

## **Precision System with DV-5 Deluge Valve Single Interlock, Supervised — Electric Actuation 1-1/2 thru 8 Inch (DN40 thru DN200)**

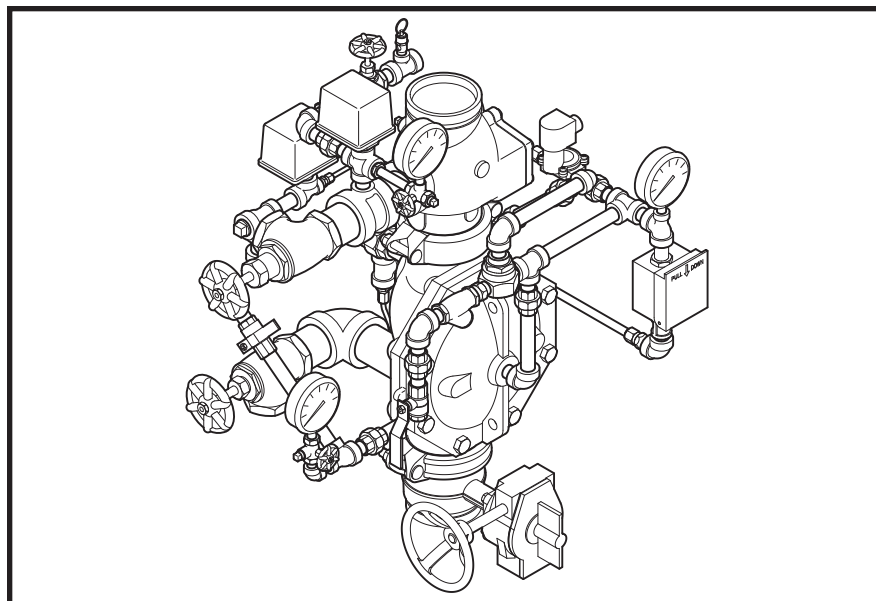
### **General Description**

The TYCO DV-5 Supervised Single Interlock Precision System with Electric Actuation (Fig. 1) utilizes automatic sprinklers and a supplemental detection system. The supplemental detection system is typically comprised of 24 VDC heat detectors, smoke detectors, manual pull stations, etc. Actuation of the detection system automatically operates (releases) the DV-5 Deluge Valve, allowing water to flow into the sprinkler piping system and to be discharged from any sprinklers that may be open.

In accordance with the requirements of the National Fire Protection Association, a precision system employing more than 20 automatic sprinklers is to have the sprinkler piping automatically supervised to monitor the overall integrity of the system. In the case of a Supervised Single Interlock Precision System, a Riser Check Valve (that does not require the use of priming water) provides an air check so that the system can be automatically pressurized with a nominal supervisory air or nitrogen pressure of 10 psi (0,69 bar). A supervisory low pressure alarm switch that is set to transfer its contacts at nominally 5 psi (0,34 bar), on decreasing pressure, is utilized to indicate whether there are any abnormal leaks in the sprinkler system piping. Loss of air pressure from the system as a result of a damaged sprinkler or broken piping will not cause the DV-5 Valve to open — the air pressure is for supervisory alarm only.

Typically, the system designer selects the detection components for a single interlock precision system that will respond to a fire sooner than the automatic sprinklers. Consequently, the system will experience a minimal delay in water delivery over that for a wet pipe sprinkler system because the system will have begun to fill with water before a sprinkler operates.

Supervised single interlock precision systems are generally used to protect areas where there is danger of serious



water damage that might result from damaged automatic sprinklers or piping. Typically, such areas include computer rooms, storage areas for valuable artifacts, libraries, and archives.

Single interlock precision systems are also effectively used to protect properties where a pre-alarm of a possible fire condition may allow time for fire extinguishment by alternate suppression means, prior to a sprinkler discharge. In the event the fire cannot otherwise be extinguished, the precision sprinkler system will then perform as the primary fire protection system.

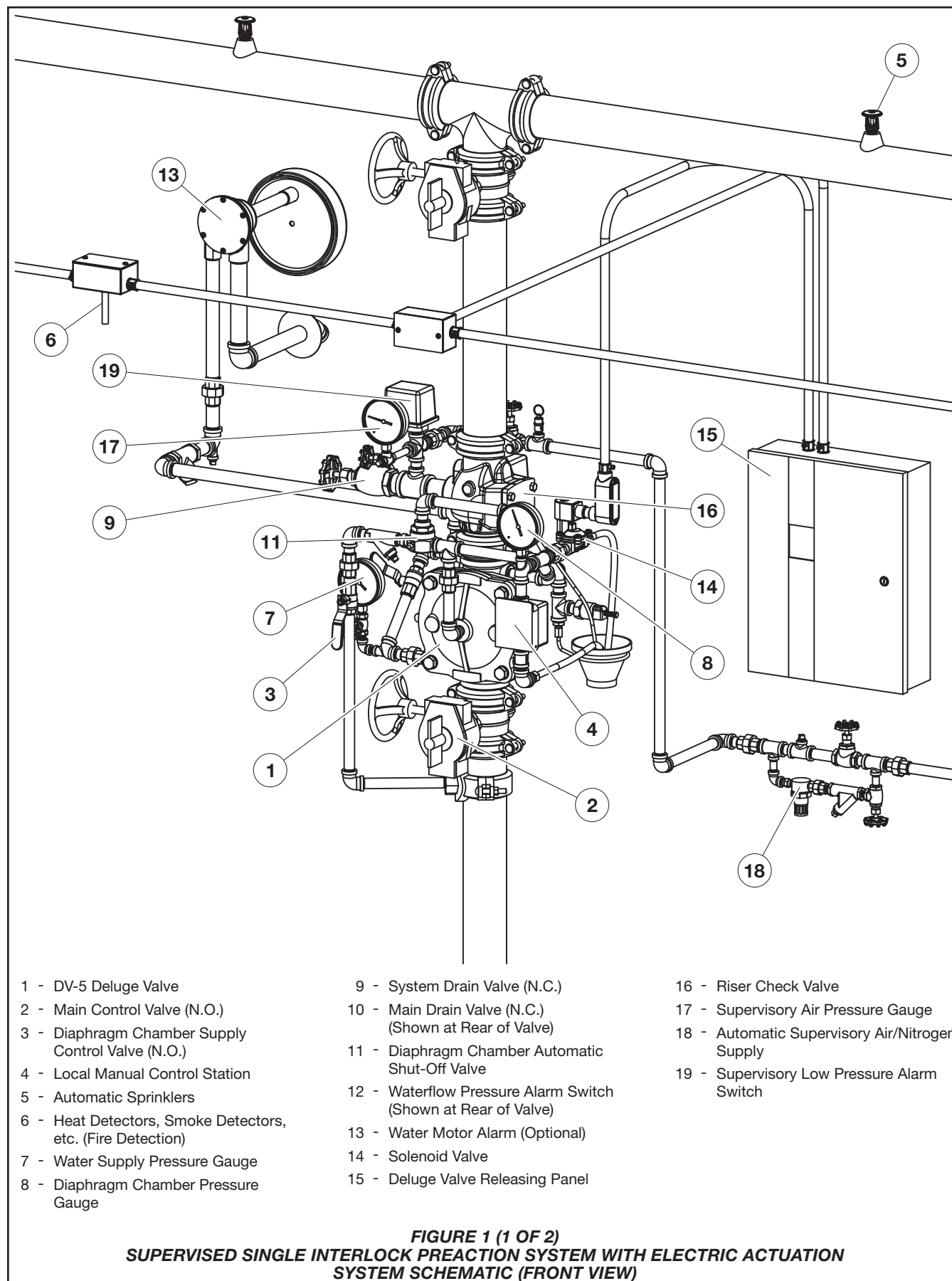
The DV-5 Deluge Valve (described in Technical Data Sheet TFP1305) is a diaphragm style valve that depends upon water pressure in the Diaphragm Chamber to hold the Diaphragm closed against the water supply pressure. When the DV-5 Valve is set for service, the Diaphragm Chamber is pressurized through the trim connections from the inlet side of the system's main control valve, such as an O.S.&Y. gate valve or butterfly valve (Fig. 1).

