



without Built-In Releasing Control Panel

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

Serial Number _____

Date of Installation _____ **Date of Commissioning** _____



UNITED Fire Systems

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Kenilworth, NJ USA 07033
908-688-0300

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Manual Part Number 10-500002-00N

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HAZARD IDENTIFICATION

Carefully read, understand, and follow instructions identified by these symbols.



The use of the word “DANGER” identifies an immediate hazard with a likelihood of death or serious personal injury if instructions, including recommended precautions, are not followed.



The use of the word “WARNING” identifies the presence of hazards or unsafe practices that could result in death, personal injury, or serious property damage if instructions, including recommended precautions, are not followed.



The use of the word “CAUTION” identifies possible hazards or unsafe practices that could result in personal injury or property damage if instructions, including recommended precautions, are not followed.



The use of the word “IMPORTANT” identifies special instructions, not related to hazards, that should be followed.

FOREWORD

This manual is written for those who install, operate and maintain **UNITED Fire Systems PREACTION-PAC™** sprinkler valve assemblies. The manual contains installation, operation, and maintenance information for these assemblies.



IMPORTANT

UNITED Fire Systems assumes no responsibility for the installation, operation, or maintenance of any systems other than those addressed in this manual. The data contained in this manual is for information purposes only. **UNITED Fire Systems** believes this data to be accurate at the time of publication, but the data is published and presented without any guarantee or warranty whatsoever. **UNITED Fire Systems** disclaims any liability for any use that may be made of the data and information contained in this manual by any and all parties.



IMPORTANT

The **UNITED Fire Systems PREACTION-PAC™** sprinkler valve assembly is a vital part of the fire protection of any facility where these units are installed. Life safety and property protection depends on continuing proper operation of the assembly. The owner of the **PREACTION-PAC™** is responsible for the condition of the assembly and its continued proper operation. **UNITED Fire Systems** strongly recommends that all owners of **PREACTION-PAC™** engage the services of qualified, trained fire protection professionals to design the system containing the assembly, and to install and maintain the assembly.

UNITED Fire Systems PREACTION-PAC™ sprinkler valve assemblies are to be installed and maintained by qualified, trained personnel in accordance with:

- This Installation, Operation, and Maintenance Manual P/N 10-500002-00N.
- National Fire Protection Association No. 13, “Standard for the Installation of Sprinkler Systems.”
- National Fire Protection Association No. 25, “Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.”
- National Fire Protection Association No. 70, “National Electrical Code®”.
- National Fire Protection Association No. 72, “National Fire Alarm Code®”.

Any questions on the information in this manual should be addressed to:

UNITED Fire Systems
1 Mark Road
Kenilworth, NJ USA 07033
908-688-0300
www.unitedfiresystems.com



LIMITED WARRANTY PREACTION-PAC™



What Does This Warranty Cover?

This Limited Warranty covers all manufacturing defects in material and workmanship in all equipment supplied by **UNITED Fire Systems** for new **PREACTION-PAC™** sprinkler valve assemblies.

How Long Does The Coverage Last?

This Limited Warranty lasts for either eighteen (18) months from the date of shipment to the original purchaser or twelve (12) months from the date of commissioning by **UNITED Fire Systems** or a trained distributor, whichever comes first.

What Will **UNITED Fire Systems** Do?

UNITED Fire Systems will repair, replace, or refund the purchase price of, at its option, any defective **PREACTION-PAC™** equipment at no charge.

What Does This Warranty Not Cover?

- Equipment that is not supplied by **UNITED Fire Systems** is not covered.
- Equipment that has not been installed, commissioned, operated, and maintained per the instructions in the applicable **UNITED Fire Systems** instruction manual is not covered.
- Equipment that has been repaired, modified, or otherwise tampered with not in accordance with the applicable **UNITED Fire Systems** instruction manual is not covered.
- Any problem that is caused by abuse, misuse, or an act of God (such as a flood) is not covered.
- Transportation and shipping charges to return equipment to **UNITED Fire Systems** or for **UNITED Fire Systems** to return repaired or replacement equipment are not covered.
- Consequential and incidental damages are not covered. Some states do not allow the exclusion or limitation of incidental or consequential damages, so this exclusion may not apply.

What Are The Customer's Responsibilities?

- Ensuring that the **UNITED Fire Systems** equipment is installed, commissioned, operated, and maintained per the instructions in the applicable **UNITED Fire Systems** instruction manual.
- Where applicable, ensuring that checklists supplied by **UNITED Fire Systems** are properly used and completed at the time of installation, commissioning, operation, and maintenance, and such checklists are retained as records of proper completion.
- Noting and recording the serial number(s) of **UNITED Fire Systems** equipment.
- Notifying **UNITED Fire Systems** or a trained distributor of the need for service under this Limited Warranty.

How Is Warranty Service Obtained?

If anything goes wrong with **UNITED Fire Systems** equipment, contact:

UNITED Fire Systems
Division of United Fire Protection Corporation
1 Mark Road
Kenilworth, NJ 07033 USA
Phone: 908-688-0300
Fax: 908-481-1131
www.unitedfiresystems.com

= OR =

Your
Trained
Distributor

Be prepared to supply the serial number(s) of the equipment requiring service, and copies of the installation, commissioning, and maintenance checklists, as applicable.



LIMITED WARRANTY PREACTION-PAC™



Is This Limited Warranty Transferable?

If the **PREACTION-PAC™** equipment is moved from one to another installation during the time period of Limited Warranty coverage, the **PREACTION-PAC™** equipment must be re-commissioned by **UNITED Fire Systems** or a trained distributor to be eligible for continuing coverage. There will be a quoted charge for this re-commissioning.

Is This The Entire Warranty?

This Limited Warranty is the entire warranty given by **UNITED Fire Systems** to the purchaser of new **PREACTION-PAC™** equipment. Component warranties supplied by component manufacturers to **UNITED Fire Systems** that are valid for a longer period of time than the **UNITED Fire Systems** Limited Warranty may apply. Contact **UNITED Fire Systems** for more information. There are no other warranties expressed or implied, beyond those required by law.

How Do State and Federal Laws Apply?

This Limited Warranty grants specific legal rights per Federal law. There may also be other rights which vary from state to state.

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**Figure 1 –
PREACTION-
PAC™ Shown
With Enclosure
Doors Closed**

1. GENERAL

1.1. Introduction. The **UNITED Fire Systems PREACTION-PAC™** is a fully assembled and factory tested preaction fire suppression system, including preaction valve, and trim, providing one complete zone of preaction water sprinkler fire protection. All components are contained in two steel enclosures assembled one above the other. The system pressure gauges and the required manual release handle are mounted on the front of the lower enclosure. The system electrical connection terminal strip, compressor disconnect switch (where applicable), and spare sprinkler head storage are behind a door in the upper enclosure. Lockable latches on both doors permit authorized access to all system components. Both enclosures are finished in powder-coat red paint. Gasketing provides sealing of the enclosure doors. Knockouts permit easy attachment of external electrical conduits.

1.1.1. Preaction Valve. The preaction valve installed in the **PREACTION-PAC™** is a low-differential, latched clapper valve that uses a unique direct-acting diaphragm to separate the system water supply from the system piping. The positive latching system uses the supply water pressure to hold the clapper shut. When the water pressure in the diaphragm chamber is released, the latch retracts from the clapper and the valve actuates. The low differential and unique latch and actuator design of the valve allows the valve to be self-resetting.

1.1.2. Piping. Water inlet pipe connections are located on the lower left and lower right sides of the lower enclosure. The unused inlet is left plugged. Grooved pipe is used for the inlet connection. The water outlet pipe connection is located at the top center of the lower enclosure, behind the upper enclosure. The drain connection is accessible within the lower enclosure, and knockouts are provided allowing exit of the drain from either side. All pipe connections are done in the lower enclosure.

1.1.3. Wiring. All wiring from the integral terminal strip to the valve solenoid and all switches is factory installed and tested. Where applicable, wiring for compressor power and control is also factory installed and tested. All field wiring for compressor power, switch contacts, and the preaction valve solenoid is connected to a terminal strip in the upper enclosure. No access to the lower enclosure is necessary to complete the wiring installation.

1.1.4. Compressor. For assemblies equipped with a compressor for air pressurization of the preaction sprinkler piping, all wiring and adjustments are performed at the factory. Three sizes of compressor are available, depending on the volume of installed piping to be pressurized. The compressor is mounted using molded rubber mounts and bushings to minimize noise and vibration during motor operation. A compressor disconnect switch is located in the upper enclosure.

1.1.5. Pressure Maintenance Device. Assemblies are equipped with a pressure maintenance device when the source of the supervisory gas is external of the **PREACTION-PAC™**, such as a tank-mounted air compressor or a nitrogen generator. A blank plate replaces the compressor disconnect switch.

1.2. Features

1.2.1. Attractive and rugged metal enclosure. The entire enclosure is manufactured from steel with continuous welded seams. The lower enclosure is 12 gauge, while the upper enclosure is 14 gauge. Both enclosures are coated with red powder-coat paint inside and out. Continuous piano-style hinges attach the doors to the enclosures.

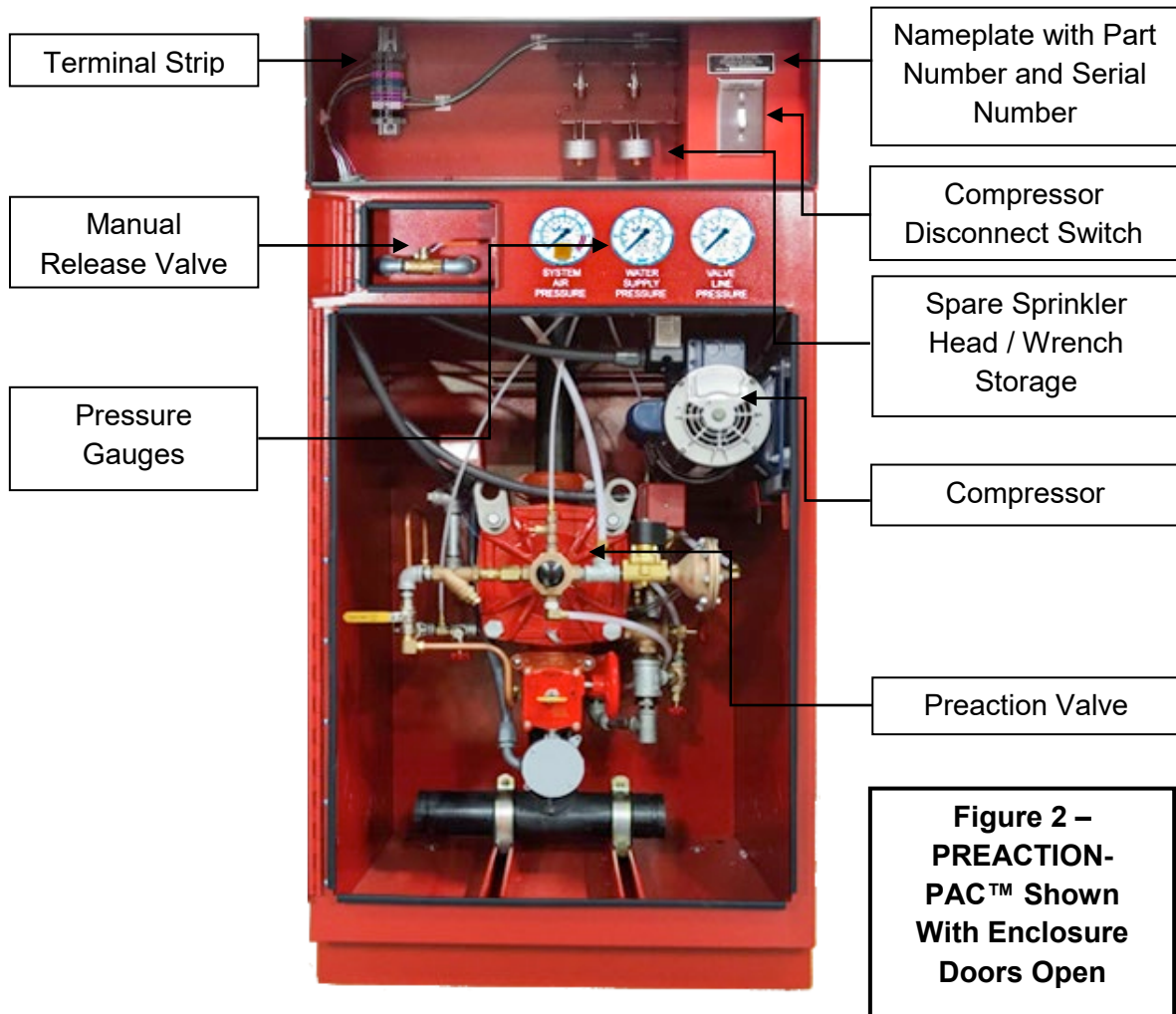
1.2.2. Easy-to-see gauges on front of enclosure. Three pressure gauges are mounted on the front of the lower enclosure, and are visible at all times. These gauges monitor the air pressure in the system piping, the water supply pressure up to the preaction valve, and the water pressure keeping the valve clapper piston closed.

1.2.3. Easy access to manual release valve. The emergency manual release ball valve is located behind a small unlocked door on the front of the lower enclosure. Operation of this ball valve opens the preaction valve, filling the system piping with water. No power is necessary to accomplish this

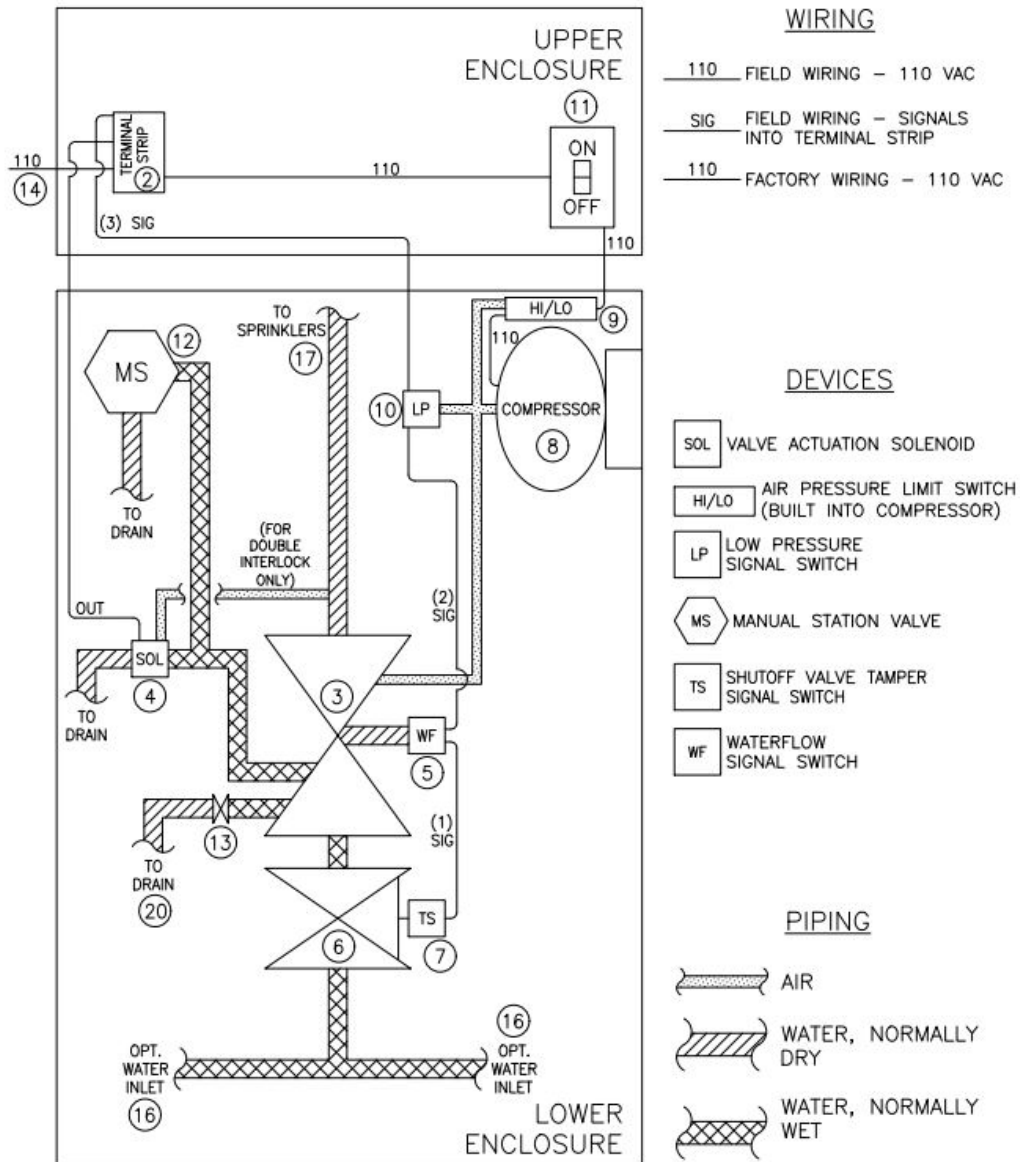
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operation. The key for the lower enclosure main door does not have to be available to accomplish this operation.

- 1.2.4.**Water inlet connections. The water inlet piping may attach to the lower enclosure near the bottom on either side.
- 1.2.5.**Space for required spare sprinkler heads and wrench. As required by NFPA 13, a built-in storage location for spare sprinkler heads and a sprinkler wrench is behind the door of the upper enclosure.
- 1.2.6.**Separate mechanical and electrical enclosures. This allows mechanical and electrical trades to keep their work areas separate.



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**Figure 3a – Diagram –
Functional Description with Compressor**

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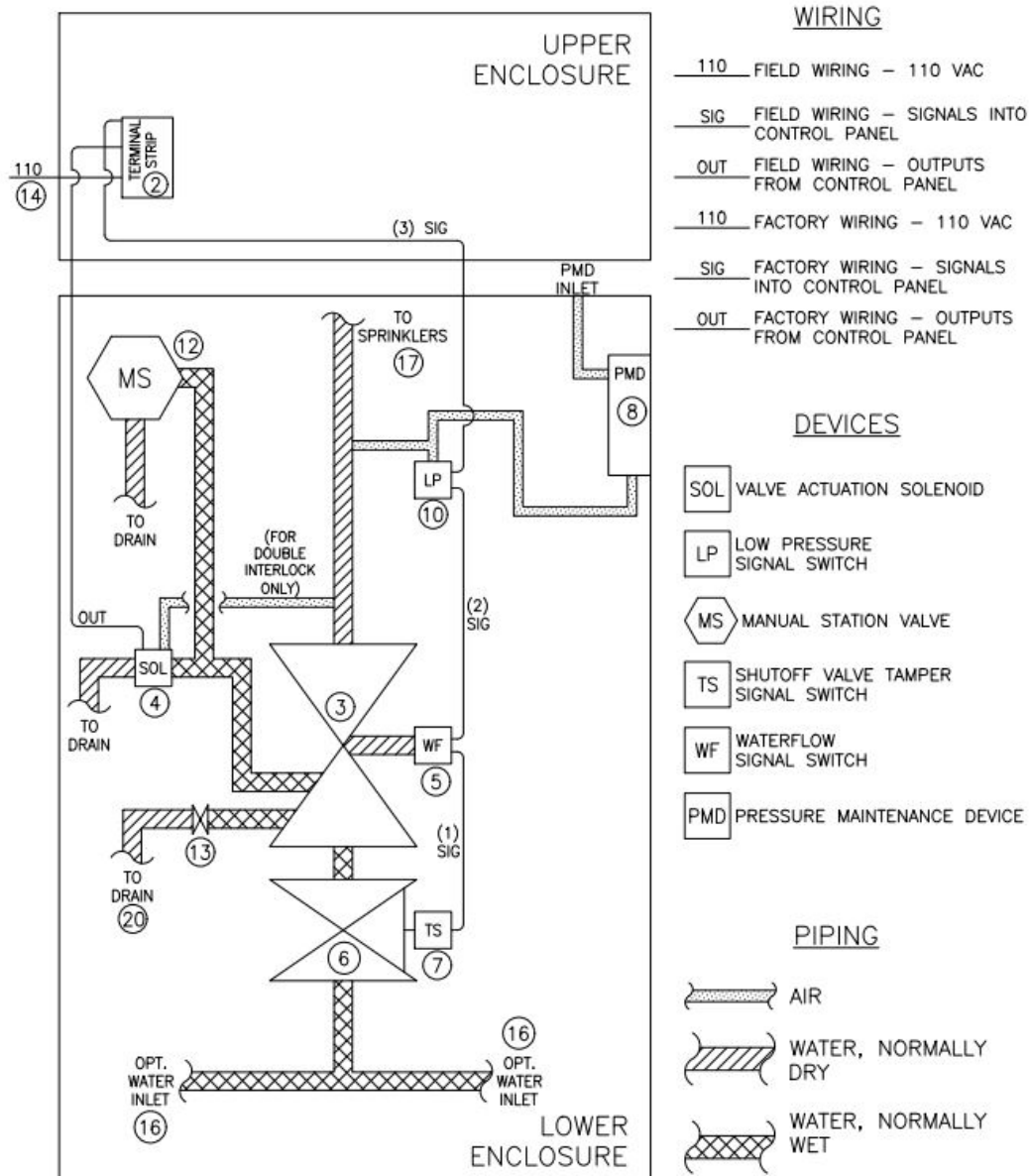


Figure 3b – Diagram –
Functional Description with Pressure Maintenance Device

1.3. Functional Description. Refer to Figure 3a on page 4 and Figure 3b on page 5.

- 1.3.1. Terminal strip (2).** The terminal strip provides a convenient point for landing the required field wiring.
- 1.3.2. Preaction valve (3).** The preaction valve is the heart of the assembly. The valve holds back the sprinkler water until the field-installed control panel reacts to the signal from the fire detectors and sends a signal to the valve actuation solenoid (4). In single-interlock assemblies, actuation of the valve actuation solenoid (4) sends water into the sprinkler pipe. In double-interlock assemblies, fusing of a sprinkler head from heat is required, along with valve actuation solenoid (4) actuation, to send water into the sprinkler pipe. Refer to Tyco Manual TFP1421 in Section 2 for more detailed information on the preaction valve.
- 1.3.3. Valve actuation solenoid (4).** The valve actuation solenoid receives the signal from the field-installed control panel, and actuates the preaction valve (3). The solenoid is the Victaulic Series 753-E, and is rated at 24VDC, 0.364 amps, 8.7 watts, 66 ohms. The solenoid is FM Approved under Group I (as in India). Refer to Tyco Manual TFP1421 in Section 2 for more detailed information.
- 1.3.4. Waterflow signal switch (5).** The waterflow signal switch responds to waterflow in the pipe downstream of the preaction valve (3). The switch contains Quantity 2, SPDT switches, rated at 10A-125/250VAC, 1/2HP, 2.5A-6/12/24VDC. Contacts transfer when water flow begins after preaction valve opens. Contacts automatically restore when waterflow ceases. The switch sends a signal to the field-installed control panel.
- 1.3.5. Manual shutoff valve (6).** The manual shutoff valve is used to shut off the flow of water after actuation of the preaction valve (3). The normal position of this valve when the system is in service is open. Refer to Tyco Manual TFP1421 in Section 2 for more detailed information on the use of this valve.
- 1.3.6. Shutoff valve tamper signal switch (7).** The shutoff valve tamper signal switch sends a supervisory signal to the field-installed control panel when the manual shutoff valve (6) is closed. The switch contains Quantity 2, SPDT switches, rated at 10A-125/250VAC, 0.5A-125VDC. Contacts transfer when valve begins to close. Contacts restore when valve is fully open.
- 1.3.7. Compressor (8).** The compressor supplies supervisory air pressure to fill the sprinkler pipe downstream of the preaction valve (3). The sprinkler pipe is pressurized to 13 PSIG minimum and 18 PSIG maximum by the compressor (8). Loss of this pressure, from damage to the pipe or a sprinkler head, results in a supervisory signal at the field-installed control panel.
- 1.3.8. Pressure Maintenance Device (8).** The pressure maintenance device supplies supervisory gas pressure, from either a tank-mounted air compressor or nitrogen generator, to fill the sprinkler pipe downstream of the preaction valve (3). The sprinkler pipe is pressurized to 15 PSIG by the pressure maintenance device (8). Loss of this pressure, from damage to the pipe or a sprinkler head, results in a supervisory signal at the field-installed control panel.
- 1.3.9. High / low air pressure limit switch (9).** The high / low air pressure limit switch is built in to the compressor (8). When pressure in the pipe falls below 13 PSIG, the switch turns the compressor (8) on. When pressure in the pipe rises to 18 PSIG, the switch turns the compressor (8) off.
- 1.3.10. Low pressure signal switch (10).** The low pressure signal switch sends the supervisory signal for low pressure to the field-installed control panel. The switch contains Quantity 2, SPDT switches, rated at 10A-125/250VAC, 1/2HP, 2.5A-6/12/24VDC. Contacts transfer when pressure in the piping falls below 13PSIG. Contacts automatically restore when pressure rises above 13PSIG.
- 1.3.11. Compressor disconnect switch (11).** Where applicable, the compressor disconnect switch is used to manually interrupt the 110VAC power to the compressor motor, during inspection, maintenance, and resetting of the assembly. Only trained personnel should use this switch. The normal position of this switch when the system is in service is ON.
- 1.3.12. Manual station valve (12).** The manual station valve is located behind a separate door on the front of the lower enclosure. No key is needed to open this door. To manually open the preaction

valve (3), open the door and pull the lever on the manual station valve forward. The preaction valve (3) will open, and the sprinkler pipe will fill with water. No power is needed to manually open the preaction valve (3) in this manner.



