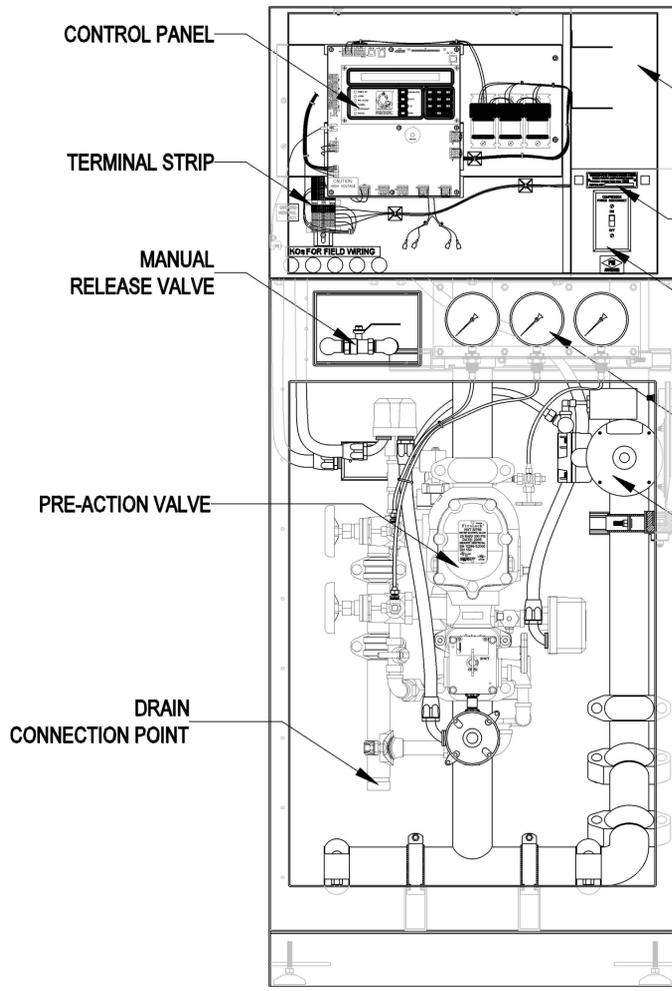


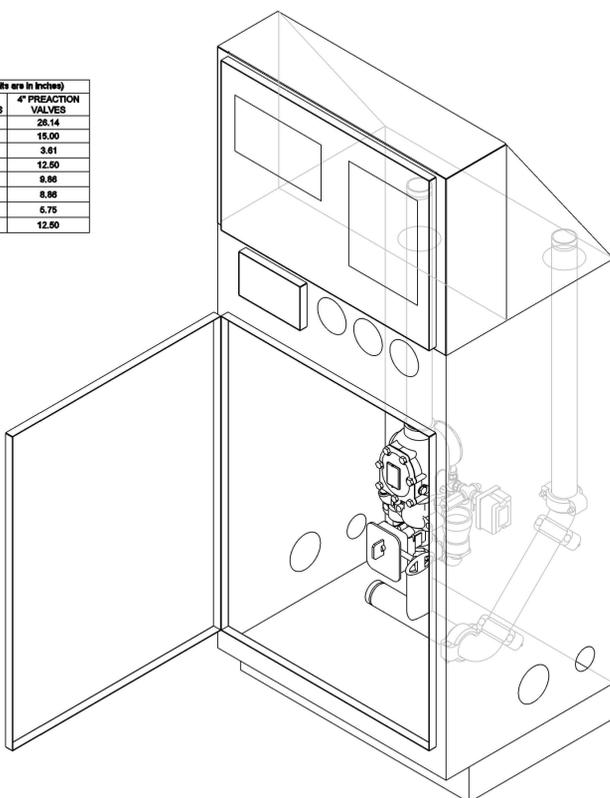
Furnish and install water-based pre-action fire suppression system using self-contained preaction assembly that contains all mechanical and electrical components required. Assembly shall be pre-assembled, pre-wired, and fully factory tested by the manufacturer as a system to make up a complete, ready-to-install device. Assembly shall be PREACTION-PAC™, manufactured by UNITED Fire Systems, 1 Mark Road, Kenilworth, NJ 07033 (201-688-0300 x222).

