

SPECIFICATION 16XXX

Emergency Power Shutdown Management System (EPSMS) for Clean Agent Fire Suppression and/or Pre-action Fire Sprinkler System Application

Part 1. General

1.01 **Scope:** This specification outlines the requirements for an **Emergency Power Shutdown Management System (EPSMS)** as manufactured by **Fike Corporation**. The purpose of this system is to consolidate, control, and monitor the emergency power off circuits for a given environment. The work described in this specification includes material, installation, sequence of operation schematic, shop drawings, testing, and warranty. .

1.02 **Applicable Standards and Publications:**

The latest edition of the following standards shall apply:

- A. NFPA No. 70 - National Electrical Code
- B. NFPA No. 75 - Protection of Electronic Computer/Data Processing Equipment
- C. UL Standard 508A – Standard for Industrial Control Panels

1.03 **Inclusive Work in this Specification:**

- A. Furnish the EPSMS control panel and optional features and equipment necessary to meet the project drawings and specifications
- B. Provide engineering, installation and testing required for a complete Emergency Power Shutdown Management System (EPSMS)
- C. All interconnecting wire and conduit to equipment interfaced for shutdown shall be included in this scope and installed in conduit and wire.
- D. Emergency power shutdown switch and the maintenance override notification beacon shall be connected to the EPSMS panel.
- E. System shall be installed in conduit and wire in accordance with the project general electrical specifications
- F. The equipment to be shut down by the EPSMS, locations of the EPSMS panels, and rooms to be protected are referenced in the project drawings.

1.04 **Related Work in Other Sections:**

The following work may be required and is not included in the scope of work of the fire suppression system contractor.

- A. All power to computer equipment, motorized dampers, HVAC, and any other equipment.
- B. Furnish and install the shunt trip breakers. (Signal to activate the shunt trip breakers from the EPSMS panel is included if required).

- C. Monitoring of the EPSMS by the building management system (if required), building life safety system (if required), and/or security system (if required).
- D. A 120 VAC "E" power circuit shall be provided through a dedicated 20-amp circuit breaker to the EPSMS panel.
- E. Conduit and wire for all above.

1.05 Submittals:

- A. The installing contractor shall submit the following items to the city, owner's insurance underwriter, engineer of record, and all other authorities having jurisdiction, for approval prior to starting work on this project.
 - (i) **EPSMS control panel drawings**
 - 1) Single-line general arrangement diagram showing the EPSMS control panel and identifying all devices the EPSMS connects to.
 - 2) Enclosure diagram showing the key switch, indicating LED's, and labels. This sheet shall contain the enclosure dimensions and a complete bill of materials to be used in the construction of the EPSMS.
 - 3) Sequence of operation detailing the input signals, output logic, monitoring relay operation, and maintenance override operation.
 - 4) Wiring schematic clearly identifying termination points on terminal blocks within the EPSMS control panel.
 - (ii) A copy of all the approved EPSMS drawings shall be sent to the architect, engineer, or general contractor for their records.

1.06 Quality Assurance:

- A. **Manufacturer:**
 - (i) The name of the manufacturer, part numbers and serial numbers shall appear on all major components.
 - (ii) All devices and components shall be U.L. listed.
 - (iii) The EPSMS shall be assembled and bench tested to verify proper operation prior to delivery to the job site. Customer may witness the bench test of the EPSMS at the supplier's shop at customer's option prior to delivery to job site.

1.07 System Description and Operation

- A. General Description:
 - (i) When connected to a fire suppression system: When the EPSMS receives a second smoke detector alarm signal from the fire suppression control panel (FCP), the EPSMS shall shut down all 2nd Alarm related equipment. After the FCP time delay expires and sends a discharge (water flow if pre-action system only) signal to the EPSMS, the Discharge related equipment shall be shut down.
 - (ii) EPO Switch: When the Emergency Power Off Switch is activated, all connected equipment shall be powered off.
 - (iii) Built-in Safety: The entire EPSMS shall be equipped with a keyed maintenance override switch that disables EPSMS preventing it from shutting any equipment down regardless of any input signals the EPSMS receives.

- (iv) Annunciation: Both local annunciation using indicating LED's and remote monitoring using dry contacts shall be provided.
- (v) The system shall be constructed using a programmable relay logic controller to manage the system logic. Hard-wired relays shall not be acceptable.
- (vi) The EPSMS shall be connected to and be monitored by the fire suppression system control panel (FCP) that controls the environment the EPSMS serves.

B. Sequence of Operation:

(This will be as written below or as shown on the drawings using the sequence of operations matrix.)

(i) Normal Operation:

- 1) Green power led is illuminated
- 2) Maintenance key switch is in the normal position
- 3) Maintenance key switch normal green led is illuminated.

