Advanced Integrated Fire Protection Systems

TOTALPac® 2

Owner's Operation and Maintenance Manual

PREACTION DOUBLE INTERLOCKED

September 2009
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General

1. Applicable Standards
   The TOTALPac2 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 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 TOTALPac2 Unit has also been tested and approved by recognized laboratories. Here is the list of Listings & Approvals it meets:
   - Underwriters Laboratories Inc. (UL): Preaction TotalPac2 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 TotalPac2 systems are FM Approved under the heading: "Automatic Water Control Valves" when installed with specific components.
   - California State Fire Marshal <CSFM>: Preaction TotalPac2 systems are CSFM Approved under the heading: Misc. Devices/Control Unit Accessories, Listing No. 7300-0533:107.
   - City of New York: Preaction TotalPac2 systems are Approved under the Certificate of Approval # 6021

   Note: Although most TOTALPac2 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 units 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
   TOTALPac2 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 several types of preaction systems, however all of them use closed automatic sprinklers in the sprinkler piping. A detection network or system is used in parallel with the automatic sprinkler system and is designed to operate before a sprinkler head fuses. This network may be hydraulic, pneumatic or 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. Because preaction systems are often used in freezing areas, electrical and pneumatic detection systems are by far the most common.

This **TOTALPAC2** integrated fire protection system by FireFlex Systems Inc. consists of a preaction system trim totally pre-assembled, pre-wired and factory tested. All electrical and mechanical components of the system are contained in one single unit.

**Note:** Skid units include the trim components only and must be wired by the installing contractor.

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.

The only connections required for installation are the water supply inlet, water discharge outlet, main drain, the electrical detection and alarm connections, as well as the AC power line(s). The discharge outlet is connected to a fixed piping system of automatic sprinklers. Water is the extinguishing agent.

**Double interlocked** preaction systems are designed so the Deluge valve will open when **BOTH** a detector on the detection system **OR** on the pneumatic release 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.

**Note:** Every **TOTALPAC2** 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 TOT2#### or TOTS#### for Skid Units).

### 5. Features

The **TOTALPAC2** unit is superior to 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 Valves
- Units available either with or without Integrated Control Panel, but is provided by others on Skid version
- Skid version without control panel available
- 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 unit, all available with grooved end or flanged fittings
- No open drain cup inside unit
- Sturdy 14 Gauge steel cabinet or skid, 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.
6 Configuration Description

**TOTALPac** Preaction systems are built around the Viking Trim using Deluge Valves Model E-3 for **1 1/2”** (40 mm) diameter (Model E-4 is the Halar® Coated version for use in corrosive environments) and Model E-1 for **2”** (50 mm) diameter and up (Model E-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)

**TotalPac2** Preaction systems are supplied with flange–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:

**Double Interlocked.**

This preaction system utilizes a detection system and pressurized air or gas in the sprinkler piping. This system utilizes the Viking Deluge Valve and is arranged so that the valve will open only when both pressure is reduced in the sprinkler piping **and** the detection system operates, or anytime the handle of the Emergency Release Valve is pulled. 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 (or release) 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 sprinkler pipes 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 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.

**Available release systems are:**

- Pneumatic/Pneumatic,
- Electric/Pneumatic,
- Electric/Pneu-Lectric.

7 System Release

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

7a- Pneumatic/Pneumatic Release

Pneumatically controlled preaction systems require a pneumatic release system, equipped with thermostatic (rate-of-rise) releases, and/or fixed temperature releases, and/or pilot heads. Release trim for the Double Interlocked Pneumatic/Pneumatic Preaction System requires the factory pre-assembled pneumatic/pneumatic release module consisting of two pneumatic actuators (F3) and a pressure releasing vent valve (B14). Pneumatic Actuator no.1 is normally held closed by the pressure maintained in the pneumatic release system. Pneumatic Actuator no.2 is normally held closed by pressure maintained in the sprinkler system. BOTH release systems must activate before the deluge valve will open and fill the sprinkler system with water.

**Note:** The air supply for the pneumatic release piping system must be provided by the contractor and installed outside the **TotalPac2** unit. **The air supply must be restricted** to ensure that the automatic air supply cannot replace air as fast as it escapes when a releasing device or sprinkler operates. It is also recommended to provide Inspectors Test Connections on both the release system and the sprinkler system.

Viking Pneumatic/Pneumatic release systems are commonly used as refrigerated area systems when used with fixed temperature releasing devices, such as pilot heads.

7b- Electric/Pneumatic Release

Electric/Pneumatic controlled preaction systems use a pneumatic actuator (F3), normally held closed by supervisory pressure maintained in the sprinkler system AND a normally closed electric solenoid valve (F1) controlled by an approved system control panel with compatible detection system (if provided with this system, see Controls Section and VFR-400 manual for details).

BOTH the electric detection system AND supervisory pressure must be relieved from the sprinkler system before the deluge valve will open and fill the sprinkler system with water.
7c- Electric/Pneu-Lectric Release

Electric/Pneu-Lectric controlled preaction systems use pneumatic supervision of the automatic sprinkler system, and an electric detection system. The deluge valve release trim uses a normally closed electric solenoid valve (F1) controlled by an approved system control panel (if provided with this system, see Controls Section and VFR-400 manual for details) with two initiating circuits configured for "cross-zoned" operation. One initiating circuit is connected to the electric detection system; the other to a "Low-Air" alarm switch (E4). BOTH the electric detection system AND supervisory pressure must be relieved from the sprinkler system before the deluge valve will open and fill the sprinkler system with water.
1- Installation, Operations & instructions

See Trim Schematic at the end of the current Section

1.1 Installation

1. Install the TOTALPAC2 unit 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, releasing piping detection and signaling circuits (if applicable) in accordance with applicable standards.

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

4. Perform preliminary inspection outlined in paragraph 1.2 prior to putting system in service.

5. Place the system in service as outlined in paragraph 1.3.

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.

TOTALPAC2 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.

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. CLOSE Main Water Supply Control Valve (D1) and OPEN main drain valve (D3) to completely drain the sprinklers piping.

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

5. If applicable, 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).
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. Main water supply control valve (D1) is CLOSED.

2. CLOSE System Main Drain Valve (D3).

3. Restore supervisory pressure to sprinkler piping.

4. Double interlocked with Pneumatic-Pneumatic Release: OPEN pressure releasing valve (B14) to relieve pressure between Pneumatic Actuators #1 and #2 (F3). Restore pressure to the pneumatic release system (pilot line). CLOSE pressure releasing valve (B14).

5. 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).

6. On systems with electric release, reset the System Control Panel. Solenoid valve (F1) should close. Flow from solenoid valve to drain should stop.

7. OPEN Flow Test Valve (B6).

8. PARTIALLY OPEN Main Water Supply Control Valve (D1).

9. When full flow develops from the Flow Test Valve (B6), CLOSE the Flow Test Valve and verify that there is no flow from the Drip Check valve (B7) when the plunger is pushed.

10. FULLY OPEN the Main Water Supply Control Valve (D1).

11. 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).

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

13. Check and repair all leaks.

14. 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/Flow Control Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

15. After completing the trip test, perform MAINTENANCE – SEMI-ANNUALLY, article 1.8 of the current section.

16. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the affected area that the system is in service.

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.

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).