IMPORTANT

Fusing of a sprinkler head by heat is necessary for water to be discharged onto a fire, even after operation of the manual station valve.

- 1.3.13. Drain valve (13).** The drain valve is used to drain the sprinkler pipe after actuation of the preaction valve (3). This valve is used only during inspection, maintenance, and resetting of the assembly. Only trained personnel should use this valve. Refer to Tyco Manual TFP1421 in Section 2 for more detailed information on this valve. The normal position of this valve is closed.
- 1.3.14. Input connection for 110 VAC power (14).** 110VAC is required to power the assembly. This power shall come from a source in compliance with all applicable codes and standards. Internal wiring (factory assembled) takes this power to the compressor (8). Refer to Section 1.10 for additional information on this connection.
- 1.3.15. Water inlet connection (16).** The sprinkler water supply is field-connected to this connection. One of two optional water inlet connections may be chosen. The connection may be made on the lower right of the assembly, or by removing the cap, the connection may be made on the lower left of the assembly. Refer to Section 1.10 and Section 2 – Tyco Manual TFP1421 for more detailed information on this connection.
- 1.3.16. Outlet connection to fire sprinklers (17).** The outlet connection from the assembly to the fire sprinklers is field-connected to this connection. The connection is located in the top center of the lower enclosure, behind the upper enclosure. Refer to Section 1.10 and Section 2 – Tyco Manual TFP1421 for more detailed information on this connection.
- 1.3.17. Drain connection (20).** Drain water from the assembly must be piped away to a drain. The drain piping may be connected to the assembly on the left or the right side. Refer to Section 1.10 and Section 2 – Tyco Manual TFP1421 for more detailed information on this connection.
- 1.3.18. Output connections to field-installed control panel.** These connections are:
- 1.3.18.1. Valve actuation solenoid (4).** The solenoid is to be connected to the releasing output of an FM Approved releasing control panel. The solenoid is the Victaulic Series 753-E, and is rated at 24VDC, 0.364 amps, 8.7 watts, 66 ohms. The solenoid is FM Approved under Group E.
- 1.3.18.2. Waterflow signal switch (5).** Quantity 2, SPDT switches, rated at 10A-125/250VAC, 1/2HP, 2.5A-6/12/24VDC. Contacts transfer when water flow begins after preaction valve opens. Contacts automatically restore when waterflow ceases. One contact should be connected to signal field-installed control panel, which should respond with ALARM signal.
- 1.3.18.3. Shutoff valve tamper signal switch (7).** Quantity 2, SPDT switches, rated at 10A-125/250VAC, 0.5A-125VDC. Contacts transfer when manual shutoff valve is closed. Contacts automatically restore when shutoff valve is manually re-opened. One contact should be connected to signal field-installed control panel, which should respond with SUPERVISORY signal.
- 1.3.18.4. Low pressure signal switch (10).** Quantity 2, SPDT switches, rated at 10A-125/250VAC, 1/2HP, 2.5A-6/12/24VDC. Contacts transfer when pressure less than 13 PSIG is sensed in the sprinkler pipe. Contacts automatically restore when compressor restores pressure above 13 PSIG. One contact should be connected to signal field-installed control panel, which should respond with SUPERVISORY signal.

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1.4. Configurations. **UNITED Fire Systems PREACTION-PAC™** sprinkler valve assemblies are available in the following configurations:

1.4.1. Valve sizes: 2" through 4".

1.4.2. Valve types: Single-interlock and double-interlock available in all valve sizes.

1.4.3. Supervisory gas sources:

1.4.3.1. For 2" valves: 1/6HP compressor and pressure maintenance device available.

1.4.3.2. For 3" and 4" valves: 1/6HP, 1/3HP, and 1/2HP compressors and pressure maintenance device available.

1.4.3.3. Gas sources are capable of pressurizing piping systems up to the following limits:

1.4.3.3.1. 1/6HP compressor: maximum system capacity is 290 gallons.

1.4.3.3.2. 1/3HP compressor: maximum system capacity is 475 gallons.

1.4.3.3.3. 1/2HP compressor: maximum system capacity is 780 gallons.

1.4.3.3.4. Pressure maintenance device: Refer to manual of the external source.

1.5. Options - None at this time.

1.6. Approvals. **UNITED Fire Systems PREACTION-PAC™** sprinkler valve assemblies, as listed in this Manual, are Approved by FM Approvals under the heading "Automatic Water Control Valves." See pages 11 and 12 for Approved assemblies. NOTE: Although most **PREACTION-PAC™** assemblies are FM Approved, custom-built units are supplied from time to time upon request. Various components within these custom assemblies maintain their individual approvals, but these custom assemblies are not FM Approved as a unit.

1.7. Applicable Standards. **UNITED Fire Systems PREACTION-PAC™** sprinkler valve assemblies are to be installed and maintained by qualified, trained personnel in accordance with:

1.7.1. National Fire Protection Association No. 13, "Standard for the Installation of Sprinkler Systems."

1.7.2. National Fire Protection Association No. 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems."

1.7.3. National Fire Protection Association No. 70, "National Electrical Code®".

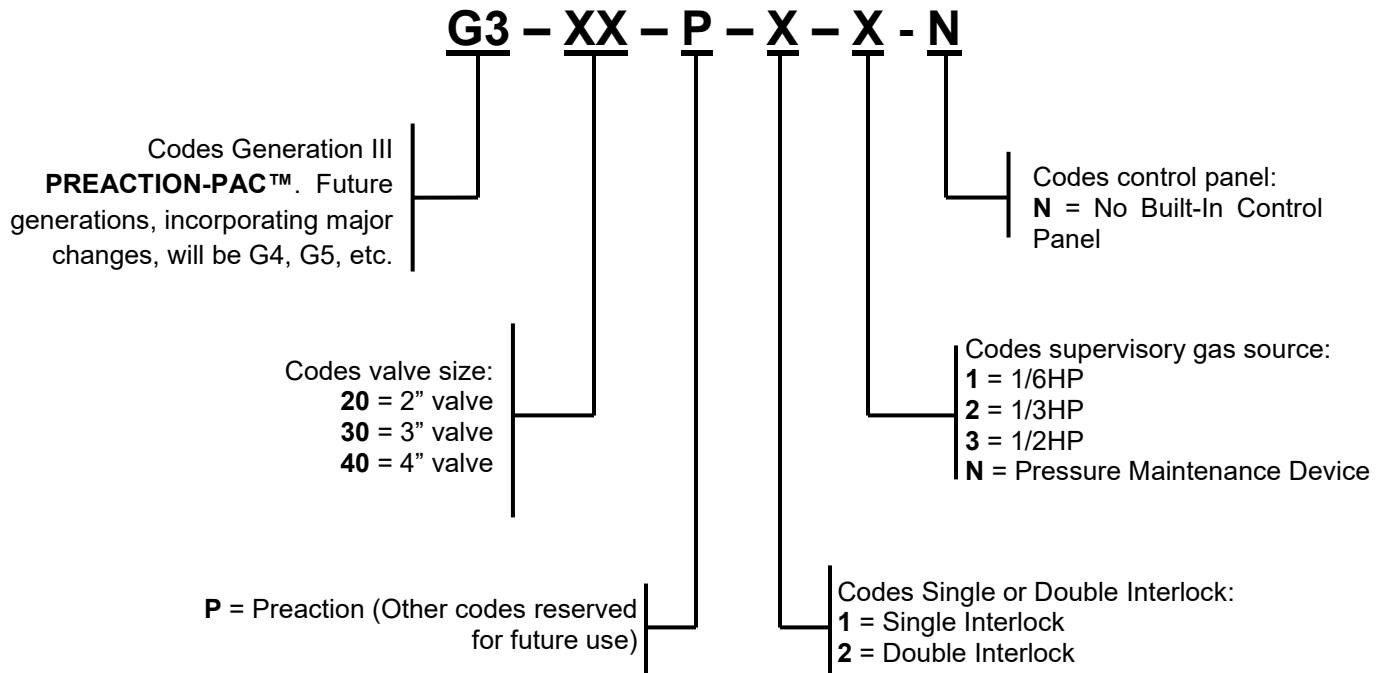
1.7.4. National Fire Protection Association No. 72, "National Fire Alarm Code®".

1.8. Applicable Manuals. Manuals supplied by the manufacturers of components used in **UNITED Fire Systems PREACTION-PAC™** assemblies are included with this manual. In some cases, these manuals contain references that are **NOT APPLICABLE** to **PREACTION-PAC™** assemblies. The following tables detail these NOT APPLICABLE items. Care should be taken to be clear on what is applicable and what is not when referring to these manuals for installation, operation, inspection, and maintenance instructions.

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1.9 FM Approved Assemblies

Part Number Coding:



PREACTION-PAC™ assemblies with indicated part numbers are FM Approved. From time to time, custom-built units are supplied upon request. The components in these custom-built units retain their individual approvals, but these custom-built units are not FM Approved.

All FM Approved systems require the installation of an FM Approved preaction control panel.

When the **PREACTION-PAC™** is installed where FM Global is an AHJ, follow the requirements of FM Approvals Class Numbers 1011, 1012, 1013 and FM Global Property Loss Prevention Data Sheet 5-40 dated 2007, especially:

- Alarm control panels for automatic release of preaction sprinkler systems are required to have 90 hours of secondary power followed by 10 minutes of release power and alarm operation.
- Include the installation of Class A (Style D or E) initiating device circuits. All FM Approved systems / installations must be configured as Class A for Deluge and Preaction Releasing Service.
- Do not include abort switches to abort the preaction sprinkler actuation function.

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Table 1.9 – Approved PREACTION-PAC™ Assemblies with No Built-In Releasing Control Panel

Part Number	Valve Size, in.	Valve Type	Supervisory Gas Source	Control Panel
G320P11N	2"	Single Interlock	1/6 HP Compressor	No Panel
G320P1NN	2"	Single Interlock	Pressure Maintenance Device	No Panel
G330P11N	3"	Single Interlock	1/6 HP Compressor	No Panel
G330P12N	3"	Single Interlock	1/3 HP Compressor	No Panel
G330P13N	3"	Single Interlock	1/2 HP Compressor	No Panel
G330P1NN	3"	Single Interlock	Pressure Maintenance Device	No Panel
G340P11N	4"	Single Interlock	1/6 HP Compressor	No Panel
G340P12N	4"	Single Interlock	1/3 HP Compressor	No Panel
G340P13N	4"	Single Interlock	1/2 HP Compressor	No Panel
G340P1NN	4"	Single Interlock	Pressure Maintenance Device	No Panel

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1.10. Installation.

1.10.1. Location. Locate the **PREACTION-PAC™** assembly as shown on the system shop drawings or design plans. The location should be dry, clean, and within the Approved temperature range of the assembly (+40 deg F to +110 deg F). Refer to Figure 4 for overall dimensions.

1.10.2. Unpacking, Placement & Leveling. Unpack the **PREACTION-PAC™** as follows:

1.10.2.1. Remove the outer carton and any other packing material surrounding the assembly.

1.10.2.2. Open the lower enclosure door.

1.10.2.3. Use a flat-bladed or Phillips screwdriver to remove the (4) bolts holding the assembly to the pallet. See Figure 5.

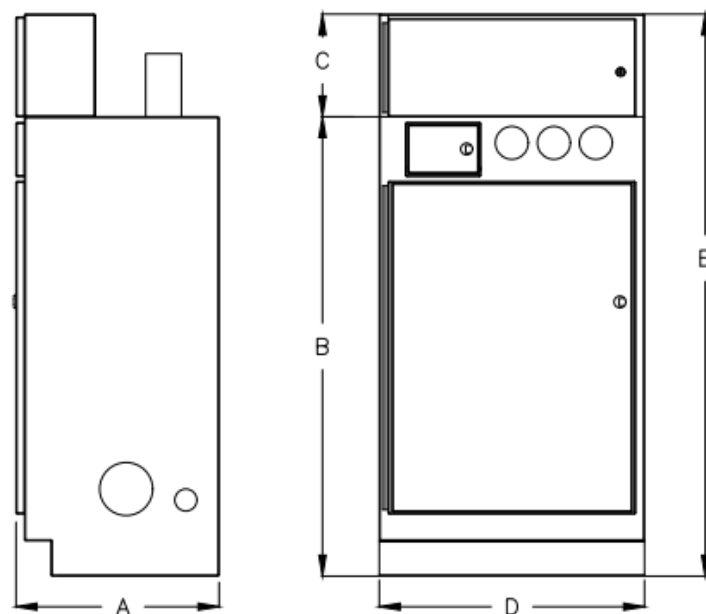
1.10.2.4. Close the lower enclosure door. Remove the unit from the pallet, and place in the intended installation location.

1.10.2.5. Level the unit:

1.10.2.5.1. Open the lower enclosure door.

1.10.2.5.2. Using a flat-bladed screwdriver, adjust the (4) leveling feet from inside the enclosure until all feet are firmly in contact with the floor. See Figure 5.

1.10.2.5.3. Using a spirit level, adjust the leveling feet until the assembly is level both front-to-back and side-to-side.



Dimension	Inches
A	24.00
B	52.00
C	10.00
D	30.00
E	62.00

Figure 4 – Diagram - Overall Dimensions

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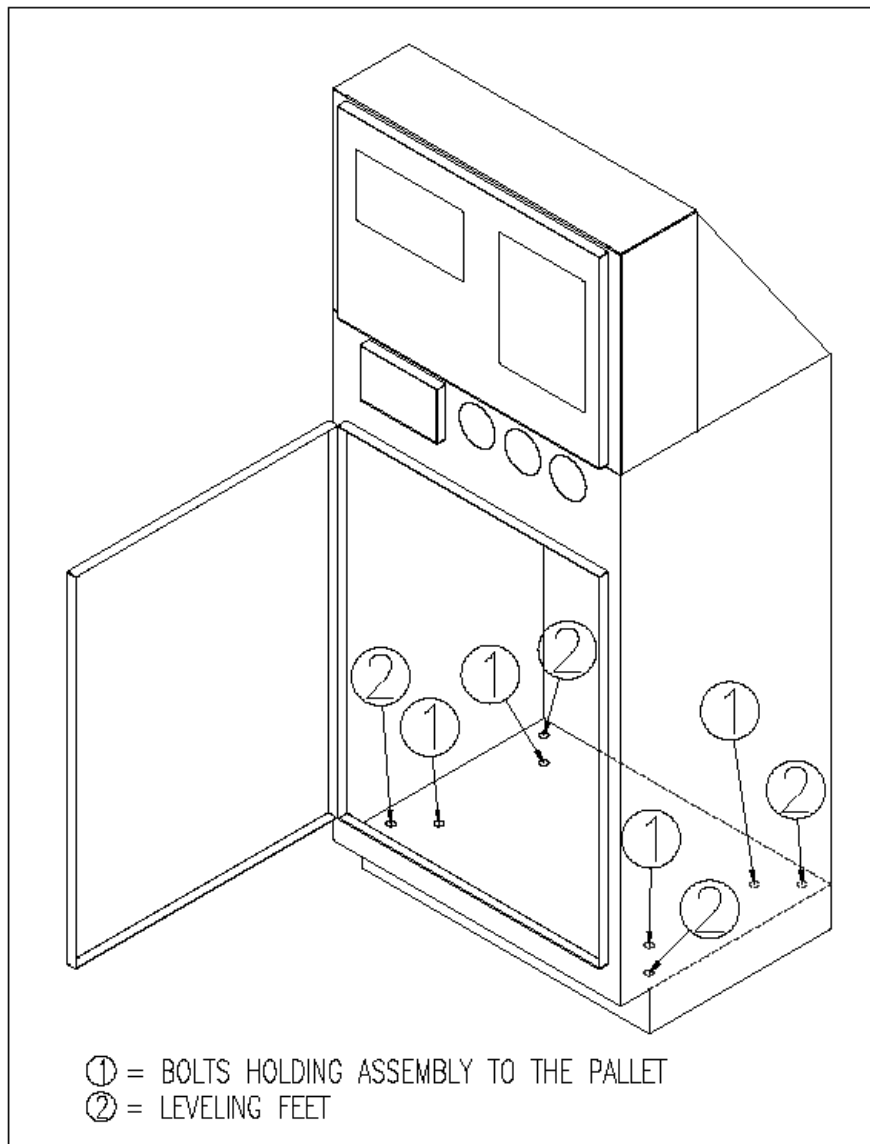
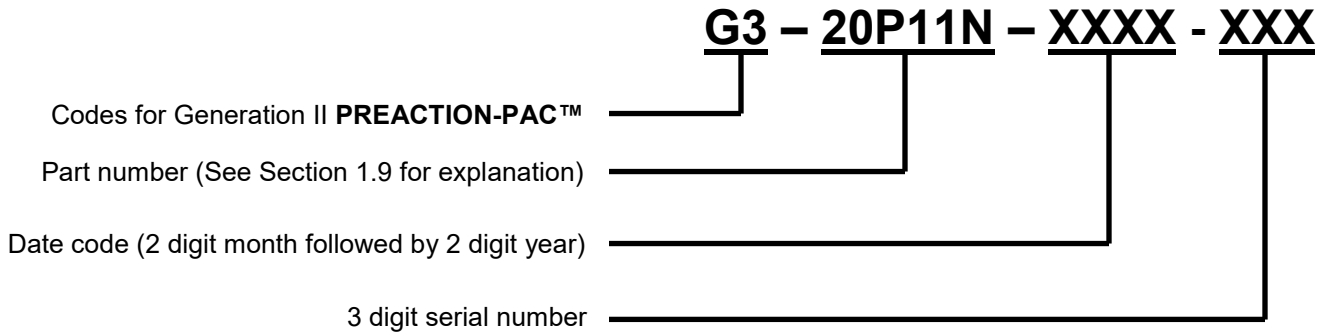


Figure 5 – Diagram - Location of Pallet Bolts and Leveling Feet

1.10.3. Serial Number. The serial number of each assembly is located on a permanent metal nameplate, located behind the upper enclosure door above the compressor disconnect switch. The serial number is coded as follows:



Note the serial number, date of installation, and date of commissioning on the front of this manual where indicated.

1.10.4. External Attachments.

1.10.4.1. Preaction Valve. Use Section 2 - Tyco Manual TFP1421 to guide the installation of inlet, outlet, and drain piping. See Figure 6 for details.

1.10.4.1.1. Inlet Piping. Inlet piping may be attached to the **PREACTION-PAC™** in one of two locations:

- The standard connection is at the lower right center of the lower enclosure. The assembly is pre-piped to accept inlet piping at this location. This location is labeled INLET. Remove the plastic protection cap from the inlet pipe, and use a field-supplied grooved coupling to make this connection.
- An optional connection at the lower left center of the lower enclosure. Remove the precut knockout from the lower left center of the lower enclosure. Remove the steel cap from the grooved coupling on the left side of the tee at the bottom of the enclosure. Attach the inlet piping to the left side of the tee using the grooved coupling. Remove the plastic protection cap from the lower right center inlet connection, and assemble the steel cap removed from the tee to the lower right connection using a field-supplied grooved coupling.



