UNITED FIRE SYSTEMS

PREACTION PAC
SPRINKLER VALVE ASSEMBLY®

with Potter ARC-100 Releasing Control Panel

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

Serial Number _____

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

FM APPROVED

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HAZARD IDENTIFICATION

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

DANGER

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.

WARNING

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.

CAUTION

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.

IMPORTANT

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 10-500003-00F.
- 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.

UFS-113 Rev. 2.01 Nov 2020

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, trim, and control panel 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 detection and control panel is mounted behind a door in the upper enclosure with a clear polycarbonate window allowing visual access to the system indicators. 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. Control Panel. A Potter ARC-100 releasing control panel is factory-installed in the upper enclosure. Programming for a basic preaction system is factory programmed and tested. Additional programming may be necessary after installation to suit field conditions. This manual provides complete instructions for additional programming. All necessary internal wiring connections are factory-installed and tested.

1.1.4. Wiring. All wiring from the integral control panel 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 control panel power, compressor power, detection circuits, notification appliance circuits, and circuits requiring contact closure is connected to terminal strips in the upper enclosure. No access to the lower enclosure is necessary to complete the wiring installation.

1.1.5. 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.

1.1.6. 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 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. Easy-to-follow instructions on enclosure front. System instructions, mounted behind clear plastic, are located on the front of the upper enclosure.

1.2.6. 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.

1.2.7. Separate mechanical and electrical enclosures. This allows mechanical and electrical trades to keep their work areas separate.

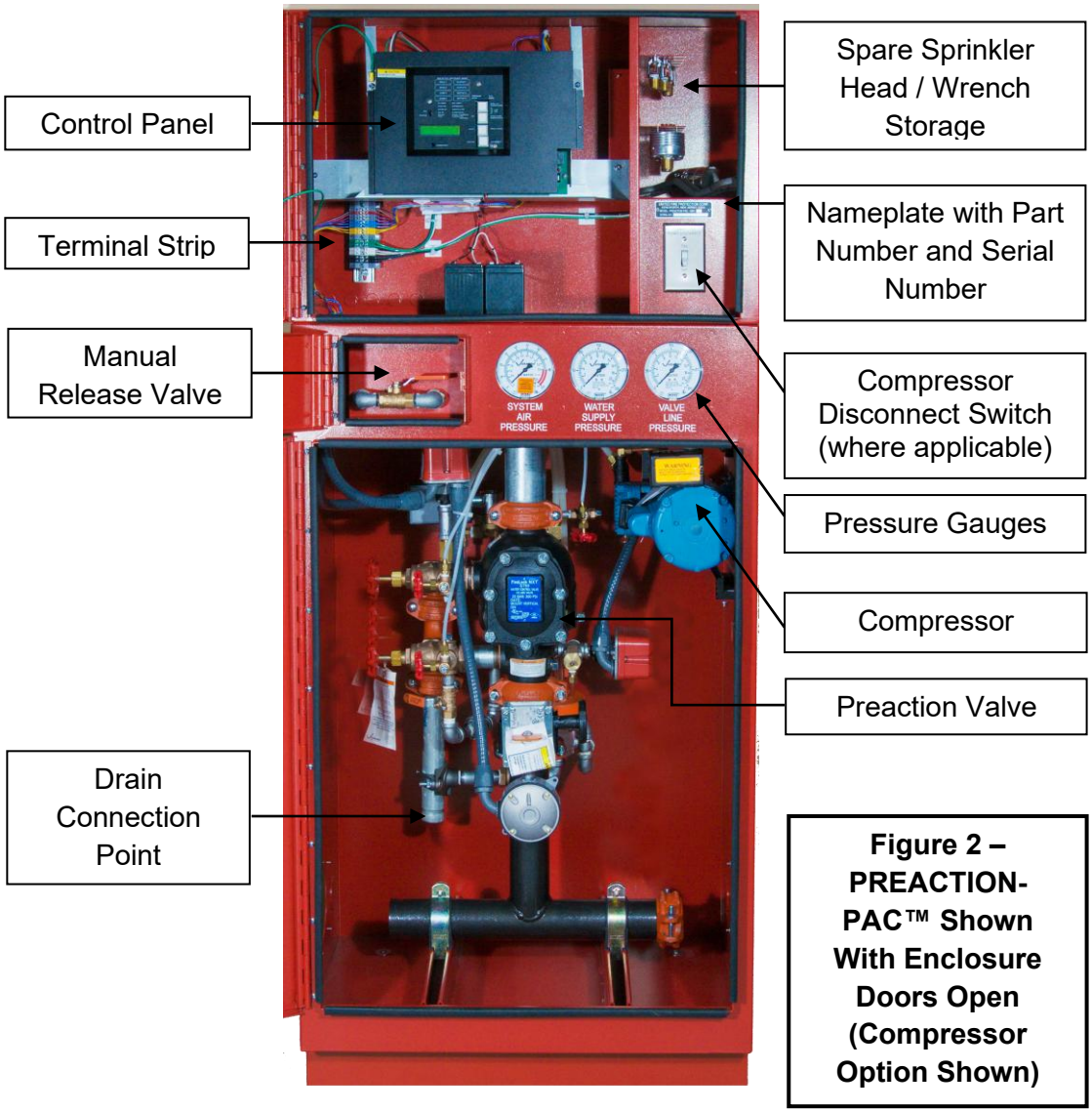


Figure 2 – PREACTION-PAC™ Shown With Enclosure Doors Open (Compressor Option Shown)

Figure 3a – Diagram - Functional Description with Compressor

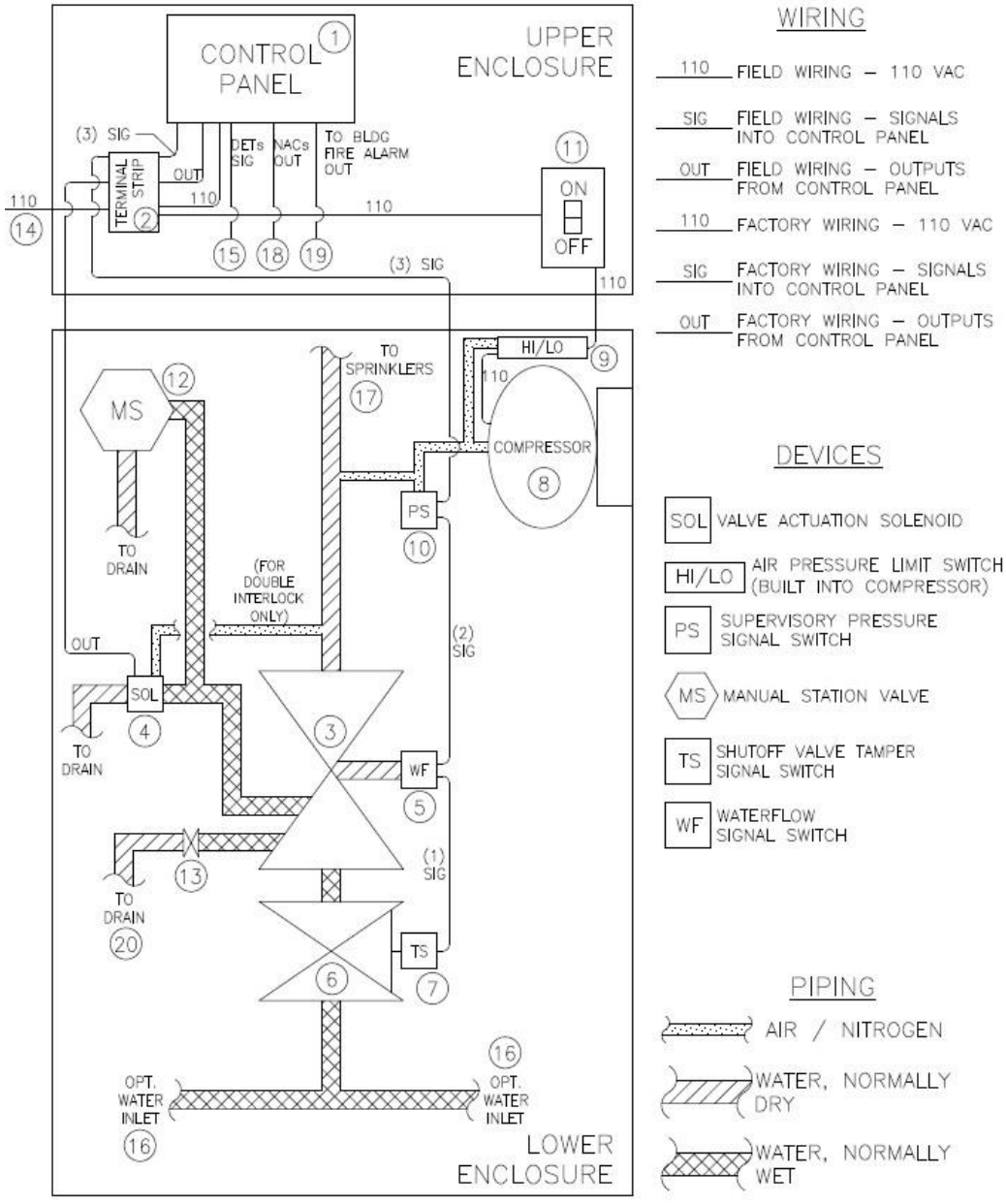
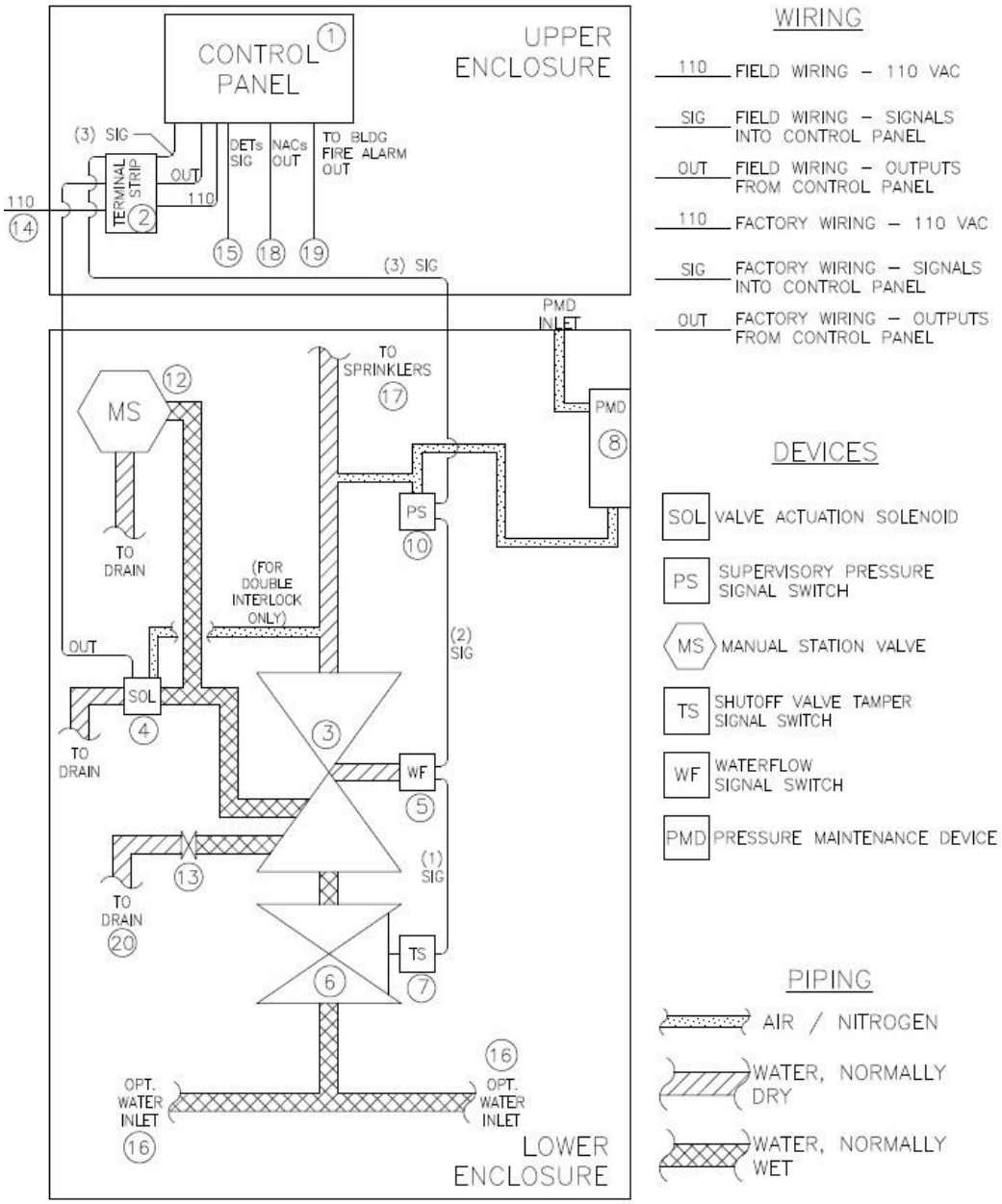


Figure 3b – Diagram - Functional Description
with Pressure Maintenance Device



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

1.3.1. Control panel (1). The control panel receives signals from fire detectors located in the protected space, as well as signals from various switches within the assembly. The panel processes the input signals per a pre-determined sequence of operation, and operates outputs for external audible / visual devices and building fire alarm signaling, as well as the signal to open the preaction valve within the assembly. Refer to the control panel instruction manual in Section 5 for details on the panel and the sequence of operation.

1.3.2. Terminal strip (2). The terminal strip provides a convenient point for landing some of the required field wiring and also serves as the interface point between the control panel (1) and the various connections in the lower enclosure.

1.3.3. Preaction valve (3). The preaction valve is the heart of the assembly. The valve holds back the sprinkler water until the control panel (1) reacts to the signal from the fire detectors and sends a signal to the valve actuation solenoid (4). 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 TFP1461 in Section 2 for more detailed information on the preaction valve.

1.3.4. Valve actuation solenoid (4). The valve actuation solenoid receives the signal from the control panel (1) and actuates the preaction valve (3). The Tyco solenoid valve 52-287-1-124 is rated at 24VDC, 0.83 amps, 22 watts. The solenoid valve is FM Approved as a trim component for the release of the Model DV-5a valve. Refer to Tyco Manual TFP1461 in Section 2 for more detailed information.

1.3.5. Waterflow signal switch (5). The waterflow signal switch responds to waterflow in the pipe downstream of the preaction valve (3). The switch contains two, SPDT (Form C) contacts, rated at 10A-125/250VAC, 2.5A-6/12/24VDC. Contacts transfer when waterflow begins after preaction valve opens. Contacts automatically restore when waterflow ceases. One contact is factory-wired to send a signal to the control panel (1). Refer to the control panel instruction manual in Section 5 for details on the response of the panel to the waterflow signal switch.

1.3.6. 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 TFP1461 in Section 2 for more detailed information on the use of this valve.

1.3.7. Shutoff valve tamper signal switch (7). The shutoff valve tamper signal switch sends a supervisory signal to the control panel (1) when the manual shutoff valve (6) is closed. The switch contains two SPDT (Form C) contacts, rated at 10A-125/250VAC, 0.5A-125VDC. Contacts transfer when valve begins to close. Contacts restore when valve is fully open. One contact is factory-wired to send a signal to the control panel (1). Refer to the control panel instruction manual in Section 5 for details on the response of the panel to the shutoff valve tamper signal switch.

1.3.8. 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 control panel (1).

1.3.9. 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 control panel (1).

1.3.10. High / low air pressure limit switch (9). Where applicable, the high / low air pressure limit switch is built into 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.

1.3.11. Supervisory pressure signal switch (10). The supervisory pressure signal switch sends the supervisory signal for low and high system pressure to the control panel (1). The switch contains two SPDT (Form C) contacts, rated at 10.1A-125/250VAC, 2.0A-30VDC. Low pressure contacts

transfer when pressure in the piping falls below 10PSIG. High pressure contacts transfer when pressure in the piping exceeds 25PSIG. Contacts automatically restore when system pressure is within normal range. Both contacts are factory-wired to send a signal to the control panel (1). Refer to the control panel instruction manual in Section 5 for details on the response of the panel to the supervisory pressure signal switch.

1.3.12. **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.

1.3.13. **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.

1.3.14. **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 TFP1461 in Section 2 for more detailed information on this valve. The normal position of this valve is closed.

1.3.15. **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 control panel (1) and, if equipped, the compressor (8). If local codes require individual 110VAC power sources for the control panel (1) and the compressor (8), jumpers may be removed from the terminal strip (2) permitting this. Refer to Section 1.10 for additional information on this connection.

1.3.16. **Input connection for automatic fire detectors (15).** Automatic fire detectors are required to provide the signal for opening the preaction valve (3). These detectors are field-connected to this connection. See Section 1.10, and refer to the control panel instruction manual in Section 5 for details on these detectors and this connection.

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.

1.3.17. **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 TFP1461 for more detailed information on this connection.

1.3.18. **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 TFP1461 for more detailed information on this connection.

1.3.19. Notification appliance output connection (18). Notification appliances are required by code to alert occupants that a fire has been detected. These appliances are field-connected to this connection. Refer to the control panel instruction manual in Section 5 for details on this connection.

1.3.20. Output connection to building fire alarm system (19). Most codes require a fire protection sub-system to signal the building fire alarm system. This signal is field-connected to this connection. Refer to the control panel instruction manual in Section 5 for details on this connection.

1.3.21. 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 TFP1461 for more detailed information on this connection.

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 type: Double Interlock.

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 the manual of the external source.

1.4.4. Control panel: A Potter ARC-100 conventional detection control panel is factory-installed in the upper enclosure.

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 9 and 10 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.”

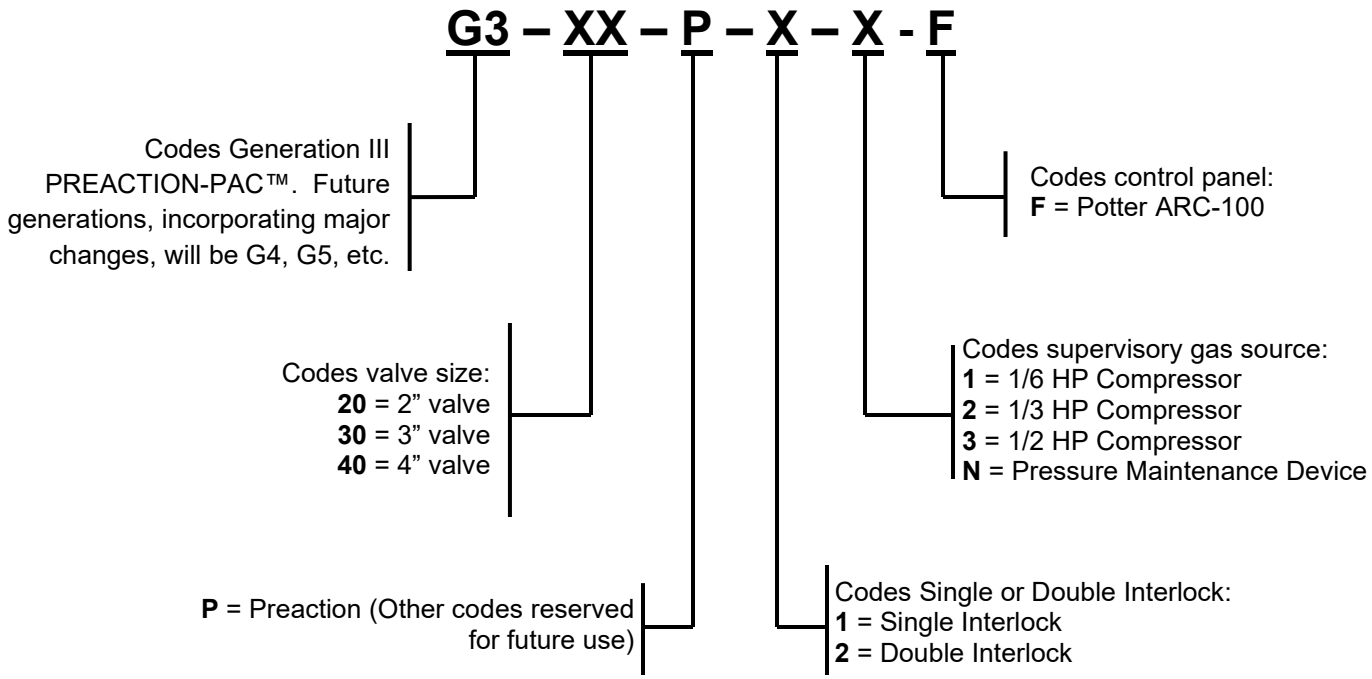
1.7.3. National Fire Protection Association No. 70, “National Electrical Code®”.

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. 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.

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.

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.

Table 1.9 – Approved PREACTION-PAC™ Assemblies with Potter ARC-100 Control Panel

Part Number	Valve Size, in.	Valve Type	Supervisory Gas Source	Control Panel
G320P21F	2”	Double Interlock	1/6 HP Compressor	Potter ARC-100
G320P2NF	2”	Double Interlock	Pressure Maintenance Device	Potter ARC-100
G330P21F	3”	Double Interlock	1/6 HP Compressor	Potter ARC-100
G330P22F	3”	Double Interlock	1/3 HP Compressor	Potter ARC-100
G330P23F	3”	Double Interlock	1/2 HP Compressor	Potter ARC-100
G330P2NF	3”	Double Interlock	Pressure Maintenance Device	Potter ARC-100
G340P21F	4”	Double Interlock	1/6 HP Compressor	Potter ARC-100
G340P22F	4”	Double Interlock	1/3 HP Compressor	Potter ARC-100
G340P23F	4”	Double Interlock	1/2 HP Compressor	Potter ARC-100
G340P2NF	4”	Double Interlock	Pressure Maintenance Device	Potter ARC-100

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.

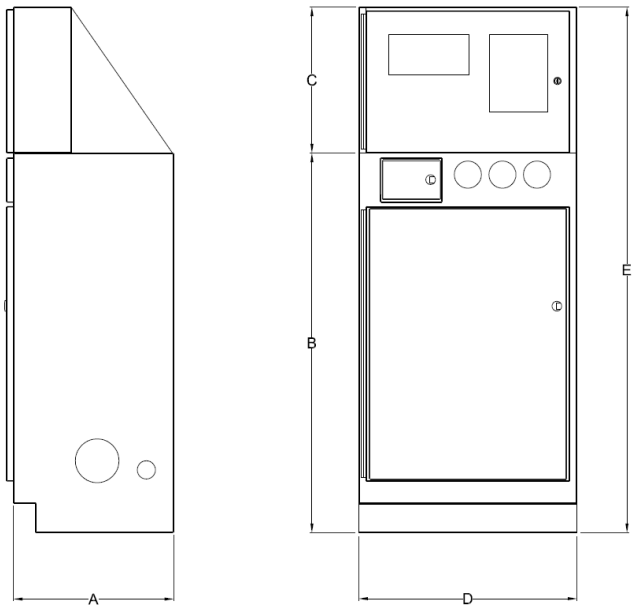
1.10.2.4. Close the lower enclosure door. Remove the unit from the pallet, and place in the intended installation location.