► Pneumatic/Pneumatic Release system: Water supply pressure is trapped in the priming chamber by the check valve (B1) and the two pneumatic actuators (F3) in the pneumatic/pneumatic release module. Pneumatic actuator (F3) #1 is held closed by pressure maintained in the pneumatic release system. Pneumatic actuator (F3) #2 is held closed by supervisory pressure maintained in the sprinkler system. The water supply pressure trapped in the priming chamber holds the deluge valve clapper closed, keeping the outlet chamber and system piping dry.

► Electric/Pneumatic Release system: Water supply pressure is trapped in the priming chamber by check valve (B4), and BOTH pneumatic actuator (F3) and normally closed solenoid valve (F1). The water supply pressure trapped in the priming chamber holds the deluge valve clapper closed, keeping the outlet chamber and system piping dry.

► Electric/PneuLectric Release system: Water supply pressure is trapped in the priming chamber by check valve (B4) and normally closed solenoid valve (F1). The water supply pressure trapped in the priming chamber holds the deluge valve clapper closed, keeping the outlet chamber and system piping dry.

1.4.2 In a fire condition:
► Pneumatic/Pneumatic Release system: When a releasing device operates, pressure in the pneumatic release system escapes, causing alarms controlled by air supervisory switch (E4) to activate, and Pneumatic Actuator (F3) #1 to open. When a sprinkler opens, supervisory pressure in the sprinkler piping is reduced, causing alarms controlled by the air supervisory switch (E4) to activate, and pneumatic actuator (F3) #2 to open.

► Electric/Pneumatic Release system: In a fire condition, when the detection system activates the first initiating circuit in the system control panel, causing an alarm to activate. When a sprinkler operates, air pressure escapes from the sprinkler piping. The air supervisory switch (E4) activates the second initiating circuit in system control panel. When BOTH initiating circuits have been activated, system control panel energizes 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). 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 a sprinkler head opens, water will flow from the system.

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, even if the open releasing devices close. 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:
If a sprinkler opens prior to operation of the detection system OR ANY TIME SUPERVISORY PRESSURE IN THE SPRINKLER PIPING IS LOST, alarms connected to Air Supervisory Switch (E4) (refer to AIR SUPPLY SECTION for details) will signal a low air pressure condition but the Deluge Valve will NOT open.
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 Water Supply Control Valve (D1).
2. Open system Main Drain Valve (D3).
3. Silence alarms (refer to Control Section for additional details when panel is provided with this unit).

Note: Electric alarms controlled by a pressure switch installed in the ½" (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).
6. Close Priming Valve (B1).

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 or thermostatic releases that have been damaged. Replace pilot heads or fixed temperature releases that have operated.
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.

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.

* Double interlocked with Pneumatic-Pneumatic Release: OPEN pressure releasing valve (B14) to relieve pressure between Pneumatic Actuators #1 and #2 (F3). Restore pressure to the pneumatic release system (pilot line). CLOSE pressure releasing valve (B14).
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. On systems with electric release, reset the System 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.
9. Verify that there is no flow from the Drip Check (B7) when the plunger is pushed.
10. FULLY OPEN the Main Water Supply Control Valve (D1).
11. 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).
12. Depress the plunger of the Drip Check Valve (B7). No water should flow from the Drip Check when the plunger is pushed.
13. Check and repair all leaks.
14. 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

NOTICE: THE OWNER IS RESPONSIBLE FOR MAINTAINING THE FIRE PROTECTION SYSTEM AND DEVICES IN PROPER OPERATING CONDITION.

It is imperative that the system be inspected and tested on a regular basis in accordance with NFPA 25. Refer to INSPECTIONS and TESTS recommended in Viking Technical Data describing individual components of the Viking Non-Interlocked Preaction System used.

The frequency of the inspections may vary due to contaminated water supplies, corrosive water supplies, corrosive atmospheres, as well as the condition of the air supply to the system. For minimum maintenance and inspection requirements, refer to NFPA 25. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

WARNING: Any system maintenance that 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

To Test Pneumatic Release System “Low Air” Alarm:
1. To prevent operation of the deluge valve and filling of the sprinkler piping with water during the test, CLOSE main water supply control valve (D1) and OPEN flow test drain (B6).
2. Fully open the Inspectors Test Valve on the Release line being tested.
3. Verify that low air alarms operate within an acceptable time period and continue without interruption.
4. Close the Inspectors Test Valve.
5. Close priming valve (B1).
6. Establish recommended pneumatic pressure to be maintained.
7. Open priming valve (B1).

To Test Sprinkler System “Low Air” Alarm:
Repeat steps 1-7 above operating the sprinkler system Inspectors Test Valve.

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

Caution! This procedure applies only when done in conjunction with “Low Air” Alarm testing described above.

1. Verify that the pressure indicated on priming pressure water gauge (B11) indicates that the priming chamber is pressurized with system water supply pressure.
2. Open flow test valve (B6).
3. Partially open main water supply control valve (D1).
4. When full flow develops from flow test valve, close the flow test valve (B6).
5. Verify that there is no flow from the Drip Check (B7) when the plunger is pushed.
6. Fully open and secure the main water supply control valve (D1).
7. 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).
8. Depress the plunger of drip check. 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 releasing devices.

Caution! Performance of this test will cause the deluge valve to open and the sprinkler system to fill with water.

To Trip Test the Pneumatic/Pneumatic Release system:
1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. To trip the deluge valve:
   a. Open the release system inspector’s test valve or operate a releasing device according to the manufacturer’s instructions.
   b. Open the sprinkler system inspector’s test valve.

To Trip Test the Electric/Pneumatic Release system:
1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. To trip the deluge valve:
   a. Operate a detector according to the manufacturer’s instructions.
   b. Open the sprinkler system inspectors test valve.

To Trip Test the Electric/PneuLectric Release system:
1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Trip the deluge valve:
   a. Operate a detector according to the manufacturer’s instructions.
   b. Open the sprinkler system inspector’s test connection.

When Trip Testing is complete:
5. Perform steps 1 through 10 of article 1.5, EMERGENCY INSTRUCTIONS to take the system out of service.
6. Perform steps 1 through 11 of article 1.3, PLACING THE SYSTEM IN SERVICE to return the system to service.
7. Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

1.7.3 Main 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. Fully open the flow test valve (B6).
3. Record residual pressure.
4. Close the flow test valve slowly (B6).
5. 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. It is imperative that the system be inspected in a regular basis in accordance with NFPA 25.

Refer to MAINTENANCE INSTRUCTIONS provided in 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.

3. A main drain test shall be conducted any time the control valve is closed and reopened at system riser.

**Quarterly:**

1. Alarm Device (pressure or flow switch).  
   *(Testing by opening the alarm test valve B5)*

2. Conduct Low Air Pressure Alarm Test.

**Semi-Annually:**

1. Water supply control valve (D1) switch shall be tested to verify the operation of the switch upon movement of the hand wheel.

2. Alarm Device (pressure or flow switch).  
   *(Testing by opening the alarm test valve B5)*

**Annually:**

1. Manual emergency release test

2. Full trip test: Isolation valve perfect for special site condition such as freezing condition.  
   
   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.

3. Main Drain Test.

**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- Double Interlocked System with Pneumatic-Pneumatic Release

2.1 Description
The TOTALPAC2 System with the Viking Double Interlocked Preaction Trim utilizes a Viking Deluge Valve (A1) controlled by pressure maintained in the pneumatic release system and supervisory pressure maintained in the automatic sprinkler system. In fire conditions, BOTH the release 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 pneumatic release 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.