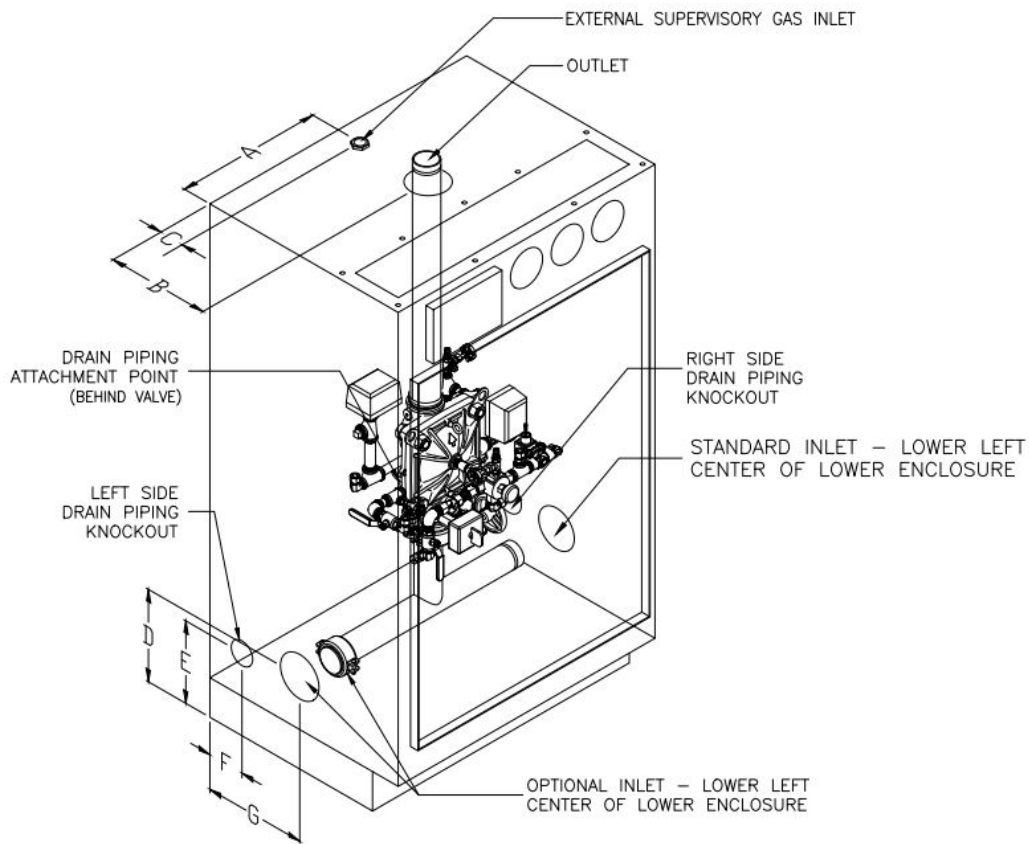
Failure to assemble the steel cap to the top inlet will result in property damage due to water escaping from the top inlet.

1.10.4.1.2. Outlet Piping. Outlet piping is attached to the **PREACTION-PAC™** in one location; at the top center of the lower enclosure. This location is labeled OUTLET. Remove the plastic protection cap from the outlet pipe, and used a field-supplied grooved coupling to make this connection.

1.10.4.1.3. Drain Piping. Drain piping is attached to the **PREACTION-PAC™** at a nipple located in the lower enclosure. The drain pipe may exit the enclosure on either the left or right side. Remove the precut knockout from the chosen side. Attach the drain pipe to the nipple with two field-supplied grooved couplings and a field-supplied grooved elbow.

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1.10.4.1.4. External Supervisory Gas Inlet. External supervisory gas inlet piping is attached to the **PREACTION-PAC™** in one location: the back center of the top surface of the lower enclosure. The connection point is a ½ NPT female bulkhead (through-wall) fitting. Make the field connection by removing the red plastic plug and plumbing to the location with ½ inch pipe, typically either steel or copper. PLEASE NOTE: This inlet option is only present on configurations with a pressure maintenance device.



NOTES:
1. TRIM ELEMENTS AND UPPER ENCLOSURE REMOVED FOR CLARITY

Dimension	Inches
A	15.00
B	12.50
C	9.86
D	8.86
E	5.75
F	12.50

Figure 6 – Diagram - Piping Attachment Details

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1.10.4.2. Terminal Strip. Use Figure 6 to guide the installation of connections to the terminal strip in the upper enclosure. Terminals for 110VAC power accept qty. (1) 10 ga. max. conductor. Terminals for signal switch and solenoid connection accept qty. (1) 12 ga. max or qty. (2) 16 ga. max conductors. NOTE: All conductors used for field wiring must comply with NFPA 70 – National Electrical Code. Power-limited and non-power limited conductors should be run with minimum 1/4" spacing within the upper enclosure. 110VAC power conductors are non-power-limited. Refer to the field-installed control panel instruction manual for information on the power- or non-power-limited status of the solenoid and signal conductors.

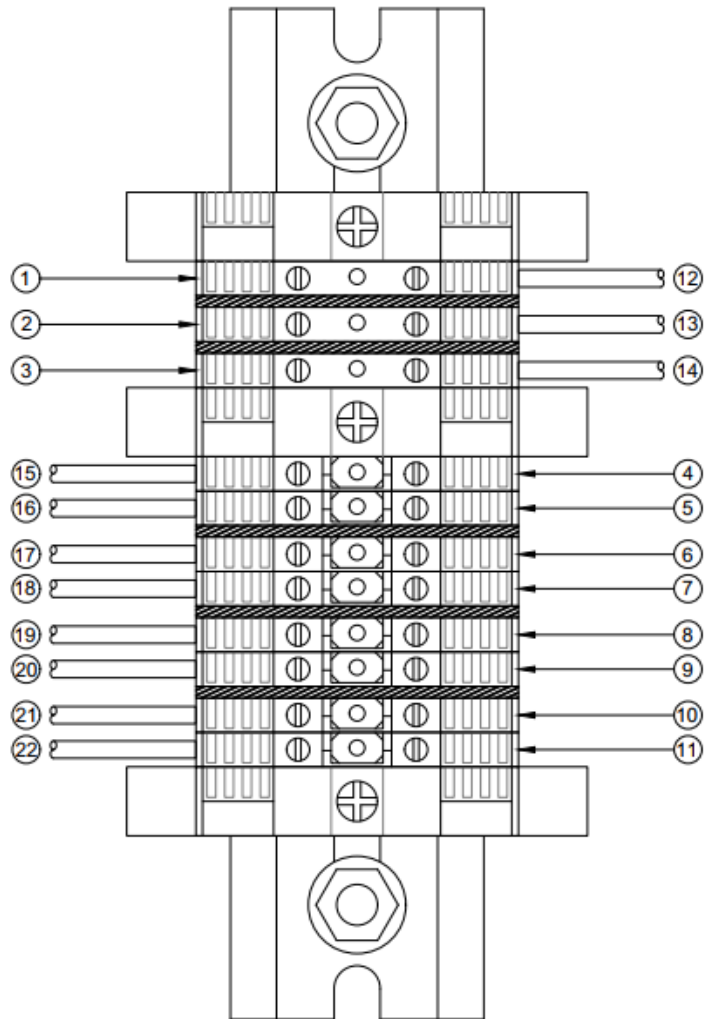


CAUTION



DO NOT drill or punch the upper enclosure to attach conduit. Use the knockouts supplied at the lower back of the upper enclosure. Failure to follow these instructions can result in damage to the assembly.

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**Figure 7a – Diagram –
Terminal Strip with Compressor Wiring Detail**

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LEGEND		
FIELD WIRING		
		COLOR OF TERMINAL BLOCK
1	110 VAC GROUND FOR COMPRESSOR	GREEN/YELLOW
2	110 VAC NEUTRAL FOR COMPRESSOR	WHITE
3	110 VAC HOT FOR COMPRESSOR	BLACK
4	PREACTION SOLENOID WIRING (-) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	GRAY
5	PREACTION SOLENOID WIRING (+) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	RED
6	LOW AIR SIGNAL SWITCH WIRING (NO) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	GRAY
7	LOW AIR SIGNAL SWITCH WIRING (COM) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	GRAY
8	WATERFLOW SIGNAL SWITCH WIRING (NO) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	BLUE
9	WATERFLOW SIGNAL SWITCH WIRING (COM) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	BLUE
10	TAMPER SIGNAL SWITCH WIRING (NO) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	YELLOW
11	TAMPER SIGNAL SWITCH WIRING (COM) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	YELLOW
FACTORY WIRING		
12	110 VAC GROUND TO COMPRESSOR	GREEN/YELLOW
13	110 VAC NEUTRAL TO COMPRESSOR	WHITE
14	110 VAC HOT TO COMPRESSOR	BLACK
15	PREACTION SOLENOID WIRING (-) FROM LOWER ENCLOSURE	GRAY
16	PREACTION SOLENOID WIRING (+) FROM LOWER ENCLOSURE	RED
17	LOW AIR SIGNAL SWITCH WIRING (NO) FROM LOWER ENCLOSURE	GRAY
18	LOW AIR SIGNAL SWITCH WIRING (COM) FROM LOWER ENCLOSURE	GRAY
19	WATERFLOW SIGNAL SWITCH WIRING (NO) FROM LOWER ENCLOSURE	BLUE
20	WATERFLOW SIGNAL SWITCH WIRING (COM) FROM LOWER ENCLOSURE	BLUE
21	TAMPER SIGNAL SWITCH WIRING (NO) FROM LOWER ENCLOSURE	YELLOW
22	TAMPER SIGNAL SWITCH WIRING (COM) FROM LOWER ENCLOSURE	YELLOW

Legend for Figure 7a

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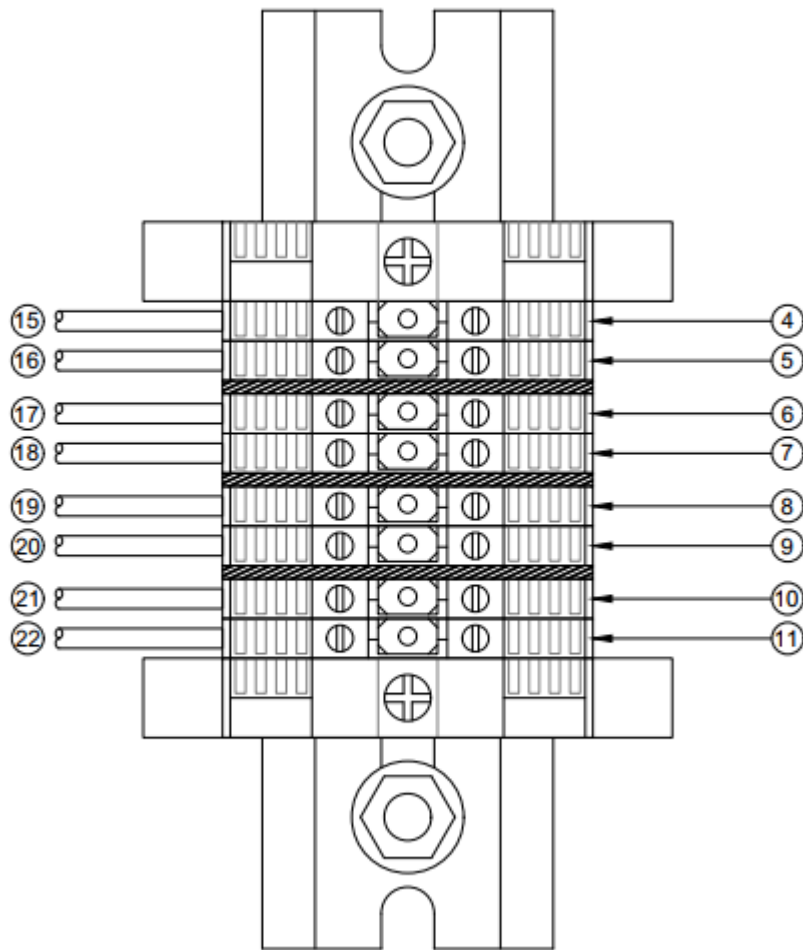


Figure 7b – Diagram –
Terminal Strip with Pressure Maintenance Device Wiring Detail

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LEGEND		
FIELD WIRING		
		COLOR OF TERMINAL BLOCK
4	PREACTION SOLENOID WIRING (-) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	GRAY
5	PREACTION SOLENOID WIRING (+) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	RED
6	LOW AIR SIGNAL SWITCH WIRING (NO) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	GRAY
7	LOW AIR SIGNAL SWITCH WIRING (COM) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	GRAY
8	WATERFLOW SIGNAL SWITCH WIRING (NO) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	BLUE
9	WATERFLOW SIGNAL SWITCH WIRING (COM) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	BLUE
10	TAMPER SIGNAL SWITCH WIRING (NO) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	YELLOW
11	TAMPER SIGNAL SWITCH WIRING (COM) TO FIELD-INSTALLED CONTROL PANEL OR MODULE	YELLOW
FACTORY WIRING		
15	PREACTION SOLENOID WIRING (-) FROM LOWER ENCLOSURE	GRAY
16	PREACTION SOLENOID WIRING (+) FROM LOWER ENCLOSURE	RED
17	LOW AIR SIGNAL SWITCH WIRING (NO) FROM LOWER ENCLOSURE	GRAY
18	LOW AIR SIGNAL SWITCH WIRING (COM) FROM LOWER ENCLOSURE	GRAY
19	WATERFLOW SIGNAL SWITCH WIRING (NO) FROM LOWER ENCLOSURE	BLUE
20	WATERFLOW SIGNAL SWITCH WIRING (COM) FROM LOWER ENCLOSURE	BLUE
21	TAMPER SIGNAL SWITCH WIRING (NO) FROM LOWER ENCLOSURE	YELLOW
22	TAMPER SIGNAL SWITCH WIRING (COM) FROM LOWER ENCLOSURE	YELLOW

Legend for Figure 7b

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- 1.10.4.2.1. Power.** 110VAC, 3-wire, single-phase power is attached to the terminal strip in the upper enclosure. See Figure 7. Terminals for 110VAC power accept qty. (1) 10 ga. max. conductor. Current draw: With 1/6HP compressor = 6.6 amps; with 1/3HP compressor = 6.6 amps; with 1/2HP compressor = 8.0 amps; with pressure maintenance device = 0 amps.



DANGER



Only qualified electricians should connect incoming power to the assembly. Failure to follow this instruction could result in death or serious personal injury.

- A. Turn off circuit breaker at the main power distribution panel.
- B. Connect service ground conductor to terminal marked GROUND.
- C. Connect primary neutral conductor to terminal marked NEUTRAL.
- D. Connect primary hot conductor to terminal marked HOT.

- 1.10.4.3. Compressor.** Where applicable. See Figure 7a. 110VAC, 3-wire, single-phase power is attached to the terminal strip in the upper enclosure. The compressor power is factory-wired to the terminal strip in the upper enclosure. The compressor pressure outlet is factory-attached to the system piping within the lower enclosure.

- 1.10.5. Prior To Placing In Service.** Before placing the **PREACTION-PAC™** in service, perform the following steps. Ensure that all discrepancies are corrected before proceeding to the next step.

- 1.10.5.1.** Ensure the entire system is installed per the latest revision of all applicable shop drawings.
- 1.10.5.2.** Ensure all testing has been performed on the sprinkler piping per the requirements of the authority having jurisdiction and NFPA 13.
- 1.10.5.3.** Perform all preliminary tests on the field-installed control panel, field wiring, and field devices.
- 1.10.5.4.** Use Section 2 – Tyco Manual TFP1421 to perform all preliminary tests on the preaction valve, trim, and sprinkler piping.
- 1.10.5.5.** Perform all tests required to be witnessed by the authority having jurisdiction. Obtain AHJ approval of the installation.

1.10.6. Placing In Service.

- 1.10.6.1.** Verify that the water supply is on.
- 1.10.6.2.** Using Section 2 – Tyco Manual TFP1421, verify that all valves are in the proper position for in-service status. Verify that the three pressure gauges on the front of the lower enclosure are indicating expected values within expected limits.
- 1.10.6.3.** Ensure that the owner of the system has received adequate introductory training.
- 1.10.6.4.** Turn over this manual and the enclosure door keys to the owner. The manual may be stored in the pocket on the inside of the lower enclosure door.

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1.11. Operation.

- 1.11.1. Automatic.** Fully automatic operation of the system will be conducted by the field-installed control panel. Power from 110VAC and / or batteries is required for the control panel to function in this way. No manual intervention is required for the control panel to perform its functions. Manual intervention to acknowledge and silence signals may be performed.



IMPORTANT

Fusing of a sprinkler head by heat is necessary for water to be discharged onto a fire, even after operation of automatic fire detectors.

- 1.11.2. Manual.** Manual operation of the preaction valve is accomplished with the manual release valve. Open the door marked IN CASE OF FIRE OPEN DOOR AND PULL LEVER. No key is needed to open this door. Pull the lever. No power is needed to open the preaction valve in this manner. The door may not be closed until the lever is restored to its normal position.



IMPORTANT

Fusing of a sprinkler head by heat is necessary for water to be discharged onto a fire, even after operation of the manual station valve.

- 1.11.3. Restoring To Service.** After automatic or manual system operation, follow instructions in Section 2 – Tyco Manual TFP1421 to restore the **PREACTION-PAC™** to service.

- 1.12. Inspection, Testing, and Maintenance.** Regular inspection, testing and maintenance of the **PREACTION-PAC™** assembly is essential to the assembly's continued proper operation. Follow all instructions in the documents described in this section. Pay particular attention to the required minimum interval for each item of inspection, testing, and maintenance. The owner of the system (or their designated representative) is responsible for the overall condition of the system, and ensuring that all inspection, testing, and maintenance items are conducted as recommended.



IMPORTANT

The **UNITED Fire Systems PREACTION-PAC™** sprinkler valve assembly is a vital part of the fire protection of any facility where these units are installed. Life safety and property protection depends on continuing proper operation of the assembly. The owner of the **PREACTION-PAC™** is responsible for the condition of the assembly and its continued proper operation. **UNITED Fire Systems** strongly recommends that all owners of **PREACTION-PAC™** engage the services of qualified, trained fire protection professionals to inspect, test, maintain, and repair the assembly.

- 1.12.1. Inspection.** Inspection involves carrying out a set of procedures to discover and note any and all discrepancies that could render the system impaired, inoperative, or ineffective. The result of an inspection is a comprehensive list of these discrepancies. Inspection does not specifically include maintenance or repair; however, maintenance and repair can be and usually is conducted at the time of inspection.
- 1.12.2. Testing.** Testing involves carrying out procedures to discover if tested components function as intended. Testing is an integral part of performing inspection. Testing is also done after the performance of some maintenance procedures.
- 1.12.3. Maintenance.** Maintenance involves carrying out procedures to ensure that maintained components continue to function as intended. Maintenance is usually preventive in nature. Maintenance can be conducted during inspection.
- 1.12.4. Repair.** Repair involves carrying out procedures to correct the deficiencies found during inspection, or as a result of other events such as system actuation or control panel trouble / alarm signals.
- 1.12.5. Documents Relevant To Inspection, Testing, Maintenance, and Repair.**
- 1.12.5.1.** Tyco Manual TFP1421.
 - 1.12.5.2.** General Air Products Manual OILLESSINST.
 - 1.12.5.3.** United Fire Systems Instruction Sheet UFS-710.
 - 1.12.5.4.** National Fire Protection Association No. 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems."
 - 1.12.5.5.** National Fire Protection Association No. 72, "National Fire Alarm Code®"

SECTION

2

Tyco Manual TFP1421

DV-5A Automatic Water
Control Valve, Single
Interlock Preaction,
Electric Actuation

DV-5A Automatic Water Control Valve, Single Interlock Preaction, Electric Actuation, Fire Protection Systems 1 1/2 to 8 Inch (DN40 to DN200)

General Description

The TYCO DV-5A Automatic Water Control Valve Single Interlock Preaction Electric Actuation is a diaphragm type valve that can be used in single interlock preaction fire protection systems. When properly trimmed, the double seat design of the DV-5A Valve also provides actuation of fire alarms upon system operation.

The diaphragm style design of the DV-5A Valve allows external resetting, providing for easy resetting of a deluge system without having to open a valve handhole cover to manually reposition a clapper and/or latch mechanism. Simply re-pressurizing the diaphragm chamber resets the valve.

The DV-5A features internal and external coating of the valve to provide corrosion resistance. The external corrosion resistance of the epoxy coating permits the use of the DV-5A in corrosive atmospheres associated with many types of industrial processing plants and outdoor installations.

The DV-5A Single Interlock Preaction Electric Actuation Valve is offered with or without a System Main Control Valve.

The DV-5A Single Interlock Preaction Electric Actuation Valve utilizes automatic sprinklers and a supplemental detection system, comprised of electric detection comprised of heat detectors, smoke detectors, and manual pull stations. Actuation of the detection system automatically operates (releases) the DV-5A Valve, allowing water to flow into the sprinkler piping system and to be discharged from any sprinklers that may subsequently open.

Typically, the system designer selects the detection components for a single interlock preaction system that will respond to a fire sooner than the automatic sprinklers. Consequently, the



Available End Connections and Weights — lb (kg)

End Connection		Nominal Valve Size ANSI Inches (DN)					
		1 1/2 (40)	2 (50)	3 (80)	4 (100)	6 (150)	8 (200)
Inlet	Outlet	1 1/2 (40)	2 (50)	3 (80)	4 (100)	6 (150)	8 (200)
Thread	Thread	26 (11,8)	25 (11,3)	N/A	N/A	N/A	N/A
Groove	Groove	25 (11,3)	25 (11,3)	60 (27,2)	95 (43,1)	177 (80,3)	327 (148,3)
Flange	Groove	N/A	N/A	66 (30,0)	106 (48,1)	190 (86,2)	346 (157,0)
Flange	Flange	N/A	N/A	72 (32,7)	116 (52,6)	204 (92,5)	365 (165,6)

system will experience a minimal delay in water delivery over that for a wet pipe sprinkler system because the system will have essentially filled with water before a sprinkler operates. The DV-5A Single Interlock Preaction Electric Actuation Valve automatically supervises the integrity of the overall system. Supervision is provided by monitoring a relatively low air pressure in the system via a low pressure alarm switch so as to detect leaks in the system that otherwise would result in unwanted water discharge should the system operate in a fire condition.

