

### DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, Limited Space Valve Cabinet

# General Description

The TYCO DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, Limited Space Valve Cabinet is a pre-assembled, fire protection valve package enclosed in a stainless steel cabinet designed to accommodate two risers.

The DV-5 Valve depends upon water pressure in the Diaphragm Chamber to hold the Diaphragm closed against water supply pressure. Key features include the following:

- Pressure-reducing function maintains a set outlet pressure
- Compact, space-saving design reduces valve room footprint and construction costs

Operation of the DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve is provided by an automatic electric detection system or remote manual electric activation.

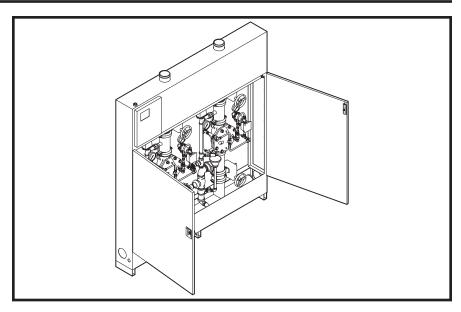
The force differential applied through the Diaphragm that holds it in the set position is reduced below the Valve trip point. Water supply pressure then forces the Diaphragm open, permitting water to flow into the system piping and through the Alarm Port, actuating system alarms.

When the Deluge Valve is activated, system outlet pressure is determined by the Pilot Valve set point. The Diaphragm regulates downstream pressure based on this setting.

The Pilot Valve can be used in various applications and configurations, and should be installed according to the Deluge Valve application scheme, honoring the Pilot Valve working conditions described herein. For other configurations, contact a TYCO Representative.

#### NOTICE

The DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, Limited Space Valve Cabinet described herein must be installed and maintained in compliance with this document as well as with



the applicable installation and testing standards (e.g., NFPA 13 and 25), in addition to the standards of any local authorities having jurisdiction. Failure to observe these instructions and standards may impair the performance of this product.

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 Listed
UL Online Certifications Directory
Category VLFT: Special System Water
Control Valves, Deluge Type

Maximum Inlet Pressure 250 psi (17,2 bar)

Minimum Differential Pressure 50 psi (3,45 bar)

Field Outlet Set Pressure Range 35 to 200 psi (2,4 to 13,8 bar)

### Pressure Loss with Inlet Pressure Above Set Pressure

The inlet pressure minus the outlet set pressure equals pressure loss. For example, if the inlet flowing pressure is 225 psi (15,5 bar) and the field outlet set pressure is 130 psi (9,0 bar), the pressure loss is 95 psi (6,5 bar).

Pressure Loss with Inlet Pressure Below Set Pressure Refer to Graph A.

#### **Rated Flowing Range**

4 inch . . . . . . . . . . 0 to 1000 gpm (DN100). . . . . . . . (0 to 3785 lpm)

### **Pressure-Reducing Pilot Valve**

With reference to Figure 5, the system water supply pressure from the inlet cavity of the DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve enters the Diaphragm Chamber through the diaphragm chamber supply line. A strainer, pilot line restrictor, and spring-loaded check valve are included in this line.

The restrictor provides the required orifice size for the supply line to the Diaphragm Chamber to optimize performance. Exit flow from the Diaphragm Chamber through the Pilot Valve is controlled by a regulating spring that is factory set, and subsequently field adjustable, to the desired downstream "set pressure" that is to be maintained.

	VALVE PARTS				
No.	Description	Qty.	Repair Parts		
1 2 3 4 5 6	Valve Body Diaphragm Diaphragm Cover. Flat Washer, M16 Hex Bolt, M16 x 50 mm. Hex Nut, M16	1 1 8 6	NR (a) NR CH CH CH		



**ORIENT** 

DIAPHRAGM TAB

**PERPENDICULAR** TO VALVE BODY

CENTERLINE

#### NOTES:

- 1. NR Not Replaceable
- 2. CH Common Hardware
- 3. Valve Body is equipped with studs
- V-Ring is attached to Diaphragm at factory. If, during internal valve inspection, V-Ring is discovered to be detached from Diaphragm, be advised that V-Ring is a required valve component and that detachment will not affect normal valve operation or performance. Should V-Ring become detached, reinstall between Diaphragm and Diaphragm Cover concentrically as shown.