Pneumatically controlled preaction systems require a pneumatic release system, equipped with thermal releases and/or pilot heads. Release trim, for Pneumatic/Pneumatic Double Interlocked Preaction System, requires the factory pre-assembled pneumatic/pneumatic release module consisting of two Pneumatic Actuators (F3) and a pressure release valve (B14). Pneumatic Actuator no.1 is normally held closed by the pressure maintained in the pneumatic release system. Pneumatic Actuator No. 2 is normally held closed by pressure maintained in the closed sprinkler system.

Double interlocked preaction systems are designed so the Deluge valve will open when BOTH a detector on the pneumatic release 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.

**CAUTION!** The Pressure releasing valve (B14) MUST remain CLOSED during normal operation. When the valve is open, the system is NOT double interlocked. Loss of supervisory pressure in the release piping or the sprinkler piping while this valve is open will trip the system.

**Note:** The air supply for the pneumatic release piping system must be provided by the contractor and installed outside the TOTALPAC2 cabinet. The air supply must be restricted to ensure that the automatic air supply cannot replace air as fast as it escapes when a releasing device or sprinkler operates. It is also recommended to provide Inspectors Test Connections on both the release system and the sprinkler system.

Pneumatic/Pneumatic Double Interlocked TOTALPAC2 Systems are commonly used as refrigerated area systems when used with fixed temperature releasing devices such as pilot heads. 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.
Trim Schematic: Double Interlocked with Pneumatic / Pneumatic 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
   B14 Pressure releasing 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

F. Release System:
   F3 Pneumatic actuators #1 & #2
3- Double Interlocked System with Electric / Pneumatic Release

3.1 Description

The TOTALPac2 System with the Viking Double Interlocked Preaction Trim utilizes a Viking Deluge Valve (A1) controlled by a pneumatic actuator (F3) normally held closed by supervisory pressure maintained in the automatic sprinkler system AND a normally closed electric solenoid (F1) controlled by an approved system control panel with compatible detection system.

In fire conditions, operation of BOTH the electric detection system must activate AND supervisory pressure must 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.

Electric/Pneumatic Double Interlocked TOTALPac2 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 TOTALPac2 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

1. Control panel of the TOTALPac2 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) Manual emergency release valve (B10) is CLOSED (handle in vertical position).
   g) Alarm test valve (B5) is CLOSED.
   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) 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 section)
   a) Shut-off valve (D4) is OPEN.
   b) Accelerator bypass valve (1) is OPEN.

Table 1: Pressure Settings

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>WATER SUPPLY PRESSURES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 175 psi (1207 kPa)</td>
</tr>
<tr>
<td>Sprinklers Air Pressure Gauge (E3)</td>
<td>35 PSI (241 kPa)</td>
</tr>
<tr>
<td>Low Air Supervisory Pressure Switch (E4)</td>
<td>25 PSI (172 kPa)</td>
</tr>
</tbody>
</table>

For complete pressure settings, see "Air Supply" Section

Note: Factory Mutual <FM> approves Double Interlocked Preaction Systems for use in refrigerated areas only.
Trim Schematic: Double Interlocked with Electric / Pneumatic 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 Prime 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)

F. Release System:
   F1 N.C Solenoid Valve – 24Vdc
   F3 Pneumatic actuators
3- Double Interlocked with Electric / Pneu-Lectric Release

3.1 Description

The TOTALPac2 System with the Viking Double Interlocked Preaction Trim utilizes a Viking Deluge Valve (A1), pneumatic supervision of the automatic sprinkler system AND a normally closed electric solenoid (F1) 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.

Electric / Pneu-Lectric Double Interlocked TOTALPac2 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 TOTALPac2 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 (refer to AIR SUPPLY SECTION for exact location).

3.2 Normal condition

1. Control panel of the TOTALPac2 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) Air pressure (E3): 20 PSI (138 kPa).

4. Pressure switches
    a) Alarm switch (C1) - should activate when pressurized higher than 5 psi (35 kPa).
    b) Low air supervisory pressure switch (E4): 12 Psi (83 kPa).
    c) Very low air supervisory pressure switch (E4): 10 psi (69 kPa).

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

Table 1: Pressure Settings

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Note: Factory Mutual <FM> approves Double Interlocked Preaction Systems for use in refrigerated areas only.
**Trim Schematic:** Double Interlocked with Electric / PneuLectric 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 (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)

F. Release System:
   - F1 N.C Solenoid Valve – 24Vdc
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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) or Flow Control Valve (A2) (See Annual test under the INSPECTION AND MAINTENANCE section.) Using a flashlight in one of 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.

**Figure 1 - Test Valve for Preaction Systems**

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 / Flow Control Valve (A1 or A2). An access hole of the proper diameter is factory pre-drilled on the side of the TotalPac enclosure for connection of the piping going to the Fire Department Connection.

**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.

**Figure 2 – Fire Department Connection for Preaction Systems**
3. Semi and Full-flanged Option:

When required by the user, TotalPac2 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:
1- Cabinet Air Supplies

Pneumatic, dry valve and other 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 TOTALPac2 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 and with dry pipe systems. Air supply style "A" includes the air compressor mounted inside the TOTALPac2 cabinet with its supervisory trim and options. Compressors are of the oilless piston type without reservoir and are factory piped to the sprinkler system riser, all within the TOTALPac2 cabinet. They are available in four (4) sizes:
  - 1/6HP
  - 1/3HP
  - 1HP.

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

- 120Vac-60Hz
- 220Vac-50Hz.

The 120Vac-60Hz is the normal voltage used in Canada and the United-States while the 220Vac-50Hz is primarily used in Europe, Middle-East and other countries with 220 volts, 50 cycles current.

- **Air Supply Style "B":** (Refer to Figure 2) Used only for the sprinkler piping network of Preaction or dry pipe 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 TOTALPac2 cabinet.

Note: For the releasing system piping of pneumatically actuated systems, use air supply type "C" or "D" 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 or deluge 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 TOTALPac2 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 TOTALPac2 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 TOTALPac2 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>CMF @ 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>110</td>
<td>90</td>
</tr>
<tr>
<td>1/3</td>
<td>2.61</td>
<td>215</td>
<td>170</td>
</tr>
<tr>
<td>1/2</td>
<td>4.06</td>
<td>335</td>
<td>270</td>
</tr>
<tr>
<td>1</td>
<td>7.40</td>
<td>610</td>
<td>400</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 TotalPac2 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 figure below and FIELD WIRING DIAGRAM.

1.3 Operation

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 in the control section of the unit (refer to CONTROL SECTION, Fig. 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 (Furnas switch):

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:

a) Remove the metal cover of the compressor air pressure switch (E2).

b) To raise the cut-out pressure of the air compressor, turn the cut-out adjustment screw (middle) half a turn CLOCKWISE.

c) 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).

Turn clockwise to increase both cut-out and cut-in pressure adjustment.

Factory set.
DO NOT CHANGE!

Front view of the Furnass Switch
(Part # 69HA3)

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 Supply

1. 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.

2. 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).

3. 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.

4. Air supply style "B" or "C":

7. To Apply Air Supply:

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

8. To Close Air Supply:

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

1.4 Maintenance and inspection:

5. Air supply style "D":

7. To Apply Air Supply:

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

8. To Close Air Supply:

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

1.4 Maintenance and inspection:

6. To Apply Air Supply:

This procedure requires turning OFF the compressor's AC power. Follow instructions "To close Air Supply" above.

a) Carefully loosen the ¼” copper adapter, remove copper tubing, and proceed to disassemble the check valve assembly (E11).

b) Once disassembled, carefully clean the check valve seat, or replace the check valve (part # 40CHSW0002) altogether if worn out components are found.

c) Remove all brass connections, by unscrewing gently all tubing adapters from the fittings, removing the previously installed Teflon tape and apply new Teflon tape on all threads. Re-install all components and check for leaks after reconnecting power to the air compressor.

