Advanced Integrated Fire Protection Systems

TOTALPac® 3
Owner's Operation
and
Maintenance Manual

SUREFIRE
# Totalpac®3

## Integrated Fire Protection System

**Owner’s Operation & Maintenance Manual**

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1. Applicable Standards

   The TOTALPac®3 SUREFIRE® complies with the following standards:
   - NFPA-13 Sprinkler Systems;
   - NFPA-15 Water Spray Fixed Systems;
   - NFPA-16 Foam-Water Sprinkler and Foam-Water Spray Systems;
   - NFPA-72 Fire Alarm Systems.

Before the installation, the contractor installing the unit shall also be familiar with the following documents and standards:
   - Applicable Local & State Building Codes
   - Any additional requirements of the Local Authority Having Jurisdiction.

2. Listings and Approvals

   In addition to being fabricated under tight ISO-9001 manufacturing and quality control procedures, your TOTALPac®3 Unit has also been tested and approved by recognized laboratories. Here is the list of Listings & Approvals it meets:
   - Underwriters Laboratories Inc. (UL): Preaction TOTALPac®3 systems are UL Listed under “Special System Water Control Valves - Assembled Units, category # VKYL.EX4641” and “Assembled Units Certified for Canada, Category # VKYL7.EX4641 (C-UL)”.
   - Factory Mutual Research <FM>: Preaction TOTALPac®3 systems are FM Approved under the heading: “Automatic Water Control Valves” when installed with specific components.

   Note: Although most TOTALPac®3 units are Listed and Approved, custom built units are sometimes supplied on request. Components in these special units maintain their individual Listings/Approvals but the cabinets are not Listed as an assembled unit.

   Warning ! Any unauthorized modification or addition made on-site to a factory built Listed Unit will void this Listing. Such modifications or additions may void the unit’s warranty as well. Consult your nearest FireFlex Systems Authorized Distributor before proceeding with such modifications or additions.

3. Environment

   TOTALPac®3 SUREFIRE® units shall be installed in a dry and clean location. Verify that all equipment is properly heated and protected to prevent freezing and physical damage.

   The unit and its components must be kept free of foreign matter, freezing conditions, corrosive atmospheres, contaminated water supplies, and any condition that could impair its operation or damage the components.

   The frequency of the inspections and maintenance will vary depending on these environmental conditions as well as the condition of the air supply to the system. The owner is responsible for maintaining the fire protection system and devices in proper operating condition. Refer to MECHANICAL SECTION for maintenance instructions.
4. General Description

There are two types of SUREFIRE® preaction systems, and both of them use closed automatic sprinklers in the sprinkler piping. A detection network is used in parallel with the automatic sprinkler system and is designed to operate before a sprinkler head fuses. This network is electric and may be actuated by manual, fixed temperature, rate-of-rise temperature, smoke or other means. Detection system operates before the sprinkler fuses and gives an alarm.

This TOTALPac®3 SUREFIRE® integrated fire protection system by FireFlex Systems Inc. consists of a fail-safe preaction system trim totally pre-assembled, pre-wired and factory tested. All electrical and mechanical components of the system are contained in one single cabinet. The only connections required for installation are the water supply inlet, water discharge outlet, main drain, and the electrical detection and alarm connections. The discharge outlet is connected to a fixed piping system of automatic sprinklers. Water is the extinguishing agent.

Fail-safe preaction systems are fully supervised. The TOTALPac®3 SUREFIRE® system is completely supervised in order to monitor its integrity. The sprinkler piping is supervised by compressed air pressure or nitrogen. If there is a leak on the system or if a sprinkler head is accidentally broken, only an audible signal will sound.

In single and double interlocked preaction systems, no water will enter the sprinkler system because the detection system has not operated. The electrical detectors and associated wiring are also supervised.

The most common applications are very large dry systems which exceed the capacity normally permitted on a dry valve and in a system application where it is important to control accidental water discharge due to damaged sprinkler piping.

5. Features

Your TOTALPac®3 SUREFIRE® unit is superior than many other products available on the market now and has been manufactured by the company that has introduced and developed the concept of integrated fire protection systems in the market.

Main features are:
- Trouble free design for safe and easy application
- Available in 5 sizes from 1½" to 6" diameter
- Uses the Viking Deluge Valve
- Available only with an Integrated Control Panel
- Compact, aesthetic and easy to move
- User-friendly standardized owner's manual with every unit
- Unique serial number on every unit
- Uses only UL, C-UL Listed and FM Approved components
- Designed in accordance with NFPA Standards
- Trim is fully assembled and tested at the factory
- All trims are galvanized steel, Listed and Approved for 250 psi (1724 kPa) service maximum.
- Quick connections to water supply and drain on both sides, and sprinkler riser on top of cabinet, all available with grooved end or flanged fittings
- No open drain cup inside cabinet
- Sturdy 14 Gauge steel cabinet painted fire red with oven baked polyester powder on phosphate base
- Textured rust proof finish
- Neoprene gasket on all doors to eliminate vibrations
- Easily removable doors for ease of access
- Separate unlocked access hatch to emergency manual release
- Key-alike locks on all cabinet doors
- Manufactured under ISO-9001 quality control procedures.

Note: Every TOTALPac®3 SUREFIRE® Unit is identified with its unique Serial Number. This number is located on an adhesive label inside the main door panel and is used to maintain a record in our computerized data base. Have this Serial Number handy when calling for information on your unit (format is TOT3####).
6. Configurations Description

**TOTALPac®3 SUREFIRE®** Preaction systems are built around the Viking trim using straight through deluge valves Model F-1 (Model F-2 is the Halar® Coated version for use in corrosive environments).

All the valves are rated up to a maximum of 250 psi WWP (1724 kPa) max. and are available in the following diameters:

- 1 1/2" (40 mm)
- 2" (50 mm)
- 3" (80 mm)
- 4" (100 mm)
- 6" (150 mm)
- 8" (200 mm)

**TOTALPac®3 SUREFIRE®** Preaction systems are supplied with groove–groove deluge valves. Units with flange–flange deluge valves are also available on request.

Preaction systems operate in several ways and perform a variety of functions. Following is a summary of the most common types of systems:

- **Single Interlocked.**
  
  This preaction system requires the operation of the detection system to trip the Viking Deluge Valve and fill the system with water. Water will then be discharged on the fire when the sprinklers fuse. If the sprinkler piping or sprinkler is broken, the valve will not open. If the detection system operates due to fire, damage or malfunction, the valve will open but the water will be contained in the sprinkler piping.

  If the detection system does not operate, the deluge valve will not open. Supervision is generally used since control of accidental discharge is usually desired.

  The single interlocked SUREFIRE® preaction system is commonly used where it is desirable to have water available at the sprinkler when the sprinkler fuses and where the sprinkler piping and detectors are subject to damage. The most common applications are very large dry systems which exceed the capacity normally permitted on a dry valve and in a system application where it is important to control accidental water discharge due to damaged sprinkler piping.

- **Double Interlocked.**
  
  This preaction system utilizes a detector system and pressurized air or gas in the sprinkler piping. This system utilizes the Viking Deluge Valve and is so arranged that the valve will open only when both pressure is reduced in the sprinkler piping AND the detection system operates. If the detection system operates due to fire, damage or malfunction, the valve will not open. If the sprinkler piping is damaged or a sprinkler is broken or fused, the valve will not open.

  The operation of both a sprinkler and a detector is required before the valve will open, allowing water to enter the system piping.

  Since pressurized air or nitrogen gas is available in the output piping, the system is usually supervised. The double interlocked system is commonly used in freezers where flooding of the pipe can have serious consequences and in system applications where it is important to control accidental discharge of the system.

  Care should be taken because Double Interlocked Preaction Systems may not produce flow from opened sprinklers as quickly as Single Interlocked Preaction Systems. Activation of a sprinkler alone will sound an alarm but will NOT cause the system to fill with water.

7. SUREFIRE® Release System

**Note:** Numbers indicated between brackets refer to items on the TRIM and AIR SUPPLY SCHEMATICS.

The Viking SUREFIRE® preaction system, available for Single and Double Interlocked, electric releases only, utilizes a Viking Model E Deluge valve (A1), with a VFR-400 Control Panel together with additional valves, devices and trim to form a unique operating system.

The system piping is pneumatically pressurized to monitor the integrity of the piping, fittings and sprinklers and act as a fail-safe emergency backup to the electrical detection system. The system piping is normally dry and may be installed in locations subject to freezing. Built in with special features to minimize accidental water damage, unlike other systems, it can be installed where the detector and/or sprinklers are easily damaged or broken accidentally. In addition to special features that offer perfect fail-safe modes, the Viking SUREFIRE® Preaction Systems also provide excellent fire protection environment with or without electrical power.

Equipped with batteries that provide up to ninety (90) hours of emergency power. If the AC power fails and the battery backup power expires while the system is operating, the preaction system will “fail-safe”, and continue flowing until AC power is restored or the system is manually shut-off.
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1- Installation, Operations & instruction

See Trim Schematic at the end of the current Section

1.1. Installation

1. Install the TOTALPac®3 Surefire® cabinet and connect the system according to instruction manual and technical data supplied.

Note: The drain collector shall be connected to an open drain. Do not restrict or reduce drain piping.

2. Install the automatic sprinkler piping, detection and signaling circuits in accordance with applicable NFPA standards.

3. Conform to local municipal or other codes regarding installations of fire protection systems.

4. Perform preliminary inspection outlined below prior to putting system in service.

5. Put the system into operation as outlined below.

6. Perform the annual inspection sequence and test each detector and alarm unit.

7. If the system does not operate as it should, make the necessary corrections according to manuals issued or consult your distributor or FireFlex Systems Inc.

8. Make sure that building owner or a delegated representative has received instructions regarding the operation of the system.

TOTALPac®3 Units must be installed in an area not subject to freezing temperatures or physical damage.

1.2 Preliminary inspection before placing the system in service

1. Open door to mechanical section. Main Water Supply Control Valve (D1) should be CLOSED. Priming valve (B1) must be CLOSED. Air supply must be CLOSED (see AIR SUPPLY SECTION). Flow Test Valve (B6) and main drain valve (D3) must be CLOSED. Alarm test valve (B5) must be CLOSED. All gauges (B11, B12 and E3) should show 0 psi pressure.

2. Using the built-in contractor's hydrostatic test ports (see TRIM SCHEMATIC for location) fill sprinkler system with water and maintain pressure as per NFPA-13 requirements.

Warning ! Do not subject the air pressure gauges to hydrostatic pressures above 250 psi. Close gauge valves before proceeding with hydrostatic test.

3. Correct leaks if any before completing test. OPEN main drain valve (D3) completely. Completely drain the sprinklers piping.

Note: After pressure testing the system with water, make sure the air pressure gauge of the Pneumatic Actuator (F4) reads the same value as the air supply pressure gauge (E3). If value differs, the float check valve (E9) may be sticking. Gently press on the plunger of the float check valve (E9) to un-stick. Pressure should then equilibrate. Perform same when pressurizing system with air.

4. Connect all detection and alarm audible devices, where applicable, according to electrical schematics (see field wiring diagram in PROGRAMMING SECTION).

5. Connect the AC power for the control panel and for the optional air compressor on two separate breakers in the electric distribution panel (see field wiring diagram in Programming Section).

Note: Do not use these circuit breakers for other parallel applications. If necessary, equip each circuit breaker with a security seal in order to avoid accidental closing.
1.3 Placing the system in service
(Refer to TRIM SCHEMATIC)

1. Verify that the system has been properly drained. System Main Drain Valve (D3) is OPEN. Verify that the Emergency Release Valve (B10) is CLOSED.
2. CLOSE System Main Drain Valve (D3).
3. Restore supervisory pressure to sprinkler piping.
   a. On systems provided with an Air Maintenance Device (Air Option Style "B"), verify that the ½" valve (E8) in the Air Pressure Maintenance Device by-pass trim is CLOSED and that both ¼" valves (E6 & E7) are OPEN.
4. Verify that all releasing devices are set and that any Inspector's test Valve and/or auxiliary drain valves are CLOSED. OPEN Priming Valve (B1).
5. Reset the Control Panel. Solenoid valve (F1) should close. Flow from solenoid valve to drain should stop.
6. OPEN Flow Test Valve (B6).
7. PARTIALLY OPEN Main Water Supply Control Valve (D1).
8. When full flow develops from the Flow Test Valve (B6), CLOSE the Flow Test Valve.
   a. Verify that there is no flow from the Drip Check when the plunger is pushed.
9. FULLY OPEN the Main Water Supply Control Valve (D1).
   After the Deluge Valve is set, operation of the valve requires the release of priming water from the priming chamber. This may be by automatic or manual operation of the release system described above. For specific trim arrangement, refer to the MECHANICAL TRIM DESCRIPTION.
10. Verify that the Alarm Test Valve (B5) is CLOSED and that all other valves are in their "normal" operating position (Refer to TRIM SCHEMATIC for details).
11. Depress the plunger of the Drip Check Valve (B7). No water should flow from the Drip Check when the plunger is pushed.
12. Check and repair all leaks.
13. On new installations, systems that have been placed out of service, or where new equipment has been installed, trip test the system to verify that all equipment functions properly. Refer to INSPECTIONS & TESTS, article 1.7.2 of the current section for instructions.