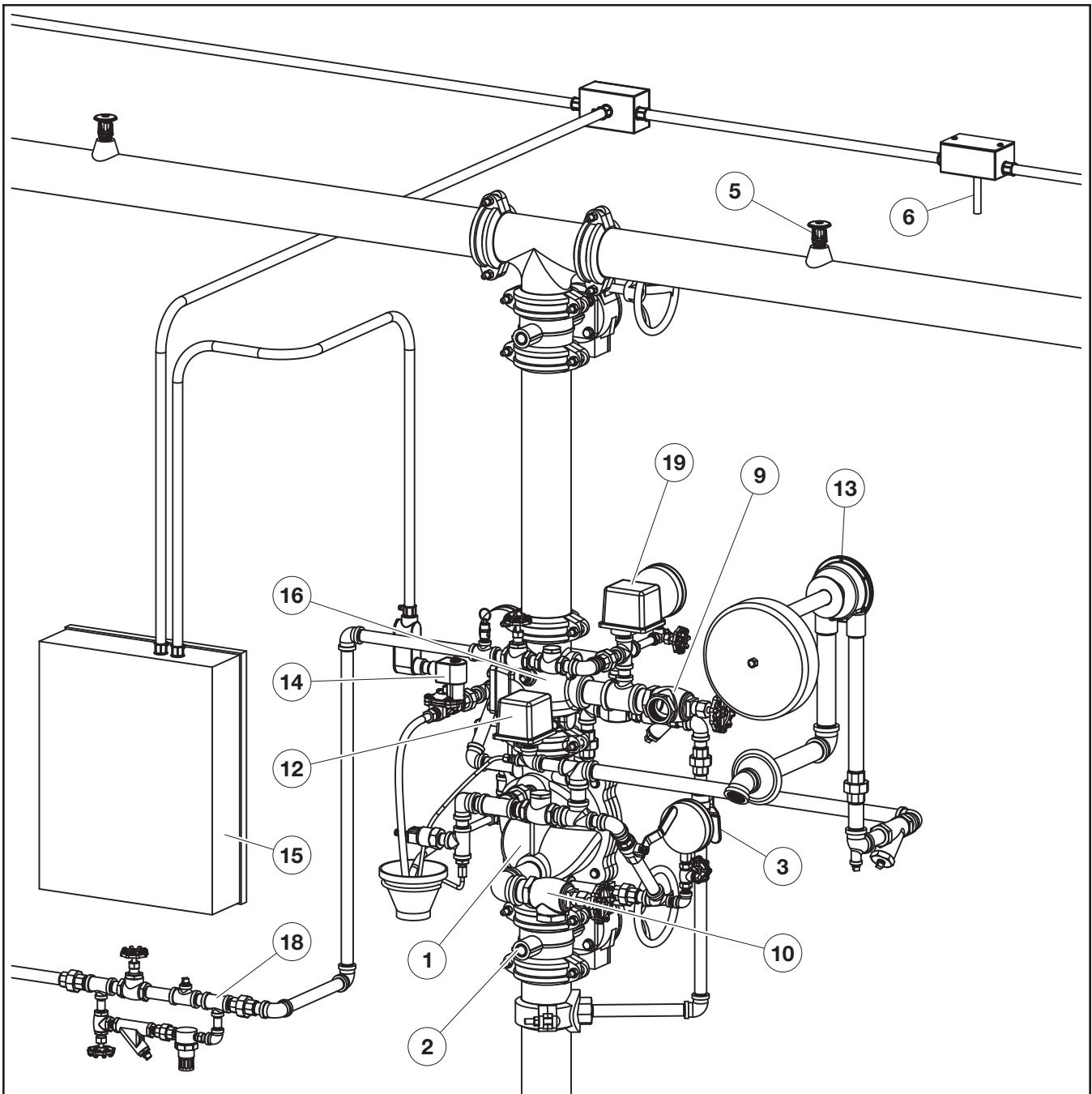
Operation of an electrical detection device such as a heat sensitive thermostat, smoke detector, or electrical manual control station signals the deluge valve releasing panel to energize the

Solenoid Valve. In turn, the energized Solenoid Valve opens to release water from the Diaphragm Chamber faster than it can be replenished through the 1/8 inch (3,2 mm) restriction provided by the Model ASV-1 Automatic Shut-Off Valve in the diaphragm supply connection (Item 5 - Fig. 3A, also described in Technical Data Sheet TFP1384). This results in a rapid pressure drop in the Diaphragm Chamber to below the valve trip point. The water supply pressure then forces the Diaphragm open, permitting water to flow into the system piping, as well as through the Alarm Port to actuate the system alarms.

As water flows into the system, the pilot chamber of the Model ASV-1 Automatic Shut-Off Valve (Item 5 - Fig. 3A) becomes pressurized and the ASV-1 automatically shuts off the diaphragm chamber supply flow to the DV-5 Diaphragm Chamber. Shutting off the diaphragm chamber supply flow prevents the DV-5 Diaphragm Chamber from becoming re-pressurized, thereby preventing inadvertent closing of the DV-5 during a fire (as may be the case should the Solenoid Valve become de-energized after its initial operation).

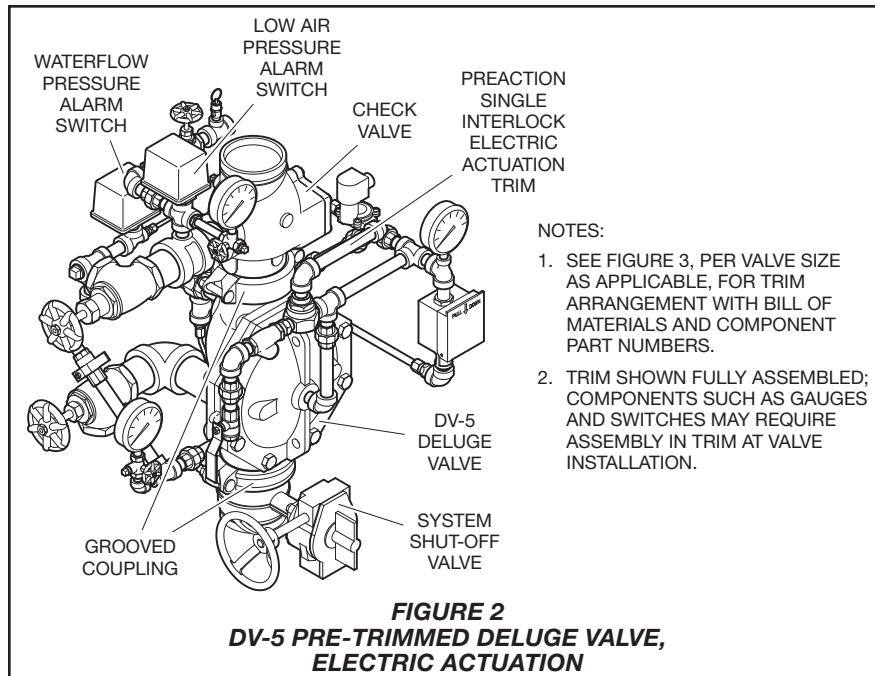
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- |  |   |   |
|--|---|---|
| 1 - DV-5 Deluge Valve                                      | 8 - Diaphragm Chamber Pressure Gauge (Shown at Front of Valve)            | 16 - Riser Check Valve  |
| 2 - Main Control Valve (N.O.)                              | 9 - System Drain Valve (N.C.)   | 17 - Supervisory Air Pressure Gauge (Shown at Front of Valve) |
| 3 - Diaphragm Chamber Supply Control Valve (N.O.)          | 10 - Main Drain Valve (N.C.)  | 18 - Automatic Supervisory Air/Nitrogen Supply                |
| 4 - Local Manual Control Station (Shown at Front of Valve) | 11 - Diaphragm Chamber Automatic Shut-Off Valve (Shown at Front of Valve) | 19 - Supervisory Low Pressure Alarm Switch                    |
| 5 - Automatic Sprinklers                                   | 12 - Waterflow Pressure Alarm Switch                                      |   |
| 6 - Heat Detectors, Smoke Detectors, etc. (Fire Detection) | 13 - Water Motor Alarm (Optional)   |   |
| 7 - Water Supply Pressure Gauge (Shown at Front of Valve)  | 14 - Solenoid Valve   |   |
|  | 15 - Deluge Valve Releasing Panel   |   |

**FIGURE 1 (2 OF 2)**  
**SUPERVISED SINGLE INTERLOCK PREACTION SYSTEM WITH ELECTRIC ACTUATION**  
**SYSTEM SCHEMATIC (REAR VIEW)**



**NOTICE**

The TYCO DV-5 Supervised Single Interlock Preaction System with Electric Actuation Trim described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of the related devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

## Technical Data

**Approvals**

UL and C-UL Listed  
 FM Approved

**Deluge Valve**

DV-5

**Riser Check Valve**

Model CV-1FR

**NOTE:** 1-1/2 inch (DN40) risers utilize a 2 inch (DN50) Model CV-1FR Riser Check Valve connected to the 1-1/2 inch (DN40) DV-5 Deluge Valve by a 2 x 1-1/2 inch Figure 716 Reducing Coupling.

**Valve Trim**

The Supervised Single Interlock Preaction System with Electric Actuation Trim (Fig. 3A or 3B) forms a part of the laboratory listings and approvals. The trim is necessary for proper operation of the DV-5 Valve.

Each package of trim includes the following items:

- Water Supply Pressure Gauge
- Diaphragm Chamber Pressure Gauge
- Diaphragm Chamber Connections
- Manual Control Station
- Main Drain Valve
- System Drain Valve
- Alarm Test Valve
- Automatic Drain Valve
- System Air Pressure Gauge
- Air Supply Connections
- Low Air Pressure Supervisory Switch
- Waterflow Pressure Alarm Switch (PS10-2)

The following items are included in the Pre-trimmed Valve Assembly and can be ordered separately for the valve trim:

- Model BFV-N Butterfly Valve
- Figure 577 Grooved Coupling

To ease field assembly of the trim arrangement, the trim components are provided partially assembled as shown in Figure 3B.

The trim arrangement is provided with galvanized or black nipples and fittings. The galvanized trim is intended for non-corrosive or corrosive conditions, whereas the black trim is principally intended for use with AFFF systems.

**NOTE:** When the system pressure is greater than 175 psi (12,1 bar), provision is to be made to replace the standard order 300 psi (20,7 bar) Water Pressure Gauges, shown in Figure 3A or 3B with separately ordered 600 psi (41,4 bar) Water Pressure Gauges.

**Detection System**

In order for a single interlock preaction system to be hydraulically calculated as a wet pipe system, as opposed to a dry pipe sprinkler system, the detection system must be designed to operate sooner than the automatic sprinklers on the sprinkler piping.

