



1. SYSTEM NAME

SUREFIRE® Single Interlocked Pre-Primed Preaction System

2. MANUFACTURER

THE VIKING CORPORATION

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3. SYSTEM DESCRIPTION

(Refer to Figure 1)

The Viking SUREFIRE® Single Interlocked Pre-Primed Preaction System utilizes a Viking Model E or Model F Deluge Valve (A.1), a Viking Easy Riser® Check Valve (D.2), a PAR-3 Control Panel (F.8), two Electric Release Solenoid Valves (F.2 & F.6), Detectors (F.9), detector cable(s), Deluge Valve Conventional Trim and Check Valve Trim to form a unique operating system. The system piping is hydraulically pressurized (See Table 1 for pressure settings) to monitor the integrity of the piping, fittings and sprinklers and to act as a fail-safe emergency backup to electrical detection system wire and panel malfunctions. The system piping is normally wet and may NOT be installed in locations subject to freezing. Built in with special features to minimize accidental water damage, unlike wet systems, the system may be installed where the detector and/or sprinklers are easily damaged or broken accidentally. In addition to special features that offer fail-safe operation, the Viking SUREFIRE® Single Interlocked Pre-Primed Preaction Systems also provide excellent fire protection environment with or without electrical power. The system has the capacity for batteries that provide up to ninety (90) hours of emergency power. If the system is in the set condition and the panel is in trouble condition, or all power fails, the system will be hydraulically latched by the sprinklers in the system. If the system is operating, no matter the condition of the panel or power, the system will continue flowing until it is manually shut off.

Preaction systems are commonly used to help minimize accidental water damage and still provide fast water discharge during a fire emergency. Consult all Authorities Having Jurisdiction prior to installing a SUREFIRE® Single Interlocked Pre-Primed Preaction System. If using a heat detector, the detector temperature must be lower than the lowest temperature rated sprinkler being used. For proper location, spacing and positioning of detectors, refer to the Manufacturers recommendations and/or NFPA 72.

NOTE: IT IS NORMALLY NOT POSSIBLE TO MODIFY THE COMPONENTS OF THE SYSTEM CONTROLS OR THEIR INTER-RELATION WITHOUT COMPROMISING THE LISTING.

4. TECHNICAL DATA

Listings and Approvals:

UL Listed - Category VLFT

FM Approved - Preaction

Sprinkler Systems

Patent Pending

For Technical Data, Installation, Maintenance and Testing Instructions for individual system components, refer to current Viking Technical Data describing individual Components of the Preaction System used.

Viking Technical Data may be found on The Viking Corporation's Web site at

<http://www.vikingcorp.com>.

The Web site may include a more recent edition of this Technical Data Page.

5. AVAILABILITY

The Viking Preaction System is available through a network of domestic and international distributors. See the Viking Corp. Web site for closest distributor or contact The Viking Corporation.

6. GUARANTEES

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

7. SYSTEM OPERATION

(Refer to Figure 1)

In the SET condition:

System water supply pressure enters the priming chamber of the Deluge Valve (A.1) through the 1/4" (8 mm) priming line which includes a normally open priming valve (B.1), strainer (B.2), restricted orifice (B.3) and check valve (B.4). In the SET condition, water supply pressure is trapped in the priming chamber by check valve (B.4) normally closed Emergency Release (B.11) and normally closed Release Solenoid Valve (F.2). By pre priming the system, the normally open Solenoid Valve (F.6) provides full hydraulic pressure on the Deluge Valve (A.1). The optional pilot pressure regulating valve (F.7) allows system pressure to be supervised lower than the system supply pressure. See Table 1 for settings. Water Supply pressure in the priming chamber holds the clapper of the Deluge Valve (A.1) on the seat due to the differential design of the valve clapper. The clapper separates the inlet chamber from the outlet chamber, keeping the outlet chamber of the deluge valve dry.



In Fire conditions:

When the detection system (F.9) operates, the PAR-3 Control Panel (F.8) activates a piezo sounder and energizes normally closed Release Solenoid Valve (F.2) open. Pressure is released from the priming chamber faster than it is supplied through restricted orifice (B.3). The Deluge Valve (A.1) clapper opens to allow water to pressurize the system piping and alarm devices. Water enters the system and Easy Riser® Check Valve (D.2) which continually vents and pressurizes the PORV (B.10) prime chamber. Water will flow from any open sprinklers or nozzles.