Supervised single interlock preaction 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 preaction 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.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Item	Description	Qty.	Nominal Valve Size ANSI Inch (DN)					
			1 1/2 (DN40)	2 (DN50)	3 (DN80)	4 (DN100)	6 (DN150)	8 (DN200)
			P/N	P/N	P/N	P/N	P/N	P/N
1	Valve Body	1	N/R	N/R	N/R	N/R	N/R	N/R
2	Diaphragm	1	545000020	545000020	545000030	545000040	545000060	545000080
3	Diaphragm Cover	1	N/R	N/R	N/R	N/R	N/R	N/R
4	Hex Bolt, Short	2 ^a	545100001	545100001	545100002	545100003	545100004	545100003
5	Hex Bolt, Long	2	545100011	545100011	545100012	545100013	545100014	545100015
6	Lift Washer	2 ^b	N/A	N/A	545100021	545100022	545100023	545100022
7	Hex Nut	2	545100031	545100031	545100032	545100033	545100034	545100033
8	Hoist Ring	2	545100041	545100041	545100041	545100041	545100041	545100041
9	Flat Washer	2	N/A	N/A	545100024	545100025	545100026	545100025

NOTES:
a. Hex Bolt, Short, Qty. 6 in 6 and 8 inch (DN150 and DN200) assemblies
b. Lift Washer not used in 1 1/2 and 2 inch (DN40 and DN50) assemblies
c. N/R = Not Replaceable
d. Order replacements parts only via Part Numbers given, do not replace Hex Bolt, Hex Nut, Lift Washer or Hoist Ring with common hardware parts

FIGURE 1
DV-5A VALVE ASSEMBLY AND REPLACEMENT PARTS

Nominal Valve Size ANSI Inches (DN)	Flange Drilling Specification											
	Nominal Dimensions in Inches and (mm)											
	ANSI B16.1 ^a (Class 125)			ISO 7005-2 (PN16) ^b			JIS B 2210 (10K)			AS 2129 (Table E)		
	A	B	N	A	B	N	A	B	N	A	B	N
3 (80)	6.00 (152,4)	0.75 (19,0)	4	6.30 (160,0)	0.75 (19,0)	8	5.90 (150,0)	0.59 (15,0)	8	5.75 (146,0)	0.71 (18,0)	4
4 (100)	7.50 (190,5)	0.75 (19,0)	8	7.09 (180,0)	0.75 (19,0)	8	6.89 (175,0)	0.60 (15,0)	8	7.00 (178,0)	0.71 (18,0)	8
6 (150)	9.50 (241,3)	0.88 (22,2)	8	9.45 (240,0)	0.91 (23,0)	8	9.45 (240,0)	0.75 (19,0)	8	9.25 (235)	0.87 (22,0)	8
8 (200)	11.75 (298,5)	0.88 (22,2)	8	11.61 (295,0)	0.91 (23,0)	12	11.42 (290,0)	0.75 (19,0)	12	11.50 (292,0)	0.87 (22,0)	8

NOTES:
a. Same drilling as for ANSI B16.5 (Class 150) and ANSI B16.42 (Class 150)
b. Same drilling as for BS 4504 Section 3.2 (PN16) and DIN 2532 (PN16)

TABLE A
FLANGE DRILLING SPECIFICATIONS

Port	Port Description	Port Sizes, NPT Inch per ANSI B1.20.1					
		1 1/2 (DN40)	2 (DN50)	3 (DN80)	4 (DN100)	6 (DN150)	8 (DN200)
P1	Diaphragm Chamber Supply	1/2	1/2	1/2	1/2	1/2	1/2
P2	Water Supply Pressure & Alarm Test	1/2	1/2	1/2	1/2	1/2	1/2
P3	Alarm Actuation	3/4	3/4	3/4	3/4	3/4	3/4
P4	Automatic Drain Valve	1/2	1/2	1/2	1/2	1/2	1/2
P5	System Drain	3/4	3/4	3/4	3/4	3/4	3/4
P6	Main Drain	3/4	3/4	1 1/4	2	2	2
P7	System Air Supply	1/2	1/2	1/2	1/2	1/2	1/2

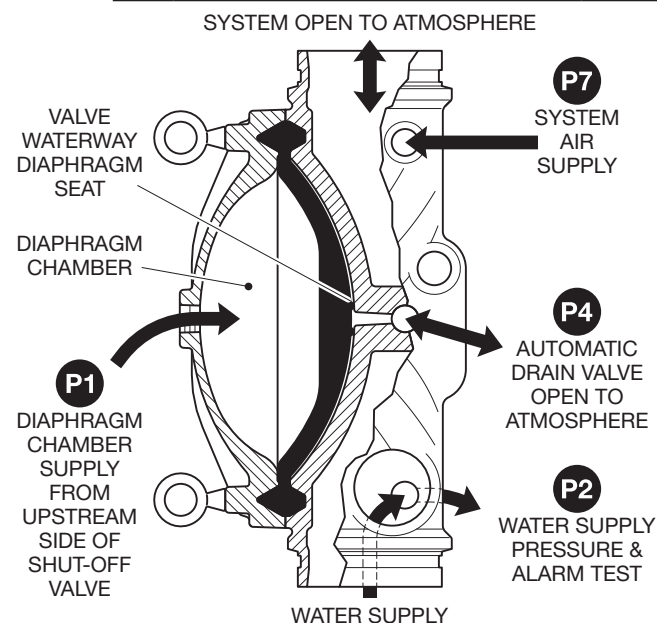


FIGURE 2A
SET CONDITION

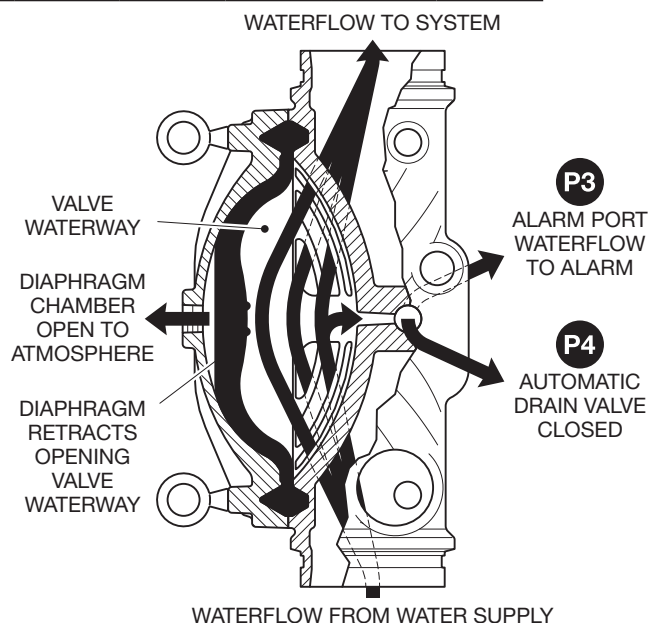


FIGURE 2B
OPERATED CONDITION

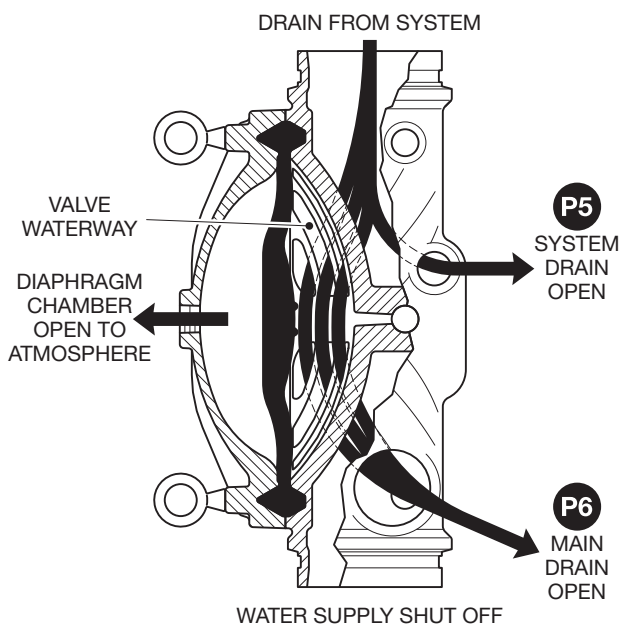


FIGURE 2C
SYSTEM DRAIN CONDITION

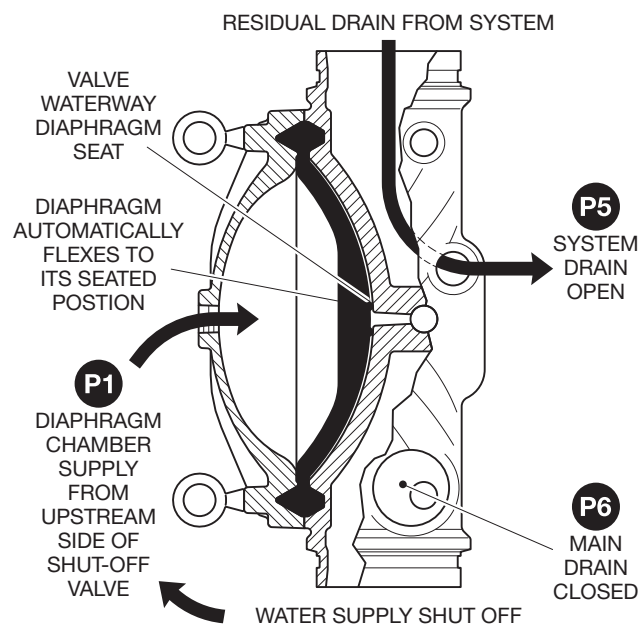
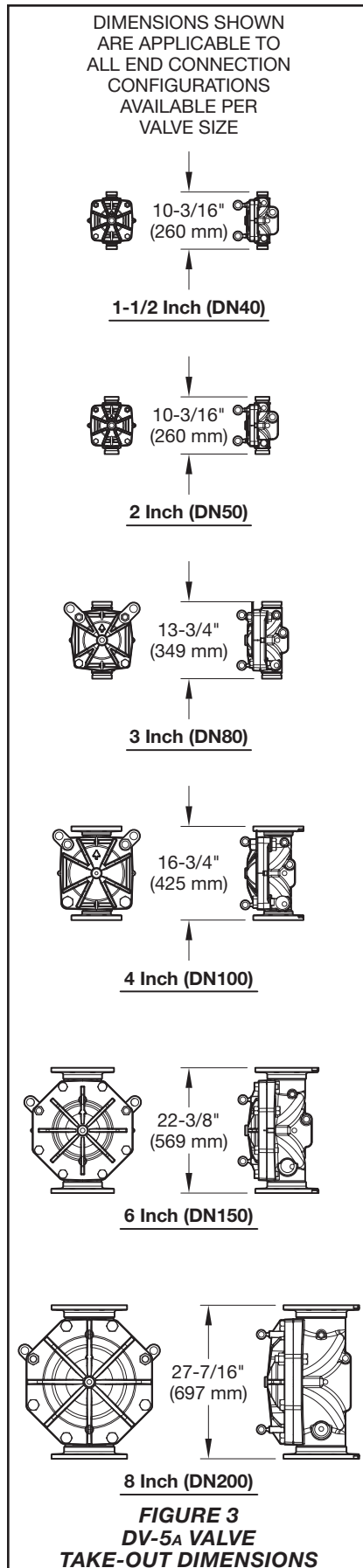


FIGURE 2D
RESIDUAL DRAIN CONDITION

FIGURE 2
DV-5A VALVE OPERATION, PREACTION SYSTEMS



In the event the fire cannot otherwise be extinguished, the preaction sprinkler system will then perform as the primary fire protection system.

NOTICE

The DV-5A Single Interlock Praction Electric Actuation Valve 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 (NFPA), in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these 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

Listing and Approvals are based on DV-5a Single Interlock Praction Electric Actuation Valve being trimmed as described in Figure 5.

DV-5A Valve

Components for the 1 1/2 in. to 8 in. (DN40 to DN200) DV-5A Valve are shown in Figure 1. The DV-5A Valve is for vertical installations. It is rated for use at service pressures of 20 to 300 psi (1,4 to 20,7 bar).

The take-out dimensions are shown in Figure 3, and flanged connections are available drilled per ANSI, ISO, AS, and JIS specifications (see Table A). Threaded inlet and outlet connections are available in NPT or ISO 7-1. Threaded port connections are NPT threaded.

Note: PN16 flanges are pressure rated to 16 bar.

Valve Trim

The maximum pressure rating for the Single Interlock Praction Electric Actuation is dependent on the separately ordered solenoid valve per Technical Data Sheet TFP2180.

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 with separately ordered 600 psi (41,4 bar) Water Pressure Gauges.

If the addition of an Alarm Control Valve is desired or required by the local AHJ, the Alarm Control Valve noted as Item H in Figure 8 is to be a separately ordered electronically supervised normally open valve.

External trim connections are NPT threaded. EMEA trim is provided with NPT x ISO 7-1 thread adapters.

Pressure Loss

See Graph A

Detection System

See the Electric Actuation subsection

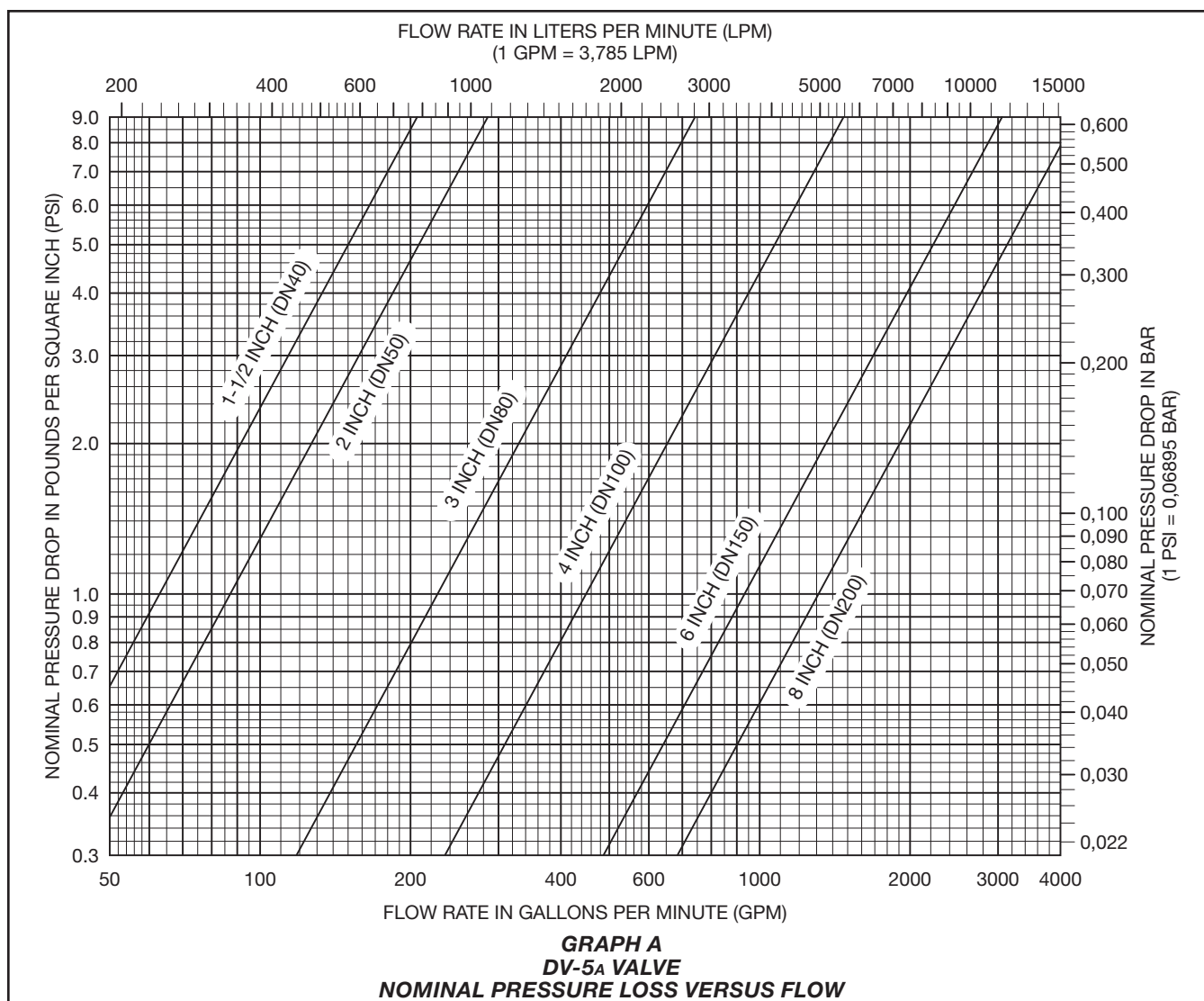
System Air Pressure Requirements

The supervisory air (nitrogen) pressure is to be 10 ± 2 psi ($0,69 \pm 0,07$ 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 Switch (Item T - Figure 8), which is factory set to alarm at 5 ± 1 psi ($0,34 \pm 0,07$ bar) on decreasing pressure. The supervisory air supply pressure of 10 ± 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 Switch (Item T - Figure 8) is factory set at 5 ± 1 psi ($0,34 \pm 0,07$ bar) on decreasing pressure. The Pressure Relief Valve (Item S - Figure 8) is factory set to fully open at 25 ± 2 psi ($1,72 \pm 0,14$ bar) and it begins to crack open at a pressure of about 18 psi (1,24 bar).



Materials of Construction

Valve Body

Epoxy coated ductile iron per ASTM A536-77, Grade 65-45-12

Diaphragm Cover

Epoxy coated ductile iron per ASTM A536-77, Grade 65-45-12

Diaphragm

Polyester fabric reinforced, TEFLON coated, EPDM rubber per ASTM D2000

Diaphragm Cover Fasteners

Aluminum zinc coated steel

Common Hardware Trim

- Common hardware pipe fittings are galvanized or black as required and are malleable per ASME B16.3.
- Common hardware pipe nipples are galvanized or black as required and are Schedule 40 per ASTM A53 or A135.

- Common hardware compression fittings are brass per ASTM B16.
- Common hardware tubing is Type L copper per ASTM B88.

Operation

The TYCO DV-5A Valve is a diaphragm style valve that depends upon water pressure in the Diaphragm Chamber (see Figure 2A) to hold the Diaphragm closed against the water supply pressure.

When the DV-5A 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.

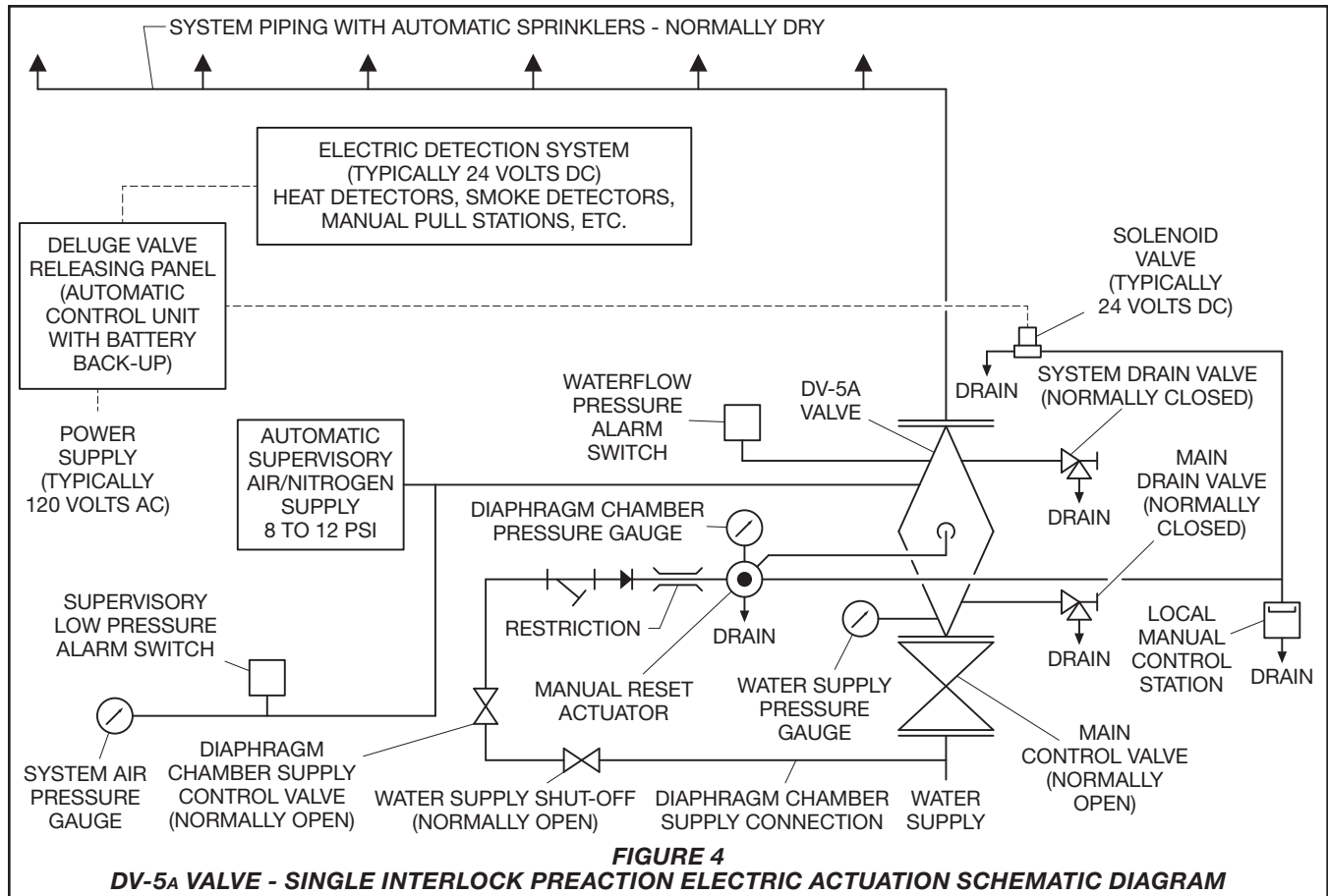
Opening the Electric Actuation Trim trips the Model MRA-1 Manual Reset Actuator. Tripping the MRA-1 releases water from the DV-5A Diaphragm Chamber faster than it can be replenished through a 1/8 in. (3,2 mm) restriction located in the Diaphragm Chamber

Supply Connection. Release of water through the MRA-1 results in a rapid pressure drop in the DV-5A Diaphragm Chamber. The force differential applied through the Diaphragm to hold the Diaphragm in the set position is then reduced 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 (see Figure 2B).

Upon opening of the DV-5A Valve, the Model MRA-1 Manual Reset Actuator opens to constantly vent the DV-5A Diaphragm Chamber to hydraulically latch the DV-5A in the tripped position until manually reset.

In standby mode, the integrity of the system piping is supervised by a low pressure alarm switch.

See the Electric Actuation section for additional information.



Electric Actuation

The Electric Actuation Trim forms a part of the laboratory approval of the DV-5A Valves and is necessary for their proper operation.

The Electric Actuation Trim is required for electric operation of the DV-5A Valve by a detection system consisting of electrical devices such as heat sensitive thermostats, smoke detectors, and/or electric manual pull stations as shown in Figure 4.

Note: For Single Interlock Preaction Systems with Electric Actuation, the system design typically selects electric detection devices that will operate sooner than the automatic sprinklers chosen for use on the sprinkler piping.