The Supervised Single Interlock Preaction System with Electric Actuation Trim provides for electric operation of the DV-5 Valve by a detection system consisting of electrical devices such as heat sensitive thermostats, smoke detectors, and/or electric manual pull stations. Information on the various types of separately ordered Solenoid Valves that may be used with this trim package is given in Technical Data Sheet TFP2180. Nominal installation dimensions for the Supervised Single Interlock Preaction System with Electric Actuation Trim are shown in Figure 4.

**NOTES:**

Approval by Factory Mutual is contingent on the use of an FM Approved 24VDC Solenoid Valve (P/N 52-287-1-024 or P/N 52-287-1-124). FM only approves solenoid valves for use in non-hazardous locations.

Consult with the authority having jurisdiction regarding installation criteria pertaining to electric actuation circuitry.

The Supervised Single Interlock Preaction System with Electric Actuation Trim is provided with a Model ASV-1 Automatic Shut-Off Valve (Item 5 - Fig. 3A); consequently, the release circuit of the releasing panel need only provide the standard ten minutes of alarm condition intended to energize the Solenoid Valve. After the ten minute duration, should the Solenoid Valve become de-energized and closed (especially while operating under battery back-up), the Automatic Shut-Off Valve will have already automatically closed thereby preventing the DV-5 Diaphragm Chamber from becoming re-pressurized and preventing an inadvertent closing of the DV-5 during a fire event.



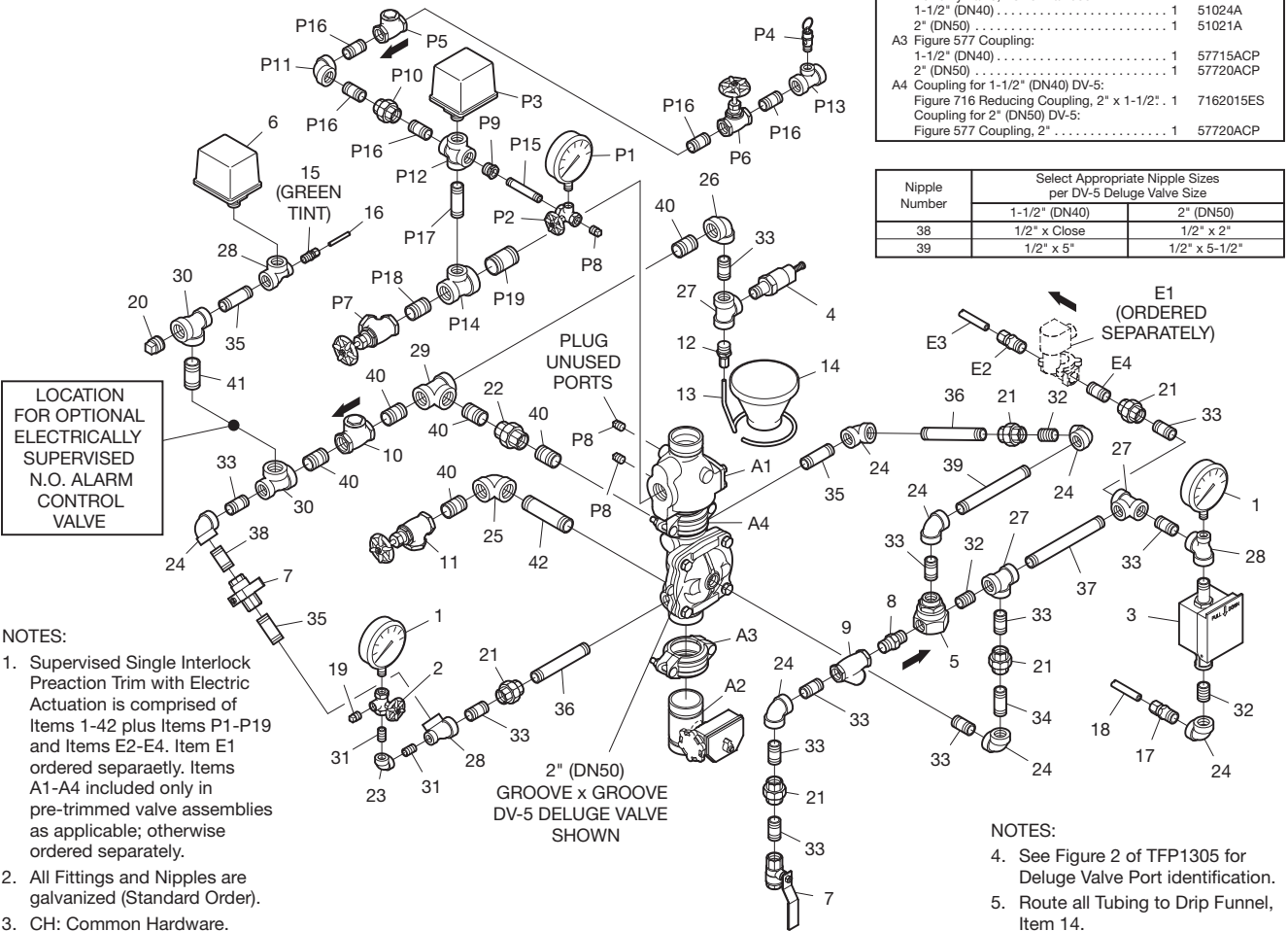
NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge . . .	2	92-343-1-005
2	1/4" Gauge Test Valve . . .	1	46-005-1-002
3	Model MC-1 Manual Control Station . . .	1	52-289-2-001
4	Model AD-1 Automatic Drain Valve . . .	1	52-793-2-004
5	Model ASV-1 Automatic Shut-Off Valve . . .	1	92-343-1-021
6	Waterflow Pressure Alarm Switch, Model PS10-2 . . .	1	25710
7	1/2" Ball Valve . . .	2	46-050-1-004
8	1/2" Spring Loaded Check Valve . . .	1	92-322-1-002
9	1/2" Y-Strainer . . .	1	52-353-1-005
10	3/4" Swing Check Valve . . .	1	46-049-1-005
11	3/4" Angle Valve . . .	1	46-048-1-005
12	Drip Funnel Connector . . .	1	92-211-1-005
13	Drip Funnel Bracket . . .	1	92-211-1-003
14	Drip Funnel . . .	1	92-343-1-007
15	3/32" Vent Fitting . . .	1	92-032-1-002
16	1/4" x 18" Tubing . . .	1	CH
17	1/2" Tubing Connector . . .	1	CH
18	1/2" x 12" Tubing . . .	1	CH
19	1/4" Plug . . .	1	CH
20	3/4" Plug . . .	1	CH
21	1/2" Union . . .	5	CH
22	3/4" Union . . .	1	CH
23	1/4" 90° Elbow . . .	1	CH

NO.	DESCRIPTION	QTY.	P/N
24	1/2" 90° Elbow . . .	7	CH
25	3/4" 90° Elbow . . .	1	CH
26	3/4" x 1/2" 90° Elbow . . .	1	CH
27	1/2" Tee . . .	3	CH
28	1/2" x 1/4" x 1/2" Tee . . .	3	CH
29	3/4" Tee . . .	1	CH
30	3/4" x 1/2" x 3/4" Tee . . .	2	CH
31	1/4" x Close Nipple . . .	2	CH
32	1/2" x Close Nipple . . .	3	CH
33	1/2" x 1-1/2" Nipple . . .	11	CH
34	1/2" x 2" Nipple . . .	1	CH
35	1/2" x 2-1/2" Nipple . . .	3	CH
36	1/2" x 5" Nipple . . .	2	CH
37	1/2" x 7" Nipple . . .	1	CH
38	Select Nipple per Table . . .	1	CH
39	Select Nipple per Table . . .	1	CH
40	3/4" x 1-1/2" Nipple . . .	6	CH
41	3/4" x 2" Nipple . . .	1	CH
42	3/4" x 4" Nipple . . .	1	CH
P1	250 psi/ 1750 kPa Air Pressure Gauge . . .	1	92-343-1-012
P2	1/4" Gauge Test Valve . . .	1	46-005-1-002
P3	Low Air Pressure Alarm Switch, Model PS10-2 . . .	1	25710

