load against network interference.

### Compact Design:

The Spike Electric Controls MTS are based on a back-to-back switching technology, providing a compact solution.

### On-load Switching:

The Spike Electric Controls UL enables secure and reliable switching, without the need for pre-breaking upstream.



Example of connection for temporary or portable power (1).

(1) National Fire Protection Agency, NFPA 70: National Electrical Code®. 2017 Edition. Quincy, MA: National Fire Protection Agency, 2016, p. 70–581.



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## Manual Transfer Switch



### Applications:

Manual transfer switches are highly useful for safely connecting generator power directly to your electric systems when there is a power outage. Hard wiring a portable generator directly into your panel & skipping the transfer switch could fry downstream equipment, endanger utility workers who might be working on power lines, or damage your generator.

When operating a manual transfer switch, you can alter the flow of power from the utility company's electric panel to your generator. This eliminates added cost and safety concerns of hardwiring your generator directly into your electrical panel then disconnecting and re hard wiring the main service when it becomes available. Wattage, circuit enclosures, and amperage are important factors to consider when buy a manual transfer switch. Our qualified sales engineers can help you properly size your switch to fit your application.

Spike Electric Controls an ISO 9001 manufacturer offers high-quality manual transfer switches with Amps ranging from 100-3000. There are 2 options for enclosure ratings- NEMA 4X (Water Tight), NEMA 3R (Rain Resistant). These are UL1008 rating switches from from 100-1200A, 1600-3000 Amps are IEC rated.. Spike Electric has designed Non-Service Entrance Rated switches for your manual generator. Based on UL508 through UL508A, manufacturers will assemble and label the package. There is also a double breaking system for every pole of switches. You can find a sliding bar contact with this product. The closure and opening systems are easy to use. It helps in connecting and disconnecting your power contacts.



### Additional Features:

- I-O-II Operation
- Built to NEC National Electric Code
- Built to CSA Canadian Standard Association
- 3 phase & 4-pole switching neutral setup
- Three Phase 240-600VAC
- 100-1200A Switching Device UL1008 rated
- 60-1200A Assembly (UL508A rated)
- Non-fused or Fused Disconnect protection
- Pilot Light Indicator available
- Ground Kits installed
- Cam-Lok Plugs and Receptacles available
- Padlock able Handle for lock out tag out
- Reversal Protection Relay (optional)
- Service Entrance Rating available
- Built per ISO 9001 manufacturing standard
- Increased safety and traceability
- 1 year warranty

### Catalog Number System

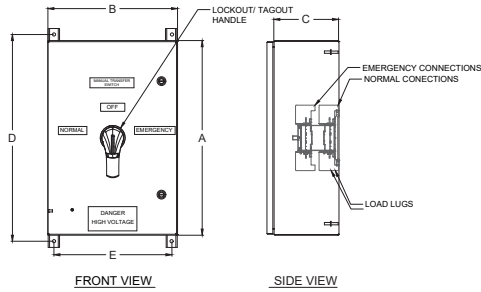
**MTS MTSR NF 100 3 6 SER PRR**

MTS		MTSR		NF		100		3		6		SER		PRR	
Series		Short Circuit Protection		AMPS		# of Poles for Switch		Service Entrance Rated							
MTS	Manual Transfer Switch	NF	Non Fused	100		3		SER	Service Entrance Labled						
		FN	Fusible with solid neutral	200		4		NSER	Non- Serive Entrance Rated						
		SN	Fusible with switched neutral	400											
				600											
				800											
				1200											
				1600											
				2000											
				2500											
				3000											
Enclosure						Voltage Selection									
MTS4X	NEMA4X SS					2 240 Volt									
MTSR	NEMA 3R					4 480 Volt									
						6 600 Volt									

