

Product Guide



Fike Model
20-1181 EPSMS Base Panel
20-1398 EPSMS Pre-Action
20-1399 EPSMS EPO Only

Emergency Power Shutdown Management System (EPSMS)



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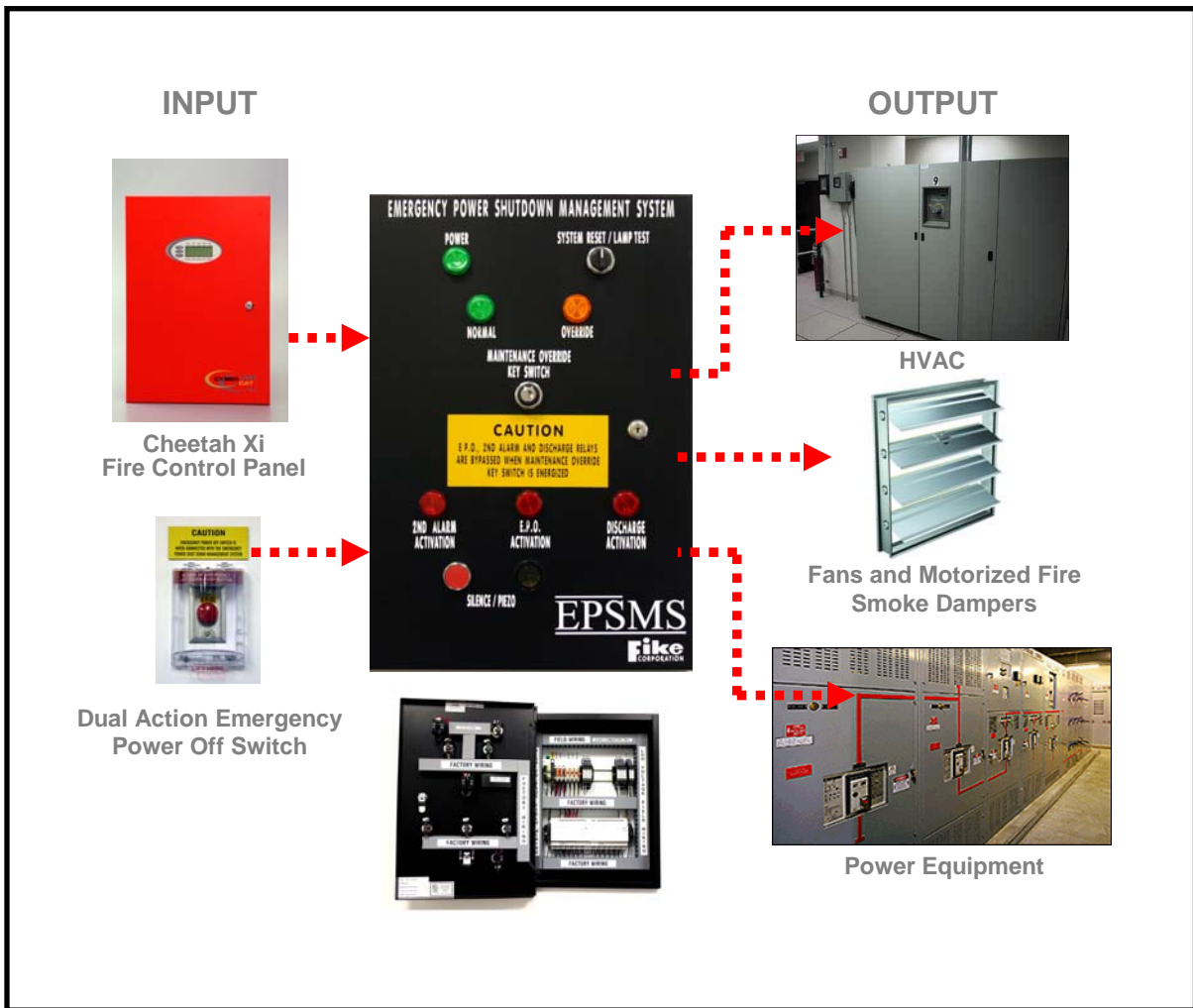
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1.1 Fike's EPSMS (Emergency Power Shutdown Management System)

Fike's EPSMS (Emergency Power Shutdown Management System) is designed to consolidate and control equipment emergency power off in a timely, efficient and coordinated manner. This system improves the reliability of EPO controls—reducing the chance of an accidental activation and expensive interruption to your business. Emergency Power Off (EPO) stations are a safety feature intended to power down information technology (IT) equipment, a datacenter or an entire installation in an emergency such as fire, flood and HVAC failure resulting in overheating of sensitive equipment—thus protecting the facility and personnel. Arguably one of the most important safety features of any IT, data center or equipment room, emergency power off circuitry is increasingly mandated by many local jurisdictions.



EPO Controls – an asset or an accident waiting to happen?

Unfortunately, most emergency power off installations are an afterthought. The EPO is designed, installed and tested in the field at the end of a project, simply to meet minimum code requirements. Often construction documents do not include detailed specifications, standards for quality, wiring

schematics or desired sequence of operation. Consequently, most EPO installations end up as decentralized, independent mechanisms—usually comprised of relays located in j-boxes scattered about the room, access floor and/or above ceilings. Each individual piece of equipment may have to be shut down separately—virtually impossible in times of emergency. In addition, breakers are not easily identified or monitored; wiring diagrams are often not available; and no maintenance bypass switch is installed that would allow an EPO condition to be locked out during routine maintenance. These installations are not easily modified or expanded and are susceptible to expensive false shutdowns.

1.2 EPSMS is used in many applications to:

- De-energize equipment during a fire
- Close fire dampers and turn off ventilation and cooling equipment to contain fire and maintain proper concentration of clean agent fire suppression
- Safely shutdown equipment during a flood or sprinkler system discharge
- Help protect fire department personnel from electrocution when fighting a fire

1.3 Applications

- Data Centers
- Telecommunications Facilities
- Industrial Facilities
- Elevator Machine Rooms
- Water Treatment Plants
- Electrical Rooms
- Anywhere there is a need for emergency power shutdown controls

1.4 *The Solution –The EPSMS*

Fike's Emergency Power Shutdown Management System (EPSMS) addresses all the concerns of a typical EPO installation and effectively consolidates controls and monitors all power off circuits. In addition, the UL-listed EPSMS system greatly reduces the chance of accidental EPO activation and improves your system restart time if the EPO is activated for any reason. That's peace of mind.

- Consolidates controls in one location
- Includes Maintenance Bypass with Lock Out to prevent accidental activation of the EPO when removing the system from override mode
- Segregates the Power and HVAC shutdown within the control system
- Includes thorough documentation, sequence of operation, clear signage and drawings of the entire control system
- Includes dual action locking-type EPO switches with protective cover
- Control panel provides local monitoring and display of functions
- Control panel provides remote monitoring capabilities
- Power to the EPO controls can be monitored by fire control panel as required by NFPA 75
- Can be easily modified or expanded

The Fike EPSMS is offered in three different configurations.

2.1 Model 20-1181 EPSMS Base Panel

This panel is used in an application where a clean agent suppression system is installed. It is designed to be used when the HVAC and power equipment must shutdown at two different times yet when a remote EPO switch is activated all equipment must be shut down simultaneously. In this application, the HVAC equipment and fire smoke dampers are shutdown upon smoke detection. The power equipment shuts down when the fire control panel abort countdown cycle expires and the clean agent is discharged. All equipment shuts down simultaneously if a remote EPO station is activated.

2.2 Model 20-1398 EPSMS Pre-Action

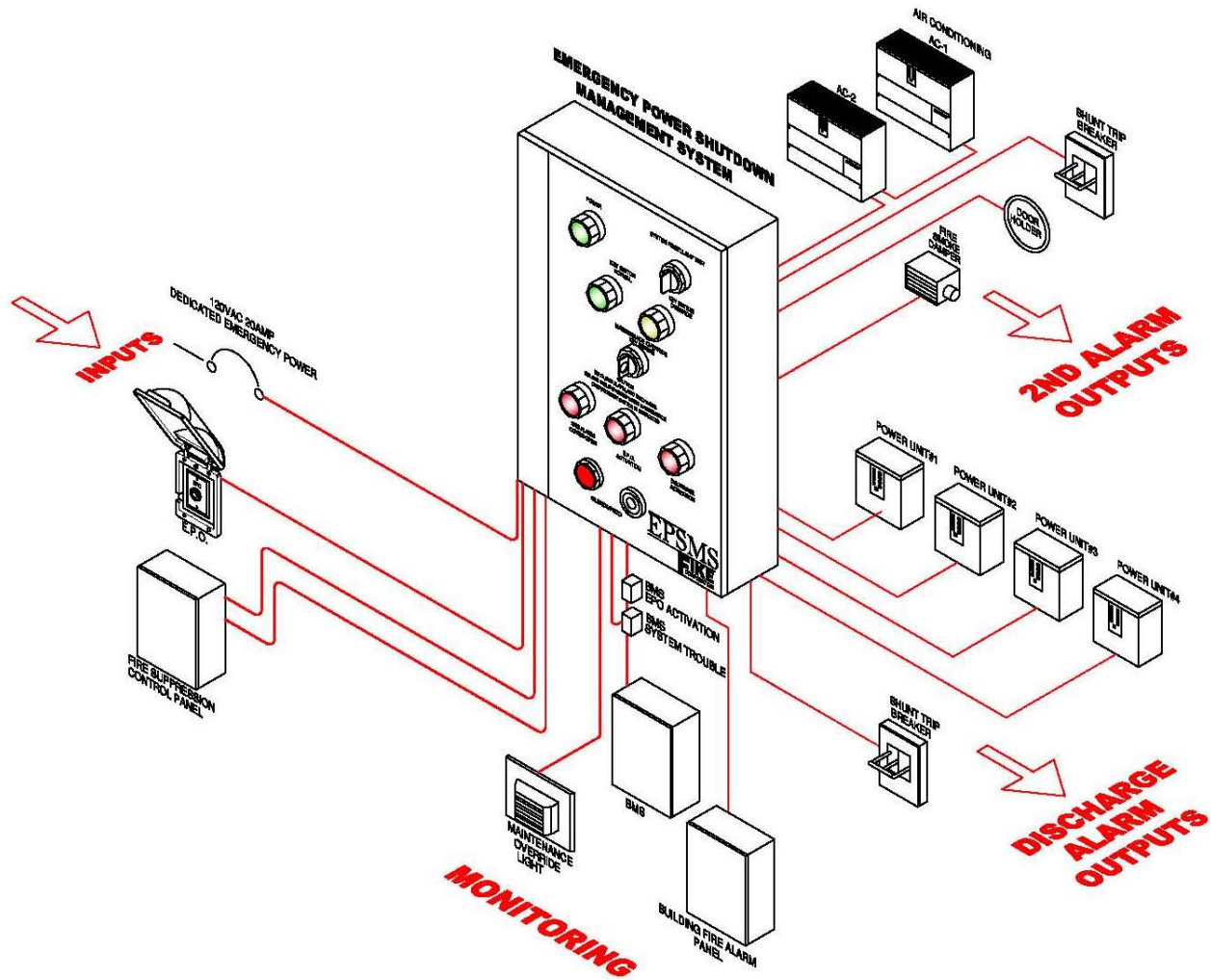
This panel is used in an application where only a wet or pre-action sprinkler system is installed. This panel is designed to be used when the HVAC and power equipment must shutdown at two different times yet when an EPO switch is activated all equipment must be shut down simultaneously. In this application, the HVAC equipment and fire smoke dampers are shutdown upon smoke detection. The power equipment shuts down when the fire control panel determines that the sprinkler water flow switch is activated. All equipment shuts down simultaneously if a remote EPO station is activated.

2.3 Model 20-1399 EPSMS EPO Only

This panel is used in any application where it is required to shutdown equipment when an EPO switch is activated. All HVAC and/or power equipment shuts down simultaneously when a remote EPO station is activated.

2.4 Custom Design Service

In addition to the standard system documentation included in this manual, Fike offers custom design services. The service includes a project specific control riser diagram and scaled floor plan showing point-to-point interconnecting conduit and wiring. Contact the distributor in your area for details.



General Arrangement Diagram

2.5 Panel Location

It is recommended that the EPSMS be located either in the control center or the area that the EPSMS serves.