Warning! Performing a trip test results in operation of the Deluge Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

Note: When a valve has been removed from service and is subject to freezing or will be out of service for an extended period of time, all water must be removed from the priming chamber, trim piping, water supply piping and any other trapped areas.

14. After completing the trip test, perform MAINTENANCE – SEMI-ANNUALLY, article 1.8 of the current section.
15. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the affected area that the system is in service.

Pressures settings:
For complete pressures settings, see "Air Supply" Section in the current manual.
1.4 System Operation

1.4.1 In the SET condition:
System water supply pressure enters the priming chamber of the Deluge Valve (A1) through the priming line which includes a normally open priming valve (B1), strainer (B2), restricted orifice (B3) and spring loaded check valve (B4).
Water supply pressure is trapped in the priming chamber by spring loaded check valve (B4), normally closed Emergency Release (B11), Pneumatic Actuator (F3) and normally closed Solenoid Valve (F1).
Water supply pressure in the priming chamber holds the clapper of the Deluge Valve (A1) on the seat due to the differential design of the valve pressure.

1.4.2 In a fire condition:
Single Interlocked Surefire® Preaction Systems:
When the detection condition is satisfied, the VFR-400 Control Panel activates a piezo sounder and energizes normally closed Solenoid valve (F1) open.
Pressure is released from the priming chamber of the Deluge Valve (A1) to the open drain manifold faster than it is supplied through the restricted orifice (B3). Pressure is released from the priming chamber faster than it is supplied through the restricted orifice (B3). The Deluge Valve clapper opens to allow water to flow into the system piping and alarm devices, causing the optional Water Motor Alarm (C2) and water flow alarms connected to the Alarm Pressure Switch (C1) to activate. When the deluge valve operates, the sensing end of the PORV (B9) is pressurized, causing the PORV to open. When the PORV opens, it drains the priming water pressure to the priming chamber, preventing the Deluge Valve (A1) from resetting. When a sprinkler head opens, water will flow from the system.

The Deluge Valve can only be reset after the system is taken out of service, and the outlet chamber of the deluge valve and associated trim piping is depressurized and drained.

Double Interlocked Surefire® Preaction Systems:
When the detection condition is satisfied, the VFR-400 Control Panel activates a piezo sounder and initiates the appropriate detection alarms. No water enters the piping at this time.
When sprinkler operates, as caused by heat or fire, system supervisory air is lost, and the Low Air Pressure Switches (E4 & E5) are activated. Only after both indicating circuits have operated, the control panel energizes normally closed Solenoid valve (F1) open and the normally open Solenoid valve (F2) closed. Pressure is released from the priming chamber faster than it is supplied through the restricted orifice (B3). The Deluge Valve clapper opens to allow water to flow into the system piping and alarm devices, causing the optional Water Motor Alarm (C2) and water flow alarms connected to the Alarm Pressure Switch (C1) to activate. When the deluge valve operates, the sensing end of the PORV (B9) is pressurized, causing the PORV to open. When the PORV opens, it drains the priming water pressure to the priming chamber, preventing the Deluge Valve (A1) from resetting. When a sprinkler head opens, water will flow from the system.

The Deluge Valve can only be reset after the system is taken out of service, and the outlet chamber of the deluge valve and associated trim piping is depressurized and drained.

1.4.3 Manual operation:
Anytime the handle of the Emergency Release Valve (B10) is pulled, pressure is released from the priming chamber; Deluge Valve will open. Water will flow into the system piping, and alarm devices (C1 & C2) will operate. If a sprinkler head opens, water will flow from the system.
1.4.4 Trouble conditions:

**Single Interlocked Preaction Systems:**
If the system piping and/or the sprinklers are damaged and either the AC Power and/or Standby Battery power is available, the low air supervisory switch (E4) will activate a trouble alarm at the VFR-400 Panel, and the normally open Release Solenoid valve (F2) closed to prevent water flow through any opened sprinkler(s). In the event of fire that cause any detector to operate, the normally closed solenoid valve (F1) will open and water will flow through any open sprinkler(s).

**Double Interlocked Preaction Systems:**
If the system piping and/or the sprinklers are damaged and either the AC Power and/or Standby Battery power is available, the low air supervisory switch (E4) detection circuit four (4) will activate a trouble at the VFR-400 panel, when supervisory air drops to a point just above the operation of the pneumatic actuator (F3). The second pole of supervisory switch (E4) activates the normally open solenoid valve (F2) closed to prevent water flow through any opened sprinkler(s). In the event of a fire that causes the detectors to operate when air pressure drops just below the trouble air setting, the air supervisory switch (E5) linked to the normally closed solenoid valve (F1) will activate the normally closed solenoid valve (F1).

If the detection system is damaged or malfunctions, the control panel will go into alarm. In the event of fire, the deluge valve (A1) will NOT open and the emergency release (B11) must be pulled in order to provide water flow through any opened sprinkler(s).

**Loss of power prior to operation:** If the AC power fails, the SUREFIRE® preaction system continues to operate on the standby batteries. Should the AC power and the standby batteries drop power to a point less than required to operate solenoid valve (F1), both solenoid circuits of panel drop out, allowing normally open solenoid (F2) to open. Prior to the operation of the system, all alarms will be lost. As long as air pressure remains in the system piping, the Pneumatic Actuator (F3) will keep the Deluge valve from opening. If the system air pressure is lost, the Deluge valve (A1) will open, allowing water to flow into the system piping and be discharged from any open sprinkler(s).

**Loss of power during operation:** If the AC power fails while the system is flowing water, the normally open solenoid valve (F2) will open and the normally closed solenoid valve (E1) will close. The PSOV (B9) is already pressurized closed to prevent pressure in the priming chamber from building up. Water from main supply control valve (D1) will continue entering the system, and flow through any open sprinkler(s).
1.5. Emergency Instructions (refer to TRIM SCHEMATIC)

To take system Out of Service:

**Warning!** Placing a control valve or detection system out of service may eliminate the Fire Protection capabilities of the system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employ a fire patrol in the affected areas.

After a fire, verify that the fire is OUT and that placing the system out of service has been authorized by the appropriate Authority Having Jurisdiction.

1. Close Main water supply control valve (D1).
2. Open system Main Drain Valve (D3).
3. Silence alarms (refer to CONTROL PANEL SECTION for additional details when panel is provided with this unit).

**Note:** Electric alarms controlled by a pressure switch installed in the ¼" (15mm) NPT connection (C2) for a Non-interruptible Alarm Pressure Switch cannot be shut-off until the Deluge or Flow Control Valve is reset or taken out of service.

4. Shut-off the air supply (refer to AIR SUPPLY SECTION).
5. Open Flow Test Valve (B6).

Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary.

7. Replace any detectors that have been damaged.
8. Replace any sprinklers that have opened, been damaged, or have been exposed to fire conditions.
9. Perform all maintenance procedures recommended in MAINTENANCE, describing individual components of the system that has operated.
10. Return the system to service as soon as possible.

1.6 Placing the system back in service after operation: (refer to TRIM SCHEMATIC)

1. Verify that the system has been properly drained. System Main Drain Valve (D3) is OPEN. Verify that the Emergency Release Valve (B10) is CLOSED.
2. CLOSE System Main Drain Valve (D3).
3. Restore supervisory pressure to sprinkler piping.
   a. On systems provided with an Air Maintenance Device (Air Option Style “B”), verify that the ¼" valve (E8) in the Air Pressure Maintenance Device by-pass trim is CLOSED and that both ¼" valves (E6 & E7) are OPEN.
4. Verify that all releasing devices are set and that any Inspector’s test Valve and/or auxiliary drain valves are CLOSED. OPEN Priming Valve (B1).
5. Reset the Control Panel. Solenoid valve (F1) should close. Flow from solenoid valve to drain should stop.
6. OPEN Flow Test Valve (B6).
7. PARTIALLY OPEN Main Water Supply Control Valve (D1).
8. When full flow develops from the Flow Test Valve (B6), CLOSE the Flow Test Valve.
   a. Verify that there is no flow from the Drip Check when the plunger is pushed.
9. FULLY OPEN the Main Water Supply Control Valve (D1).
10. Verify that the Alarm Test Valve (B5) is CLOSED and that all other valves are in their "normal" operating position (Refer to TRIM SCHEMATIC for details).
11. Depress the plunger of the Drip Check Valve (B7). No water should flow from the Drip Check when the plunger is pushed.
12. Check and repair all leaks.
13. On systems that have been placed out of service, or where new equipment has been installed, trip test system to verify that all equipment functions properly. Refer to MAINTENANCE – ANNUALLY for instructions.

**Warning!** Performing a trip test results in operation of the Deluge Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

14. After completing the trip test, perform MAINTENANCE – SEMI-ANNUALLY.

**Note:** When a valve has been removed from service and is subject to freezing or will be out of service for an extended period of time, all water must be removed from the priming chamber, trim piping, water supply piping and any other trapped areas.

15. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the affected area that the system is in service.
1.7 Inspections & Tests

It is imperative that the system be inspected on a regular basis. Refer to INSPECTIONS and TESTS recommended in current Viking technical Data describing individual components of the Viking Preaction System used.

The frequency of the inspections may vary due to contaminated water supplies, corrosive or humid atmospheres as well as the condition of the air supply to the system. In addition to the instructions herewith, local Authority Having Jurisdiction may have additional maintenance, testing and inspection requirements which must be followed.

**Warning!** Any system maintenance which involves placing a control valve or detection system out of service may eliminate the fire protection capabilities of that system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected areas.

1.7.1 Low Air Pressure Alarm Test:
Quarterly testing of low air alarms is recommended.

**To test Sprinkler System "Low Supervisory Air" Alarm:**

1. To prevent operation of the Deluge Valve and filling the system with water during the test, DO NOT operate the electric detection system during this test. Consider closing the Main Supply Control Valve (D1).

Note: When testing a single interlocked preaction system, Main Supply Control Valve (D1) should be CLOSED. If the Main Water Supply Control Valve was NOT closed in Step 1, proceed directly with steps 7 & 8 below.

2. Fully open the sprinkler system Inspectors Test Valve to simulate operation of a sprinkler.

3. Verify that low air alarms operate within an acceptable time period and continue without interruption.

4. Close the Inspectors Test Valve.

5. Establish recommended pneumatic supervisory pressure to be maintained. Refer to paragraph 2, INSTALLATION.

6. Reset System Control Panel. Alarms should stop.

**When testing is complete, return the system to service following steps 1 through 8 below.**

**Warning!** This procedure applies only when done in conjunction with "Low Air" Alarm testing described above.

.7 Verify that the pressure indicated on Priming Pressure Water Gauge (B11) indicates that the priming chamber is pressurized with System Water Supply Pressure (B12).

.8 Depress the plunger of Drip Check (B7). No water should flow from the Drip Check when the plunger is pushed.

.9 Open Flow Test Valve (B6).

.10 Partially open Main Water Supply Control Valve (D1).

.11 When full flow develops from Flow Test Valve (B6), close the Flow Test Valve.

.12 Fully open and secure the Main Water Supply Control Valve (D1).

.13 Verify that the Alarm Test Valve (B5) and all other valves are in their NORMAL operating position.

.14 Depress the plunger of the Drip Check (B7). No water should flow from the Drip Check when the plunger is pushed.

1.7.2 Full Flow Trip test:
Performance of a Trip Test is recommended annually during warm weather. Consider coordinating this test with operation testing of the detectors.

**Warning!** Performance of this test will cause the Deluge / Flow Control Valve to open and the sprinkler system to fill with water unless the Optional Shut-Off Valve is installed and closed prior to the test.

**To Trip Test the Preaction System:**

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.