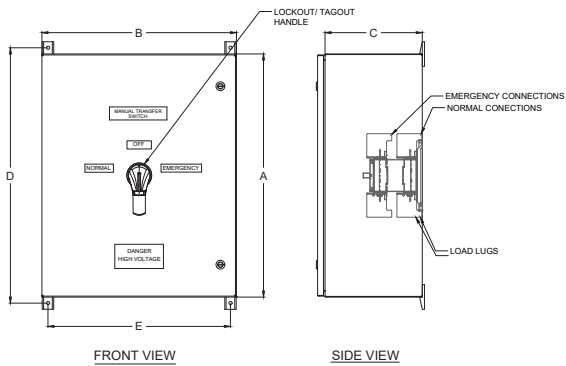


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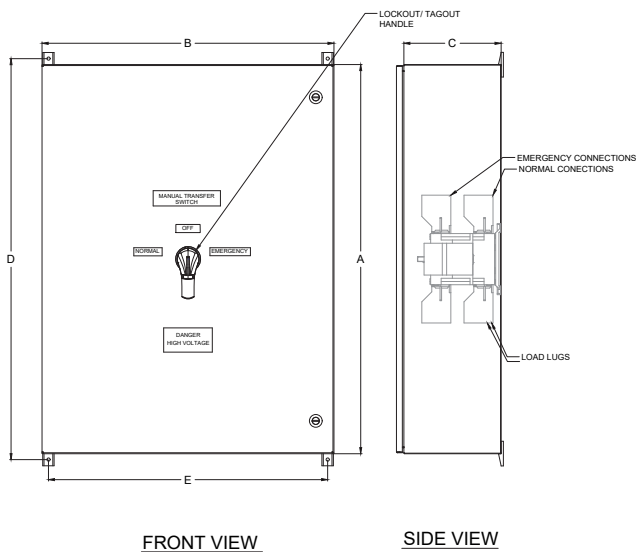
## Manual Transfer Switch