3. To close the Air Supply:

This procedure requires turning OFF the compressor's AC power. Follow instructions "To close Air Supply" above.

a) The motor compressor unit should be kept dirt-free. A dirty filter restricts air flow, and causes the pump to run hotter and results in longer operating cycles.

b) To inspect the inlet filter, turn the black plastic cover counter-clockwise to remove it from its case (refer to Figure 1). Remove old felt. Clean or replace with new one (part # B300A). DO NOT CLEAN WITH PETROLEUM-BASED PRODUCTS.

c) Re-install filter and cap. DO NOT OPERATE COMPRESSOR WITHOUT A FILTER.

Intake and exhaust filters are standard on most compressors and will provide adequate filtration for most applications. Check filters periodically and replace when necessary. Initial inspection is suggested at 500 hours, then the user should determine the frequency. Most problems can be prevented by keeping filters and mufflers clean. Dirty filters and mufflers decrease compressor performance and can decrease compressor service life.

Should the compressor need rebuilding, field rebuilt kits are available from Authorized Service Facilities. Refer to the compressor's Owner's Manual provided with the TOTALPac2 unit. Maintain a clean air filter cartridge to insure best flow and performance. The location and the quality of the air being ingested indicate the frequency for inspection and replacement. A dirty filter restricts air flow, causes the pump to run hotter and results in longer operating cycles.
TOTALPac2 Integrated Fire Protection System

Air Supply

4. 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.
**TOTALPac2**

**TOTALPac2 Integrated Fire Protection System**

**Air Supply**

**Figure 1 – Air Supply Style “A”**

(Cabinet mounted air compressor)

![Diagram of Air Supply Style “A”](image)

**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-seal check valve |
| E11 | Air compressor check valve |
| E12 | Air option drain valve |
| E15 | Compressor isolating switch (not shown) |

**Optional Components:**

*(see Air Supply Options for details)*

- Viking Dehydrator
- Accelerator
**Figure 2 – Air Supply Style “B”**

(APMD without air compressor)

Contractor external AIR or NITROGEN connection (also used as dehydrator option connection)

Plug removed for Optional accelerator or Pneumatic actuator (when used)

**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, open the input valve (E6) 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

**Optional Components:**
(see Air Supply Options for details)
- Viking Dehydrator
- Accelerator
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

Optional Components:
(see Air Supply Options for details)
- Accelerator
**Figure 4 – Air Supply Style “D”**

(Air supply connection only for external air supply)

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

**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

**Optional Components:**
(see Air Supply Options for details)
- Viking Dehydrator
- Accelerator
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<th>System Type</th>
<th>Air Supply Style</th>
<th>Air Regulator</th>
<th>Compressor Start</th>
<th>Compressor Stop</th>
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## Table 2: Water Pressure from 175 Psi to 250 Psi

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2- Skid Air Supply Option

When TotalPac2 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 TotalPac2 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 TotalPac2 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.

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

2.2 Operation

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

2. 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.
**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

**Optional Components:**
(see Air Supply Options for details)
- Accelerator
**Figure 2 – Skid Air Supply for Pilot Line**
(Air supply connection only for external air supply)

![Diagram of Skid Air Supply for Pilot Line]

**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

**Optional Components:**
(see Air Supply Options for details)
- Accelerator
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Viking Dehydrator:
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 90°F (32°C) temperature with a regeneration temperature of 350°F (177°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 4400 standard cubic feet (124,6m³) of air to –45°F (-43°C) atmospheric dew point at rated specifications before the desiccant becomes saturated.
3. The maximum air flow rating is 10 standard cubic feet per minute (0,283m³/minute) at 100 psi (689.5 kPa) per unit.
4. All ratings are based on 70°F (21°C) saturated inlet air temperatures at 100 psi (689.5 kPa).
5. The polycarbonate plastic bowl holds 1.64 pounds (0.74 kg) of desiccant and is rated for a maximum temperature and pressure at 125°F (52°C) and 150 psi (1034 kPa).
6. The silica gel desiccant is provided in a sealed 1.75 pound (0.794 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 plastic bowl of dehydrator is filled with silica gel. As the relative humidity increases, the silica gel absorbs the moisture and begin to change color from dark blue to light pink, indicating the desiccant must be replaced.

To Make Dehydrator Functional:
Drain valve (E12) shall be closed.

To Drain Dehydrator input line:
CLOSE air shut-off valve (E14). OPEN drain valve (E12) to drain input line then close it. OPEN air shut-off valve (E14).

To replace Dehydrator cartridge:
Once it has been drained, CLOSE the Dehydrator air shut-off valve (E14). Unscrew both the bowl guard and the transparent bowl. Replace desiccant with a fresh charge.

Follow instructions described on Viking data sheet no. 276 (Form No. F_042089) provided with the silicagel recharge.
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Viking Accelerator:

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 then 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 Control Panel Section of the Self-Contained TOTALPAC2 unit is an add-on cabinet that is installed on the top of the trim enclosure at the factory. This cabinet is fabricated of Gauge 14 steel, painted fire red with baked powder paint making it rustproof, the same finish as the Trim Enclosure.

The Control Panel Section is provided with a locked stainless steel door on the front giving access to the basic controls of the Control Panel. Once opened, the cabinet door gives access to the panel's Terminal Strip (refer to FIELD WIRING DIAGRAM for additional details), the control panel main board, emergency batteries and other related equipment. Refer to Figures 1 and 2 for additional details.

1.2 Self-contained TOTALPAC2 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 TOTALPAC2 System.

In fire conditions when an initiating device circuit (or predetermined combination of circuits) is energized, the panel activates the release and signaling circuits according to the 'Program' setting.

On the panel's display board, the appropriate Alarm, Trouble and Supervisory LED's will flash until the event has been acknowledged. A message will be displayed on the LCD as well.

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 Switches:

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 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.

WARNING ! For more information and technical data, please see the VIKING VFR-400 INSTALLATION, OPERATION AND INSTRUCTION MANUAL provided with the TOTALPAC2 Unit.

WARNING ! Alarms initiated from a WATERFLOW signal can not be silenced. The panel must be reset to silence audible devices.
**TOTALPac2 Integrated Fire Protection System**

**Control Section**

**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:**

A- Press the "PROGRAM" switch down

B- Press on "FUNCTION" button until the following is displayed:

```
SET TIME?
```

C- Press the "SELECT" button to get to the "MINUTES" sub-menu;

```
01/21/2000
MINUTES 02:58:04
```

D- Use "SELECT" button to increase the minutes, or use "SET" button to decrease minutes.

E- Press the "FUNCTION" button to get to the "HOURS" sub-menu;

```
01/21/2000
HOURS 02:58:04
```

F- Use "SELECT" button to increase the hours, or use "SET" button to decrease hours.

G- Press the "FUNCTION" button to get to the "DAY" sub-menu;

```
DAY 01/21/2000
02:58:04
```

H- Use "SELECT" button to increase day, or use "SET" button to decrease day.

I- Press the "FUNCTION" button to get to the "MONTH" sub-menu;

```
MONTH 01/21/2000
02:58:04
```

J- Use "SELECT" button to increase month, or use "SET" button to decrease month.