**NOTE:** Do not apply adhesives, lubricants. or other substances to Diaphragm, V-Ring, or Valve Body.

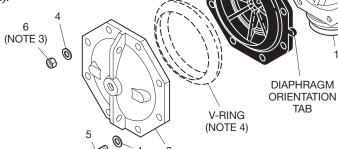


FIGURE 1 **DV-5 DELUGE VALVE ASSEMBLY** 

A sensing line connects the outlet of the Pilot Valve to the system piping downstream of the DV-5 Deluge Valve via the Pressure Sensor Insert in the outlet cavity (see detail in Figure 2). When the downstream pressure rises above the "set pressure" of the spring, exit flow from the Diaphragm Chamber through the Pilot Valve to the DV-5 Deluge Valve outlet cavity is stopped and pressure increases in the Diaphragm Chamber. When downstream pressure falls below the "set pressure" of the spring, exit flow from the Diaphragm Chamber through the Pilot Valve to the DV-5 outlet cavity resumes and pressure in the Diaphragm Chamber decreases. The regulated flow through the Pilot Valve decreases and increases the pressure in the diaphragm chamber to sufficiently open and close the DV-5 Deluge Valve, as required, to regulate the downstream "set pressure."

### Materials of **Construction**

### NOTICE

Trim components material provide corrosion resistance and are intended to extend the life of the TYCO DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, Limited Space Valve Cabinet when exposed to internal and external corrosive conditions. Although

these selections are intended to resist corrosion, it is recommended that the end user or other technical expert familiar with conditions at the proposed installation be consulted with respect to these selections for a given corrosive condition.

Systems using a seawater or brackish water supply require special consideration in order to extend the life of the Deluge Valve and Trim. This type of system ideally should be configured with a primary source of clean, fresh water (e.g., a pressurized water tank) and that only upon system operation is the secondary water supply (seawater or brackish water) allowed to enter the system. After the system operation, the system should be thoroughly flushed with clean, fresh water. Following this recommendation can increase the service life of the DV-5 Deluge Valve.

### **DV-5 Deluge Valve**

### **Body**

RILSAN polyamide 11 coated ductile iron per ASTM A536-77, Grade 65-45-12

### **Diaphragm Cover**

RILSAN polyamide 11 coated ductile iron per ASTM A536-77, Grade 65-45-12

### Diaphragm

Nylon fabric reinforced, natural rubber per ASTM D2000

### V-Ring

Natural rubber per ASTM D2000

**STUDS** 

(NOTE 3)

(NOTE 4)

### **Diaphragm Cover Fasteners** Galvanized carbon steel

#### **Pressure Gauge**

Bronze bourdon tube with brass socket

#### **Gauge Test Valve**

Bronze body per ASTM B584

### **Manual Control Station**

Corrosion-resistant copper alloys and glass filled PTFE seals; Thermoplastic enclosure

### **Automatic Drain Valve**

Brass body per ASTM B584, Type 440 stainless steel or brass per ASTM B134 ball, and galvanized steel inlet