2. Close the optional Shut-Off Valve (D5) if installed. Trip the Deluge valve by performing option "a" or "b" below.

   a. Operate a detector according to the manufacturers instructions.

   b. Open the sprinkler system Inspectors Test Valve.

   c. Open the door of Emergency Release Valve (B10) and pull the handle.

3. The Deluge or Flow Control Valve should open, filling the sprinkler system with water and Water Flow Alarms should operate.

3. Open the sprinkler system Inspectors Test Valve to

When trip testing is complete:

1. Perform steps 1 through 10 of Paragraph 2 EMERGENCY INSTRUCTIONS to take the system out of service.

2. Perform steps 1 through 11 of paragraph 3 PLACING THE SYSTEM BACK IN SERVICE to return the system to service.

3. Notify the Authority Having Jurisdiction and those in the area that testing is complete.
1.7.3 Drain Test: A main drain test shall be conducted to determine whether there has been a change in the condition of the water supply piping and control valves.

Test procedure:
1. Record the pressure indicated by the supply water gauge (B12).
2. Close the alarm control valve (if applicable)
3. Fully open the flow test valve (B6).
4. Record residual pressure.
5. Close the flow test valve slowly (B6).
6. Record the time taken for supply water pressure to return to the original pressure.

Note: A main drain test shall be conducted any time the water supply control valve (D1) is closed and reopened at the system.
1.8 Maintenance

| Note: | The owner is responsible for maintaining the fire protection system and devices in proper operating condition. |

Refer to MAINTENANCE INSTRUCTIONS provided in current Viking Technical Data describing individual components of the Viking Preaction System used.
Where difficulty in performance is experienced, the valve manufacturer or his authorized representative shall be contacted if any field adjustment is to be made.
The following requirements are based upon NFPA-25:

**Records.**
Records of inspections, tests, and maintenance of the system and its components shall be made available to the Authority Having Jurisdiction upon request. Typical records include, but are not limited to, valve inspections; flow, drain, and pump tests; and trip tests of dry pipe, deluge, and preaction valves.
Acceptance test records should be retained for the life of the system or its special components. Subsequent test records should be retained for a period of 1 year after the next test.
The comparison determines deterioration of system performance or condition and the need for further testing or maintenance.

**Monthly:**
.1 Inspection of gauges (water supply and system pressure) to ensure good condition and normal water supply pressure.
.2 Control valve shall be externally inspected. The valve inspection shall verify the following:
   a. The gauges indicate that normal supply water pressure is being maintained.
   b. The valve is free of physical damage.
   c. All valves are in the appropriate open or closed position.
   d. There is no leakage from the alarm drains.

**Quarterly:**
.1 Alarm Device (pressure or flow switch).
   (Testing by opening the inspector's test connection)
.2 Main Drain Test (Riser Flow Test) to determine if change in water supply or control valve position.

Test procedure:
.1 Record the pressure indicated by the supply water gauge.
.2 Close the alarm control valve.
.3 Fully open the main drain valve.
.4 Record residual pressure.
.5 Close the main drain valve slowly.
.6 Record the time taken for supply water pressure to return to the original pressure.
.7 Open the alarm control valve
.8 Low air pressure alarm switch

**Semi-Annually:**
Valve supervisory switch shall be tested to verify the operation of the switch upon movement of the hand wheel.

**Annually:**
.1 Manual Pull station test
.2 Full trip test: Isolation valve perfect for special site condition such as freezing condition.
.3 Record indicating the date of the last trip, tripping time and name of the organization conducting the test shall be maintained at a location available for review by the Authority Having Jurisdiction.

**Every 5 years:**
.1 Test on gauge (gauge precision required: less than 3% of the full scale)
.2 Test on control valves operation
.3 Interior of valves, strainers, filters and orifices.
.4 Main drain test.
2-Single Interlocked SUREFIRE® System

2.1. Description
The TOTALPAC®3 SUREFIRE® System with the Viking Single Interlocked Preaction Trim utilizes a Viking Deluge valve (A1) and a pneumatically pressurized automatic sprinkler system. The system piping is pneumatically pressurized for supervisory purposes only. This feature serves to prevent undetected leaks. If the system piping is damaged, supervisory pressure is reduced and a "low air" alarm is activated.

SUREFIRE® preaction systems require two electric Solenoid valves (F1 & F2) controlled by an approved System Control Panel with compatible detection system. In fire conditions, when the detection system operates, System Control Panel energizes the normally closed Solenoid Valve (F1) open, causing Deluge Valve (A1) to open. The sprinkler system fills with water. If any sprinklers have opened, water will flow from the system. If sprinklers have not opened, water will be in the piping when the sprinkler operates. A sprinkler head MUST open before water flows from the system. Activation of a detector alone will only cause the system to fill the piping network with water and sound an alarm.

Single interlocked preaction systems are designed so the Deluge valve will open ONLY when a detector on the electric release system operates. A loss of pressure in the sprinkler system will only cause a supervisory condition. When the Deluge Valve opens, water will flow into the sprinkler piping and out of open sprinklers and any opening on the system.

Single interlocked preaction systems are designed to provide maximum protection against accidental water damage. Both the electrical detection system which must be activated and a sprinkler head be fused before water is discharged.

SUREFIRE® Single interlocked preaction systems are commonly used where it is desirable to have water available at the sprinkler when the sprinkler fuses and where both the detection system and the sprinkler piping are subject to damage. The most common applications are very large dry systems which exceed the capacity normally permitted on a dry valve and in system applications where it is important to control accidental water discharge due to damaged sprinkler piping.

Note: The TOTALPAC®3 Trim is provided with a contractor's hydrostatic test water supply port handily located on the priming trim (see trim schematic for exact location). Simply remove the plug of the Tee connection and connect the test pump between this port and the system side port located on the air trim.

2.2. Normal condition
1. Control panel of the TOTALPAC®3 system
   a) Green lamp identified "AC POWER" lights up.
   b) All other lamps are off.

2. Valves
   a) Main water supply control valve (D1) is OPEN.
   b) All upstream water supply valves are OPEN.
   c) Priming valve (B1) is OPEN.
   d) Flow test valve (B6) is CLOSED.
   e) System main drain valve (D3) is CLOSED.
   f) Alarm test valve (B5) is CLOSED.
   g) Manual emergency release valve (B10) is CLOSED (handle in vertical position).
   h) Air supply is OPEN (see AIR SUPPLY SECTION).
   i) All gauge valves are OPEN.

3. Gauges
   a) Water supply (B12) - at water supply pressure
   b) Priming chamber (B11) - should be equal to, or higher than, water supply pressure (B12).
   c) Sprinklers air pressure (E3) – See Table 1 below.

4. Pressure switches
   a) Alarm switch (C1) - should activate when pressurized higher than 5 psi (35 kPa).
   b) Low air supervisory pressure switch (E4) - See Table 1 below.

5. Optional equipment (see OPTIONAL EQUIPMENT)
   a) Shut-off valve (D4) is OPEN.

REFER TO NEXT PAGE TO VIEW TRIM SCHEMATIC.
**Trim Schematic:** Single Interlocked SUREFIRE® with Electric Release

**Trim Components:**

A. Valve:
   - A1 Deluge valve

B. Deluge Valve Trim:
   - B1 Priming valve
   - B2 Strainer
   - B3 1/16" Restricted orifice
   - B4 Spring loaded check valve
   - B5 Alarm test valve
   - B6 Flow test valve
   - B7 Drip check valve
   - B8 Drain check valve
   - B9 Pressure operated relief valve (PORV)
   - B10 Emergency release valve
   - B11 Priming pressure water gauge & valve
   - B12 Water supply pressure gauge & valve
   - B13 Clapper check valve

C. Water Flow Alarm Equipment:
   - C1 Alarm pressure switch
   - C2 Connection to water motor gong (strainer supplied by contractor)

D. Valve:
   - D1 Water supply control valve
   - D2 Riser check valve
   - D3 Main drain valve

E. Supervisory Air Supply:
   - (See AIR SUPPLY SECTION for additional details)
   - E4 Air supervisory pressure switch
   - E9 Float-check assembly

F. Release System:
   - F1 N.C. Solenoid valve – 24Vdc
   - F2 N.O. Solenoid valve – 24Vdc
   - F3 Pneumatic actuator
   - F4 Pneumatic actuator pressure gauge
   - F5 5/64" Restricted orifice
3. Double Interlocked SUREFIRE® System

3.1. Description

The TOTALPac®3 SUREFIRE® System with the Viking Double Interlocked Preaction Trim utilizes a Viking Deluge Valve (A1), pneumatic supervision of the automatic sprinkler system, a normally closed solenoid valve (F1) and a normally open solenoid valve (F2), both controlled by an approved system control panel with compatible detection system. The system control panel has two initiating circuits configured for "cross-zones" operation. One initiating circuit is connected to the electric detection system; the other to an alarm "Very Low Air" Supervisory Switch (E4).

In fire conditions, BOTH the electric detection system must activate AND supervisory pressure be relieved from the sprinkler system before the deluge valve will open to fill the sprinkler system with water. If the electric detection system (alone) operates due to fire, damage, or malfunction, an alarm will activate, but the deluge valve will NOT open. If the sprinkler piping is damaged or a sprinkler is broken or fused, but the release system has not activated, an alarm will activate but the deluge valve will NOT open.

Double interlocked preaction systems are designed so the Deluge valve will open when BOTH a detector on the detection system operates, AND a loss of pressure in the sprinkler system occurs. When the Deluge Valve opens, water will flow into the sprinkler piping and out of sprinklers and any opening on the system.

SUREFIRE® Double Interlocked TOTALPac®3 Systems are commonly used as refrigerated area systems. Double Interlocked Preaction Systems are also commonly used where flooding of the pipe can have serious consequences, and where it is important to control accidental water discharge due to damaged sprinkler piping.

NOTE: Care should be taken because Double Interlocked Preaction Systems may not produce flow from opened sprinklers as quickly as Single or Non-Interlocked Preaction Systems. Activation of a releasing device alone, or operation of a sprinkler alone, will sound an alarm, but will NOT cause the system to fill with water.

The TOTALPac®3 Trim is provided with a contractor’s hydrostatic test water supply port handily located on the priming trim (see trim schematic for exact location). Simply remove the plug of the Tee connection and connect the test pump between this port and the system side port located on the air trim.

3.2. Normal condition

6. .1 Control panel of the TOTALPac®3 system
   a) Green lamp identified "AC POWER" lights up.
   b) All other lamps are off.

   .2 Valves
   a) Main water supply control valve (D1) is OPEN.
   b) All upstream water supply valves are OPEN.
   c) Priming valve (B1) is OPEN.
   d) Flow test valve (B6) is CLOSED.
   e) System main drain valve (D3) is CLOSED.
   f) Alarm test valve (B5) is CLOSED.
   g) Manual emergency release valve (B10) is CLOSED (handle in vertical position).
   h) Air supply is OPEN (see AIR SUPPLY SECTION).
   i) All gauge valves are OPEN.

8. .3 Gauges
   a) Water supply (B12) - at water supply pressure
   b) Priming chamber (B11) - should be equal to, or higher than water supply pressure (B12).
   c) Air pressure (E3) – See Table 1 below.

9. .4 Pressure switches
   a) Alarm switch (C1) - should activate when pressurized higher than 5 psi (35 kPa).
   b) Low air supervisory pressure switch (E4 & E5) – See Table 1 below).

10. .5 Optional equipment (see OPTIONAL EQUIPMENT SECTION)
   a) Shut-off valve (D4) is OPEN.
   b) Accelerator bypass valve (1) is OPEN.

Refer to next page to view trim schematic.

Note: Factory Mutual <FM> and NYC MEA approve SUREFIRE® Double Interlocked Preaction Systems for use in refrigerated areas only.
Trim Schematic: Double Interlocked SUREFIRE® with Electric Release

Trim Components:

A. Valve:
   A1 Deluge valve

B. Deluge Valve Trim:
   B1 Priming valve
   B2 Strainer
   B3 1/16" Restricted orifice
   B4 Spring loaded check valve
   B5 Alarm test valve
   B6 Flow test valve
   B7 Drip check valve
   B8 Drain check valve
   B9 Pressure operated relief valve (PORV)
   B10 Emergency release valve
   B11 Priming pressure water gauge & valve
   B12 Water supply pressure gauge & valve
   B13 Clapper check valve

C. Water Flow Alarm Equipment:
   C1 Alarm pressure switch
   C2 Connection to water motor gong (strainer supplied by contractor)

D. Valve:
   D1 Water supply control valve
   D2 Riser check valve
   D3 Main drain valve

E. Supervisory Air Supply:
   E4 Air supervisory pressure switch - DPST
   E5 Air supervisory pressure switch - SPST
   E9 Float-check assembly

F. Release System:
   F1 N.C. Solenoid valve – 24Vdc
   F2 N.O. Solenoid valve – 24Vdc
   F3 Pneumatic actuator
   F4 Pneumatic actuator pressure gauge
   F5 5/64" Restricted orifice
Preaction trim options

1. Shut-off valve & sight glass:

The Shut-off valve & sight glass Option is intended to be used for applications where testing of the system operation without filling the sprinkler piping network is desirable and where it is critical that all functions of the preaction system be tested under actual discharge conditions. Examples of such applications are freezers, ovens, museums, data processing and other hazards where the possibility of water leaking from the piping system is to be avoided at all costs.