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.



SIDE VIEW **FRONT VIEW**

Dimension	Inches
A	24.00
B	52.00
C	20.00
D	30.00
E	72.00

Figure 4 – Diagram - Overall Dimensions

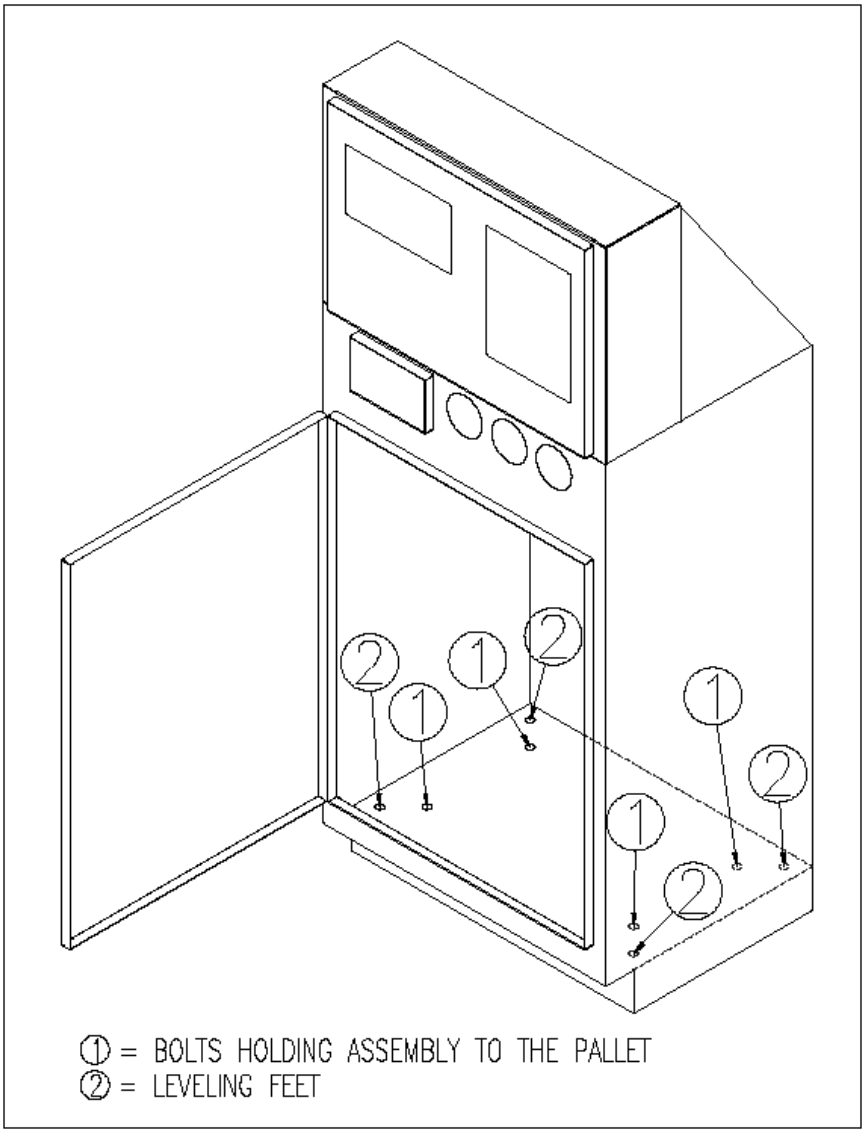
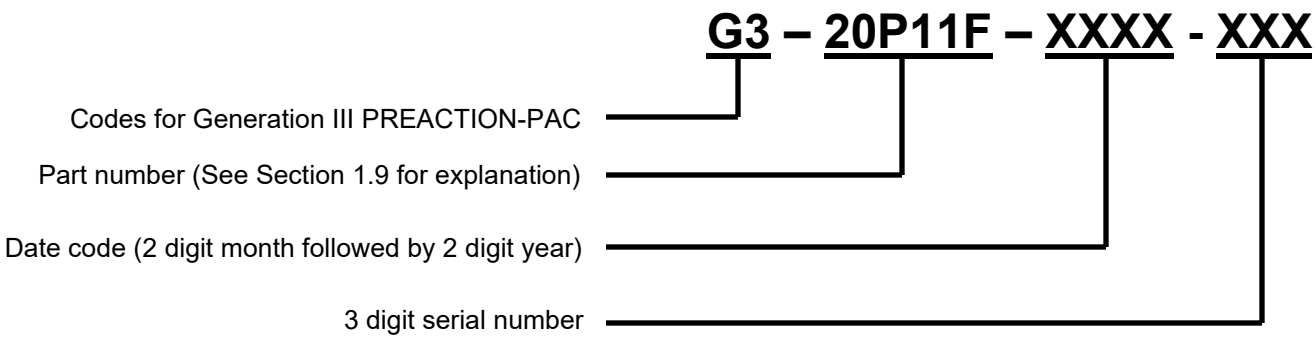


Figure 5 – Diagram - Location of Pallet Bolts and Leveling Feet

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 TFP1461 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.

CAUTION

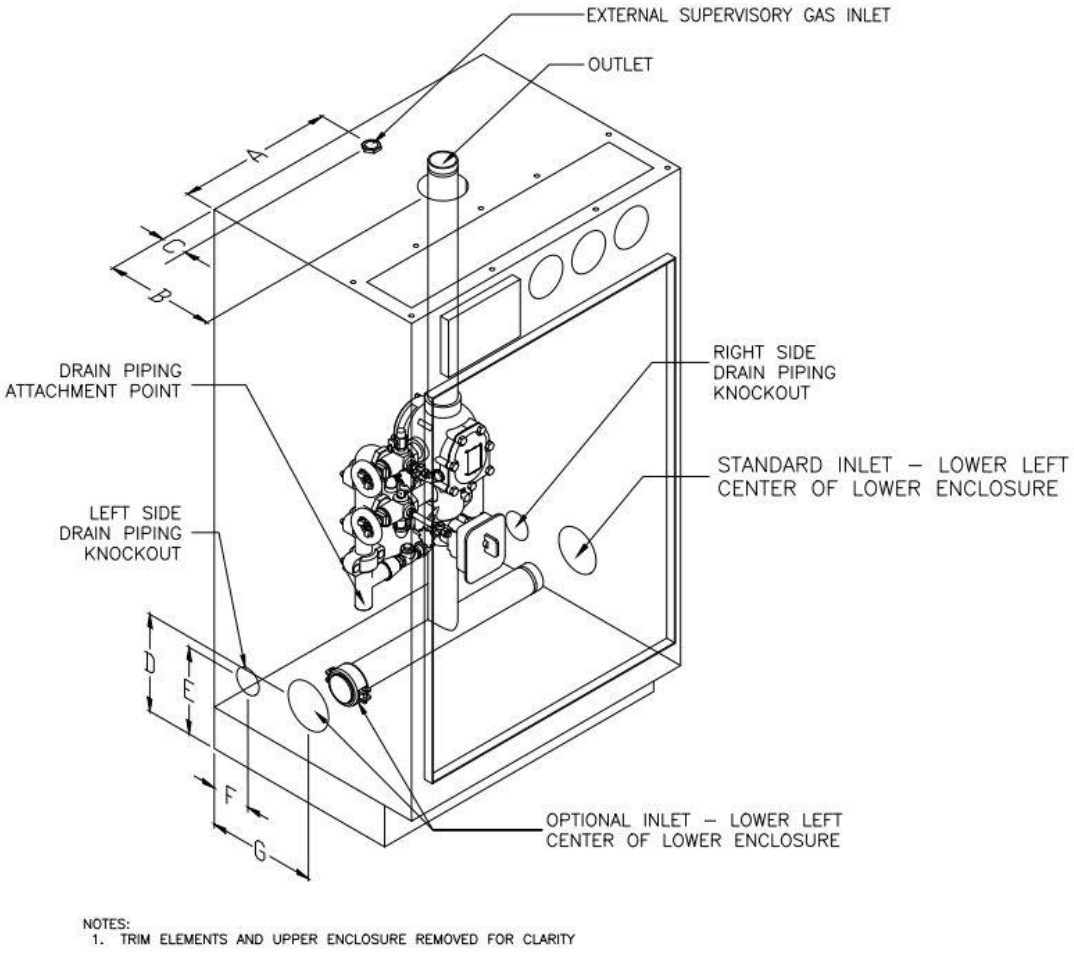
Failure to assemble the steel cap to the lower right center inlet will result in property damage due to water escaping from the lower right center inlet.

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.

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.



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

1.10.4.2. Terminal Strip and Control Panel. See Figure 7a and Figure 7b for information on connection to the terminal strip in the upper enclosure. Use Section 5 – Potter manual 5403650 to guide the installation of connections to the control panel. Terminals for 110VAC power accept qty. (1) 10 ga. max. conductor. NOTE: All conductors used for field wiring must comply with NFPA 70 – National Electrical Code, and control panel manufacturer's instructions (see Section 5). See Section 5 for information on power-limited conductor runs.

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 control panel. **UNITED Fire Systems** will not be responsible for warranty adjustment of damaged control panels when these instructions are not followed.

CAUTION

This assembly contains static-sensitive components. ALWAYS ground yourself with a proper wrist strap before handling any electronic components or circuits. Failure to do so can lead to equipment damage from static electricity.

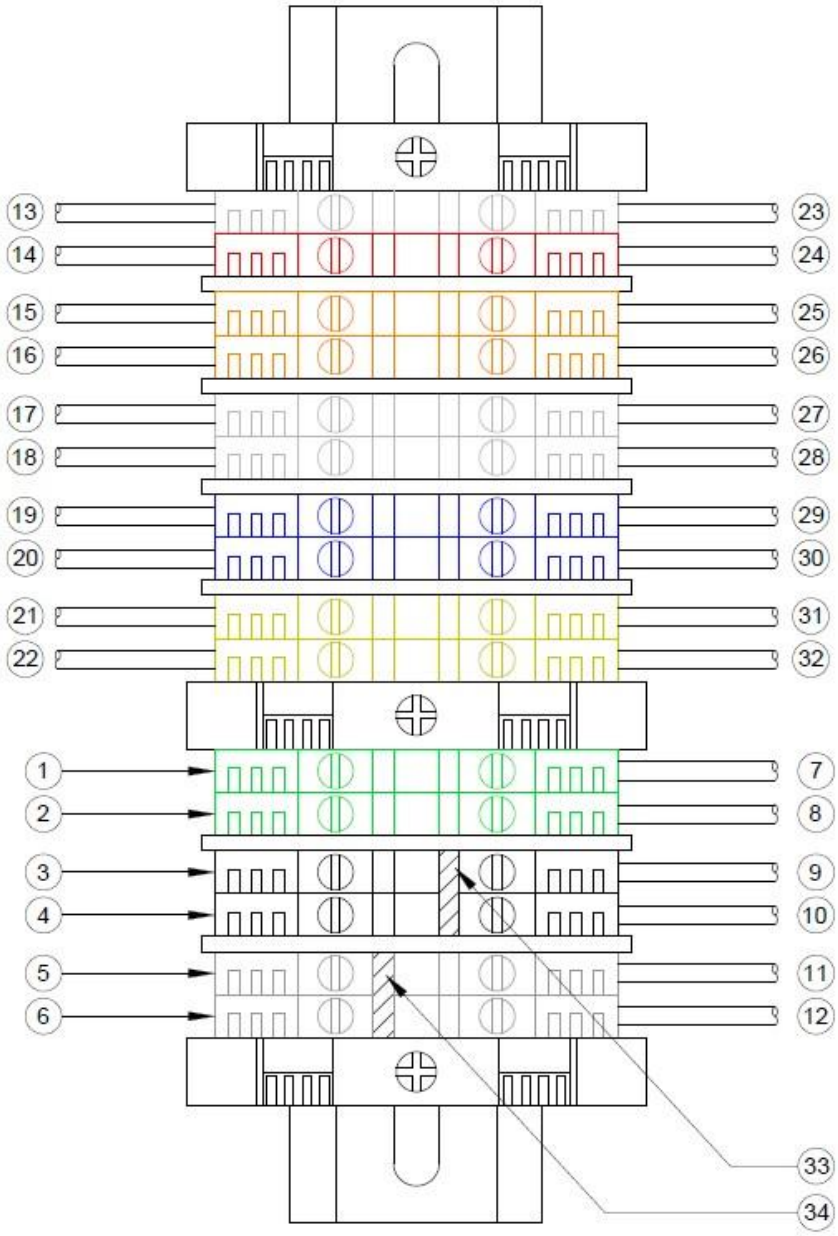


Figure 7a – Diagram –

Terminal Strip with Compressor Wiring Detail

LEGEND			
FIELD WIRING			
			COLOR OF TERMINAL BLOCK
1	DEDICATED 110 VAC GROUND FOR CONTROL PANEL (COMPRESSOR WILL ALSO BE GROUNDED THROUGH THIS TERMINAL)		GREEN/YELLOW
2	DEDICATED 110 VAC GROUND FOR AIR COMPRESSOR (USE ONLY IF REQUIRED BY AHJ)		GREEN/YELLOW
	WITH JUMPER 33 IN PLACE	**WITH JUMPER 33 REMOVED**	
3	110 VAC NEUTRAL FOR CONTROL PANEL & COMPRESSOR	110 VAC NEUTRAL FOR CONTROL PANEL ONLY	WHITE
4	DO NOT USE	110 VAC NEUTRAL FOR COMPRESSOR ONLY	WHITE
	WITH JUMPER 34 IN PLACE	**WITH JUMPER 34 REMOVED**	
5	110 VAC HOT FOR CONTROL PANEL & COMPRESSOR	110 VAC HOT FOR CONTROL PANEL ONLY	BLACK
6	DO NOT USE	110 VAC HOT FOR COMPRESSOR ONLY	BLACK
FACTORY WIRING			
7	110 VAC GROUND TO CONTROL PANEL		GREEN/YELLOW
8	110 VAC GROUND TO AIR COMPRESSOR		GREEN/YELLOW
9	110 VAC NEUTRALTO CONTROL PANEL		WHITE
10	110 VAC NEUTRAL TO AIR COMPRESSOR		WHITE
11	110 VAC HOT TO CONTROL PANEL		BLACK
12	110 VAC HOT TO AIR COMPRESSOR		BLACK
13	PREACTION SOLENOID WIRING (-) FROM LOWER ENCLOSURE		GRAY
14	PREACTION SOLENOID WIRING (+) FROM LOWER ENCLOSURE		RED
15	HIGH AIR SIGNAL SWITCH WIRING (NO) FROM LOWER ENCLOSURE		ORANGE
16	HIGH AIR SIGNAL SWITCH WIRING (COM) FROM LOWER ENCLOSURE		ORANGE
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
23	PREACTION SOLENOID WIRING (-) TO CONTROL PANEL		GRAY
24	PREACTION SOLENOID WIRING (+) TO CONTROL PANEL		RED
25	HIGH AIR SIGNAL SWITCH WIRING (NO) TO CONTROL PANEL		ORANGE
26	HIGH AIR SIGNAL SWITCH WIRING (COM) TO CONTROL PANEL		ORANGE
27	LOW AIR SIGNAL SWITCH WIRING (NO) TO CONTROL PANEL		GRAY
28	LOW AIR SIGNAL SWITCH WIRING (COM) TO CONTROL PANEL		GRAY
29	WATERFLOW SIGNAL SWITCH WIRING (NO) TO CONTROL PANEL		BLUE
30	WATERFLOW SIGNAL SWITCH WIRING (COM) TO CONTROL PANEL		BLUE
31	TAMPER SIGNAL SWITCH WIRING (NO) TO CONTROL PANEL		YELLOW
32	TAMPER SIGNAL SWITCH WIRING (COM) TO CONTROL PANEL		YELLOW
33	JUMPER - CONNECTS CONTROL PANEL & COMPRESSOR 110 VAC NEUTRAL CONDUCTORS		**REMOVE BOTH JUMPERS TO SEPARATE CIRCUITS**
34	JUMPER - CONNECTS CONTROL PANEL & COMPRESSOR 110 VAC HOT CONDUCTORS		

Legend for Figure 7a

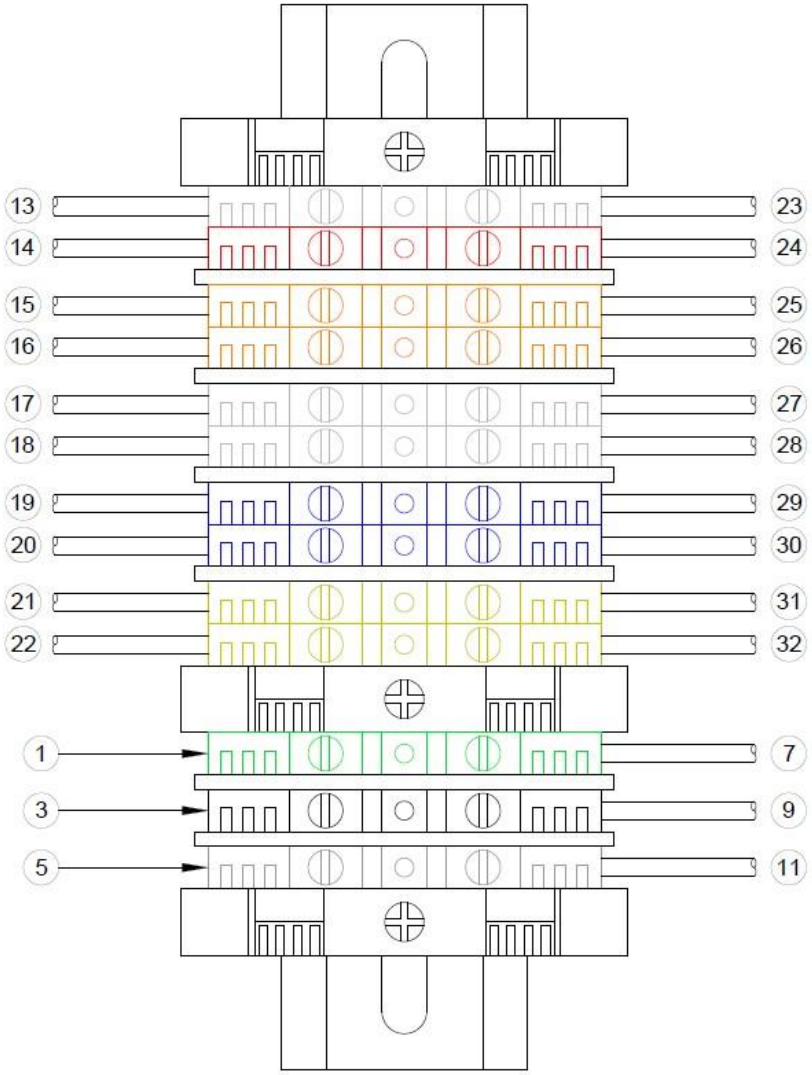


Figure 7b – Diagram –

Terminal Strip with Pressure Maintenance Device Wiring Detail

LEGEND		
FIELD WIRING		
		COLOR OF TERMINAL BLOCK
1	110 VAC GROUND FOR CONTROL PANEL	GREEN/YELLOW
3	110 VAC NEUTRAL FOR CONTROL PANEL	WHITE
5	110 VAC HOT FOR CONTROL PANEL	BLACK
FACTORY WIRING		
7	110 VAC GROUND TO CONTROL PANEL	GREEN/YELLOW
9	110 VAC NEUTRALTO CONTROL PANEL	WHITE
11	110 VAC HOT TO CONTROL PANEL	BLACK
13	PREACTION SOLENOID WIRING (-) FROM LOWER ENCLOSURE	GRAY
14	PREACTION SOLENOID WIRING (+) FROM LOWER ENCLOSURE	RED
15	HIGH AIR SIGNAL SWITCH WIRING (NO) FROM LOWER ENCLOSURE	ORANGE
16	HIGH AIR SIGNAL SWITCH WIRING (COM) FROM LOWER ENCLOSURE	ORANGE
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
23	PREACTION SOLENOID WIRING (-) TO CONTROL PANEL	GRAY
24	PREACTION SOLENOID WIRING (+) TO CONTROL PANEL	RED
25	HIGH AIR SIGNAL SWITCH WIRING (NO) TO CONTROL PANEL	ORANGE
26	HIGH AIR SIGNAL SWITCH WIRING (COM) TO CONTROL PANEL	ORANGE
27	LOW AIR SIGNAL SWITCH WIRING (NO) TO CONTROL PANEL	GRAY
28	LOW AIR SIGNAL SWITCH WIRING (COM) TO CONTROL PANEL	GRAY
29	WATERFLOW SIGNAL SWITCH WIRING (NO) TO CONTROL PANEL	BLUE
30	WATERFLOW SIGNAL SWITCH WIRING (COM) TO CONTROL PANEL	BLUE
31	TAMPER SIGNAL SWITCH WIRING (NO) TO CONTROL PANEL	YELLOW
32	TAMPER SIGNAL SWITCH WIRING (COM) TO CONTROL PANEL	YELLOW

Legend for Figure 7b

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 1/6 HP compressor = 10.0 amps; with 1/3 HP compressor = 12.4 amps; with 1/2 HP compressor = 15.0 amps; with pressure maintenance device = 5.0 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.

1.10.4.2.2. Backup Batteries. Calculate backup battery requirements, and connect backup batteries, per Section 5 – Potter manual 5403650. The upper enclosure is capable of holding batteries up to 26 A-h. If larger batteries are needed, use an external battery enclosure per Section 5 – Potter manual 5403650. The maximum battery capacity for this control panel is 55 A-h.

1.10.4.2.3. Fire Detectors (Initiating Devices). Fire detectors (initiating devices), located in the area protected by the sprinklers connected to the **PREACTION-PAC™**, are necessary to provide the signal to open the preaction valve. Refer to NFPA 72 for information on the number, type, and spacing of fire detectors. Install detectors, wiring, and panel connections per Section 5 – Potter manual 5403650. All FM Approved systems / installations must be configured as Class A for Deluge and Preaction Releasing Service.

1.10.4.2.4. Audible / Visual Appliances (Indicating Devices). Audible / visual appliances (indicating devices), located in and around the area protected by the sprinklers connected to the **PREACTION-PAC™**, are necessary to warn occupants that a fire has been detected. Refer to NFPA 72 for information on the number, type, and spacing of audible / visual appliances. Install audible / visual devices, wiring, and panel connections per Section 5 – Potter manual 5403650.

1.10.4.2.5. Building Fire Alarm Systems. In buildings with fire alarm systems separate from the **PREACTION-PAC™** detection system, most national and local codes and authorities having jurisdiction require the **PREACTION-PAC™** to provide signals to the building fire alarm system. The Potter control panel installed in the **PREACTION-PAC™** contains dry contacts capable of providing the necessary signals. Install audible / visual devices, wiring, and panel connections per Section 5 – Potter manual 5403650.