2.6 Input power

It is recommended that the input power to the EPSMS be a dedicated circuit that will not be shutdown during an EPO or Discharge event. The EPSMS can be ordered with a Dual Input Power Source Part #20-1403 allowing the installer the option of supplying the EPSMS with two different input power sources. When this option is ordered, the EPSMS will automatically switch from power source one to power source two in the event of loss of power from power source one. A system trouble condition is activated upon loss of power from either source.

If additional protection from power loss is required, it is recommended that the Remote Power Supply (24VDC) Part #20-1404 be used. This power source is backed by battery power. See DWG. NO. 20-1404.

2.7 Maintenance Override with LOCK-OUT Feature

The EPSMS is featured with a maintenance override that performs two functions.

1. It inhibits the output relays and shunt trip circuits while the EPSMS is placed in the Maintenance Override Mode.
2. It prevents the EPSMS from being removed from the Maintenance Override Mode if there are any input signals present that would cause the EPSMS to perform a shutdown function.

Most EPO designs include some sort of inhibit capability. However, a properly designed EPO also includes a LOCK-OUT feature that substantially reduces the potential of an accidental EPO activation when conducting EPO maintenance. See Section 4 Operating Procedures for details.

2.8 Output Shutdown Relays

The output relays on the EPSMS are rated 6AMP @250V. The relays can be used for any typical shutdown control application. Because of the high AMP rating they can be used to interrupt direct line power to the damper circuits thus eliminating the need for remote intervening control relays.

2.9 Shunt-Trip Power Circuits

The EPSMS is equipped with an internal shutdown shunt trip power circuit for both the “2ND Alarm” and “Discharge” function. Therefore, there is no need for external shunt-trip circuits. The total available output shunt-trip power is 6AMPS.

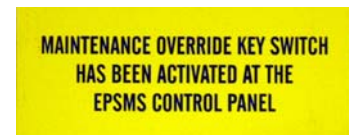
2.10 Keyed Emergency Power Off Station

It is recommended that the Fike EPO stations be used with all EPSMS applications. The Fike EPO station is furnished optionally with a keyed locking button so that the location of the EPO station, if activated, can be easily identified. The button is protected by a clear flip-up plastic cover to prevent the likelihood of an accidental EPO activation. Optionally the flip-up cover can activate a horn. A caution sign is also furnished with EPO station. See DWG. NO. 20-1184 and 20-1402.



2.11 Remote Maintenance Override Light with w/Trim Plate

When the EPSMS is placed in the Maintenance Override Mode, a remote light can be installed that flashes. Light notifies occupants within the protected space that the EPSMS is in the override mode. The light is furnished with a caution sign. See DWG. NO. 20-1383.





2.12 Table 1: Traditional EPO vs. Fike’s EPO Design

Below is a table summarizing a comparison between typical EPO designs and the Fike EPSMS design.

<i>Feature</i>	<i>Traditional EPO Design</i>	<i>Fike’s EPO Design</i>
Shop Drawings	No	Yes
Documented Sequence of Operation	No	Yes
Consolidated Controls	No	Yes
Maintenance Override w/ Lock-Out Feature	No	Yes
EPO Button - Dual Action Locking Type	NOT TYPICAL	Yes
Local Monitoring	No	Yes
Remote Monitoring	No	Yes
Power to Controls Monitored by Fire Control Panel According to NFPA 75	No	Yes
System Test Capability	No	Yes
Quality Control Testing	AT THE JOB SITE	PRE-TESTED AND CERTIFIED PRIOR TO DELIVERY
UL Approved	NO	YES
Posted Restart Procedures	NO	YES

Refer to Ordering Information and the enclosed DWG sheets for details.

3.1 What's in the Box

The EPSMS is shipped from the manufacturer fully assembled and pre-tested. Inside the box is the EPSMS control panel, the Installation, Operation and Maintenance Manual, and panel wiring diagram. Two sets of keys for the control panel, maintenance override keyed switch, and each keyed EPO button (if purchased) are included. The keys to the control panel are taped to the outside of the back box. The maintenance override keys are inside the control panel stored in a black magnetic key holder labeled "Maintenance Override/EPO Keys". The keys for the keyed EPO button (if purchased) are shipped inside the box the EPO switch is packaged in. Optional equipment and accessories may be shipped separately. Verify your order with the packing list and immediately report any discrepancies to the distributor before you install the equipment.

3.2 Mounting the Control Panel

The EPSMS interior controls are mounted on a single back plate that can be easily removed from the enclosure. To remove the back plate, first remove the left and right side panduit covers. Then remove the four Phillips head screws that secure the back plate to back box. Then remove the three nuts and lock washers that attach the door to the back box. The door electronics and the enclosure controls are connected with a wire harness. DO NOT disconnect the wire harness. Instead, remove the door, wire harness and controls/back plate as one assembly and place it in a safe place while mounting the back box.

The EPSMS enclosure can be flush or surface mounted. When flush mounting the EPSMS, be sure that the back box protrudes a minimum of one inch (1") past the finished wall surface to allow proper clearance to re-mount the door assembly. The outside dimension of the door is larger than that of the back box. The door acts as a cosmetic trim when the door is mounted and closed. Be sure to allow for the door clearance when mounting the enclosure.

Conduit penetrations should enter the enclosure from the top, bottom or right side.

Refer to DWG. NO. 20-1386 and 20-1401 for enclosure mounting details.

3.3 Control Panel Terminations

The EPSMS is furnished with panduit raceways dedicated for field wiring. We highly recommend all field wiring be routed through these raceways. Refer to the system wiring diagram DWG. NO. 20-1181 for details.

3.4 Optional Equipment

For the installation details and wiring of optional equipment, please refer to the optional equipment details contained in this manual.

To prevent accidental shutdown of your equipment or damage to the EPSMS, please read all the operating instructions and thoroughly familiarize yourself with the EPSMS BEFORE powering up the EPSMS for the first time.

4.1 Input and Output Sequence of Operation

The EPSMS is designed to operate according to a pre-defined input/output sequence of operation. The Fike EPSMS is offered in three different configurations. They are 20-1181 Base Panel, 20-1398 Pre-Action and 20-1399 EPO Only. Refer to the enclosed sequence of operation table for the control panel you are using.

4.2 Programming

The relay controller on the EPSMS comes pre-programmed with the sequence of operation of EPSMS model purchased. In order to maximize the reliability of the EPSMS, the program logic is standardized and thoroughly tested at the manufacturer prior to shipment. The EPSMS is a defined use control panel. The program is not intended to be modified in the field. Field modification of the relay controller program voids the manufacturer's warranty. Replacement relay controllers are shipped pre-programmed from the factory to match the model and serial number of the EPSMS panel. Submit the model and serial number of EPSMS panel (found on the inside of the door) when ordering a replacement controller.

4.3 Powering Up the Panel

Caution! Always place the EPSMS in the Maintenance Override Mode before applying power to the EPSMS. If any input signals exist when the EPSMS is powered on, and the EPSMS is not in the Maintenance Override Mode, the corresponding output shutdown function will occur. See the following instructions for Placing the EPSMS in Maintenance Override Mode.

When the panel is first powered on, the LEDs on the front panel display will all illuminate and the piezo alert will sound momentarily. After a short startup period, the LEDs will go to the normal state and the piezo alert will turn off.

The green status LED on the trouble relay will remain illuminated. This is the normal condition of the trouble relay.

If the EPSMS is furnished with optional Dual Input Power Source Part #20-1403, there will be four relays located to the left of the main relay controller. Provided both input power sources are present, the green status LEDs located on these four relays will be illuminated. This is normal.

All other relay LEDs will be de-energized and the green status LEDs will not be active.

The green status LEDs on the main and sub relay controllers will flash.

The EPSMS is now in the normal condition and ready to operate. If any input signals are active when the EPSMS is powered on, and the EPSMS is not in the Maintenance Override Mode, the corresponding output shutdown function will occur.

4.4 Keyed Emergency Power Off (EPO) Button Operation

The Fike 20-1184 Keyed Emergency Power Off (EPO) Button is a dual action latching switch. To activate the EPO switch, lift the protective flip-up cover and fully depress the red EPO button. The EPO switch will activate and remain activated (latched) until the EPO button is manually reset. To reset the EPO button, slide the red protective cover on the face of the EPO button out of the way. Insert the EPO key and turn it to the right. The button will release and the EPO switch will return to the normal position. Remove the key and slide the EPO button cover back in place.

The Fike 20-1402 Keyed Emergency Power Off (EPO) Button w/Ext. Horn (optional) operates exactly the same as the 20-1184 with the exception that when the protective flip-up cover is lifted, a notification horn sounds. To stop the horn from sounding, close the protective flip-up cover. Audibly warning the user that the EPO button is about to be activated reduces the likelihood that the EPO button will be activated accidentally.

If an EPO button is used that is not supplied by FIKE, follow the manufacturers operating procedure for the switch used.

To reset the EPSMS after EPO activation, see Resetting the EPSMS After a Shutdown Event.

4.5 Resetting the EPSMS After a Shutdown Event

Caution! Determine the cause of the shutdown event and resolve it prior to resetting the EPSMS to prevent injury to personnel or damage to equipment.

To reset the EPSMS after an alarm event, you must first clear any input signals. The EPSMS is uniquely designed to assist you in quickly locating the source of the shutdown signal. Read the display panel on the front of the EPSMS control panel. If the source of the shutdown signal is the fire control panel you must first clear any alarms from the fire control panel and clear the input signal to the EPSMS. If the source of the shutdown signal is an EPO switch activation you must locate the EPO switch that activated and reset it if the EPO switch is of a latching type. The standard Fike 20-1184 and 20-1402 Keyed Emergency Power Off Buttons are of the latching type. Non-latching EPO switches may be used and can be custom ordered from Fike.

Once the input signal(s) is cleared, the corresponding input LED will begin to flash. Turn the black momentary selector switch in the upper right-hand corner of the panel door to the “system reset” position and release. The flashing input LEDs will turn off and the output relays will reset to normal. The EPSMS is now in the normal mode. You must then restart your equipment following your documented facility restart procedures. Fike is not responsible for your facility restart procedures and makes no representations as the appropriate and safe procedure for restoring power to your equipment.

4.6 Keyed Maintenance Override

From time to time certain work will be conducted in your facility that may cause unintended input signals to be received by the EPSMS that may result in an inadvertent activation of output shutdown signals.

Typical examples are:

- Scheduled functional testing of the fire suppression/fire alarm system
- Adds, moves, and changes to your IT environment such as pulling data cables, modifying electrical conduit and wire, adding or removing partition walls, etc.
- Janitorial work such as cleaning under the raised access floor
- Soldering and welding of HVAC components
- Access to your IT environment by untrained personnel

For this reason, the EPSMS is equipped with a keyed maintenance override switch that can temporarily disable the EPSMS output shutdown functions.

4.7 Placing the EPSMS in the Maintenance Override Mode

To disable the outputs of the EPSMS, insert the key into the keyed maintenance override switch on the face of the control panel and turn it from normal to override. The green "Normal" status LED will turn off and the amber "Override" LED will alternate between flashing and constant illumination in 30-second intervals. The system trouble relay activates when the EPSMS is placed in the override mode. It is recommended that the trouble relay be monitored by the fire control panel or other customer monitoring equipment.

If the optional REMOTE maintenance override notification LED (part # 20-1383 LED120VAC w/white trim) is purchased and installed, the LED will alternate between flashing and solid illumination in 30-second intervals while the EPSMS is in the override mode.

If an input signal is received while the EPSMS is in the override mode, the appropriate input LED will illuminate and the piezo alert will sound. NO OUTPUT SHUTDOWN RELAYS WILL CHANGE STATE AND THE SHUNT TRIP CIRCUITS WILL NOT BE POWERED WHILE THE EPSMS IS IN THE MAINTENANCE OVERRIDE MODE.

4.8 Maintenance Override LOCK-OUT Feature

If an input signal is received while the EPSMS is in the maintenance override mode, the EPSMS WILL PREVENT you from placing it back into the normal mode until the input signal(s) is cleared.

This feature provides a second level of protection against accidental equipment shutdown.

To place the EPSMS back into the normal mode after an input signal is received while in the maintenance mode, first clear the input signal(s).