- COMPONENTS.** The system shall consist of:
 - 1.1 Self-Contained Preaction Assembly with:
 - 1.1.1 Preaction Sprinkler Valve. The fire preaction sprinkler valve shall be Model FireLock NXT Series 789, manufactured by Victaulic. Valve shall be a low-differential, latched clapper valve that uses supply water pressure from upstream of main control valve to hold clapper shut. Valve shall be self-resetting and no disassembly or cover removal shall be required for reset. Valve shall be rated for no less than 300 PSIG water working pressure, and factory hydrostatically tested to a minimum of 600 PSIG. Minimum required supervisory gas pressure shall be 13 PSIG. No separate check valve shall be required. Valve shall be factory-assembled to an inlet tee secured to the bottom of the lower enclosure. The full trim for the preaction valve shall be factory-assembled. No field modifications of valve trim shall be required.
 - 1.1.2 Control Panel. The control panel shall be of the addressable type, and shall be FenwalNET 6000 or approved equal. Assemblies using non-addressable control panels shall not be accepted. The control panel shall be factory-assembled into the PREACTION-PAC™ upper enclosure. Panel display shall be visible through a polycarbonate window in upper enclosure door. Control panel shall be listed and approved for pre-action release service.
 - 1.1.2.1 Circuit Board. The FenwalNET 6000 addressable control panel printed circuit board shall consist of:
 - Main system microprocessor, real-time clock, history buffer, and watchdog timer.
 - Integral display/control assembly with:
 - Four (4) operator switches (Acknowledge, Silence, Scroll, Reset).
 - Six (6) status LEDs (Power On, Alarm, Pre-Alarm, Trouble, Supervisory, Silence).
 - One (1) 12-key numeric keypad with BACKSPACE and ENTER keys.
 - One (1) 10-character backlit liquid crystal display (LCD).
 - One (1) USB device port, two (2) RS-232 serial ports, and one (1) RS-485 communications circuit.
 - One (1) signaling line circuit (SLC) and two (2) notification appliance circuits (NACs).
 - Two (2) releasing circuits and two (2) combination NAC releasing circuits (Combos).
 - Three (3) programmable volt-free relay contacts and one (1) volt-free trouble relay contact.
 - One (1) circuit for connection of secondary battery, providing for changeover to secondary power upon loss of primary power, and charging of battery when primary power is present.
 - 1.1.2.2 Power Supply. The system shall have a primary power supply / charger assembly, consisting of an AC to DC switching power unit. The power-supply / charger assembly shall be factory configured to accept 120 VAC input voltage, and shall provide 5.4 A at 24 VDC of filtered and regulated power to operate system and charge system's standby batteries. Two user-configurable auxiliary-power circuits shall be provided on PCB to power peripheral devices. The auxiliary-power circuits shall be software programmable for either continuous or interruptible power output, and shall be rated for 1.0 A at 24 VDC. It shall not be necessary to set jumpers or dip switches on PCB to make these outputs continuous or interruptible.
 - 1.1.2.3 Programming. The control panel shall be programmable and configurable in the field without programming of PROM chips or replacement of memory chips. Programming shall allow any input to activate any output or group of outputs. Systems with limited programming capability or complex hardware programming (such as a diode matrix) are not considered suitable.
 - 1.1.2.4 Communication. The control panel shall communicate with all initiating devices via a digital data protocol, transmitted over a two-wire signaling line circuit (SLC). Each point on the SLC shall have a unique address, permitting point identification of fire location and detector faults. The communication protocol used by control panel over SLC shall provide complete supervision of wiring and detector status.
 - 1.1.2.5 Contacts. Dry contacts shall be provided as follows:
 - Alarm. Contact operates on any fire alarm signal processed by the PREACTION-PAC™ control panel.
 - Trouble. Contact operates on any fault reported by the PREACTION-PAC™ control panel.
 - Supervisory. Contact operates on any supervisory signal processed by the PREACTION-PAC™ control panel.
 - 1.1.3 Addressable Modules. Addressable input and output modules shall be factory-assembled and wired in the PREACTION-PAC™ upper enclosure. Input modules shall be factory-wired to the low air sensor switch, tamper switch, and waterflow sensor switch contacts in the lower enclosure. An output module shall be factory-wired to the valve releasing solenoid in the lower enclosure. All modules shall be factory-wired and programmed for the FenwalNET SLC circuit.