Operation of the shut-off valve: Inspection of the system can be implemented without filling the sprinkler piping system with water.

1. CLOSE the supervised sprinkler piping system shut-off valve (D4); the valve is supervised on the same circuit as the system water supply control valve (D1).
2. OPEN the system main drain valve (D3).
3. Simulate the operation of the system to open the deluge (A1) (See annual test under the INSPECTION AND MAINTENANCE section.) Using a flashlight in the sight glasses, verify that water flows through the sight glass assembly (D5).
4. Once tests are completed, make sure the system main drain valve (D3) is completely CLOSED. Reset the system as per PLACING THE SYSTEM BACK IN SERVICE.
5. FULLY OPEN the system shut-off valve (D4). Reset the system’s release control panel.

Note: The fire department connection hardware itself (drain, Siamese, etc.) is NOT provided with this option and shall be provided by the installing contractor. Refer to NFPA-13 Standard for additional information about the equipment layout and installation.

Warning: Fire department connection is NOT AVAILABLE on 6" & 8" systems.

Figure 1 – Shut-off valve & sight glass

2. Fire department connection:

The fire department connection option consists of a grooved tee fitting installed in lieu of the 90 degree elbow at the outlet of the deluge valve (A1). An access hole of the proper diameter is factory pre-drilled on the side of the TOTALPAC®3 enclosures for connection of the piping going to the fire department connection.

Figure 2 – Fire Department Connection:
3. Semi and full-flanged option:

When required by the user, TOTALPAC®3 units can be provided in either a semi-flanged or full flanged configuration.

The semi flanged option provides flanged fittings only on the water inlet pipe (side needs to be specified at the time of order) and on the system riser outlet. The drain manifold is then provided with a threaded end that also needs to have its side specified (left or right). The rest of the fittings are the same as usual with the main components being provided in the standard flanged-grooved configuration.

The full flanged option is the same as above but goes a step further with the main components being also provided with a flanged-flanged configuration.

When provided, the face of the flanges will always be situated 6 inches from the outside face of the mounting base or cabinet surface. On skid units, the surface of the flange on the outlet riser will always be 6 inches above the dimension shown on the dimensional data of the system ordered.

Figure 3 – Semi-flanged unit typical detail:

4. Anti-column device option:

The model LD-1 anti-column device is an optional trim component designed for use with preaction sprinkler systems. The anti-column device automatically prevents an unwanted water column from establishing within the system riser. On preaction sprinkler systems the anti-column device prevents water from columning downstream of the easy riser check valve.

Figure 4 – Anti column device detail:
1 Cabinet Air Supplies

Preaction sprinkler systems using air pressure for supervisory or releasing purposes are provided with either internal or external supervised air supplies.

Four (4) styles of air supplies are available for the TOTALPAC®3 units depending on needs or configurations. These air supplies are all factory assembled, mounted in the cabinet and pressure tested. They are all located in the top part of the cabinet, hung on mounting rails above the valve trim. Here is the description of those options:

Air Supply Style "A": (Refer to Figure 1) Used only for the sprinkler piping network of electrically operated preaction systems. Air supply style "A" includes the air compressor mounted inside the TOTALPAC®3 cabinets with its supervisory trim and options. Compressors are of the oilless piston type without reservoir and are factory piped to the sprinkler piping system riser, all within the TOTALPAC®3 cabinets. They are available in six (6) sizes, see table 1 for details.

Table 1

<table>
<thead>
<tr>
<th>System sizes</th>
<th>Compressor sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/6 HP</td>
</tr>
<tr>
<td>1-1/2&quot;</td>
<td>■</td>
</tr>
<tr>
<td>2&quot;</td>
<td>■</td>
</tr>
<tr>
<td>3&quot;</td>
<td>■</td>
</tr>
<tr>
<td>4&quot;</td>
<td>■</td>
</tr>
<tr>
<td>6&quot;</td>
<td>■</td>
</tr>
<tr>
<td>8&quot;</td>
<td>n/a</td>
</tr>
</tbody>
</table>

All the air compressors have open, single phase motors with internal thermal protection and can be ordered in three supply voltages settings:

- 115Vac-60Hz
- 230Vac-60Hz
- 220Vac-50Hz.

Note: 2HP air compressor is only available 230Vac-60Hz

Air Supply Style "B": (Refer to Figure 2) Used only for the sprinkler piping network of Preaction systems, when an external air supply is provided by others (either compressor, plant air or dry nitrogen cylinders) and piped to the air inlet port of the unit. Air supply style "B" provides an Air Pressure Maintenance Device (APMD) trim, factory mounted in the TOTALPAC®3 cabinet.

Note: For the releasing system piping of pneumatically actuated systems, use air supply type "C" below (with an external air compressor).

Air Supply Style "C": (Refer to Figure 3) Used only for the pneumatic release piping network of pneumatically operated Preaction systems. An external air supply has to be provided by others (compressor, plant air or dry nitrogen cylinders) and piped to the air inlet port of the unit. Air supply style "C" provides an Air Pressure Maintenance Device (APMD) trim, factory mounted in the TOTALPAC®3 cabinet.

Air Supply Style "D": (Refer to Figure 4) Mainly used with Preaction systems protecting refrigerated spaces and freezers, where a special dry external air supply unit is piped directly to the system riser inside the freezer itself, as shown in NFPA-13. Air supply Style "D" provides only an air supervisory and shut-off trim.

Ambient temperature at the special external air supply unit location should not exceed 104°F (40°C). Refer to NFPA and Factory Mutual Codes & Standards for details on refrigerated spaces applications. Air supply style "D" can also be used when the contractor prefers to provide his own air supply & regulation trim, mounted outside the TOTALPAC®3 cabinet.

Note: When air supplies style "B", "C" or "D" are selected, the air supply should be provided and installed by the sprinkler contractor OUTSIDE of the TOTALPAC®3 Cabinet it is NOT provided with the unit.

1.1 Air supply design and selection:

The air supply compressor should be sized to automatically establish the total required air pressure in 30 minutes. External air supply should be provided with an Air Maintenance Device (air supply style "B") to regulate and restrict the flow of supervisory air into the sprinkler system piping.

Note: External air supply MUST always be restricted to insure that the automatic air supply cannot replace air as fast as it escapes when a sprinkler operates.

WARNING Pressures other than the factory pressure settings may affect the operation of the system.

Air compressor selection Table:

<table>
<thead>
<tr>
<th>H.P</th>
<th>CFM @ 40 psi</th>
<th>120Vac System capacity (gallon) to Pump to 40 psi in 30 Minutes</th>
<th>220Vac System capacity (gallon) to Pump to 40 psi in 30 Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/6</td>
<td>1.33</td>
<td>125</td>
<td>103</td>
</tr>
<tr>
<td>1/3</td>
<td>2.61</td>
<td>250</td>
<td>198</td>
</tr>
<tr>
<td>1/2</td>
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<td>365</td>
<td>301</td>
</tr>
<tr>
<td>1</td>
<td>7.40</td>
<td>615</td>
<td>519</td>
</tr>
<tr>
<td>1-1/2</td>
<td>7.40</td>
<td>915</td>
<td>758</td>
</tr>
<tr>
<td>2</td>
<td>7.40</td>
<td>1225</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note: Selection of the proper air compressor size is the responsibility of the installing contractor.
1.2 Connecting the Air Compressor to AC power

The motor must be protected against short circuit, overload and excessive temperature rise. Fuses, motor protective switches and thermal protective switches provide the necessary protection in these circumstances.

Fuses only serve as a short circuit protection of the motor (wiring fault), not as protection against overload. Those are provided and wired by the electrical contractor. An isolation switch (for location detail, refer to Figure 2 in CONTROLS Section) is also provided in the TOTALPac³ Cabinet and is factory wired, allowing powering off the air compressor while some maintenance work on the unit is done, without disturbing the rest of the system.

Connect non-energized AC power to the air compressor. Refer to field wiring diagram into electrical section of the present document.

<table>
<thead>
<tr>
<th>Compressor Service Factor Amp (S.F.A) rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor Size (HP)</td>
</tr>
<tr>
<td>1/6</td>
</tr>
<tr>
<td>1/3</td>
</tr>
<tr>
<td>1/2</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>1-1/2</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

1.3 Operation

Air Supply Style "A":

1.3.1 To Apply Air Supply:

Establish AC power for the air compressor by activating the correspondent circuit breaker at the electrical distribution panel. Start compressor by activating the compressor isolating switch (E15) located on the junction box of the unit (refer to CONTROL SECTION, Fig.1&2 for exact location of the isolating switch).

If the air compressor motor fails to start or slows down under load, shut the compressor off. Check that the supply voltage agrees with the motor nameplate.

A Float Check Valve (E9) is provided with Air Option "A". The Float Check Valve allows sensing of air pressure in the system during supervisory times of the system.

1.3.2 To close air supply:

Turn off the compressor isolating switch (E15).

1.3.3 To adjust system air pressure:

**WARNING** The cut-out/cut-in differential switch adjustment screw (small screw to the right) is factory set. DO NOT CHANGE ITS SETTING. Any unauthorised modification of this setscrew adjustment will void the system warranty and may also prevent the system from operating normally.

The air compressor cut-off pressure switch (E2) (shown below with its metal cover removed) has its air compressor cut-out adjustment switch (middle screw) factory set. This switch should not need any adjustment but if necessary, follow the instructions below:

1. Remove the metal cover of the compressor air pressure switch (E2).
2. To raise the cut-out pressure of the air compressor, turn the cut-out adjustment screw (middle) half a turn CLOCKWISE.
3. Open the system main drain valve (D3) and let the pressure drop until the air compressor (E1) restarts. Check pressure reading on the system pressure gauge (E3) when the air compressor stops again. Repeat until the desired pressure is reached. Once all done, replace the metal cover on the switch (E2).

**Note:** Do not turn the cut-out adjustment screw (middle) all the way down in one shot. Proceed by steps. Use the same method turning the cut-out adjustment screw COUNTER-CLOCKWISE to lower the air compressor cut-out pressure.
Air supplies style "B" or "C":

1.3.4 To Apply Air Supply:

Turn on upstream air supply. Open APMD (Air Pressure Maintenance Device) input valve (E6) by placing handle in line with valve body then open APMD output valve (E7) by placing handle in line with the valve body.

In order to accelerate filling of sprinkler piping by air pressure, bypass valve (E8) can be opened by placing handle in line with valve body while piping is initially filled by the air compressor. This valve (E8) must then be closed (handle crossways to valve body) and kept in this position once the system is filled with air.

1.3.5 To Close Air Supply:

Close APMD output valve (E7) by placing handle crossways to valve body then close APMD input valve (E6) by also placing handle crossways to the valve body. Be sure bypass valve (E8) is closed (handle crossways to valve body).

1.3.6 To Adjust System Air pressure:

Be sure APMD input valve (E6) and APMD output valve (E7) are both open (handle in line with the valve body), and bypass valve (E8) is closed (handle crossways to valve body) prior to performing this operation. Loosen lock nut and turn pressure adjustment nut clockwise to increase air pressure or counter-clockwise to decrease pressure. Tighten lock nut.

**Note:** Depending on site conditions, the internal filter of the APMD may need maintenance on a regular basis. Refer to Viking Data Sheet # 127 for more details.

Air supply style "D":

1.3.7 To Apply Air Supply:

Turn on upstream air supply. Open air shut-off valve (E14) by placing handle in line with valve body.

1.3.8 To Close Air Supply:

Close bypass air shut-off valve (E14) (handle crossways to valve body).
1.4 Maintenance and inspection:

To drain the Air Supply Accumulator:

The amount of moisture pumped into the system and how quickly it accumulates is proportional to the amount of humidity in the air and how long the compressor is in operation. This unit has been designed to operate between 32 and 100°F.