1.10.4.2.6. Other Connections. From time to time, additional signals from the **PREACTION-PAC™** control panel may be required. Such signals can be associated with building management systems, equipment shutdown, or security notification. Additional dry contacts may be needed to satisfy all of these requirements.

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. In the default configuration, the same 110VAC source used for the control panel serves for the compressor. If the local authority having jurisdiction requires separate power sources for the control panel and the compressor, jumpers can be removed from the terminal strip. 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. Use Section 5 – Potter manual 5403650 to perform all preliminary tests on the control panel, field wiring, and field devices.

1.10.5.4. Use Section 2 – Tyco Manual TFP1461 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 control panel is indicating POWER ON, with no alarm or trouble indicators illuminated, and no error messages on the display.

1.10.6.2. Verify that the water supply is on.

1.10.6.3. Using Section 2 – Tyco Manual TFP1461, 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.

1.10.6.4. Ensure that the owner of the system has received adequate introductory training.

1.10.6.5. 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.

1.11. Operation.

1.11.1. Automatic. Fully automatic operation of the system will be conducted by the 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. Refer to Section 5 – Potter manual 5403650 for information on signals.

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 TFP1461 and Section 5 – Potter manual 5403650 to restore the individual parts of 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 TFP1461.

1.12.5.2. General Air Products Manual OILLESSINST.

1.12.5.3. United Fire Systems Instruction Sheet UFS-710.

1.12.5.4. Potter Manual 5403650.

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

1.12.5.6. National Fire Protection Association No. 72, “National Fire Alarm Code®”

SECTION 2

Tyco Manual TFP1461

DV-5A Automatic Water Control Valve, Double Interlock Preaction, Electric/Pneumatic Actuation

DV-5A Automatic Water Control Valve, Double Interlock Preaction Electric/Pneumatic Actuation Fire Protection Systems, 1 1/2–8 in. (DN40–DN200)

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

Scan the QR code or enter the URL in a web browser to access the most up-to-date electronic version of this document. Data rates may apply.

docs.jci.com/tycofire/tfp1461

Available End Connections and Weights

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

General Description

The TYCO DV-5A Automatic Water Control Valves are diaphragm type valves that can be used in double 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 Valves are offered with the DV-5A Valve and separately ordered semi-assembled trim shown in Figures 6 and 7, or, for ease of installation, with DV-5A Valve completely trimmed with or without a System Main Control Valve.

Double interlock preaction systems are designed for use in applications, such as refrigerated areas, requiring the maximum degree of protection against inadvertent flooding of the sprinkler system piping. In order for a double interlock preaction system to automatically activate, two independent events must occur. First, the electric detection system must operate, and secondly, an automatic sprinkler on the system piping must operate. Typically, the electric detection system is designed to operate before any automatic sprinkler. Operation of just the electric detection, or just the opening of a sprinkler will not allow the DV-5A Valve to open and permit water to flow into the normally dry sprinkler system piping. However, operation of just the electric detection system or the opening of a sprinkler (loss of system air pressure) will result in a supervisory alarm to notify the building occupants of a condition

Item	Description	Qty.	Nominal Valve Size ANSI Inch (DN)					
			1 1/2 (DN40)	2 (DN50)	3 (DN80)	4 (DN100)	6 (DN150)[e]	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.
e. Also applicable to metric 165,1 mm size.

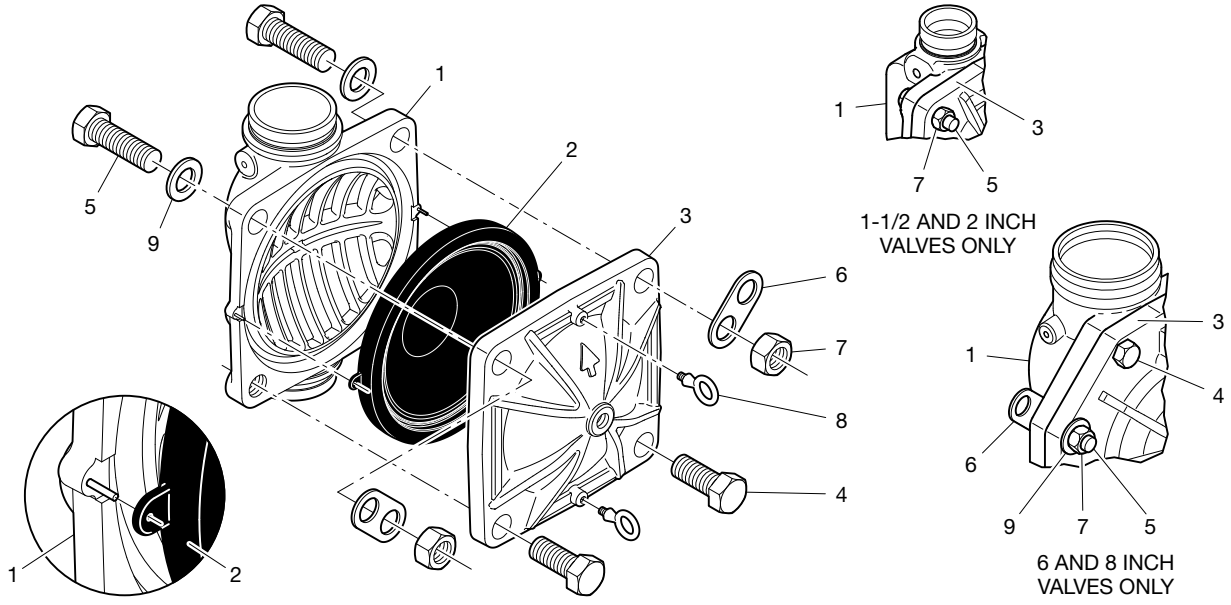
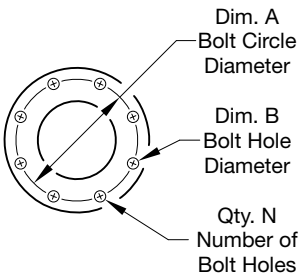


FIGURE 1
DV-5A VALVE ASSEMBLY AND REPLACEMENT PARTS

Nominal Valve Size ANSI Inches (DN)	Flange Drilling Specification											
	Nominal Dimensions in Inches and (mm)											
	ANSI B16.42[a] (Class 150)			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. Flat face flange; Same drilling as for ANSI B16.1 (Class 125)
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)[a]	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

NOTES
a. Also applicable to metric 165,1 mm size.

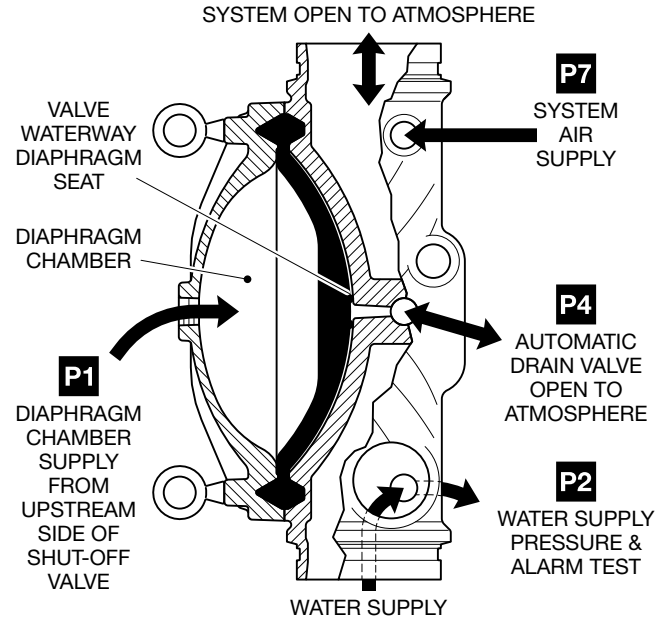


FIGURE 2A
SET CONDITION

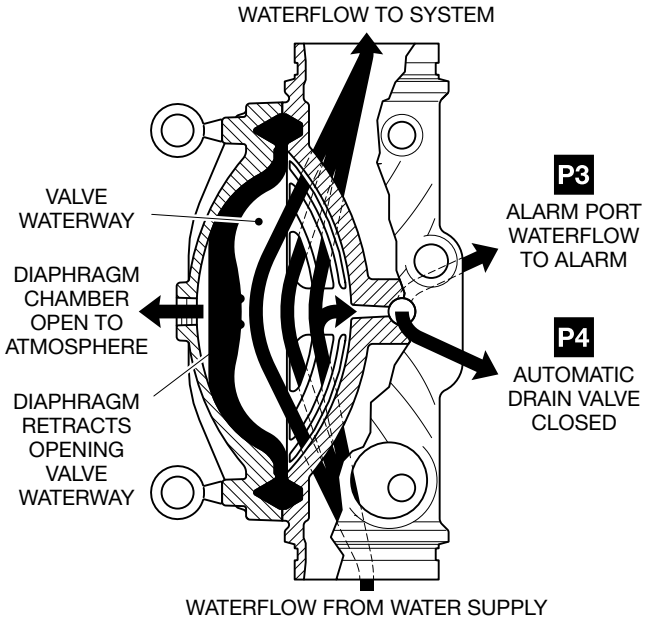


FIGURE 2B
OPERATED CONDITION

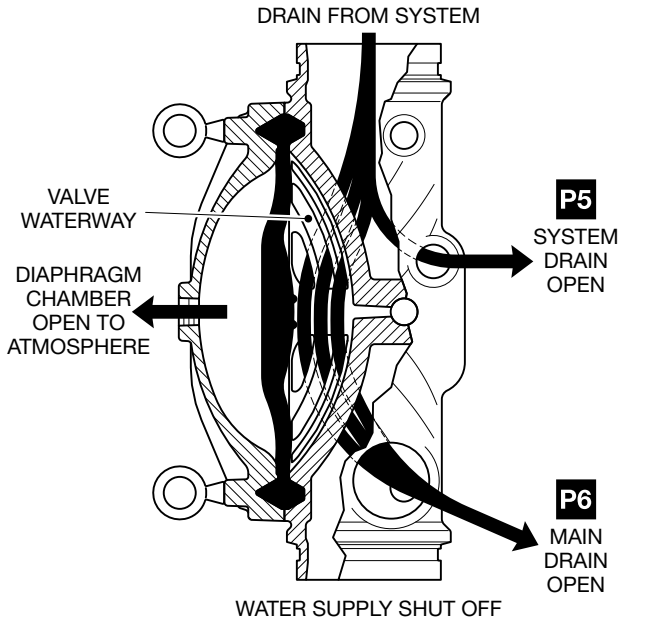


FIGURE 2C
SYSTEM DRAIN CONDITION

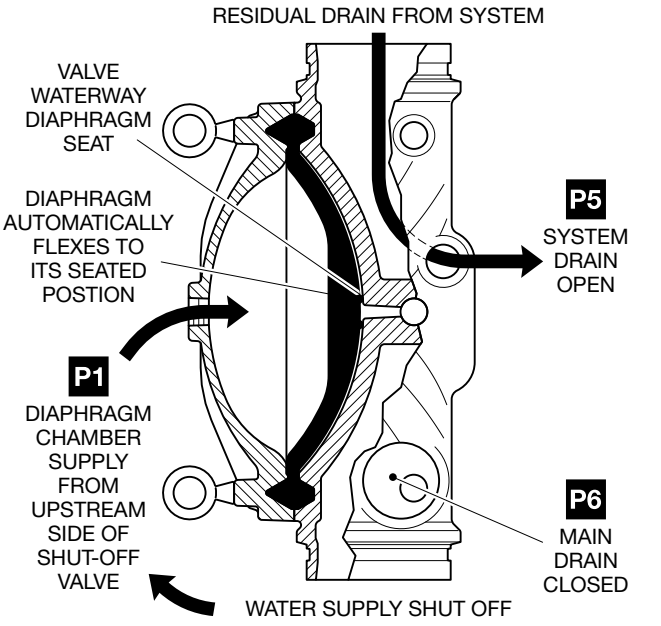


FIGURE 2D
RESIDUAL DRAIN CONDITION

FIGURE 2
DV-5A VALVE OPERATION, PREACTION SYSTEMS

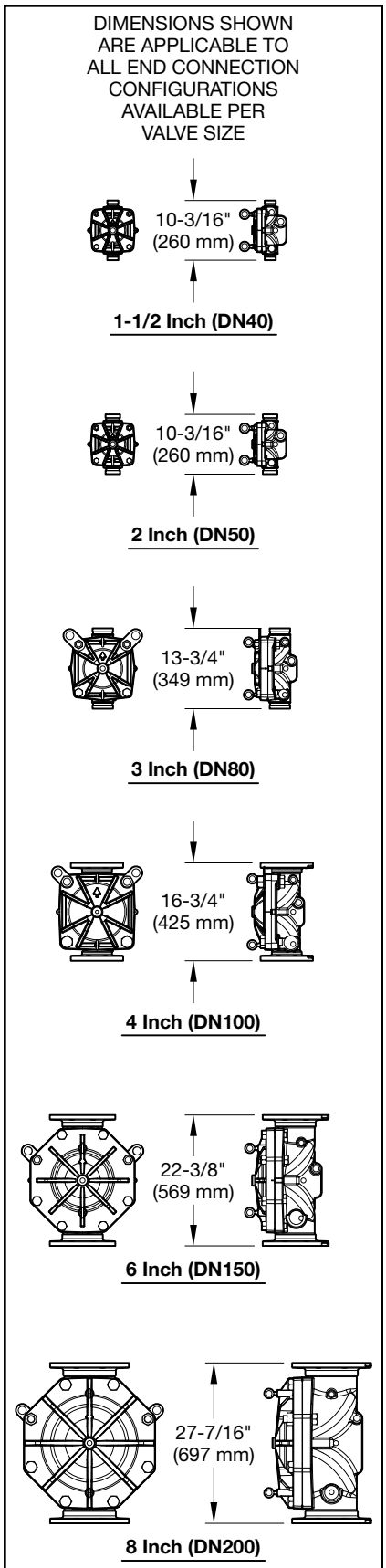


FIGURE 3
DV-5A DELUGE VALVE
TAKE-OUT DIMENSIONS

needing attention so as to avoid inadvertent flooding of the system piping.

In the case of Electric/Pneumatic Actuation, a solenoid valve and a dry pilot actuator connected in series is used to hold the DV-5A Valve closed by locking pressure in the diaphragm chamber of the DV-5A Valve. In the event of a fire, a releasing panel is initiated by a fire detection or electric manual pull station, which opens the solenoid valve. The heat from the fire will activate sprinkler head(s) which causes a loss of system air pressure that results in opening of the dry pilot actuator. Opening of both the solenoid valve and dry pilot actuator results in operation of the DV-5A Valve.

NOTICE

The DV-5A Valves 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/C-UL Listed
FM Approved

Listings and Approvals are based on DV-5A being trimmed as described in this technical data sheet.

DV-5A Valve
Components for the 1 1/2 thru 8 Inch (DN40 thru DN200) DV-5A Valves are shown in Figure 1. The DV-5A Valves are for vertical installations. They are rated for use at a 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.

Valve Trim
The maximum pressure rating for the electric pneumatic double interlock preaction trim is limited by the solenoid valve. For more information about the solenoid valve, see 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
Refer to Graph A

Actuation Options
Refer to subsections for Electric/Electric Actuation or Electric/Pneumatic Actuation

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

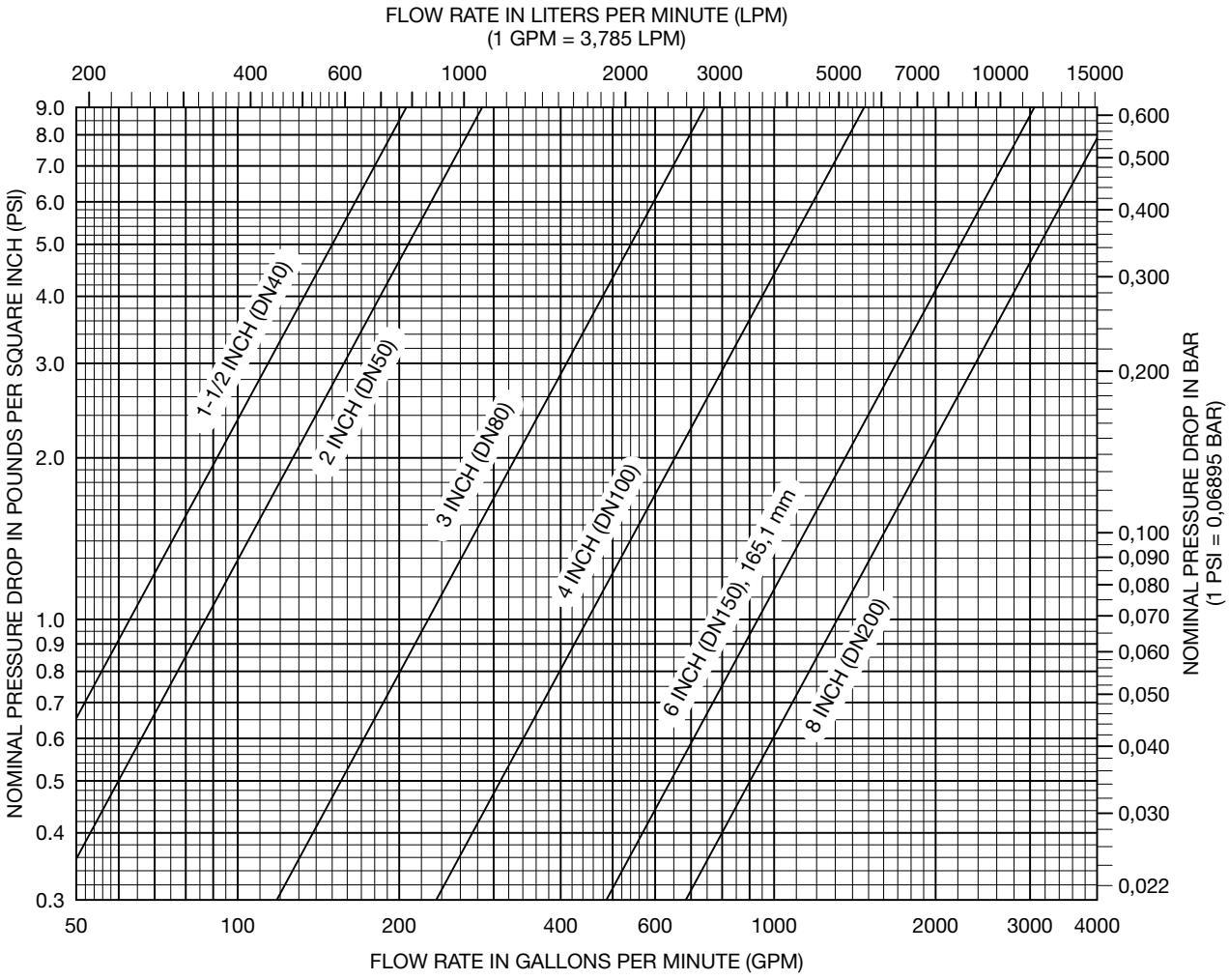
Common Hardware Trim
- Common hardware pipe fittings are galvanized or black as required and are malleable per ASME B16.3.
- Common hardware pipe nipples are galvanized or black as required and are Schedule 40 per ASTM A53 or A135.
- Common hardware compression fitting are brass per ASTM B16
- Common hardware tubing is Type L 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 of a solenoid valve for electric/pneumatic actuation (see Figure 4) trips the Model MRA-1 manual reset actuator. Tripping the MRA-1 releases water from the DV-5A diaphragm chamber faster than it



GRAPH A
DV-5A VALVE
NOMINAL PRESSURE LOSS VERSUS FLOW

can be replenished through the 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.

See the Electric/Pneumatic section for additional information.

Electric/ Pneumatic Actuation

System Design Considerations
Because a double interlock preaction system requires time for a drop in system air pressure to occur (concurrently with the response time for the separate fire detection system) before it will allow water to enter the system piping, this system has characteristics similar to a dry pipe sprinkler system. Therefore, the system design considerations for a dry pipe system are normally applied to a double interlock preaction system — including a 30% increase in design area; a maximum 1 minute water delivery time for system capacities of 500 gallons (1890 liters) or more; and, prohibition of gridded system piping.

In order to readily perform the System Inspection Procedure described in the Care and Maintenance section, it is recommended that a system shut-off Valve be installed above the DV-5A valve, as shown in Figure 4. The system shut-off valve should be a listed or approved (as appropriate) indicating valve with a supervisory switch to monitor the normally open position.

Detection System
The double interlock preaction system with electric/pneumatic actuation trim provides 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. Information on the various types of separately ordered solenoid valves that may be used with this trim package is given in Technical Data Sheet TFP2180. Nominal installation dimensions for the double interlock preaction system with electric/

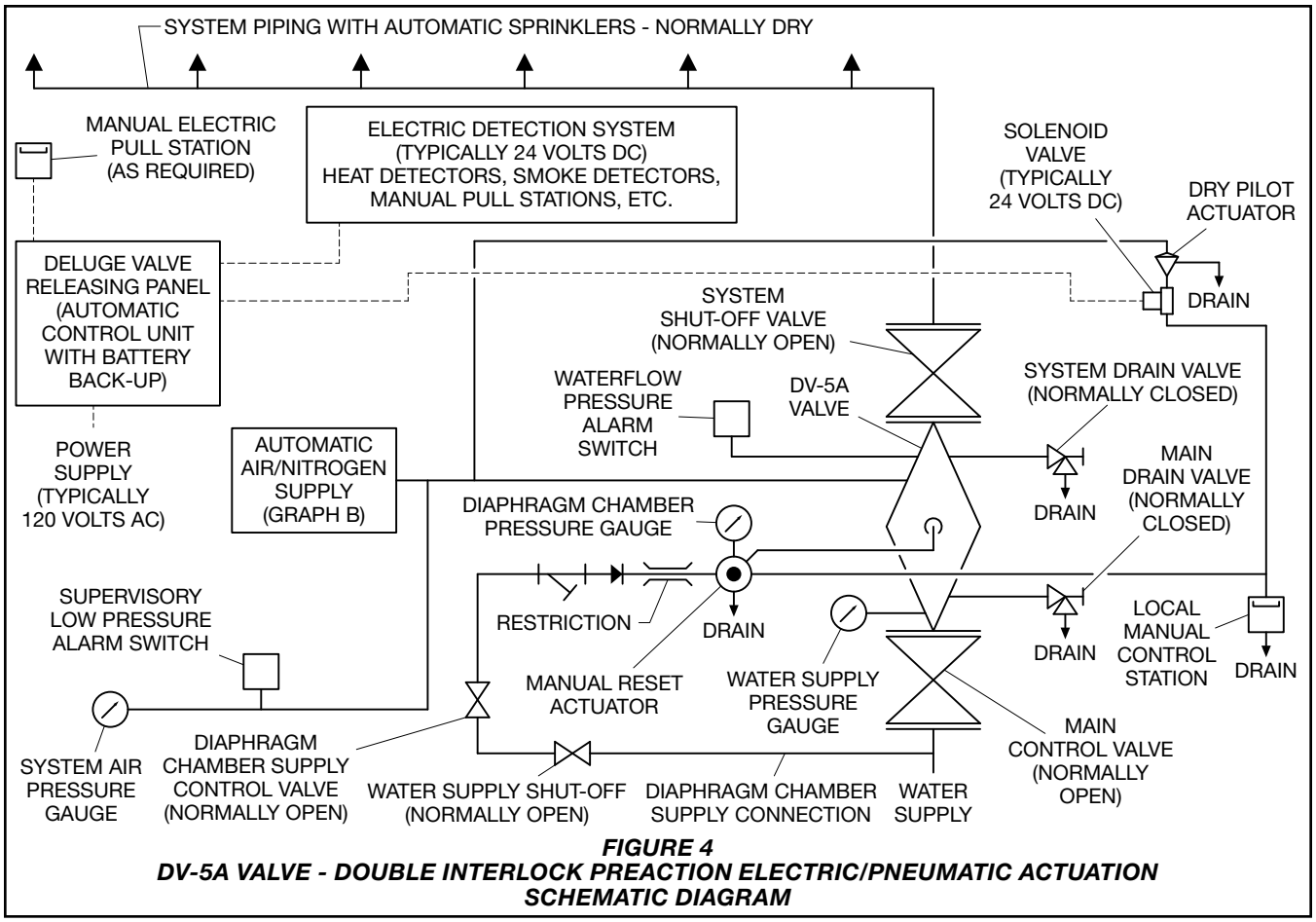


FIGURE 4
DV-5A VALVE - DOUBLE INTERLOCK PREACTION ELECTRIC/PNEUMATIC ACTUATION SCHEMATIC DIAGRAM

pneumatic actuation trim are shown in Figure 5.