 - 1.1.4 Compressor. The air compressor shall be factory assembled into lower enclosure, wired and connected to preaction valve. Compressor shall be sized to restore normal air pressure in the preaction system piping in 30 minutes or less. Compressor shall be of the oil-less piston type, equipped with a pressure switch and a bubble-light check valve. Power source shall be 110 VAC 60 Hz, 1 phase.
 - 1.1.5 Enclosures. The PREACTION-PAC™ enclosure shall be constructed of two separate steel enclosures factory-assembled together, one above the other. Both enclosures shall be finished in powder-coat red paint, and shall be equipped with lockable access doors. Key locks for upper and lower enclosures doors to be equipped with different keys. Access door for manual release handle shall be separate from enclosure doors. No key lock shall be installed on manual release handle door. All doors equipped with full piano hinge and oil-resistant gaskets.
 - 1.1.5.1 Upper Enclosure. The upper enclosure shall be constructed of 12 gauge steel with continuous welded seams, and shall contain:
 - Integral addressable control panel printed circuit board and power supply.
 - All wiring in upper enclosure for complete system installed at factory.
 - Printed instructions visible with door closed through polycarbonate window in upper enclosure door.
 - Knockouts for attachment of external electrical conduits.
 - Space for required spare sprinkler heads and sprinker wrench. No separate spare sprinkler head enclosures shall be permitted.
 - 120VAC, 60 Hz, single phase connection point in upper enclosure to serve both control panel and compressor. If necessary, jumpers may be removed to permit separate 120VAC connections for control panel and compressor.
 - Assembly to be FM Approved and marked with FM Approval mark on inside of upper enclosure.
 - 1.1.5.2 Lower Enclosure. The lower enclosure shall be constructed of 14 gauge steel with continuous welded seams, and shall contain:
 - Preaction valve factory-assembled to inlet tee.
 - Compressor to provide supervisory air pressure, factory assembled to rubber mounts, pre-wired to shut-off switch in upper enclosure, and factory connected to preaction valve.
 - (3) pressure gages factory assembled and visible through cutouts in lower enclosure without opening lower enclosure door, indicating System Air Pressure, Water Supply Pressure, and Valve Line Pressure.
 - Manual release handle behind separate non-lockable door.
 - All wiring in lower enclosure for complete system installed at factory. No field wiring in lower enclosure permitted.
 - Inlet for water supply on top of lower enclosure, with optional inlets on left and right side of lower enclosure.
 - Outlet for water to sprinklers on top of lower enclosure.
- 1.2 Spot Smoke Detectors. Furnish and install intelligent spot smoke detectors. The detectors shall be SmartOne photoelectric, Model PSD-7252, manufactured by Kidde-Fenwal, Inc., 400 Main Street, Ashland, MA 01721, USA, phone (508) 881-2000, www.kidde-firealarm.com. The control panel's distributed intelligence shall extend to the detectors on the signaling line circuit. The detector shall have a microprocessor capable of independently determining whether or not a fire signature at its monitored location is of sufficient magnitude to warrant the issuance of an alarm signal to the control unit. The detector shall be a low profile light scattering type that senses a broad range of smoldering and flaming-type fires. The sensing chamber shall permit a full 360° smoke entry. The detector shall be electronically addressable and fully factory-programmable. It shall be possible to set an alert threshold from 0.2 to 3.4% per foot obscuration in 0.1% per foot increments, and to set an alarm threshold from 0.5 to 3.5% per foot obscuration in 0.1% per foot increments. The detector shall provide a real-time value of the current local obscuration level in percent-per-foot readout when requested by an operator at the control unit. Detector calibration, address, alert and alarm thresholds, and drift-compensation algorithm shall be stored in each detector's non-volatile memory. Systems that store an detector parameters in the control unit (i.e., non-distributed-intelligence-to-the-device-level architecture) shall not be considered as equivalent.
- 1.3 Alarm Notification Devices. Provide audible and visual alarm notification devices as indicated on the Contract Drawings. Devices shall be compatible with control panel assembled in PREACTION-PAC™ assembly. Devices shall be related to allow supervision by control panel NAC circuit. Device voltage shall be 24 VDC. Devices shall meet the requirements of FCC Part 15 Class B. Specified strobes shall flash at a rate of one (1) flash per second. Strobes shall be capable of synchronization. A sign shall be mounted next to or underneath each alarm notification device to identify the system condition(s) represented by operation of the device. Each sign shall be red with white lettering, and a minimum size of seven by ten inches.