To return the system to "Normal" conditions, drain the system piping and replace any sprinklers that may have operated. Replace any detectors which have been damaged and place the system in service in accordance with Section 9. Press the "System Reset" button on the PAR-3 Control Panel (F.8) to clear all alarms.

Panel Trouble, Loss of Power Prior to Operation or Pipe Damage conditions: During Normal Power Supply

Conditions, faults or complete loss of power.

During normal power conditions if the system piping and/or the sprinklers are damaged, the low pressure supervisory switch (E.1) will activate a supervisory alarm at the Par-3 Release Control Panel (F.8) and the normally open solenoid valve (F.6) will be powered closed to prevent the deluge valve from opening. This action limits any water flow from the damaged pipe and/or sprinklers to the volume of water in the pre-primed pipe network.

In the event of a fire during a fault on the detection wiring, loss of primary AC power which has caused a trouble condition or complete loss of all power, the deluge valve will open allowing water flow if the following conditions occur:

1. The initiating devices (F.9) activate causing the Par-3 Release Control Panel (F.8) to enter an alarm and release condition. The normally closed solenoid (F.2) will open allowing water pressure to be relieved from the priming chamber of the deluge valve (A.1). With pressure relieved from the priming chamber, the deluge valve will open and allow water flow. Water will not be discharge into the protected area until a sprinkler head operates.
2. During a fault condition on the detection wiring or panel which caused a trouble alarm on the Par-3 Release Control Panel (F.8) or a complete loss of normal AC power and standby battery backup power the normally open solenoid (F.6) is prevented from operating. During this condition activation of a sprinkler head will allow a hydraulic release of the deluge valve (A.1). Water pressure will be relieved from the priming chamber, the deluge valve (A.1) will open and allow water to flow.

Loss of Power During Operation:

If all power fails while the system is flowing water, the normally open Release Solenoid (F.6) will open and the normally closed Release Solenoid (F.2) will close. The PORV (B.10) is already pressurized closed to prevent pressure in the chamber from building up. Water from main supply will continue entering the system, and through any open sprinkler(s).

Manual Operation:

Any time the handle inside Emergency Release (B.11) is pulled, pressure is released from the priming chamber faster than it can be replaced through the priming line; the Deluge Valve (A.1) will open. Water will flow to the system piping, activating any connected alarms, but will not discharge from any closed sprinklers attached to the system until a sprinkler has operated, as in a fire. All alarms will operate normally. After operating the Emergency Release (B.11), do not close the Emergency Release until the system is ready to be reset.

8. INSTALLATION

Refer to current Viking Technical Data describing individual components of the Viking SUREFIRE® Single Interlocked Pre-Primed Preaction System. Technical Data describing the Viking Deluge Valve and other system components are packed with product and in the Viking Engineering Design Data book.

Also, refer to applicable installation standards, codes, and Authorities Having Jurisdiction.

- A. The Deluge Valve (A.1) and Conventional Trim must be installed only in areas where they will not be subjected to freezing temperatures or mechanical damage.
- B. All indicating appliances and releasing devices must be compatible and approved for use with the SUREFIRE® Single Interlocked Pre-Primed Preaction System. Refer to appropriate Fire Protection Equipment Approval Guides and current Viking Technical Data describing individual components of the Viking SUREFIRE® System.
- C. Use Normally Open Heat Detectors (F.9) or Smoke Detectors and Viking Cable as listed for the protection.

9. PLACING THE SYSTEM IN SERVICE AT INITIAL START-UP

(Refer to Figure 1)

NOTE: REFER TO PAR-3 OWNER'S MANUAL, AND INSTRUCTIONS PROVIDED IN TECHNICAL DATA DESCRIBING THE VIKING DELUGE VALVE AND OTHER SYSTEM COMPONENTS.

To Place the System in Service:

- A. Verify that the PAR-3 Control Panel (F.8), Detector Circuits and Detectors have been properly installed and energized according to instructions provided in Viking Technical Data and the PAR-3 Owner's Manual.