K- Press the "FUNCTION" button to get to the "YEAR" sub-menu;

```
YEAR 01/21/2000
02:58:04
```

L- Use "SELECT" button to increase year, or use "SET" button to decrease year.
Figure 1 - Cabinet door assembly:

- Control section hinged door (recessed hinges on top)
- Releasing panel controls access door (stainless steel)
- Control Panel annunciator window
- Door Lock (with key alike keys)
- Flush door handle

"TBB" field terminal strip for 120 / 220 Vac Power Supply (under protective cover)
"TBC" field terminal strip for Los Angeles & Chicago option
Air compressor isolatin switch (E15)

Typical control panel motherboard placement.

Emergency batteries

NOTE: TBB field terminal strip and Air compressor isolation switch (E15) only with Air Supply Style A air

Figure 2 - Control equipment layout:
Figure 3 - Detail of VFR-400 Panel control section:
Figure 4 - Detail of VFR-400 wiring routing:

**AC POWER**

- 120 / 220 Vac Power Supply (Control panel only)

**POWER LIMITED CIRCUITS**

- "TBC" field terminal strip for 120 / 220 Vac Power Supply (Air compressor only)
- NAC Circuits
- Dry contacts
- 24Vdc / Ann. Supervisory / Detection

"TBC" field terminal strip for Los Angeles & Chicago option
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2- Control Section without control panel.

2.1 Product Description

When the TOTALPAC2 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 top control section of the TOTALPAC2 is not provided and is replaced by a field wiring junction box (See Figure 1 for details). All electrical components in the trim (pressure switches, supervisory switches, etc.) are factory wired to a terminal strip (TBA) for contractor's field wiring. The junction box is provided with a cover plate maintained in place by 4 screws and contains the wiring schematic on it's internal face. Junction box has 4 knock-outs for contractor field wiring.

2.2 Remote Controlled TOTALPAC2 (without Control Panel)

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.

2.3 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.
Wire size: minimum #14 AWG with 600 Volt insulation.

Note: This TOTALPAC2 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 1: Detail of contractor wiring junction box:

NOTE: Junction box shown with coverplate removed for clarity. See Figure 2 for wiring routing.

Figure 2 - Wiring routing:

Wiring shown indicates typical Wiring Routing for Power-Limited circuits. Refer to Field Wiring Diagram in "Programming Section" for additional details.
1- Remote Controlled, Pneumatic / Pneumatic Release

This TOTALPac2 Unit without control panel is factory wired for one of the following configurations:

**Double Interlocked Pneumatic/Pneumatic Release**

This TOTALPac2 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. The remote control panel shall also be Listed and be compatible for supervising sprinklers supervisory and alarm contact devices. 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 – Double Interlocked Preaction**

When the pneumatic release system is activated, it allows the opening of a first pneumatic actuator, but no water will enter the system since there is still air pressure in the sprinkler system network. When a sprinkler head opens causing a loss of air pressure in the sprinkler system, it allows the opening of a second pneumatic actuator. 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 device will operate 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 sprinkler system piping network which allows supervisory air pressure to drop below 25 psi causes the closing of the corresponding Low Pressure Switch contact. No water will flow in the system piping.

   b) Any leak or opening in the pneumatic release piping network which allows supervisory air pressure to drop below 25 psi causes the closing of the corresponding Low Pressure Switch contact.

1.2 Water Discharge (Double Interlocked)

Water discharge occurs when both these conditions are satisfied: pneumatic release and opening of a sprinkler head, causing the closing of the waterflow pressure switch contact. 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. Sprinkling remains in effect until main control valve is manually closed.

1.4 Supervisory of the Valves

An abnormal position of a valve will cause the closing of the Valve Supervisory Switch contact.
Field wiring diagrams:

- **TOTALPac2 Integrated Fire Protection System**
- **Programming Section**

**Notes:**
- All devices are shown in their normal supervisory state.
- Dry contacts ratings:
  - Pressure switches: 2.0A, 30VDC / 10A, 125/250VAC
  - Supervisory switches: 0.5A, 125VDC / .025A, 250VAC / 10A, 125/250VAC
- Use end-of-line devices compatible with the release control panel used (not included).

**Wiring of 120/220Vac Air Compressor Power Source**

- Input power source:
  - L1: 120Vac, 60Hz
  - L2: 220Vac, 50Hz
  - Neutral: Air Compressor
  - Ground: 1 HP Maximum

- Wiring size: Minimum 14 AWG with 600V insulation.

**FACTORY WIRED DEVICES**

- **Los Angeles Option**
- **Chicago Option**

**Note:**
- Contacts provided for connection to the building's central Fire Alarm Panel.
2- Remote Controlled, Electric / Pneumatic Release

Your TOTALPAC2 Unit without control panel is factory wired for one of the following configurations:

**Double Interlocked Electric / Pneumatic Release**

This TOTALPAC2 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 supplied to control this system complies with the sequence of operation described in MECHANICAL SECTION, paragraph 1.4. The remote control panel shall also be Listed and be compatible for supervising sprinklers supervisory and alarm contact devices and be compatible for supervising N.C. 24Vdc Solenoid Valve. 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 – Double Interlocked Preaction**

When the normally closed (N.C.) solenoid valve of the system is energized, 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. 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 in the piping network or opening of a sprinkler head which allows supervisory air pressure to drop below 25 psi on 175 psi systems (45 psi on 250 psi systems) causes the closing of the air pressure Supervisory switch. No water will flow in the system piping.

b) Any leak in the piping network or opening of a sprinkler head which allows supervisory air pressure to drop below 23 psi on 175 psi systems (43 psi on 250 psi systems) causes the closing of the air pressure Alarm switch. No water will flow in the system piping. (NYC only)

1.2 Double Interlock

The operation of the N.C. solenoid AND a sprinkler head causes a loss of pressure in the valve trim. Water then escapes from the priming chamber of the deluge valve. The clapper of the deluge valve opens, filling the system with water and causing the closing of the waterflow 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.

3. System Manual Operation

Manual opening of the deluge valve by the operation of the manual emergency release valve causes the closure of the water flow switch.
**Field wiring diagrams:**

![Field wiring diagrams](image)

**TOTALPac2 Integrated Fire Protection System**

**Programming Section**

**Notes:**
- All devices are shown in their normal supervisory state.
- Dry contacts ratings:
  - Press. switches: 2.0A, 30VDC / 10A, 125/250 VAC
  - Supv. switches: 0.5A, 125 VDC / .025A, 250 VAC / 10A, 125/250 VAC
  - Use only with power limited circuits
- Use end-of-line devices compatible with the release control panel used (not included).

**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 DC</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- Remote Controlled, Electric/Pneu-Lectric Release

This **TOTALPac2** Unit without control panel is factory wired for one of the following configurations:

**Double Interlocked Electric / Pneu-Lectric Release**

This **TOTALPac2** 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 supplied to control this system complies with the sequence of operation described in MECHANICAL TRIM SCHEMATIC. The remote control panel shall also be Listed and be compatible for supervising sprinklers supervisory and alarm contact devices and be compatible for supervising N.C. 24Vdc Solenoid Valve. 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 – Double Interlocked Preaction**

When the detection system is operated, it activates the first initiating circuit in the remote control panel, causing an alarm to activate. When a sprinkler operates, supervisory pressure escapes from the sprinkler piping. The air supervisory switch activates the second initiating circuit in system control panel. When BOTH initiating circuits have been activated (cross zoned), system control panel energizes N.C. solenoid. The clapper of the deluge valve opens, filling the outlet chamber and sprinkler piping with water. Electric water flow alarms and the water motor gong (if installed) will activate.