The deluge valve releasing panel (automatic control unit) with battery back-up, fire detection devices, manual pull stations, and signaling devices that are utilized with the double interlock preaction system with electric/pneumatic actuation must be UL Listed, ULC Listed, C-UL Listed, or FM Approved, as applicable.

NOTICE

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 authority having jurisdiction 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 minimum 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.

WARNING

If the delay between electric actuation and subsequent sprinkler activation is anticipated to be greater then 10 minutes, adjust the battery back-up calculation accordingly. Inadequate battery back-up may result in failure of the system to operate in the event of a fire during a power failure.

System Air Pressure Requirements

The required system air pressure for the double interlock preaction system with electric/pneumatic actuation is shown in Graph B as a function of the anticipated water supply pressure. It is recommended that the system air pressure be maintained by one of the following methods:

- 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 dedicated air compressor in combination with the Model AMD-2 Air Maintenance Device described in Technical Data Sheet TFP1231.
- 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.

NOTICE

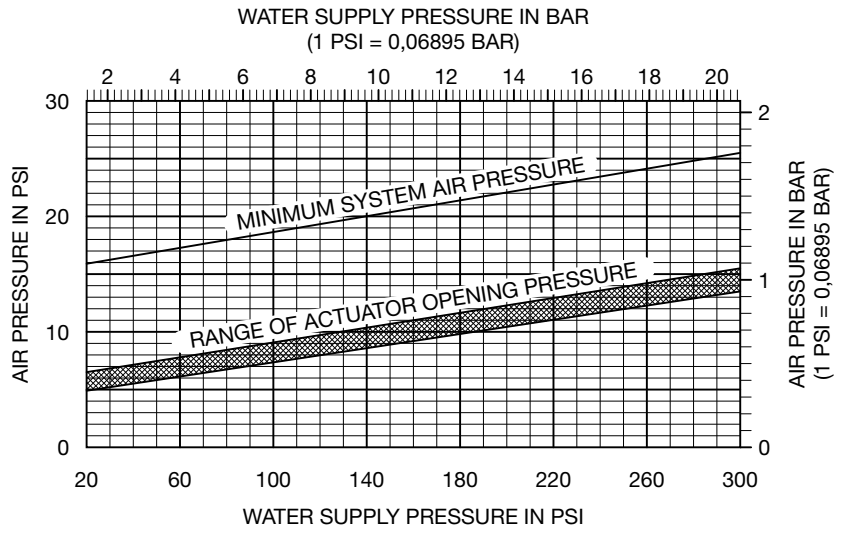
The dew point of the air or nitrogen supply, for a system exposed to freezing conditions, must be maintained below the lowest ambient temperature to which the system piping will be exposed. Introduction of moisture into the system piping can create ice build up which could prevent proper operation of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

Installation

The TYCO DV-5A 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



NOTES:

1. The dew point of the pilot line air pressure must be maintained below the lowest ambient temperature to which the dry pilot actuation system will be exposed. Accumulation of water in the pilot line connection to the Actuator will lower the air pressure at which the actuator will open and possibly prevent proper operation. Also, introduction of moisture into the pilot lines exposed to freezing temperatures can create an ice buildup that could prevent proper operation of the Actuator.
2. An air dryer must be installed where the moisture content of the air supply is not properly controlled at less than the required value.
3. It is recommended that an AMD-3 Nitrogen Maintenance Device be utilized in dry pilot actuation system applications where the dew point must be maintained below -20°F (-29°C). Refer to Technical Data Sheet TFP1241.

GRAPH B
DV-5A VALVE
DRY PILOT LINE AIR PRESSURE REQUIREMENTS (DP-2)

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.

When installing the valve in a corrosive environment, including outdoor locations, protection from moisture, chemicals or fumes is highly recommended. Galvanic corrosion can result from joining unprotected dissimilar metals. For example, exposed steel pipe threads can become corroded if unprotected by painting or other coating methods. Where coating such exposed surfaces is impractical or unwanted, construct a rain-resistant roof or enclosure over the valve and trim.

Proper operation of the DV-5A valves 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 valve must be trimmed in accordance with one of the trim illustrations shown in Figures 6 or 7, as applicable.

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).

Note: In Figure 8, Item R is a hexhead on-off valve that must be open in order to set the valve.

Step 8. An inspector's test connection is to be located on the sprinkler system at the most hydraulically demanding location.

Step 9. A suitable automatic air (nitrogen) supply, as described in the electric/pneumatic actuation sub-section, is to be installed in accordance with the applicable technical data sheet. The minimum air pressure is to be in accordance with the referenced sub-sections.

Step 10. A desiccant dryer, when specified, is to be installed between a drip leg and the air maintenance device.

Step 11. The low air pressure alarm switch (U) in Figure 8 in the electric/pneumatic actuation is to be adjusted so that the low pressure alarm setting is set at approximately 6 psi (0,4 bar) below the minimum system service pressure requirement shown in Graph B.

Step 12. Unused pressure alarm switch connections must be plugged.

Step 13. The pressure relief valve (T) in Figure 8 is to be at 5 psi (0,34 bar) higher than the required system air pressure, or be reset in accordance with the requirements of the authority having jurisdiction.

To reset the pressure relief valve, first loosen the jam nut and then adjust the cap accordingly, clockwise for a higher pressure setting or counter clockwise

for a lower pressure setting. After verifying the desired pressure setting, tighten the jam nut.

Note: *The maximum pressure is 70 psi (4,83 bar).*

Step 14. Conduit and electrical connections are to be made in accordance with the applicable standards of the approval agency.

Step 15. 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.

Valve Setting Procedure

Perform Steps 1 through 20 when initially setting the TYCO DV-5A 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 2a. Close the diaphragm supply valve (P) and air supply valve (S).

Step 2b. Verify all pressure gauges valves are open.

Step 3a. Open the main drain valve (D), system drain valve (E), and all auxiliary drains in the system.

At this time make certain that the pressure gauge Valves and the alarm control valve (H), as applicable, are open.

Step 3b. Open the system shut-off valve (X), as will be the case when resetting a system after performing an operational test.

NOTICE

Do not open the inspector's test connection and auxiliary drains if resetting after a system test; otherwise, system air pressure will be relieved unnecessarily.

Step 4. Close the auxiliary drain valves and the system drain valve (E) after water ceases to discharge. Leave the main drain valve (D) open. Depress the plunger of the automatic drain valve (F) to verify that it is open.

Step 5. 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 6. Inspect for and clear all ice plugs where system piping has been exposed to freezing conditions and when there has been a flow of water into the system.

Step 7. Replace all damaged or operated sprinklers. Replacement sprinklers must be of the same type and temperature rating as those that operated.

NOTICE

In order to prevent the possibility of a subsequent operation of an overheated solder type sprinkler, any solder type sprinklers possibly exposed to a temperature greater than their maximum rated ambient must also be replaced.

Step 8. Service the air dryer, if applicable, in accordance with the manufacturer's instructions.

Step 9. De-energize the solenoid valve (V) by resetting the electric detection system in accordance with the manufacturer's instructions.

Step 10. 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.

NOTICE

If water is not flowing flowing from the manual control station, ensure the inverted flare shut-off valve (R) is open.

Step 11. 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 12. Inspect the actuation device drain connections. Any leaks must be corrected before proceeding to the next step. Electric/pneumatic actuation drain connection to be inspected are from the manual control station (M) and dry pilot actuator (W) shown in Figure 4.

Step 13. Verify the ability for the DV-5A diaphragm to hold pressure as follows:

- With the diaphragm chamber pressurized per Step 11, 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 14. Open the air supply valve (S) and allow the system to automatically re-establish its nominal system air pressure. Observe the automatic drain valve (F) for leaks. If there are leaks, determine/correct the cause of the leakage problem.

- Nominal system air pressure for electric/pneumatic actuation is per Graph B.

Step 15. 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.

Step 16. Verify the water supply pressure gauge (J) test valve is open, and the gauge is reading the correct system pressure. Verify the DP-2 valve (W) is not leaking from the drain line.

Note: It is normal to have some water discharge from the DP2 valve when opening the main control valve (B).

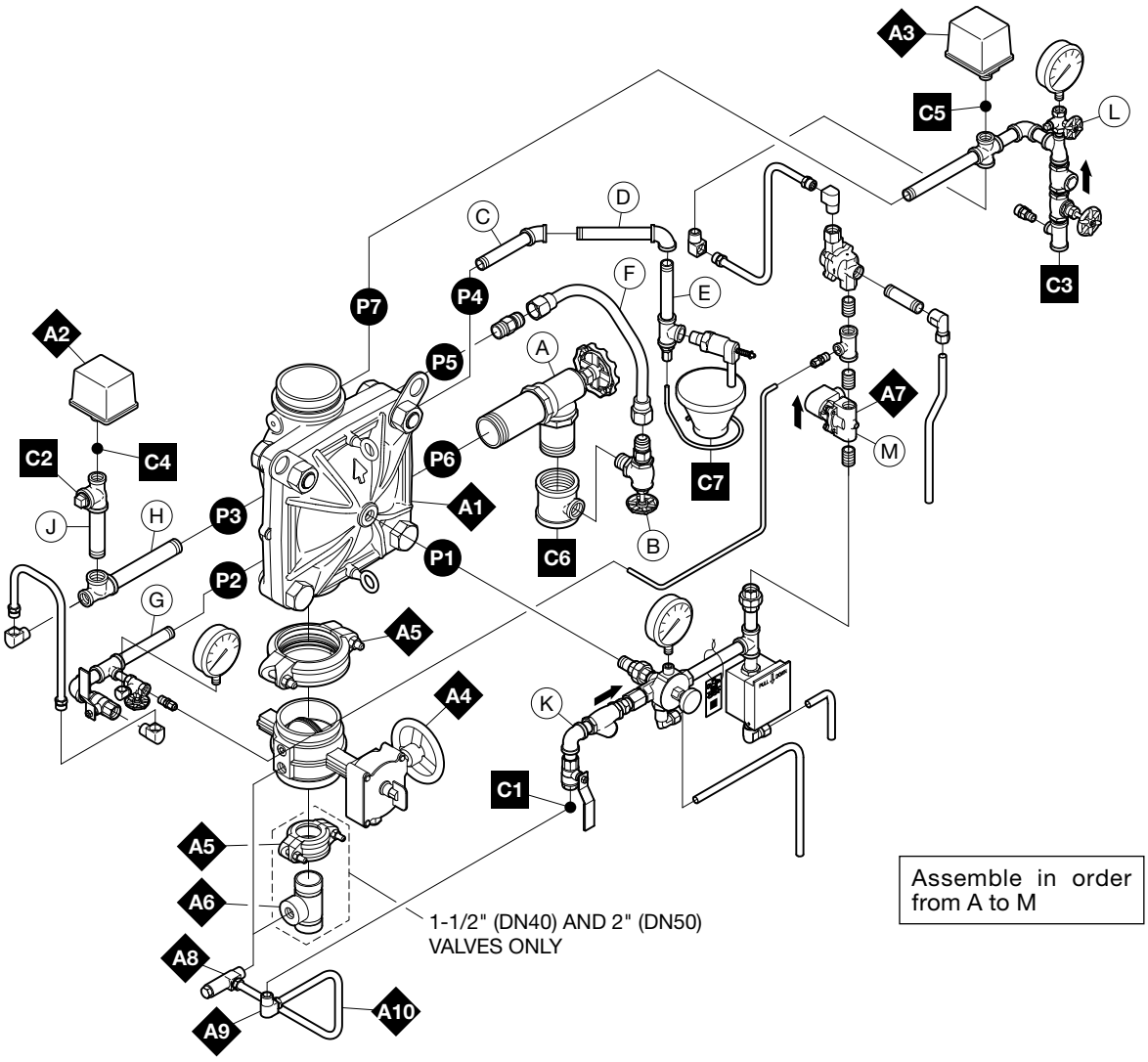
NOTICE

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 17. Open the manual control station (M) slightly to vent any excess pressure in the diaphragm trim after opening the system main control valve (B). Close the hinged cover on the manual control station (M) and insert a new break rod in the small hole through the top of the enclosing box.

Step 18. Fully open the system main control valve (B).

Step 19. After setting a fire protection system, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.



NOTES
1. Port Connections P1 to P7 are shown in Figure 2.
2. External Trim Connections C1 through C7 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 A10 are provided, as applicably related to valve size, and Item A7 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 A10 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
DOUBLE INTERLOCK PREACTION ELECTRIC/PNEUMATIC ACTUATION TRIM
SEMI-ASSEMBLED

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.

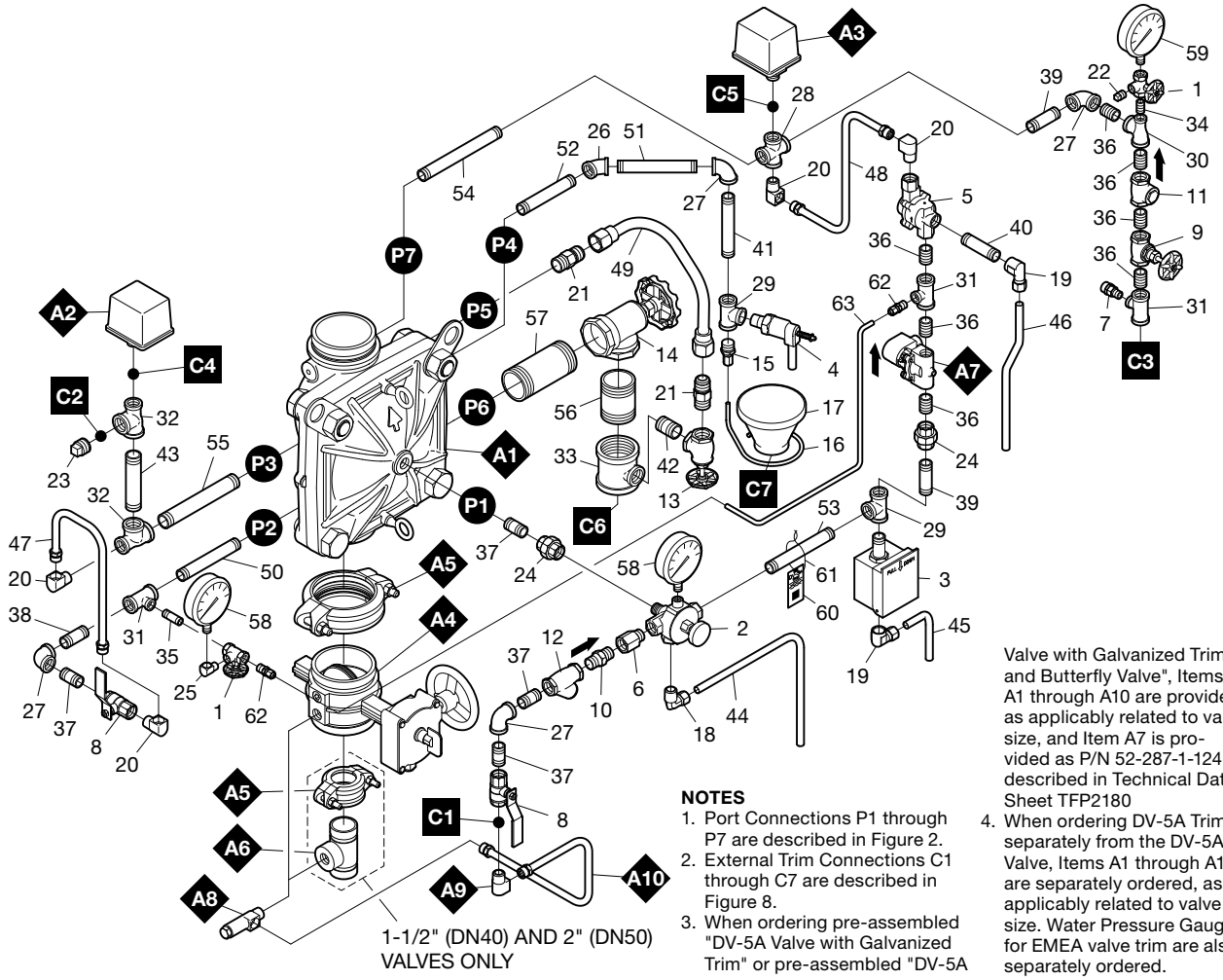
NOTICE

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 water supply 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



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4. When ordering DV-5A Trim separately from the DV-5A Valve, Items A1 through A10 are separately ordered, as applicably related to valve size. Water Pressure Gauges for EMEA valve trim are also separately ordered.

ITEM	QTY.	DESCRIPTION	CH	1 1/2 IN. (DN40)	2 IN. (DN50)	3 IN. (DN80)	4 IN. (DN100)	6 IN. (DN150)[b]	8 IN. (DN200)
1	2	1/4" GAUGE TEST VALVE		460051003	460051003	460051003	460051003	460051003	460051003
2	1	MRA-1 MANUAL RESET ACTUATOR		545001000	545001000	545001000	545001000	545001000	545001000
3	1	MC-2 MANUAL CONTROL STATION		545002000	545002000	545002000	545002000	545002000	545002000
4	1	AD-3 AUTOMATIC DRAIN VALVE		547932004	547932004	547932004	547932004	547932004	547932004
5	1	DP-2 DRY PILOT ACTUATOR		522801001	522801001	522801001	522801001	522801001	522801001
6	1	PRIMING SUPPLY RESTRICTION		545100051	545100051	545100051	545100051	545100051	545100051
7	1	1/4" PRESSURE RELIEF VALVE		923431020	923431020	923431020	923431020	923431020	923431020
8	2	1/2" BALL VALVE		460501004	460501004	460501004	460501004	460501004	460501004
9	1	1/2" GLOBE VALVE		460471005	460471005	460471005	460471005	460471005	460471005
10	1	1/2" SPRING LOADED CHECK VALVE		923221003	923221003	923221003	923221003	923221003	923221003
11	1	1/2" SWING CHECK VALVE		460491007	460491007	460491007	460491007	460491007	460491007
12	1	1/2" Y-STRAINER		523531006	523531006	523531006	523531006	523531006	523531006
13	1	3/4" ANGLE VALVE		460481010	460481010	460481010	460481010	460481010	460481010
14	1	ANGLE VALVE		460481010	460481010	460481011	460481012	460481012	460481012
15	1	DRIP FUNNEL BRACKET CONNECTOR		922111005	922111005	922111005	922111005	922111005	922111005
16	1	DRIP FUNNEL BRACKET		922111003	922111003	922111003	922111003	922111003	922111003
17	1	DRIP FUNNEL		923431007	923431007	923431007	923431007	923431007	923431007
18	1	COMP. FITTING 90° 1/2" MNPT x 1/2" OD TUBE		1001253-01	1001253-01	1001253-01	1001253-01	1001253-01	1001253-01
19	2	COMP. FITTING 90° 1/2" FNPT x 1/2" OD TUBE		1001420-01	1001420-01	1001420-01	1001420-01	1001420-01	1001420-01
20	4	FLARE FITTING 90° 1/2" NPT x 1/2" TUBE		545100062	545100062	545100062	545100062	545100062	545100062
21	2	FLARE FITTING 3/4" NPT x 3/4" TUBE		545100063	545100063	545100063	545100063	545100063	545100063
22	2	PIPE PLUG	✓	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"
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"

FIGURE 6 (1 OF 2)
DV-5A VALVES
DOUBLE INTERLOCK PREACTION ELECTRIC/PNEUMATIC ACTUATION TRIM
EXPLODED VIEW

ITEM	QTY.	DESCRIPTION	CH	1 1/2 IN. (DN40)	2 IN. (DN50)	3 IN. (DN80)	4 IN. (DN100)	6 IN. (DN150)[b]	8 IN. (DN200)
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	6	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 3"	1/2" x 3"	1/2" x 3"	1/2" x 3"	1/2" x CLOSE	1/2" x 3"
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	✓	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"
43	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"
44	1	TUBING, MRA-1 DRAIN		545100065	545100065	545100066	535002140	535002160	535002180
45	1	TUBING, MC-2 DRAIN		535000220	535000220	535000230	535000240	535000260	535000280
46	1	TUBING, DP-2 DRAIN		535001220	535001220	535001230	535001240	535001260	535001280
47	1	TUBING ASSY, ALARM TEST INTERCONNECT		535000320	535000320	535000330	535000340	535000360	535000380
48	1	TUBING ASSY, ACTUATION INTERCONNECT		535001320	535001320	535001330	535001340	535001360	535001380
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	✓	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"
54	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"
55	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"
56	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"
57	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"
58	2	WATER PRESSURE GAUGE, 300 PSI / 2000 kPa (AMER/APAC)		923431005	923431005	923431005	923431005	923431005	923431005
58	2	WATER PRESSURE GAUGE, 20 bar / 2000 kPa (EMEA)		025500013	025500013	025500013	025500013	025500013	025500013
59	1	AIR PRESSURE GAUGE, 80 PSI / 550 kPa RETARDED TO 250PSI / 1750 kPa		923431012	923431012	923431012	923431012	923431012	923431012
60	1	LABEL		545003005	545003005	545003005	545003005	545003005	545003005
61	1	LABEL WIRE		—	—	—	—	—	—
62	2	3/32" VENT FITTING		920321002	920321002	920321002	920321002	920321002	920321002
63	1	1/4" OD COPPER TUBE		1/4" x 24"	1/4" x 24"	1/4" x 29"	1/4" x 32-1/4"	1/4" x 36"	1/4" x 41-13/16"
A1	1	DV-5A VALVE		SEE ORDERING PROCEDURE, SEPARATE DV-5A VALVES WITHOUT TRIM, FOR PART NUMBERS					
A2	1	WATERFLOW PRESSURE ALARM SWITCH, DOUBLE CONTACTS (APAC)		25710 or 100102	25710 or 100102	25710 or 100102	25710 or 100102	25710 or 100102	25710 or 100102
	1	WATERFLOW PRESSURE ALARM SWITCH, SINGLE CONTACTS (EMEA)		0260 or 100101	0260 or 100101	0260 or 100101	0260 or 100101	0260 or 100101	0260 or 100101
	1	WATERFLOW PRESSURE ALARM SWITCH, DOUBLE CONTACTS (AMER)		25710	25710	25710	25710	25710	25710
A3	1	LOW AIR PRESSURE ALARM SWITCH, DOUBLE CONTACTS (APAC)		25730 or 100402	25730 or 100402	25730 or 100402	25730 or 100402	25730 or 100402	25730 or 100402
	1	LOW AIR PRESSURE ALARM SWITCH, DOUBLE CONTACTS (AMER)		25730	25730	25730	25730	25730	25730
	1	LOW AIR PRESSURE ALARM SWITCH, SINGLE CONTACTS (EMEA)		0262 or 100401	0262 or 100401	0262 or 100401	0262 or 100401	0262 or 100401	0262 or 100401
A4	1	BUTTERFLY VALVE, G x G		51024A	51021A	—	—	—	—
	1	BFV-300 BUTTERFLY VALVE, G x G		—	—	59300G030WS	59300G040WS	59300G060WS	59300G080WS
A5	2	FIGURE 577 RIGID GROOVED COUPLING		57715ACP	57720ACP	—	—	—	—
	1	FIGURE 577 RIGID GROOVED COUPLING		—	—	57730ACP	57740ACP	57760ACP	57780ACP
A6	1	GROOVE x THREADED OUTLET WELDED TEE		545004000	545004001	—	—	—	—
A7	1	SOLENOID VALVE NORMALLY CLOSED (SEPARATELY ORDERED)		SEE TFP2180	SEE TFP2180	SEE TFP2180	SEE TFP2180	SEE TFP2180	SEE TFP2180
A8	1	INVERTED FLARE SHUT-OFF VALVE[a]		545100100	545100100	545100099	545100100	545100100	545100100
A9	1	FLARE FITTING 90° 1/2" NPT x 1/2" TUBE		545100062	545100062	545100062	545100062	545100062	545100062
A10	1	TUBING ASSY, DIAPHRAGM CHAMBER SUPPLY		540000015	540000020	540000030	540000040	540000060	540000080

NOTES
a. Not VdS Approved.
b. Also applicable to metric 165,1 mm size.
CH - Common Hardware - See Materials of Construction section for specifications.