- B. Verify that the system has been properly drained. (When plunger is depressed on drip check, (B.7) no water should flow.) System Drain (G.4) should be closed. Verify that Emergency Release (B.11) is closed.
- C. Verify that the System Main Water Supply Control Valve (D.1) is closed and the Deluge Valve (A.1) is trimmed according to current Viking Trim Technical data page for the system used (See section 12).
- D. Verify that the system water supply piping is pressurized up to the closed System Main Water Supply Control Valve (D.1) and the priming line is pressurized up to the closed Priming Valve (B.1).
- E. Restore system water pressure by opening the Bypass Isolation Valve (G.3). Make sure supervisory switch (E.1) is set to proper activation pressure per Table 1.
- F. Open Priming Valve (B.1) and system Maintenance Valve (F.3). When the system is full of water, close the system Bypass Isolation Valve (G.3).
- G. Reset the PAR-3 Control Panel (F.8): Open panel and press "RESET". Release Solenoid Valve (F.2) should close. Flow from Release Solenoid Valve (F.2) to Drain Cup (B.14) should stop.
- H. Open Flow Test Valve (B.15).
- I. Partially open Main Water Supply Control Valve (D.1) (If closed).
- J. When full flow develops from Flow Test Valve (B.15), close the Flow Test Valve. Verify that there is no flow from open Auxiliary Drain (B.6).
- K. Close Auxiliary Drain (B.6) and Bypass Valve (G.3).
- L. Fully open and secure the Main Water Supply Control Valve. (D.1)
- M. Verify that the Alarm Shut-off Valve (B.9) is open and that all other valves are in their normal operating position.
- N. Depress the plunger of Drip check (B.7). No water should flow from the Drip Check when the plunger is pushed.

10. EMERGENCY INSTRUCTIONS

(Refer to Figure 1)

Taking 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 EMPLOYMENT OF 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.

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.

- A. If All System Components Are Operational:
 - 1. Open Auxiliary Drain (B.6).
 - 2. Silence alarms (optional).
 - a. To silence electric alarms controlled by PAR-3 Control Panel (F.8), open panel and press "ALARM SILENCE"
 - b. To silence electric alarms not controlled by PAR-3 Control Panel (F.8), close Alarm Shut-Off Valve (B.9).
 - 3. To return to service immediately, (when no maintenance or repairs are required) :
 - a. Close Auxiliary Drain (B.6) if opened in step 1-A. If necessary, open System Drain (G.4) to drain system and/or Test Valve (B.15) to drain the inlet chamber of the Deluge Valve (A.1).
- NOTE: THIS SYSTEM IS PRE-PRIMED WITH WATER. DRAINING THE SYSTEM IS ONLY REQUIRED IF REPAIRS ARE REQUIRED, OR IF THE WATER IN THE SYSTEM IS REPLACED WITH ANOTHER SUPERVISORY LIQUID SUPPRESSANT.**
- b. Restore system water pressure by opening the Water Supply Valve (F.3). After the system fills with water, Close the Bypass Isolation Valve (G.3).
 - c. Open PAR-3 Control Panel (F.8) and press "RESET".
 - d. Open Alarm Shut-Off Valve (B.9) (If it was closed in step B-2 above).
 - e. Verify that all valves are secured in their normal operating position. (Refer to Figure 1)
- B. If it is necessary to remove the SUREFIRE® Single Interlocked Pre-Primed Preaction system from service:
 - 1. Close the Main Water Supply control Valve (D.1).
 - 2. Close Priming Valve (B.1) (optional). If necessary, open System Drain (G.4) to drain system and/or Test Valve (B.15) to drain the inlet chamber of the Deluge Valve (A.1). Close the Maintenance Valve (F.3). If draining the system is necessary, open the system main drain valve (G.4).
 - 3. Disconnect all power sources to the PAR-3 Control Panel prior to performing any maintenance or repairs to the detection system (F.9), the panel (F.8), solenoid valves (F.2, F.6), or any electrical component of the system.
- C. Perform all maintenance procedures recommended in PAR-3 Owner's Manual and Technical Data Pages for the individual components of the system that has operated.
 - 1. Replace any piping, detectors (F.9), or sections of detection cable that have been damaged.



NOTE: THE COMPLETE SYSTEM OPERATION MUST BE TESTED AFTER SERVICING, CHANGING PROGRAMMING, ADDITION OR DELETION OF SYSTEM COMPONENTS OR AFTER ANY MODIFICATION, REPAIR, OR ADJUSTMENT TO SYSTEM HARDWARE OR WIRING. ALL COMPONENTS, CIRCUITS, SYSTEM OPERATION OR SOFTWARE FUNCTIONS KNOWN TO BE AFFECTED BY A CHANGE MUST BE 100% TESTED.