Dimensions are provided in Figure 7.

Notes:

The normally closed, de-energized, Solenoid Valve is separately ordered and selected based on the required laboratory approval acceptable to the authority having jurisdiction. Refer to Technical Data Sheet TFP2180 for specific laboratory approvals.

Consult with the applicable standards of the Approval agency regarding installation criteria pertaining to electric actuation circuitry.

Due to the functionality of the Model MRA-1 Manual Reset Actuator, the release circuit of the releasing panel need only provide the typical ten minutes of alarm condition intended to energize the Solenoid Valve to open. After the ten minute duration, at which point should the Solenoid Valve become de-energized and close (especially while operating under battery back-up), the MRA-1 will have already automatically opened, thereby preventing the DV-5A Diaphragm Chamber from becoming re-pressurized, and preventing an inadvertent closing of the DV-5A during a fire event.

Installation

The TYCO DV-5A Single Interlock Preaction Electric Actuation Trim Valve is to be installed in accordance with this section.

NOTICE

DV-5A Automatic Water Control Valves are designed to be used in freshwater systems. When the supply is from an alternative source such as brackish water, saltwater, or contains additives such as foam, the limited warranty is reduced to one year from the time of installation. An increase in frequency of inspections is required when the valve is exposed to such supplies and other corrosive conditions or chemicals that could impact valve materials or the operation of the assembly. The system and all components must be designed accordingly for the increased demand. It is required to thoroughly flush the valve and trim assembly with freshwater and reset to the set condition after each operation.

Proper operation of the DV-5A Single Interlock Preaction Electric Actuation Valve depends upon their 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-5A Valve from functioning properly, as well as void approvals and the manufacturer's warranties.

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

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

Heat tracing of the DV-5A 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.

Always open the system control valves slowly to avoid a sudden rush of water entering the system.

The DV-5A 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-5A Single Interlock Preaction Electric Actuation Valve must be trimmed in accordance with the trim illustration shown in Figure 5.

Note: *If the addition of an Alarm Control Valve is desired or required by the local AHJ, the Alarm Control Valve noted as Item H in Figure 8 is to be a separately ordered electronically supervised normally open valve.*

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 in. (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 Supply Valve to the inlet side of the System Main Control Valve in order to facilitate setting of the DV-5A Valve (see Figure 8).

Step 8. Unused Pressure Alarm Switch connections must be plugged.

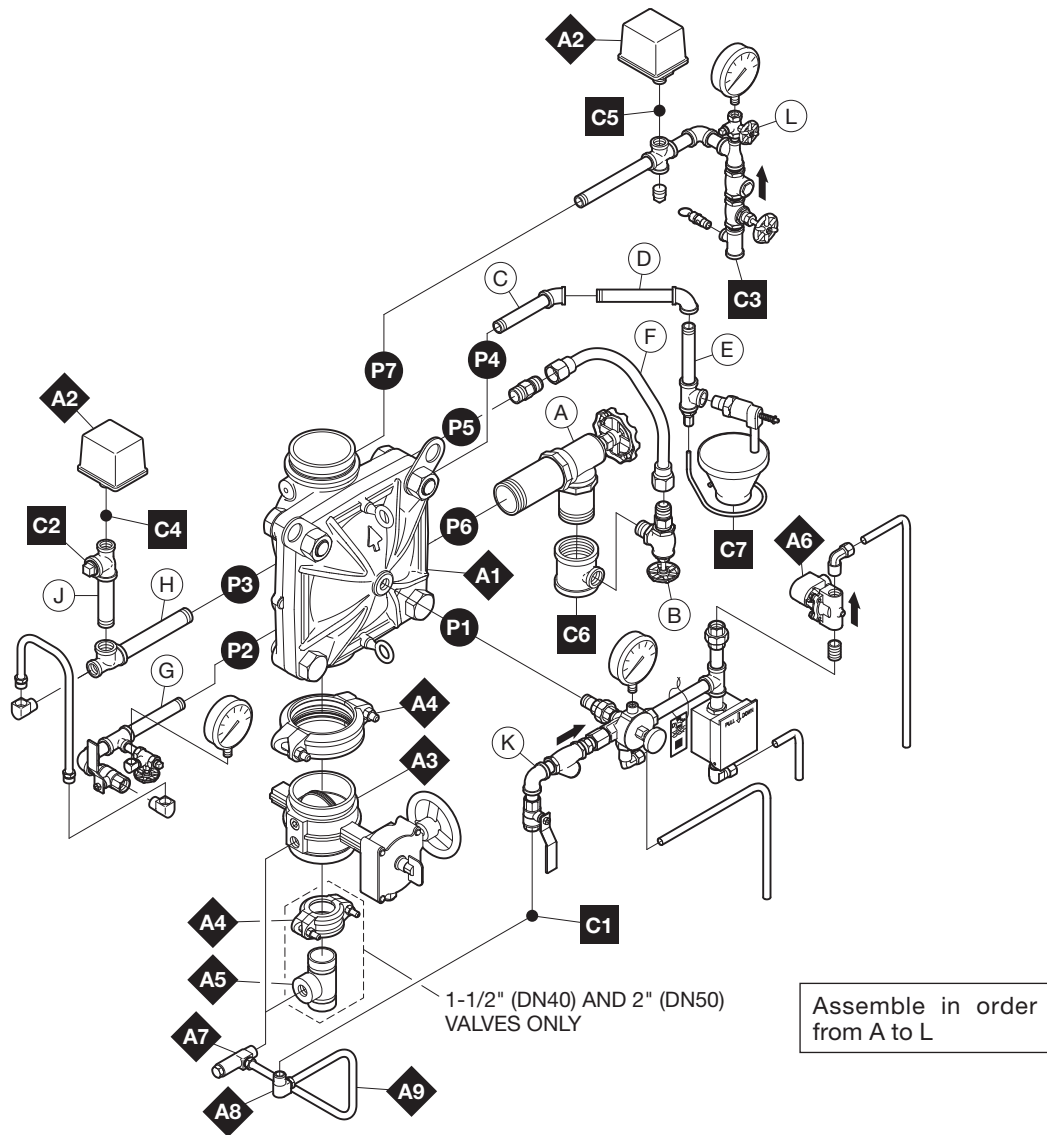
Step 9. A suitable automatic supervisory air (nitrogen) supply, as described in the Technical Data section, is to be installed in accordance with the applicable technical data sheet and set for 10 ± 2 psi ($0,69 \pm 0,14$ bar).

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 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 applicable standards of the approval agency.

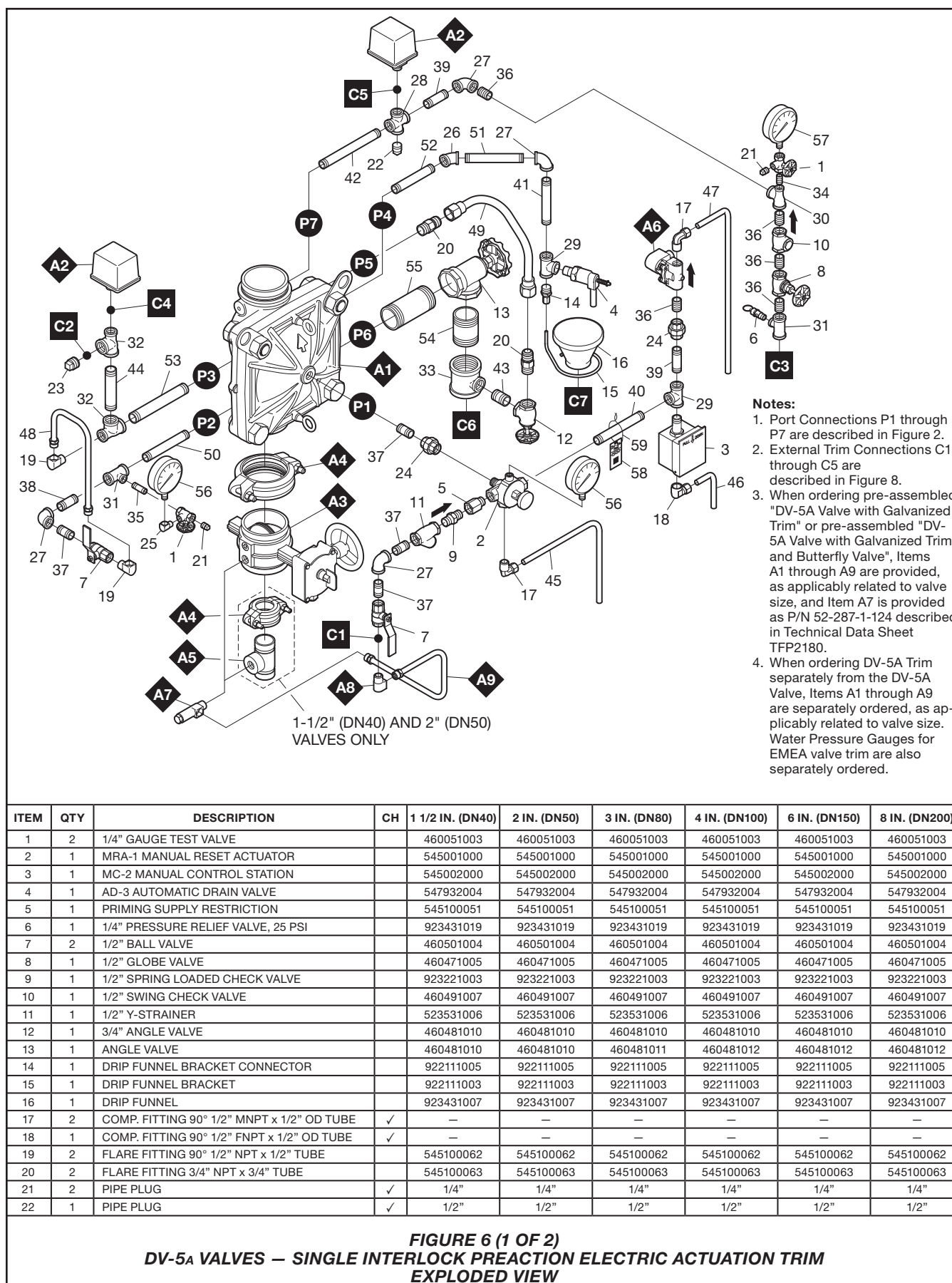
Step 13. Before a system hydrostatic test is performed, the DV-5A Diaphragm Chamber is to be depressurized, the Automatic Drain Valve is to be temporarily replaced with a plug, and the Diaphragm Cover Bolts must be uniformly and securely tightened using a cross-draw sequence. After tightening, double-check to make certain that all of the Diaphragm Cover Bolts are securely tightened. See Table B in the Care and Maintenance section for torque specifications.



Notes:

1. Port Connections P1 through P7 are described in Figure 2.
2. External Trim Connections C1 through C5 are described in Figure 8.
3. When ordering pre-assembled "DV-5A Valve with Galvanized Trim" or pre-assembled "DV-5A Valve with Galvanized Trim and Butterfly Valve", Items A1 through A9 are provided, as applicably related to valve size, and Item A6 is provided as P/N 52-287-1-124 described in Technical Data Sheet TFP2180.
4. When ordering DV-5A Trim separately from the DV-5A Valve, Items A1 through A9 are separately ordered, as applicably related to valve size. Water Pressure Gauges for EMEA valve trim are also separately ordered.

FIGURE 5
DV-5A VALVES WITH SINGLE INTERLOCK PREACTION
ELECTRIC ACTUATION TRIM
SEMI-ASSEMBLED



ITEM	QTY	DESCRIPTION	CH	1 1/2 IN. (DN40)	2 IN. (DN50)	3 IN. (DN80)	4 IN. (DN100)	6 IN. (DN150)	8 IN. (DN200)
23	1	PIPE PLUG	✓	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
24	2	UNION	✓	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
25	1	STREET ELBOW	✓	1/4" x 90°	1/4" x 90°	1/4" x 90°	1/4" x 90°	1/4" x 90°	1/4" x 90°
26	1	ELBOW	✓	1/2" x 45°	1/2" x 45°	1/2" x 45°	1/2" x 45°	1/2" x 45°	1/2" x 45°
27	4	ELBOW	✓	1/2" x 90°	1/2" x 90°	1/2" x 90°	1/2" x 90°	1/2" x 90°	1/2" x 90°
28	1	CROSS	✓	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
29	2	TEE	✓	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
30	1	REDUCING TEE	✓	1/2" x 1/4" x 1/2"	1/2" x 1/4" x 1/2"	1/2" x 1/4" x 1/2"	1/2" x 1/4" x 1/2"	1/2" x 1/4" x 1/2"	1/2" x 1/4" x 1/2"
31	2	REDUCING TEE	✓	1/2" x 1/2" x 1/4"	1/2" x 1/2" x 1/4"	1/2" x 1/2" x 1/4"	1/2" x 1/2" x 1/4"	1/2" x 1/2" x 1/4"	1/2" x 1/2" x 1/4"
32	2	REDUCING TEE	✓	3/4" x 1/2" x 3/4"	3/4" x 1/2" x 3/4"	3/4" x 1/2" x 3/4"	3/4" x 1/2" x 3/4"	3/4" x 1/2" x 3/4"	3/4" x 1/2" x 3/4"
33	1	REDUCING TEE	✓	3/4" x 3/4" x 3/4"	3/4" x 3/4" x 3/4"	1 1/4" x 1 1/4" x 3/4"	2" x 2" x 3/4"	2" x 2" x 3/4"	2" x 2" x 3/4"
34	1	PIPE NIPPLE	✓	1/4" x CLOSE	1/4" x CLOSE	1/4" x CLOSE	1/4" x CLOSE	1/4" x CLOSE	1/4" x CLOSE
35	1	PIPE NIPPLE	✓	1/4" x 1 1/2"	1/4" x 1 1/2"	1/4" x 1 1/2"	1/4" x 1 1/2"	1/4" x 1 1/2"	1/4" x 1 1/2"
36	4	PIPE NIPPLE	✓	1/2" x CLOSE	1/2" x CLOSE	1/2" x CLOSE	1/2" x CLOSE	1/2" x CLOSE	1/2" x CLOSE
37	4	PIPE NIPPLE	✓	1/2" x 1 1/2"	1/2" x 1 1/2"	1/2" x 1 1/2"	1/2" x 1 1/2"	1/2" x 1 1/2"	1/2" x 1 1/2"
38	1	PIPE NIPPLE	✓	1/2" x 2"	1/2" x 2"	1/2" x 2"	1/2" x 2"	1/2" x 2"	1/2" x 2"
39	2	PIPE NIPPLE	✓	1/2" x 2 1/2"	1/2" x 2 1/2"	1/2" x 2 1/2"	1/2" x 2 1/2"	1/2" x 2 1/2"	1/2" x 2 1/2"
40	1	PIPE NIPPLE	✓	1/2" x 4 1/2"	1/2" x 4 1/2"	1/2" x 4 1/2"	1/2" x 4 1/2"	1/2" x 4 1/2"	1/2" x 4 1/2"
41	1	PIPE NIPPLE	✓	1/2" x 5"	1/2" x 5"	1/2" x 5"	1/2" x 5"	1/2" x 5"	1/2" x 5"
42	1	PIPE NIPPLE	✓	1/2" x 8 1/2"	1/2" x 8 1/2"	1/2" x 8 1/2"	1/2" x 8 1/2"	1/2" x 8 1/2"	1/2" x 8 1/2"
43	1	PIPE NIPPLE	✓	3/4" x 1 1/2"	3/4" x 1 1/2"	3/4" x 1 1/2"	3/4" x 1 1/2"	3/4" x 1 1/2"	3/4" x 1 1/2"
44	1	PIPE NIPPLE	✓	3/4" x 4 1/2"	3/4" x 4 1/2"	3/4" x 4 1/2"	3/4" x 4 1/2"	3/4" x 4 1/2"	3/4" x 4 1/2"
45	1	TUBING, MRA-1 DRAIN		545100065	545100065	545100066	535002140	535002160	535002180
46	1	TUBING, MC-2 DRAIN		535000220	535000220	535000230	535000240	535000260	535000280
47	1	TUBING, SOLENOID DRAIN		535001020	535001020	535000630	535000640	535000660	535000680
48	1	TUBING ASSY, ALARM TEST INTERCONNECT		535000320	535000320	535000330	535000340	535000360	535000380
49	1	TUBING ASSY, SYSTEM DRAIN		535000420	535000420	535000430	535000440	535000460	535000480
50	1	PIPE NIPPLE	✓	1/2" x 3 1/2"	1/2" x 3 1/2"	1/2" x 4 1/2"	1/2" x 5 1/2"	1/2" x 5 1/2"	1/2" x 6 3/4"
51	1	PIPE NIPPLE	✓	1/2" x 5"	1/2" x 5"	1/2" x 5 1/2"	1/2" x 5 1/2"	1/2" x 5 1/2"	1/2" x 6 1/2"
52	1	PIPE NIPPLE	✓	1/2" x 5"	1/2" x 5"	1/2" x 4 1/2"	1/2" x 5"	1/2" x 7 1/2"	1/2" x 9 1/2"
53	1	PIPE NIPPLE	✓	3/4" x 5"	3/4" x 5"	3/4" x 6"	3/4" x 7"	3/4" x 9"	3/4" x 11 1/2"
54	1	PIPE NIPPLE	✓	3/4" x 4 1/2"	3/4" x 4 1/2"	1 1/4" x 3 1/4"	2" x 3"	2" x 3"	2" x 3"
55	1	PIPE NIPPLE	✓	3/4" x 6 1/2"	3/4" x 6 1/2"	1 1/4" x 5 1/2"	2" x 5"	2" x 6"	2" x 8"
56	2	WATER PRESSURE GAUGE, 300 PSI / 2000 kPa (AMER/APAC)		923431005	923431005	923431005	923431005	923431005	923431005
	2	WATER PRESSURE GAUGE, 20 bar / 2000 kPa (EMEA)		025500013	025500013	025500013	025500013	025500013	025500013
57	1	AIR PRESSURE GAUGE, 80 PSI / 550 kPa RETARDED TO 250PSI / 1750 kPa		923431012	923431012	923431012	923431012	923431012	923431012
58	1	LABEL		545003005	545003005	545003005	545003005	545003005	545003005
59	1	LABEL WIRE		—	—	—	—	—	—
A1	1	DV-5A VALVE		SEE ORDERING PROCEDURE, SEPARATE DV-5A VALVES WITHOUT TRIM, FOR PART NUMBERS					
A2	2	WATERFLOW PRESSURE ALARM SWITCH, PS10-2 (AMER/APAC)		25710	25710	25710	25710	25710	25710
	2	WATERFLOW PRESSURE ALARM SWITCH, PS10-1 (EMEA)		0260	0260	0260	0260	0260	0260
A3	1	BUTTERFLY VALVE, G x G		51024A	51021A	—	—	—	—
	1	BFV-300 BUTTERFLY VALVE, G x G		—	—	59300G030WS	59300G040WS	59300G060WS	59300G080WS
A4	2	FIGURE 577 RIGID GROOVED COUPLING		57715ACP	57720ACP	—	—	—	—
	1	FIGURE 577 RIGID GROOVED COUPLING		—	—	57730ACP	57740ACP	57760ACP	57780ACP
A5	1	GROOVE x THREADED OUTLET WELDED TEE		545004000	545004001	—	—	—	—
A6	1	SOLENOID VALVE NORMALLY CLOSED		REFER TO TFP2180					
A7	1	INVERTED FLARE SHUT-OFF VALVE*		545100100	545100100	545100099	545100100	545100100	545100100
A8	1	FLARE FITTING 90° 1/2" NPT x 1/2" TUBE		545100062	545100062	545100062	545100062	545100062	545100062
A9	1	TUBING ASSY, DIAPHRAGM CHAMBER SUPPLY		540000015	540000020	540000030	540000040	540000060	540000080

NOTE:

a. Not VdS Approved
CH - Common Hardware - See Materials of Construction section for specifications.

FIGURE 6 (2 OF 2)
DV-5A VALVES — SINGLE INTERLOCK PREACTION ELECTRIC ACTUATION TRIM
EXPLODED VIEW

Nominal Valve Size ANSI Inches (DN)	Inches (mm)								
	A	B	C	D	E	F	G	H	J
1 1/2 (40)	2.8 (71)	9.7 (246)	10.4 (264)	15.7 (399)	16.2 (411)	7.3 (185)	10.2 (259)	8.0 (203)	1.2 (31)
2 (50)	2.8 (71)	9.7 (246)	10.4 (264)	15.7 (399)	16.2 (411)	7.3 (185)	10.2 (259)	3.8 (97)	2.9 (74)
3 (80)	3.0 (76)	10.9 (277)	12.0 (305)	16.3 (414)	18.5 (470)	5.8 (147)	13.8 (351)	3.9 (99)	3.6 (91)
4 (100)	3.0 (76)	12.2 (310)	13.1 (333)	16.5 (419)	21.0 (533)	5.1 (130)	16.8 (427)	4.5 (114)	4.3 (109)
6 (150)	4.5 (114)	13.6 (345)	15.0 (381)	18.4 (467)	24.8 (630)	3.4 (86)	22.4 (569)	5.9 (150)	5.7 (145)
8 (200)	5.3 (135)	16.3 (414)	17.2 (437)	19.5 (495)	29.2 (742)	2.9 (74)	27.5 (699)	5.2 (132)	6.7 (170)

Notes:

1. Dimensions based on drain valves being open.
2. Dimensions do not provide installation clearance.

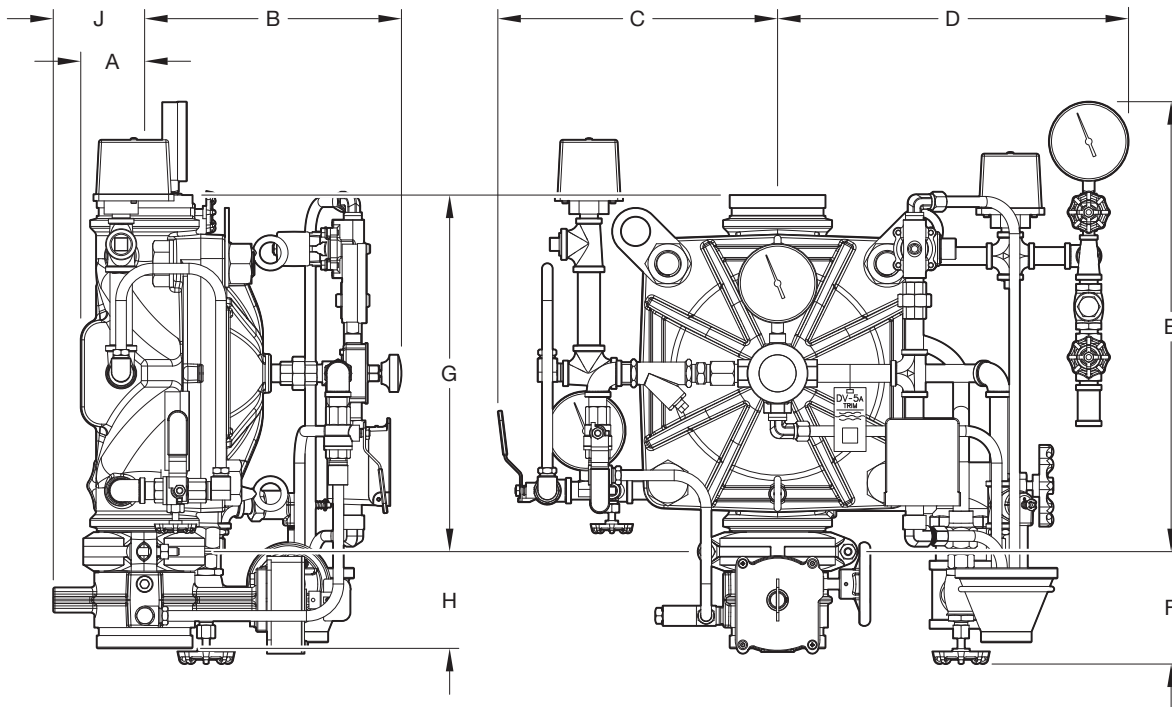


FIGURE 7
DV-5A VALVE
SINGLE INTERLOCK PREACTION ELECTRIC ACTUATION TRIM
NOMINAL DIMENSIONS

Valve Setting Procedure

Perform Steps 1 through 16 when initially setting the TYCO DV-5A Electric Actuation Valve, after an operational test of the fire protection system, or after system operation due to a fire. See Figure 8.