At least once a year, open air option Drain Valve (E12) until all condensate water is drained from the air receiver. Close air option Drain Valve.

**WARNING** The relief valve and outlet pipe of the air compressor may become very hot during normal operation. Do not touch the valve, compressor heads or outlet piping until the compressor has been turned off and allowed to cool.

A safety relief valve is provided on standard compressors and is preset at the factory. Do not exceed or adjust safety relief pressures other than those preset at the factory.

**WARNING** Do not unscrew relief valve head entirely off while the compressor is operating. Ejection of valve parts could cause severe injury.

Air supplies style "B" or "C":

The Viking Model D-2 Air Pressure Maintenance Device (APMD) (E5) is a pressure regulator that automatically reduces the supply air pressure to a pre-set requirement when connected to a constantly maintained air supply (plant air, external tanked air compressor or dry nitrogen tank). Refer to Figure 2 or 3 for details.

**Features:**

- Replaceable air filter
- Outlet pressure range is 5 to 75 psi (± 2 psi) (34,47 to 517,11 kPa). Air pressure setting can be readjusted after installation. See Paragraph 3.6, TO ADJUST SYSTEM AIR PRESSURE.
- Ball check to prevent back flow.
- Restriction 1/16” (1,59mm) to prevent rapid re-pressurization of a system.
- The Viking Model D-2 APMD (E5) regulates and restricts air flow.
- The air or nitrogen supply provided to the APMD must be continuous, clean, dry and oil free.
- By-pass piping is provided to allow initial pressurization of system piping more rapidly than the restricted air flow through the APMD will allow.
- Determine the appropriate pressure to be maintained in the system. Refer to Table 1 or Table 2 of the current Section.
- If adjustment is necessary, refer to paragraph 1.3 of the current Section.

The APMD (E5) should be checked for correct pressure regulation after installation or repair by noting the air pressure reading within the system. If adjustment is required, refer to paragraph 1.3 of the current Section. The filter should also be inspected and replaced or cleaned as required.

To clean Air Pressure Maintenance Device (APMD) (E5) in Air option B (refer to Figure 2):

- Do not disconnect or disassemble the APMD without closing the outlet (E7) and inlet (E6) isolation valves. System air pressure will be trapped between the outlet of the APMD and the downstream control valve. Relieve pressure before proceeding with disassembly.
- This procedure requires turning OFF the compressor's power.
- Carefully loosen the union between the outlet of APMD (E5) and the outlet isolation valve (E7) to relieve pressure.
- Remove and clean Air Pressure Maintenance Device (APMD) filter. Refer to VIKING Technical Data Sheet 127 Model D-2 Air Pressure Maintenance Device for more details. If admission filter is blocked, replace with filter kit (part # 03007 A).

Refer to Viking Data Sheet 127 for additional details.

To close the Air Supply:

Close Air Pressure Maintenance Device (APMD) output isolation valve (E7) by placing handle crossways to the valve body. Make sure the APMD input valve (E6) is open (handle in line with valve body), and the bypass valve (E8) is closed (handle crossways to valve body). Refer to Figure 2 or 3.

**Air supply style "D":**

- The air or nitrogen supply provided must be continuous, clean, dry and oil free.
- Determine the appropriate pressure to be maintained in the system. Refer to System Data and Technical Data for the system and components used.

**Important:** Advise local authorities of the necessary work over the fire protection equipment. In order to avoid accidental water release, it is considered good practice to completely close the main water inlet valve while doing maintenance work.

**WARNING**! Air compressor head and copper tubing may be relatively hot after the air compressor has run for some time. Take precautions when handling the components to avoid skin burns.
Figure 1 – Air Supply Style "A"
(Cabinet mounted air compressor)

Air Option Components:

- **E1**: Air compressor
- **E2**: Air compressor "Cut-off" pressure switch
- **E3**: System air pressure gauge
- **E4**: Air supervisory pressure switch
- **E9**: Float check valve
- **E10**: Soft-seat check valve
- **E11**: Air compressor check valve
- **E12**: Air option drain valve
- **E15**: Compressor isolating switch (not shown)
Figure 2 – Air Supply Style "B"

(APMD without air compressor)

This section replaced by Dehydrator option B (when used)

Contractor external Air or Nitrogen connection

TO PNEUMATIC ACTUATOR (plugged when not used)

TO OPTIONAL ACCELERATOR (plugged when not used)

E7
E6
E5
E4
E3
E8
E16

CONTRACTOR'S HYDROSTATIC TEST PORT (system side)

TO SPRINKLER RISER

Note: The external air supply must be restricted to insure that it cannot replace air as fast as it escapes when a releasing device or sprinkler operates. When the system is put in service, input valve (E6) must be open first.

Air Option Components:

E3 System air pressure gauge
E4 Air supervisory pressure switch
E5 Air pressure maintenance device (APMD)
E6 APMD input valve
E7 APMD output valve
E8 APMD bypass valve
E16 Swing check valve
Figure 3 – Air Supply Style "C"

(APMD for Pilot Line release system only)

Air Option Components:

E3  System air pressure gauge
E4  Air supervisory pressure switch
E5  Air pressure maintenance device (APMD)
E6  APMD input valve
E7  APMD output valve
Figure 4 – Air Supply Style "D"
(Air supply connection only for external air supply)

Plug removed for Optional Accelerator or Pneumatic Actuator (when used)

To Sprinklers riser

Contractor external AIR or NITROGEN connection

Note: The external air supply must be restricted to insure that it cannot replace air as fast as it escapes when a releasing device or sprinkler operates.

Air Option Components:

- E3 System air pressure gauge
- E4 Air supervisory pressure switch
- E6 Air shut-off valve
- E16 Swing check valve
### Table 1: Water Pressure up to 175 Psi

<table>
<thead>
<tr>
<th>System Type</th>
<th>Air Supply Style</th>
<th>Air Regulator</th>
<th>Compressor Start</th>
<th>Compressor Stop</th>
<th>Low Air Supervisory</th>
<th>Low Air Alarm</th>
</tr>
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<tbody>
<tr>
<td>Non-Interlocked Pneumatic Release</td>
<td>A</td>
<td>n/a</td>
<td>30 Psi (207 kPa)</td>
<td>35 Psi (242 kPa)</td>
<td>25 Psi (173 kPa)</td>
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<tr>
<td></td>
<td>B or D</td>
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<td>25 Psi (173 kPa)</td>
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<td>Release (pilot) Line</td>
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# Integrated Fire Protection System
## Air Supply

### Table 2: Water Pressure from 175 Psi to 250 Psi

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<tr>
<th>System Type</th>
<th>Air Supply Style</th>
<th>Air Regulator</th>
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<td>n/a</td>
<td>45 Psi (311 kPa)</td>
<td>n/a</td>
<td></td>
</tr>
</tbody>
</table>
2- Skid Air Supply Option

When TOTALPAC®3 units are provided in skid form, the air supply is provided by the installing contractor. Preaction, dry valve and other sprinkler systems skids using air pressure for supervisory or releasing purposes are all provided without the external supervised air supplies.

The system trim includes only a connection for the air supply including a ball valve, a pressure switch and a pressure gauge, adapted to the particular layout ordered. When an air pressure maintenance device is required, it shall also be provided and installed by the contractor along with his air supply.

The skid air supply trim is factory assembled, mounted in the system trim and pressure tested.

☐ Skid Air Supply for sprinklers: (Refer to Figure 1) Provides only an air supervisory and shut-off trim. Used with the contractor provided air supply & regulation trim, mounted separate from the TOTALPAC®3 trim skid.

☐ Skid Air Supply for pilot line: (Refer to Figure 2) Very similar to the air supply for sprinklers, it provides only an air supervisory and shut-off trim. Used with the contractor provided air supply & regulation trim, mounted separate from the TOTALPAC®3 trim skid.

2.1 Air supply design and selection:

The air supply compressor should be sized to automatically establish the total required air pressure in 30 minutes. External air supply should be provided with an air pressure maintenance device to regulate and restrict the flow of supervisory air into the sprinkler system piping.

Note: External air supply MUST always be restricted to insure that the automatic air supply cannot replace air as fast as it escapes when a sprinkler operates.

2.2 Operation

To Apply Air Supply:

Turn on upstream air supply. Open Air shut-off valve (E14) by placing handle in line with valve body.

To Close Air Supply:

Close Air shut-off valve (E14) (handle crossways to valve body).

3. Maintenance and inspection:

The air or nitrogen supply provided must be continuous, clean, dry and oil free.

Determine the appropriate pressure to be maintained in the system. (Refer to Table 1 or 2)

Important: Advise local authorities of the necessary work over the fire protection equipment. In order to avoid accidental water release, it is considered good practice to completely close the main water inlet valve while doing the maintenance work.

WARNING: Pressures other than the factory pressure settings may affect the operation of the system.
Figure 1 – Skid Air Supply for Sprinklers Network

(Air supply connection only for external air supply)

Note: The external air supply must be restricted to insure that it cannot replace air as fast as it escapes when a releasing device or sprinkler operates.

Air Option Components:
- E3 System air pressure gauge
- E4 Air supervisory pressure switch
- E14 Air shut-off valve
- E16 Swing check valve
Figure 2 – Skid Air Supply for Pilot Line

(Air supply connection only for external air supply)

**Note:** The external air supply must be restricted to insure that it cannot replace air as fast as it escapes when a releasing device or sprinkler operates.

**Air Option Components:**

- E3 System air pressure gauge
- E4 Air supervisory pressure switch
- E14 Air shut-off valve
- E16 Swing check valve

**NOTE:** Piping layout may vary slightly depending on valve trim configuration.
The Viking Dehydrator is a manually regenerated desiccant-type air dryer. The desiccant acts as a moisture indicator by changing color, and is visible through the required bowl guard and transparent plastic bowl.

**Technical Information:**

1. The desiccant is silica gel having a –45°F (-43°C) dew point at a maximum of 180°F (32°C) temperature with a regeneration temperature of 275°F (135°C). When the silica gel color changes from dark blue to light pink or clear, it has become saturated with moisture and must be changed.

2. The unit has a drying capacity of 8100 standard cubic feet (229.3m³) of air to –40°F (-40°C) atmospheric dew point at rated specifications before the desiccant becomes saturated.

3. The maximum air flow rating is 15 standard cubic feet per minute (0.4247m³/minute) at 100 psi (6.895 BAR) per unit.

4. All ratings are based on 100°F (38°C) saturated inlet air temperatures at 100 psi (6.895 BAR).

5. The aluminum bowl holds 2.5 pounds (1.134 kg) of desiccant and is rated for a maximum temperature and pressure at 180°F (82°C) and 300 psi (20.68 BAR).

6. The silica gel desiccant is provided in a sealed 2.5 pound (1.134 kg) bag and is shipped in a box inside the unit cabinet.

7. The unit is to be used on compressed air service only.

**Operation of Dehydrator:**

The Dehydrator directs the incoming air down through the silica gel desiccant. The silica gel absorbs the moisture without physically changing. As the relative humidity increases, the silica gel begins to change color from dark blue to light pink, indicating the desiccant must be replaced.

**To Make Dehydrator Functional:**

1. Drain valve (E12) shall be closed.

2. OPEN air shut-off valve (E14).  OPEN drain valve (E12) to drain input line then close it.  OPEN air shut-off valve (E14).

**To Drain Dehydrator cartridge:**

Once it has been drained, CLOSE the Dehydrator air shut-off valve (E14). Turn the clamp ring left while holding the bowl, and exert a downward pull until the clamp ring, and the bowl drop free.

Follow instructions described on Viking data sheet no. 276 (Form No. F_011711) provided with the silica gel recharge.
3- Accelerator option

The Viking Model E-1 Accelerator is a quick-opening device. When installed with the required external Anti-flood Device (on dry pipe systems only), it is used to increase the operational speed of a differential type valve. An accelerator (quick-opening device) is recommended on all differential dry pipe valves and is required on dry pipe systems of certain capacities. Refer to NFPA Standards and Authorities Having Jurisdiction. The Viking Model E-1 Accelerator may also be used without the Anti-flood device to speed the action of a pneumatic release system on a deluge, flow control or preaction system.

Features:

a) Automatically resets.
b) External anti-flood Assembly.
c) UL Listed for use on systems of maximum capacity allowed.
d) Factory tested.