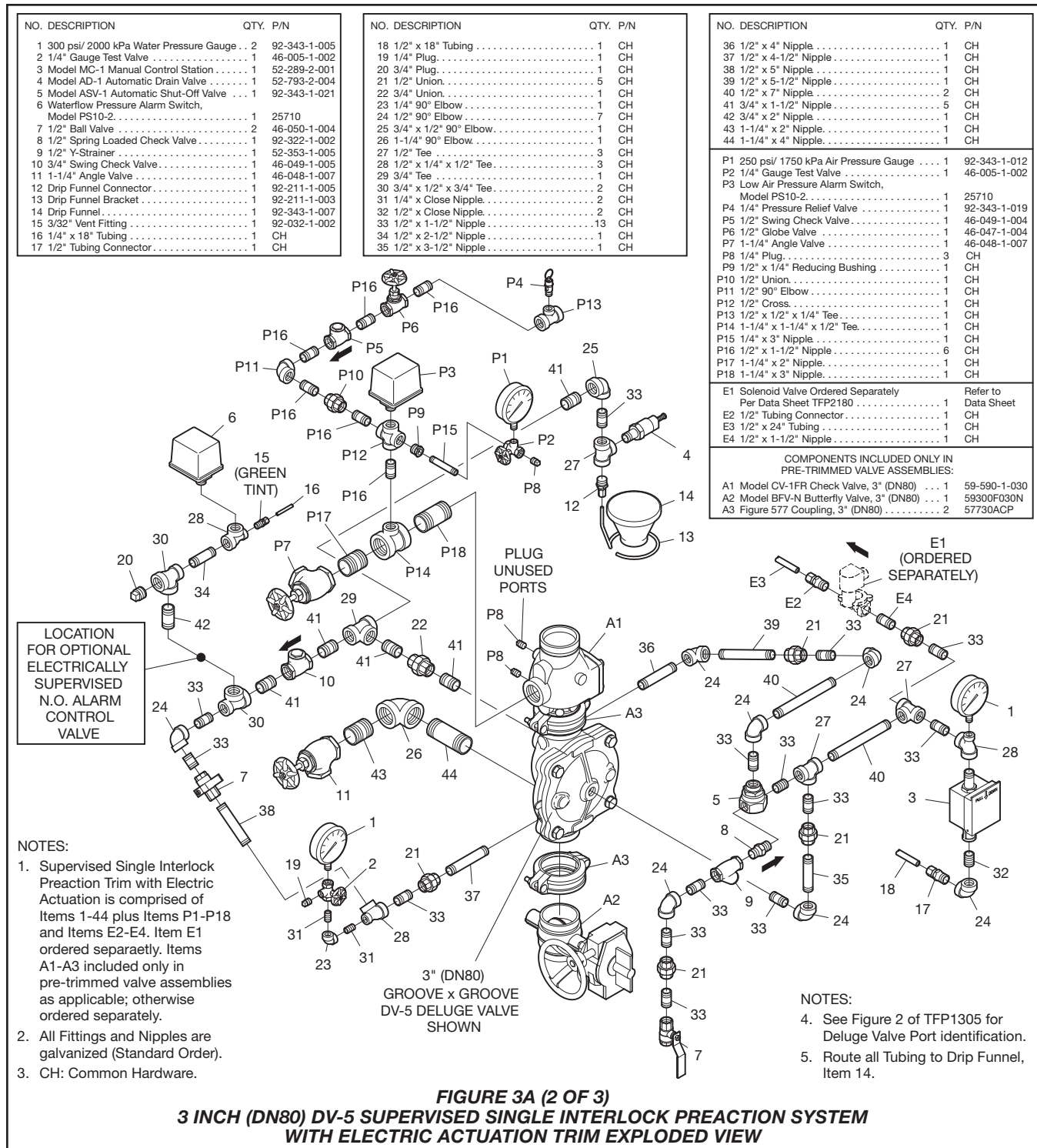
NO.	DESCRIPTION	QTY.	P/N
P4	1/4" Pressure Relief Valve . . .	1	92-343-1-019
P5	1/2" Swing Check Valve . . .	1	46-049-1-004
P6	1/2" Globe Valve . . .	1	46-047-1-004
P7	3/4" Angle Valve . . .	1	46-048-1-007
P8	1/4" Plug . . .	3	CH
P9	1/2" x 1/4" Reducing Bushing . . .	1	CH
P10	1/2" Union . . .	1	CH
P11	1/2" 90° Elbow . . .	1	CH
P12	1/2" Cross . . .	1	CH
P13	1/2" x 1/2" x 1/4" Tee . . .	1	CH
P14	1" x 3/4" x 1/2" Tee . . .	1	CH
P15	1/4" x 3" Nipple . . .	1	CH
P16	1/2" x 1-1/2" Nipple . . .	5	CH
P17	1/2" x 2-1/2" Nipple . . .	1	CH
P18	3/4" x 1-1/2" Nipple . . .	1	CH
P19	1" x 2" Nipple . . .	1	CH
E1	Solenoid Valve Ordered Separately Per Data Sheet TFP2180 . . .	1	Refer to Data Sheet
E2	1/2" Tubing Connector . . .	1	CH
E3	1/2" x 24" Tubing . . .	1	CH
E4	1/2" x 1-1/2" Nipple . . .	1	CH

COMPONENTS INCLUDED ONLY IN PRE-TRIMMED VALVE ASSEMBLIES:		
A1	Model CV-1FR Check Valve, 2" (DN50) . . .	59-590-1-020
A2	Butterfly Valve, Power Ball 300: 1-1/2" (DN40) . . .	51024A
	2" (DN50) . . .	51021A
A3	Figure 577 Coupling: 1-1/2" (DN40) . . .	57715ACP
	2" (DN50) . . .	57720ACP
A4	Coupling for 1-1/2" (DN40) DV-5: Figure 716 Reducing Coupling, 2" x 1-1/2" . . .	7162015ES
	Coupling for 2" (DN50) DV-5: Figure 577 Coupling, 2" . . .	57720ACP

Nipple Number	Select Appropriate Nipple Sizes per DV-5 Deluge Valve Size	
	1-1/2" (DN40)	2" (DN50)
38	1/2" x Close	1/2" x 2"
39	1/2" x 5"	1/2" x 5-1/2"



**FIGURE 3A (1 OF 3)**  
**1-1/2 AND 2 INCH (DN40 AND DN50) DV-5 SUPERVISED SINGLE INTERLOCK PREACTION SYSTEM**  
**WITH ELECTRIC ACTUATION TRIM EXPLODED VIEW**



**FIGURE 3A (2 OF 3)**  
**3 INCH (DN80) DV-5 SUPERVISED SINGLE INTERLOCK PREACTION SYSTEM**  
**WITH ELECTRIC ACTUATION TRIM EXPLODED VIEW**

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	1	46-005-1-002
3	Model MC-1 Manual Control Station	1	52-289-2-001
4	Model AD-1 Automatic Drain Valve	1	52-793-2-004
5	Model ASV-1 Automatic Shut-Off Valve	1	92-343-1-021
6	Waterflow Pressure Alarm Switch, Model PS10-2	1	25710
7	1/2" Ball Valve	2	46-050-1-004
8	1/2" Spring Loaded Check Valve	1	92-322-1-002
9	1/2" Y-Strainer	1	52-353-1-005
10	3/4" Swing Check Valve	1	46-049-1-005
11	Item No. Not Used		
12	2" Angle Valve	1	46-048-1-009
13	Drip Funnel Connector	1	92-211-1-005
14	Drip Funnel Bracket	1	92-211-1-003
15	Drip Funnel	1	92-343-1-007
16	3/32" Vent Fitting	1	92-032-1-002
17	1/4" x 24" Tubing	1	CH
18	1/2" Tubing Connector	1	CH
19	1/2" x 24" Tubing	1	CH
20	1/4" Plug	1	CH
21	3/4" Plug	1	CH
22	1/2" Union	5	CH
23	1" Union	1	CH
24	1/4" 90° Elbow	1	CH
25	1/2" 90° Elbow	7	CH
26	1/2" Tee	3	CH

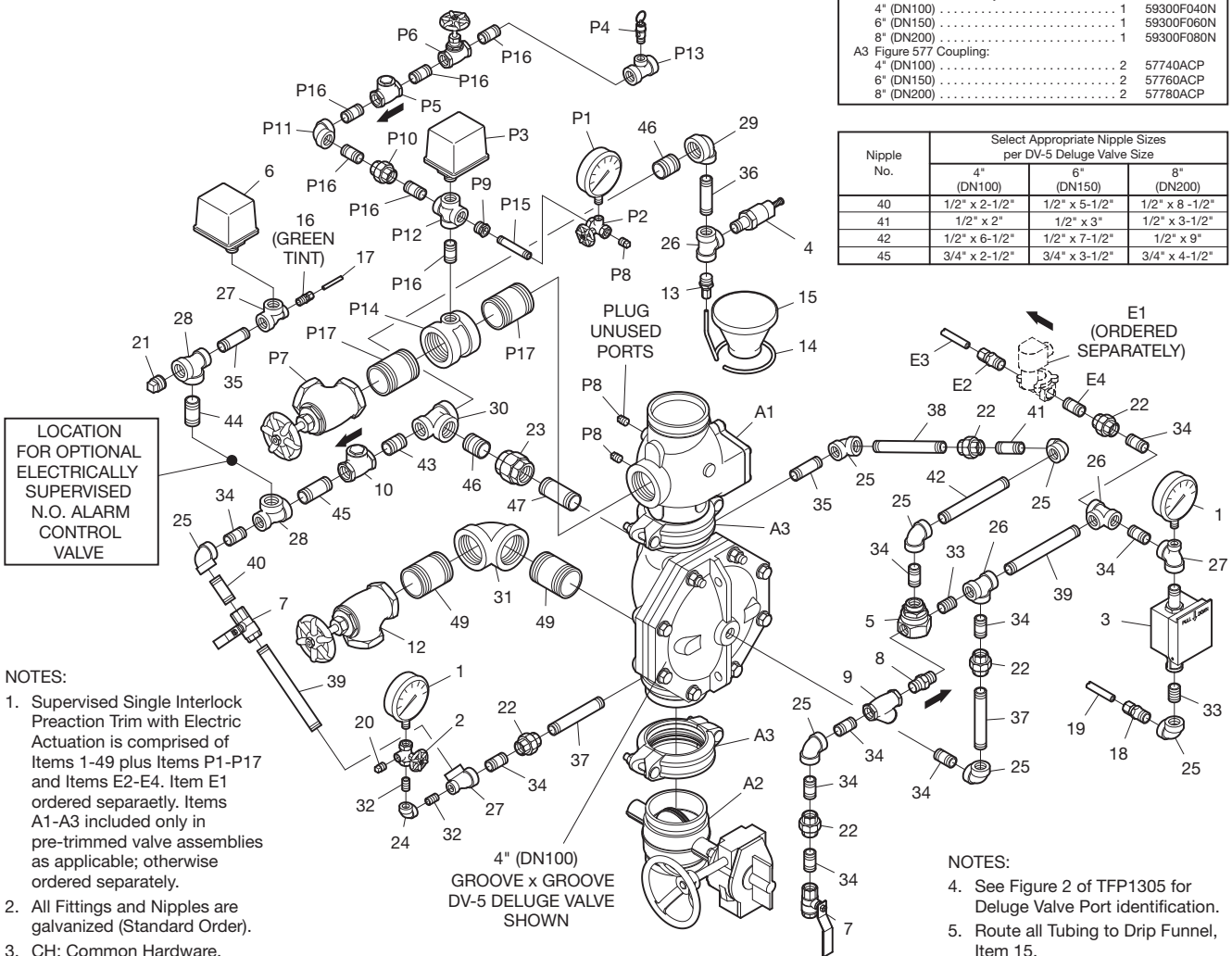
NO.	DESCRIPTION	QTY.	P/N
27	1/2" x 1/4" x 1/2" Tee	3	CH
28	3/4" x 1/2" x 3/4" Tee	2	CH
29	1" x 1/2" 90° Elbow	1	CH
30	1" x 3/4" x 1" Tee	1	CH
31	2" 90° Elbow	1	CH
32	1/4" x Close Nipple	2	CH
33	1/2" x Close Nipple	2	CH
34	1/2" x 1-1/2" Nipple	10	CH
35	1/2" x 2-1/2" Nipple	2	CH
36	1/2" x 3" Nipple	1	CH
37	1/2" x 5" Nipple	2	CH
38	1/2" x 6" Nipple	1	CH
39	1/2" x 7" Nipple	2	CH
40	Select Nipple per Table	1	CH
41	Select Nipple per Table	1	CH
42	Select Nipple per Table	1	CH
43	3/4" x 1-1/2" Nipple	1	CH
44	3/4" x 2" Nipple	1	CH
45	Select Nipple per Table	1	CH
46	1" x Close Nipple	2	CH
47	1" x 3" Nipple	1	CH
48	Item No. Not Used		
49	2" x 3" Nipple	2	CH
P1	250 psi/ 1750 kPa Air Pressure Gauge	1	92-343-1-012
P2	1/4" Gauge Test Valve	1	46-005-1-002
P3	Low Air Pressure Alarm Switch, Model PS10-2	1	25710