- 2. Replace any sprinklers and/or spray nozzles that have been damaged or exposed to fire conditions.
- D. Restore AC power to PAR-3 Control Panel (F.8). Ensure that standby batteries are charged or charging. Always connect and turn on AC power source prior to connecting the standby batteries. Connecting the standby batteries to the PAR-3 Control Panel (F.8) before the AC power is connected and turned on may damage the panel.
- E. Return the system to service. Refer to Section E: "PLACING THE SYSTEM IN SERVICE".

11. INSPECTIONS AND TESTS

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 current Viking Technical Data describing individual components of the SUREFIRE® Single Interlocked Pre-Primed Preaction System.

Where difficulty in performance is experienced, contact Viking Technical Service if any field adjustments are to be made.

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

WARNING: ANY SYSTEM MAINTENANCE WHICH INVOLVES PLACING A CONTROL VALVE OR DETECTION SYSTEM OUT OF SERVICE MAY ELIMINATE THE FIRE PROTECTION CAPABILITIES OF THAT SYSTEM. PRIOR TO PROCEEDING, NOTIFY ALL AUTHORITIES HAVING JURISDICTION. CONSIDERATION SHOULD BE GIVEN TO EMPLOYMENT OF A FIRE PATROL IN THE AFFECTED AREAS.

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

Refer to MAINTENANCE INSTRUCTION provided in the current Viking Technical Data describing individual components of the Viking Single Interlocked SUREFIRE® Single Interlocked Pre-Primed Preaction 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.

WATER SUPERVISORY SWITCH SETTINGS			
Water Supply PSI	Detection Circuit Two (DC2) PSI	Detection Circuit Four (DC4) PSI	System Water Normal PSI*
0 - 250	.75 X Water Supply	10 + DC2	N/A
0 - 250 *	15 + Pm	10 + DC2	25 + DC2

See system wiring diagram #13730

***For use when using lower supervisory pressure than the system supply and the optional Pilot Pressure Regulating Valve**

Pm = Maximum Head Pressure = H x 0.433
 where H = height from switch (E.1) to highest sprinkler pipe point at ceiling

Table 1



Deluge Valve Trim Package Part Numbers

DESCRIPTION	NOMINAL SIZE	PART NUMBER
CONVENTIONAL DELUGE VALVE TRIM Includes Deluge Valve Accessory Package	Rated to 250 psi (1 724 kPa)	
	Use with Angle Style Valves	
	Galvanized	
	1½" / DN40	10202
	2" / DN50	10203
	3" / DN80	10204
	4" / DN100	10205
	6" / DN150	10206
	Brass	
	1½" / DN40	10250
	2" / DN50	10251
	3" / DN80	10252
	4" / DN100	10253
	6" / DN150	10254
	Use with Straight Through Valves	
	Galvanized	
Vert.	1½" / DN40	12409-1
	2" / DN50	12409-1
	2½" / DN65	12298-1
	3" / DN80	12298-1
	4" / DN100	11712-1
	6" / DN150	11714-1
	8" / DN200	11077
	Brass	
Vert.	1½" / DN40	12409-2
	2" / DN50	12409-2
	2½" / DN65	12298-2
	3" / DN80	12298-2
	4" / DN100	11712-2
	6" / DN150	11714-2
	8" / DN200	11165

Release Trim Package Part Numbers

DESCRIPTION	FINISH	PART NUMBER
RELEASE TRIM PACKAGES		
Use with Pre-Primed Surefire®	Angle Style Valves	
Includes:	Galvanized	
- Solenoid Valve, N.C., 24VDC	1½" / DN40	13657-1
- Solenoid Valve, N.O., 24VDC	2" / DN50	13657-1
- Supervisory Pressure Switch	3" / DN80	13658-1
	4" / DN100	13658-1
	6" / DN150	13658-1
	Brass	
	1½" / DN40	13657-2
	2" / DN50	13657-2
	3" / DN80	13658-2
	4" / DN100	13658-2
	6" / DN150	13658-2
	Straight Through Valves	
	Galvanized	
	1½" / DN40	13659-1
	2" / DN50	13659-1
	3" / DN80	13660-1
	4" / DN100	13660-1
	6" / DN150	13660-1
	Brass	
	1½" / DN40	13659-2
	2" / DN50	13659-2
	3" / DN80	13660-2
	4" / DN100	13660-2
	6" / DN150	13660-2