Note: If you place the keyed override switch into the normal position without first clearing the input signals, the green normal LED will illuminate and the piezo alert will activate. The silence button will not silence the piezo alert. You must first return the keyed switch to the override position and proceed with the following steps in order to clear the input signals and reset the panel.

After the input signal(s) is cleared, the corresponding input LED(s) will begin to flash. Next, turn the momentary selector switch to the “system reset” position and release it. The input signal LED will stop flashing verifying that the input signal(s) is cleared from the EPSMS. You can then return the EPSMS panel to the normal mode. See Removing the EPSMS from Maintenance Override Mode.

4.9 Removing the EPSMS from the Maintenance Override Mode

Verify that no input signal lights are illuminated. If any input lights are illuminated refer to Maintenance Bypass LOCK-OUT Feature. If no input signal LEDs are illuminated, turn the keyed maintenance bypass switch on the face of the control panel from override to normal. The piezo alert will sound. Turn the momentary selector switch to the “system reset” position and release. The green normal LED will illuminate. The system trouble relay will return to normal state. It is recommended that the trouble relay be monitored by the fire control panel or other customer monitoring equipment.

If the REMOTE optional maintenance override notification LED (part # 20-1383 LED120VAC w/white trim) is purchased and installed, the LED will turn off.

The EPSMS is now in the normal mode and if any input signal(s) are received, the EPSMS will function normally.

4.10 Panel Silence

Depress the momentary “Silence/Piezo” button on the face of the panel. The piezo alert will turn off.

In order to ensure the reliability of the EPSMS it is recommended that periodic functional testing be performed twice annually. In most cases, functional testing that includes shutting down your HVAC and power equipment is not practical. As an alternative, below is a description of the recommended maintenance procedures.

5.1 Loss of Power Test

1. Remove input power to the EPSMS by lifting the input power fuse holder located on terminal 3. The system trouble relay will change state (the green status LED on the trouble relay will extinguish). If the trouble signal is monitored remotely, verify the remote monitoring system receives the trouble signal. Replace the fuse holder and the EPSMS will power up. See Powering Up the Panel.
2. If the EPSMS is equipped with the optional Dual Input Power Source Part # 20-1403, repeat Step 1 only this time remove the input power fuse holder located on terminal 6 (alternate input power source).

5.2 Input Functional Test

1. With the EPSMS in the normal condition, place the EPSMS in the Maintenance Override Mode. See Placing the EPSMS in the Maintenance Override Mode. The system trouble relay will change state (the green status LED on the trouble relay will extinguish) and the optional remote Maintenance Override Light Part #20-1383, if installed, will flash.
2. While in the Maintenance Override Mode, functionally test the remote devices that send input signals to the EPSMS such as the fire suppression panel and the EPO stations. Verify that the appropriate LED illuminates on the front panel display.
3. Clear the input signals. See Maintenance Override LOCK OUT feature.
4. Remove the EPSMS from the Maintenance Override Mode. See Removing the EPSMS from the Maintenance Override Mode.

5.3 Lamp Test

To test the panel display LEDs, piezo alert, and the optional remote maintenance override light (LED120VAC w/white trim part # 20-1383), turn the momentary selector switch in the upper right-hand corner of the panel display to the position marked "Lamp Test." Verify all LED's are illuminated and the piezo alert sounds. Release the momentary selector switch and it will return to the normal position automatically. If a defective component exists, place the EPSMS in maintenance mode, power it down, replace the defective component, power up the EPSMS, return the EPSMS to the normal mode, and repeat the lamp test procedure to verify the repair.

Note: The lamp test momentary selector switch does not test the Normal LED when the EPSMS in the maintenance override position. To test all LEDs the EPSMS must be in the normal mode.

5.4 Testing the Optional EPO Station Horn

To test the proper operation of the optional EPO station horn, the EPSMS must be powered up. Place the EPSMS in the Maintenance Override Mode. Then lift up the EPO button flip-up protective cover. The horn will sound. Replace the flip-up protective cover into the normal position and the horn will turn off. Repeat for each EPO station. Remove the EPSMS from the Maintenance Override Mode.

Exhibit 1 EPSMS Sequence of Operation Matrix Model 20-1182 and 20-1398

EMERGENCY POWER SHUTDOWN MANAGEMENT SYSTEM SEQUENCE OF OPERATION FIKE MODEL 20-1181 EPSMS BASE PANEL AND 20-1398 EPSMS PRE-ACTION								
EPSMS OUTPUT SIGNALS/ANNUNCIATION	EPSMS INPUT SIGNAL							
	MAINTENANCE OVERRIDE KEYPED SWITCH IN NORMAL POSITION	FIRE CONTROL PANEL 2ND ALARM ACTIVATED	FIRE CONTROL PANEL DISCHARGE ALARM (or Pre-Action model 20-1398) ACTIVATED	EMERGENCY POWER OFF (EPO) SWITCH ACTIVATED	MAINTENANCE OVERRIDE KEYPED SWITCH IN OVERRIDE POSITION (See Note 1,2,3,4,5)	LAMP TEST SWITCH (MOMENTARY) ACTIVATED (Note: LEDs shall return to normal condition when lamp test button is released)	LOSS OF POWER TO EPSMS CONTROL PANEL	SILENCE BUTTON (MOMENTARY) ACTIVATED
"POWER" GREEN LED ILLUMINATES	●	●	●	●	●	●		
"NORMAL" GREEN LED ILLUMINATES	●	●	●	●		●		
"OVERRIDE" AMBER LED ILLUMINATES					●	●		
"2ND ALARM ACTIVATION" RED LED ILLUMINATES		●				●		
2ND ALARM SHUTDOWN RELAYS ENERGIZE AND LATCH		●		●				
2ND ALARM MOMENTARY (5 SECOND) 120VAC SHUNT TRIP CIRCUIT SHALL ACTIVATE		●		●				
ALL INTERCONNECTED 2ND ALARM EQUIPMENT SHALL DE-ENERGIZE		●		●				
"DISCHARGE (or "PRE-ACTION" model 20-1398)" ACTIVATION LED ILLUMINATES			●			●		
DISCHARGE (or PRE-ACTION model 20-1398) SHUTDOWN RELAYS ENERGIZE AND LATCH			●	●				
DISCHARGE (or PRE-ACTION model 20-1398) MOMENTARY (5 SECOND) 120V SHUNT TRIP CIRCUIT SHALL ACTIVATE			●	●				
ALL DISCHARGE (or PRE-ACTION model 20-1398) EQUIPMENT SHALL DE-ENERGIZE			●	●				
"EPO ACTIVATION" RED LED ILLUMINATES				●		●		
EPO SWITCH MONITORING RELAY ACTIVATED				●				
PIEZO ALERT ACTIVATED		●	●	●		●		
PIEZO ALERT DE-ACTIVATED								●
SYSTEM TROUBLE RELAY ACTIVATED					●		●	
REMOTE AMBER NOTIFICATION LED ILLUMINATES (OPTIONAL)					●	●		

**EMERGENCY POWER SHUTDOWN MANAGEMENT SYSTEM SEQUENCE OF OPERATION
FIKE MODEL 20-1181 EPSMS BASE PANEL AND 20-1398 EPSMS PRE-ACTION**

Notes:

1. When the maintenance override switch is in the override position, the shunt trip circuits, "2nd Alarm Activation" (or Smoke Alarm Activation (20-1398) , "Discharge Activation" (or Pre-Action Activation (for model 20-1398) and "EPO Activation" relays shall remain in the normal position (locked out) regardless of the input signals received to prevent accidental shutdown of equipment.
2. When the maintenance override switch is in the override position, if any input signal is received, the corresponding "2nd Alarm Activation" (or Smoke Alarm Activation (20-1398) , "Discharge Activation" (or Pre-Action Activation (for model 20-1398) and "EPO Activation" LEDs shall illuminate.
3. When the maintenance override switch is in the override position, if any input signal is received then cleared, the corresponding "2nd Alarm Activation" (or Smoke Alarm Activation (20-1398) , "Discharge Activation" (or Pre-Action Activation (for model 20-1398) and "EPO Activation" LEDs shall flash indicating the input alarm condition is cleared. The output relays and shunt trip circuits shall remain locked out.
4. Once the maintenance override switch is in the override position, the system cannot be returned to "Normal" without activating the reset switch. The reset switch "Unlocks" the maintenance override feature.
5. If the EPSMS panel receives an input signal while in Maintenance Override it cannot be returned to Normal mode and reset until all input signals are cleared. This feature provides a second level of protection against accidental equipment shutdown.

Exhibit 2 EPSMS Sequence of Operation Matrix Model 20-1399

EMERGENCY POWER SHUTDOWN MANAGEMENT SYSTEM SEQUENCE OF OPERATION MATRIX FIKE MODEL 20-1399 EPSMS (EPO ONLY)						
EPSMS OUTPUT SIGNALS/ANNUNCIATION	EPSMS INPUT SIGNAL					
	MAINTENANCE OVERRIDE KEYED SWITCH IN NORMAL POSITION	EMERGENCY POWER OFF (EPO) SWITCH ACTIVATED	MAINTENANCE OVERRIDE KEYED SWITCH IN OVERRIDE POSITION (See Note 1,2,3,4,5)	LAMP TEST SWITCH (MOMENTARY) ACTIVATED (Note: Lamps shall return to normal condition when lamp test button is released)	LOSS OF POWER TO EPSMS CONTROL PANEL	SILENCE BUTTON (MOMENTARY) ACTIVATED
"POWER" GREEN LED ILLUMINATES	●	●	●	●		
"NORMAL" GREEN LED ILLUMINATES	●	●		●		
"OVERRIDE" AMBER LED ILLUMINATES			●	●		
ALL EPO EQUIPMENT SHALL DE-ENERGIZE		●				
"EPO ACTIVATION" RED LED ILLUMINATES		●		●		
EPO ACTIVATED SHUTDOWN RELAYS ENERGIZE AND LATCH		●				
EPO ACTIVATED MOMENTARY (5 SECOND) 120VAC SHUNT TRIP CIRCUIT SHALL ACTIVATE		●				
EPO SWITCH MONITORING RELAY ACTIVATED		●				
PIEZO ALERT ACTIVATED		●		●		
PIEZO ALERT DE-ACTIVATED						●
SYSTEM TROUBLE RELAY ACTIVATED			●		●	
REMOTE AMBER NOTIFICATION LED ILLUMINATES (OPTIONAL)			●	●		

*EMERGENCY POWER SHUTDOWN MANAGEMENT SYSTEM SEQUENCE OF OPERATION
MATRIX
FIKE MODEL 20-1399 EPSMS (EPO ONLY)*

Notes:

1. When the maintenance override switch is in the override position, the shunt trip circuits and "EPO Activation" relays shall remain in the normal position (locked out) regardless of the input signals received to prevent accidental shutdown of equipment.
2. When the maintenance override switch is in the override position, if any input signal is received, the "EPO Activation" LED shall illuminate.
3. When the maintenance override switch is in the override position, if any input signal is received then cleared, the "EPO Activation" LEDs shall flash indicating the input alarm condition is cleared. The output relays and shunt trip circuits shall remain locked out.
4. Once the maintenance override switch is in the override position, the system cannot be returned to "Normal" without activating the reset switch. The reset switch "Unlocks" the maintenance override feature.
5. If the EPSMS panel receives an input signal while in Maintenance Override it cannot be returned to Normal mode and reset until all input signals are cleared. This feature provides a second level of protection against accidental equipment shutdown.