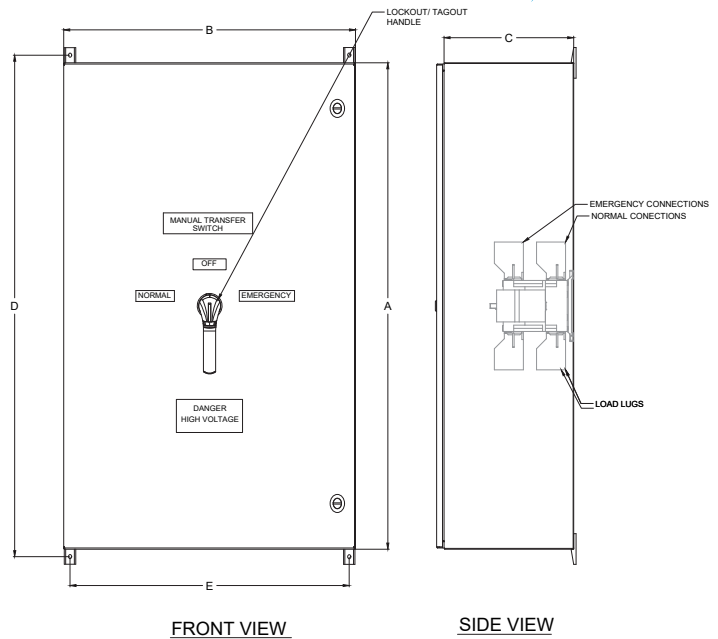
A



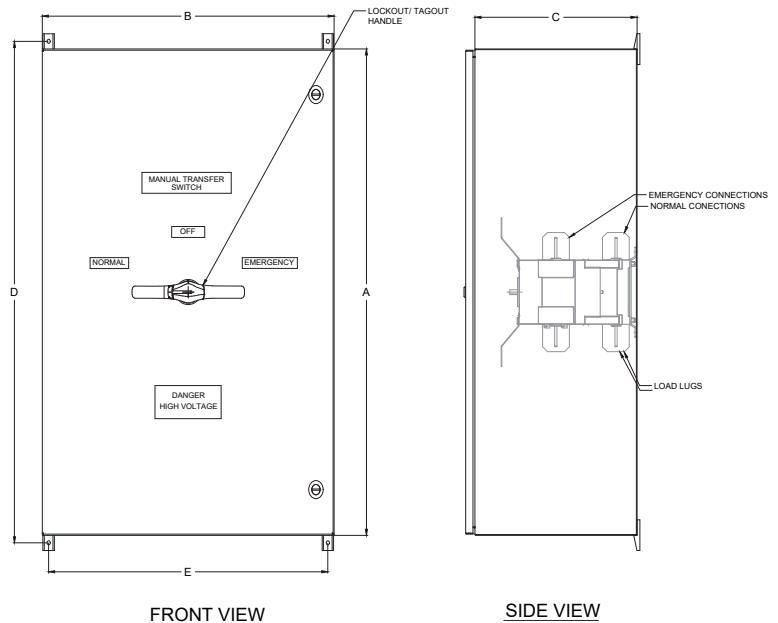
B



C



D



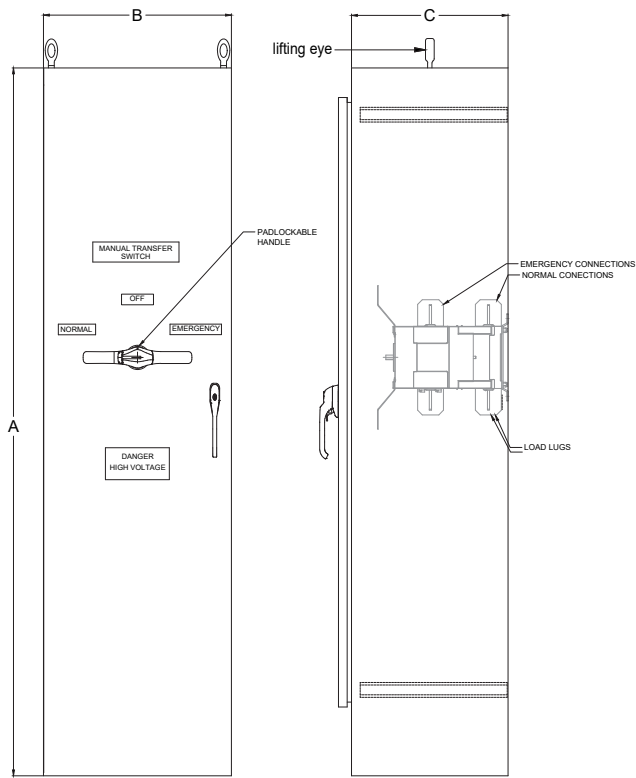
E

Enclosure MTS AMPS	Nominal dimensions in inches			
	FIG	A	B	C
100 & 200	A	36	36	12
400	B	60	36	16
600	C	60	36	24



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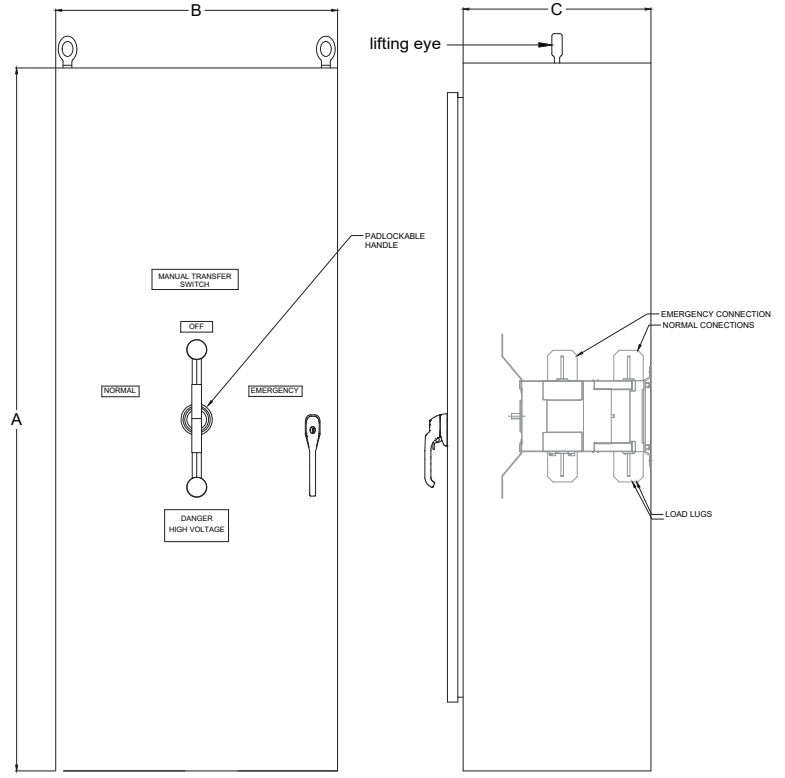
Manual Transfer Switch