### **Pilot Valve**

Brass body and Diaphragm of nylon reinforced rubber

### Spring-Loaded Check Valve Brass body and Buna-N seal

#### Y-Strainer

Bronze body per ASTM B584 and Type 304 stainless steel screen

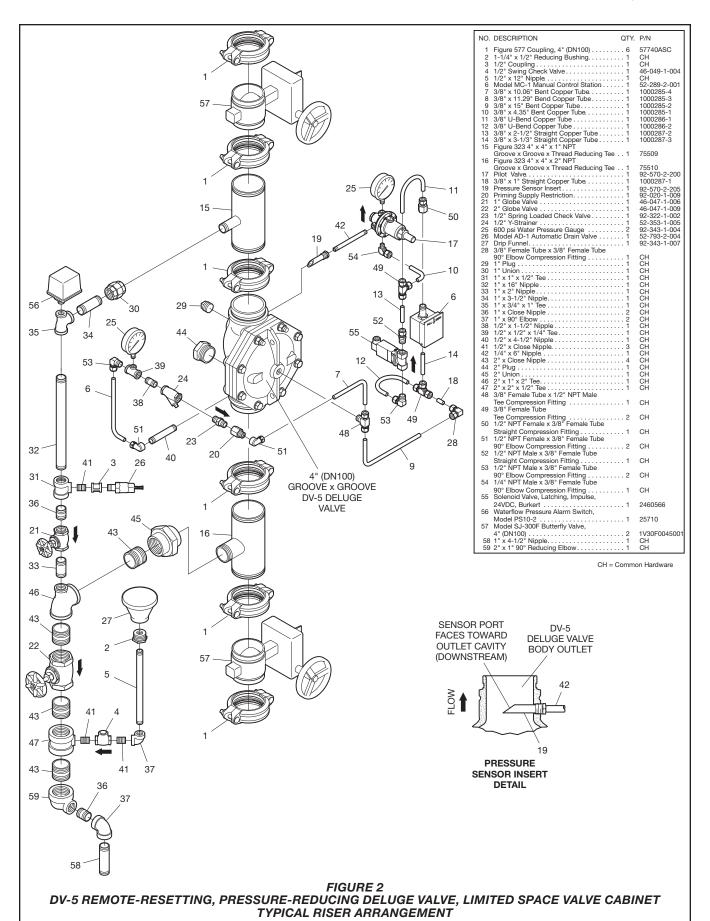
Bronze body per ASTM B584 with Nitrile disc for 1 Inch Valve; TEFLON disc for 2 Inch Valve

### **Tubing Fittings**

Brass per ASTM B16

### Tubina

Type L copper per ASTM B88



### **TFP1302** Page 4 of 10

### **Pipe Fittings**

Galvanized malleable iron per ANSI B16.3 or cast iron per ANSI B16.4

#### **Pipe Nipples**

Schedule 40 galvanized steel per ASTM A53 or A135

### Cabinet Stainless Steel

### Design Criteria

The following items must be considered and applied accordingly for TYCO DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, Limited Space Valve Cabinet installations.

### NOTICE

The owner is responsible to design into the system a releasing circuit such that the Solenoid Valve is properly configured to enable remote resetting where this functionality is desired.

The building owner must be informed of the capabilities and limitations of a remote-resetting system as it pertains to the possibility of an inadvertent manual closing of the DV-5 Deluge Valve during a fire condition. Therefore, the personnel responsible for the fire protection system must be fully trained with respect to system components and required actions in the case of an alarm.

The Control Panel, Detectors, and Pull Stations are to be installed in accordance with their laboratory listings and approval. The Solenoid Valve must be deemed compatible by the panel manufacturer.

At least one Electrical Pull Station is to be located adjacent to the Control Panel to facilitate manual remote operation of the system.

System piping is to be installed so that it is self-draining. TYCO Model AD-2 Automatic Drain Valves can be used to drain low sections of pipe as necessary. Refer to technical data sheet TFP1632.

### **Operation**

The Pilot Valve on the DV-5 Deluge Valve determines the system outlet pressure once the valve is tripped.

Regulated flow through the Pilot Valve decreases and increases the pressure in the Diaphragm Chamber sufficiently to open and close the DV-5 Deluge Valve, as required, to regulate downstream pressure. Refer to the Pressure-Reducing Pilot Valve section under Technical Data.

Initial activation of the Solenoid Valve due to electrical detection or activation of the electrical manual pull station results in voltage applied to terminals 2 and 3 of the Burkert solenoid valve as defined in Figure 3. The application of voltage results in the latched opening of the Solenoid Valve allowing water to flow from the Diaphragm Chamber pressure allows the Diaphragm to open, permitting water to flow into the system piping and to the Waterflow Pressure Switch.

To remotely reset the DV-5 Deluge Valve, the voltage to the Solenoid Valve must be transferred to the appropriate closed terminals on the Solenoid Valve (Figure. 3). This results in the latched closure of the Solenoid Valve, prohibiting continued flow of water from the Diaphragm Chamber, resulting in closing of the Deluge Valve. After resetting the electrical detection system or electrical manual pull station, ensure that the releasing circuit is returned to the open terminals, 2 and 3, for the system to be set for service.

### Installation

The TYCO DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, Limited Space Valve Cabinet must be installed in accordance with this section.