FIGURE 6 (2 OF 2)
DV-5A VALVES
DOUBLE INTERLOCK PREACTION ELECTRIC/PNEUMATIC 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)	13.6 (345.4)	9.8 (249)	15.7 (399)	19.3 (490,2)	7.4 (188)	10.2 (259)	8.02 (204)	1.2 (31)
2 (50)	2.8 (71)	13.6 (345.4)	9.8 (249)	15.7 (399)	19.3 (490,2)	7.4 (188)	10.2 (259)	8.09 (205)	2.9 (74)
3 (80)	4.0 (102)	15.0 (381)	11.5 (292)	16.3 (414)	21.1 (535,9)	6.2 (158)	13.8 (351)	3.79 (96)	3.6 (91)
4 (100)	4.5 (114)	16.2 (411)	12.6 (320)	16.5 (419)	23.5 (596,9)	5.5 (140)	16.8 (427)	4.54 (115)	4.3 (109)
6[3] (150)	5.7 (145)	15.7 (399)	14.5 (368)	18.4 (467)	27.3 (693,4)	3.8 (97)	22.4 (569)	5.83 (148)	5.7 (145)
8 (200)	6.8 (174)	20.0 (508)	16.7 (424)	19.5 (495)	31.7 (805,2)	3.3 (84)	27.5 (699)	5.24 (133)	6.7 (170)

NOTES
1. Dimensions based on drain valves being open.
2. Dimensions do not provide installation clearance.
3. Also applicable to metric 165,1 mm size.

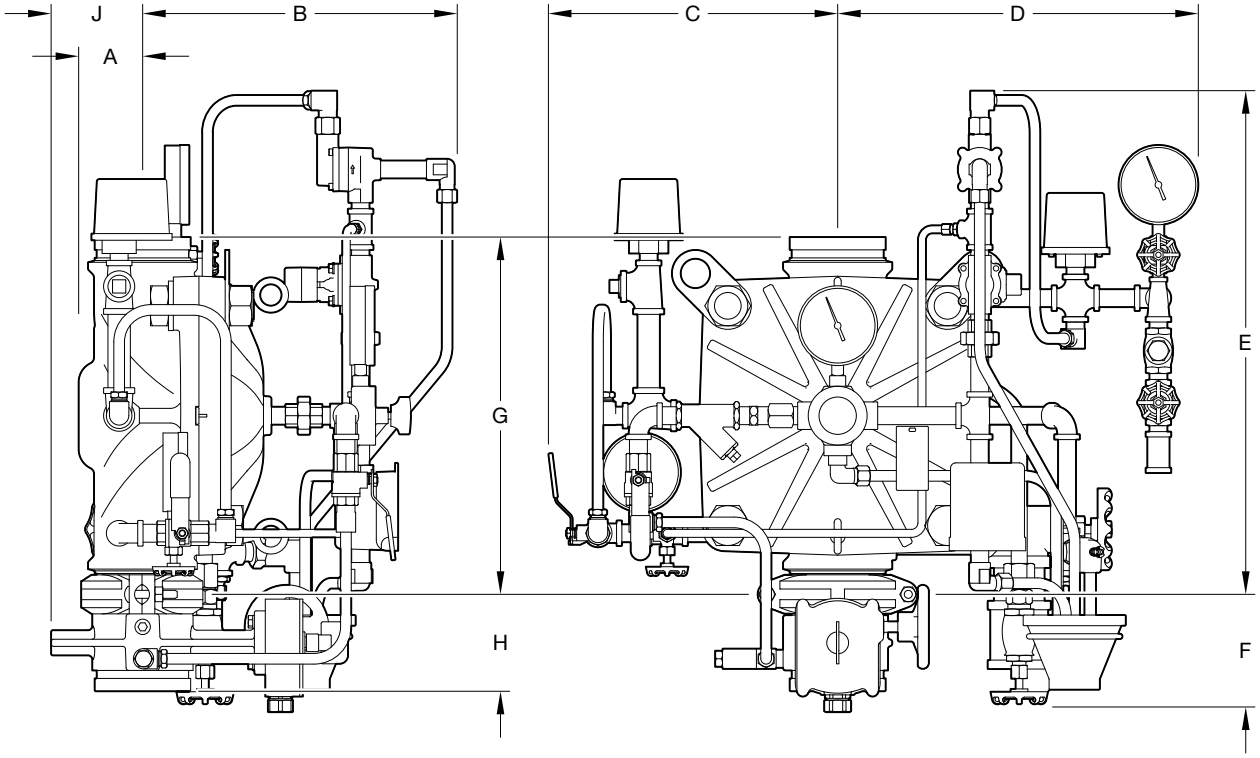


FIGURE 7
DV-5A VALVE
DOUBLE INTERLOCK PREACTION ELECTRIC/PNEUMATIC ACTUATION TRIM
NOMINAL DIMENSIONS

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.

It is recommended that the System Inspection Procedure be performed at least semi-annually by a qualified Inspection Service. The double Interlock Preaction System Inspection Procedure may be followed in lieu of performing any of the operational tests recommended in the Technical Data Sheets for the 24 VDC solenoid valve, dry pilot actuator, and Model MC-1 manual control station.

It is recommended that the individuals responsible for the care and maintenance of the double interlock preaction system develop a working understanding of the system, in general, prior to performing inspection and/or maintenance procedures. These instructions, as well as individual instructions for the solenoid valve, dry pilot actuator, manual control station, switches, and pressure maintenance device should be reviewed.

The following procedures pertain to the automatic control valve portion of the double interlock preaction system. Refer to the manufacturer's instructions and NFPA 25 for care and maintenance procedures for all other devices (e.g., electric detection, main control and system shut-off valves, supervisory devices, sprinklers, etc.).

Before performing the System Inspection Procedure or Waterflow Alarm Test Procedure, which will result in operation of alarms, notify the proper authorities and all personnel who may be affected.

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).

Electric/Pneumatic Actuation System Operation Procedure
Proper operation of the DV-5A valve for both opening of the DV-5A valve in a fire condition, or not opening the DV-5A valve in a non-fire condition, must be verified as follows:

Step 1. Close the system main control valve (B) and then open the main drain valve (D).

Step 2. Manually operate the releasing panel and verify the following:

- The operation of the releasing panel and its associated alarms
- That there is no leakage from the dry pilot actuator (W)

NOTICE

During this procedure, the solenoid valve (V) is opened; however, the dry pilot actuator (W) should remain closed and the DV-5A valve diaphragm chamber should remain pressurized.

This procedure is used to verify that the DV-5A valve will remain set if the electric detection system operates but the sprinkler system remains in its normally pressurized condition.

Step 3. Open the inspector's test connection but be prepared to close it immediately after verifying that the low air pressure alarm switch (U) and its associated alarms operate properly. The low air pressure alarm switch (U) should operate at the previously established pressure (see Installation section, Step 9).

Step 4. Close the inspector's test connection.

Step 5. Close the system shut-off valve (X) after the system air pressure has been restored to normal.

Step 6. Manually restore the electric fire detection system to a normal condition in accordance with the manufacturer's instructions. The solenoid valve (V) will then be de-energized and returned to its normally closed position.

Step 7. Open the system main control valve (B) one turn beyond the position at which water just begins to flow from the main drain valve (D).

Step 8. Close the main drain valve (D).

Step 9. Close the air supply valve (S).

Step 10. Open the dry pilot actuator (W) by partially opening the system drain valve (E) to relieve air pressure at the inlet to the dry pilot actuator (W). The dry pilot actuator will flow water from its priming line, however the DV-5A valve will not trip. Verify there is no leakage from the automatic drain valve (F).

NOTICE

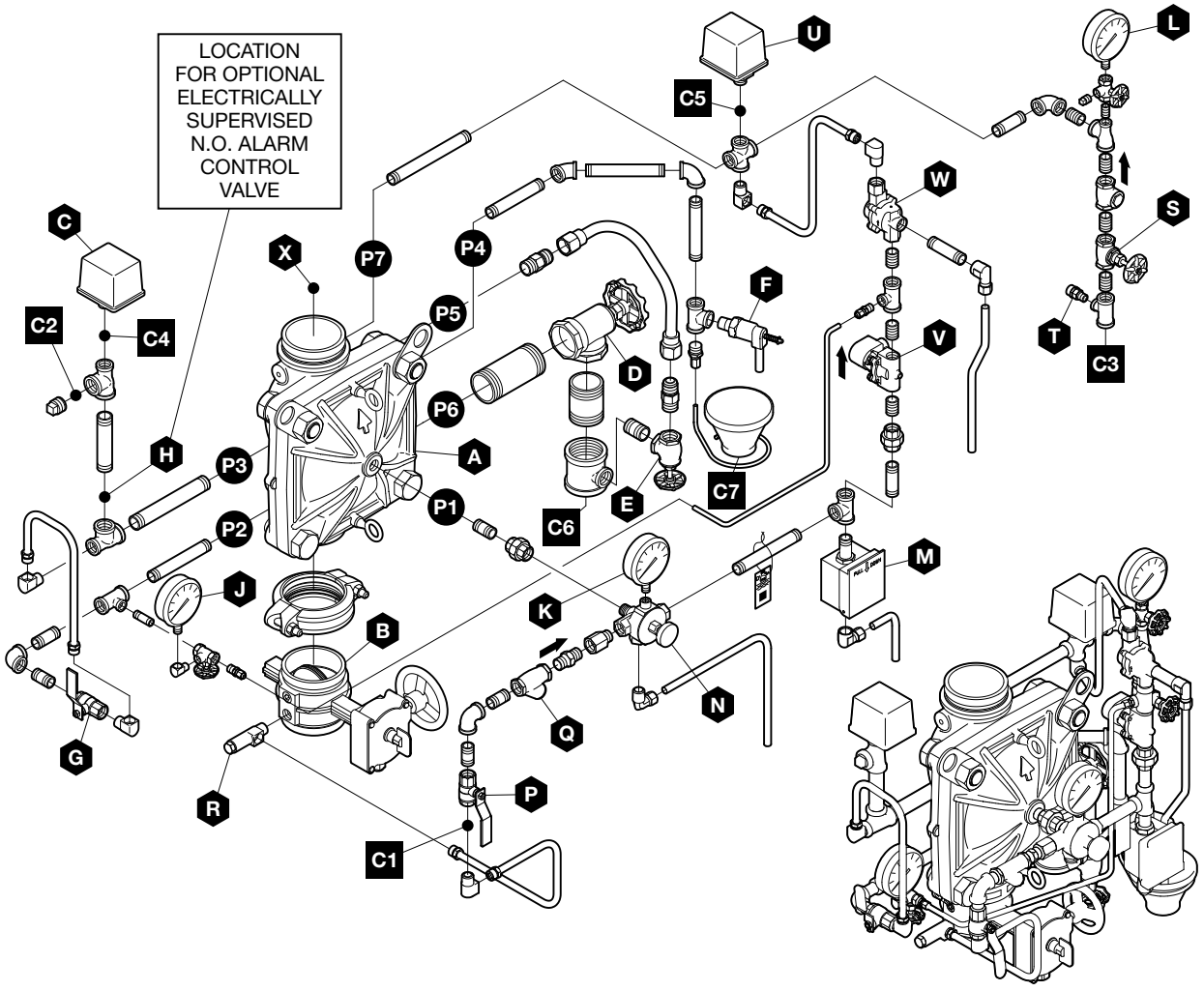
During this procedure, the dry pilot actuator (W) is opened; however, the solenoid valve (V) should remain closed and the DV-5A valve diaphragm chamber should remain pressurized.

This procedure is used to verify that the DV-5A valve will remain set if the dry pilot actuator (W) operates due to loss of system air pressure and the electric detection system remains in a normal condition.

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
L	System Gauge
M	Manual Control Station

Item	Description
N	Manual Reset Actuator
P	Diaphragm Supply Valve
Q	Diaphragm Supply Strainer
R	Inverted Flare Shut-Off Valve
S	Air Supply Valve
T	Air Pressure Relief Valve
U	Low Air Pressure Alarm Switch
V	Solenoid Valve
W	Dry Pilot Actuator
X	System Shut-Off Valve (Shown in Figure 5)

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



Notes:
- Port Connections P1 to P7 are shown in Figure 2.
- Before changing the state of the inverted flare shut-off valve (R), close the diaphragm supply valve (P).

FIGURE 8
DV-5A DOUBLE INTERLOCK PREACTION VALVE ELECTRIC/PNEUMATIC ACTUATION
(REFER TO FIGURES 6 FOR SPECIFIC BILLS OF MATERIALS)

Step 11. Open (energize) the solenoid valve by operating the releasing panel and verify the following:

- That the DV-5A valve operates as is indicated by a discharge of water from the system drain valve (E) and the automatic drain valve (F). The automatic drain valve (F) may or may not close depending on the flow past the partially open system main control valve (B)
- That the Model MRA-1 manual reset actuator (N) has operated as is indicated by water discharging into the drip funnel from the 1/2 in. drain tube connected to the Model MRA-1 manual reset actuator (N)
- That the waterflow pressure switch (C) and its associated alarms properly operate
- That the water motor alarm, if applicable, properly operates

NOTICE

This procedure simulates opening of both the dry pilot actuator (W) (loss of system air pressure) and solenoid valve (V) (operation of the valve releasing panel) to verify automatic system operation.

Step 12. Reset the double interlock preaction system in accordance with the valve setting procedure section.

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/pneumatic actuation trim and remove the electric/pneumatic 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 valves until reaching the torque valves 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/pneumatic actuation trim.

Step 7. Replace the copper tube fitting between the diaphragm supply valve (P) and the inverted flare shut-off valve (R).

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

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)	125 (169,5)	125 (169,5)
4 (100)	150 (203,4)	150 (203,4)
6[1] (150)	150 (203,4)	150 (203,4)
8 (200)	188 (254,9)	188 (254,9)

NOTES
1. Also applicable to metric 165.1 mm size.

TABLE B
DIAPHRAGM COVER BOLTS MINIMUM TORQUE

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 Double Interlock Preaction Electric/Pneumatic Actuation Trim, complete with assembled Model BFV-300 Butterfly Valve, P/N (specify):

1 1/2 in. (DN40) 551011415
2 in. (DN50) 551011420
3 in. (DN80) 551011430
4 in. (DN100). 551011440
6 in. (DN150). 551011460
8 in. (DN200) 551011480

Note: *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, Double Interlock Preaction Electric/Pneumatic Actuation Trim, P/N (specify):

Grooved x Grooved
1 1/2 in. (DN40) 550011415
2 in. (DN50) 550011420
3 in. (DN80) 550011430
4 in. (DN100). 550011440
6 in. (DN150). 550011460
8 in. (DN200) 550011480

Flange x Flange ANSI
3 in. (DN80) 550021430
4 in. (DN100). 550021440
6 in. (DN150). 550021460
8 in. (DN200) 550021480

Flange x Grooved ANSI
3 in. (DN80) 550031430
4 in. (DN100). 550031440
6 in. (DN150). 550031460
8 in. (DN200) 550031480

Thread x Thread NPT
1 1/2 in. (DN40) 550061415
2 in. (DN50) 550061420

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) 530020080

Thread x Thread NPT
1 1/2 in. (DN40) 530060015
2 in. (DN50) 530060020

Note: *Valves are typically provided with flange drilling per ANSI B16.42 (Class 150) 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/Pneumatic Actuation Trim for DV-5A Automatic Water Control Valves used in Double Interlock Preaction Fire Protection System, P/N (specify):

Galvanized
1 1/2 in. (DN40) 540001420A
2 in. (DN50) 540001420A
3 in. (DN80) 540001430A
4 in. (DN100). 540001440A
6 in. (DN150). 540001460A
8 in. (DN200) 540001480A

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, Double Interlock Preaction Electric/Pneumatic Actuation Trim, P/N (specify):

Grooved x Grooved
1 1/2 in. (DN40) 550111415
2 in. (DN50) 550111420
3 in. (DN80) 550111430
4 in. (DN100). 550111440
6 in. (DN150). 550111460
165,1 mm 550111466
8 in. (DN200) 550111480

Flange x Flange ANSI
3 in. (DN80) 550121430
4 in. (DN100). 550121440
6 in. (DN150). 550121460
8 in. (DN200) 550121480

Flange x Grooved ANSI
3 in. (DN80) 550131430
4 in. (DN100). 550131440
6 in. (DN150). 550131460
8 in. (DN200) 550131480

Flange x Flange ISO
3 in. (DN80) 550141430
4 in. (DN100). 550141440
6 in. (DN150). 550141460
8 in. (DN200) 550141480

Flange x Grooved ISO
3 in. (DN80) 550151430
4 in. (DN100). 550151440
6 in. (DN150). 550151460
8 in. (DN200) 550151480

Thread x Thread ISO
1 1/2 in. (DN40) 550171415
2 in. (DN50) 550171420

Note: *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
165,1 mm 530010066
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

Thread x Thread 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

Thread x Thread ISO
1 1/2 in. (DN40) 530070015
2 in. (DN50) 530070020

Note: *Valves are typically provided with flange drilling per ANSI B16.42 (Class 150) 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), Double Interlock Preaction Electric/ Pneumatic Actuation Trim for DV-5A Automatic Water Control Valves used in Deluge Fire Protection System, P/N (specify):

Galvanized

1 1/2 in. (DN40) 540101420
2 in. (DN50) 540101420
3 in. (DN80) 540101430
4 in. (DN100). 540101440
6 in. (DN150). 540101460
8 in. (DN200) 540101480

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, Double Interlock Preaction Electric/Pneumatic Actuation Trim, P/N (specify):

Grooved x Grooved

1 1/2 in. (DN40) 550011415
2 in. (DN50) 550011420
3 in. (DN80) 550011430
4 in. (DN100). 550011440
6 in. (DN150). 550011460
165,1 mm 550011466
8 in. (DN200) 550011480

Flange x Flange ANSI

3 in. (DN80) 550021430
4 in. (DN100). 550021440
6 in. (DN150). 550021460
8 in. (DN200) 550021480

Flange x Grooved ANSI

3 in. (DN80) 550031430
4 in. (DN100). 550031440
6 in. (DN150). 550031460
8 in. (DN200) 550031480

Thread x Thread NPT

1 1/2 in. (DN40) 550061415
2 in. (DN50) 550061420

Flange x Flange ISO

3 in. (DN80) 550041430
4 in. (DN100). 550041440
6 in. (DN150). 550041460
8 in. (DN200) 550041480

Flange x Grooved ISO

3 in. (DN80) 550051430
4 in. (DN100). 550051440
6 in. (DN150). 550051460
8 in. (DN200) 550051480

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
165,1 mm 530010066
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) 530020080

Thread x Thread 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

Thread x Thread ISO

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

Note: *Valves are typically provided with flange drilling per ANSI B16.42 (Class 150) 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/Pneumatic Actuation Trim for DV-5A Automatic Water Control Valves used in Double Interlock Preaction Fire Protection System, P/N (specify):

Galvanized

1 1/2 in. (DN40) 540001420
2 in. (DN50) 540001420
3 in. (DN80) 540001430
4 in. (DN100). 540001440
6 in. (DN150). 540001460
8 in. (DN200) 540001480

ALL REGIONS

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

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

Waterflow Pressure Alarm Switch, PS10-2 (America). 25710
Waterflow Pressure Alarm Switch (APAC) . . . . . 25710 or 100102
Waterflow Pressure Alarm Switch (EMEA) . . . . . 0260 or 100101
Supervisory Air Pressure Alarm Switch, PS40-2 (America). 25730
Supervisory Air Pressure Alarm Switch (APAC) . . . . . 25730 or 100402
Supervisory Air Pressure Alarm Switch (EMEA) . . . . . 0262 or 100401
Model WMA-1 Water Motor Alarm (America/APAC) 526301001P
Model WMA-1 Water Motor Alarm (EMEA) 526301021R
Model AMD-1 Air Maintenance Device 523242002
Model AMD-2 Air Maintenance Device 523262001
Model AMD-3 Nitrogen Maintenance Device 523282001
Model MC-1 Manual Control Station. 522892001
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)

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DV-5A Appendix A Poster Printing Instructions

General Description

The appendix found at the end of this document provides valve setting and testing/inspection procedures summarized from the Care and Maintenance section.