FRONT VIEW

SIDE VIEW

F



FRONT VIEW

SIDE VIEW

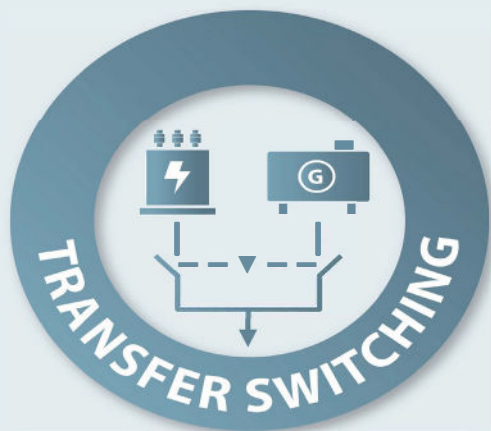
G

Enclosure MTS AMPS	Nominal dimensions in inches			
	FIG	A	B	C
800- 1600	D	90	36	24
2000 - 3000	E	90	36	36

## TECHNICAL NOTE

National Electrical Code®

(NEC) requirements for transfer switching equipment



## Introduction:

The National Electrical Code® (NEC) requires Transfer Switching Equipment (TSE) to be UL 1008 Listed by Underwriters Laboratories and carry the UL 1008 label. The UL Listed TSE can be used in standby systems described in NFPA 70 (National Fire Protection Association) and has to conform to applicable requirements of UL 1008, NEMA ICS 1, and NEMA ICS 2.

In this technical note we will focus on the Articles 700, 701, and 702 of the NEC, these Articles describe the electrical safety of the installation, operation, and maintenance of emergency systems including specific requirements for TSE.

The table below summarizes the scope of each Article:

The 2017 edition of the NEC contains a modification on the specification and use of standby power systems (Article 702), we will go over these changes in this technical note. Note that while the 2017 edition is already in place in many states it is not yet applied in all states. As of July 1, 2018, the 2017 NEC is in effect in 22 states, the 2014 NEC is in effect in 16 states, the 2011 NEC is in effect in 3 states, and the 2008 NEC is in effect in 5 states. The following map summarizes the editions of the NEC used across the United States

Article	Type of installation	Scope
700	Emergency Systems	Power to equipment and lighting essential for the safety of human life
701	Legally required systems	Power to equipment defined as required by municipal, state, federal, or other codes or by any governmental agency having jurisdiction
702	Optional standby systems	Power to equipment which is not essential to human safety