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 12 psi causes the closing of the Low Air Supervisory Pressure Switch contact.

b) Opening of a sprinkler head will allow supervisory air to drop below 10 psi, causing the closing of the Low Air Alarm Pressure Switch contact.

**Note:** The low air pressure switch used is a dual switch. One set of contact (set to 12 psi) is connected with the main valve supervisory switch. The second one (set to 10 psi) is used to detect the opening of sprinkler head.

1.2 Double Interlock

The operation of a detection circuit AND a very low air condition by the opening of a sprinkler head causes the N.C. Solenoid to open and the sprinkling of water.

1.3 Water Discharge

The opening of the Deluge valve causes the sprinkling of water and the closing of the waterflow pressure switch contact. Sprinkling remains in effect until main control valve is manually closed.


Operation of the Emergency Release Valve causes the manual activation of the Deluge Valve.

3. 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.
Field wiring diagrams:

**SOLENOID VALVE ELECTRICAL RATINGS**

<table>
<thead>
<tr>
<th>Viking P/N</th>
<th>Description (De-energized)</th>
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<th>Watts</th>
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<td>24 VDC</td>
<td>10.0 DC</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.
4- Self Contained, Electric/Pneumatic Release

The VIKING VFR-400 Control Panel included with the TOTALPAC2 Unit is factory programmed and wired for the following configurations:

- Double Interlocked, Electric/Pneumatic Release
- Double Interlocked, Electric/Pneumatic Release NYC and
- Activation by Zone 1 OR Zone 2
- Activation by Zone 1 (NYC)
- Activation by Zone 1 AND Zone 2 (Cross-zoned)
- Activation by Zone 4 (Pull Station) for all configurations

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

Pre-configured programs allows field programming for possible input/output combinations, of which only three are available and Listed for the current use of the TOTALPAC2 System:

Program #1, Single Hazard, Two Alarm Zones with One Manual Station Zone, One Waterflow Zone and Two Supervisory Zones.

Program #12, Single Hazard, Two Alarm Zones (Cross-zoned) with One Manual Station Zone, One Waterflow Zone and Two Supervisory Zones.

Program #5, Single Hazard, One Alarm Zone with One Manual Station Zone, One Waterflow Zone and Three Supervisory Zones. (NYC)

Program #1 allows the panel to activate the solenoid valve when EITHER detection Zone 1, Zone 2 OR Zone 4 is activated.

Program #12 allows the panel to activate the solenoid valve when BOTH detection Zone 1 AND Zone 2 are activated (Cross-zoned) OR Zone 4 only. (Pull Station)

Program # 5 allows the panel to activate the solenoid valve when EITHER detection Zone 1 OR Zone 4 (Pull Station) is activated. (NYC)

WARNING ! Only the three Pre-configured programs above are Listed/Approved with the present TOTALPAC2 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 #12 Output and Relay Circuits Activated by Detection Circuits:

<table>
<thead>
<tr>
<th>PROGRAM 12</th>
<th>OUTPUT CIRCUITS</th>
<th>RELAY CIRCUITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGLE HAZARD CROSS ZONED</td>
<td>ALARM BELL</td>
<td>WATERFLO W BELL</td>
</tr>
<tr>
<td>INPUT CIRCUITS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUPERVISORY ZONE 1 (Valve Tamper)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUPERVISORY ZONE 2 (Air)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 1</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 3 (Waterflow)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 4 (Pull Station)</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

### Program #5 Output and Relay Circuits Activated by Detection Circuits:

<table>
<thead>
<tr>
<th>PROGRAM 5</th>
<th>OUTPUT CIRCUITS</th>
<th>RELAY CIRCUITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGLE HAZARD TWO ZONES NYC</td>
<td>ALARM BELL</td>
<td>SUPERVISORY BELL</td>
</tr>
<tr>
<td>INPUT CIRCUITS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUPERVISORY ZONE 1 (Valve Tamper)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SUPERVISORY ZONE 2 (Low Air)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 1 (Detection)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 2 (Low Air Alarm)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 3 (Waterflow)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>DETECTION ZONE 4 (Pull Station)</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

**Operation**

**Double-Interlocked, Electric / Pneumatic Release**

On activation of either Zone 1 or Zone 2 (in crossed zones mode, both detection zones have to be activated) OR the activation of Zone 4 (pull station). The system alarm audible devices operate and, if desired can be silenced manually. The normally closed (N.C.) solenoid valve of the system is energized, but 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. Water then escapes from the priming chamber of the deluge valve.

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

**Double-Interlocked, Electric / Pneumatic Release for refrigerated areas only. (NYC)**

On activation of either Zone 1 OR the activation of Zone 4 (pull station). The system alarm audible devices operate and, if desired can be silenced manually. The normally closed (N.C.) solenoid valve of the system is energized, but 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. Water then escapes from the priming chamber of the deluge valve.
An individual branch circuit shall be required for the supply of the control panel power source.

**Input Wiring in Class B (style B)**

**Output Wiring in Class B (style Y)**

**Auxiliary dry contact relay outputs rated 3A at 30Vdc (resistive)**

**FIELD WIRING DIAGRAMS**

**Legend**

**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.
FIELD WIRING DIAGRAMS

An individual branch circuit shall be required for the supply of the control panel power source.

AC POWER SUPPLY
120 VAC, 60Hz / 220VAC, 50Hz
CIRCUIT IS NON-POWER LIMITED AND SUPERVISED

Input Wiring in Class B (style B)

Output Wiring in Class B (style Y)

INPUT POWER SOURCE
120Vac, 60Hz 220Vac, 50Hz

Wiring of 120/220Vac Air Compressor Power Source

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

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
5- Self Contained, Electric/Pneu-Lectric Release

The VIKING VFR-400 Control Panel included with the TOTALPAC2 Unit is factory programmed and wired for the following configurations:

- Double Interlocked, Electric/Pneu-Lectric Release
- Activation by Zone 1 + Low Air Alarm (single zone)

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 one is available and listed with the current use of the TOTALPAC2 System:

**Program #3**, Single Hazard, One Alarm Zone, One Low Air Alarm Zone, One Waterflow Zone, One Manual Station Zone, One Low Air Supervisory Zone and One Valve Tamper Zones.

Program #3 allows the panel to activate the solenoid valve when BOTH detection Zone 1, **AND** Low Air Alarm Zone are activated.

**Warning**: Only the Pre-configured program above is Listed/Approved with the TOTALPAC2 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 #3 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>SUPERVISORY ZONE 1 (Air)</td>
<td>ALARM BELL</td>
<td>WATERFLOW BELL</td>
</tr>
<tr>
<td>Detection Zone 1 (Detector)</td>
<td>Note 1</td>
<td>X</td>
</tr>
<tr>
<td>Detection Zone 2 (Low Air Alarm)</td>
<td>Note 1</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>

**Note 1**: The solenoid valve activates when detection Zone 1, **AND** Low Air Alarm Zone are activated.
**Operation**

**Electric / Pneu-Lectric Release**

On activation of Zone 1 (detection cct). The system alarm audible devices sound and, if desired, can be silenced manually. When a sprinkler head opens causing a loss of air pressure, Zone 2 (Low Air Alarm) is activated and the normally closed (N.C.) solenoid valve of the system is energized open, 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. Water flow audible devices and the water motor gong (if installed) will sound.