NO.	DESCRIPTION	QTY.	P/N
P4	1/4" Pressure Relief Valve	1	92-343-1-019
P5	1/2" Swing Check Valve	1	46-049-1-004
P6	1/2" Globe Valve	1	46-047-1-004
P7	2" Angle Valve	1	46-048-1-009
P8	1/4" Plug	3	CH
P9	1/2" x 1/4" Reducing Bushing	1	CH
P10	1/2" Union	1	CH
P11	1/2" 90° Elbow	1	CH
P12	1/2" Cross	1	CH
P13	1/2" x 1/2" x 1/4" Tee	1	CH
P14	2" x 2" x 1/2" Tee	1	CH
P15	1/4" x 3" Nipple	1	CH
P16	1/2" x 1-1/2" Nipple	6	CH
P17	2" x 3" Nipple	2	CH

E1	Solenoid Valve Ordered Separately	Refer to
	Per Data Sheet TFP2180	Data Sheet
E2	1/2" Tubing Connector	1
E3	1/2" x 24" Tubing	1
E4	1/2" x 1-1/2" Nipple	1

COMPONENTS INCLUDED ONLY IN PRE-TRIMMED VALVE ASSEMBLIES:			
A1	Model CV-1FR Check Valve:		
	4" (DN100)	1	59-590-1-040
	6" (DN150)	1	59-590-1-060
	8" (DN200)	1	59-590-1-080
A2	Model BFV-N Butterfly Valve:		
	4" (DN100)	1	59300F040N
	6" (DN150)	1	59300F060N
	8" (DN200)	1	59300F080N
A3	Figure 577 Coupling:		
	4" (DN100)	2	57740ACP
	6" (DN150)	2	57760ACP
	8" (DN200)	2	57780ACP

Nipple No.	Select Appropriate Nipple Sizes per DV-5 Deluge Valve Size		
	4" (DN100)	6" (DN150)	8" (DN200)
40	1/2" x 2-1/2"	1/2" x 5-1/2"	1/2" x 8-1/2"
41	1/2" x 2"	1/2" x 3"	1/2" x 3-1/2"
42	1/2" x 6-1/2"	1/2" x 7-1/2"	1/2" x 9"
45	3/4" x 2-1/2"	3/4" x 3-1/2"	3/4" x 4-1/2"

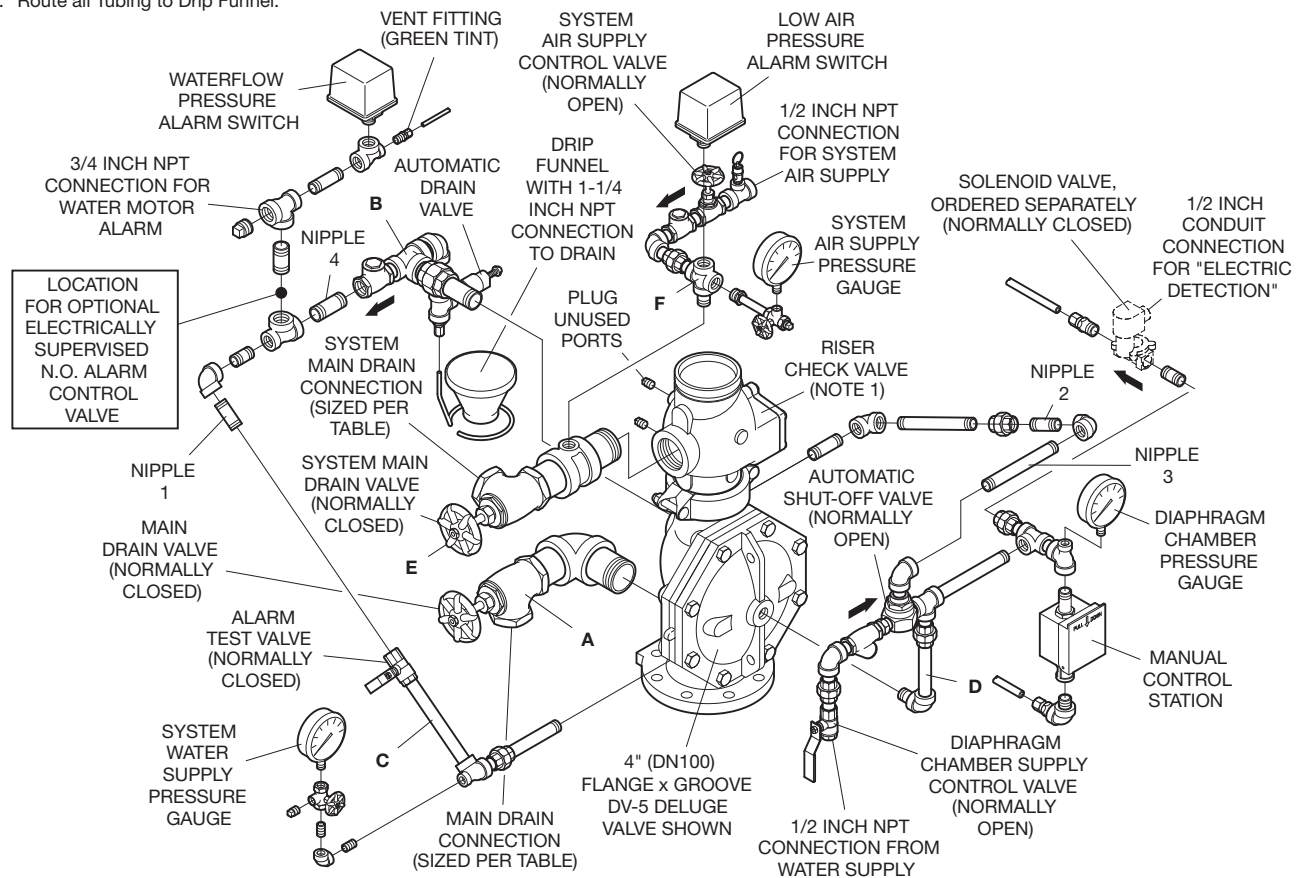


**FIGURE 3A (3 OF 3)**  
**4, 6, AND 8 INCH (DN100, DN150 AND DN200) DV-5 SUPERVISED SINGLE INTERLOCK PREACTION SYSTEM WITH ELECTRIC ACTUATION TRIM EXPLODED VIEW**

NOTES:

1. Use only 2" (DN50) Model CV-1FR Riser Check Valve in 1-1/2" (DN40) and 2" (DN50) assemblies. Use CV-1FR Valve size equal to mating DV-5 Valve in larger assemblies.
2. Nipples 1-4 vary in length relative to DV-5 size. Select per table. All other nipples packed unassembled shall be installed per appropriate trim exploded view, Figure 3A Part 1, 2, or 3.
3. Install subassemblies in alphabetical order.
4. See Figure 2 of TFP1305 for Deluge Valve Port identification.
5. Route all Tubing to Drip Funnel.