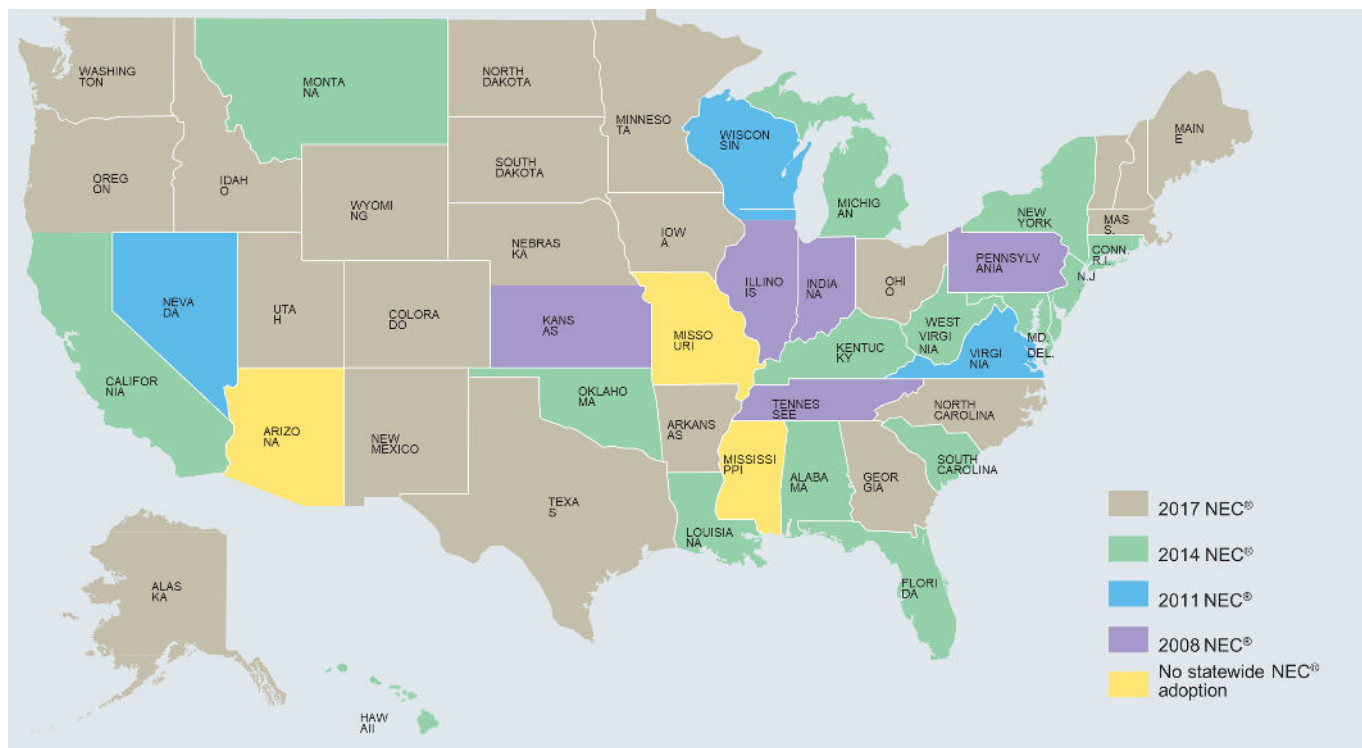


Fig. 1 - National Electrical Code® in effect July 01, 2018 (source NFPA ORG).



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## Manual Transfer Switch



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### Article 700:

#### Emergency Systems:

Article 700 of the NEC covers the electrical safety requirement for the installation, operation and maintenance of circuits and equipment that must be operational to enable the safety of people in public places. For instance, this Article is applicable in establishments such as shopping malls, stadiums, hotels and healthcare facilities.

The circuit and equipment covered in Article 700 are referred to as "emergency equipment". Examples of such equipment could be emergency lighting, ventilations, fire protection systems, public safety communications, industrial processes where interruption could cause health hazards or any other system that could cause harm to the public safety if unable to operate.

Article 700 is divided into 6 parts each addressing a distinct function within emergency systems. The division is done as follows:

- Part I: General Requirements,
- Part II: Circuit Wiring,
- Part III: Sources of Power,
- Part IV: Emergency Circuits,
- Part V: Controls – Emergency Lighting Circuits,
- Part VI: Overcurrent Protections.