Step 1. Close the System Main Control Valve (B).

Step 2. Close the Diaphragm Supply Valve (P).

Step 3. Close the Supervisory Air Supply Valve (R).

Step 4. Open the Main Drain Valve (D), System Drain Valve (E), and all auxiliary drains in the system. Close the auxiliary drain valves and the System Drain Valve (E) after water ceases to discharge. Leave the Main Drain Valve (D) open.

At this time make certain that the Pressure Gauge Valves and the Alarm Control Valve (H), as applicable, are open.

Step 5. Depress the plunger of the Automatic Drain Valve (F) to verify that it is open.

Step 6. Clean the Diaphragm Supply Strainer (Q) by removing the clean-out plug and strainer basket. The Diaphragm Supply Strainer (Q) may be flushed out by momentarily opening the Diaphragm Supply Valve (P).

Step 7. Replace any operated sprinklers on the system piping, as applicable.

Step 8. Reset the automatic actuation system. Reset the electric detection system in accordance with the manufacturer's instructions to de-energize the solenoid valve.

Step 9. Operate (open) the Manual Control Station (M) and then open the Diaphragm Supply Valve (P). After unaerated water ceases to discharge from the Manual Control Station (M) drain tube, slowly close the operating lever by pushing it up. Do not close the hinged cover at this time.

Step 10. After allowing water to flow out of the Manual Reset Actuator (N) drain tube until aerated water ceases to discharge, reset the Manual Reset Actuator (N) by pressing the Reset Knob and hold until water stops flowing from its drain tube and the pressure builds and reaches approximately 15 psi (1,0 bar) on the Diaphragm Gauge (K). Pressure will then build up in the DV-5A Diaphragm Chamber.

Step 11. Verify the ability for the DV-5A Diaphragm to hold pressure as follows:

- With the diaphragm chamber pressurized per Step 10, temporarily close the Diaphragm Supply Valve (P), and then observe the Diaphragm Gauge (K) for a drop in pressure.
- If a drop in pressure is noted, the DV-5A Diaphragm is to be replaced and/or any leaks must be corrected before proceeding to the next step.
- If the Diaphragm Gauge (K) indicates no drop in pressure, re-open the Diaphragm Supply Valve (P) and proceed to the next step.

Step 12. Open the Supervisory Air Supply Valve (R) to reestablish supervisory system air pressure at nominally 10 psi (0,68 bar).

Step 13. Partially open the System Main Control Valve (B). Slowly close the Main Drain Valve (D) as soon as water discharges from the Main Drain Valve (D). Observe the Automatic Drain Valve (F) for leaks. If there are leaks, determine/correct the cause of the leakage problem before proceeding.

NOTICE

When the System Main Control Valve (B) is partially opened, the pressure on the DV-5A Diaphragm Chamber may increase. This increase in pressure is normal, and if the pressure is greater than 300 psi (20,7 bar), the pressure is to be relieved by partially and temporarily opening the Manual Control Station (M); however, do not allow the pressure as indicated on the Diaphragm Gauge (K) to drop below the supply pressure shown on the Water Supply Gauge (J), since this action may result in tripping of the DV-5A Valve.

Step 14. Close the hinged cover of the Manual Control Station (M) and insert a new break rod in the small hole through the top of the enclosing box.

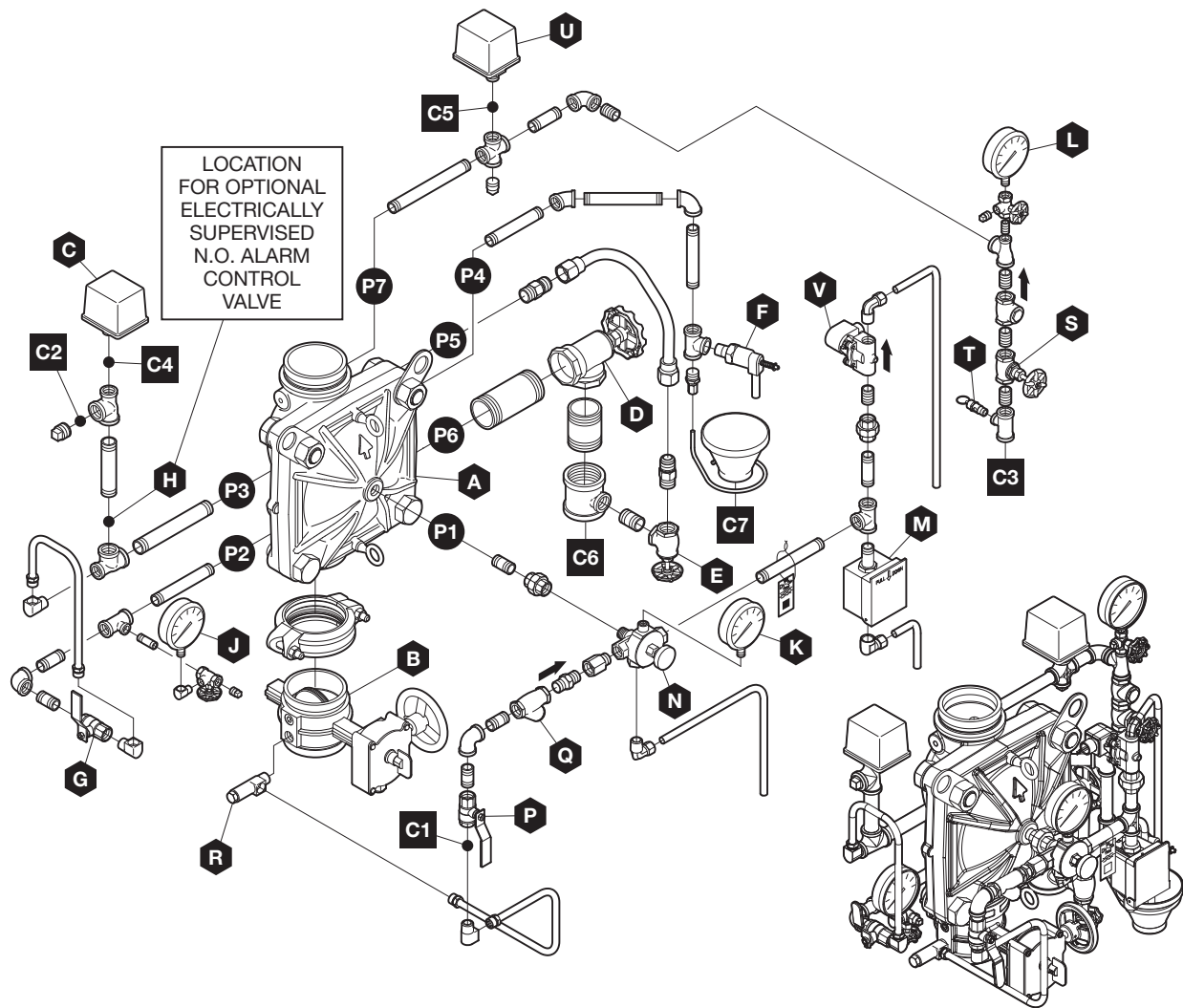
Step 15. Fully open the System Main Control Valve (B).

Step 16. After setting a fire protection system, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

Item	Description
A	DV-5A Valve
B	System Main Control Valve
C	Waterflow Pressure Switch
D	Main Drain Valve
E	System Drain Valve
F	Automatic Drain Valve
G	Alarm Test Valve
H	Alarm Control Valve (Optional)
J	Water Supply Gauge
K	Diaphragm Gauge

Item	Description
L	System Gauge
M	Manual Control Station
N	Manual Reset Actuator
P	Diaphragm Supply Valve
Q	Diaphragm Supply Strainer
R	Inverted Flare Shut-Off Valve
S	Supervisory Air Supply Valve
T	Supervisory Air Pressure Relief Valve
U	Supervisory Low Pressure Switch
V	Solenoid Valve

External Trim Connections	
C1	Diaphragm Supply Connection
C2	Water Motor Alarm Connection
C3	Supervisory Air Supply Connection
C4	Waterflow Pressure Alarm Switch Connection
C5	Low Air Pressure Alarm Switch Connection
C6	Main Drain Connection
C7	Drip Funnel Drain Connection



Note:
 Port Connections P1 through P7 are described in Figure 2.

FIGURE 8
DV-5A VALVE - SINGLE INTERLOCK PREACTION ELECTRIC ACTUATION
 (See Figure 6 for specific Bills of Materials)

Care and Maintenance

The following procedures and inspections must be performed as indicated, in addition to any specific requirements of the NFPA and any applicable standards recognized by the Approval agency. Any impairment must be immediately corrected. See Figure 8.

NOTICE

If the water supply needs to be shut off to the DV-5A valve and trim and cannot be shut off upstream of the system, close the System Main Control Valve (B), the Diaphragm Supply Valve (P), and the Inverted Flare Shut-Off Valve (R). This will allow any trim above the System Main Control Valve (B) to be taken apart for service if necessary.

The frequency at which the following procedures and inspections are to be performed are to be in accordance with the NFPA and any applicable specific requirements of the standards recognized by the Approval agency.

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 NFPA and any applicable standards recognized by the Approval agency. Contact the installing contractor or product manufacturer with any questions.

Some procedures in this section result in the operation of the associated alarms. Notify the owner and the fire department, central station, or other signal station to which the alarms are connected before performing the tests.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with the NFPA and any applicable standards recognized by the Approval agency.

Drop in Water Supply Pressure Below Normal Range

NOTICE

If the water supply pressure is significantly reduced below the normally expected static pressure range (as could occur in the case of a water main break or repair), and there is a subsequent drop in the diaphragm chamber water pressure below its normal range (for example, due to a leak in a piping connection to or from the diaphragm chamber or, a leak in the diaphragm chamber check valve caused by dirt or debris in the check valve seal area), a deluge valve such as the DV-5A could inadvertently trip, if its water supply pressure is quickly restored.

A drop in the water supply pressure to below its normal range (as in the case of an interrupted water supply condition) constitutes an emergency impairment.

Should this condition occur, immediately close the System Main Control Valve (B) and use the following procedure to reset the system:

Step 1. Prior to the water supply pressure being restored to the closed System Main Control Valve (B), note the pressure indicated by the Diaphragm Gauge (K) and determine if the pressure is within the normally expected range.

Step 2. If the diaphragm chamber pressure is below the normal range, check for and correct any source of leakage from the diaphragm chamber prior to resetting the system.

Step 3. After the water supply pressure is restored to the System Main Control Valve (B), reset the DV-5A Valve in accordance with the Valve Setting Procedure section.

NOTICE

For fire protection systems subject to an emergency impairment caused by an interrupted water supply condition, it is recommended that consideration be given to installing a low water supply pressure switch with the appropriate alarm/indications to monitor the water supply pressure.

Waterflow Alarm Test Procedure

To test the waterflow alarm, open the Alarm Test Valve (G), which will allow a flow of water to the Waterflow Pressure Switch (C) and/or Water Motor Alarm. Upon satisfactory completion of the test, close the Alarm Test Valve (G).

To ensure drainage of the alarm line, depress the plunger on the Automatic Drain Valve (F).

Supervisory Low Pressure Alarm Test Procedure

Proper operation of the Supervisory Low Pressure Switch (U) must be performed as follows:

Step 1. Open the System Drain Valve (E) just enough to slowly relieve supervisory air pressure from the system. Verify that the Supervisory Low Pressure Switch (U) is operational and that the low pressure set point is approximately 5 psi (0,34 bar).

Step 2. Close the System Drain Valve (E) and allow the system supervisory pressure of 10 ± 2 psi (0,69 \pm 0,14 bar) to be automatically re-established. The Supervisory Low Pressure Switch (U) 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 Supervisory Air Pressure Relief Valve (T). If the Supervisory Air Pressure Relief Valve (T) continues to bleed air after the system pressure has been reduced to its normal supervisory pressure range of 10 ± 2 psi (0,69 \pm 0,14 bar), most likely debris became lodged in the seating area. To help clean the seating area, slowly pull up on the ring at the top of the Supervisory Air Pressure Relief Valve (T) to allow a full flow of air through the Supervisory Air Pressure Relief Valve (T), and then release the ring to allow the Supervisory Air Pressure Relief Valve (T) to snap closed. Repeat the cleaning procedure as necessary.

Electric Actuation Solenoid Valve Test Procedure

Proper operation of the Solenoid Valve (V) for electric actuation must be verified at as follows:

Step 1. Close the System Main Control Valve (B).

Step 2. Open the Main Drain Valve (D).

Step 3. Test the deluge releasing panel in accordance with the manufacturer's instructions to energize the solenoid valve.

Step 4. Verify that there is a flow of water from the Solenoid Valve drain connection.

Step 5. Verify that the Diaphragm Chamber pressure has decreased to below 25% of the water supply pressure.

Step 6. Reset the electric detection system in accordance with the manufacturer's instructions to de-energize the Solenoid Valve (V), and proceed as follows:

- Water should cease draining from the Solenoid Valve (V) but remain draining from the Manual Reset Actuator (N).
- Press the Reset Knob on the Manual Reset Actuator (N) and hold it a few seconds until water stops flowing from its drain tube.
- Pressure will then build up in the DV-5A Diaphragm Chamber.
- After system pressure is restored in the DV-5A Diaphragm Chamber, inspect the Solenoid Valve (U) and Manual Reset Actuator (N) for leaks at the drain tube. Any leaks must be corrected before proceeding to the next step.

Step 7. Partially open the System Main Control Valve (B). Slowly close the Main Drain Valve (D) as soon as water discharges from the Main Drain Valve (D). Observe the Automatic Drain Valve (F) for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, the DV-5A Valve is ready to be placed in service and the System Main Control Valve (B) must then be fully opened.

Internal Valve Inspection

Once every five years during the annual operational test procedure and prior to the DV-5A Valve being reset and with the DV-5A Valve de-pressurized, the interior of the DV-5A 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.)

NOTICE

The Diaphragm Cover may be removed between Steps 4 and 5 of the resetting instructions, since at that point the DV-5A Valve should be de-pressurized as evident by a zero gauge reading on the Diaphragm Gauge (K) and Water Supply Gauge (J), as well as no water discharging from the Automatic Drain Valve (F).

To perform internal valve inspection between Steps 4 and 5 of the Valve Setting Procedure remove the Diaphragm cover as follows:

Step 1. Close the Inverted Flare Shut-Off Valve (R).

Step 2. Remove the Copper Tube Fitting between the Diaphragm Supply Valve (P) and the Inverted Flare Shut-Off Valve (R).

Step 3. Loosen the union securing the Electric Actuation Trim and remove the Electric Actuation Trim.

Step 4. Loosen and remove the union between the Diaphragm Cover and the MRA-1 Manual Reset Actuator (N) and remove the MRA-1 Manual Reset Actuator (N) subassembly.

Step 5. Remove the Diaphragm Valve Cover hardware, then slowly remove the Diaphragm Cover and perform internal valve inspection. Clean the valve interior and replace parts as necessary.

After cleaning and inspecting valve interior, and replacing parts as necessary, reinstall the Diaphragm Cover by completing the following steps to assure the Diaphragm Cover Fasteners are uniformly and securely tightened.

Step 1. With reference to Figure 1, ensure that the Diaphragm is properly oriented and that the proper hardware arrangement is utilized when assembling the Diaphragm Covers. The hardware arrangements differ depending on the size of the DV-5A Valve.

Step 2. By first using the Long Hex Bolts, support of the Diaphragm Cover will be provided before installing the Short Hex Bolts. Align Diaphragm in proper orientation with Valve Body, and then align Diaphragm Cover in proper orientation with Valve Body. Hand-tighten all fasteners.

Step 3. Using crossdraw sequence to assure uniformity, wrench-tighten Long Hex Bolts and Short Hex Bolts to appropriate torque values. Repeat crossdraw sequence two to three times at incremental torque values until reaching the torque values found in Table B.

Step 4. Inspect to assure all Hex Bolts are securely tightened.

Step 5. Using the union, secure the MRA-1 Manual Reset Actuator (N) to the Diaphragm Cover.

Step 6. Using the union, secure the Electric Actuation Trim.

Step 7. Replace the Copper Tube Fitting between the Diaphragm Supply Valve (P) and the Inverted Flare Shut-Off Valve (R).

Nominal Valve Sizes ANSI Inches (DN)	Torque lb-ft (N·m)	
	Nuts	Short Hex Bolts
1 1/2 (40)	44 (59,7)	35 (47,5)
2 (50)	44 (59,7)	35 (47,5)
3 (80)	188 (254,9)	150 (203,4)
4 (100)	396 (536,9)	316 (428,4)
6 (150)	265 (359,3)	212 (287,4)
8 (200)	545 (738,9)	436 (591,1)

**TABLE B
DIAPHRAGM COVER BOLTS
MINIMUM TORQUE**

Step 8. Ensure that the unions and flare fittings are securely tightened.

Step 9. With the Diaphragm Supply Valve (P) closed, fully open the Inverted Flare Shut-Off Valve (R) stainless steel screw (approximately 1/2 in.) until resistance is met so as not to break the internal roll-pin. The internal roll-pin stops the removal of the Inverted Flare Shut-Off Valve (R) stainless steel screw.

Step 10. Proceed with Step 5 of the Valve Setting Procedures section in this data sheet.

NOTICE

If the water supply contains chemicals which tend to attack a polyester fabric-reinforced, EPDM rubber or the five year inspection indicates a build-up of debris within the DV-5A Valve that could affect its proper operation, then the frequency of the internal valve inspection procedure must be appropriately increased.

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

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

Use only TYCO replacement fasteners as specified in Figure 1.

Do not apply adhesives, lubricants, or other substances to the Diaphragm Valve Body.

Limited Warranty

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

Ordering Procedure

The TYCO DV-5A Automatic Water Control Valves may be ordered as follows:

Pre-Assembled Valves with Trim

DV-5A Valves with Galvanized Trim and Butterfly Valve

Specify: Size (specify), DV-5A Automatic Water Control Valve, G x G connections with assembled galvanized Americas Single Interlock Praction Electric Actuation Trim, complete with assembled Model BFV-300 Butterfly Valve, P/N (specify):

Groove x Groove

1 1/2 in. (DN40)	551011315
2 in. (DN50)	551011320
3 in. (DN80)	551011330
4 in. (DN100)	551011340
6 in. (DN150)	551011360
8 in. (DN200)	551011380

Notes:

AMERICAS DV-5A Valve with Trim and Butterfly Valve: Americas pressure switches, P/N 52-287-1-124 solenoid valve, and psi/kPa water pressure gauges are provided.

This arrangement is available for EMEA and APAC upon request. Contact your local distributor.

AMERICAS

DV-5A Valves with Galvanized Trim

Specify: Size (specify), DV-5A Automatic Water Control Valve, (specify) end connection with assembled galvanized Americas Single Interlock Praction Electric Actuation Trim, P/N (specify):

Groove x Groove

1 1/2 in. (DN40)	550011315
2 in. (DN50)	550011320
3 in. (DN80)	550011330
4 in. (DN100)	550011340
6 in. (DN150)	550011360
8 in. (DN200)	550011380

Flange x Flange ANSI

3 in. (DN80)	550021330
4 in. (DN100)	550021340
6 in. (DN150)	550021360
8 in. (DN200)	550021380

Flange x Grove ANSI

3 in. (DN80)	550031330
4 in. (DN100)	550031340
6 in. (DN150)	550031360
8 in. (DN200)	550031380

T x T NPT

1 1/2 in. (DN40)	550061315
2 in. (DN50)	550061320

Separate DV-5A Valves without Trim
See Table A for flange drilling specifications.

Specify: Size (specify), DV-5A Automatic Water Control Valve, (specify) end connection, P/N (specify):

Groove x Groove

1 1/2 in. (DN40)	530010015
2 in. (DN50)	530010020
3 in. (DN80)	530010030
4 in. (DN100)	530010040
6 in. (DN150)	530010060
8 in. (DN200)	530010080

Flange x Flange ANSI

3 in. (DN80)	530020030
4 in. (DN100)	530020040
6 in. (DN150)	530020060
8 in. (DN200)	530020080

Flange x Grove ANSI

3 in. (DN80)	530030030
4 in. (DN100)	530030040
6 in. (DN150)	530030060
8 in. (DN200)	530030080

T x T NPT

1 1/2 in. (DN40)	530060015
2 in. (DN50)	530060020

Notes:

Valves are typically provided with flange drilling per ANSI B16.1 (Class 125) or ISO (7005-2 PN16).

Upon request, valves can be provided with flange drilling per JIS B 2210 or AS 2129. In which case part numbers are not assigned.