FRONT VIEW

NOTE:
PREACTION VALVE SHOWN IS 2" NPS SINGLE INTERLOCK DIMENSION AND TRIM OF OTHER VALVE SIZES AND TYPES MAY VARY.



ISOMETRIC VIEWS

- NOTES:**
1. TRIM ELEMENTS AND UPPER ENCLOSURE REMOVED FOR CLARITY
 2. ASSEMBLIES EQUIPPED WITH AHP COMPRESSORS DO NOT HAVE TOP INLET CONNECTION

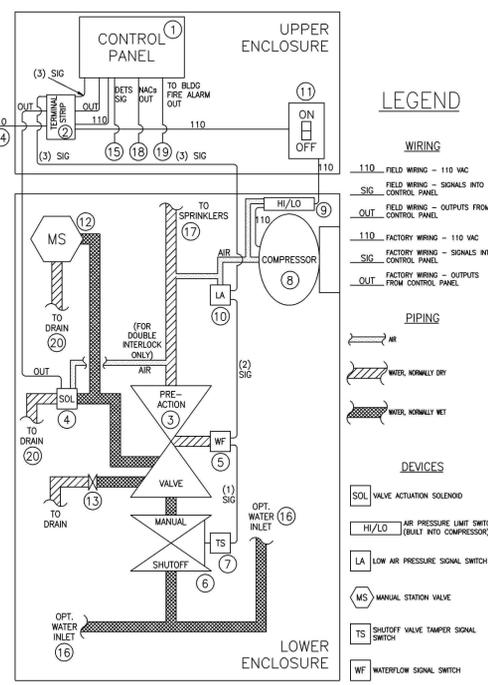
ORTHOGRAPHIC VIEW

DIMENSIONAL DETAILS (all units are in inches)		
DIMENSION	1-1/2" THROUGH 3" PREACTION VALVES	4" PREACTION VALVES
A	22.00	24.00
B	52.00	52.00
C	20.00	20.00
D	30.00	30.00
E	72.00	72.00

- OPERATION - IMPORTANT!** Consult only ONE of the two paragraphs below.

Single Interlock. The valve shall operate as a single-interlock preaction valve with electric release. When the electric solenoid is operated by the PREACTION-PAC™ control panel, the water in the diaphragm chamber shall be released and the valve shall open.