In the following paragraph we will detail parts I, III and VI as these segments contain the most specifications for transfer switching equipment.

The most significant addition to Article 700 is the addition to Article 700.3 (part I). This Article states that emergency systems that contain a single source of alternate power supply must be equipped with permanent connection means for a portable or temporary power generator. This has been added to ensure a standby secondary power source even during maintenance or failure of the alternate power source. The permanent connection can be done with a UL 1008 non automatic transfer switch as described in the figure below (from the 700.3(F)).

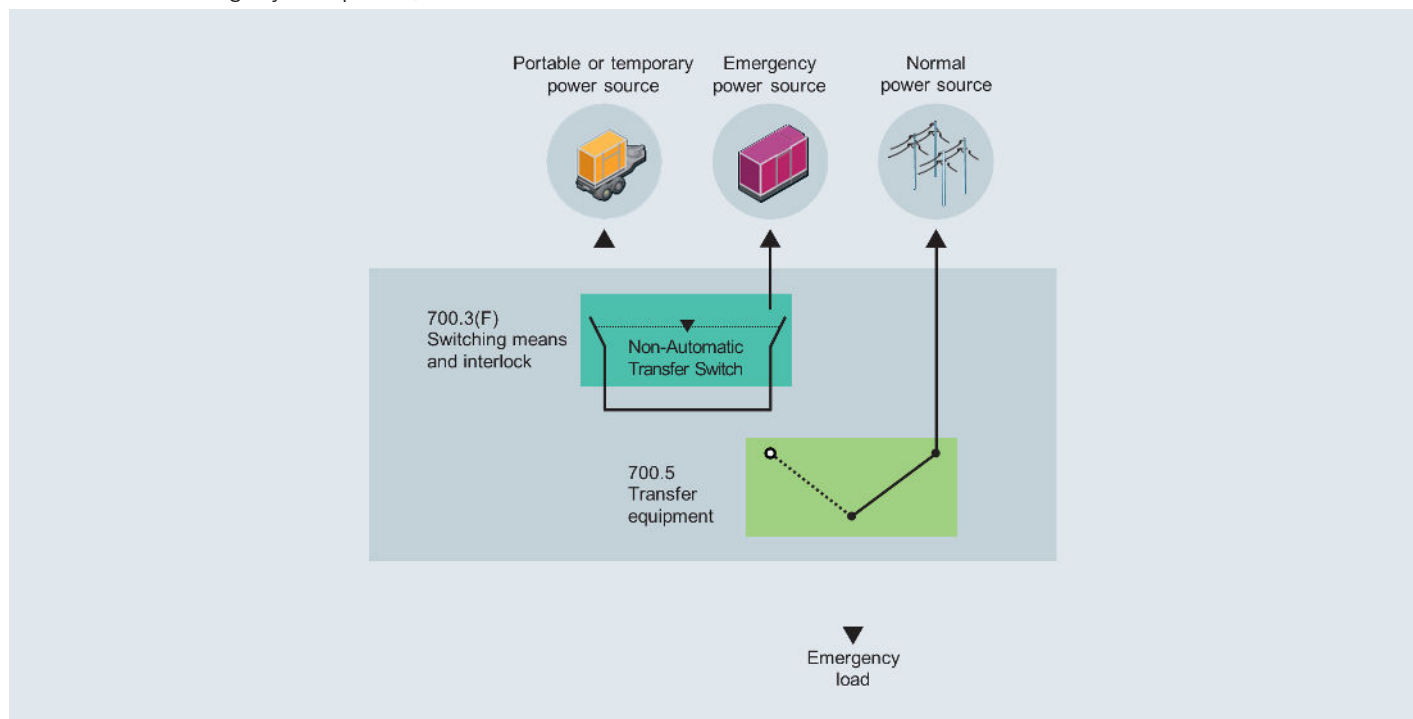
Additionally, 700.3 (F) specifies that this permanent means of connection can also be used to connect to a load bank.