Operation:

The Viking Model E-1 Accelerator operates on the principle of unbalanced pressures. As the accelerator is pressurized, air enters the inlet chamber, goes through the screen filter into the middle chamber and through an orifice into the lower chamber. From the middle chamber, air slowly enters the upper chamber through a filtered orifice restriction in the cover diaphragm.

In the SET position, the system air pressure is the same in all chambers. When a sprinkler or release device operates, the pressure in the middle and lower chambers is reduced at the same rate as the system pressure. The orifice restriction in the cover diaphragm restricts the air flow from the upper chamber, temporarily causing higher pressure in the upper chamber.

The pressure differential forces the cover diaphragm down, pushing the actuator rod down. This action vents the pressure from the lower chamber to the outlet vent, allowing residual pressure in the inlet chamber to force the clapper diaphragm open. After the clapper diaphragm opens, any pressure remaining in the inlet chamber and associated piping is vented to atmosphere.

On a pneumatic release system, when the accelerator operates, the outlet pressure is vented to atmosphere, speeding the release system operation.

To enable the Accelerator Device:

The Accelerator Device is enabled the Air Bypass Valve is opened (handle aligned with the valve body). The system air pressure should be higher or equal to the pressure indicated on the pressure gauge (3) prior to opening the main water inlet Valve (D1).

Ensure that the Air Bypass Valve is open (handle aligned with the valve body) in normal supervisory mode.

To isolate the Accelerator Device:

Close the Air Bypass Valve, positioning the handle across the valve body. This operation can be necessary in order to verify the pressure adjustments or to allow the pressure switches adjustments.

Refer to instructions described on Viking datasheet no. 122 (Form No. 071692).

Viking Accelerator Model E-1 :

(for preaction systems & pilot lines)
Resetting the Accelerator device:

Make sure the system is properly drained and reset. Observe the air pressure gauge (3) on top of the accelerator. The gauge must read zero before the accelerator will automatically reset. It may be necessary to loosen, remove and re-install the accelerator air gauge (use the appropriate wrench) to vent trapped air pressure from the upper chamber, even when the gauge indicates zero if the air supply is on while performing the reset.

Make sure system is pressurized according to recommended settings. Do not exceed 60 Psi (414 kPa).

INSPECTION & TESTS:

After every operation, and each time water is allowed to enter the system:

1. Inspect the interior of the accelerator for the presence of water. Dampness or condensation may indicate that the air supply is not being dried adequately. If water is allowed to enter the middle or upper chamber of the accelerator, it may contaminate the accelerator orifices and prevent it from operating properly.

2. Remove the 1/2" NPT plug from the base of the accelerator. If water or dampness is present, the accelerator must be disassembled, cleaned and dried. For more information about this procedure, refer to Viking datasheet 122 (Form No. 071692).

3. Weekly inspection is recommended unless system is provided with low air alarm, then monthly inspection may be adequate.

4. Check the air pressure gauge (3) at the top of the accelerator. Air pressure in the upper chamber of the accelerator should be equal to the air pressure maintained in the system on which it is installed.

Note: Standard tolerance allowance in pressure gauge calibration may result in a slight variation when pressure readings of any two gauges are compared.

A difference in pressure other than slight variation due to gauge calibration may indicate gauge malfunction, plugged accelerator orifices and/or filters, or other maintenance is required.

See Viking datasheet 122 (Form No. 071692), paragraph 12 ACCELERATOR MAINTENANCE.

5. Verify that all other trim valves are in their normal operating position.

6. Check for signs of mechanical damage and/or corrosive activity. If detected, perform maintenance as required or, if necessary, replace device.

7. Verify that the water supply main control valve is open and secure and that the by-pass valve (1) is open.
1- Control Section with Control Panel

1.1 Product Description

The release control panel of the TotalPac®3 system is an add-on unit that is installed inside the cabinet at the factory.

Once the left door opened, the locked control panel door can be opened to give access to the control panel keyboard, the emergency battery compartment, and other related equipment.

A releasing circuit disabled switch is located at left of the release control panel.

The control panel can be easily flipped once unlatched from the right side, giving access to electrical junction boxes of the unit.

1.2 Self-contained TotalPac®3 Unit (with Viking VFR-400 Control Panel)

The model VFR-400 is a listed and approved, microprocessor based fire control/releasing panel. It is primarily designed for use as a releasing panel for pre-action, Surefire®, Firecycle® III, and deluge, water based extinguishing systems. The panel is available for use with either 120VAC-60Hz or 220VAC-50Hz power supplies. The battery compartment can hold two 12 volt batteries which are charged by an internal battery charger. Batteries are available to provide up to 90 hours of backup power during AC power failure.

The VFR-400 panel can be used with a wide range of compatible initiating devices such as pull stations, heat detectors (including linear heat detectors), photo-electric and ionization smoke detectors.

Pre-configured programs allow field programming for one of twelve possible input/output combinations that are available and listed for use with the TotalPac®3 System.

A field wiring electrical junction boxes is integrated with the cabinet for connection of detection system, auxiliary contacts and signaling devices. All inputs & outputs are factory wired to a terminal strip (TBA) for contractor’s field wiring.

Gauges to indicate air, water supply pressure and priming water pressure are all visible through clear Lexan windows.

1.3 VFR-400 Visual Indicators:

Red LED’s:
- Initiating Device Circuits Active (4)
- Notification/Release Circuits Active (4)
- Common Alarm (1)

Green LED:
- AC Power

Yellow LED’s:
- Initiating Device Circuits Troubles (4)
- Output Circuits Troubles (4)
- Supervisory Initiating Zone (4)
- Supervisory Bell Output Active (4)
- Supervisory Zone,
- Supervisory 1, Supervisory 2,
- Power Trouble
- Supervisory
- Trouble
- System Trouble
- Ground Fault
- Discharging/Discharged
- Alarm Silenced

1.4 Control buttons:

SCROLL UP / BUZZER SILENCE:
Acknowledge troubles and supervisory. Once all events in trouble or supervisory state have been viewed, the panel buzzer and appropriate output will silence. The applicable TROUBLE or SUPERVISORY LED will change from flashing to steady. A Second trouble or supervisory will resound the panel buzzer. Trouble conditions are self restoring. Supervisory latch and require RESET to clear.

SCROLL DOWN / BUZZER SILENCE:
Acknowledge troubles and supervisory. Once all events in trouble or supervisory state have been viewed, the panel buzzer and appropriate output will silence. The applicable TROUBLE or SUPERVISORY LED will change from flashing to steady. A Second trouble or supervisory will resound the panel buzzer. Trouble conditions are self restoring. Supervisory latch and require RESET to clear.

SIGNAL SILENCE:
By pressing SIGNAL SILENCE button, all silencable outputs will de-activate. A trouble condition will be created, TROUBLE contact will be activated and the yellow ALARM SILENCE LED will light.

WARNING Alarms initiated from a WATERFLOW signal can not be silenced. The panel must be reset to silence audible devices.

SYSTEM RESET: The RESET button breaks power to all initiating circuits, 4-wire smoke power and will clear any activated output circuits. If any alarm or trouble still exists after reset, they will reactivate the panel.
1.5 Time & Date setting:

1. Press the "PROGRAM" switch down
2. Press on "FUNCTION" button until the following is displayed:
   
   **SET TIME?**

3. Press the "SELECT" button to get to the "MINUTES" sub-menu:
   
   **01/21/2000**
   **MINUTES 02:58:04**

4. Use "SELECT" button to increase the minutes, or use "SET" button to decrease minutes.
5. Press the "FUNCTION" button to get to the "HOURS" sub-menu:
   
   **01/21/2000**
   **HOURS 02:58:04**

6. Use "SELECT" button to increase the hours, or use "SET" button to decrease hours.
7. Press the "FUNCTION" button to get to the "DAY" sub-menu:
   
   **DAY 01/21/2000**
   **02:58:04**

8. Use "SELECT" button to increase day, or use "SET" button to decrease day.
9. Press the "FUNCTION" button to get to the "MONTH" sub-menu:
   
   **MONTH 01/21/2000**
   **02:58:04**

10. Use "SELECT" button to increase month, or use "SET" button to decrease month.
11. Press the "FUNCTION" button to get to the "YEAR" sub-menu:
   
   **YEAR 01/21/2000**
   **02:58:04**

12. Use "SELECT" button to increase year, or use "SET" button to decrease year.
Figure 2 - Control equipment layout:

Figure 3 - Detail of VFR-400 Panel control section:
Figure 4 – Junction box layout:

Air Compressor or Excess Pressure Pump
Isolating Switch

TBB Terminals

TBA & TBC Terminals

Junction Box with cover removed (behind Control Panel)

Optional ARM-44 Relay Module Location

Factory wired flexible conduits to Control Panel and system devices

Figure 5 - Detail of wiring routing:

AC POWER
120VAC, 50/60Hz or
220VAC, 50Hz

POWER LIMITED CIRCUITS

Refer to Electrical Section for Wiring Diagrams.

All conduits are installed by the Contractor through 1/2" and 3/4" knock-outs

OPTIONAL ARM-44 RELAY MODULE

FACTORY WIRED AIR COMPRESSOR
or Excess Pressure Pump
Isolating Switch (when applicable)

NOTE: Junction box is located behind the Control Panel once rotated. It is shown with cover removed.
2- Control Section without control panel.

2.1 Product Description

When the TOTALPAC®3 unit is provided without any control panel, such as in retrofit applications where the unit is connected and controlled by a central control panel already installed in the building or premises.

When such is the case, the control panel of the TOTALPAC®3 is not provided, only a field wiring electrical junction boxes is integrated with the cabinet for connection of all electrical components in the trim. Pressure switches, supervisory switches, etc. are all factory wired to a terminal strip (TBA) for contractor's field wiring.

The installing contractor should make sure the remote control panel is both listed and programmed to handle the required sequence of operation necessary to operate the automatic sprinkler system. Refer to GENERAL DESCRIPTION Section, appropriate standards and Authority Having Jurisdiction for additional information.

2.2 Technical Data

Cabinet:

Steel enclosure: Refer to Cabinet Data Sheet for further details.

Environment (electrical section):

Temperature: 32°F. (0°C) to 120°F (48°C)

Humidity: 85% Relative Humidity (non-condensing) at 90°F (32°C) maximum.

AC Power:

The unit may be provided with an air compressor. Refer to the appropriate Field Wiring Diagram in "Programming Section" to determine applicable power requirements.

Note: This TOTALPAC®3 Unit has been provided without an Integrated Control Panel, which is supplied by others.

Contractor should make sure the control panel supplied to control this system complies with the sequence of operation described in the programming Section. The remote control panel shall also be listed for releasing service and be compatible for supervising N.O. contact devices and operating the 24 Vdc/10Wdc solenoid valve of the system if applicable.
Figure 6 – Junction box layout:

Air Compressor or Excess Pressure Pump
Isolating Switch
TBB Terminals
Bypass Switch
TBA & TBC Terminals
Junction Box with cover removed (behind Control Panel)
Factory wired flexible conduits to Control Panel and system devices
1- Remote Controlled, Single Interlocked

This TOTALPac®3 Unit without control panel is factory wired for one of the following configurations:

▶ Single-Interlocked SUREFIRE® Electric Release

This TOTALPac®3 Unit has been provided without an Integrated Control Panel since its dry contacts are supervised by a remote panel. Contractor should make sure the control panel supervising this system complies with the sequence of operation described in MECHANICAL Section, paragraph 1.4 SCHEMATIC. The remote control panel shall also be Listed and be compatible for supervising sprinklers supervisory and alarm contact devices as well as for supervising N.C. and N.O. 24Vdc Solenoid Valves. Refer to FIELD WIRING DIAGRAM for more details. Make sure the system will perform as required and is tested to confirm it meets all requirements.

Note:

Remote Controlled Unit:
All field wiring should be terminated in the contractor wiring junction box and terminals provided (TBA and TBB) as shown on the FIELD WIRING DIAGRAM. No connection should be made directly in the trim components as this would void warranty and might prevent the normal operation of the unit.

Skid Unit:
All field wiring should be made directly in the trim components.

Operation – Single Interlocked Preaction

When a fire occurs, at least one detector reaches his trip point. Detection circuit-1 is then automatically activated and will energize the normally closed (N.C.) solenoid valve of the system, allowing the water to escape from the priming chamber of the deluge valve. The system alarm audible devices sound and, if desired, can be silenced manually.

The operation of the low air pressure switch on Alarm circuit-2 will energize the normally open (N.O.) solenoid valve of the system.