Double Interlock. The valve shall operate as a double-interlock preaction valve with electric release. When the electric solenoid is operated by the PREACTION-PAC™ control panel AND the supervisory gas is exhausted by the operation of an automatic sprinkler head, the water in the diaphragm chamber shall be released and the valve shall open.
- PERFORMANCE REQUIREMENTS.**
- General Requirements.** Design and performance of systems, components, and methods specified shall comply with all applicable codes and standards. Contract drawings indicate the general arrangement of the system and are a guide for intent only. Contractor is responsible for providing and installing all equipment necessary to complete the installation in compliance with all applicable requirements. Contractor shall design, furnish, and install the preaction sprinkler system(s) per this specification. Contractor is responsible for system layout in the fire zones indicated as "Pre-Action" on the contract drawings, including spacing and location of sprinkler heads, pipe size and pipe routing, location and number of preaction enclosures, and all other details required by applicable standards. All equipment and materials shall be new and unused.
 - 3.2 Power.
 - Primary. Primary power shall be from a 110 VAC dedicated branch circuit. A primary power calculation that details the power requirements for the FenwalNET 6000 Control Unit and all field devices such as smoke detectors, notification appliances and releasing solenoids shall be performed.
 - Secondary. Secondary power shall be provided by rechargeable gel-cell batteries installed in the PREACTION-PAC™ upper enclosure. A secondary power calculation that shows quiescent and alarm power requirements for the FenwalNET 6000 Control Unit and all field devices shall be performed.
 - Quiescent power requirement = 24 hours.
 - Alarm power requirement = 5 minutes.
 - Wire Sizes. Voltage drop calculations shall be performed justifying the wire sizes of all 24 VDC circuits.
 - 3.3 SUBMITTALS.
 - 3.3.1 General Requirements. The Engineer shall review all submittals for conformance to the contract drawings and specifications. The contractor shall be required to resubmit any materials, with appropriate modifications, that are found to be in non-conformance with the requirements of the contract drawings and these specifications after review by the Engineer. Approval of the submittals by the Engineer shall not relieve the Contractor of their responsibility to meet the requirements of the drawings and specifications.
 - 3.3.2 Product Data. For each type of product submitted, include, as applicable, product rated capacities, operational characteristics, electrical characteristics, materials of construction, standards of construction, and approvals.
 - 3.3.3 Shop Drawings. Include all pertinent information such as structural members, ceiling construction, partitions, lighting fixtures, air diffusers and registers, speakers, sprinklers, and piping runs.
 - Plan views of all areas protected by preaction sprinkler systems, including room designations and node numbers for hydraulic calculations.
 - Plan views of all rooms where PREACTION-PAC™ assemblies are located.
 - Plan views indicating installation location of all electrical devices. Contact readings shall be shown, with number of conductors, type of wire, and wire sizes indicated for each conduit segment.
 - An electrical riser diagram, specific to this design, showing interconnection of all electrical devices.
 - Wiring diagrams for all electrical devices and power, signal, and control wiring.
 - 3.3.4 Coordination Drawings. All preaction sprinkler system components, drawn to scale, coordinated with all electrical and mechanical trades.
 - 3.3.5 Calculations. For primary and backup power, and wire size voltage drop.
 - 3.3.6 Commissioning Field Test Plan. Provisions for commissioning, inspecting, and testing.
 - 3.4 **INSTALLATION**
 - 3.4.1 Location and Arrangement. Contract drawings, plans, schematics, and diagrams indicate general location and arrangement of electrical devices. Working drawings shall indicate actual device installation layout. Install devices per working drawings.
 - 3.4.2 Deviations. Installation deviations from approved working drawings require written approval from the Engineer. During installation, do not deviate from approved working drawings without written approval from the Engineer.
 - 3.4.3 Wiring. All wiring shall be of the proper size to conduct the circuit current, but shall not be smaller than #18 AWG. Wiring for the signaling line circuit shall be in accordance with the FenwalNET 6000 installation manual. Wire with scrapes, nicks, gouges, or crushed insulation shall not be used. Aluminum wire shall not be used. Splicing of circuits shall be kept to a minimum, and is only permitted in an electrical box suitable for the purpose. Approve wire splicing shall be used exclusively for the identification of the earth-ground conductor of AC or DC circuits. Wire with green insulation shall be used exclusively for the identification of the earth-ground conductor of AC or DC circuits. Appropriate color-coding shall be used for all other field wiring. All electrical circuits shall be numerically tagged with suitable markings at each terminal point. All circuits shall correspond with the installation drawings.
 - 3.4.4 Raceways. Wiring to be installed in a minimum 1/2 inch EMT using steel compression fittings. All electrical enclosures, raceways, and conduits shall be provided and installed in accordance with applicable codes and intended use, and shall contain only those electrical circuits associated with the fire detection and control system. No circuit or circuits that are unrelated to the fire detection system shall be routed through the enclosures, raceways, and conduits dedicated to the fire detection system.
 - 3.5 **COMMISSIONING.** Electrical commissioning shall be performed by the Contractor. Contractor personnel shall be competent fire alarm technicians with a current training certificate from UNITED Fire Systems or approved equal.
 - 3.5.1 Commissioning Plan. The Contractor shall submit a commissioning plan that describes how the system shall be tested. This shall include a step-by-step description of all tests and shall indicate type and location of test apparatus to be used. At a minimum, the tests to be conducted shall be per the relevant referenced codes and any additional supplemental tests required by the authority having jurisdiction. Tests shall not be scheduled or conducted until the Engineer approves the commissioning plan.
 - 3.5.2 Execution. All tests shall be performed in the presence of the Engineer and the authority having jurisdiction. The Contractor shall record all equipment, tests and system configurations in a format approved by the Engineer and the authority having jurisdiction. A copy of the commissioning results shall be provided to the Engineer, the authority having jurisdiction, and the end user.
 - 3.5.3 Closeout. Provide six (6) sets of as-built shop drawings, commissioning data and results, operation and maintenance instructions, and system sequence of operation.
 - 3.6 **WARRANTY.** All equipment and installation to be warranted against defects for 12 months starting upon the date of system acceptance by all authorities having jurisdiction.