Some jurisdictions require a copy of the Summary Instructions appendix to be displayed in proximity to a DV-5A Automatic Control Valve riser supplying a fire protection system.

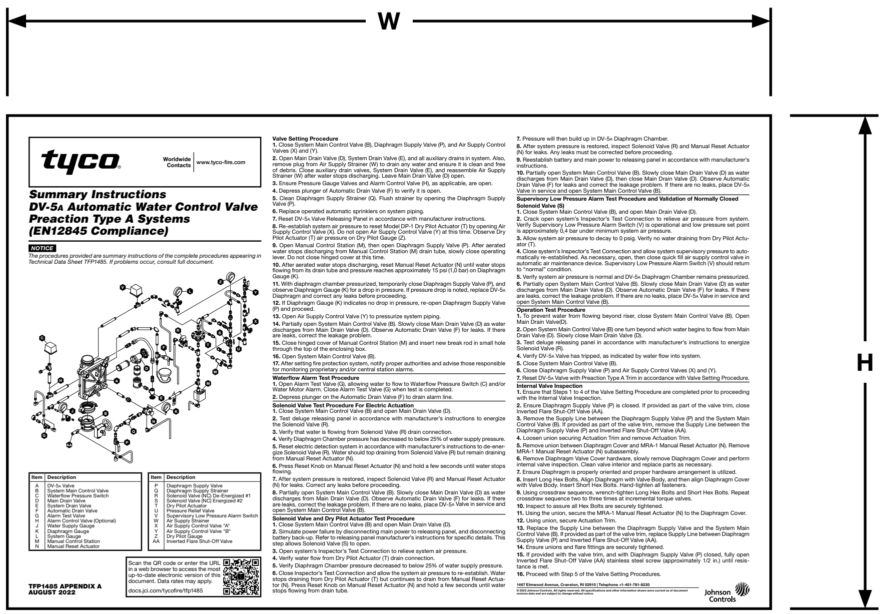
Reproduce as an individual poster by printing on appropriate media.

A form of protection is recommended to prevent damage which could render the poster illegible. Conditions to avoid include moisture infiltration, fading, mutilation, etc.. Protective measures may include lamination, placement within an impact- and water-resistant frame, etc.

The format shown in this document is landscape orientation on US Tabloid size, also known as ANSI B drawing format, both roughly comparable to ISO A3 size format.

To avoid potential cropping of content when printing to A3 format, select options such as print to fit or scale to fit. Depending on printer capability content will be slightly reduced but should remain readable.

See Print Format Dimensions Table for details.



Format	Imperial in.		Metric mm	
	W	H	W	H
US Tabloid	17	11	—	—
ANSI B				
ISO A3	—	—	420	297

PRINT FORMAT DIMENSIONS

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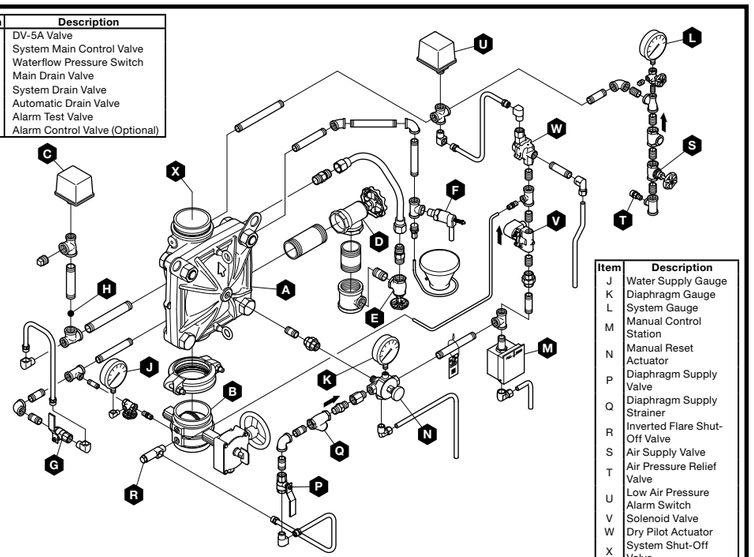
Summary Instructions DV-5A Automatic Water Control Valve Double Interlock Preaction Electric/ Pneumatic Actuation Fire Protection System

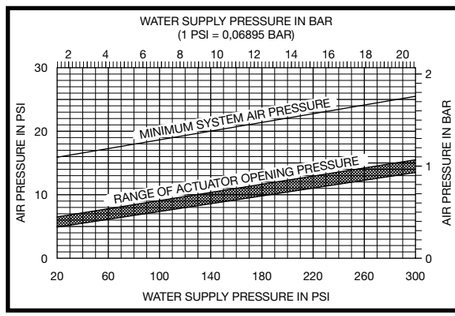
NOTICE

The procedures provided are summary instructions of the complete procedures appearing in Technical Data Sheet TFP1461. If problems occur, consult full document.



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)

Item	Description
J	Water Supply Gauge
K	Diaphragm Gauge
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	Air Supply Valve
T	Air Pressure Relief Valve
U	Low Air Pressure Alarm Switch
V	Solenoid Valve
W	Dry Pilot Actuator
X	System Shut-Off Valve



NOTES:

1. The dew point of the pilot line air pressure must be maintained below the lowest ambient temperature to which the dry pilot actuation system will be exposed. Accumulation of water in the pilot line connection to the Actuator will lower the air pressure at which the actuator will open and possibly prevent proper operation. Also, introduction of moisture into the pilot lines exposed to freezing temperatures can create an ice buildup that could prevent proper operation of the Actuator.
2. An air dryer must be installed where the moisture content of the air supply is not properly controlled at less than the required value.
3. It is recommended that an AMD-3 Nitrogen Maintenance Device be utilized in dry pilot actuation system applications where the dew point must be maintained below -20°F (-29°C). Refer to Technical Data Sheet TFP1241.

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TFP1461 APPENDIX A
MARCH 2025

Valve Setting Procedure

1. Close system main control valve (B), diaphragm supply valve (P), and air supply valve (S).

2. Open main drain valve (D), system drain valve (E), and all auxiliary drains in the system. Close auxiliary drain valves and system drain valve (E) after water stops discharging. Leave main drain valve (D) open.

3. Depress plunger of automatic drain valve (F) to verify it is open.

4. Clean diaphragm supply strainer (Q). Flush strainer by opening the diaphragm supply valve (P).

5. Inspect for and clear all ice plugs where system piping has been exposed to freezing conditions.

6. Replace operated sprinklers.

7. Service air dryer, if applicable, in accordance with the manufacturer's instructions.

8. De-energize solenoid valve (V) via potter RCDS-1 releasing circuit disable switch, or equivalent.

9. Open manual control station (M), then open diaphragm supply valve (P). After aerated water stops discharging, slowly close operating lever. Do not close hinged cover at this time.

10. After aerated water stops discharging, reset manual reset actuator (N) until water stops flowing from the drain tube and the pressure builds and reaches approximately 15 psi (1,0 bar) on diaphragm gauge (K).

11. Inspect electric/electric actuation drain connection from manual control station (M) and solenoid valve (V). Correct any leaks before proceeding.

12. With diaphragm chamber pressurized, temporarily close diaphragm supply valve (P), and observe diaphragm gauge (K) for a drop in pressure. If a pressure drop is noted, correct any leaks before proceeding. If diaphragm gauge (K) indicates no drop in pressure, re-open diaphragm supply valve (P) and proceed.

13. Open air supply valve (S) and allow system to automatically re-establish nominal system air pressure - see air pressure requirements graph shown below. Observe automatic drain valve (F) for leaks. If there are leaks, correct leaks before proceeding.

14. Open system shut-off valve (X), as will be the case when resetting a system after performing an operational test.

15. Proceed to reset electric detection system in accordance with the manufacturer's instructions. After setting releasing panel, return potter RCDS-1 to "green light - releasing circuit system normal".

16. Partially open system main control valve (B). Slowly close main drain valve (D) as water discharges from main drain valve (D). Observe automatic drain valve (F) for leaks. If there are leaks, correct the leakage problem. Vent off express pressure through the manual control station (M).

17. Close hinged cover on manual control station (M) and insert a new break rod in small hole through top of enclosing box.

18. Fully open system main control valve (B).

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

Drop in Water Supply Pressure Below Normal Range

1. Note water supply pressure by the diaphragm gauge (K) and determine if the pressure is within normally expected range.

2. If below normal range, correct any leakage from diaphragm chamber prior to resetting the system.

3. When water supply pressure is restored, reset DV-5A valve in accordance with the Valve Setting Procedure.

Waterflow Alarm Test Procedure

1. Open alarm test valve (G), allowing water to flow to waterflow pressure switch (C) and/or water motor alarm. Close the alarm test valve (G) when test is completed.

2. Depress plunger on automatic drain valve (F) to drain alarm line.

Electric/Pneumatic Actuation System Operation Procedure

1. Close system main control valve (B), then open main drain valve (D).

2. Manually operate releasing panel and verify operation of releasing panel and its associated alarms, ensuring no leakage from dry pilot actuator (W)

3. Open inspector's test connection and close it immediately after verifying low air pressure alarm switch (U) and its associated alarms operate properly. Low air pressure alarm switch (U) should operate at previously established pressure.

4. Close inspector's test connection, then close system shut-off valve (X) after system air pressure has been restored to normal.

5. Manually restore electric fire detection system to a normal condition in accordance with manufacturer's instructions. Solenoid valve (V) will then be de-energized and returned to its normally closed position.

6. Open system main control valve (B) one turn beyond which water just begins to flow from main drain valve (D).

7. Close main drain valve (D) and air supply control valve (S).

8. Open dry pilot actuator (W) by partially opening system drain valve (E) to relieve air pressure at inlet to dry pilot actuator (W). Verify there is no leakage from dry pilot actuator (W).

9. Open solenoid valve by operating releasing panel. Verify DV-5A valve operates as indicated water discharging from system drain valve (E) and automatic drain valve (F). Automatic drain valve (F) may or may not close depending on flow past partially open system main control valve (B).

10. Verify Model MRA-1 manual reset actuator (N) has operated as indicated by water discharging into drip funnel drain tube connected to Model MRA-1 manual reset actuator (N), and waterflow pressure switch (C) and its associated alarms properly operate, and water motor alarm, if applicable, properly operates.

11. Reset double interlock preaction system in accordance with Valve Setting Procedure section.

Internal Valve Inspection

1. Ensure that Steps 1 to 4 of the Valve Setting Procedure are completed prior to proceeding with the Internal Valve Inspection.

2. Ensure diaphragm supply valve (P) is closed. If provided as part of the valve trim, close inverted flare shut-off valve (R).

3. Remove the supply line between the diaphragm supply valve (P) and the system main control valve (B). If provided as part of the valve trim, remove the supply line between the diaphragm supply valve (P) and inverted flare shut-off valve (R).

4. Loosen union securing actuation trim and remove actuation trim.

5. Remove union between diaphragm cover and MRA-1 manual reset actuator (N). Remove MRA-1 manual reset actuator (N) subassembly.

6. Remove diaphragm valve cover hardware, slowly remove diaphragm cover and perform internal valve inspection. Clean valve interior and replace parts as necessary.

7. Ensure diaphragm is properly oriented and proper hardware arrangement is utilized.

8. Insert long hex bolts. Align diaphragm with valve body, and then align diaphragm cover with valve body. Insert short hex bolts. Hand-tighten all fasteners.

9. Using crossdraw sequence, wrench-tighten long hex bolts and short hex bolts. Repeat crossdraw sequence two to three times at incremental torque valves.

10. Inspect to assure all hex bolts are securely tightened.

11. Using the union, secure the MRA-1 manual reset actuator (N) to the diaphragm cover.

12. Using union, secure actuation trim.

13. Replace the supply line between the diaphragm supply valve and the system main control valve (B). If provided as part of the valve trim, replace supply line between diaphragm supply valve (P) and inverted flare shut-off valve (R).

14. Ensure unions and flare fittings are securely tightened.

15. If provided with the valve trim, and with diaphragm supply valve (P) closed, fully open inverted flare shut-off valve (R) stainless steel screw (approximately 1/2 in.) until resistance is met.

16. Proceed with Step 5 of the Valve Setting Procedures.

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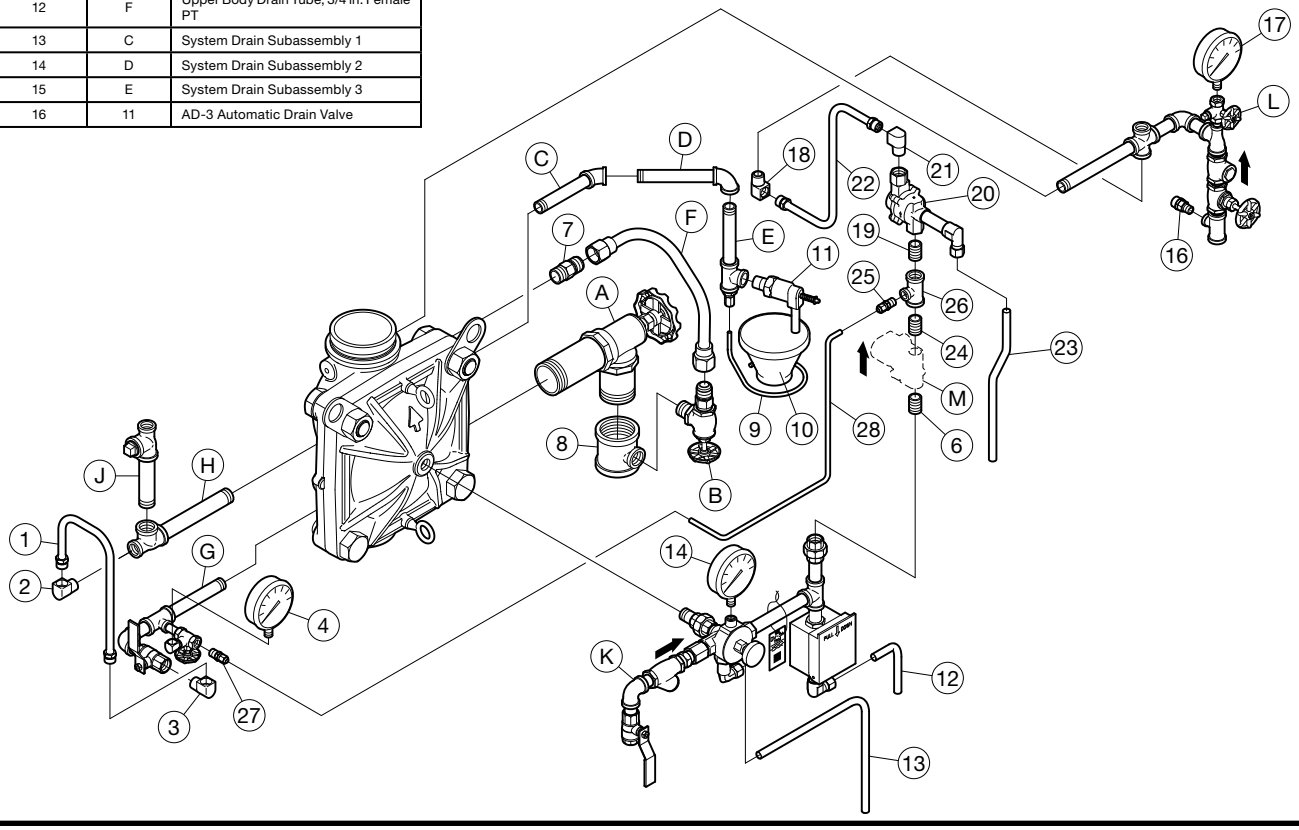
DV-5A Automatic Water Control Valve Double Interlock Preaction Electric/Pneumatic Actuation Fire Protection Systems Trim Assembly

Assembly Sequence	Item Number	Item Description
1	G	Lower Alarm Line Subassembly
2	H	Upper Alarm Line Subassembly 1
3	J	Upper Alarm Line Subassembly 2
4	2	90° Elbow, 1/2 in. Male PT x 1/2 in. Female Tube
5	3	90° Elbow, 1/2 in. Male PT x 1/2 in. Female Tube
6	4	System Water Supply Pressure Gauge (Included with ANSI kit only)
7	1	Alarm Bypass Tube, 1/2 in.
8	7	Adapter Nipple, 3/4 in. Male PT x 3/4 in. Female Tube
9	A	Main Drain Valve Subassembly
10	8	Reducing Tee
11	B	Upper Body Drain Valve Subassembly
12	F	Upper Body Drain Tube, 3/4 in. Female PT
13	C	System Drain Subassembly 1
14	D	System Drain Subassembly 2
15	E	System Drain Subassembly 3
16	11	AD-3 Automatic Drain Valve

Assembly Sequence	Item Number	Item Description
17	9	Drip Funnel Bracket
18	10	Drip Funnel
19	L	Supervisory Air Subassembly
20	16	1/4 in. Air Pressure Relief Valve, P/N 923431020
21	17	Supervisory Air Pressure Gauge (Included with ANSI kit only)
22	18	90° Elbow, 1/2 in. Male PT x 1/2 in. Female Tube
23	K	Diaphragm Chamber Supply and Actuation Connection Subassembly
24	6	Nipple, 1/2 in. x Close
25	M	Solenoid Valve (sold separately)
26	24	Nipple, 1/2 in. x Close
27	26	Reducing Tee, 1/2 in. x 1/2 in. x 1/4 in.
28	19	Nipple, 1/2 in. x Close

Assembly Sequence	Item Number	Item Description
29	20	Dry Pilot Actuation Subassembly
30	23	DP-2 Drain Tube, 1/2"
31	21	90° Elbow, 1/2 in. Female PT x 1/2 in. Female Tube
32	22	Actuation Supervisory Air Interconnect Tube, 1/2 in. Female PT
33	25	Vent Fitting, 3/32 in. x 1/4 in. Male Pt x 1/4 in. Female Tube
34	27	Vent Fitting, 3/32 in. x 1/4 in. Male Pt x 1/4 in. Female Tube
35	28	System Water Supply Actuation Interconnect Tube, 1/4 in.
36	12	MC-1 Drain Tube, 1/2 in.
37	13	MRA-1 Drain Tube, 1/2 in.
38	14	Diaphragm Chamber Water Supply Pressure Gauge (Included with ANSI kit only)



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TFP1461 APPENDIX B
MARCH 2025

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SECTION 3

General Air Products Manual

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

GENERAL AIR PRODUCTS

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

version 2.3
07-2019

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Section 5 - Lubrication

Section 6 - Piping
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- 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
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- 7.2 - Oilless Air Compressor Single & 3 Phase Wiring Drawing

Section 8 - Maintenance Instructions

Section 9 - Troubleshooting Guide

Section 10 - Warranty Policy

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

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

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

NOTICE - *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

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

WARNING - 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.

WARNING - 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**.

WARNING - 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.

WARNING

- 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

NOTICE

- 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

WARNING

- 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.

NOTICE

- 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.

NOTICE

- 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.

WARNING

- 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.

NOTICE

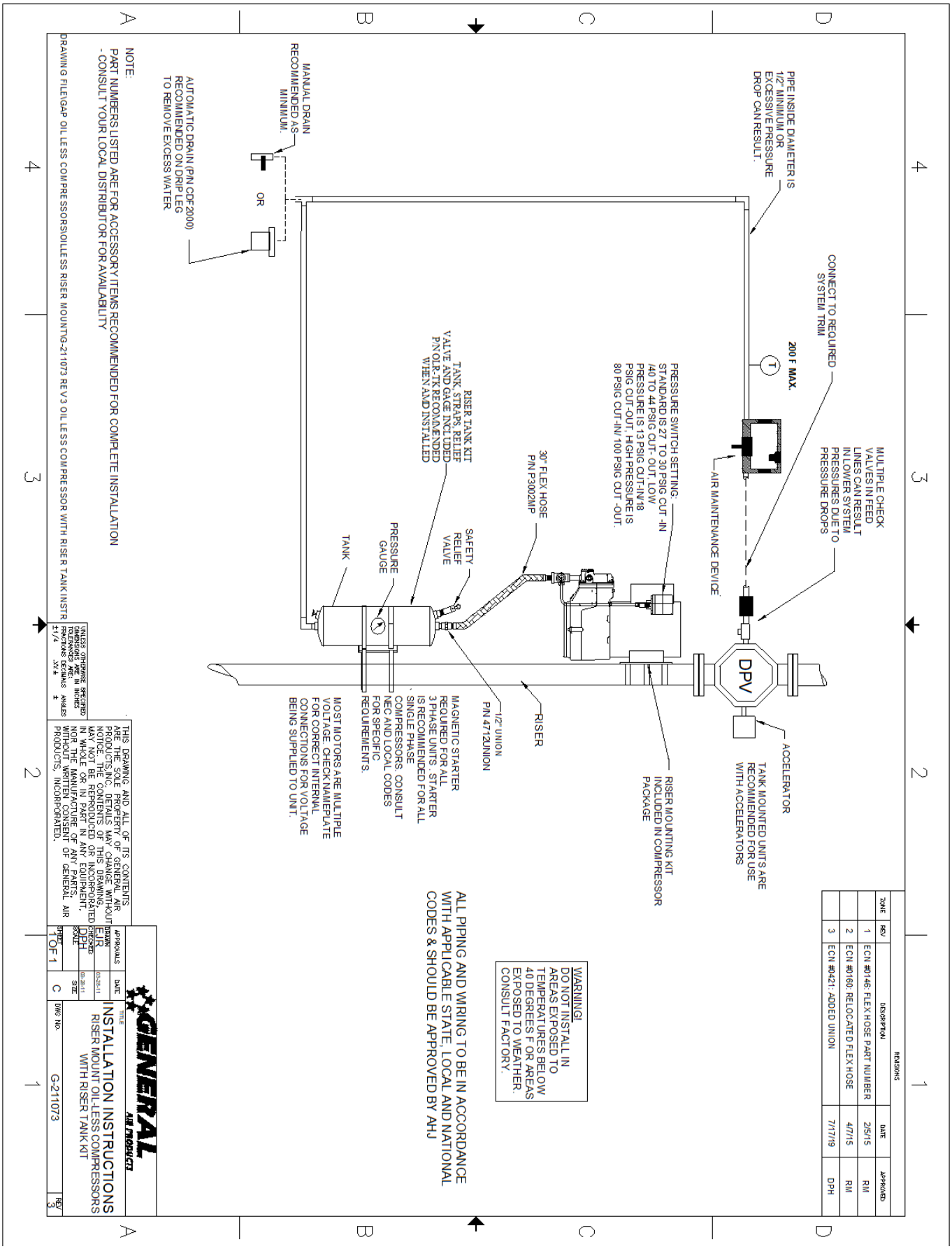
- Accumulation of condensed water in the system can cause corrosion of components and reduction of system capacity.