System pressurized audible devices and the water motor gong (if installed) will sound. The opening of a sprinkler head will cause water to be discharged.

The sprinkler system will continue to operate until the main water inlet valve is manually closed.

1.1 Air Pressure Drop

a) Any leak or opening in the piping network which allows supervisory air pressure to drop below Table 1 settings causes the closing of the Low Air Pressure Switch contact on Supervisory Circuit-2.

b) Any leak or opening in the piping network or a sprinkler head which allows supervisory air pressure to drop below Table 1 settings causes the closing of the Low Air Pressure Switch contact on Alarm Circuit-2.

1.2 Water Discharge

Water discharge occurs upon operation of the electrical detection causing the closing of the water flow pressure switch contact. Opening of a sprinkler head alone will not discharge any water. Sprinkling remains in effect until main control valve is manually closed.

1.3 Manual Operation of the System

Operation of the Emergency Release Valve causes the manual activation of the Deluge Valve and filling of the sprinklers piping causing the closing of the water flow pressure switch contact.

2. Supervisory of the Valves

An abnormal position of a valve will cause the closing of the Valve Supervisory Switch contact. Both the Water Supply Control Valve and the optional Shut-off Valve are supervised.

Table 1: Pressure Settings

<table>
<thead>
<tr>
<th>Water Supply PSI</th>
<th>System Air Normal PSI</th>
<th>Alarm Circuit-2 PSI</th>
<th>Supervisory Circuit-2 PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 100</td>
<td>30</td>
<td>15 +</td>
<td>25</td>
</tr>
<tr>
<td>100 - 200</td>
<td>40</td>
<td>25 +</td>
<td>35</td>
</tr>
<tr>
<td>200 - 250</td>
<td>50</td>
<td>35 +</td>
<td>45</td>
</tr>
</tbody>
</table>
2- Remote Controlled, Double Interlocked

This TOTALPac®3 Unit without control panel is factory wired for the following configuration:

- **Double Interlocked SUREFIRE™ Electric Release**

This TOTALPac®3 Unit has been provided without an Integrated Control Panel since its dry contacts are supervised by a remote panel. Contractor should make sure the control panel supervising this system complies with the sequence of operation described in MECHANICAL Section, paragraph 1.4 SCHEMATIC. The remote control panel shall also be Listed and be compatible for supervising sprinklers supervisory and alarm contact devices as well as for supervising N.C. and N.O. 24Vdc Solenoid Valves. Refer to FIELD WIRING DIAGRAM for more details. Make sure the system will perform as required and is tested to confirm it meets all requirements.

**Note:** All field wiring should be terminated in the contractors junction box and terminals provided (TBA and TBB) as shown on the FIELD WIRING DIAGRAM. No connection should be made directly in the trim components as this would void warranty and might prevent the normal operation of the unit.

### Operation – Double Interlocked Preaction

When a fire occurs, at least one detector reaches its trip point. Detection circuit (Zone 1) is then automatically activated but normally closed (N.C.) solenoid valve of the system is not energized, and no water will enter the system since there is still air pressure in the piping network, the system alarm audible devices operate and, if desired can be silenced manually. The operation of the low air supervisory pressure switch on Supervisory circuit 2 will energize the normally open (N.O.) solenoid valve of the system.

When a sprinkler head opens causing a loss of air pressure, it allows the opening of the pneumatic actuator and activation of the low air alarm pressure switch on Zone 2. Normally closed (N.C.) solenoid valve of the system is energized, and water then escapes from the priming chamber of the deluge valve.

The clapper of the deluge valve opens, filling the outlet chamber and causing water to be discharged. Water flow audible devices and the water motor gong (if installed) will sound.

The sprinkler system will continue to operate until the main water supply control valve is manually closed.

### 1.1 Air Pressure Drop

- a) Any leak or opening in the piping network which allows supervisory air pressure to drop below Table 1 settings causes the closing of the Low Air Pressure Switch contact on Supervisory Circuit-2.

- b) Any leak or opening in the piping network or a sprinkler head which allows supervisory air pressure to drop below Table 1 settings causes the closing of the Low Air Pressure Switch contact on Alarm Circuit-2.

### 1.2 Water Discharge

Water discharge occurs upon operation of the electrical detection and opening of a sprinkler head, causing the closing of the water flow pressure switch contact. Opening of a sprinkler head alone will not discharge any water. Sprinkling remains in effect until main control valve is manually closed.

### 1.3 Manual Operation of the System

Operation of the Emergency Release Valve causes the manual activation of the Deluge Valve and filling of the sprinklers piping causing the closing of the water flow pressure switch contact.

### 2. Supervisory of the Valves

An abnormal position of a valve will cause the closing of the Valve Supervisory Switch contact. Both the Water Supply Control Valve and the optional Shut-off Valve are supervised.

<table>
<thead>
<tr>
<th>Table 1: Pressure Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Supply PSI</strong></td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>0 - 100</td>
</tr>
<tr>
<td>100 - 200</td>
</tr>
<tr>
<td>200 - 250</td>
</tr>
</tbody>
</table>
Field wiring diagrams Surefire Single & Double Interlocked remote controlled:

WIRING OF AIR COMPRESSOR POWER SOURCE
(WITH AIR OPTION "A" ONLY)

TBB

1. 120VAC, 60Hz
2. 220VAC, 50Hz

<table>
<thead>
<tr>
<th>LINE</th>
<th>NEUTRAL</th>
<th>GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Refer to Local Electrical Codes for wiring size.
Branch circuit for air compressor shall not be the same as the Release Control Panel power source.

NOTES:
- All devices are factory wired.
- All devices are shown in their normal supervisory state.
- Contacts are rated:
  - Pressure switches: 2A, 30VDC 10A, 125/250VAC Supervisory switches: 0.5A, 125VDC 0.25A, 250VDC 5A, 1/6HP, 125/250VAC
- Use dry contacts with power limited circuits only.
- EOL devices (not included) must be compatible with the Release Control Panel used.

SOLENOID VALVE ELECTRICAL RATINGS

<table>
<thead>
<tr>
<th>Viking P/N</th>
<th>Description (De-energized)</th>
<th>Voltage</th>
<th>Watts</th>
<th>DC Amps</th>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>11591</td>
<td>NC</td>
<td>24 VDC</td>
<td>10.0</td>
<td>416 mA</td>
<td>300 psi (2,068 kPa)</td>
</tr>
<tr>
<td>11595</td>
<td>NO</td>
<td>24 VDC</td>
<td>10.0</td>
<td>416 mA</td>
<td>300 psi (2,068 kPa)</td>
</tr>
</tbody>
</table>

Notes:
1. Solenoid Valve is UL Listed as Fire Protection Special System Water Control Release Service (UL 429A Product category VLTR).
2. Voltage Drop: For proper operation, make sure that voltage at the solenoid valve is at least 85% of nameplate rating.
3- Self-Contained, Single & Double Interlocked

This VIKING VFR-400 Control Panel included with the TOTALPac®3 Unit is factory programmed and wired for the following configurations:
- Single Interlocked, Electric Release
- Double Interlocked, Electric Release
- and
- Activation by Zone 4 (Pull Station) for all configuration

This programming makes sure the system will perform as required and was factory tested to make sure it meets all requirements.

Pre-configured programs allow field programming for possible input/output combinations, of which only two are available and Listed for the current use of the TOTALPac®3 System:

Program #10, Single Hazard, One Alarm Zone with One Low Air Alarm Zone, One Manual Station Zone, One Waterflow Zone and Two Supervisory Zones.

Program #11, Single Hazard, One Alarm Zone with One Low Air Alarm Zone, One Manual Station Zone, One Waterflow Zone and Two Supervisory Zones.

Program #10 allows the panel to activate the solenoid valve when EITHER detection Zone 1, OR Zone 4 is activated.

Program #11 allows the panel to activate the solenoid valve when BOTH detection Zone 1 AND Low Air Alarm Zone 2 are activated OR Zone 4 only. (Pull Station)

Warning! Only the two Pre-configured programs above are Listed/Approved with the TOTALPac®3 Surefire® Unit. Changing for another pre-configured program may eliminate the Fire Protection capabilities of the system and/or void Listing/Approval and Warranty. Consult FireFlex Systems before making any change.

Note: The control panel motherboard is factory pre-wired and programmed for the configuration selected at the time of purchase. All field wiring should be terminated as shown on the FIELD WIRING DIAGRAM.

Program #10 Output and Relay Circuits Activated by Detection Circuits:

<table>
<thead>
<tr>
<th>INPUT CIRCUITS</th>
<th>OUTPUT CIRCUITS</th>
<th>RELAY CIRCUITS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ALARM BELL</td>
<td>SUPERVISORY BELL</td>
</tr>
<tr>
<td>SUPERVISORY ZONE 1 (Main Valve)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SUPERVISORY ZONE 2 (Air)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DETECTION ZONE 1 (Detection)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DETECTION ZONE 2 (Low Air Alarm)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DETECTION ZONE 3 (Waterflow)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DETECTION ZONE 4 (Pull Station)</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Integrated Fire Protection System

Electrical Section – Preenaction Surefire®

Program #11 Output and Relay Circuits Activated by Detection Circuits:

<table>
<thead>
<tr>
<th>PROGRAM 11</th>
<th>OUTPUT CIRCUITS</th>
<th>RELAY CIRCUITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGLE HAZARD</td>
<td>ALARM BELL</td>
<td>X</td>
</tr>
<tr>
<td>DOUBLE INTERLOCKED</td>
<td>WATERFLOW BELL</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>NC SOLENOID</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>NO SOLENOID</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ALARM RELAY</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>TROUBLE RELAY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WATERFLOW RELAY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SUPERVISORY RELAY</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUT CIRCUITS</th>
<th>ALARM BELL</th>
<th>WATERFLOW BELL</th>
<th>NC SOLENOID</th>
<th>NO SOLENOID</th>
<th>ALARM RELAY</th>
<th>TROUBLE RELAY</th>
<th>WATERFLOW RELAY</th>
<th>SUPERVISORY RELAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPERVISORY ZONE 1 (Main Valve)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUPERVISORY ZONE 2 (Air)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 1 (Detection)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 2 (Low Air Alarm)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 3 (Waterflow)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 4 (Pull Station)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operation

Single-Interlocked, Electric Release

On activation of the Zone 1 (detection cct) OR the activation of the Zone 4 (pull station), the system alarm audible devices sound and, if desired, can be silenced manually. The normally closed (F1) solenoid valve of the system is energized, allowing the water to escape from the priming chamber of the deluge valve. The clapper of the deluge valve opens, filling the outlet chamber and sprinkler piping with water. System pressurized waterflow devices and the water motor gong (if installed) will sound. The opening of a sprinkler head will cause water to be discharged.

Double-Interlocked, Electric Release

On activation of the Zone 1 (detection cct) OR the activation of the Zone 4 (pull station), the system alarm audible devices operate and, if desired can be silenced manually but normally closed (F1) solenoid valve of the system is not energized, and no water will enter the system since there is still air pressure in the piping network. When a sprinkler head opens causing a loss of air pressure, it allows the opening of the pneumatic actuator and activation of Zone 2 (Low Air Alarm). Normally closed (F1) solenoid valve of the system is energized, and water then escapes from the priming chamber of the deluge valve. The clapper of the deluge valve opens, filling the outlet chamber and causing water to be discharged. Waterflow audible devices and the water motor gong (if installed) will sound.

Trouble condition

During normal power conditions if the system piping and/or the sprinklers are damaged, the Low Air Alarm switch (Zone 2) will activate a supervisory alarm at the VFR-400 Release Control Panel and the normally open solenoid valve (F2) will be powered closed to prevent the deluge valve from opening.

In the event of a fire during a fault on the input circuit wiring, loss of primary AC power or complete loss of all power, the deluge valve will open allowing water flow if the following conditions occur:

1-The initiating devices (detector, pull station) activate causing the VFR-400 Release Control Panel to enter an alarm and release condition. The normally closed solenoid (F1) will open allowing water pressure to be relieved from the priming chamber of the deluge valve (A1). With pressure relieved from the priming chamber, the deluge valve will open and allow water flow. Water will not be discharged into the protected area until a sprinkler head operates.

2-During a fault condition on the input wiring (detector, pull station) which caused a trouble alarm on the VFR-400 Release Control Panel, loss of primary AC power or complete loss of all power, the normally open solenoid (F2) is prevented from operating. During this condition, activation of a sprinkler head will allow a pneumatic release (F3) of the deluge valve. Water pressure will be relieved from the priming chamber, the deluge valve (A1) will open and allow water to flow.