Exhibit 3 Ordering Information

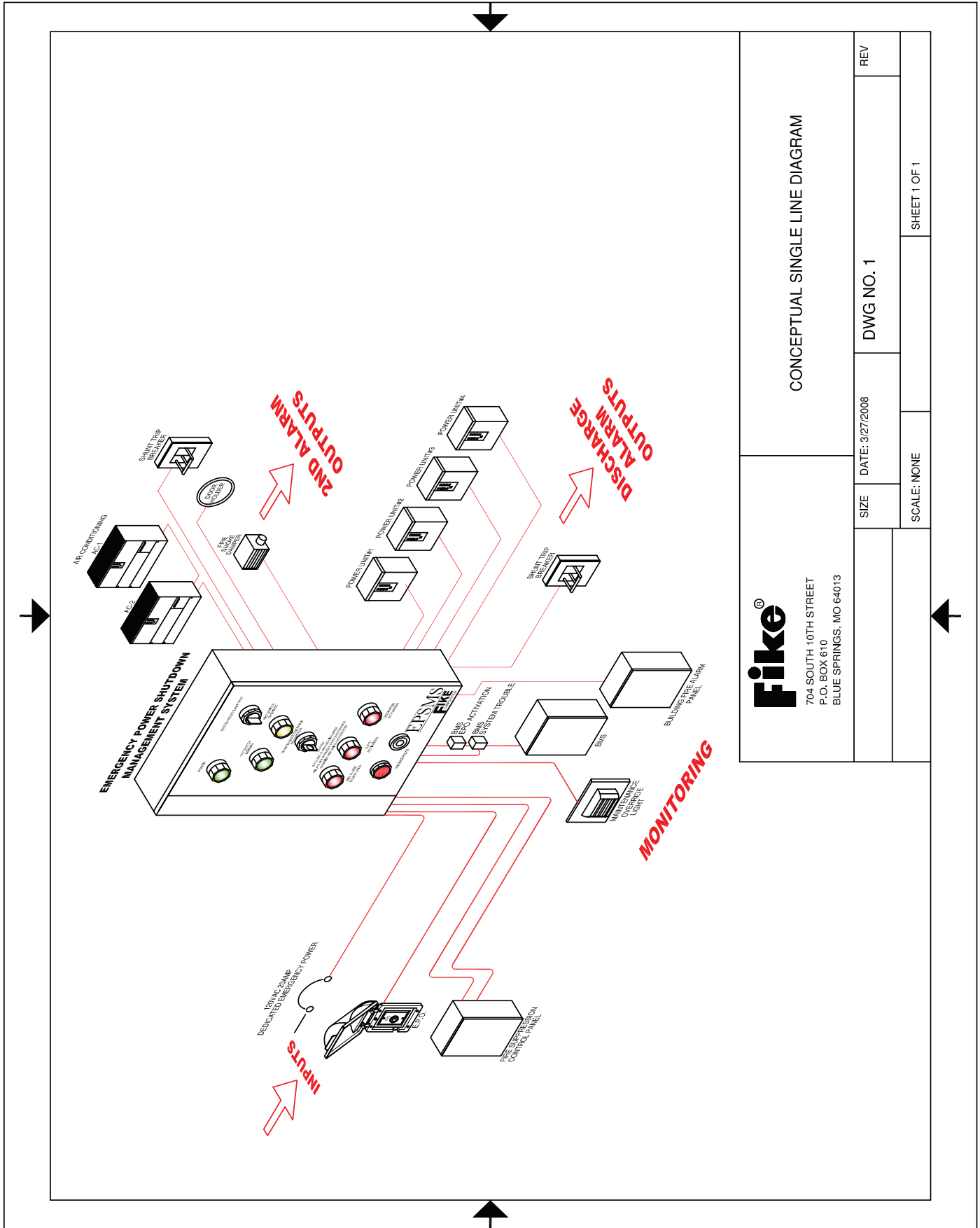
Fike Part #	Description	
	EPSMS Panels	
20-1181	EPSMS Base Panel	Fike
	Enclosure is black NEMA 1 with keyed hinged door. Size is 14 1/2"W X 18 1/2"H X 5"D. Can be installed flush or surface mount.	
	A quantity of eight (8) output contacts rated at 6 AMP 250V are installed as standard. Each contact can be normally open or normally closed. Four (4) contacts activate upon "2nd Alarm Activation" and four (4) contacts activate upon "Discharge Activation".	
	Monitoring contacts are included as standard:	
	System Trouble:	
	Loss of Input Power, Loss of Relay Controller Power, Panel in Maintenance Override	
	Qty (1) normally open or normally closed contact	
	Emergency Power Off Switch Activated	
	Qty (1) normally open or normally closed contact	
	Up to (8) more contacts can be added for a maximum of (18) and can be used for either 2nd Alarm, Discharge, System Trouble, and/or EPO Activated depending on specification of project. See Optional Equipment below. Additional relays over (18) require the use of the large enclosure option.	
20-1398	EPSMS (Pre-Action)	Fike
	This control panel is the same as the base panel but shall be used for Pre-Action Sprinkler and EPO only applications. When this panel is ordered, the "Second Alarm Activation" input and LED is eliminated (can be retained upon request at time of order). The "Discharge Activation" LED label is changed to read "Pre-Action Activation".	
20-1399	EPSMS (EPO Only)	Fike
	This control panel is the same as the base panel but shall be used for EPO only applications. When this panel is ordered, the "Second Alarm Activation" and "Discharge Activation" LED are eliminated.	
	Optional Equipment and Service	
20-1400	Custom Design Services (1 Lot)	Fike
	In addition to standard base system documentation, this service includes project specific control riser diagram and scaled floor plan showing point to point device interconnecting wiring and conduit to all field devices such as EPSMS control panel and accessories and devices to be shutdown by the EPSMS such as Air Conditioning Units, Dampers, and Power Equipment. Drawings furnished in electronic CAD format. Customer to furnish details on the equipment to be shutdown and backgrounds in electronic format. The cost is per EPSMS control panel ordered.	
20-1182	C383 Relay (120V)	Fike
	(single pole each N.O. or N.C.)	
	When placing an order specify how many relays shall activate upon 2nd Alarm, Discharge, System Trouble and/or EPO Activated. Can be added in the field.	
20-1373	C383 Relay (24V)	Fike
	(single pole each N.O. or N.C.)	
	When placing an order specify how many relays shall activate upon 2nd Alarm, Discharge, System Trouble and/or EPO Activated. Can be added in the field.	

	Optional Equipment and Service cont.	
20-1401	Large Panel Enclosure Add	Fike
	Enclosure shall be black NEMA1. Size is 18" W X 23"H X 5"D. Can be installed flush or surface mounted. The large enclosure shall accommodate up to a total of (40) output relays as opposed to the standard enclosure that accommodates (18).	
20-1383	Light 120VAC Amber w/White Trim	Fike
	The remote notification strobe to be activated by power from EPSMS when control panel is put into maintenance bypass mode. Can be surface or flush mounted (back box furnished by others). Voltage to match control panel voltage.	
20-1184	Keyed Emergency Power Off Button (Red)	Fike
	Includes keyed button, flip-up protective cover, key and caution sign. Can be surface or flush mounted to a single gang box (back box furnished by others). Caution sign is yellow with black letters "Caution EPO Switch Interconnected with Emergency Power Shutdown Management System".	
20-1402	Keyed EPO Button (Red) w/Ext. Horn	Fike
	Same as 20-1184 with the addition of a horn. Horn is mounted separately in a two gang box (back box furnished by others) and interconnected with the EPSMS control power and protective flip-up cover micro switch. Interconnecting wire and conduit by others. Horn voltage will match voltage of EPSMS control panel unless specified otherwise.	
20-1403	Dual Input Power Source Add	Fike
	This feature allows the control panel to accommodate two separate 120VAC power input sources. When ordering this feature with the base 120VAC control panel enclosure, due to space constraints the maximum output relays are reduced from (18) to (14).	
20-1404	Remote Power Supply (24VDC)	Fike
	Includes a separate black NEMA 1 enclosure 14 1/2 W" X 14 1/2 "H X 5"D. Batteries included. Can be installed flush or surface mounted. Includes a 6 AMP 120VAC input 24VDC output power supply. The power supply is shipped standard with illuminating LED's on the front panel indicating the presence of "120VAC Source #1", "120VAC Source # 2" and "Power Supply on Battery". An interfacing trouble relay terminal block intended to be connected to the EPSMS trouble signal or customer supplied remote monitoring system. Please be advised that when a 24VDC power supply is ordered, the EPSMS control panel will be manufactured with 24VDC controls instead of the base system 120VAC. Therefore, the output of the EPSMS shunt trip circuit will be 24VDC. If the shunt trip circuit is used, the shunt trip controls on any interfacing shunt trip breakers MUST BE RATED at 24VDC.	

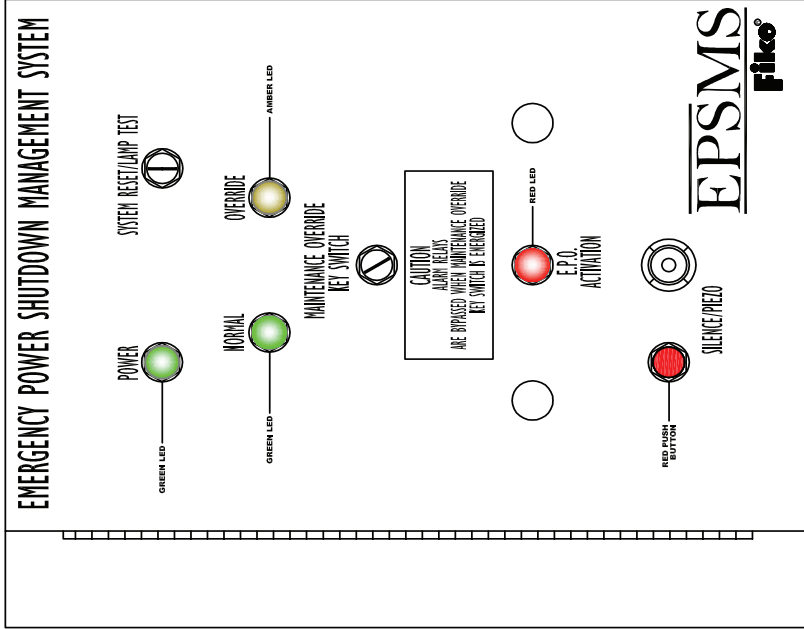
Exhibit 4 Replacement Parts List

Fike Part #	Replacement parts List	
	EPSMS Indicating Lights	
	(Includes LED and Contact Base)	
20-1351	Ind Light Red (120V)	Fike
20-1352	Ind Light Green (120V)	Fike
20-1353	Ind Light Amber (120V)	Fike
20-1354	Ind Light Red (24V)	Fike
20-1355	Ind Light Green (24V)	Fike
20-1356	Ind Light Amber (24V)	Fike
	EPSMS Buttons and Switches	
20-1357	Sel Switch 3 Pos (2NO)	Fike
20-1358	Flush Push Button (Red) (1NO)	Fike
20-1359	Keyed Sel Switch 2 Pos (1NO)	Fike
	Includes Key, Switch, Holder, 1 NO Contact	
20-1360	Contact Block for 2 Pos Switch (1NC)	Fike
20-1361	EPO Cover Surface w/Horn 1 Gang	Fike
20-1362	Momentary Micro Switch	Fike
	EPSMS Terminal Blocks	
20-1363	Terminal Block White (6mm)	Fike
20-1364	Terminal Block Red (6mm)	Fike
20-1365	Terminal Block Blue (6mm)	Fike
20-1366	Terminal Block Black(6mm)	Fike
20-1367	Ground Block Grn/Yel (6mm)	Fike
20-1368	C383 Marking Tags 1-10 (6mm)	Fike
20-1369	C383 Marking Tags 11-20 (6mm)	Fike
20-1370	Disconnect Terminal Block Gray (6mm)	Fike
20-1371	Fused Terminal Block Black (6mm)	Fike
20-1372	End Stop (6mm)	Fike
	EPSMS Relay Controller Parts	
20-1182	C383 Relay (120V)	Fike
20-1373	C383 Relay (24V)	Fike
20-1374	C383 Relay Jumper	Fike
20-1375	EZ Relay Controller (120VAC)	Fike
20-1376	EZ Expansion Controller (120VAC)	Fike
20-1377	EZ Relay Controller (24VAC)	Fike
20-1378	EZ Expansion Controller (24VAC)	Fike
	EPSMS Notification Devices	
20-1183	Beacon 120VAC Amber	Fike
20-1384	Light 24VDC Amber White trim	Fike
20-1380	Piezo Alarm-120VAC	Fike
20-1381	Piezo Alarm-24VDC	Fike