NOTICE

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

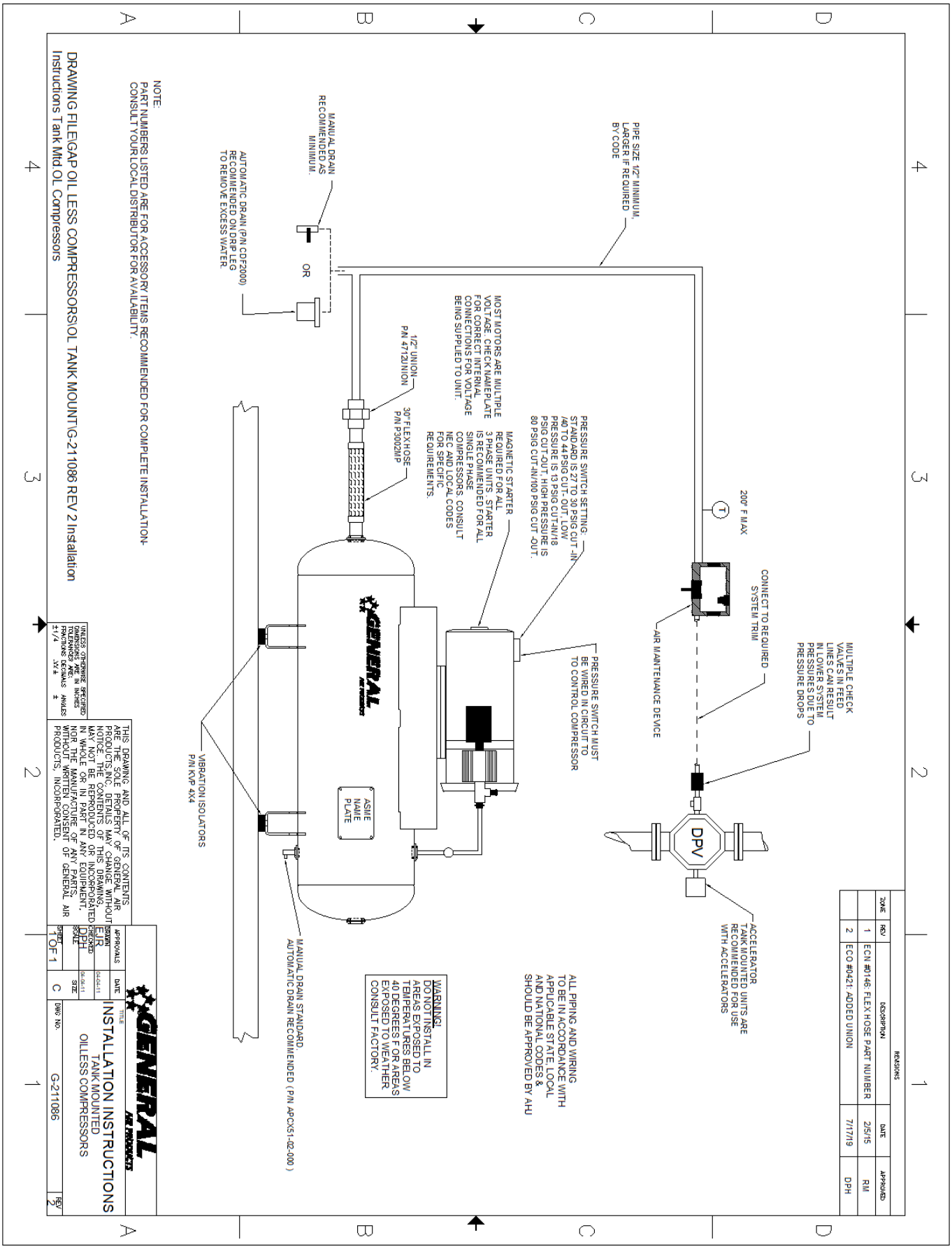
Section 6 - Piping

6.2 OL Plus Series Riser Mounted Oilless Air Compressor Installation Drawing



Section 6 - Piping

6.3 OLT Plus Series Tank Mounted Oilless Air Compressor Installation Drawing



Section 7 - Wiring

7.1 Wiring Instructions

WARNING

- 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.

CAUTION

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

NOTICE

- 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.

NOTICE

- 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

NOTICE

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

WARNING

- 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.

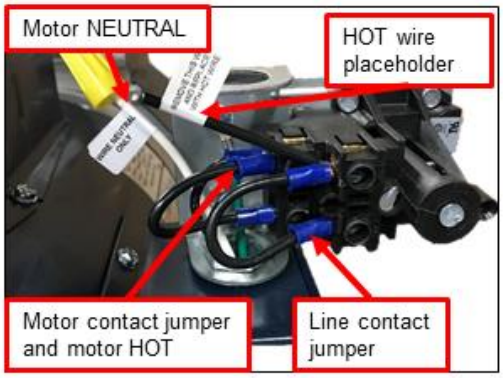
On three-phase compressors, the motor is not pre-wired to the pressure switch. Refer to the three phase wiring instruction drawing for recommended wiring. **A motor starter is required, for all three phase models, to protect the motor from overload conditions to meet NEC, NFPA70, Article 430. A motor 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.

NOTICE

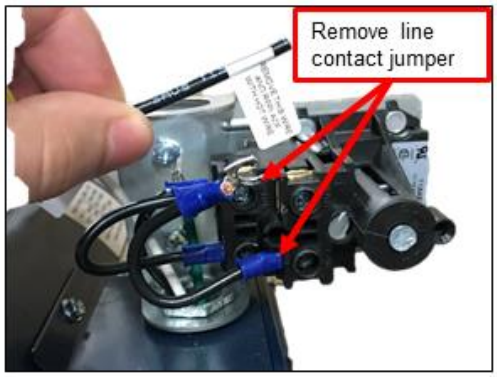
- Do not run two phases of a three phase supply through the pressure switch. Serious damage can result. Warranty is voided if connected this way.

Section 7 - Wiring

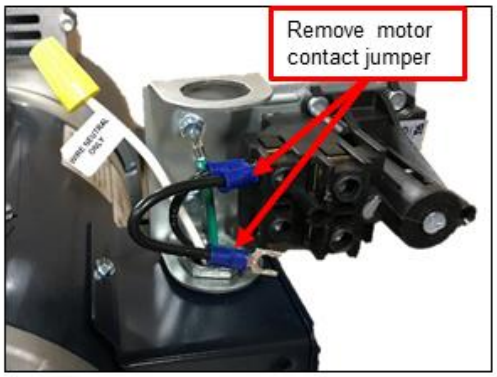
Convert Pressure Switch from 115V to 230V



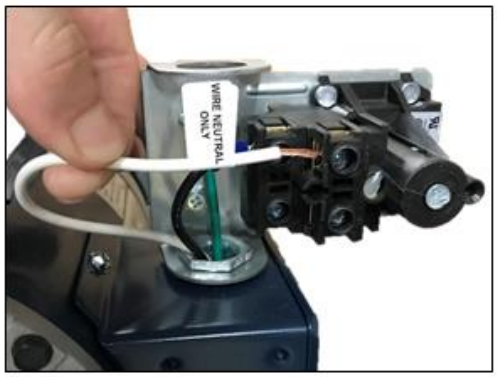
1. Identification of wires.



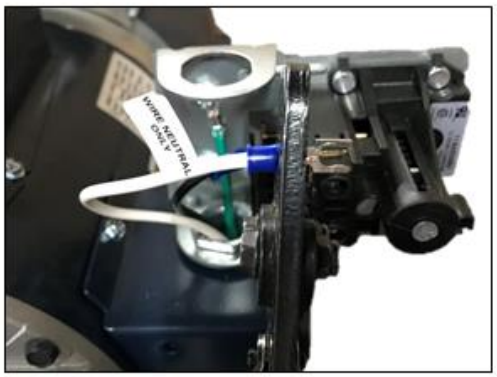
2. Remove line contact jumper and HOT wire placeholder.



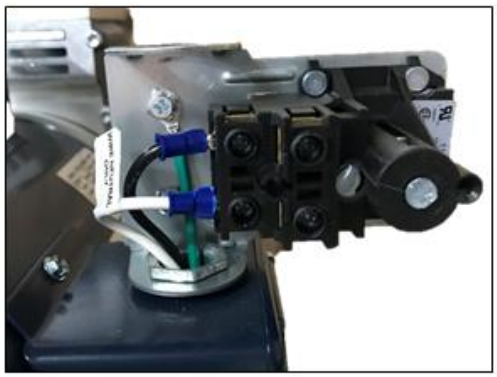
3. Remove motor contact jumper, leaving motor HOT in terminal. Retighten motor HOT wire in terminal.



4. Remove yellow wire nut from motor NEUTRAL.



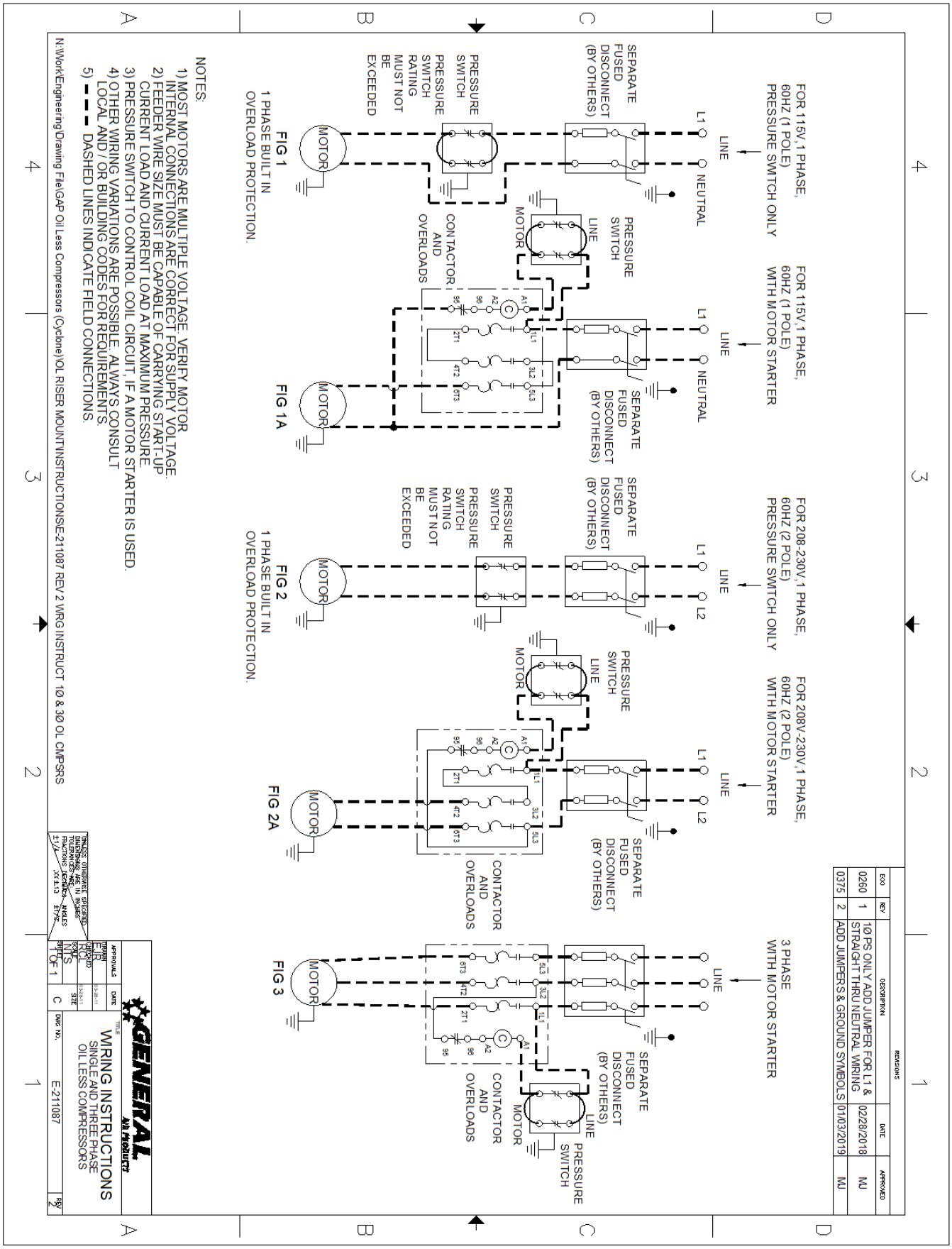
5. Crimp a spade connector onto NEUTRAL wire.



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 warrant- ed. 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.

REV: 4/22/11

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SECTION 4

United Fire Systems UFS-710

NAMD-1 Instruction Sheet

INSTRUCTION SHEET

Pressure Maintenance Device for Fire Sprinkler Systems
Model **NAMD-1**

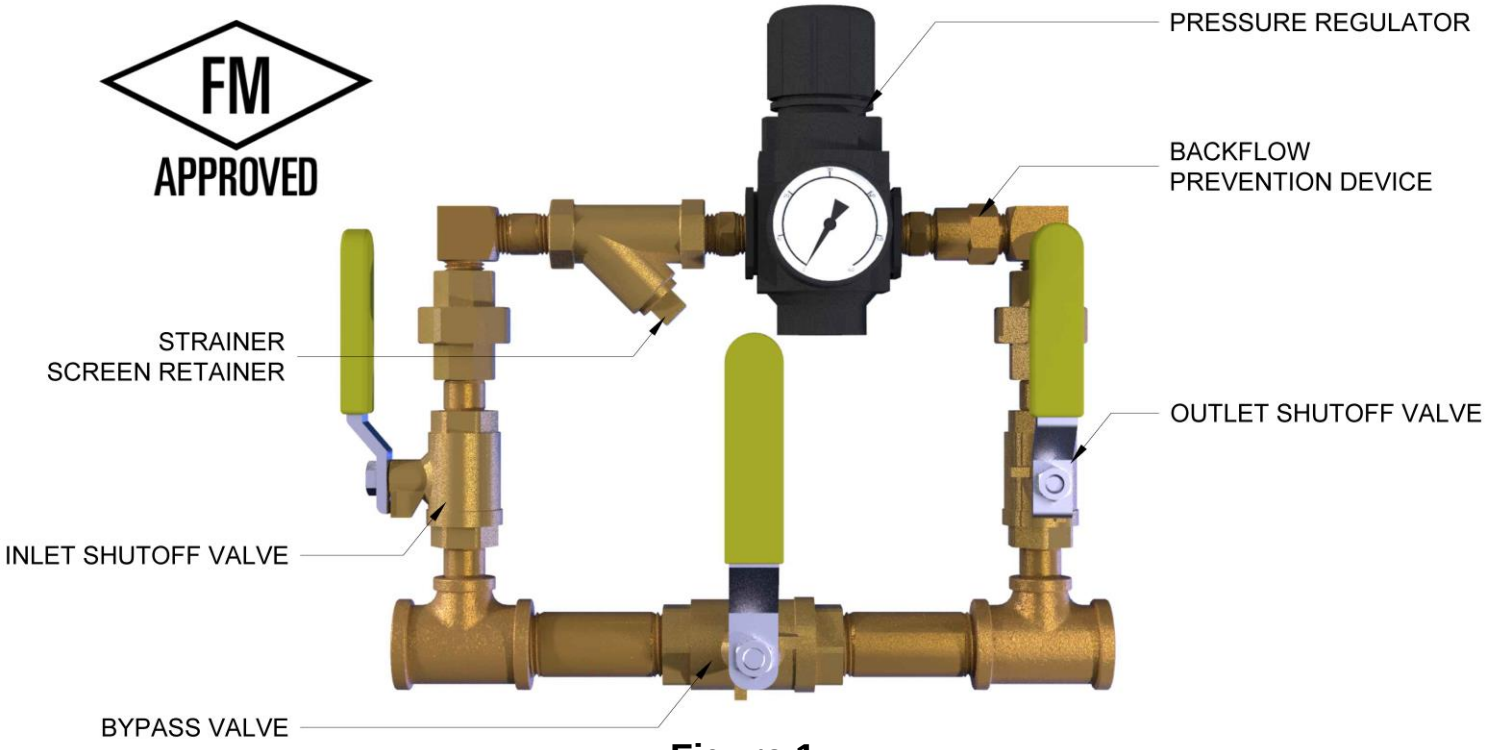

Figure 1

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 that 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

Pressure 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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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.

DANGER
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!

IMPORTANT
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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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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SECTION 5

Potter Manual 5403650

ARC-100 Control Panel Installation, Operation, and Instruction Manual

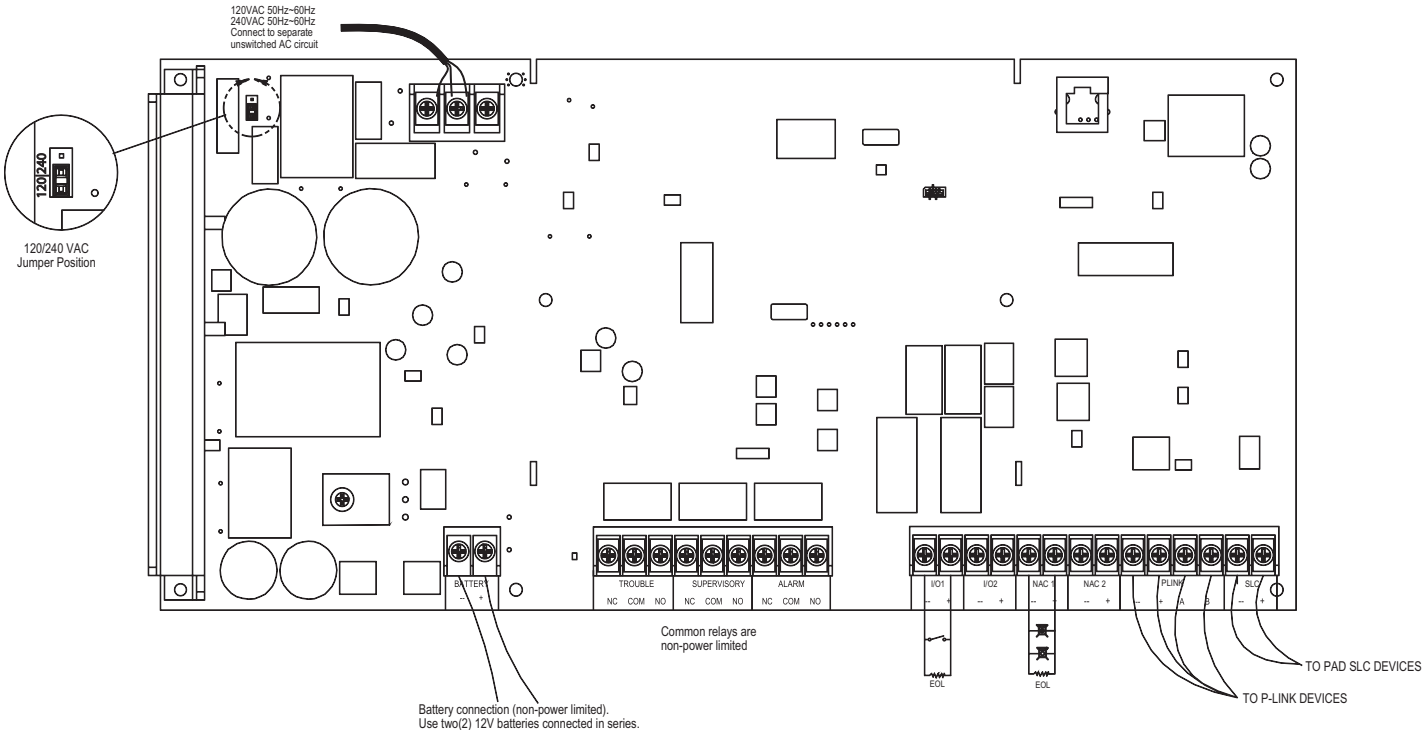
ARC-100
Fire Alarm Installation Manual

POTTER
The Symbol of Protection

Potter Electric Signal Company, LLC
St. Louis, MO
Customer Service: (866) 240-1870 • Technical Support: (866) 956-1211 • Fax: (314) 595-6999
For listing information visit our website www.pottersignal.com

Document 5403650-Rev. M
09/24

1. Installation Wiring Documents



DWG #640-1

Figure 1. ARC-100 Addressable Fire Panel Wiring Diagram

Type of Circuit	Voltage Type	Power Type
AC Connection	High Voltage	Non-Power Limited
Battery Connection	Low Voltage	Non-Power Limited
Trouble Relay	High Voltage	Non-Power Limited
Supervisory Relay	High Voltage	Non-Power Limited
Alarm Relay	High Voltage	Non-Power Limited
I/O Circuits	Low Voltage	Power Limited
Notification Device Circuits (NACs)	Low Voltage	Power Limited
P-Link RS-485 Connections	Low Voltage	Power Limited
Signaling Line Circuit	Low Voltage	Power Limited
Phone Line – DACT	High Voltage	Power Limited

Main Supply Circuit

The AC terminals are located in the upper left hand portion of the main board. The main board supervises the main AC power and provides indication that the AC power is absent.

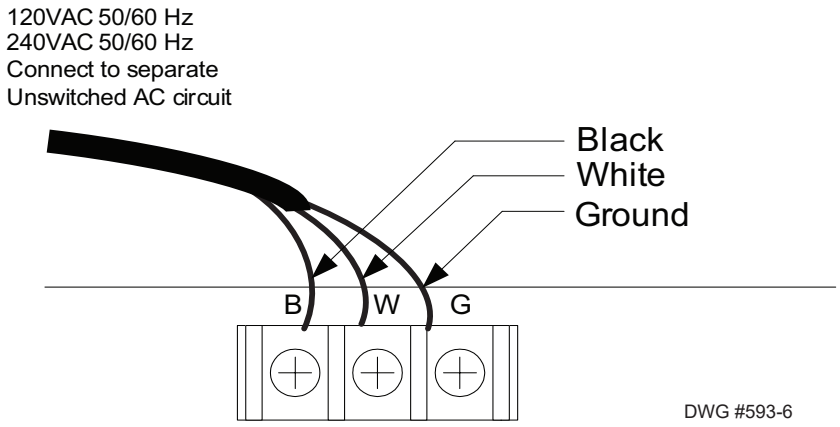


Figure 2. Main Supply Circuit

The terminals are rated at 120 VAC/240 VAC 50/60 Hertz and are marked so accordingly on the board. The earth ground connection is marked as "G" and is the furthest connection from the line voltage connection.

The AC input power ratings:
Maximum of 5A at the nominal 120 VAC rating.
Maximum of 3A at the nominal 240 VAC rating.

Rechargeable Battery Circuit

The battery charging circuit is provided on the main panel in the lower left portion of the board. Terminal connections are provided to connect wire leads for battery connection. The battery must be a recognized or listed sealed lead acid battery or equivalent.

The battery charging voltage is approximately 27.3 VDC and the circuit is supervised. The battery circuit is protected with a non-replaceable 7 amp poly switch located on the main circuit board. The maximum battery charging circuit is 1.0 amp DC.