(ii) 2nd Alarm Activation

Upon receipt of a second detector alarm signal from the FCP, the following shall occur:

- 1) 2nd alarm activation red led is illuminated
- 2) 2nd alarm shutdown relays are energized and latched
- 3) 2nd Alarm momentary (5 seconds) 120V shunt trip circuit shall activate
- 4) All 2nd alarm equipment shall de-energize
- 5) Piezo Alert shall be activated

(iii) Discharge (Water Flow If Pre-Action Only)

Upon receipt of a discharge signal from the FCP, the following shall occur:

- 1) Discharge activation red led is illuminated
- 2) Discharge shutdown relays are energized and latched
- 3) Discharge momentary (5 seconds) 120V shunt trip circuit shall activate
- 4) All discharge equipment shall de-energize
- 5) Piezo Alert shall be activated

(iv) Emergency Power Off (EPO) Switch Activated

- 1) Emergency Power Off (EPO) switch activation red led is illuminated
- 2) 2nd alarm shutdown relays are energized and latched
- 3) 2nd Alarm momentary (5 seconds) 120V shunt trip circuit shall activate
- 4) All 2nd alarm equipment shall de-energize
- 5) Discharge shutdown relays are energized and latched
- 6) Discharge momentary (5 seconds) 120V shunt trip circuit shall activate
- 7) All discharge equipment shall de-energize
- 8) EPO switch monitoring relay activated
- 9) Piezo audible alert shall activate

(v) Lamp Test Button Pressed

- 1) All lamps on the front of the EPSMS panel shall illuminate.
- 2) All lamps to return to normal state when lamp test button is released.

(vi) **Maintenance Override Lock-Out (in Over-ride position)**

The maintenance override feature is critical to proper EPSMS operation. It is used to prevent an accidental shutdown of equipment when maintenance or testing is being performed in the room. The maintenance override lock-out shall perform the following functions when it is in the override position:

- 1) Keyed switch red lamp is illuminated
- 2) Keyed switch normal (green) lamp is de-energized
- 3) System trouble relay is activated
- 4) Amber notification beacon shall energize

- 5) The 2nd Alarm Activated, Discharge Activated, and EPO Activated relays shall remain in the normal position (locked out) regardless of the input signals received to prevent accidental shutdown of equipment

- 6) If any input signal is received, the corresponding "2nd Alarm Activation", "Discharge Activation", and "EPO Activation" LED's shall illuminate

- 7) If any input signal is received then cleared, the corresponding 2nd Alarm Activation, Discharge Activation, and EPO Activation LED's shall flash indicating the input alarm condition is cleared. The output relays shall remain locked out.

- 8) 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.

- 9) If the EPSMS panel receives an input signal while in Maintenance Override it cannot be returned to Normal until all input signals are cleared and the panel is reset. This feature provides a second level of protection against accidental equipment shutdown.

C. Monitoring:

(i) **Fire Control Panel (FCP)**

- 1) The FCP shall supervise the loss of power trouble relay on the EPSMS according to NFPA 75.
- 2) The interconnecting wire, conduit, and controls to the FCP shall be included in this work scope.

(ii) **System Trouble Relay**

- 1) One normally open/normally closed dry contact shall change state upon loss of power or when maintenance override switch is in override position

(iii) **Emergency Power Off Activated**

- 1) One normally open/normally closed dry contact shall change state upon EPO activation.

(iv) **Supervision of Remote Monitoring Relays**

- 1) Supervision of relays by other monitoring systems as shown on the drawings
- 2) Building management systems (If required)
- 3) Security systems (if required)
- 4) Building life safety systems (if required)

Part 2. Products

2.01 EPSMS

- A. **EPSMS** shall be manufactured by **Fike Corporation Model 20-1181**
- B. The EPSMS shall be furnished by:
Intelli-Tech
1031 Serpentine Lane, Suite 101
Pleasanton, CA 94566
Tel: (925) 484-3701 Fax (925) 426-5013
- C. **Enclosure**
The enclosure shall be NEMA-1 capable of being surface or flush mounted with a swing door and key lock. The enclosure shall be constructed of minimum 18-gauge steel and shall be powder coated inside and out. All components of the EPSMS shall be furnished in one enclosure. If multiple panels are furnished, all panels shall be keyed alike.
- D. **Programmable Relay Logic Controller**
The logic for the EPSMS shall be controlled by a programmable relay logic controller. Logic using hardwired relays shall not be acceptable.
- E. **Input Power**
Input power shall be 120V single phase minimum 20 amps. Input power to the enclosure shall be internally fuse protected to 120VAC 10-amp.
- F. **Indicating Lamps**
All indicating lights shall be LED full voltage flush type rated at 120VAC. Indicating lamps for Power (green), Normal (green), Override (Amber), 2nd Alarm Activation (red), E.P.O. Activation (red), and Discharge Activation (red) shall appear on the front of the panel.
- G. **Momentary Reset/Test Switch**
The reset/test switch shall be a momentary.
- H. **Piezo Alert**
A piezo alert shall give audible annunciation on the front of the panel in accordance with the sequence of operation.
- I. **Silence Button**
A silence button shall be mounted on the front of the panel to silence the piezo alert.
- J. **2-Position Keyed Maintenance Override Selector Switch**
The keyed selector switch shall be a two position locking type.
- K. **Output Relays**
Relays shall be N.O. and N.C. intelligent process interface single type pole rated at 6 AMP 120VAC. Quantity as standard shall be minimum 10 relays including monitoring relays. Expandable to 18 relays in the base enclosure and 40 in the optional large enclosure. Actual quantity as required to meet the devices quantities as shown on the drawings
- L. **Wire**
All wire shall be 16-gauge THHN stranded color black. All wire shall be routed in base duct slotted wall Panduit.