Check Valve Trim Package Part Numbers

DESCRIPTION	NOMINAL SIZE	PART NUMBER
Check Valve Trim	1½" / DN40	12960
	2" / DN50	12960



TECHNICAL DATA

SUREFIRE® SINGLE INTERLOCKED PRE-PRIMED PREACTION SYSTEM

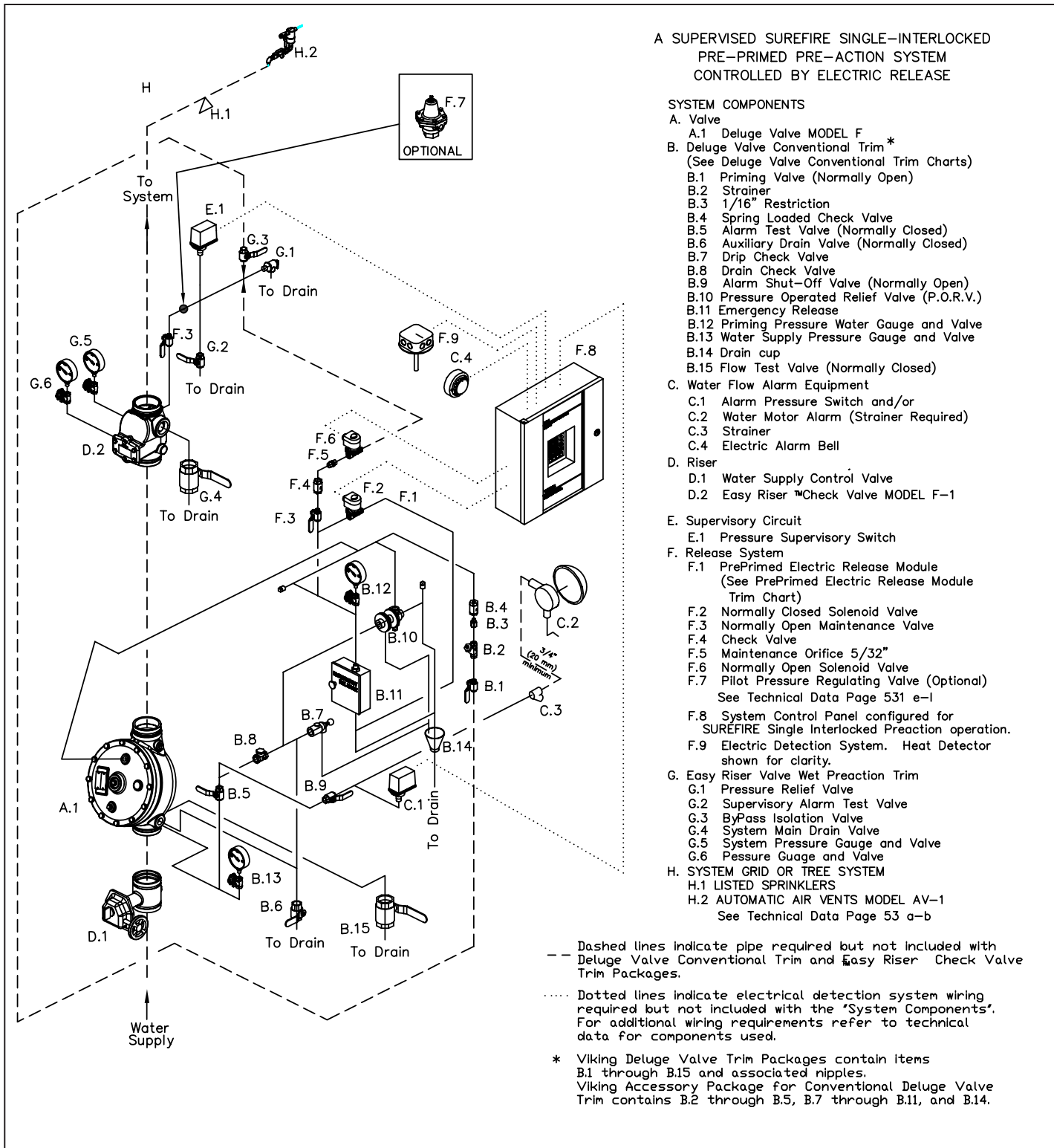


Figure 1: Surefire® Single-Interlocked Pre-Primed Preaction System Controlled by Electric Release Vertical Straight Through Style Valve Conventional Trim