DV-5A Valve Trim

Specify: Size (specify), finish (specify), Electric Actuation Trim for DV-5A Automatic Water Control Valves used in Single Interlock Praction Fire Protection System, P/N (specify):

Galvanized

1 1/2 in. (DN40)	540001320
2 in. (DN50)	540001320
3 in. (DN80)	540001330
4 in. (DN100)	540001340
6 in. (DN150)	540001360
8 in. (DN200)	540001380

Black

1 1/2 in. (DN40)	542001320
2 in. (DN50)	542001320
3 in. (DN80)	542001330
4 in. (DN100)	542001340
6 in. (DN150)	542001360
8 in. (DN200)	542001380

Note:

Pressure switches and/or solenoid valves for electric actuation are separately ordered.

EMEA

DV-5A Valves with Galvanized Trim

Specify: Size (specify), DV-5A Automatic Water Control Valve, (specify) end connection with assembled galvanized EMEA Single Interlock Praction Electric Actuation Trim, P/N (specify):

Groove x Groove

1 1/2 in. (DN40)	550111315
2 in. (DN50)	550111320
3 in. (DN80)	550111330
4 in. (DN100)	550111340
6 in. (DN150)	550111360
8 in. (DN200)	550111380

Flange x Flange ANSI

3 in. (DN80)	550121330
4 in. (DN100)	550121340
6 in. (DN150)	550121360
8 in. (DN200)	550121380

Flange x Groove ANSI

3 in. (DN80)	550131330
4 in. (DN100)	550131340
6 in. (DN150)	550131360
8 in. (DN200)	550131380

Flange x Flange ISO

3 in. (DN80)	550141330
4 in. (DN100)	550141340
6 in. (DN150)	550141360
8 in. (DN200)	550141380

Flange x Groove ISO

3 in. (DN80)	550151330
4 in. (DN100)	550151340
6 in. (DN150)	550151360
8 in. (DN200)	550151380

T x T ISO

1 1/2 in. (DN40)	550171315
2 in. (DN50)	550171320

Notes:

Pressure switches, P/N 52-287-1-124 solenoid valve, bar/psi water pressure gauges, and NPT to ISO threaded trim adaptors for external connections are provided.

Separate DV-5A Valves without Trim

See Table A for flange drilling specifications.

Specify: Size (specify), DV-5A Automatic Water Control Valve, (specify) end connection, P/N (specify):

Groove x Groove

1 1/2 in. (DN40)	530010015
2 in. (DN50)	530010020
3 in. (DN80)	530010030
4 in. (DN100)	530010040
6 in. (DN150)	530010060
8 in. (DN200)	530010080

Flange x Flange ANSI

3 in. (DN80)	530020030
4 in. (DN100)	530020040
6 in. (DN150)	530020060
8 in. (DN200)	530020080

Flange x Grove ANSI

3 in. (DN80)	530030030
4 in. (DN100)	530030040
6 in. (DN150)	530030060
8 in. (DN200)	530030080

T x T NPT

1 1/2 in. (DN40)	530060015
2 in. (DN50)	530060020

Flange x Flange ISO

3 in. (DN80)	530040030
4 in. (DN100)	530040040
6 in. (DN150)	530040060
8 in. (DN200)	530040080

Flange x Groove ISO

3 in. (DN80)	530050030
4 in. (DN100)	530050040
6 in. (DN150)	530050060
8 in. (DN200)	530050080

T x T ISO

1 1/2 in. (DN40)	530070015
2 in. (DN50)	530070020

Notes:

Valves are typically provided with flange drilling per ANSI B16.1 (Class 125) or ISO (7005-2 PN16).

Upon request, valves can be provided with flange drilling per JIS B 2210 or AS 2129. In which case part numbers are not assigned.

DV-5A Valve Trim

Specify: Size (specify), finish (specify), Electric Actuation Trim for DV-5A Automatic Water Control Valves used in Single Interlock Preaction Fire Protection System, P/N (specify):

Galvanized

1 1/2 in. (DN40)	540101320
2 in. (DN50)	540101320
3 in. (DN80)	540101330
4 in. (DN100)	540101340
6 in. (DN150)	540101360
8 in. (DN200)	540101380

Black

1 1/2 in. (DN40)	542101320
2 in. (DN50)	542101320
3 in. (DN80)	542101330
4 in. (DN100)	542101340
6 in. (DN150)	542101360
8 in. (DN200)	542101380

Note: Pressure switches, solenoid valves for electric actuation, water pressure gauges, and BFV-300 Butterfly Valve are separately ordered. NPT to ISO threaded adaptors are provided for External Trim Connections (drains, pressure switches, water motor alarms, etc.).

APAC**DV-5A Valves with Galvanized Trim**

Specify: Size (specify), DV-5A Automatic Water Control Valve, (specify) end connection with assembled galvanized APAC Single Interlock Preaction Electric Actuation Trim, P/N (specify):

Groove x Groove

1 1/2 in. (DN40)	550011315
2 in. (DN50)	550011320
3 in. (DN80)	550011330
4 in. (DN100)	550011340
6 in. (DN150)	550011360
8 in. (DN200)	550011380

Flange x Flange ANSI

3 in. (DN80)	550021330
4 in. (DN100)	550021340
6 in. (DN150)	550021360
8 in. (DN200)	550021380

Flange x Groove ANSI

3 in. (DN80)	550031330
4 in. (DN100)	550031340
6 in. (DN150)	550031360
8 in. (DN200)	550031380

T x T NPT

1 1/2 in. (DN40)	550061315
2 in. (DN50)	550061320

Flange x Flange ISO

3 in. (DN80)	550041330
4 in. (DN100)	550041340
6 in. (DN150)	550041360
8 in. (DN200)	550041380

Flange x Groove ISO

3 in. (DN80)	550051330
4 in. (DN100)	550051340
6 in. (DN150)	550051360
8 in. (DN200)	550051380

Note: Pressure switches, P/N 52-287-1-124 solenoid valve, and psi/kPa water pressure gauges are provided.

Separate DV-5A Valves without Trim
See Table A for flange drilling specifications.

Specify: Size (specify), DV-5A Automatic Water Control Valve, (specify) end connection, P/N (specify):

Groove x Groove

1 1/2 in. (DN40)	530010015
2 in. (DN50)	530010020
3 in. (DN80)	530010030
4 in. (DN100)	530010040
6 in. (DN150)	530010060
8 in. (DN200)	530010080

Flange x Flange ANSI

3 in. (DN80)	530020030
4 in. (DN100)	530020040
6 in. (DN150)	530020060
8 in. (DN200)	530020080

Flange x Groove ANSI

3 in. (DN80)	530030030
4 in. (DN100)	530030040
6 in. (DN150)	530030060
8 in. (DN200)	530030080

T x T NPT

1 1/2 in. (DN40)	530060015
2 in. (DN50)	530060020

Flange x Flange ISO

3 in. (DN80)	530040030
4 in. (DN100)	530040040
6 in. (DN150)	530040060
8 in. (DN200)	530040080

Flange x Groove ISO

3 in. (DN80)	530050030
4 in. (DN100)	530050040
6 in. (DN150)	530050060
8 in. (DN200)	530050080

T x T ISO

1 1/2 in. (DN40)	530070015
2 in. (DN50)	530070020

Notes:

Valves are typically provided with flange drilling per ANSI B16.1 (Class 125) or ISO (7005-2 PN16).

Upon request, valves can be provided with flange drilling per JIS B 2210 or AS 2129. In which case part numbers are not assigned.

DV-5A Valve Trim

Specify: Size (specify), finish (specify), Electric Actuation Trim for DV-5A Automatic Water Control Valves used in Single Interlock Preaction Fire Protection System, P/N (specify):

Galvanized

1 1/2 in. (DN40)	540001320
2 in. (DN50)	540001320
3 in. (DN80)	540001330
4 in. (DN100)	540001340
6 in. (DN150)	540001360
8 in. (DN200)	540001380

Black

1 1/2 in. (DN40)	542001320
2 in. (DN50)	542001320
3 in. (DN80)	542001330
4 in. (DN100)	542001340
6 in. (DN150)	542001360
8 in. (DN200)	542001380

Note: Pressure switches and/or solenoid valves for electric actuation are separately ordered.

DV-5A Valve Trim Accessories**(for separately ordered valve trim)**

Specify: Specify Accessory Description), P/N (specify):

Waterflow Pressure Alarm Switch, Potter PS10-2 (America/APAC)	25720
Waterflow Pressure Alarm Switch PS10-1 (EMEA)	0260
Supervisory Air Pressure Alarm Switch, Potter PS40-2 (America/APAC)	25710
Supervisory Air Pressure Alarm Switch PS40-1 (EMEA)	0262
Model WMA-1 Water Motor Alarm (America/APAC)	526301001P
Model WMA-1 Water Motor Alarm (EMEA)	526301021R
Model G16AC812 Automatic Supervisory Air Supply	521201001
Model AMD-1 Air Maintenance Device	
Supervisory Air Supply	523242002
Model AMD-3 Nitrogen Maintenance Device	
Supervisory Air Supply	523282001
Water Gauges	
with bar/psi	025500013
600 psi Water Gauge psi/kPa (service pressure over 300 psi)	923431004
Solenoid Valve for Releasing Service	Refer to Technical Data Sheet TFP2180

DV-5A Valve Replacement Parts

Specify: (Description) for use with (specify size) DV-5A Automatic Water Control Valve, P/N (See Figure 1)

DV-5A Valve Trim Replacement Parts

Specify: (Description) for use with DV-5A Valve Trim, P/N (See Figure 6)

SECTION

3

General Air Products Manual

Riser and Tank Mounted Oilless Air Compressors Installation, Operation and Maintenance Manual



OL *Plus* **& OLT *Plus* Series**

Riser and Tank Mounted Oilless Air Compressors
**Installation, Operation and
Maintenance Manual**



Call **1-800-345-8207**
or visit our web site for our complete product listing
www.GeneralAirProducts.com

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If there are any questions regarding installation, operation, or maintenance of this compressor, please call 800-345-8207

**IMPORTANT: ALL INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE.
Consult factory for the most up to date version of this manual - 1-800-345-8207.**

Section 1 - Safety & Warnings

1.1 Safety Guidelines

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.



- Danger indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



- Warning indicates a potentially hazardous situation which, if not avoided **COULD** result in death or serious injury.



- Caution indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury.



- Notice indicates important information, that if not followed may cause damage to equipment.

1.2 General Information

This compressor is intended for installation indoors for use on dry sprinkler systems in accordance with the Standard for Installation of Sprinkler Systems, NFPA 13 and the National Electrical Code, NFPA 70. The compressor should be sized to restore and maintain the air pressure in the sprinkler system in accordance with the requirements in NFPA 13.

1.3 General Safety Information

1. Read all manuals included with this product carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
2. Follow all local electrical and safety codes as well as National Electrical Codes (NEC), Occupational Safety and Health Act (OSHA), and National Fire Protection Association (NFPA).
3. Only persons familiar with these rules of safe operation should be allowed to use the equipment.
4. Keep visitors away and NEVER allow children in the work area.
5. Wear safety glasses and use hearing protection when operating the unit.
6. Do not stand on or use the unit as a handhold.
7. **Periodic inspection and test of this equipment is required.** Consult your installer and local codes to meet all requirements.
8. Check all fasteners at frequent intervals for proper tightness.

1.4 Safety Notes



- This compressor is not equipped and should NOT be used “as is” to supply breathing quality air.



- Motors, electrical equipment and controls can cause electrical arcs that will ignite flammable gas or vapor. Never operate or repair in or near flammable gas or vapor. Never store flammable liquids or gasses near the compressor.



- These compressors are suitable for pumping only atmospheric air. As defined in Compressed Gas Association Pamphlet G-7, page 3, atmospheric air is a mixture of elements and compounds where nitrogen and oxygen comprise more than 99% with all other trace gasses comprising less than 1%. **Do not use this compressor in contaminated environments or for pumping mixtures other than atmospheric air.**



- Compressed air contains liquid water and is saturated with water vapor, which can freeze when surrounding temperatures are lower than 32°F (0°C). Component selection to minimize the effects of water vapor must be considered.

Section 2 - Receiving

Your compressor is inspected at the factory and packaged to protect against shipping damage. When the compressor is unpacked, inspect for damage or missing parts. All claims should be settled directly with the freight company.



- Do not operate this compressor if damaged during shipment, handling or use. Any damage may result in failure and cause injury or property damage.

Section 3 - Installation Location

Locate the compressor in a clean, well ventilated area where air is relatively cool, clean and dry. A 110°F (43°C) maximum and 40°F (4.5°C) minimum temperature for surrounding and inlet air are recommended. Provide at least 12 to 18 inches of clearance from any wall or other obstruction that will interfere with airflow over and through the compressor. Blocking airflow through the fan may cause the compressor to overheat. Do not place the compressor in an area of excessive heat, such as near a boiler.

Section 4 - Mounting

OL Plus Series (Riser mounted units) may be mounted to a firm level floor, wall or system riser. A mounting bracket and straps are provided. Tank mounted units must be leveled and anchored to the floor; the vibration isolators (P/N KVP4X4) supplied with the unit must be used. Both tank and riser mounted units are shipped with a flex hose and union. The flex hose (P/N P3002MP) is recommended to be installed between the compressor or tank outlet and service piping.

Section 5 - Lubrication



- This compressor is designed for non-lubricated service. Bearings are permanently lubricated. **Do not lubricate any part of the compressor or motor.**

Section 6 - Piping

6.1 Piping Instructions



- Compressed air contains liquid water and is saturated with water vapor, which can freeze when surrounding temperatures are lower than 32°F (0°C). Component selection to minimize the effects of water vapor must be considered.

Piping between the compressor, accessory items and the sprinkler system must be at least ½" internal diameter to minimize pressure drop from the compressor to system. Larger pipe size may be required by code and may be substituted with no adverse effects.



- Smaller line size must not be used and will restrict the compressor flow, lowering capacity and causing the compressor/motor to work harder, which shortens compressor/motor life. All piping connected to the compressor must be fully supported and not transfer any loads to the compressor.

If an AMD-1 is used, allow sufficient distance between the compressor and AMD-1 to ensure that the maximum temperature at the AMD-1 is 200°F or less.



- When an AMD is used with riser mounted units, a riser mounted tank kit (P/N OLR-TK) is recommended to prevent short cycling the compressor.

All oilless compressors include a relief valve. For riser mounted models, the relief valve is installed on the compressor. For tank mounted models, an ASME Code relief valve is mounted on the compressor tank. This valve will open at a preset value above the pressure switch setting to prevent excess tank pressure in the event of a switch failure.



- Do not attempt to change the safety relief valve setting.

A manual drain is provided on the bottom of each tank mounted compressor. Moisture accumulated in the tank must be drained weekly. An automatic drain, P/N DVA-2T, is recommended in areas of high humidity.

The compressor outlet piping should contain an accessible drain. As a minimum a manual drain may be used, but an automatic drain is recommended to remove excess water.

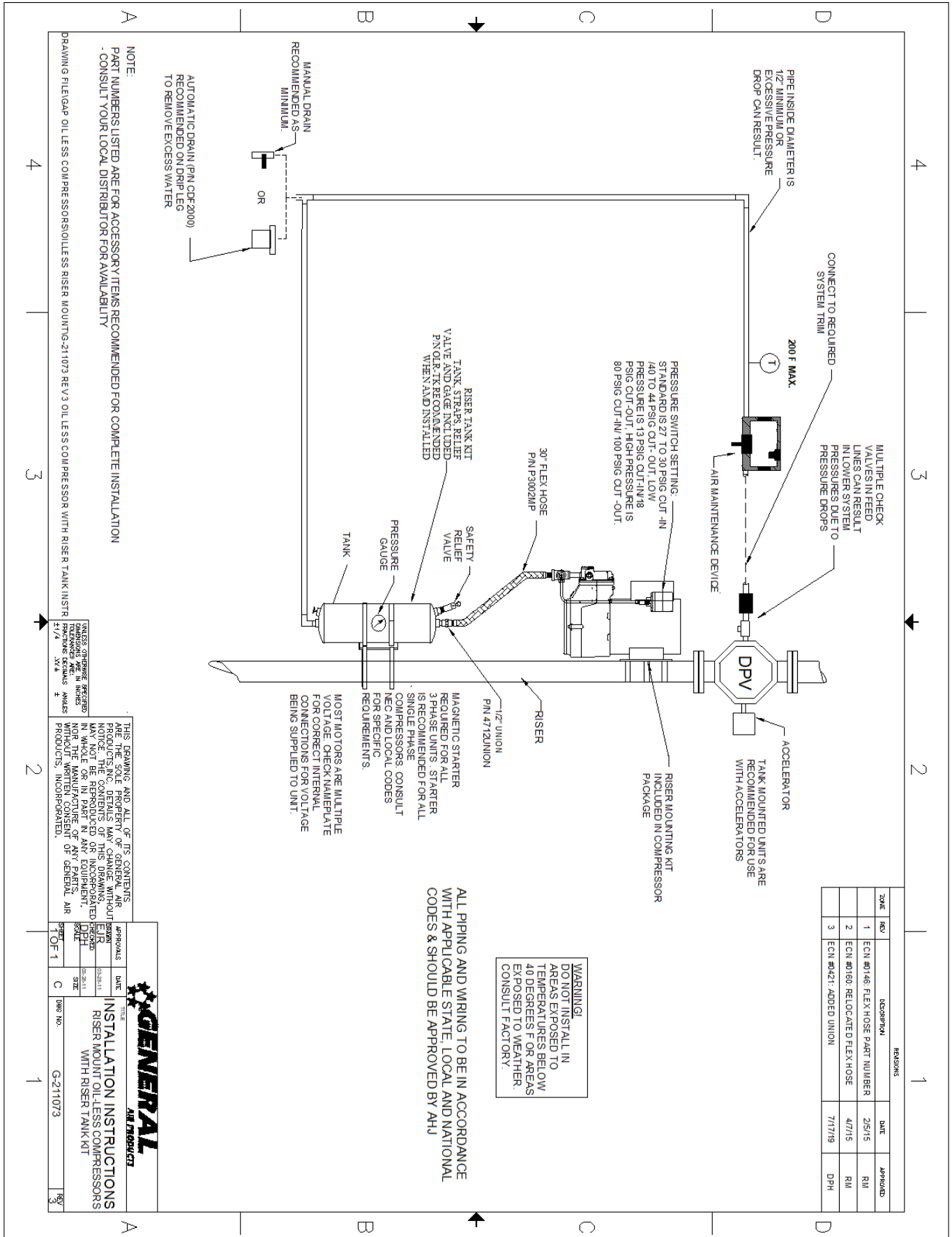


- Accumulation of condensed water in the system can cause corrosion of components and reduction of system capacity.



- Warranty is void if a separate check valve is not installed to prevent water backflow to compressor.

6.2 OL Plus Series Riser Mounted Oilless Air Compressor Installation Drawing



6.3 OLT Plus Series Tank Mounted Oilless Air Compressor Installation Drawing



Section 7 - Wiring

7.1 Wiring Instructions



- Wiring should be in accordance with the national electrical code and any local codes or regulations. Have a licensed and competent electrician ensure that the voltage supplied matches the compressor voltage.



- Inadequate wiring size can cause insufficient voltage at the compressor during start-up. Overheating and damage can result to the motor and controls.



- Failure to use the pressure switch may result in overpressure of the compressor or other components in the system. Overpressure of the compressor can result in blown head gaskets or other damage.



- Grounding Instructions: This product must be connected to a grounded, metallic, permanent wiring system, or an equipment grounding terminal or lead on the product.

The supply wire must be of adequate size and no other equipment should be connected to the same line. The adjacent table lists the recommended wire size for each model based on a 100' run and lowest operating voltage. Consult factory for longer runs. The motors supplied are multiple voltage motors. A label on the pressure switch cover indicates the voltage the motor is pre-wired for. If the supply voltage, on site, is different from the voltage indicated on this label, change the internal motor voltage connections to match the supply voltage. To change internal voltage connections, remove the cover plate located on the rear or side of the motor and reconnect the wire leads as shown on the motor's wiring diagram.

On all three phase compressors an arrow on the motor indicates the required direction of rotation of the compressor. If the compressor rotates in the opposite direction, reverse the rotation of the motor. Interchanging any two incoming supply wires reverses rotation of three phase motors.

Minimum Recommended Wire Size		
Model #	1 Phase	3 Phase
OL(T)12516**	12	N/A
OL(T)25033**	12	N/A
OL(T)36550**	12	12
OL(T)43075**	10	12
OL(T)615100**	6	12
OL(T)915150**	6	12
OL(T)1225200**	10	10
OL(T)32016**-LP	12	N/A
OL(T)55033**-LP	12	N/A
OL(T)86050**-LP	12	12
OL(T)99075**-LP	10	12



- Single-phase motors include internal thermal overload protection, which has an automatic reset device.



- Disconnect electrical power before servicing to disable reset devices. Thermal protection can automatically start the motor when the protector resets.

On single phase models, the motor is pre-wired to the pressure switch provided, which controls starting (cut in pressure) and stopping (cut out pressure) of the motor. The pressure switch is factory set. Standard models switch is set at 27 to 30 psig cut in and 40 to 44 psig cut out. Low pressure models ("-LP") switch is set at 13 psig cut in and 18 psig cut out. Consult General Air Products before adjusting the pressure switch.

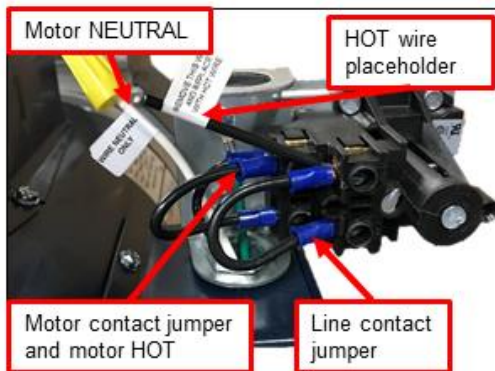
On three-phase compressors, the motor is not pre-wired to the pressure switch. Refer to the three phase wiring instruction drawing for recommended wiring. **A motor starter is required, for all three phase models, to protect the motor from overload conditions to meet NEC, NFPA70, Article 430. A motor starter is recommended, for all single phase models.** Consult the National Electric Code and local codes for motor starter requirements. Refer to the proper wiring instruction drawing for recommended wiring to a starter.



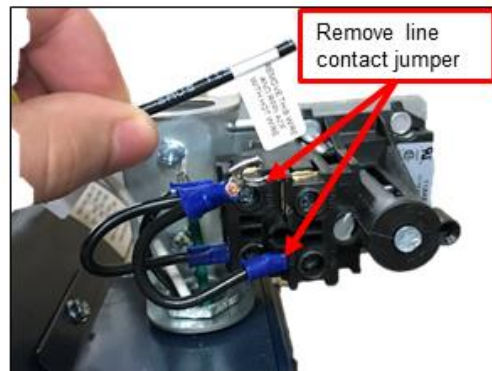
- Do not run two phases of a three phase supply through the pressure switch. Serious damage can result. Warranty is voided if connected this way.