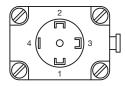
The Deluge Valve and its Cabinet must be maintained at a minimum temperature of 40°F (4.4°C).

Heat tracing of the DV-5 Deluge Valve or its Remote-Resetting, Pressure-Reducing Trim is not permitted. Heat tracing can result in the formation of hardened mineral deposits that are capable of preventing proper operation.

**Step 1.** Make all system and drain connections. Ensure suitable disposal of drain water. Direct drainage water to ensure that it will not cause accidental damage to property or danger to persons.

**Step 2.** Make conduit and electrical connections in accordance with the requirements of the authority having jurisdiction and/or the National Electrical Code (NFPA 70). (Refer to Figure 8.)

**Step 3.** For proper wiring of the Bürkert Type 5282 Solenoid Valve, refer to Figure 3.



#### DC CONNECTIONS:

TERMINAL 1 = CLOSED +
TERMINAL 2 = OPEN +
TERMINAL 3 = GND TERMINAL 4 = PROTECTIVE
CONDUCTOR CONNECTION (#)

### NOTICE

Note the voltage and current type as specified on the rating plate. The connection terminals in the device socket are identified with the numbers 1 to 3 according to the terminals on the valve.

FIGURE 3
BÜRKERT SOLENOID VALVE
ELECTRICAL CONNECTION
DIAGRAM

### Valve Setting Procedure

The TYCO DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, Limited Space Valve Cabinet must be set in accordance with the following instructions:

**Step 1.** Ensure the System Shut-Off Valve, Main Control Valve, and System Drain Valve are closed.

**Step 2.** Ensure the Manual Control Station and Solenoid Valve are closed.

**Step 3.** Open the Main Drain Valve slowly and only a small amount.

Step 4. With the System Shut-Off Valve closed, slowly open the Main Control Valve

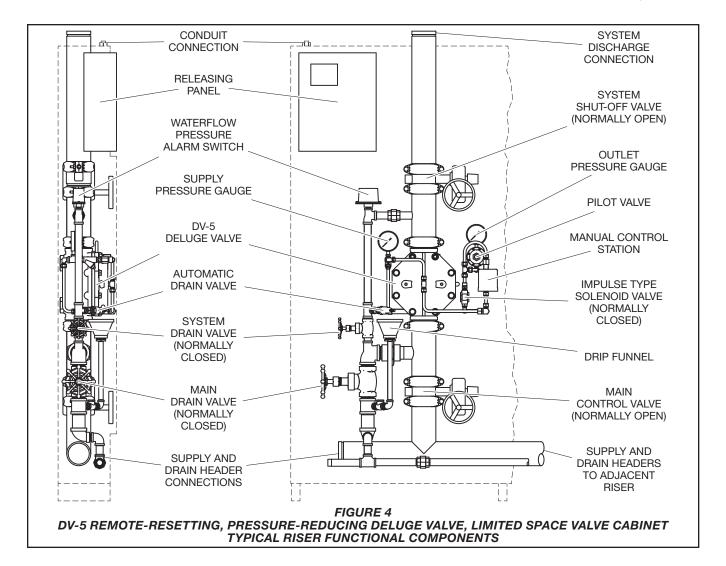
**Step 5.** Slowly close the Main Drain Valve to ensure that no trapped air exists below the Diaphragm Chamber.

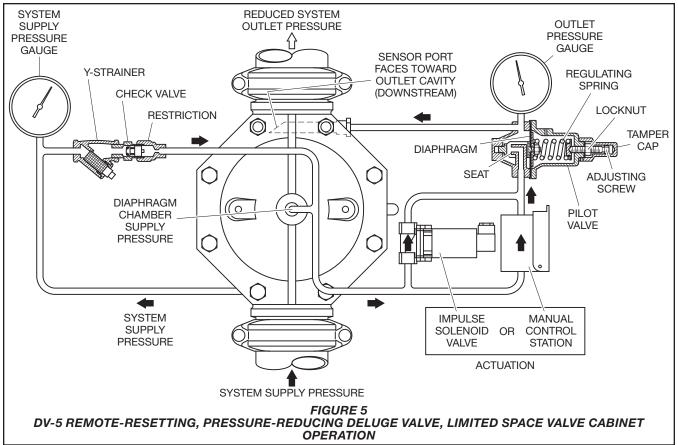
**Step 6.** Note the Supply Pressure Gauge.