TECHNICAL DATA

SUREFIRE® SINGLE INTERLOCKED PRE-PRIMED PREACTION SYSTEM

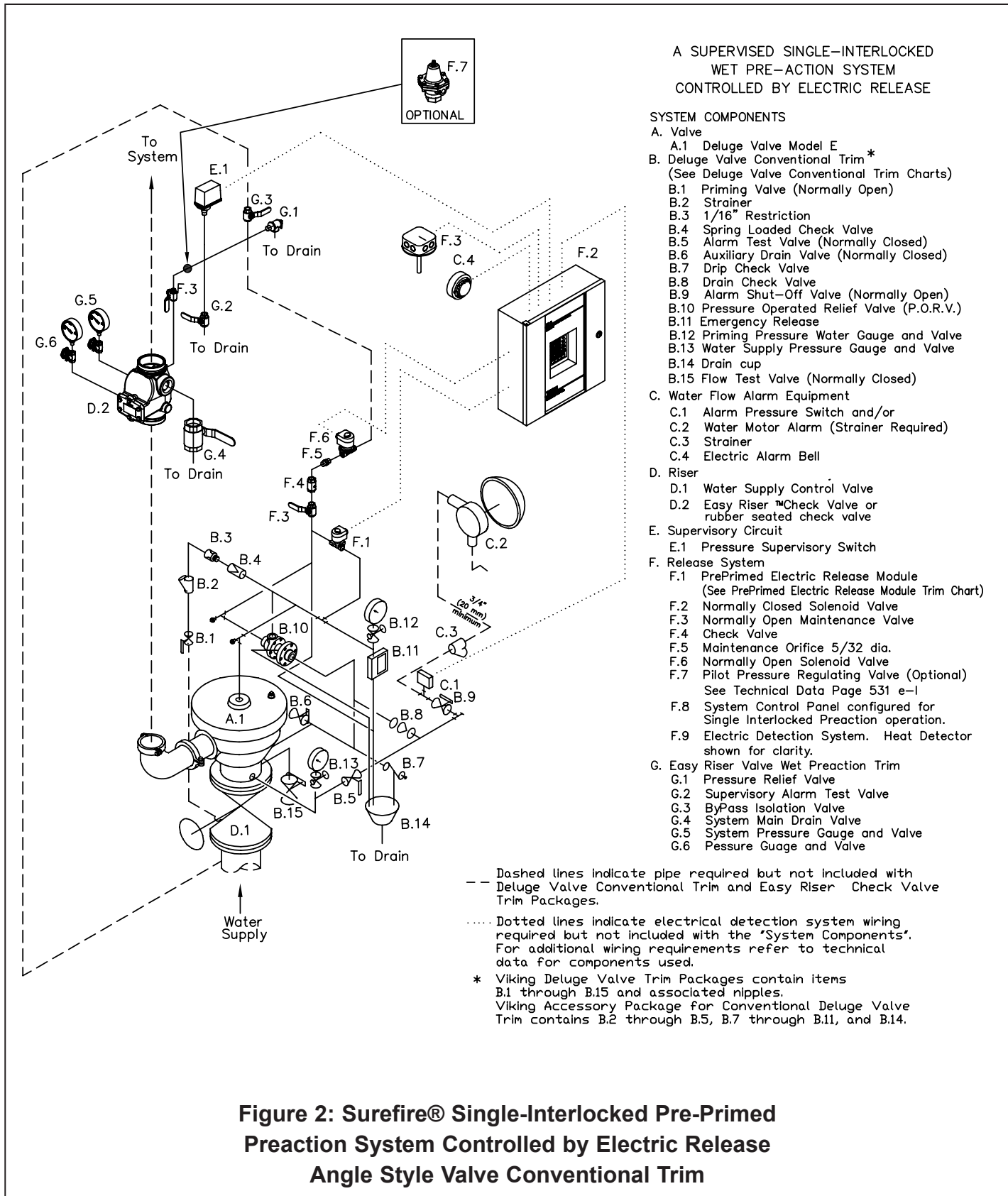
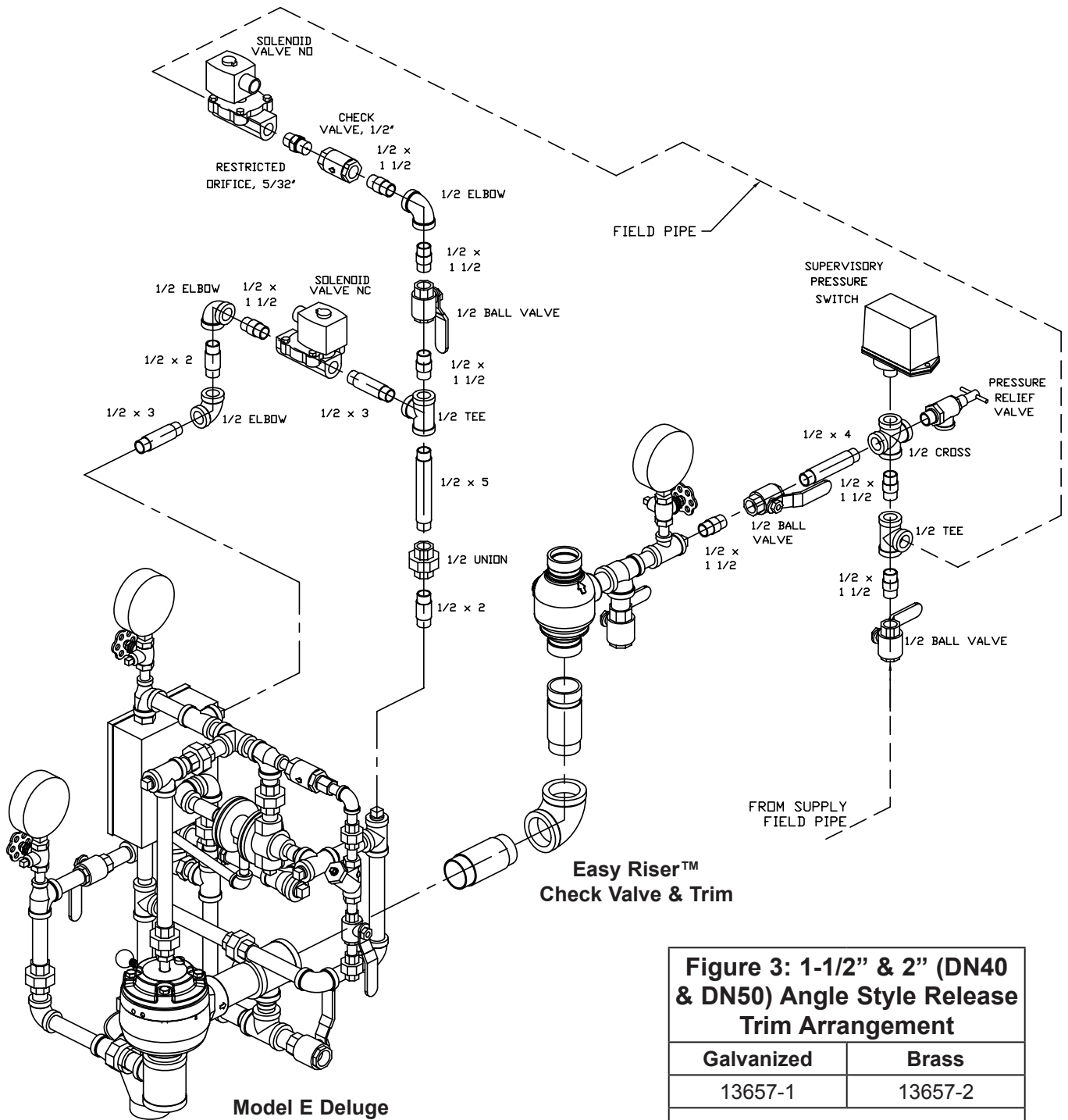