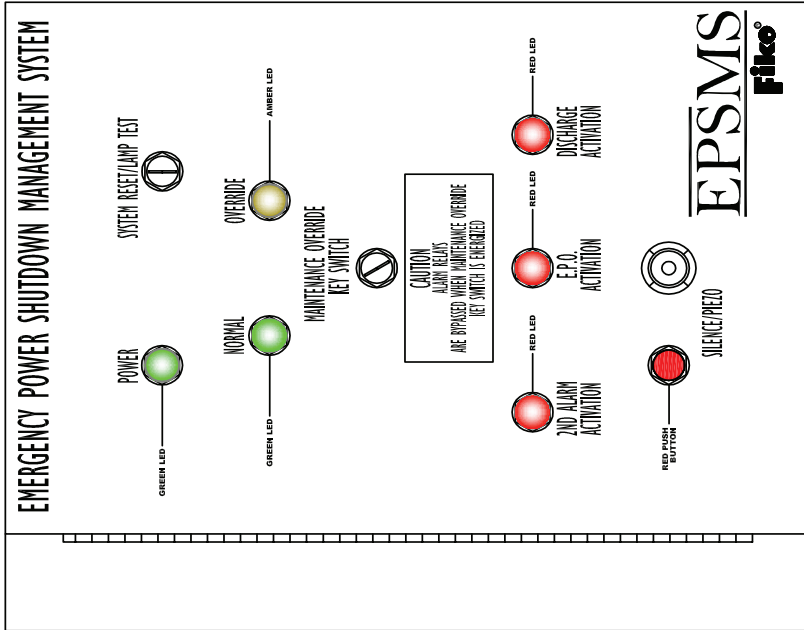
Replacement parts List cont.		
EPSMS Enclosures		
20-1385	Finished Enclosure 14 1/2"W x 14 1/2"H x 5"D (Blk) For use with 20-1404 Remote Power Supply	Fike
20-1386	Finished Enclosure 14 1/2 "W x 18 1/2 "H x 5"D (Blk) For Use with 20-1181 EPSMS Base Panel	Fike
20-1387	Finished Enclosure 14 1/2"W x 18 1/2"H x 5"D (Blk) For use with 20-1398 EPSMS (Pre-Action)	Fike
20-1388	Finished Enclosure 14 1/2"W x 18 1/2"H x 5"D (Blk) For Use with 20-1399 EPSMS (EPO Only)	Fike
20-1389	Finished Enclosure 18"W x 23"H x 5"D (Blk) For Use with 20-1181 EPSMS Base Panel	Fike
20-1390	Finished Enclosure 18"W x 23"H x 5"D (Blk) For use with 20-1398 EPSMS (Pre-Action)	Fike
20-1391	Finished Enclosure 18"W x 23"H x 5"D (Blk) For Use with 20-1399 EPSMS (EPO Only)	Fike
	Finished enclosures are NEMA Type 1. Finished enclosure includes painted finish in satin black, door, hinge, back plate with pre-mounted panduit/cover and DIN rail, pre-punched door with panduit and panduit cover, and door lettering. Specify serial number of replacement panel when ordering replacement enclosures.	
EPSMS Signage		
20-1392	Caution Sign EPO Push Button	Fike
20-1394	Sign Maintenance Override	Fike
20-1395	Sign Horn	Fike
EPSMS Spare Parts Assemblies		
20-1396	Horn Assembly Gray (120VAC)	Fike
	Horn Assembly includes horn, trim plate, and adapter plate	
20-1397	Keyed Selector Switch	Fike
	Keyed Selector Switch Assembly includes 2 position keyed switch, key, relay holder, 1 NO and 1 NC Contact block	



<p>Fike® 704 SOUTH 10TH STREET P.O. BOX 610 BLUE SPRINGS, MO 64013</p>		<p>CONCEPTUAL SINGLE LINE DIAGRAM</p>	
		<p>DATE: 3/27/2008</p>	<p>DWG NO. 1</p>
<p>SIZE</p>	<p>SCALE: NONE</p>	<p>SHEET 1 OF 1</p>	<p>REV</p>



MODEL 20-1399

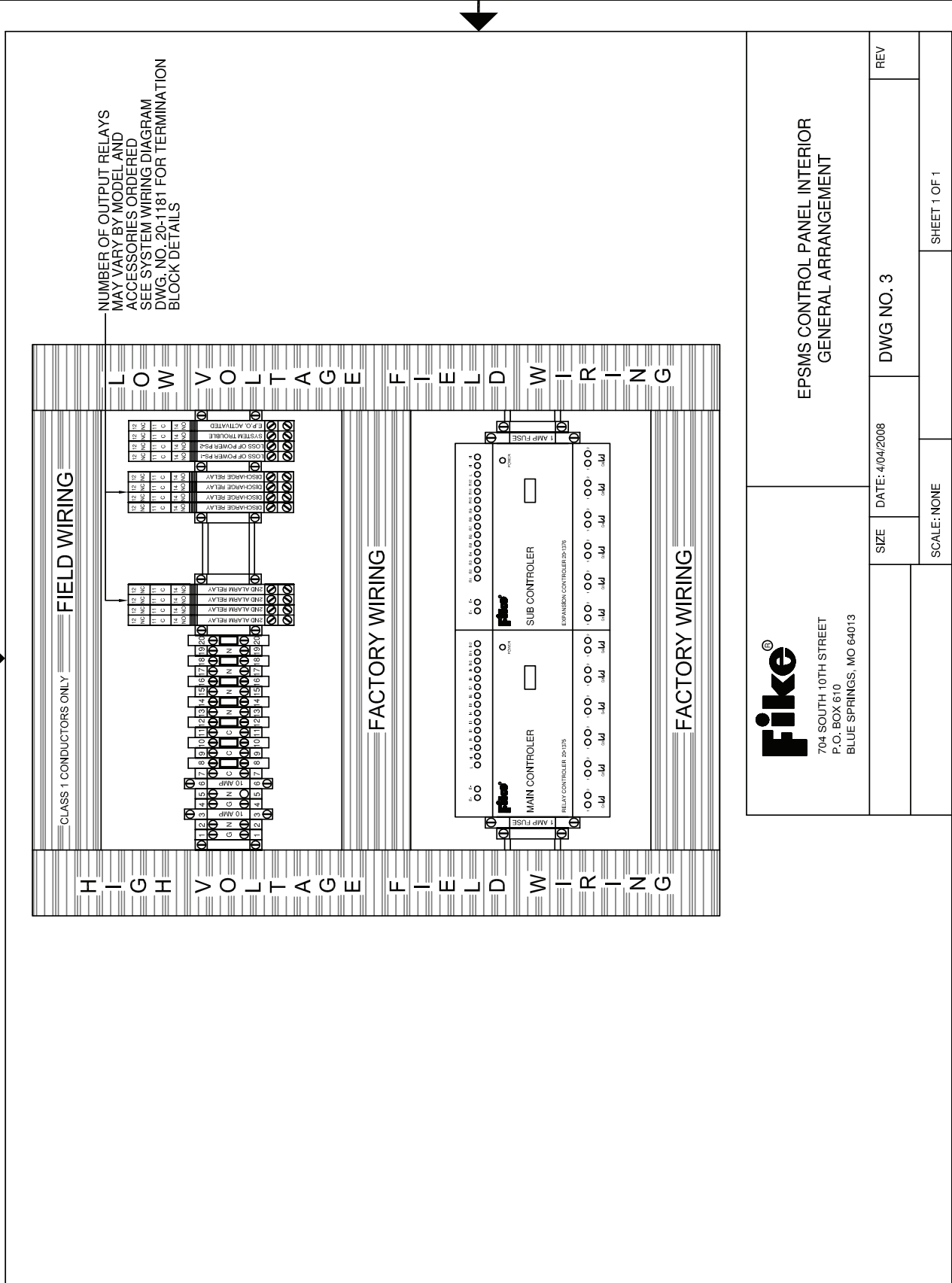


MODEL 20-1181, 20-1398

NOTE: MODEL 20-1398 "DISCHARGE ACTIVATION" IS CHANGED TO "PRE-ACTION ACTIVATION" "2ND ALARM ACTIVATION" LED IS REMOVED

ON MODELS WHERE LED IS NOT INSTALLED A BLACK PLASTIC CAP IS INSTALLED ALLOWING FOR FUTURE UPGRADES

<p>704 SOUTH 10TH STREET P.O. BOX 610 BLUE SPRINGS, MO 64013</p>		EPSMS PANEL FRONT	
		DATE: 3/27/2008	REV
SIZE	DWG NO. 2	SHEET 1 OF 1	
SCALE: NONE			

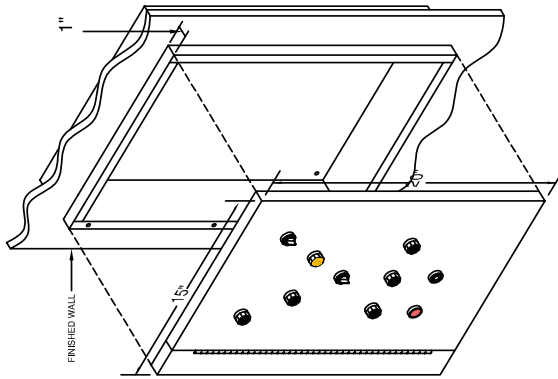


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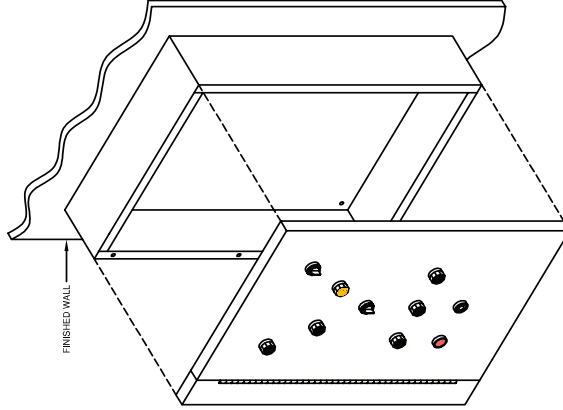
EPSMS CONTROL PANEL INTERIOR
 GENERAL ARRANGEMENT

SIZE	DATE: 4/04/2008	DWG NO. 3	REV
SCALE: NONE		SHEET 1 OF 1	

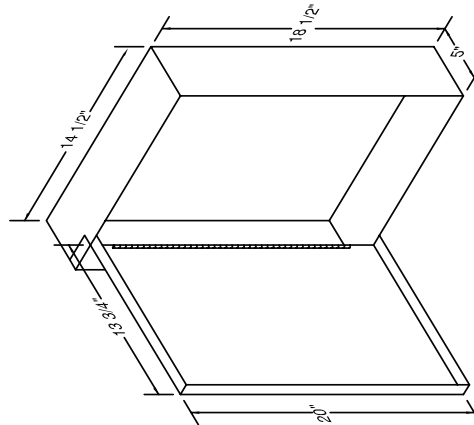
EPSMS BACK BOX MUST PROTRUDE OUT 1" PAST FINISHED WALL, TO ATTACH PROPERLY TO THE EPSMS DOOR



FLUSH MOUNT
EPSMS CABINET MOUNTING DETAIL
NO SCALE:

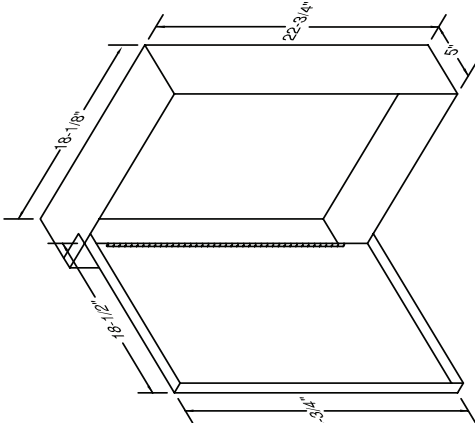


SURFACE MOUNT
EPSMS CABINET MOUNTING DETAIL
NO SCALE:

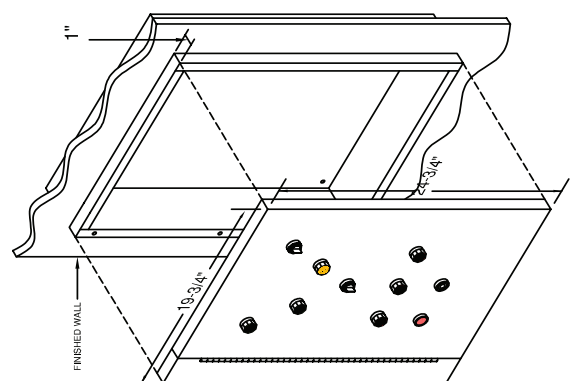


EPSMS CABINET DIMENSIONS
NO SCALE:

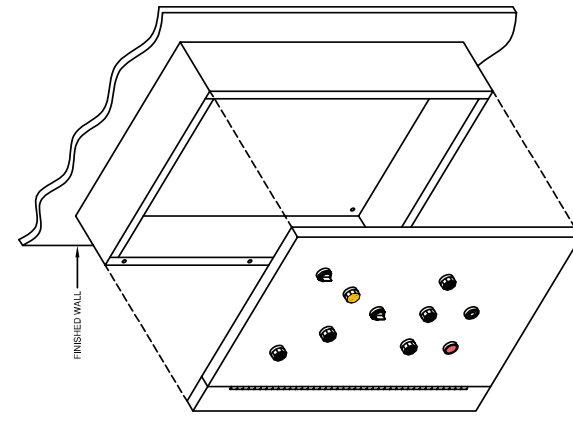
<p>704 SOUTH 10TH STREET P.O. BOX 610 BLUE SPRINGS, MO 64013</p>	<p>EPSMS STANDARD ENCLOSURE (INCLUDED WITH EPSMS CONTROL PANEL 20-1181, 20-1398, 20-1399)</p>		REV
	<p>DATE: 3/19/2008</p>	<p>DWG NO. 20-1386</p>	
<p>SIZE</p>		<p>SCALE: NONE</p>	<p>SHEET 1 OF 1</p>




EPSMS CABINET DIMENSIONS
NO SCALE:



**FLUSH MOUNT
EPSMS CABINET MOUNTING DETAIL**
NO SCALE:

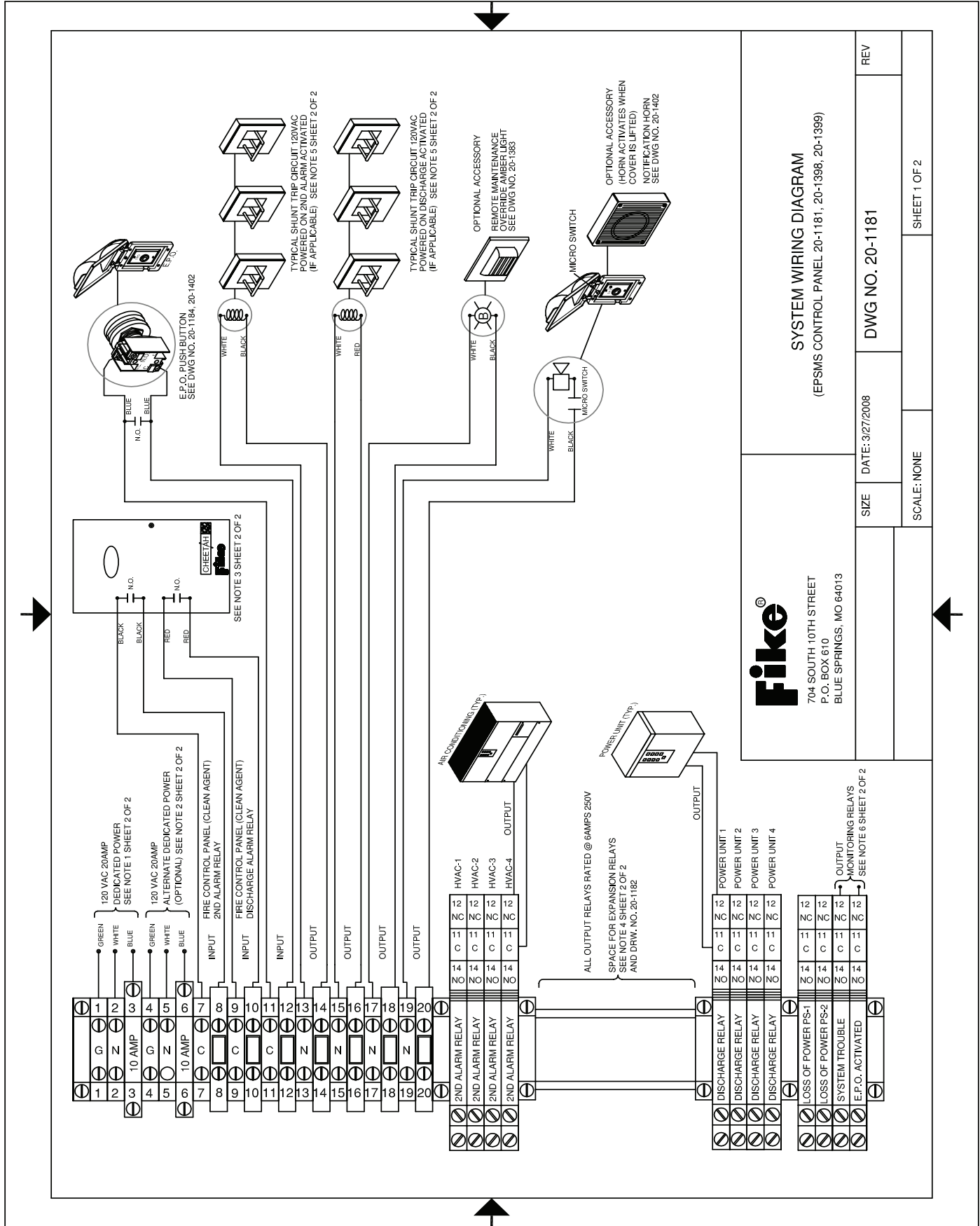


**SURFACE MOUNT
EPSMS CABINET MOUNTING DETAIL**
NO SCALE:



EPSMS LARGE ENCLOSURE
(OPTIONAL UPGRADE)

DATE: 3/19/2008	DWG NO. 20-1401	REV
SCALE: NONE		SHEET 1 OF 1



NOTES:

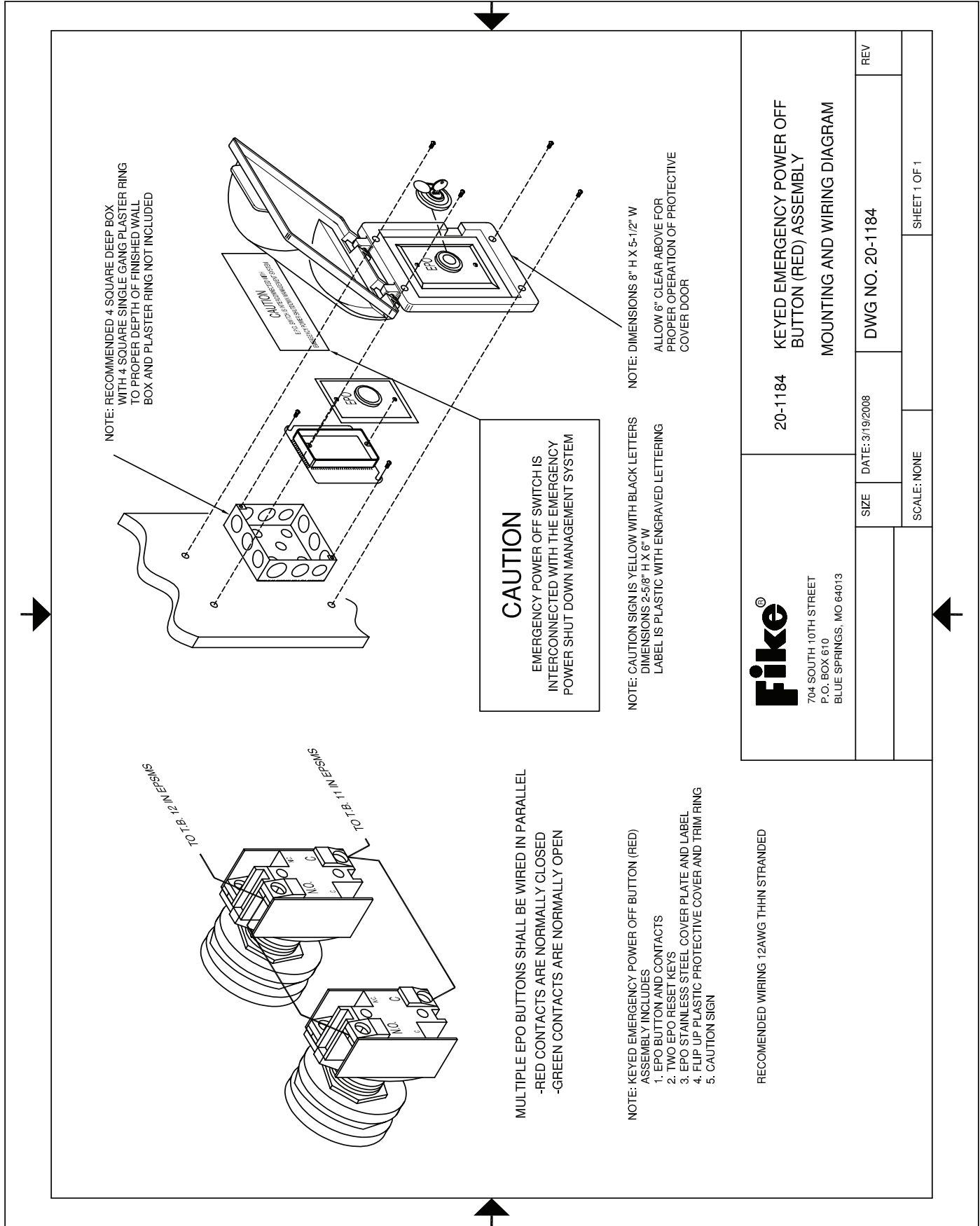
- 1 **Input Power Source**
Recommended to use dedicated 120VAC 20AMP power source that will not be turned off during an EPO or Discharge Event.
- 2 **Alternate Input Power Source (Optional)**
Alternate Input Power Source terminals 4,5,6 and Output Loss of Power Relays PS-1, PS-2 are only furnished when the accessory Dual Input Power Source Part # 20-1403 is ordered. This option cannot be field installed. Otherwise, only one set of input power terminals 1,2,3 are supplied. Due to space constraints the maximum output relays reduce from 16 to 12 in standard enclosure if alternate power source is ordered.
- 3 **EPSMS (EPO Only)**
For EPSMS (EPO Only) Model 20-1399 inputs to terminals 7,8,9,10 are not used.
- 4 **Output Relays**
Standard panel furnished with 8 output relays. Field expandable to 16 in standard enclosure and 40 in large enclosure. See DWG. 20-1182.
- 5 **Shunt Trip Circuits**
Total output power available for shunt power circuits is 6AMPS @ 120VAC
Shunt trip circuits are 24 volts when Remote Power Supply (24VDC) Part Number 20-1404 is used.
- 6 **Remote Monitoring Relays**
Loss of Power PS-1, PS-2 are internal relays and not used for remote monitoring. Loss of power is trouble condition.