Nipple Number	Select Appropriate Nipple Sizes per DV-5 Deluge Valve Size					
	1-1/2" (DN40)	2" (DN50)	3" (DN80)	4" (DN100)	6" (DN150)	8" (DN200)
1	1/2" x Close	1/2" x 2"	1/2" x 1-1/2"	1/2" x 2-1/2"	1/2" x 5-1/2"	1/2" x 8-1/2"
2	1/2" x Close	1/2" x Close	1/2" x 1-1/2"	1/2" x 2"	1/2" x 3"	1/2" x 3-1/2"
3	1/2" x 5"	1/2" x 5-1/2"	1/2" x 7"	1/2" x 6-1/2"	1/2" x 7-1/2"	1/2" x 9"
4	3/4" x 1-1/2"	3/4" x 1-1/2"	3/4" x 1-1/2"	3/4" x 2-1/2"	3/4" x 3-1/2"	3/4" x 4-1/2"
System Main Drain Size	3/4" NPT	3/4" NPT	1-1/4" NPT	2" NPT	2" NPT	2" NPT
Main Drain Size	3/4" NPT	3/4" NPT	1-1/4" NPT	2" NPT	2" NPT	2" NPT

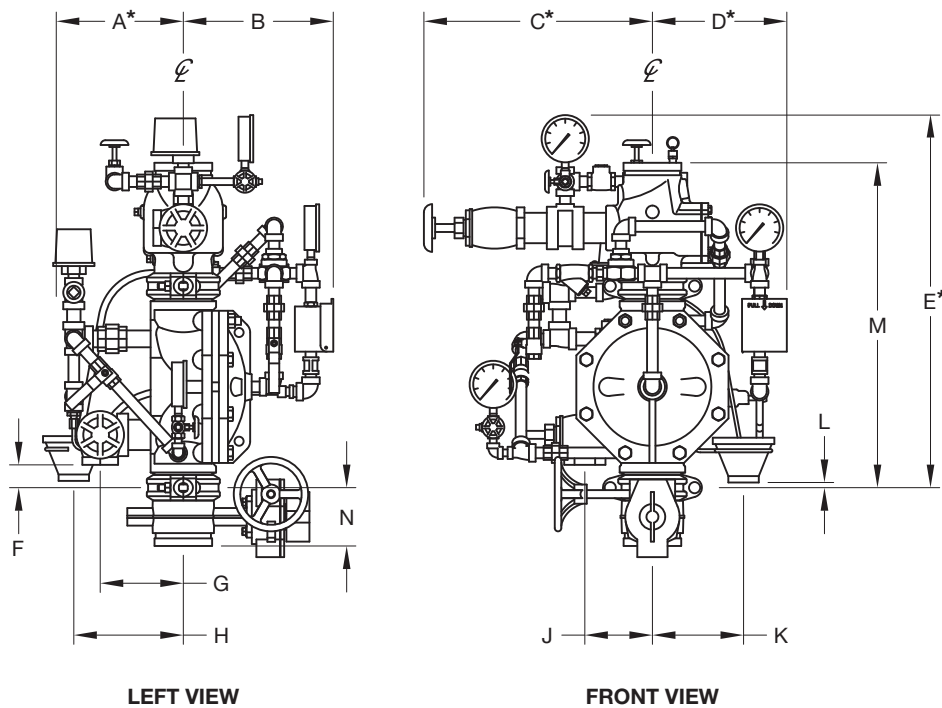


**FIGURE 3B**  
**1-1/2 THRU 8 INCH (DN40 THRU DN200) DV-5 SUPERVISED SINGLE INTERLOCK PREACTION**  
**WITH ELECTRIC ACTUATION TRIM OPERATIONAL COMPONENTS**  
**SEMI-PREASSEMBLED TRIM EXPLODED ARRANGEMENT**



Valve Size	Nominal Installation Dimensions in Inches and (mm)												
	A	B	C	D	E	F	G	H	J	K	L	M	N
1-1/2" (DN40)	7.00 (177,8)	8.88 (225,4)	13.00 (330,2)	10.50 (266,7)	20.50 (520,7)	4.00 (101,6)	5.81 (147,6)	5.81 (147,6)	3.00 (76,2)	7.00 (177,8)	4.00 (101,6)	14.81 (376,2)	4.02 (102,1)
2" (DN50)	7.13 (181,0)	9.13 (231,8)	13.00 (330,2)	10.50 (266,7)	21.06 (535,0)	3.13 (79,4)	6.00 (152,4)	6.00 (152,4)	3.00 (76,2)	7.00 (177,8)	3.13 (79,4)	15.38 (390,5)	4.09 (103,9)
3" (DN80)	7.81 (198,4)	10.44 (265,1)	14.50 (368,3)	10.50 (266,7)	25.00 (635,0)	1.69 (42,9)	6.69 (170,0)	6.69 (170,0)	4.25 (108,0)	7.00 (177,8)	0.25 (6,4)	21.13 (536,6)	3.85 (98,0)
4" (DN100)	10.00 (254,0)	11.75 (298,5)	17.88 (454,0)	10.50 (266,7)	29.13 (739,8)	1.75 (44,5)	6.50 (165,1)	8.56 (217,5)	6.25 (158,8)	7.13 (181,0)	0.38 (9,5)	25.38 (644,5)	4.56 (116,0)
6" (DN150)	11.38 (289,0)	14.31 (363,5)	18.75 (476,3)	10.50 (266,7)	31.94 (811,2)	3.50 (88,9)	7.88 (200,0)	9.94 (252,4)	6.25 (158,8)	7.13 (181,0)	1.56 (39,7)	29.63 (752,5)	5.86 (149,0)
8" (DN200)	12.00 (304,8)	16.00 (406,4)	21.25 (539,8)	10.50 (266,7)	36.75 (933,5)	1.75 (44,5)	10.75 (273,1)	10.63 (269,9)	6.25 (158,8)	7.13 (181,0)	7.13 (181,0)	36.50 (927,1)	5.26 (134,0)

\* MINIMUM CLEARANCE.



**FIGURE 4**  
**1-1/2 THRU 8 INCH (DN40 THRU DN200) DV-5 SUPERVISED SINGLE INTERLOCK PREACTION**  
**WITH ELECTRIC ACTUATION TRIM NOMINAL INSTALLATION DIMENSIONS**

### System Air Pressure Requirements

The supervisory air (nitrogen) pressure is to be  $10 \pm 2$  psi (0,69 plus or minus 0,07 bar). The use of a higher supervisory pressure is subject to approval by the authority having jurisdiction, and it should be understood that the use of a higher supervisory pressure may increase water delivery time. The use of a lower supervisory pressure may prevent clearing the alarm of the Supervisory Low Pressure Alarm Switch (Item P3 - Fig. 3A), which is factory set to alarm at  $5 \pm 1$  psi (0,34  $\pm$  0,07 bar) on decreasing pressure. The supervisory air supply pressure of  $10 \pm 2$  psi (0,69  $\pm$  0,07 bar) can be provided by any of the following methods. Refer to the applicable data sheet for laboratory approval information.

- Model G16AC812 (self contained) Automatic Supervisory Air Supply described in Technical Data Sheet TFP1620.
- A maximum 200 psi (13,8 bar) plant air supply in combination with the Model AMD-1 Air Maintenance Device described in Technical Data Sheet TFP1221.
- A maximum 3000 psi (206,9 bar) nitrogen cylinder in combination with the Model AMD-3 Nitrogen Maintenance Device described in Technical Data Sheet TFP1241.

**NOTE:** The dew point of the air or nitrogen supply for a system exposed to freezing conditions must be maintained below the lowest ambient temperature to which the system piping will be exposed. Introduction of moisture into the system piping can create ice build-up that could prevent proper operation of the system.

The Supervisory Low Pressure Alarm Switch (Item P3 - Fig. 3A) is factory set at  $5 \pm 1$  psi (0,34  $\pm$  0,07 bar) on decreasing pressure. The Pressure Relief Valve (Item P4- Fig. 3A) is factory set to fully open at  $25 \pm 2$  psi (1,72  $\pm$  0,14 bar) and it begins to crack open at a pressure of about 18 psi (1,24 bar).

### Friction Loss

The nominal pressure loss versus flow data for the DV-5 Deluge Valve plus Riser Check Valve is provided in Graph A.

## Installation

### General Instructions

Proper operation of the DV-5 Deluge Valve depends upon its trim being installed in accordance with the instructions given in this technical data sheet. Failure to follow the appropriate trim diagram may prevent the DV-5 Valve from functioning properly, as well as void listings, approvals, and the manufacturer's warranties.

1-1/2 inch (DN40) risers utilize a 2 inch (DN50) Riser Check Valve in combination with the 1-1/2 inch (DN40) DV-5 Deluge Valve.

The DV-5 Valve must be installed in a readily visible and accessible location.

The DV-5 Valve associated trim must be maintained at a minimum temperature of 40°F (4°C).

Heat tracing of the DV-5 Valve or its associated trim is not permitted. Heat tracing can result in the formation of hardened mineral deposits that are capable of preventing proper operation.

The DV-5 Deluge Valve is to be installed in accordance with the following criteria:

**Step 1.** All nipples, fittings, and devices must be clean and free of scale and burrs before installation. Use pipe thread sealant sparingly on male pipe threads only.

**Step 2.** The DV-5 Valve must be trimmed in accordance with Figure 3A or 3B.

**Step 3.** Care must be taken to ensure that check valves, strainers, globe valves, etc. are installed with the flow arrows in the proper direction.

**Step 4.** Drain tubing to the Drip Funnel must be installed with smooth bends that will not restrict flow.

**Step 5.** The main drain and Drip Funnel drain may be interconnected provided a check valve is located at least 12 inches (300 mm) below the Drip Funnel.

**Step 6.** Suitable provision must be made for disposal of drain water. Drainage water must be directed such that it will not cause accidental damage to property or danger to persons.