Activation of Zone 4 (Pull Station) the normally closed (N.C.) solenoid valve of the system is energized open, 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. Water flow audible devices and the water motor gong (if installed) will sound.

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

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

An individual branch circuit shall be required for the supply of the control panel power source.

**Input Wiring in Class B (style B)**

<table>
<thead>
<tr>
<th>ZONE 1</th>
<th>ZONE 2</th>
<th>ZONE 3</th>
<th>ZONE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Auxiliary dry contact relay outputs**

rated 3A at 30Vdc (resistive)

**Output Wiring in Class B (style Y)**

**INPUT POWER SOURCE**

<table>
<thead>
<tr>
<th>TBB</th>
<th>L1</th>
<th>120Vac, 60Hz</th>
<th>220Vac, 50Hz</th>
</tr>
</thead>
</table>

**Wiring of 120/220Vac Air Compressor Power Source**

**Legend**

- **Smoke Detector**
- **Heat Detector**
- **Notification Bell**
- **Manual Pull Station**
- **Dry Contact Device**
- **End of Line Device**

**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.
Power Limited (supervised) Initiating Device Circuits

- **POWER LIMITED 4-WIRES DETECTION CIRCUIT**
  - UL Listed
  - 24Vdc 4-Wire Smoke Detector
  - UL Listed
  - 24Vdc 4-Wire Smoke Detector
  - PAM-4 Power Supervisory Relay (EOL Relay)

- **FACTORY WIRED DEVICES**
  - N.O.: 1
  - N.C.: 2
  - C
  - N.O.: 4
  - N.C.: 5
  - C

**Note:** Contacts provided for connection to the building's central Fire Alarm Panel.
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 annunciators can be connected to one control panel.
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1- Skid mounted Unit

The TOTALPac2 unit skid is made of sturdy 14 gauge steel, measuring 36” x 20” x 6” (91,4 x 50,8 x 15,2 cm) for 1½”, 2” & 3” systems and 46” x 24” x 6” (116,8 x 61 x 15,2 cm) for 4” & 6” systems (refer to Figures 1 to 5 for dimensions). All surfaces are rust proof coated, inside and outside, with fire red, oven baked polyester powder on phosphate base.

**IMPORTANT!** The TOTALPac2 skid 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.

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 TOTALPac2 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. Refer to Figure 4 & 5 for additional details on how to pipe the drains.

<table>
<thead>
<tr>
<th>System Size (Dia.)</th>
<th>Shipping weights</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lbs.</td>
</tr>
<tr>
<td>Preaction</td>
<td></td>
</tr>
<tr>
<td>1½”</td>
<td>285</td>
</tr>
<tr>
<td>2”</td>
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<td>3”</td>
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<tr>
<td>4”</td>
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</tr>
<tr>
<td>6”</td>
<td>710</td>
</tr>
</tbody>
</table>

**Note:** Above Shipping Weights are nominal and will change depending on configuration and options selected.
**TOTALPac2 Integrated Fire Protection System**

*System design & Dimensional Data*

Figure 1 – Dimensions - Preaction:

![Diagram of TotalPac2 System Design and Dimensional Data](image)

### System Design and Dimensional Data

<table>
<thead>
<tr>
<th>System Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
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<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
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</thead>
<tbody>
<tr>
<td>1½”</td>
<td>2”</td>
<td>1½”</td>
<td>2”</td>
<td>36”</td>
<td>46”</td>
<td>20”</td>
<td>4”</td>
<td>8½”</td>
<td>9”</td>
<td>18½”</td>
<td>3½”</td>
<td>6”</td>
<td>2”</td>
<td>34¼”</td>
<td>5”</td>
<td>19½”</td>
<td>41½”</td>
<td>13½”</td>
</tr>
<tr>
<td>2”</td>
<td>2”</td>
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<td>8½”</td>
<td>9”</td>
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<td>34”</td>
<td>5”</td>
<td>19½”</td>
<td>41½”</td>
<td>14½”</td>
</tr>
<tr>
<td>3”</td>
<td>4”</td>
<td>3”</td>
<td>2”</td>
<td>36”</td>
<td>46”</td>
<td>20”</td>
<td>4”</td>
<td>9½”</td>
<td>9”</td>
<td>18½”</td>
<td>3½”</td>
<td>6”</td>
<td>2”</td>
<td>38¼”</td>
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<td>19½”</td>
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<td>4”</td>
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<td>4”</td>
<td>2”</td>
<td>46”</td>
<td>46”</td>
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<td>4”</td>
<td>9½”</td>
<td>10”</td>
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<td>24”</td>
<td>4”</td>
<td>11”</td>
<td>10”</td>
<td>18½”</td>
<td>3½”</td>
<td>6”</td>
<td>2”</td>
<td>48½”</td>
<td>6½”</td>
<td>19½”</td>
<td>54½”</td>
<td>21”</td>
</tr>
</tbody>
</table>

**Note:** Some dimensions and actual skid layout may vary depending on options and configuration selected.
Figure 2 – Dimensions – Anchoring detail:

Figure 3 – Skid clearance detail

System Size | T | U |
--- | --- | --- |
1½" | 2⅛" | 4" |
2" | 2⅛" | 4" |
3" | 2⅛" | 4" |
4" | 2⅛" | 4" |
6" | 2⅛" | 4" |

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Minimum Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1 ½&quot;</td>
<td>60&quot;</td>
</tr>
<tr>
<td>2&quot;</td>
<td>60&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>60&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>70&quot;</td>
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<tr>
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<td>70&quot;</td>
</tr>
<tr>
<td>All</td>
<td>12&quot;</td>
</tr>
<tr>
<td>All</td>
<td>24&quot;</td>
</tr>
</tbody>
</table>
Figure 4: Open drain details for single unit:
(see dimensions in table below)

![Diagram of single unit drainage system]

**Single Unit Detail**

Figure 5: Open drain details for multiple units:
(see dimensions in table below)

![Diagram of multiple unit drainage system]

**Multiple Units Detail**

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>1½&quot;</th>
<th>2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
</tr>
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<tbody>
<tr>
<td>A</td>
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<td>8&quot;</td>
<td>9&quot;</td>
<td>9&quot;</td>
<td>11&quot;</td>
</tr>
<tr>
<td>B</td>
<td>18½&quot;</td>
<td>18½&quot;</td>
<td>18½&quot;</td>
<td>18½&quot;</td>
<td>18½&quot;</td>
</tr>
<tr>
<td>C</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

**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 Unit

The TOTALPac2 unit cabinet is made of sturdy 14 gauge steel, measuring 36" x 20" x 57" (91,4 x 50,8 x 144,8 cm) for 1½", 2" & 3" systems and 46" x 24" x 57" (116,8 x 61 x 144,8 cm) for 4" & 6" for 4" & 6" systems (refer to Figure 1 for dimensions).

All surfaces are rust proof coated, inside and outside, with fire red, oven baked polyester powder on phosphate base. Cabinet is provided with individual access doors for the hydraulic and electrical sections and the emergency release with a neoprene gasket to avoid vibrations.

The 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 factory wired to a terminal strip (TBA) for contractors field wiring. The junction box is provided with a cover plate maintained in place by 4 screws and contains the wiring schematic on it's internal face.

Junction box has 4 knock-outs for contractor field wiring.

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

**IMPORTANT!** TOTALPac2 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 (refer to Figures 1 & 2 for installation and clearances details).