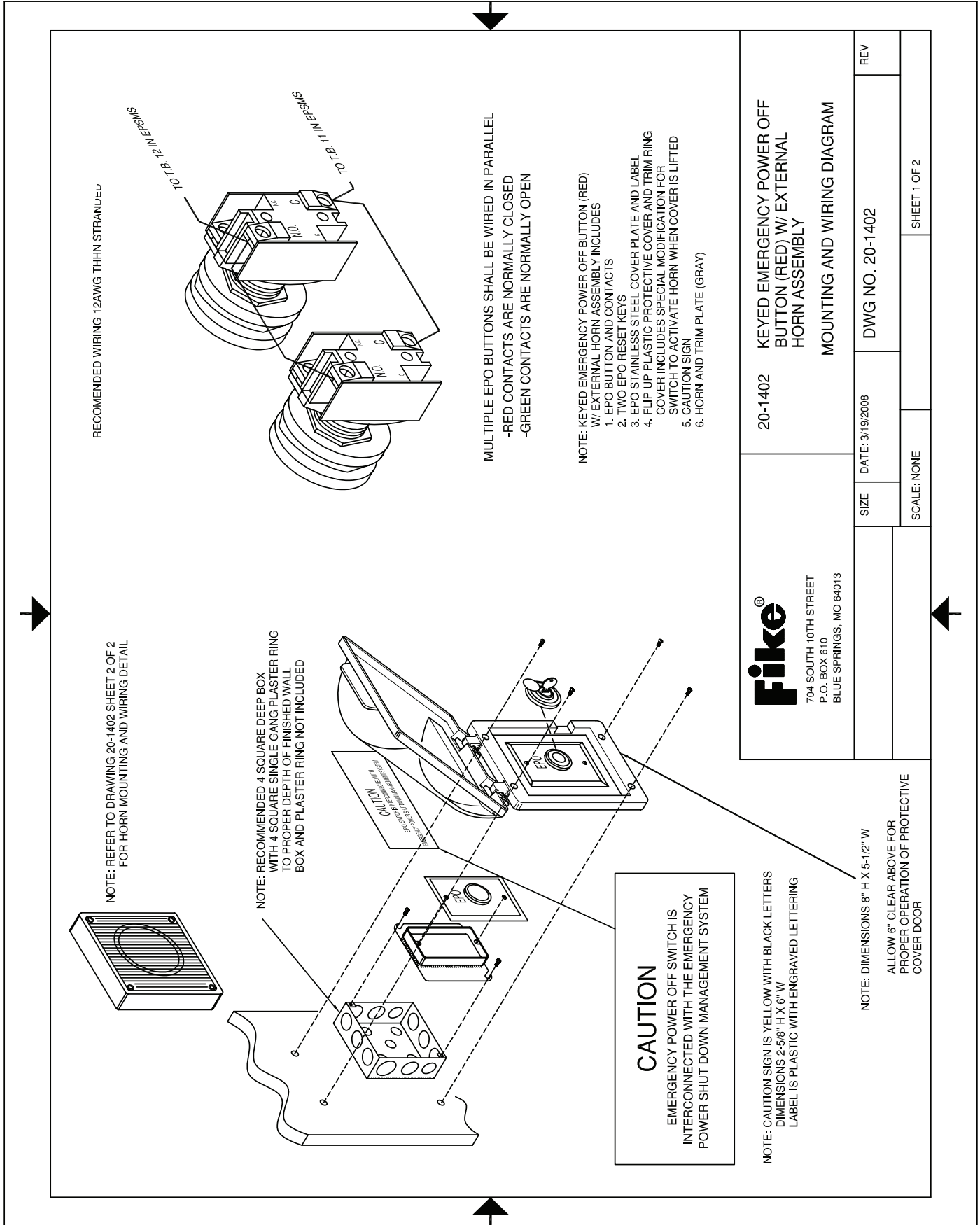


704 SOUTH 10TH STREET
P.O. BOX 610
BLUE SPRINGS, MO 64013

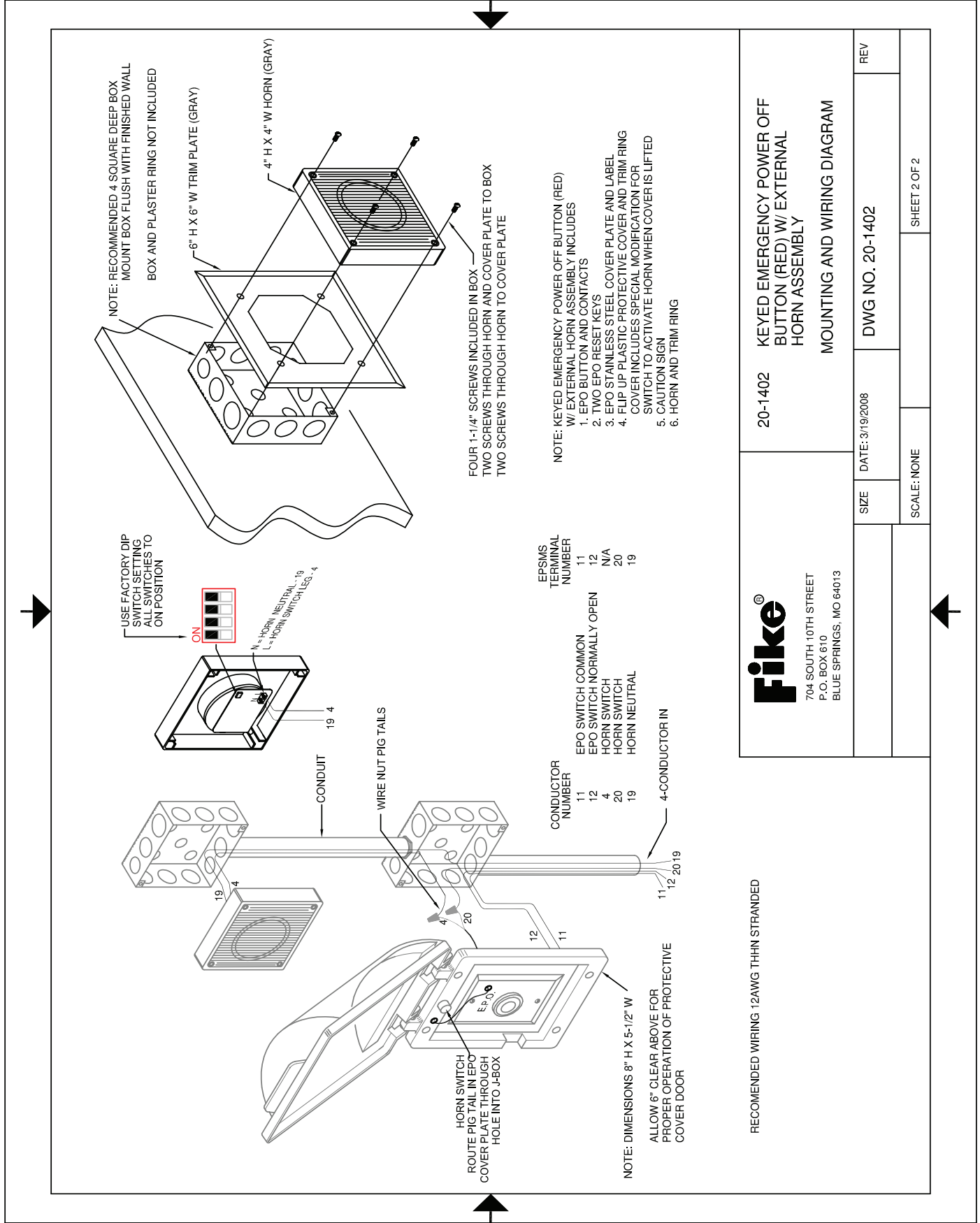
SYSTEM WIRING DIAGRAM
SHEET NOTES
(EPSMS CONTROL PANEL 20-1181, 20-1398, 20-1399)

SIZE	DATE: 3/27/2008	DWG NO. 20-1181	REV
SCALE: NONE		SHEET 2 OF 2	



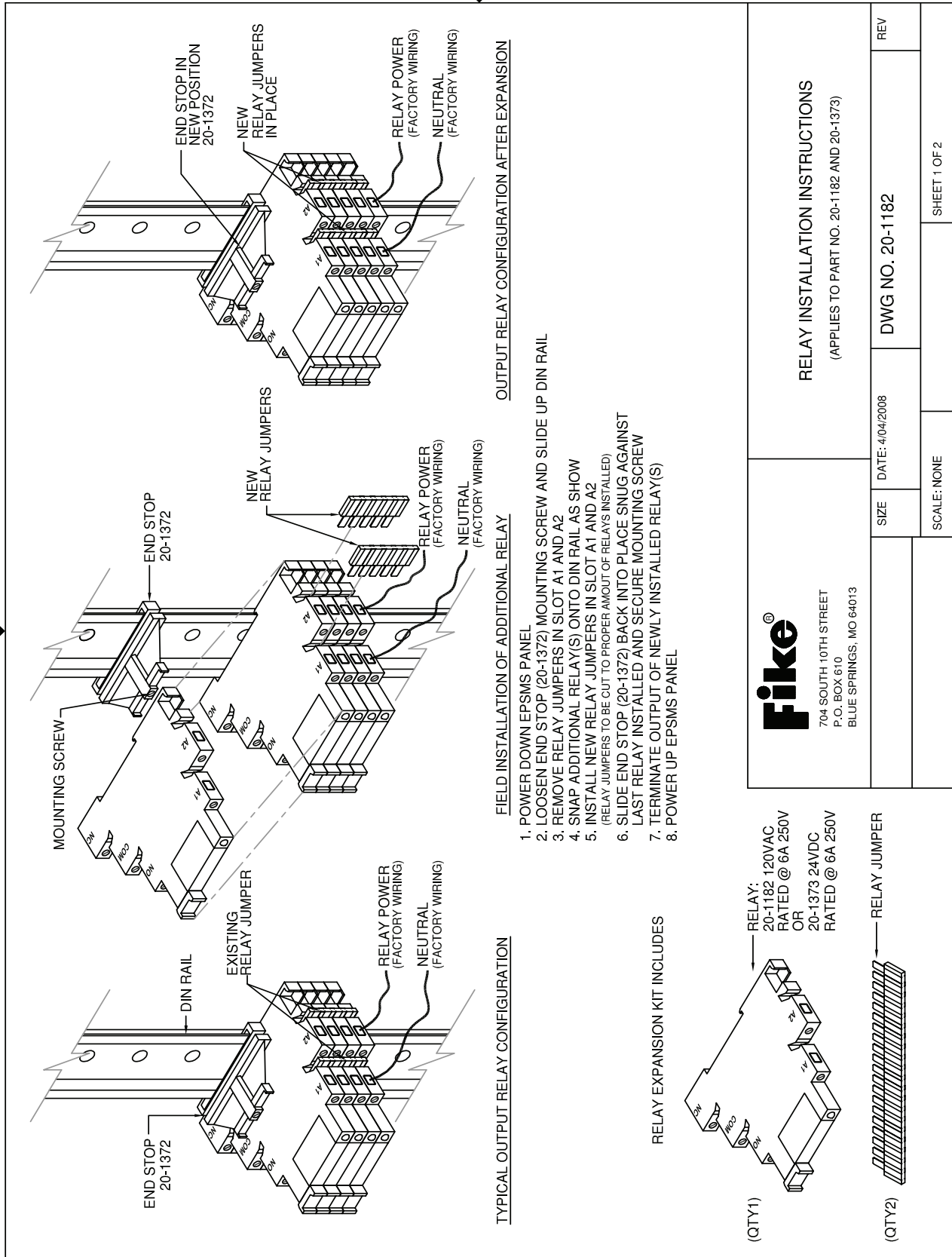


<p>704 SOUTH 10TH STREET P.O. BOX 610 BLUE SPRINGS, MO 64013</p>	<p>20-1402</p>	<p>KEYED EMERGENCY POWER OFF BUTTON (RED) W/ EXTERNAL HORN ASSEMBLY</p>	<p>DATE: 3/19/2008</p>	<p>REV</p>
	<p>SIZE</p>	<p>MOUNTING AND WIRING DIAGRAM</p>	<p>DWG NO. 20-1402</p>	<p>REV</p>
<p>SCALE: NONE</p>		<p>SHEET 1 OF 2</p>		



<p>704 SOUTH 10TH STREET P.O. BOX 610 BLUE SPRINGS, MO 64013</p>	20-1402	KEYED EMERGENCY POWER OFF BUTTON (RED) W/ EXTERNAL HORN ASSEMBLY	REV
	DATE: 3/19/2008	DWG NO. 20-1402	
SIZE	SCALE: NONE	SHEET 2 OF 2	

RECOMMENDED WIRING 12AWG THHN STRANDED



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 P.O. BOX 610
 BLUE SPRINGS, MO 64013

RELAY INSTALLATION INSTRUCTIONS
 (APPLIES TO PART NO. 20-1182 AND 20-1373)