**Step 7.** Connect the Diaphragm Chamber Supply Control Valve to the inlet side of the system's Main Control Valve in order to facilitate setting of the DV-5 Valve (Ref. Figure 4).

**Step 8.** Unused pressure alarm switch connections must be plugged.

**Step 9.** A suitable automatic supervisory air (nitrogen) supply, as described in the Technical Data section, is to be installed in accordance with the applicable technical data sheet and set for  $10 \pm 2$  psi (0,69  $\pm$  0,14 bar).

**Step 10.** A desiccant dryer, when required for the supervisory air supply, is to be installed between a drip leg and the Model AMD-1 Air Maintenance Device or between the Model G16AC812 Automatic Supervisory Air Supply and the Preaction Trim.

**Step 11.** The Supervisory Low Pressure Alarm Switch is to be wired to the supervisory alarm initiating circuit of an alarm panel.

**Step 12.** Conduit and electrical connections are to be made in accordance with the requirements of the authority having jurisdiction and/or the National Electric Code.

**Step 13.** Before a system hydrostatic test is performed in accordance with NFPA 13 system acceptance test requirements, the DV-5 Diaphragm Chamber is to be depressurized; the Automatic Drain Valve (Item 4, Fig. 3A) is to be temporarily replaced with a 1/2 inch NPT plug, the 3/32 inch Vent Fitting (16 - Fig. 3A) is to be temporarily replaced with a 1/4 inch NPT plug, and the Diaphragm Cover Bolts must be uniformly and securely tightened using a cross-draw sequence. After tightening, double-check to make certain that all of the Diaphragm Cover Bolts are securely tightened.

## Valve Setting Procedure

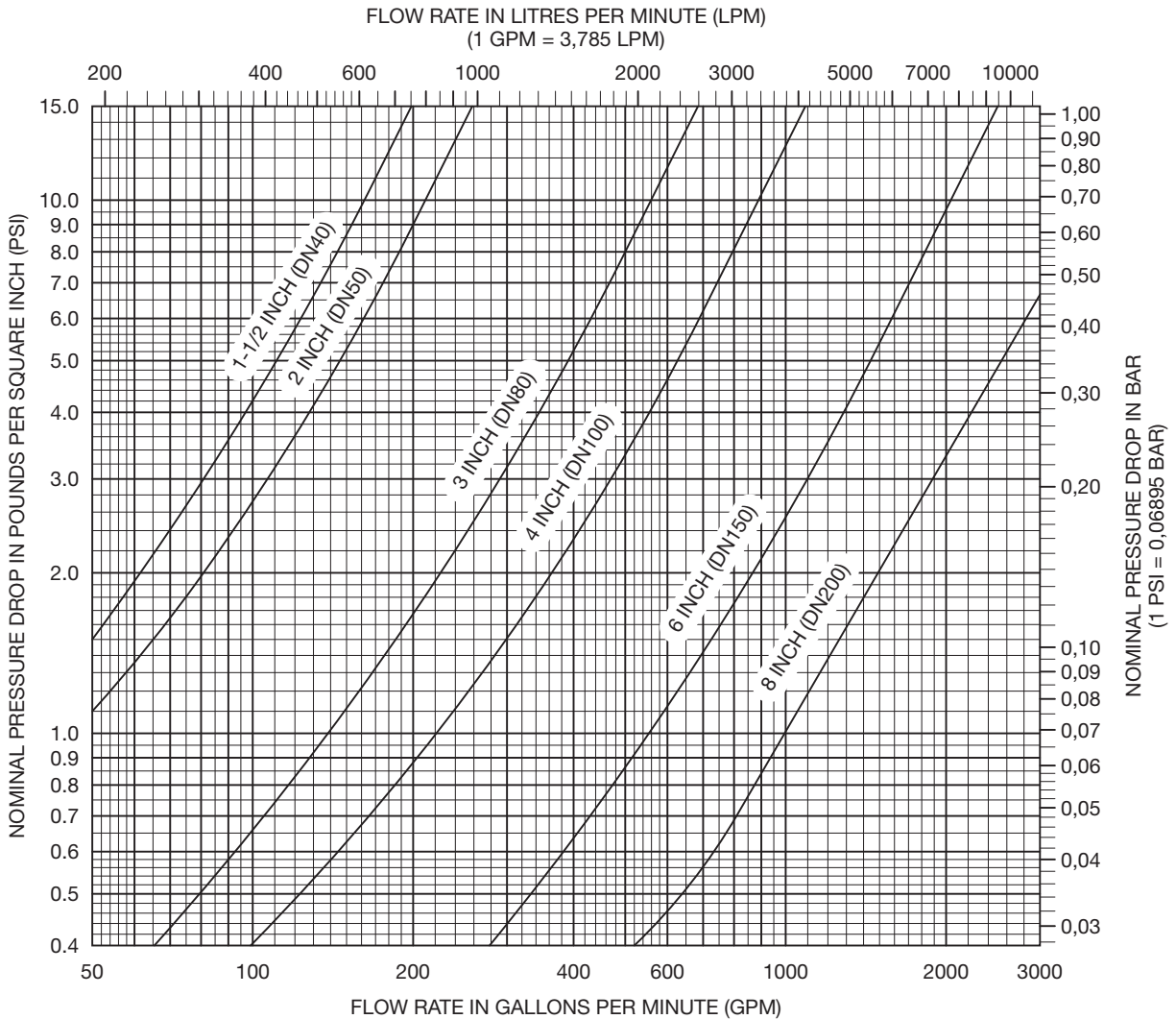
Steps 1 through 12 are to be performed when initially setting the DV-5 Deluge Valve after an operational test of the fire protection system, or, after system operation due to a fire.

**Step 1.** Close the Main Control Valve.

**Step 2.** Close the Diaphragm Chamber Supply Control Valve, the Dry Pilot Line Air Supply Control Valve, and the Supervisory Air Supply Control Valve.

**Step 3.** Open the Main Drain Valve, System Drain Valve, and all auxiliary drains in the system. Close the System Drain Valve and auxiliary drain valves after water ceases to discharge. Leave the Main Drain Valve open.

**Step 4.** Depress the plunger of the Automatic Drain Valve to verify that it is open and that the DV-5 Valve is completely drained.



The approximate friction loss, based on the Hazen and Williams formula and expressed in equivalent length of pipe with C-120, is as follows:

- 15 feet of 1-1/2 Sch. 40 pipe for the 1-1/2 inch Valve Combination\*\* calculated on a typical flow rate of 100 gpm.
- 28 feet of 2 inch Sch. 40 pipe for the 2 inch Valve Combination\* calculated on a typical flow rate of 175 gpm.
- 37 feet of 3 inch Sch. 40 pipe for the 3 inch Valve Combination\* calculated on a typical flow rate of 350 gpm.
- 48 feet of 4 inch Sch. 40 pipe for the 4 inch Valve Combination\* calculated on a typical flow rate of 600 gpm.
- 73 feet of 6 inch Sch. 40 pipe for the 6 inch Valve Combination\* calculated on a typical flow rate of 1500 gpm.
- 103 feet of 8 inch Sch. 30 Pipe for the 8 inch Valve Combination\* calculated on a typical flow rate of 2500 gpm.

**GRAPH A**  
**DELUGE AND CHECK VALVE COMBINATION\***  
**NOMINAL PRESSURE LOSS VERSUS FLOW**

\*DV-5 Deluge Valve combined with Model CV-1FR Riser Check Valve

\*\*1-1/2 Inch DV-5 Deluge Valve combined with 2 Inch Model CV-1FR Riser Check Valve

**Step 5.** Clean the Strainer in the Diaphragm Chamber Supply connection by removing the clean-out plug and strainer basket. The Strainer may be flushed out by momentarily opening the Diaphragm Chamber Supply Control Valve.

**Step 6.** Reset the actuation system.

**Manual Actuation** — Push the operating lever up; however, do not close the hinged cover at this time.

**Electric Actuation** — Reset the electric detection system in accordance with the manufacturer's instructions to de-energize the Solenoid Valve.

**Step 7.** Open the Diaphragm Chamber Supply Control Valve and allow time for full pressure to build up in the Diaphragm Chamber.

**Step 8.** Operate (open) the Manual Control Station to vent trapped air from the Diaphragm Chamber. If necessary, first open the hinged cover, and then fully pull down on the operating lever. Slowly close the operating lever by pushing it up after aerated water ceases to discharge from the Manual Control Station drain tubing. Close the hinged cover and insert a new break rod in the small hole through the top of the enclosing box.

**Step 9.** Inspect the drain connections from the Manual Control Station and Solenoid Valve. Any leaks must be corrected before proceeding to the next step.

**Step 10.** Verify the ability for the DV-5 Diaphragm to hold pressure as follows:

- With the diaphragm chamber pressurized per Step 8, temporarily close the Diaphragm Chamber Supply Control Valve, and then monitor the Diaphragm Chamber Pressure Gauge for a drop in pressure.
- If a drop in pressure is noted, the DV-5 Diaphragm is to be replaced and/or any leaks must be corrected before proceeding to the next step.
- If the Diaphragm Chamber Pressure Gauge does not indicate a drop in pressure, re-open the Diaphragm Chamber Supply Control Valve and proceed to the next step.

**Step 11.** Replace operated automatic sprinklers on the system piping and then open the Supervisory Air Supply Control Valve and allow the system to automatically re-establish its nominal air pressure of 10 psi (0.69 bar). Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem within the Riser Check Valve.

**NOTE:** In order to prevent the possibility of a subsequent operation of an over-heated solder type automatic sprinkler, any solder type automatic sprinklers that were possibly exposed to a temperature greater than their maximum rated ambient must be replaced.