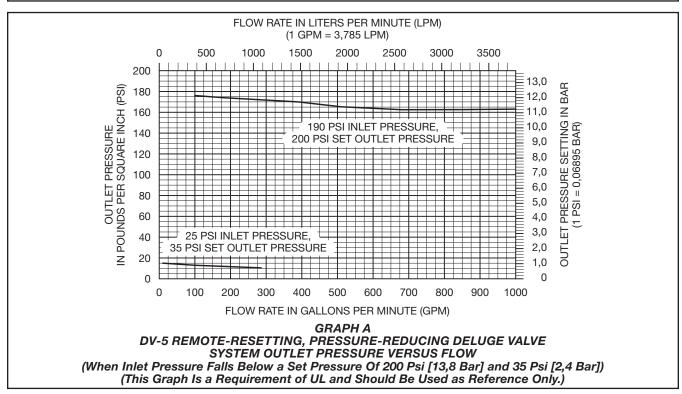
**Step 7.** Check the Automatic Drain Valve for leakage. Correct any leaks before proceeding to the next step.

**Step 8.** Slowly open the System Shut-Off Valve.

The DV-5 Deluge Valve is now set for service.







Dim.	Inches	mm
Α	4	DN100
В	4	DN100
С	2	DN50
D	37	940
Е	65	1650
F	10-1/2	267
G	80-1/4	2038
Н	57	1447
J	12	310
K	4	102
L	25-1/2	648

Dim.	Inches	mm
М	17-3/4	451
N	4-1/2	114
Р	14	356
Q	25	635
R	48-1/4	1226
Т	33	838
U	16	406
V	12	310
W	1	25
Χ	51-1/2	1310
Υ	24-3/4	630

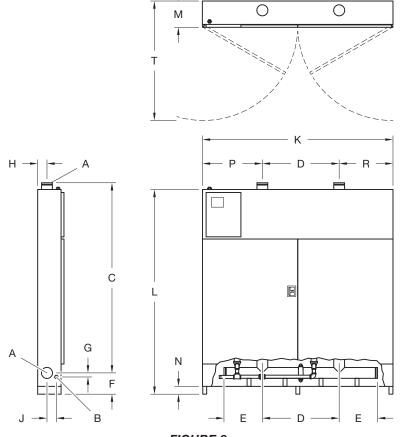
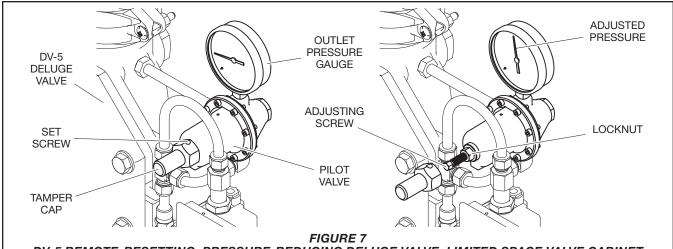


FIGURE 6 DV-5 REMOTE-RESETTING, PRESSURE-REDUCING DELUGE VALVE, LIMITED SPACE VALVE CABINET NOMINAL INSTALLATION DIMENSIONS



## DV-5 REMOTE-RESETTING, PRESSURE-REDUCING DELUGE VALVE, LIMITED SPACE VALVE CABINET SYSTEM OUTLET PRESSURE PILOT VALVE ADJUSTMENT

### Pilot Valve Pressure Adjustment Procedure

After any downstream pressure adjustment, the following items are to be recorded and attached to the valve:

- · Valve installation location
- Inlet static pressure
- · Inlet residual pressure
- · Outlet residual pressure
- Intended outlet flow

To adjust the pressure, set the valve according to the Valve Setting Procedure described in this data sheet, then follow the steps below. (Refer to Figure 7, as needed.)