NOTE: When Detection Zone #3 (waterflow) is activated, the system alarm audible devices sound and can not be silenced.

Warning! The sprinkler system will continue to operate until the main water inlet valve is manually closed.
Field wiring diagrams Surefire Single & Double Interlocked Self-contained:

**WIRING OF INPUT POWER SOURCE**

<table>
<thead>
<tr>
<th>TBB</th>
<th>1</th>
<th>LINE</th>
<th>120VAC, 60Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>NEUTRAL</td>
<td>220VAC, 50Hz</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>GROUND</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
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<tr>
<td></td>
<td>6</td>
<td>LINE</td>
<td></td>
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</tbody>
</table>

Refer to Local Electrical Codes for sizing.

Branch circuit for air compressor shall not be the same as the control panel power source.

**WIRING IN CLASS A / STYLE D**

1. POWER LIMITED 4-WIRE DETECTION CIRCUIT
2. UL-Listed 24VDC 4-Wire Smoke Detector
3. UL-Listed 24VDC 4-Wire Smoke Detector

**LEGEND**

- SMOKE DETECTOR
- HEAT DETECTOR
- MANUAL RELEASE
- BELL OR HORN
- DRY CONTACT
- END OF LINE RESISTOR

**NOTES:**
- Class A / Style D requires CA2Z module.
- End-of-line devices are not required for Class A / Style D wiring.

**WIRING IN CLASS B / STYLE B**

**WIRING IN CLASS B / STYLE Z**

Power Limited (supervised) Initiating Device Circuits

**Detection Zone 1, 2, 3, and 4.**
- Max. loop resistance: 100 ohms
- End of line: 5.1K ohms, 1/4W
- Leave ELR (provided) on all unused circuits.
- Refer to Device Compatibility in the VFR-400 Control Panel Manual.

Power Limited (supervised) Initiating Device Circuits

**Supervision Zone 1, and 2.**
- Max. loop resistance: 100 ohms
- End of line: 5.1K ohms, 1/4W
- Leave ELR (provided) on all unused circuits.
- For dry contact supervisory devices such as tamper, low air, or high air switches. (Class-B only)

Power Limited (supervised) Notification Appliance Circuits

**Output Circuit 1, 2, 3, and 4.**
- Maximum operating voltage: 27Vdc (ripple: 0.3Vdc)
- Maximum usable current per circuit: 1.0A
- Total current available (all circuits): 2.5A
- Polarity is reversed in supervisory condition.
- Leave ELR (provided) on all unused circuits.
- Refer to Device Compatibility in the VFR-400 Control Panel Manual.

**Auxiliary Power 24Vdc Regulated Source**
- Total current available: 0.2A
- Resettable for 4 wires smoke detectors.

**NOTES:**
- Control panel AC power source is supervised and non-power limited.
- All devices are shown in their normal supervisory state.
- Use dry contacts with power limited circuits only.
Relay module ARM-44

The ARM-44 is an auxiliary relay module designed to operate with the VFR-400 series release panels to provide an additional 8 independent form C relay outputs in 3 different operating modes. The panel communicates with the ARM-44 via the RS-485 and 24 VDC auxiliary power connections on the VFR-400.

### Mode 1
- Relays 1-4 follow the activation of zones 1-4, respectively.
- Relays 5-8 follow outputs 5-8, respectively.

### Mode 2
- Relays 1-4 follow the activation of zones 1-4, respectively.
- Relay 5 operates on any supervisory condition
- Relay 6 operates on any trouble condition
- Relay 7&8 operates on any alarm condition

### Mode 3
- Relay 1 operates on any supervisory condition
- Relay 2 operates on any trouble condition
- Relay 3&4 operates on any alarm condition
- Relays 5-8 follow outputs 5-8, respectively
Remote Annunciator RA-4410-RC

The RA-4410-RC remote annunciator is designed to operate with the VFR-400 releasing control panel. There are 34 LED’s to indicate a change in panel status. There is a buzzer on the annunciator that sounds for any trouble or supervisory condition. The release control panel supervises and communicates with the annunciator via separate connections for the RS-485 communication and the 24VDC power requirement of the RA-4410-RC. Separate cables should be used for power and communication. Shielded cable MUST be used for the RS-485 communication line. Up to four remote annunciator can be connected to one control panel.

**Warning:**
Connect the drain wire of the shielded cable to terminal 5 of TBC only. DO NOT connect the drain wire to any device. The drain wire must make a connections path to the last device where it is cut off and insulated.

Remove the resistor from TBC or the current device and install it on the last device only.

Annunciator address switch must be set one value higher than the previous one. Set the selector switch at the VFR-400 accordingly.
1- Skid mounted Unit

The TOTALPAC®3 unit skids are made of sturdy 14 gauge steel, they are available in four (4) sizes;

- 23” x 25” x 6” (58.4 x 63.5 x 15.2 cm) for 1½”, 2” & 3” systems,
- 36” x 25” x 6” (91.4 x 63.5 x 15.2 cm) for 4” system,
- 46” x 25” x 6” (116.8 x 63.5 x 15.2 cm) for 6” system
- 54” x 31” x 6” (137.2 x 78.7 x 15.2 cm) ) for 8” system

Refer to Figures 1 & 2 for complete dimensions

All surfaces are rust proof coated, inside and outside, with fire red, oven baked polyester powder on phosphate base.

IMPORTANT The TOTALPAC®3 skid units are NOT designed to be installed where they will be subjected to outdoors and/or freezing conditions. Subjecting the unit to conditions outside these limitations might hamper the normal operation of the system.

The skid assembly is pre-assembled and factory tested under ISO-9001 conditions (refer to following figures for installation and clearances details).

Note: This skid unit contains only the mechanical section of the TOTALPAC®3 trim. Electrical connections, control panel and air supply when applicable are provided by others.

Multiple unit installations are easily achieved by manifolding units together at their water inlets but drains shall remain separate and open.
### Figure 1 – Dimensions – Preaction:

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**Note:** Dimensions are nominal and may vary ±¼".
Figure 2 – Dimensions - Deluge:

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**Note:** Dimensions are nominal and may vary ±¼".
Figure 3 – Dimensions – Anchoring detail:

### Table of Anchoring Dimensions

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Figure 4 – Skid clearance detail

### Table of Skid Clearance Dimensions

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</table>
Figure 5: Open drain details for single unit:
(see dimensions in table below)

![Single Unit Detail](image1)

Figure 6: Open drain details for multiple units:
(see dimensions in table below)

![Multiple Units Detail](image2)

**Multiple Units Detail**

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**Notes:**
1. Supply and drain pipes can be connected on either sides of cabinet.
2. All pipes and fittings should meet applicable codes.
3. Actual drain collector diameter shall be determined with detailed hydraulic calculations and is the responsibility of the system designer.
2- Cabinet for Remote Controlled & Self-contained units

The TOTALPAC®3 unit skids are made of sturdy 14 gauge steel, they are available in four (4) sizes;

23" x 25" x 77" (58.4 x 63.5 x 195.6 cm) for 1½", and 2" systems,
36" x 25" x 77" (91.4 x 63.5 x 195.6 cm) for 3" and 4" system,
46" x 25" x 77" (116.8 x 63.5 x 195.6 cm) for 6" system
54" x 31" x 81" (137.2 x 78.7 x 205.7 cm) for 8" system

All surfaces are rust proof coated, inside and outside, with fire red, oven baked polyester powder on phosphate base. Cabinet is provided with one or two doors, all provided with a neoprene gasket to absorb vibrations.

Remote controlled;
A field wiring electrical junction boxes is integrated with the cabinet for connection of all electrical components in the trim. Pressure switches, supervisory switches, etc. are all factory wired to a terminal strip (TBA) for contractor's field wiring.

Self-contained;
A field wiring electrical junction boxes is integrated with the cabinet for connection of detection system, auxiliary contacts and signaling devices. All inputs & outputs are factory wired to a terminal strip (TBA) for contractor's field wiring.

Gauges to indicate air, water supply pressure and priming water pressure are all visible through clear Lexan windows.

IMPORTANT! TOTALPAC®3 units are NOT designed to be installed where they will be subjected to outdoors and/or freezing conditions. Refer to environmental data for additional details. Subjecting the unit to conditions outside these limitations might hamper the normal operation of the system.

Cabinet doors are provided with hinges that can easily be disassembled on site to remove the door assemblies for servicing. The cabinet assembly is pre-assembled, pre-wired, and factory tested under ISO-9001 conditions.

Multiple unit installations are easily achieved by manifolding units together at their water inlets but drains shall remain separate and open.
Integrated Fire Protection System

Dimensional Data & cabinet

Figure 7 Dimensions:

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Notes: Dimensions are nominal and may vary ±1/4".
Figure 8 – Cabinet & doors clearance detail

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<tr>
<td>4”</td>
<td>60”</td>
<td>12”</td>
<td>24”</td>
</tr>
<tr>
<td>6”</td>
<td>70”</td>
<td>12”</td>
<td>24”</td>
</tr>
<tr>
<td>8”</td>
<td>78”</td>
<td>12”</td>
<td>24”</td>
</tr>
</tbody>
</table>
Figure 9: Open drain details for single unit:  
(see dimensions in table below)

Figure 10: Open drain details for multiple units:  
(see dimensions in table below)

Notes:
1. Supply and drain pipes can be connected on either sides of cabinet.
2. All pipes and fittings should meet applicable codes.
3. Actual drain collector diameter shall be determined with detailed hydraulic calculations and is the responsibility of the system designer.
**Limited Warranty**

FireFlex Systems inc. (known herein as “the Manufacturer”) warrants to its customer that its products shall be free of defects in material [or part(s)] and workmanship for a period of twelve (12) months from the date of original delivery, under normal use and service by the Customer (and provided that the product has been properly installed and maintained).

The obligation of the Manufacturer in case of a claim made by the Customer hereunder, shall be, at the Manufacturer's option, limited to repair or replace, free of charge for parts or his labor, any product or part, which in the opinion of the Manufacturer, shall be proven to be defective. The Manufacturer will NOT accept labor back-charges incurred by the Customer to repair or replace said product or part.

The present warranty shall be void should the product [or part(s)] be altered by anyone other than the Manufacturer. In case of a claim under the present warranty, the Customer must contact the Manufacturer's Customer Service Department as soon as he is aware of a claim and, subject to the authorization of the manufacturer, return the defective product [or part(s)], transportation prepaid, to the address listed below.

This warranty constitutes the entire warranty given by the Manufacturer to the Customer with respect to the product. The present warranty is non-transferable and non-assignable. The Manufacturer does not represent that the products will prevent any loss by fire or otherwise or that the product will in all cases provide the protection for which it has been installed or intended.

The Customer acknowledges that the Manufacturer is not an insurer. The manufacturer shall not be liable for any loss or damages of any nature whatsoever, including but not limited to incidental or special or consequential damages including but not limited to, property damages, personal injury, revenue loss or lost profits, inconveniences, transportation charges or other damages suffered by anyone.

There are no other warranties, expressed or implied with regard to the products, other than those contained herein.

Some jurisdictions may not allow limitations on how long an expressed warranty lasts, so the above limitations may not apply to you. Under no circumstances, shall the Manufacturer be liable for any loss of, or damage to property, direct or indirect, incidental or special or consequential damages, arising out of the use or inability to use the Manufacturer's products. The Manufacturer shall not be liable for any personal injury which may arise in the course of or as a result of the use of the manufacturer's products.

This warranty replaces all previous warranties and is the only warranty given by the Manufacturer with respect to its products. This warranty shall not be modified, unless such modification is made in writing by an executive officer of the Manufacturer.

In consideration of the warranty provisions contained herein, the Customer hereby waives the benefit of any statutory warranty or protection or remedy to which he may be entitled under the terms of any sales of goods act or similar legislation available to him in any jurisdiction in which the Customer carries on business.

Defective part(s) must be returned to the address listed below within (30) days of receiving replacement part(s). If defective part(s) is not returned before delay expires, an invoice will be issued for replacement part(s) and shipping. On reception, an extended analysis will be performed on the said part(s). If proven to be defective, no invoice will be issued. If the part(s) is proven to be in working condition an invoice will be issued for replacement part(s) and shipping.

**Special Limitation:** Due to their self discharge characteristics when not charged during extended storage periods, Batteries supplied with integrated Releasing Control Panels are covered by the above warranty for a period limited to three (3) months only.

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**FireFlex Systems Inc.**  
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