**Step 12.** Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, the DV-5 Valve is ready to be placed in service and the Main Control Valve must then be fully opened.

**NOTES:** When the Main Control Valve is opened, the pressure on the Diaphragm Chamber may increase. This increase in pressure is normal. If the pressure is greater than 250 psi (17.2 bar), the pressure is to be relieved by partially and temporarily opening the Manual Control Station; however, do not allow the pressure as indicated on the Diaphragm Chamber Pressure Gauge to drop below the supply pressure shown on the Water Supply Pressure Gauge since this action may result in tripping of the DV-5 Valve.

After setting a fire protection system, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

## **Care and Maintenance**

The following procedures and inspections must be performed in accordance with this section, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, permission to shut down the affected fire protection systems must first be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

### **NOTICE**

Some of the procedures outlined in this section will result in operation of the associated alarms. Consequently, notification must first be given to the owner and the fire department, central station, or other signal station to which the alarms are connected.

### **Annual Operation Test Procedure**

Proper operation of the DV-5 Valve (i.e., opening of the DV-5 Valve as during a fire condition) must be verified at least once a year as follows:

**Step 1.** If water must be prevented from flowing beyond the riser, perform the following steps.

- Close the Main Control Valve.
- Open the Main Drain Valve.
- Open the Main Control Valve one turn beyond the position at which water just begins to flow from the Main Drain Valve.
- Close the Main Drain Valve.

**Step 2.** Test the Deluge Valve Releasing Panel in accordance with the manufacturer's instructions to energize the Solenoid Valve.

**NOTE:** Be prepared to quickly perform Steps 3, 4, and 5 if water must be prevented from flowing beyond the riser.

**Step 3.** Verify that the DV-5 Valve has tripped, as indicated by the flow of water into the system.

**Step 4.** Close the system's Main Control Valve.

**Step 5.** Close the Diaphragm Chamber Supply Control Valve, the Dry Pilot Line Air Supply Control Valve, and the Supervisory Air Supply Control Valve.

**Step 6.** Reset the DV-5 Deluge Valve in accordance with the Valve Setting Procedure.

### **Quarterly Waterflow Alarm Test Procedure**

Testing of the system waterflow alarms must be performed quarterly. To test the waterflow alarm, open the Alarm Test Valve, which will allow a flow of water to the Pressure Alarm Switch and/or Water Motor Alarm. Upon satisfactory completion of the test, close the Alarm Test Valve.



**Quarterly Supervisory Low Pressure Alarm Test Procedure**  
Proper operation of the Supervisory Low Pressure Alarm Switch must be performed quarterly as follows:

**Step 1.** Crack open the System Main Drain Valve for the Riser Check Valve (Item P7, Figure 3A) to slowly relieve supervisory air pressure from the system. Verify that the Supervisory Low Pressure Alarm Switch is operational and that the low pressure set point is approximately 5 psi (0,34 bar).

**Step 2.** Close the System Main Drain Valve (Item P7, Figure 3A) and allow the system supervisory pressure of  $10 \pm 2$  psi (0,69  $\pm$  0,14 bar) to be automatically re-established. The Supervisory Low Pressure Alarm Switch should return to its "normal" condition.

**Pressure Relief Valve Maintenance**  
Over-pressurization of the system piping with air will result in the opening of the Pressure Relief Valve (Item P4, Fig. 3A). If the Relief Valve continues to bleed air after the system pressure has been reduced to its normal supervisory pressure range of  $10 \pm 2$  psi (0,69  $\pm$  0,14 bar), most likely debris has become lodged in the seating area. To help clean the seating area, slowly pull up on the ring at the top of the Relief Valve to allow a full flow of air through the Relief Valve, and then release the ring to allow the Relief Valve to snap closed. Repeat the cleaning procedure as necessary.

## Ordering Procedure

The DV-5 Deluge Valve with Single Interlock Preaction Electric Actuation trim can be ordered pre-trimmed or non-assembled as separate items.

For non-assembled the following items must be ordered separately:

- DV-5 Deluge Valve
- CF-1FR Riser Check Valve
- Couplings
- Single Interlock Preaction Electric Actuation Trim, Semi-Preassembled
- Supervisory Air Supply
- Dry Pilot Air Supply
- Accessories

**NOTE:** 1-1/2 inch (DN40) risers utilize a 2 inch (DN50) Model CV-1FR Riser Check Valve connected to the 1-1/2 inch (DN40) DV-5 Deluge Valve by a 2 x 1-1/2 inch Figure 716 Reducing Coupling.

### Replacement Trim Parts

Specify: (description) for use with DV-5 Deluge Valve, P/N (see Figure 3A)

### Deluge Valve (Select One)

P/Ns are for American Standard Groove x Groove Connections, and Threaded Ports. For other configurations refer to Technical Data Sheet TFP1305. Specify: (size) DV-5 Groove x Groove Deluge Valve, P/N (specify):

1-1/2 Inch	P/N 52-477-1-919
2 Inch	P/N 52-477-1-910
3 Inch	P/N 52-477-1-912
4 Inch	P/N 52-477-1-913
6 Inch	P/N 52-477-1-915
8 Inch	P/N 52-477-1-916

### Riser Check Valve (Select One)

P/Ns are for American Standard Grooved Connections. For other configurations refer to Technical Data Sheet TFP950 for the Groove x Groove Model CV-1FR Riser Check Valve. Specify: (size), Model CV-1FR Groove x Groove Riser Check Valve, P/N (specify):

2 Inch	P/N 59-590-1-020
3 Inch	P/N 59-590-1-030
4 Inch	P/N 59-590-1-040
6 Inch	P/N 59-590-1-060
8 Inch	P/N 59-590-1-080

**NOTE:** For 1-1/2 inch (DN40) risers, use the 2 inch (DN50) Riser Check Valve.

### Coupling (Select One)

P/Ns are for American Standard Grooved Connections. For other configurations and finishes refer to Technical Data Sheet TFP1830 or TFP1880. A coupling to attach the Riser Check Valve to the outlet of the Deluge Valve must be separately ordered. Specify: (Size), (Figure #), painted, (description), P/N (specify). For 1-1/2 inch risers, order an additional Reducing Coupling for the outlet of the 2 inch Riser Check Valve.

2 x 1-1/2 Inch Figure 716 Painted Reducing Coupling	P/N 7162015ES
2 Inch Figure 772 Painted Rigid Coupling	P/N 77220ASC
3 Inch Figure 772 Painted Rigid Coupling	P/N 77230ASC
4 Inch Figure 772 Painted Rigid Coupling	P/N 77240ASC
6 Inch Figure 772 Painted Rigid Coupling	P/N 77260ASC
8 Inch Figure 772 Painted Rigid Coupling	P/N 77280ASC

### Preaction Trim (Select One)

Specify: (Size and finish — galvanized is standard) Semi-Preassembled Supervised Single Interlock Preaction

System With Electric Actuation Trim for DV-5 Deluge Valves, P/N (specify):

1-1/2 & 2 Inch Galvanized	P/N 52-478-2-119
1-1/2 & 2 Inch Black	P/N 52-478-1-119
3 Inch Galvanized	P/N 52-478-2-116
3 Inch Black	P/N 52-478-1-116
4, 6 & 8 Inch Galvanized	P/N 52-478-2-113
4, 6 & 8 Inch Black	P/N 52-478-1-113

### Supervisory Air Supply (Select One)

A device capable of maintaining a nominal system air or nitrogen pressure of nominal 10 psi (0,69 bar) must be separately ordered. Specify: (Model and description), P/N (specify):

Model AMD-1 Air Maintenance Device (TFP1221)	P/N 52-324-2-002
Model AMD-3 Nitrogen Maintenance Device (TFP1241)	P/N 52-328-2-001
Model G16AC812 Automatic Supervisory Air Supply (TFP1620)	P/N 52-150-1-001

### Solenoid Valve (Select One)

A Solenoid Valve compatible with the anticipated maximum water supply pressure must be ordered separately. Refer to Technical Data Sheet TFP2180 for other voltage ratings and NEMA classifications. Specify: 24 VDC, NEMA 2, 4, and 4X, (specify 175 or 250 psi) Solenoid Valve, P/N (specify):

175 psi	P/N 52-287-1-024
250 psi	P/N 52-287-1-124

### Pre-Trimmed DV-5 Assembly with Butterfly Valve

Specify: (size), G x G End Connection, Pre-Trimmed DV-5 Assembly with Butterfly Valve, P/N (specify):

1-1/2 Inch G x G	P/N 52-916-0-1AP
2 Inch G x G	P/N 52-926-0-1AP
3 Inch G x G	P/N 52-936-0-1AP
4 Inch G x G	P/N 52-946-0-1AP
6 Inch G x G	P/N 52-966-0-1AP
8 Inch G x G	P/N 52-986-0-1AP

### Pre-Trimmed DV-5 Assembly without Butterfly Valve

Specify: (specify size), (specify) End Connection, Pre-trimmed DV-5 Assembly without Butterfly Valve, P/N (specify):

3 Inch F x G	P/N 52-936-2-1AP
4 Inch F x G	P/N 52-946-2-1AP
6 Inch F x G	P/N 52-966-2-1AP
8 Inch F x G	P/N 52-986-2-1AP

### Accessories (As Needed)

Specify: (description), P/N (specify):

600 psi Water Pressure Gauge	P/N 92-343-1-004
Model WMA-1 Water Motor Alarm (TFP921)	P/N 52-630-1-001P