**Step 1.** To set the pressure in the field, trip the valve manually.

**Step 2.** Remove Tamper Cap on Pilot Valve by first loosening the Set Screw and unscrewing the Tamper Cap.

**Step 3.** Loosen the Lock Nut on the Adjusting Screw of the Pilot Valve.

**Step 4.** Observe the Outlet Pressure Gauge for changes. The valve needs time to reach the new set point after changing pressure. Turn the Adjusting Screw 1/2 a turn at a time until reaching the desired pressure.

**Step 5.** Turn the Adjusting Screw clockwise to increase outlet pressure or counterclockwise to decrease outlet pressure.

**Step 6.** After the desired performance, tighten the Lock Nut.

**Step 7.** Replace the Tamper Cap and tighten the Set Screw.

**Step 8.** Ensure that the system is properly drained by closing the Main Control Valve, then opening the System Drain Valve and Main Drain Valve. Finally, check any low point drains in the system.

**Step 9.** Follow Valve Setting Procedure to set valve in service.

### Care and Maintenance

TYCO DV-5 Remote-Resetting, Pressure-Reducing Deluge Valves must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection systems from the proper authorities and notify all personnel who may be affected by this action. Reset the DV-5 Deluge Valve in accordance with the Valve Setting Procedure section.

Perform the following procedures and inspections as indicated, in addition to any specific requirements of the authorities having jurisdiction. Correct any impairment immediately.

Some procedures outlined in this section result in operation of the associated alarms. Consequently, notify the owner and the fire department, central station, or other signal station to which

the alarms are connected before performing the tests.

### NOTICE

When the system is using either a seawater or brackish water supply, internal and external inspection of the DV-5 Deluge Valve is essential. Parts showing any signs of corrosion must be replaced to ensure the integrity of the system.

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

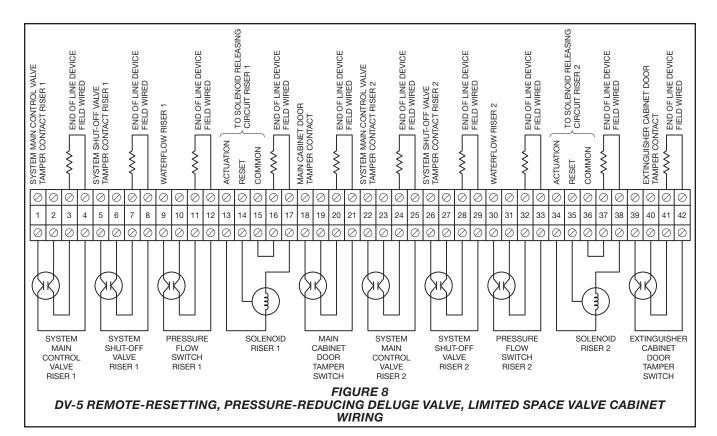
Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Prior to performing inspection and/or maintenance procedures, it is recommended that those individuals responsible for the care and maintenance of the DV-5 Deluge Valve develop a working understanding of the system in general. These instructions, as well as individual instructions for the Deluge Valve, Solenoid Valve, Manual Control Station, switches, and pressure maintenance devices, should be reviewed.

Removing the System from Service Refer to Figure 4.

Step 1. Close the Main Control Valve.

**Step 2.** Open the System Drain Valve and Main Drain Valve and drain the system.



### **Full Flow Operational Test**

To verify proper operation of the DV-5 Deluge Valve with Remote-Resetting, Pressure-Reducing Trim (i.e., valve opening during a fire condition) take the following steps (refer to Figure 4):

- **Step 1.** Test Releasing Panel in accordance with the manufacturer's instructions to activate the solenoid valve.
- **Step 2.** Verify that the DV-5 Valve has tripped, as indicated by the flow of water into the system. Also verify all alarms from the Releasing Panel. Ensure the integrity of the piping and verify that none of the sprinklers/nozzles have been obstructed. Also, compare the outlet pressure to the previous full flow trip test.
- **Step 3.** Once the above conditions have been verified, close the system's Main Control Valve.
- **Step 4.** Drain the system by opening the System Drain Valve and the Main Drain Valve. Also open any auxiliary drains, if applicable.
- **Step 5.** Follow the Valve Setting Procedure to return the valve to service.