FUNCTIONAL DESCRIPTIONS	
REF. NUMBER	FUNCTION
1	CONTROL PANEL
2	TERMINAL STRIP
3	PRE-ACTION VALVE
4	VALVE ACTUATION SOLENOID
5	WATERFLOW SIGNAL SWITCH
6	MANUAL SHUTOFF VALVE
7	SHUTOFF VALVE TAMPER SIGNAL SWITCH
8	COMPRESSOR
9	HIGH/LOW AIR PRESSURE LIMIT SWITCH
10	LOW AIR PRESSURE SIGNAL SWITCH
11	COMPRESSOR DISCONNECT SWITCH
12	MANUAL STATION VALVE
13	DRAIN VALVE
14	INPUT CONNECTION FOR 110 VAC POWER
15	INPUT CONNECTION FOR AUTOMATIC FIRE DETECTORS
16	WATER INLET CONNECTION
17	OUTLET CONNECTION TO FIRE SPRINKLERS
18	NOTIFICATION APPLIANCE OUTPUT CONNECTION
19	OUTPUT CONNECTION TO BUILDING FIRE ALARM SYSTEM
20	DRAIN CONNECTION

REV.	DATE	DESCRIPTION
1.00	23 OCT 2015	JG
1.01	28 OCT 2015	JG

UNITED FIRE SYSTEMS
1 MARK ROAD
KENILWORTH, N.J. 07033
TEL (908) 688-0300
FAX (908) 688-0218

JOB TITLE
SPECIFICATION & DETAILS
PREACTION-PAC SPRINKLER VALVE ASSEMBLY
WITH COMPRESSOR
UNITED FIRE SYSTEMS

SCALE
AS NOTED

DRAWN BY
JG

DESIGNED BY
JG

CHECKED BY
SJS

SYSTEM TYPE
PREACTION-PAC

DATE
23 OCT 2015

UFS-125

SHEET
1 OF 1

FUNCTIONAL DETAILS