Within part I, 700.4 states that emergency systems must have the necessary capacity and rating so that all loads may be supplied simultaneously and that the system must be suitable for the maximum fault current.

The following Article 700.5 indicates that the transfer equipment is to be automatic, electrically operated, mechanically held and listed as an emergency system. Additionally, the switch should transfer only emergency loads. In terms of fault current capacity for the transfer switching equipment, the switch must be able to withstand the maximum short circuit that the system can deliver until the protection devices operate. The short circuit current value needs to be indicated on the transfer equipment as specified in the UL 1008 requirements.

Part VI specifies that the overcurrent protection must be selectively coordinated with the load overcurrent devices. In other words, the upstream protection should not activate before the protection (fuses or circuit breakers) on the supply side of the installation. ATS with "any breaker" values or "0.5s" short circuit values simplify the task of the licensed professional engineer that must select the protection devices of the emergency system as the ATS will have a limited impact in the coordination considerations.

Fig. 2 - Example of connection for temporary or portable power (National Fire Protection Agency, NFPA 70: National Electrical Code®. 2017 Edition. Quincy, MA: National Fire Protection Agency, 2016, p70-581).





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Switch



## Article 700 cont...

### Emergency systems

700.5 (B) permits the use of means to bypass and isolate the transfer switch so that it may be removed, inspected or tested.

Within Part III, Article 700.12 indicates that the time for the alternate power to be available must not exceed 10 seconds. In other words, the time it takes to detect the loss of source and to start and transfer to the alternate source, must not exceed 10 seconds after the failure of the normal supply. The use of an auxiliary power supply to provide power to the emergency system within the 10 seconds is permitted if the alternate source requires more time to generate power adequate for the loads.

Part VI specifies that the overcurrent protection must be selectively coordinated with the load overcurrent devices. In other words, the upstream protection should not activate before the protection (fuses or circuit breakers) on the supply side of the installation. ATS with "any breaker" values or "0.5s" short circuit values simplify the task of the licensed professional engineer that must select the protection devices of the emergency system as the ATS will have a limited impact in the coordination considerations.

## Article 701:

### Legally required systems

NEC Article 701 covers the electrical safety of legally required equipment. Legally required systems are required by the state, or any government agency having jurisdiction. These systems cannot be essential to human safety as they would otherwise be covered by Article 700. An example of a legally required system would be communication systems used by emergency responders.

Most of the specifications in Article 700 are also valid for Article 701; there are two main variations for transfer switches:

the first variation is that the transfer switch has no obligation to switch only emergency standby systems, it can also be used for optional standby systems. The Article stipulates that the alternate source of power for legal standby systems can be used to supply both standby systems and optional standby systems if it has the adequate capacity or if the installation can provide means of selective loads and load shedding in order to ensure that the legally standby systems are powered correctly, the second variation is the time required for the alternate source to come online, for legally required systems the time for detection, power and transfer is 60 seconds (10 seconds for emergency systems).

## Article 702 - Optional standby systems

Article 702 covers the specifications for the installation and operation of optional standby equipment that are permanently installed and arranged for connection to portable supply. Optional standby systems are defined as systems on which the performance has no impact on human safety. For example, this can cover systems that avoid revenue generating function in businesses such as cash registers, warehouses or datacenter cooling systems.

The main difference from Articles 700 and 701 is that there is no maximum required time for the transfer, this allows for a wider variety of solutions for the installation and when selecting the transfer switching equipment.

Within Article 702, 702.4 authorizes the use of either manual or automatic transfer switches between the normal supply and the alternate power supply. Both manual and automatic transfer switches are required to have the adequate capacity and rating to supply the full load.

## Conclusion:

Spike Electric Controls transfer switching solutions are compliant with the National Electrical Code and are UL 1008 Listed. Available from 100 to 1200A manual or non-automatic, Spike Electric Controls TSE have been designed to offer a safe transfer between a normal and an alternate power source to help users comply with the new requirements of 700.3(F).