Trip Test That Does Not Necessitate Discharge in the Protection Area

**Step 1.** Close the System Shut-Off Valve.

- **Step 2.** Test Releasing Panel in accordance with the manufacturer's instructions to activate the solenoid valve.
- **Step 3.** Verify that the DV-5 Valve has tripped, as indicated by the Waterflow Pressure Alarm Switch.
- **Step 4.** Once alarms have been verified, close the system's Main Control Valve.
- **Step 5.** Drain the section of piping above the Deluge Valve by opening the System Drain Valve and Main Drain Valve. Ensure the Main Control Valve is closed, and open the System Shutoff Valve.
- **Step 6.** Follow the Valve Setting Procedure to return the valve to service.

Waterflow Alarm Test Procedure
Step 1. Close the System Shut-Off

- Valve
  Step 2. Open System Drain Valve.
- Step 3. Verify Waterflow Pressure
- Step 4. Close Main Control Valve.
- **Step 5.** Drain the section of piping above the Deluge Valve by opening the System Drain Valve and Main Drain Valve. Ensure the Main Control Valve is closed, and open the System Shutoff Valve.
- **Step 6**. Follow the Valve Setting Procedure to return the valve to service.

### **Internal Valve Inspection**

Once every five years during the annual operational test procedure and prior to the DV-5 Deluge Valve being reset, the interior of the Deluge Valve must be cleaned and inspected for wear and damage. Damaged or worn parts must be replaced. (Replacement of the Diaphragm every ten years is recommended, or more frequently if inspections and/or wear and tear warrant more frequent replacement.)

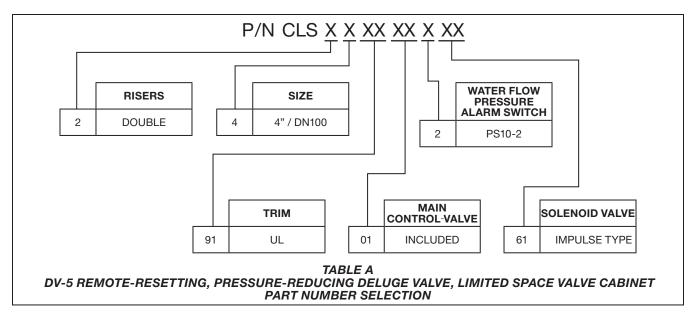
When reinstalling the Diaphragm Cover, the Diaphragm Cover Fasteners must be uniformly and securely tightened using a cross-draw sequence.

After tightening, double check to make certain that all of the Diaphragm Cover Fasteners are securely tightened.

#### **NOTES:**

If the water supply contains chemicals which tend to attack a Nylon fabric-reinforced, natural rubber or the five year inspection indicates a buildup of debris within the Deluge Valve that could affect its proper operation, then the frequency of the internal valve inspection procedure must be appropriately increased. If the system has a seawater or brackish water supply, then the frequency of the internal valve inspection procedure must be appropriately increased. (An annual internal valve inspection for a system having a seawater or brackish water supply is recommended.)

### **TFP1302** Page 10 of 10



With reference to Figure 1, make certain that the Diaphragm is correctly oriented; otherwise, the DV-5 Deluge Valve cannot be properly set.

Under-tightening the Diaphragm Cover Bolts can result in internal and external leakage.

The V-Ring is attached to the Diaphragm at the factory. If, during an internal valve inspection, the V-Ring is discovered to be detached from the Diaphragm, be advised that the V-Ring is a required valve component and that detachment will not affect normal valve operation or performance. Should the V-Ring become detached, reinstall it between the Diaphragm and Diaphragm Cover concentrically as shown in Figure 1.

**NOTE:** Do not apply adhesives, lubricants, or other substances to the Diaphragm, V-Ring, or Valve Body.

# Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

### Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product description and Part Number (P/N).

### DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, Limited Space Valve Cabinet

Specify: Size (specify), Fully Assembled DV-5 Remote-Resetting, Pressure-Reducing, Deluge Valve, Limited Space Valve Cabinet P/N (specify):

#### Accessories

Specify (description) for use with the Fully Assembled DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, P/N (specify):

### Replacement Parts

Specify (description) for use with (size) DV-5 Remote-Resetting, Pressure-Reducing Deluge Valve, P/N (specify). (Refer to Figure 2.)