M. Terminal Blocks

All Terminal blocks shall be screw type single level rated for field wiring. The terminal blocks shall be numbered with identification labels. Hand written or sticker labels are not acceptable.

N. Labels

All labels on the exterior of the enclosure shall be permanent black vinyl. The letters shall be white and a minimum of ½" high. Labels consisting of stickers or applied labels such as engraved plastic are not acceptable. All relays and LEDs inside the control panel shall be labeled for their function. No handwritten labels shall be accepted.

O. Drawings

A copy of the as-built wiring schematic and sequence of operation shall be furnished and installed inside the enclosure.

P. Emergency Power Off Buttons

The emergency power off switch shall be dual action keyed latching type. The button shall have a flip up protective cover to protect against accidental equipment shutdown. The switch shall be labeled as follows:

EMERGENCY POWER SHUTDOWN

This E.P.O. switch is connected to an Emergency Power Shutdown Management System (EPSMS) and can be overridden for maintenance purposes

Quantity and location of EPO button(s) shall be as shown on the drawings. The EPO button(s) shall be interconnected to the EPSMS. Interconnecting conduit and wire to the EPO buttons shall be included in this scope of work.

Q. Remote Maintenance Override Notification Light

One amber remote maintenance override notification light shall be furnished and installed a minimum of three feet above each EPSMS panel. The light shall be powered from the EPSMS control panel. The interconnecting wire and conduit shall be included in this scope. The light shall be activated when the maintenance override key switch is in the override position.

R. Large Enclosure (Optional)

Enclosure shall be black NEMA 1. Size is 18"W X 23"H X 5"D. Can be installed flush or surface mount. The large enclosure shall accommodate up to (40) as opposed to the standard enclosure that accommodates (18).

S. Emergency Power Flip Up Cover Audible Horn Notification (Optional)

For each Emergency Power Off Button supplied there shall be a protective flip up cover with micro switch. A 75 db horn shall be mounted separately at the EPO button location. The horn shall be interconnected with the EPSMS control power and protective flip up cover micro switch. The horn shall active when the EPO button protective cover is flipped up.

T. Dual Input Power Capability (Optional)

This EPSMS shall have provisions for the connection of two independent 120VAC power sources. The EPSMS shall be able to automatically switch between power source one and two depending upon the availability of power at each source.

U. 24 VDC Battery Back Power Supply (Optional)

The remote power supply shall be enclosed in a black NEMA 1 enclosure W14.5" X 14.5"H X 5"D that can be installed flush or surface mounted. Batteries shall be included. The power supply shall be rated at 6 AMP 120VAC input 24VDC output. Exterior annunciation shall include illuminating LED's on the front panel indicating the presence of "Source #1", "Source #2", and "Power Supply on Battery". An interfacing trouble relay terminal block shall be connected to the EPSMS trouble signal. When a 24VDC power supply is specified, the EPSMS control panel will be manufactured with 24VDC controls instead of 120 VAC. 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.

Part 3. Execution

3.01 Testing

- A. The installing contractor shall coordinate field test with other trades to verify proper field operation. The test shall demonstrate the entire control functions as designed and intended.
- B. All electrical wiring shall be tested for proper connection, continuity and resistance to ground.
- C. The complete system shall be functionally tested and all functions, including system and equipment interlocks, must be operational at least five (5) days prior to the final acceptance tests.
- D. Upon acceptance by the owner, the completed EPSMS panel shall be placed in normal service. Until that time, a tag indicating that the system is not in operation shall be placed on the EPSMS panel.

3.02 Training Requirements:

- A. After final acceptance, the installing contractor shall provide operational training to each shift of the owner's personnel.

3.03 Close Out Documents

- A. Operation and Maintenance Manuals
 - (i) Prior to final acceptance, the installing contractor shall provide complete operation and maintenance instruction manuals.
 - (ii) All aspects of the system operation and maintenance shall be detailed, including wiring diagrams of all circuits, a written description of the system design and sequence of operation, drawing(s) illustrating control logic and equipment used in the system. Checklists and procedures for emergency situations, troubleshooting techniques and maintenance operations and procedures shall be included in the manual.

Intelli-Tech
1031 Serpentine Lane, #101
Pleasanton, CA 94566
Phone (925) 484-3701

B. As-Built Drawings

- (i) Upon completion of each system, the installing contractor shall provide four (4) copies of system "As-Built" drawings to the owner. The drawings shall show actual installation details including all equipment locations (i.e.: control panel(s), and conduit routing details.

3.04 Warranty:

- A. All system components furnished under this contract shall be guaranteed against defect and workmanship for a period of one year

End of Specification # 16XXX

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