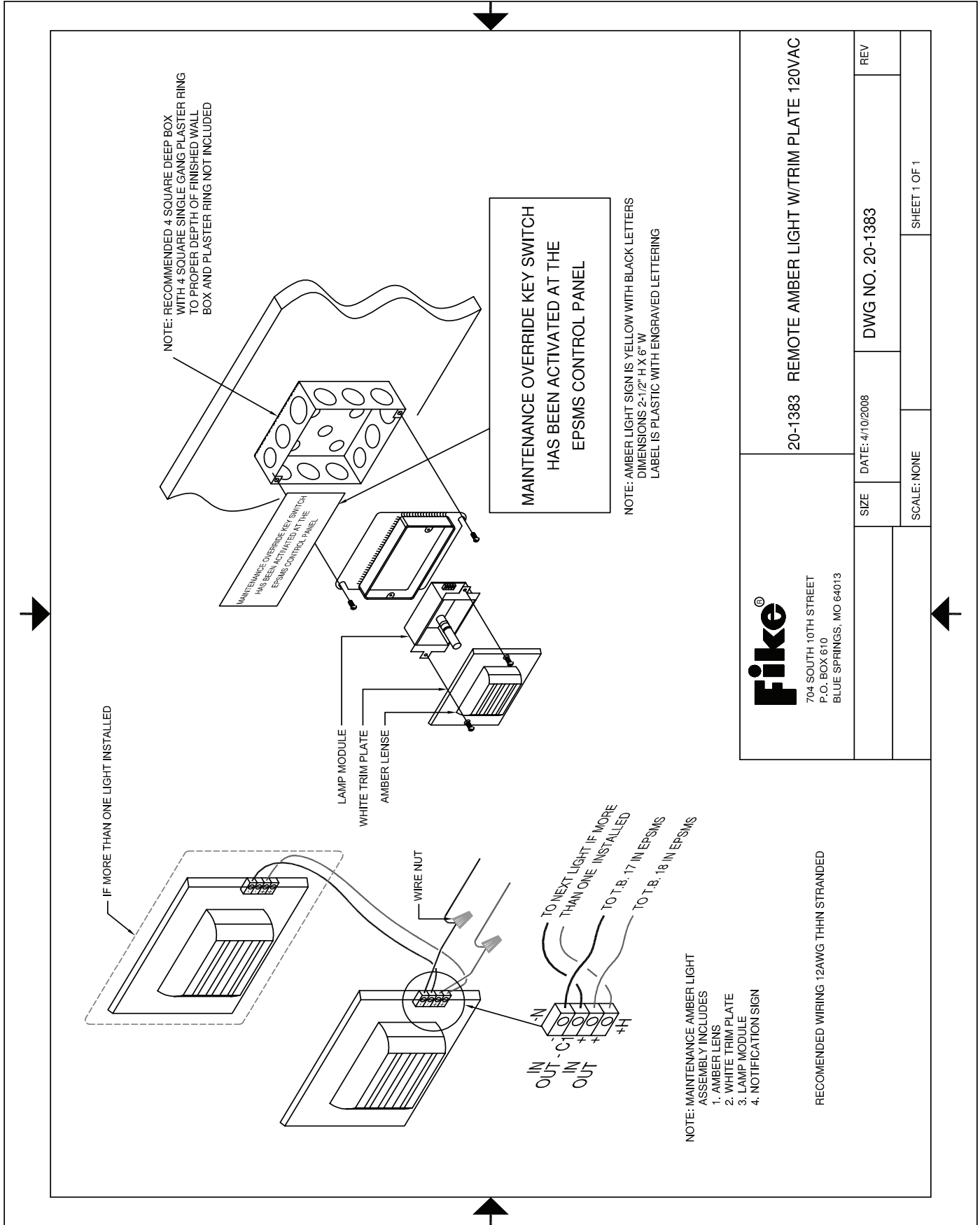
DATE: 4/04/2008	SIZE	SCALE: NONE	REV
DWG NO. 20-1182		SHEET 1 OF 2	


MAXIMUM NUMBER OF RELAYS

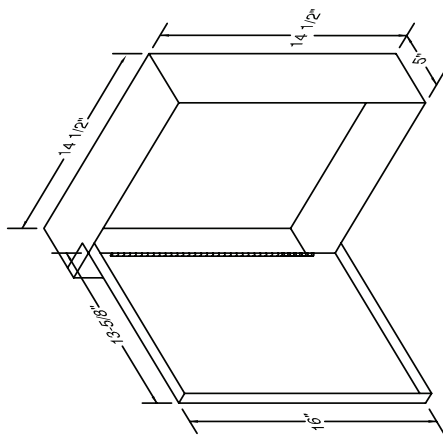
EPSMS MODEL	OUTPUT SHUTDOWN RELAYS				MONITORING RELAYS				EXPANDABLE TO STANDARD ENCLOSURE	EXPANDABLE TO LARGE ENCLOSURE
	SMOKE ACTIVATION	DISCHARGE ACTIVATION	EPO ACTIVATION	SYSTEM TROUBLE	EPO ACTIVATED	TOTAL STANDARD	EXPANDABLE TO STANDARD ENCLOSURE	EXPANDABLE TO LARGE ENCLOSURE		
20-1181	4	4		1	1	10	18		40	
20-1181 w/Dual Input Power Source	4	4		1	1	10	14		40	
20-1398	4		4	1	1	10	18		40	
20-1398 w/Dual Input Power Source	4		4	1	1	10	14		40	
20-1399	N/A	N/A		1	1	10	18		40	
20-1399 w/Dual Input Power Source	N/A	N/A		1	1	10	14		40	

Note: Relays may be added to any output shutdown or monitoring type. See relay installation instructions.

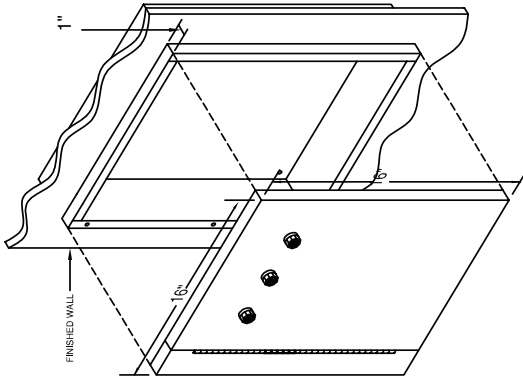
<p>704 SOUTH 10TH STREET P.O. BOX 610 BLUE SPRINGS, MO 64013</p>		RELAY INSTALLATION INSTRUCTIONS (APPLIES TO PART NO. 20-1182 AND 20-1373)	
		DATE: 4/04/2008	REV
SIZE		DWG NO. 20-1182	
SCALE: NONE		SHEET 2 OF 2	



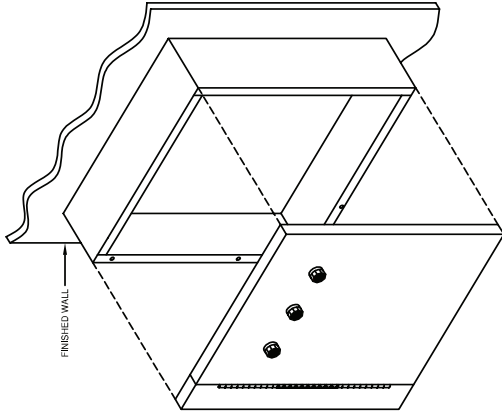
 <p>704 SOUTH 10TH STREET P.O. BOX 610 BLUE SPRINGS, MO 64013</p>		20-1383 REMOTE AMBER LIGHT W/TRIM PLATE 120VAC	
		DATE: 4/10/2008	DWG NO. 20-1383
SIZE	SCALE: NONE	REV	
SHEET 1 OF 1			



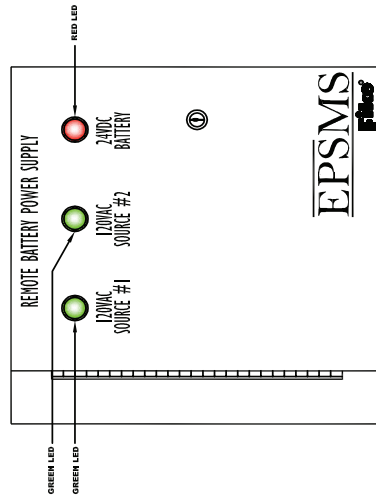
EPSMS BACKUP BATTERY CABINET DIMENSIONS
NO SCALE:



FLUSH MOUNT EPSMS BACKUP BATTERY CABINET MOUNTING DETAIL
NO SCALE:

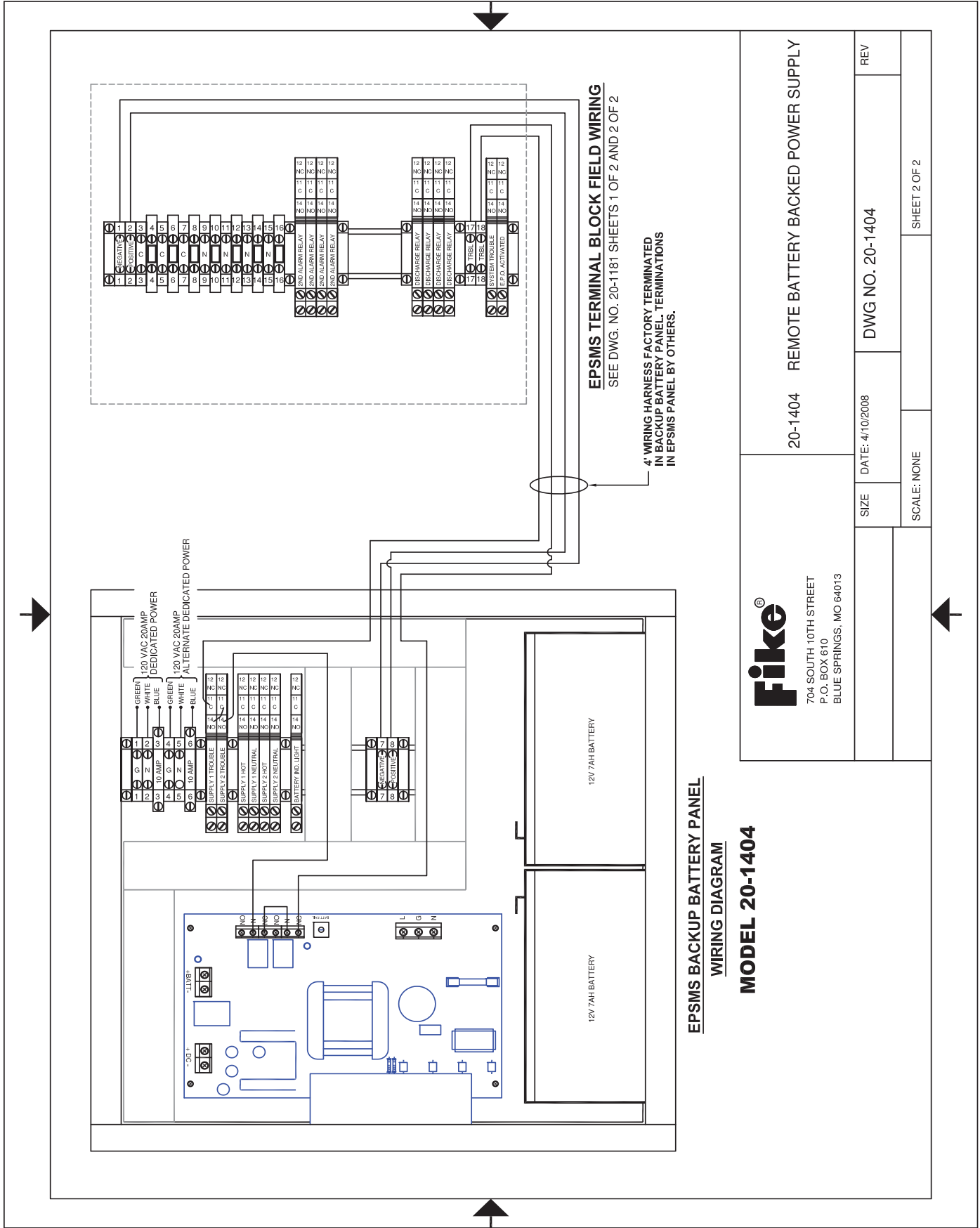


SURFACE MOUNT EPSMS BACKUP BATTERY CABINET MOUNTING DETAIL
NO SCALE:



FOR FLUSH MOUNT APPLICATIONS
EPSMS BATTERY BACK BOX MUST PROTRUDE OUT 1" PAST
FINISHED WALL, TO ATTACH PROPERLY TO
THE CABINET DOOR

<p>704 SOUTH 10TH STREET P.O. BOX 610 BLUE SPRINGS, MO 64013</p>	20-1404 REMOTE BATTERY BACKED POWER SUPPLY		REV
	SIZE	DATE: 4/10/2008	DWG NO. 20-1404
SCALE: NONE		SHEET 1 OF 2	



Fike®

704 SOUTH 10TH STREET
P.O. BOX 610
BLUE SPRINGS, MO 64013

20-1404 REMOTE BATTERY BACKED POWER SUPPLY

DATE: 4/10/2008

SCALE: NONE

DWG NO. 20-1404

SHEET 2 OF 2