Section 7 - Wiring

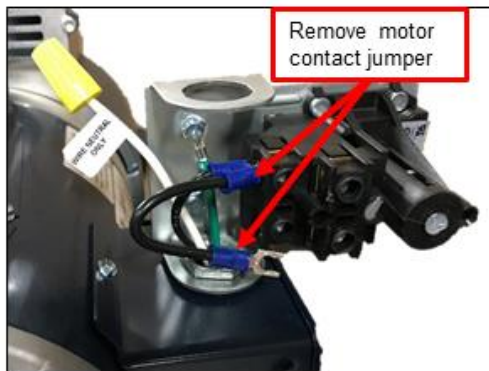
Convert Pressure Switch from 115V to 230V



1. Identification of wires.



2. Remove line contact jumper and HOT wire placeholder.



3. Remove motor contact jumper, leaving motor HOT in terminal. Retighten motor HOT wire in terminal.



4. Remove yellow wire nut from motor NEUTRAL.



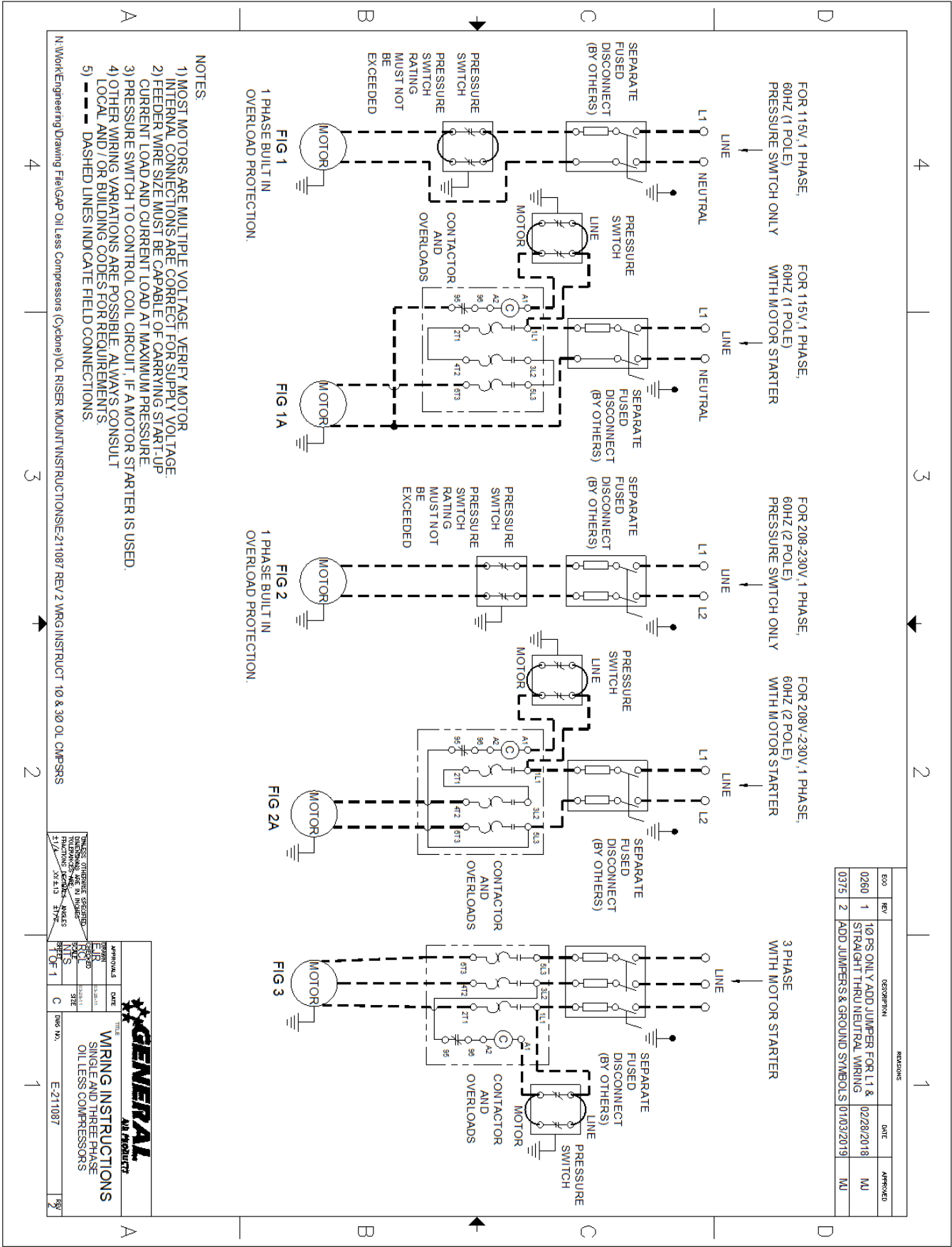
5. Crimp a spade connector onto NEUTRAL wire.



6. Insert spade connector into other motor terminal. Use wiring diagram on side of motor to wire it for 230V.
7. Wire supply line 1 and line 2 to line contacts of pressure switch.

Section 7 - Wiring

7.2 Oilless Air Compressor Single & 3 Phase Wiring Drawing



Section 8 - Maintenance Instructions



WARNING

- Disconnect, tag, and lock out power source then release all pressure from the system before attempting to install, service, relocate, or perform any service.

The following instructions are based on normal operation. If the compressor is in an excessively dusty area, increase frequency of maintenance checks.

Weekly:

- Drain condensate from receiver and traps
- Check for unusual noise or vibration
- Clean air filters (only with non-petroleum based products)
- Clean all external parts of the compressor and motor

Monthly:

- Manually test safety relief valve
- Inspect air system for leaks
- Tighten fitting, nuts, and screws as required

Quarterly:

- Change filters

Warranty can be voided if modifications or adjustments are made without consultation and approval from factory personnel.

If there are any questions regarding installation, operation, or maintenance of this compressor, please call 800-345-8207

Section 9 - Troubleshooting Guide

Symptom	Possible Cause(s)	Corrective Action
Motor hums and runs slowly or not at all.	1. Low or no voltage 2. Shorted or open motor winding 3. Defective check valve 4. Defective pressure switch - contacts will not close	1. Check voltage during start. Voltage must be within +/- 10% of nominal voltage to start motor. Increase wire size if necessary, to lower voltage drop. 2. Replace compressor 3. Replace check valve 4. Repair or replace pressure switch
Reset mechanism cuts out or fuses blow repeatedly	1. Insufficient voltage to motor 2. Pressure switch set too high 3. Wrong fuse size 4. Piping too restrictive 5. Defective motor	1. Check voltage during start. Voltage must be within +/- 10% of nominal voltage to start motor. Increase wire size if necessary, to lower voltage drop. 2. Consult factory, adjust or replace 3. Be sure fuses, heaters and/or overloads are properly rated or set 4. Add receiver vessel or increase pipe volume after compressor 5. Consult factory
Unit short cycles repeatedly	1. Piping too restrictive 2. Air leaks	1. Add receiver vessel or increase pipe volume after compressor 2. Repair leaks
Compressor overheating	1. Dirty intake filter 2. Wrong motor rotation 3. Air flow to fan blocked	1. Clean intake filter 2. Correct rotation 3. Clean air flow to fan or relocate unit
Excessive noise in operation	1. Damaged bearings 2. Worn piston cup 3. Broken valves 4. Loose fan 5. Damaged fan guard	Contact General Air Products for technical support by calling 1-800-345-8207
System pressure builds slowly	1. Compressor sized incorrectly 2. Leaks or restrictions in piping 3. Dirty intake filter	1. Check system size and compressor sizing 2. Correct leaks and remove restrictions 3. Clean intake filter

Section 10 - Warranty Policy

GENERAL PROVISIONS & LIMITATIONS

General Air Products, Inc. (the "Company") warrants to each original purchaser ("Purchaser") of its new products from the Company or its Authorized Distributor that such products are, at the time of delivery to the Purchaser, made with good materials and workman- ship. No warranty is made with respect to:

1. Any product, which has been repaired or altered in such a way, in the Companies judgment, as to affect the product adversely.
2. Any product, which has, in the Companies judgment been subjected to negligence, accident, improper storage, improper installation or application.
3. Any product, which has not been operated or maintained in accordance with the recommendations of the Company.
4. Components or accessories manufactured, warranted and serviced by others.
5. Any reconditioned or prior owned product.

Claims for items described in 4. above should be submitted directly to the manufacturer.

WARRANTY PERIOD

The Company's obligation under this Warranty is limited to repair or, at its option, replacing during normal business hours at the designated facility of the Company, any part that in its judgment proved not to be as warranted within the applicable Warranty Period as follows.

COMPONENTS

All non-consumable components are warranted for 12 months from the date of purchase. Consumables are not covered under warranty. The unit must have been installed by either a factory authorized distributor or agent in accordance with the factory recommendations taking into account all other local site conditions not originally noted to the factory. The unit must be operated and maintained in accordance with the Factory recommendations and original design conditions. Failure to provide such proof of the above may void warranty.

LABOR TRANSPORTATION & INSPECTION

The Company will repair or replace any product or part thereof which in the Companies judgment is proved to be not as warranted. Labor costs are not covered under warranty.

All costs of transportation of product, labor or parts claimed not to be as warranted and, of repaired or replaced parts to or from factory shall be borne by purchaser. The Company may require the return of any part claimed not to be as warranted to one of its facilities as designated by the Company, transportation prepaid by Purchaser, to establish a claim under this warranty.

Replacement parts provided under the terms of the warranty are warranted for the remainder of the Warranty Period of the product upon which installed to the same extent as if such parts were original components.

DISCLAIMER

THE FOREGOING WARRANTY IS EXCLUSIVE AND IT IS EXPRESSLY AGREED THAT, EXCEPT AS TO TITLE, THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OR MERCHANTABILITY.

THE REMEDY PROVIDED UNDER THIS WARRANTY SHALL BE THE SOLE, EXCLUSIVE AND ONLY REMEDY AVAILABLE TO THE PURCHASER AND IN NO CASE SHALL THE COMPANY BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES. UNDER NO CIRCUMSTANCES SHALL THE COMPANY BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, LOSSES OR DELAYS HOWSOEVER CAUSED.

No statement, representation, agreement, or understanding, oral or written, made by any agent, distributor, representative or employee of the Company which is not contained in this Warranty will be binding upon the company unless made in writing and executed by an officer of the Company.

This warranty shall not be effective as to any claim which is not presented within 30 days after the date upon which the product is claimed not to have been as warranted. Any action for breach of this warranty must be commenced within one year after the date upon which the cause of action occurred.

Any adjustment made pursuant to this warranty shall not be construed as an admission by the Company that any product was not as warranted.

PROMPT DISPOSITION & RETURNS POLICY

The Company will make a good faith effort for prompt correction or other adjustment with respect to any product, which proves to be defective within the warranty period. Before returning any product, write or call the distributor, agent or authorized company from which the product was purchased, describing defect and giving date and number of original invoice, as well as proof of Factory supplied consumables and proof of scheduled maintenance. No products will be accepted for return without the Company issuing a "Returned Goods Authorization" (RGA) to the Purchaser and unless accompanied by a properly authorized RGA request form initiated by the Purchaser. Return freight must be prepaid and each returned product must have the RGA number clearly marked on the product. Title and risk of loss pass to buyer upon delivery to the common carrier.

PRODUCT SUITABILITY

Many States, Localities and Countries have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While General Air Products, Inc. attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used? Before purchase and use of a product, please review the product application, and national and local codes and regulations, and be sure that the product, installation, and use will comply with them.

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SECTION

4

United Fire Systems
UFS-710

NAMD-1
Instruction Sheet

INSTRUCTION SHEET

Nitrogen / Air Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**

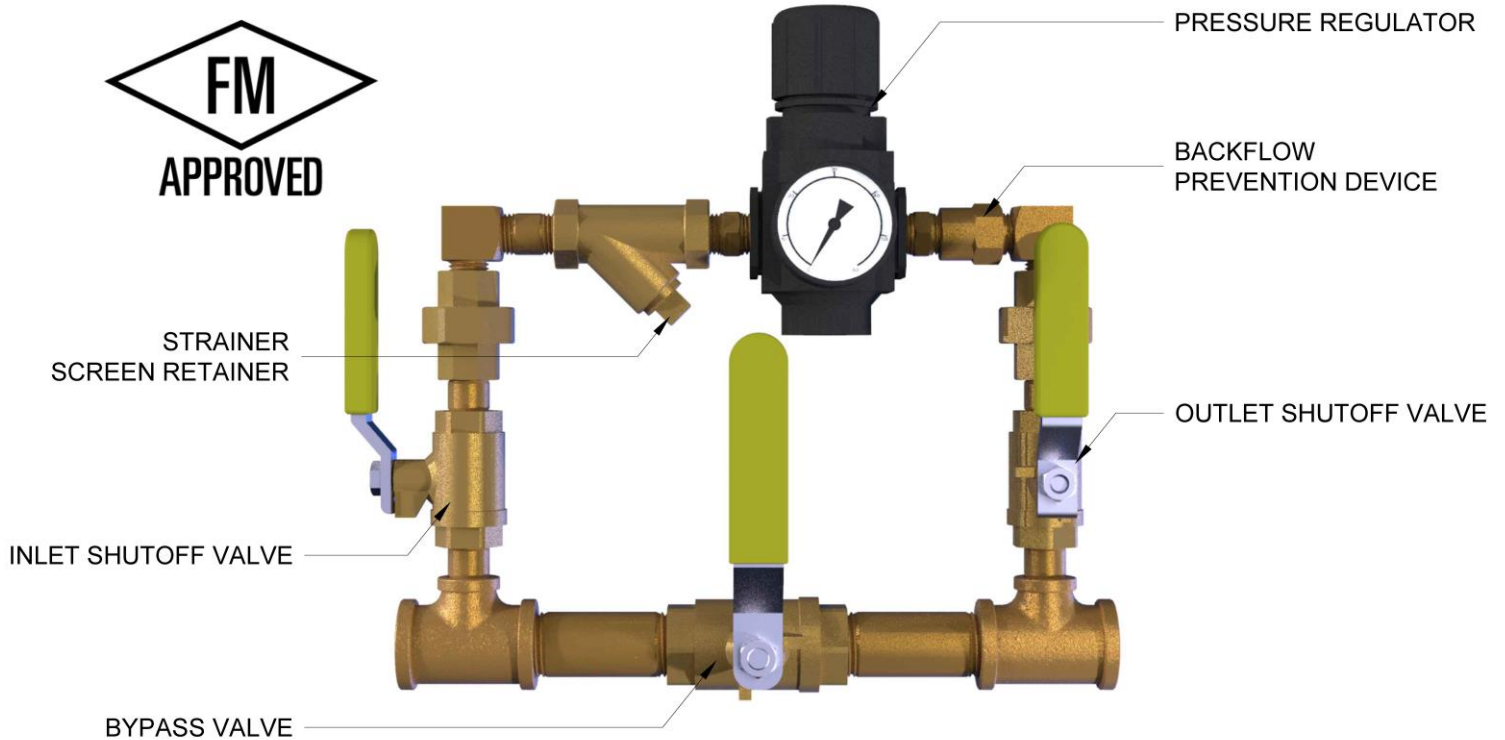


Figure 1

DESCRIPTION

The **UNITED Fire Systems Model NAMD-1** is an FM Approved device for controlling the nitrogen and / or air pressure in preaction and dry-pipe fire sprinkler piping. The device is equipped with a high-precision pressure regulator capable of providing accurate regulation over a wide range of inlet pressures and gas flows. This is especially important for sprinkler corrosion inhibiting systems supplying nitrogen to the sprinkler system, since most nitrogen systems provide less gas flow than a conventional air compressor.

SPECIFICATIONS

Model No.:	NAMD-1
Material (other than regulator):	Brass
Material (regulator body):	Zinc
Inlet:	1/2" NPT Female
Outlet:	1/2" NPT Female
Inlet Pressure Range:	0-175 PSIG (0-1200 kPa gauge)
Outlet Pressure Range:	15-60 PSIG (100-410 kPa gauge)
Maximum Pressure:	175 PSIG (1200 kPa)
Temperature Range:	-30°F to +150°F (-34°C to +65°C)
Dimensions (approx.):	9.75" L x 8.25" H (248 mm x 210 mm)
Weight (approx.):	7 lbs. (3.2 kg)

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INSTRUCTION SHEET

Nitrogen / Air Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**



1. INSTALLATION INSTRUCTIONS – READ AND UNDERSTAND BEFORE INSTALLATION

IMPORTANT



DO NOT disassemble the **Model NAMD-1** device!

- 1.1. Install the **Model NAMD-1** device in the nitrogen / air pressure supply line to the sprinkler valve trim.
- 1.2. **UNITED Fire Systems** highly recommends installing one (1) **Model NAMD-1** device for each sprinkler valve.
- 1.3. The device may be installed in any orientation.
- 1.4. Install the device as close as possible to the sprinkler valve receiving the pressure.
- 1.5. Locate the device in as a convenient place as possible, where the ball valves may be easily operated and the pressure gauge observed.
- 1.6. If the rigidity of the inlet and outlet piping is sufficient, no additional bracketing should be necessary. Otherwise, use standard split ring hangers and hardware to attach the device to the wall or other solid mounting location.

IMPORTANT



The **Model NAMD-1** device is designed to operate in one direction only. Refer to **Figure 1** to positively identify the **INLET** and **OUTLET** ports of the device.

- 1.7. Attach the piping from the pressure source to the **INLET** of the device. Piping shall be 1/2" nominal pipe size minimum. Use Teflon tape on the male pipe threads of the pipe only. DO NOT permit pipe thread sealant to enter the device.
- 1.8. Attach the piping from the **OUTLET** of the device to the proper connection point on the sprinkler valve trim. Piping shall be 1/2" nominal pipe size minimum. Use Teflon tape on the male threads of the pipe only. DO NOT permit pipe thread sealant to enter the device.
- 1.9. Proceed to the **COMMISSIONING** instructions below.

2. COMMISSIONING

- 2.1. Ensure all three (3) ball valves on the **Model NAMD-1** device are **CLOSED**.
- 2.2. Determine proper supervisory pressure for the sprinkler valve which the device is connected to.
- 2.3. Pull pressure regulator adjustment knob UP.
- 2.4. Turn pressure regulator adjustment knob COUNTERCLOCKWISE to remove all force from the regulating spring.
- 2.5. Apply nitrogen pressure from sprinkler corrosion inhibiting system to the device inlet.
- 2.6. Leak check the piping from the pressure source to the Model NAMD-1 device. Piping should be as leak-free as possible. Correct all leaks before proceeding.
- 2.7. Gradually open inlet shutoff valve. Pressure gauge on the device pressure regulator should indicate pressure.

IMPORTANT



When adjusting pressure regulator, always approach the desired adjustment from a LOWER to a HIGHER pressure.

- A. If pressure adjustment (as indicated on device pressure gauge) is LOW, turn pressure regulator adjustment knob CLOCKWISE to increase pressure to desired setting.
- B. If pressure adjustment (as indicated on the device pressure gauge) is HIGH, turn pressure regulator adjustment knob COUNTERCLOCKWISE to reduce pressure 3-5 PSIG below desired setting, then turn knob CLOCKWISE to increase pressure to desired setting.

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INSTRUCTION SHEET

Nitrogen / Air Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**



2. COMMISSIONING (continued)

- 2.8. Turn pressure regulator adjustment knob clockwise until pressure gauge indicates 2-3 PSIG above the desired supervisory pressure determined in step 2.2.
- 2.9. Gradually open outlet shutoff valve. Nitrogen pressure will reach the sprinkler valve trim.
- 2.10. Leak check the piping from the **Model NAMD-1** device to the sprinkler valve trim. Piping should be as leak-free as possible. Correct all leaks before proceeding.
- 2.11 Check that pressure gauge continues to indicate 2-3 PSIG above supervisory pressure. Adjust if necessary.
- 2.12. Push pressure regulator adjustment knob DOWN.

3. OPERATION

Table 1 – Valve Positions			
MODE	INLET Shutoff Valve	OUTLET Shutoff Valve	BYPASS Valve
No Gas Supply To Sprinkler Valve	Closed	Closed	Closed
Initial-Fill With Air	Closed	Closed	OPEN
Supply System With Nitrogen	OPEN	OPEN	Closed
DO NOT Operate	OPEN	OPEN	OPEN

4. INSPECTION AND MAINTENANCE

4.1 Monthly

- 4.1.1 Inspect the **Model NAMD-1** device valve position. Use Table 1 to verify that valve position is in accordance with desired MODE.
- 4.1.2 Inspect the pressure gauge. Verify that indicated pressure is 2-3 PSI above the desired supervisory pressure of the connected sprinkler valve. Refer to **2. COMMISSIONING** if regulator adjustment is required.

4.2 Annual At least annually, inspect and clean the device strainer screen.



Ensure that **Model NAMD-1** device is completely depressurized before inspecting and cleaning the strainer screen. Failure to do so can result in death or serious personal injury!



When ball valves have been CLOSED, the nitrogen / air supply is not available to pressurize the sprinkler system piping. Take required precautions to prevent inadvertent sprinkler valve operation. Notify applicable personnel of possible "low air" signals.

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INSTRUCTION SHEET

Nitrogen / Air Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**



4. INSPECTION AND MAINTENANCE (Continued)

4.2 Annual (Continued)

- 4.2.1 Ensure there is no pressure present in the **Model NAMD-1** device.
- 4.2.2 Hold device so that torque applied to strainer screen retainer does not move the device.
- 4.2.3 Refer to **Figure 1**. Apply suitable wrench to HEX on strainer screen retainer. Do NOT remove square plug.
- 4.2.4 Remove strainer screen retainer. Retain for replacement.
- 4.2.5 Examine rubber seal on strainer screen retainer. If damaged during removal, leakage may occur.
- 4.2.6 Remove strainer. Empty any loose material, and then flush with clean water. If necessary, use a wire brush to remove trapped particles. Dry strainer screen thoroughly before replacement.
- 4.2.7 If strainer screen is damaged, replace with new strainer screen UFS P/N 30-500003-401.
- 4.2.8 Insert strainer screen.
- 4.2.9 Replace strainer screen retainer, tightening wrench-tight.
- 4.2.10 See 2. COMMISSIONING to return Model NAMD-1 device to service.
- 4.2.11 Leak check the strainer screen retainer / strainer body connection. Correct leak if necessary.

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