**Note:** This cabinet contains only the mechanical section of the TOTALPac2 with an electrical junction box on top of the cabinet. The top electrical section is not provided since the control panel is provided by others. The cabinet is Listed both with or without the control panel section.

Multiple unit installations are easily achieved by manifolding units together at their water inlets but drains shall remain separate and open. Refer to Figure 3 & 4 for additional details on how to pipe drains.

<table>
<thead>
<tr>
<th>System Size (in.)</th>
<th>Shipping weights:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lbs.</td>
</tr>
<tr>
<td>PREACTION</td>
<td></td>
</tr>
<tr>
<td>1½&quot;</td>
<td>536</td>
</tr>
<tr>
<td>2&quot;</td>
<td>561</td>
</tr>
<tr>
<td>3&quot;</td>
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<tr>
<td>4&quot;</td>
<td>776</td>
</tr>
<tr>
<td>6&quot;</td>
<td>991</td>
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</tbody>
</table>

**Note:** Above Shipping Weights are nominal and will change depending on configuration and options selected.
**TOTALPac2 Integrated Fire Protection System**

**System design & Dimensional Data**

Figure 1 – Dimensions:

![Diagram showing dimensions and parts of the system](image)

Note: Access holes provided on enclosure bottom plate to access anchoring holes.

A = WATER INLET DIAMETER  
B = SPRINKLER RISER DIAMETER  
C = DRAIN PIPE DIAMETER

<table>
<thead>
<tr>
<th>System Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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<td>2&quot;</td>
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<td>8½&quot;</td>
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<td>18½&quot;</td>
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</tr>
</tbody>
</table>

Notes:  
- Dimension W is nominal and may vary by about ¼.  
- Dimensions P and S vary with system configuration, refer to the following table for details.
TOTALPac2

TOTALPac2 Integrated Fire Protection System
System design & Dimensional Data

<table>
<thead>
<tr>
<th>Configuration</th>
<th>System Size</th>
<th>P</th>
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<td></td>
<td>6”</td>
<td>48½”</td>
<td>54½”</td>
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Figure 2 – Cabinet & doors clearance detail

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<thead>
<tr>
<th>Unit Size</th>
<th>Minimum Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>1 ½”</td>
<td>52”</td>
</tr>
<tr>
<td>2”</td>
<td>52”</td>
</tr>
<tr>
<td>3”</td>
<td>52”</td>
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<tr>
<td>4”</td>
<td>62”</td>
</tr>
<tr>
<td>6”</td>
<td>62”</td>
</tr>
<tr>
<td>B</td>
<td>All</td>
</tr>
<tr>
<td>C</td>
<td>All</td>
</tr>
</tbody>
</table>

TotalPac2 Unit

Typical Mechanical Room
Figure 3: Open drain details for single unit:
(see dimensions in table below)

![Single Unit Detail Diagram]

Figure 4: Open drain details for multiple units:
(see dimensions in table below)

![Multiple Units Detail Diagram]

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>1½&quot;</th>
<th>2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8½&quot;</td>
<td>8½&quot;</td>
<td>9½&quot;</td>
<td>9½&quot;</td>
<td>11&quot;</td>
</tr>
</tbody>
</table>
| B         | 18½"| 18½"| 18½"| 18½"| 18½"
| C         | 2"  | 2" | 2" | 2" | 2" |

**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.
3- Cabinet for Self-Contained Unit

The **TOTALPac2** unit cabinet is made of sturdy 14 gauge steel, measuring 36" x 20" x 71" (91,4 x 50,8 x 180,3 cm) for 1½", 2" & 3" systems and 46" x 24" x 71" (116,8 x 61 x 180,3 cm) for 4" & 6" systems (refer to Figure 1 for dimensions).

All surfaces are rust proof coated, inside and outside, with fire red, oven baked polyester powder on phosphate base. Cabinet is provided with individual access doors for the hydraulic and electrical sections and the emergency release with a neoprene gasket to avoid vibrations.

Electrical junction boxes are integrated with the cabinet for connection of detection system, auxiliary contacts and signaling devices. Knockouts can be drilled by the installing contractor on-site but have to meet the restrictions indicated on Figure 3.

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

**IMPORTANT!** **TOTALPac2** 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. Refer to Figure 2 for installation and clearances details.

**Note:** The mechanical section of the **TOTALPac2** and the electrical section are provided in two separate enclosures, stacked one on top of the other. The cabinet is Listed both with or without the control panel section.

Multiple unit installations are easily achieved by manifolding units together at their water inlets but drains shall remain separate and open. Refer to Figure 7 for additional details on how to pipe drains.

<table>
<thead>
<tr>
<th>System Size (Dia.)</th>
<th>Shipping weights:</th>
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</thead>
<tbody>
<tr>
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<td>Lbs.</td>
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<tr>
<td><strong>PREACTION</strong></td>
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<tr>
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<td>610</td>
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<tr>
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<td>770</td>
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<td>856</td>
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<tr>
<td>6&quot;</td>
<td>1071</td>
</tr>
</tbody>
</table>

**Note:** Above Shipping Weights are nominal and will change depending on configuration and options selected.
**TOTALPac2 Integrated Fire Protection System**

*System design & Dimensional Data*

**Figure 1 – Dimensions:**

**Floor Anchoring Template**

**SYSTEM SIZE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>System Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J / R</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>Q</th>
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<td>8&quot;</td>
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<td>4&quot;</td>
<td>14&quot;</td>
<td>25&quot;</td>
</tr>
</tbody>
</table>

**Notes:**

- Dimension W is nominal and may vary by about 1/4.
- Dimensions P and S vary with system configuration, refer to the following table for details.
Figure 2 – Minimum cabinet & doors clearance detail

Drilling:
When drilling in the cabinet to install wiring conduits or pipes, avoid the area of the front 6" (15 cm) of the top of the cabinet since internal wiring is concentrated in that area. Always avoid drilling into internal components.

Figure 3 – Drilling detail:

Wiring Routing:
Wiring shown in Figure 4 below indicates typical Wiring Routing for Power Limited Circuits.
Refer to FIELD WIRING DIAGRAM and drilling guide above for details.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>System Size</th>
<th>P</th>
<th>S</th>
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<tbody>
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<tr>
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<td>48½&quot;</td>
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<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Minimum Dimensions</th>
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<tr>
<td>B</td>
<td>12”</td>
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<tr>
<td>C</td>
<td>24”</td>
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Figure 5: Open drain details for single unit:
(see dimensions in table below)

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

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>1½&quot;</th>
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<td>8½&quot;</td>
<td>9½&quot;</td>
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<tr>
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<td>18½&quot;</td>
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<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
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</table>

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.

Product Support

1-866-347-3353

When you bought this TOTALPac2 Integrated Fire Protection System from FireFlex Systems Inc., you got the best technology available... You also got the best people... People who make it easy and convenient for you to own our products.

Outstanding products support doesn't just mean helping fixing products when they fail. When you need our help, knowledgeable professionals will give you fast, personal assistance.

Our Products Support organization is dedicated to helping you become comfortable with FireFlex Systems Inc. by answering questions about our products, warranty and service procedures and by helping you learn how to install and use our products more effectively.

The number above is a toll free number to Product Support. Please save it and keep it for the day when you may have to test us.

FireFlex Systems Inc.
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Canada J7N 1N8
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Toll Free: (866) 347-3353 Web site: http://www.fireflex.com
User Notes