Figure 2: Surefire® Single-Interlocked Pre-Primed Preaction System Controlled by Electric Release Angle Style Valve Conventional Trim



TECHNICAL DATA

SUREFIRE® SINGLE INTERLOCKED PRE-PRIMED PREACTION SYSTEM



Model E Deluge Valve & Trim (See pages 353 e & f)

Easy Riser™ Check Valve & Trim

Figure 3: 1-1/2" & 2" (DN40 & DN50) Angle Style Release Trim Arrangement

Galvanized	Brass
13657-1	13657-2

See separate trim drawing for base Easy Trim arrangement.

See Table 2 for ordering complete SURE-FIRE™ Assembly.



TECHNICAL DATA

SUREFIRE® SINGLE INTERLOCKED PRE-PRIMED PREACTION SYSTEM

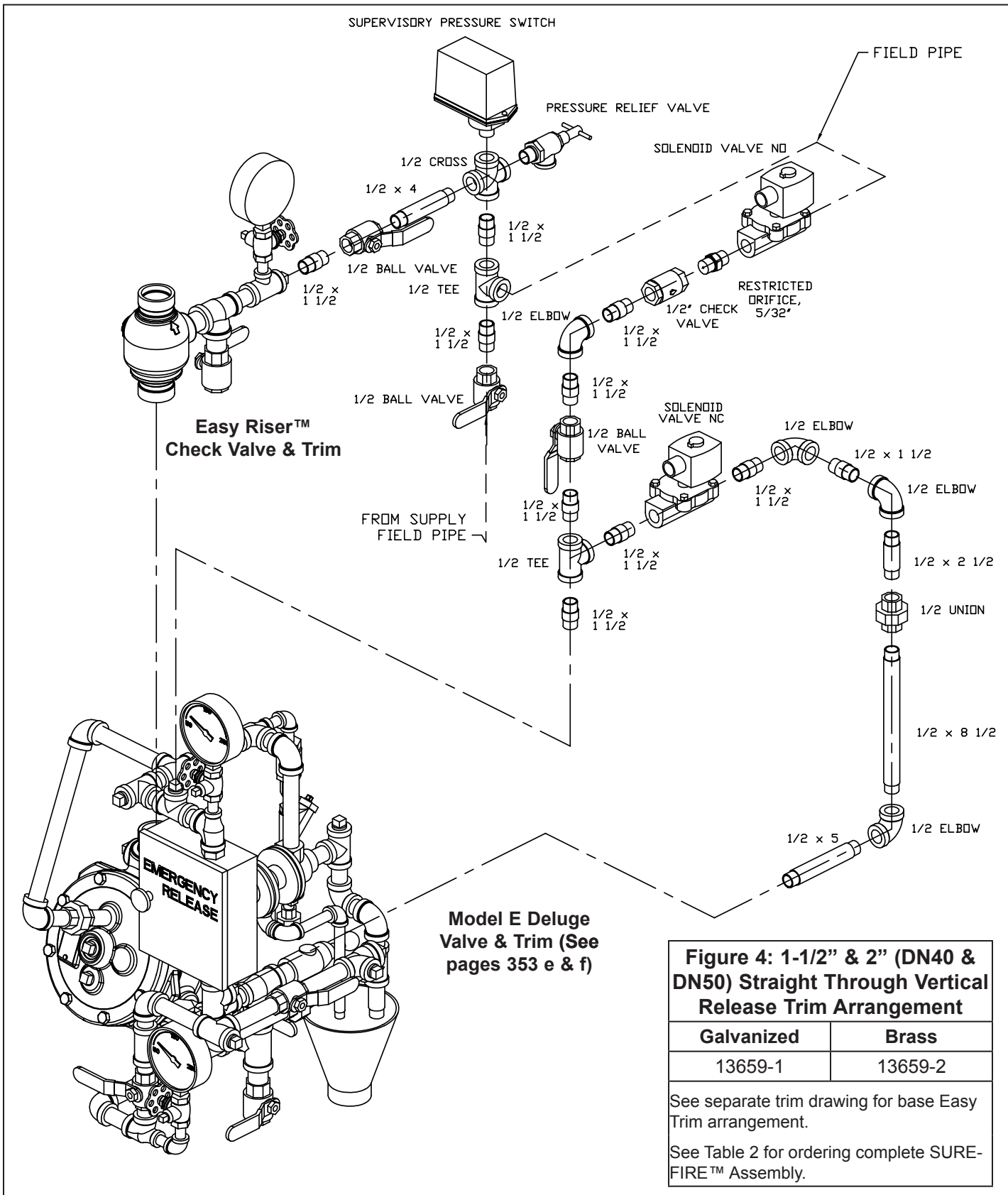


Figure 4: 1-1/2" & 2" (DN40 & DN50) Straight Through Vertical Release Trim Arrangement

Galvanized	Brass
13659-1	13659-2

See separate trim drawing for base Easy Trim arrangement.
See Table 2 for ordering complete SURE-FIRE™ Assembly.

VIKING[®]

TECHNICAL DATA

SUREFIRE[®] SINGLE
INTERLOCKED PRE-PRIMED
PREACTION SYSTEM