The battery circuit is rated for 8 to 55 AH batteries and the cabinet will house up to two 18 AH batteries. The batteries will operate the panel for at least 24 hours and 5 minutes of alarm. In order to determine the minimum size batteries for standby and alarm times desired, the installer must complete a battery calculation work sheet in order to determine the minimum battery size for a particular application. For reference, the battery calculation work sheet is attached as Appendix A. Complete standby battery calculations must be completed to ensure adequate battery sizes are provided.

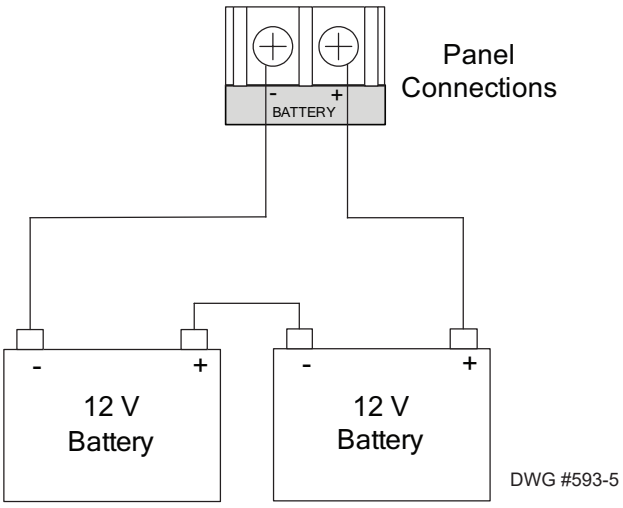


Figure 3. Battery Circuit Connections

Separation of Circuits - Power Limited, Non-Power Limited, High Voltage Wiring

The main AC power connection is considered high-voltage and non-power limited. The phone line connections to the DACT are high-voltage – power limited. Battery conductors, and the alarm, supervisory, and trouble relays are non-power limited. All remaining circuits are low-voltage, power limited connections.

Proper separation must be maintained between the circuits listed above. All separations in the different wiring must be maintained by at least 0.25 inches and the wire insulation must be for the higher voltage.

In the panel there are sufficient knock outs located around the periphery of the cabinet to allow the installer to maintain power limited and non-power limited connections. The main AC power connection should be made on the left side or top left of the cabinet. The DACT wiring connections should be made along the top right side of the cabinet.

Notification Appliance Circuits (NACs)

The panel is equipped with two NAC circuits and each are rated for a continuous 3 amps at 24 VDC. The outputs are supervised and regulated. The NACs reverse polarity upon activation and the board and illustrations are marked accordingly.

The panel can be programmable to allow for addition of a CA-6075 Class-A Expander. This expander allows for Class A operation of the NACs. Each Class A circuit is rated for a continuous 3 amps at 24 VDC. The outputs are supervised and regulated.

NAC circuits are power limited and the type of output is selectable. The NACs may be configured for strobe synchronization with AMSECO, Wheelock, Gentex, or System Sensor strobe devices as shown compatible in this document and the installation instructions.

The maximum impedance is a function of the load being applied to the circuit. In order to calculate the maximum impedance as follows:

(Alarm Current of Notification Appliances) X (Wire Resistance) < 3 volts.

The NAC circuits may be configured for Class A or Class B.

The panel has ground fault detection on the NAC circuits. The impedance to ground for ground fault detection is 0 ohms.

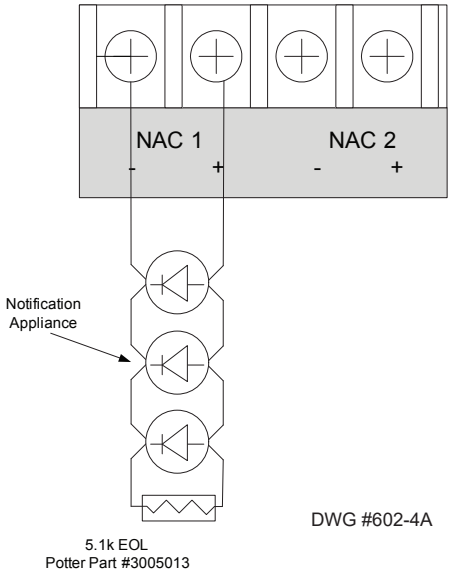


Figure 4. Class B NAC Wiring

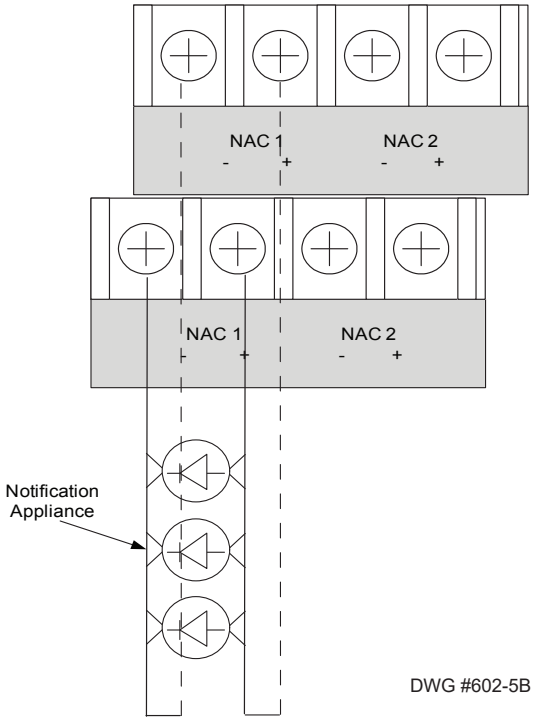


Figure 5. Class A NAC Wiring Requires CA-6075

The end of line resistor is a 5.1K ohm resistor. The resistor assembly has been evaluated in past projects and is a standard in the Potter panel product line. The Potter part number for the listed end of line assembly is 3005013 EOL Resistor Assembly.

The EMI capacitor must be placed at the panel when noise induction is present on a NAC. The EMI capacitor is a .1uF, 100V capacitor. The Potter part number for the listed capacitor assembly is 3006747 EMI Capacitor Assembly

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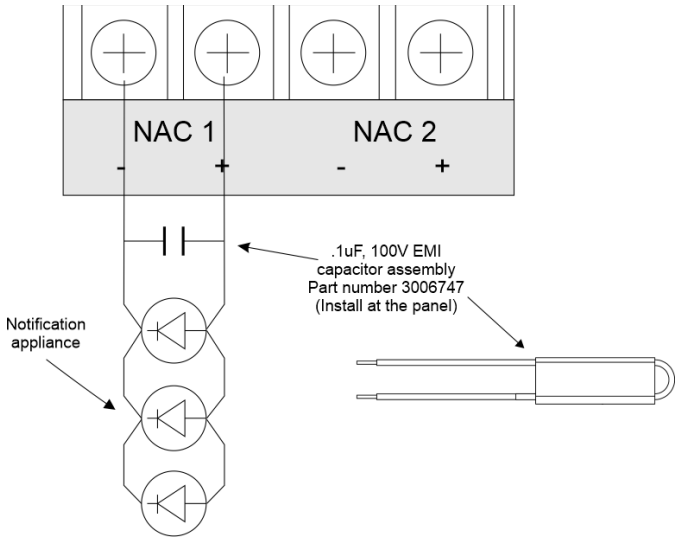


Figure 6. NAC EMI capacitor assembly wiring diagram

I/O Circuits

The panel is equipped with two I/O circuits. The I/O circuits can be configured as either an input or an output. The I/O circuits can be used in Class B mode only.

I/O Circuit as Inputs

As inputs, the I/O circuits are used as a dry contact monitoring inputs, and are power limited and supervised.

Maximum wiring resistance = 100 ohms.
Maximum wiring capacitance = 1 uF.
Maximum wire length = 10,000 feet.
Maximum IDC voltage = 24 VDC
Maximum IDC current = 15 ma

The circuit can be configured for the same selection of contact input functions as the SLC MCM and SCM modules.

I/O Circuit as Outputs (NAC)

As outputs, each of the I/O circuits is rated for 1 amp continuous current at 24 VDC. The outputs are supervised and regulated. The circuits reverse polarity upon activation and the board and illustrations are marked accordingly.

The circuit is power limited and the type of output is selectable. I/O circuits may be configured for strobe synchronization with AMSECO, Wheelock, Gentex, or System Sensor strobe devices as shown compatible in this document and the installation instructions.

The maximum impedance is a function of the load being applied to the circuit. In order to calculate the maximum impedance as follows:

(Alarm Current of Notification Appliances) X (Wire Resistance) < 3 volts.

The panels have ground fault detection on the I/O circuits. The impedance to ground for ground fault detection is 0 ohms.

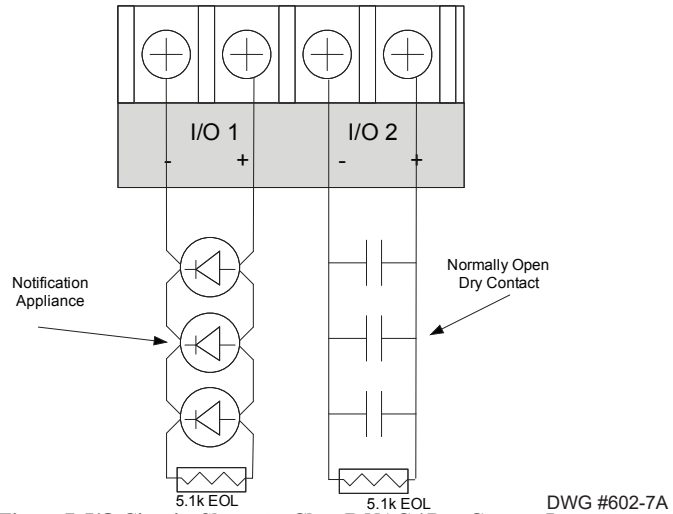


Figure 7. I/O Circuits Shown as Class B NAC and Dry Contact Input

The end of line resistor is a 5.1K ohm resistor. The resistor assembly has been evaluated in past projects and is a standard in the Potter panel product line. The Potter part number for the listed end of line assembly is 3005013 EOL Resistor Assembly.

Signaling Line Circuit (SLC)

The panel is equipped with one built-in SLC loop supporting a maximum of 100 PAD protocol devices. One PAD100-SLCE or one SLCE-127 can be added to the system to support 100 devices instead of using the built-in SLC loop. The PAD100-SLCE supports the PAD protocol, and the SLCE-127 supports the Nohmi protocol.

The addressable points may be any combination of smoke sensors, heat detectors, input modules or output modules.

The SLC provides power and communication to each of the sensors and modules connected. The SLC is fully supervised in that the communication signal is sent and must be received from each device. The entire loop is polled approximately every 4 seconds.

The voltage range for the SLC is 22-24 VDC. The power is a constant regulated connection with a maximum line resistance of 50 ohms. The SLC has a maximum loop capacitance of 0.5 micro-farads. The maximum PAD100-SLCE fully loaded loop current is 90.61 mA.

The panel has ground fault detection on the SLC circuits and addressable devices. The impedance to ground for ground fault detection is 0 ohms.

The SLC may be configured and installed as a Class A, Class X or Class B.

If the Nohmi protocol SCI short circuit isolators are installed, a total of 8 devices must be deducted from the total number of devices for each isolator installed.

All SLC wiring is low voltage and power limited.

SLC Address Programming

Addresses for all PAD protocol devices are assigned via a dipswitch on the device.

Addresses for the Nohmi protocol devices are assigned by using the hand-held programmer (part # FZAW004-P/3610053).

SLC Class X Wiring

For the PAD protocol, Class X requires a PAD100/300-IB to be installed for each sensor and/or PAD100/300-IM to be installed on each side of each module. The maximum wiring resistance between a PAD100/300-IB / PAD100/300-IM and another PAD100/300-IB / PAD100/300-IM shall be less than 10 ohms and the total resistance must be below 50 ohms. The maximum wiring resistance shall be calculated based on 0.1 ohm per PAD100/300-IB / PAD100/300-IM.

For the Nohmi protocol, Class X requires one AIB to be installed for each sensor and/or SCI to be installed on each side of each module. The maximum wiring resistance between an AIB/SCI shall be less than 10 ohms and the total resistance must be below 50 ohms. The maximum wiring resistance shall be calculated based on 0.1 ohm per ABI/SCI.

Note: Class X requires a close nipple or conduit connection to every module or sensor for both PAD and Nohmi protocols.

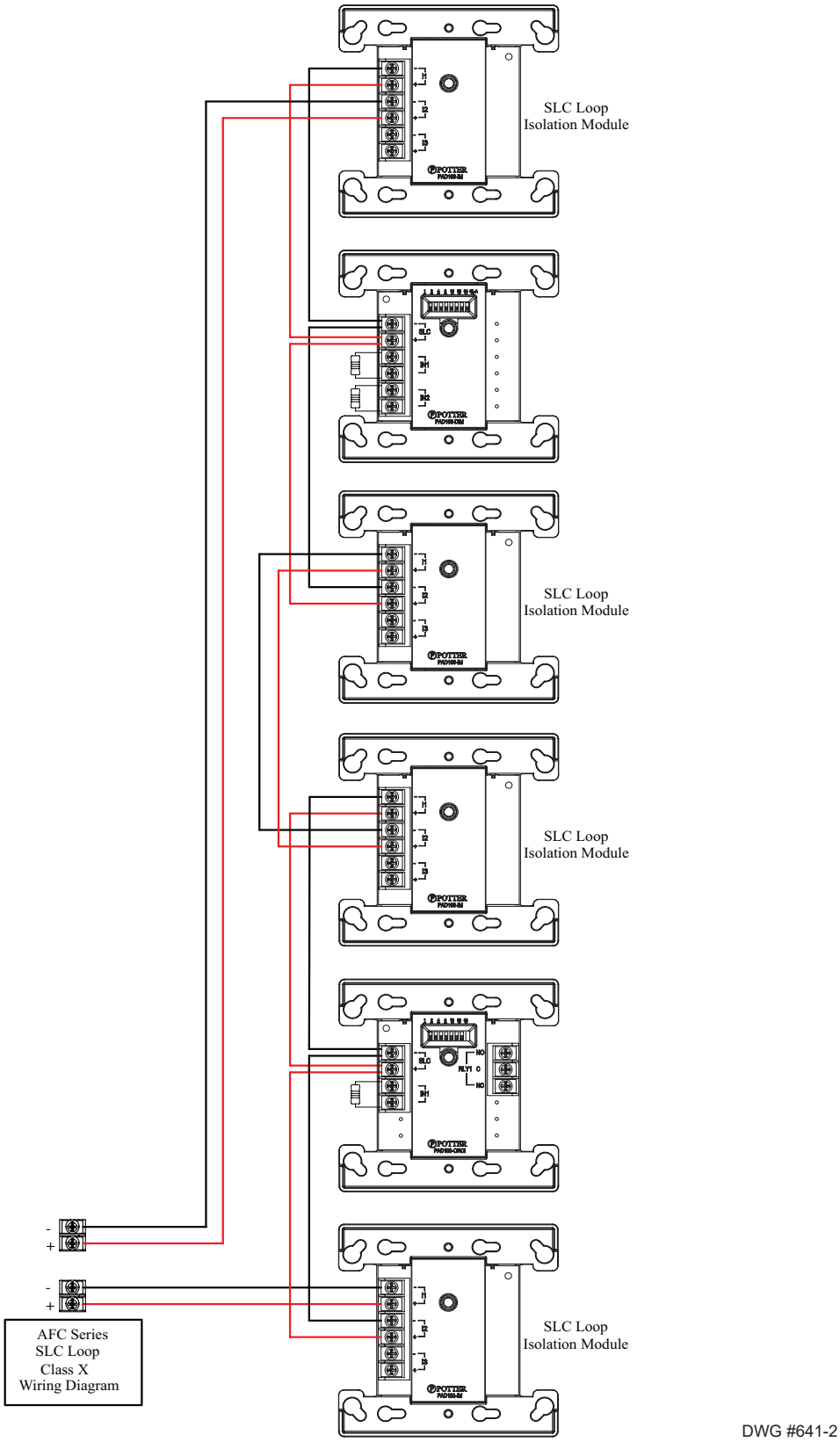
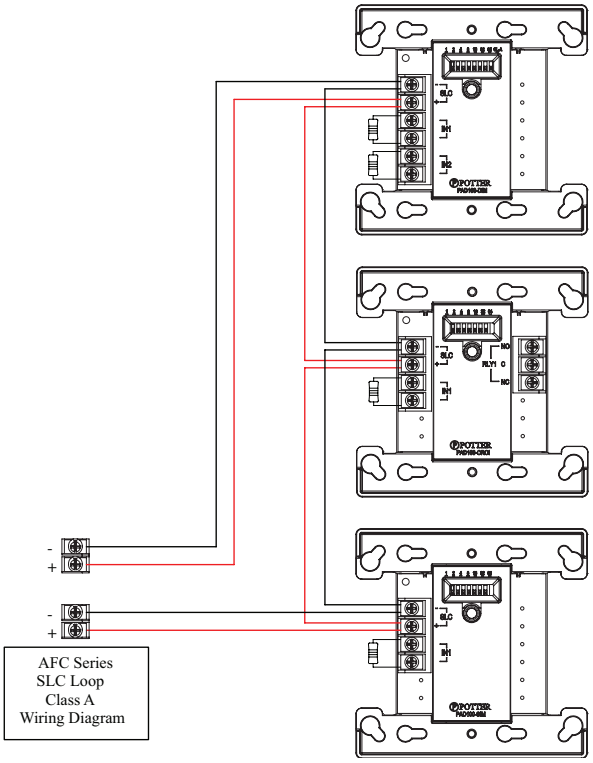


Figure 8. PAD Protocol Class X Showing PAD100-IMs Installed



DWG #641-3

Figure 9. PAD Protocol Example of SLC as Class A

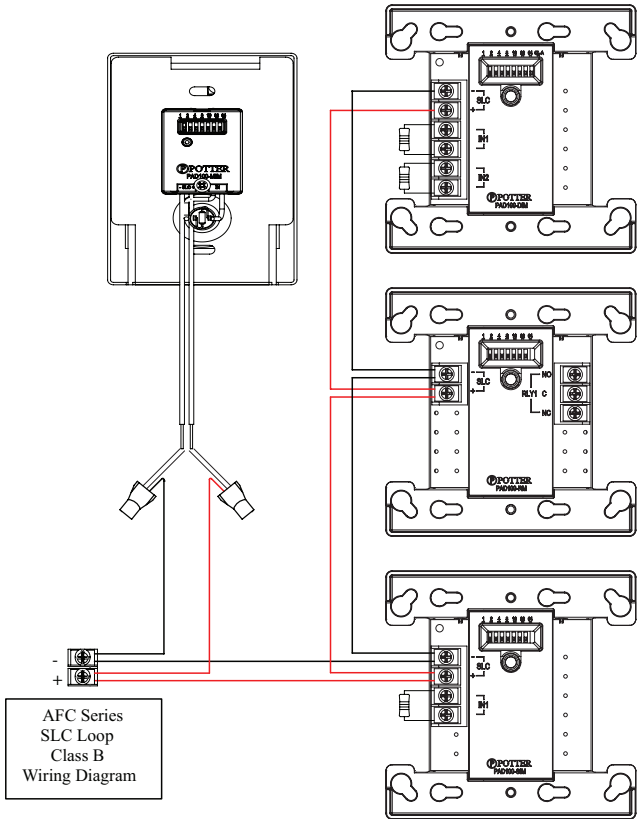


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Figure 10. PAD Protocol Example of SLC as Class B

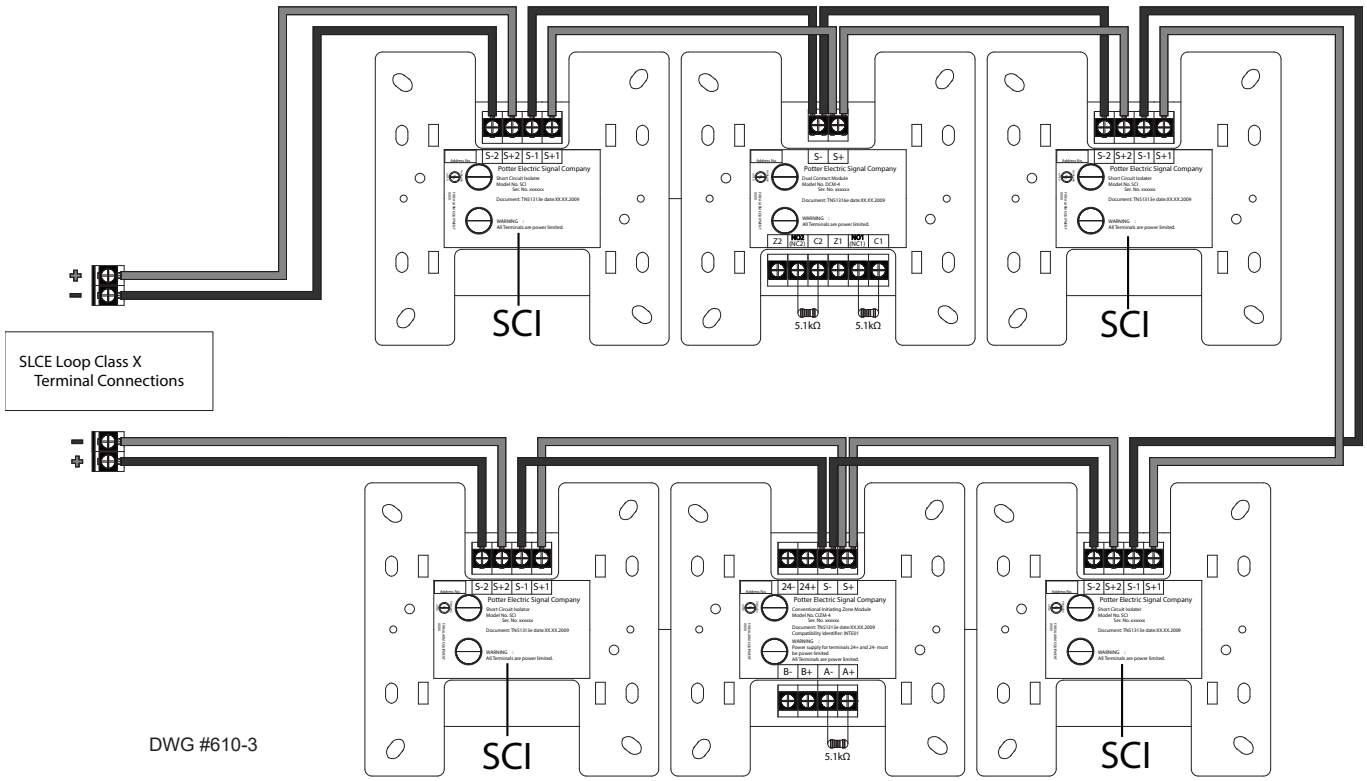

Figure 11. Nohmi Protocol Example of SLC Wired Class X

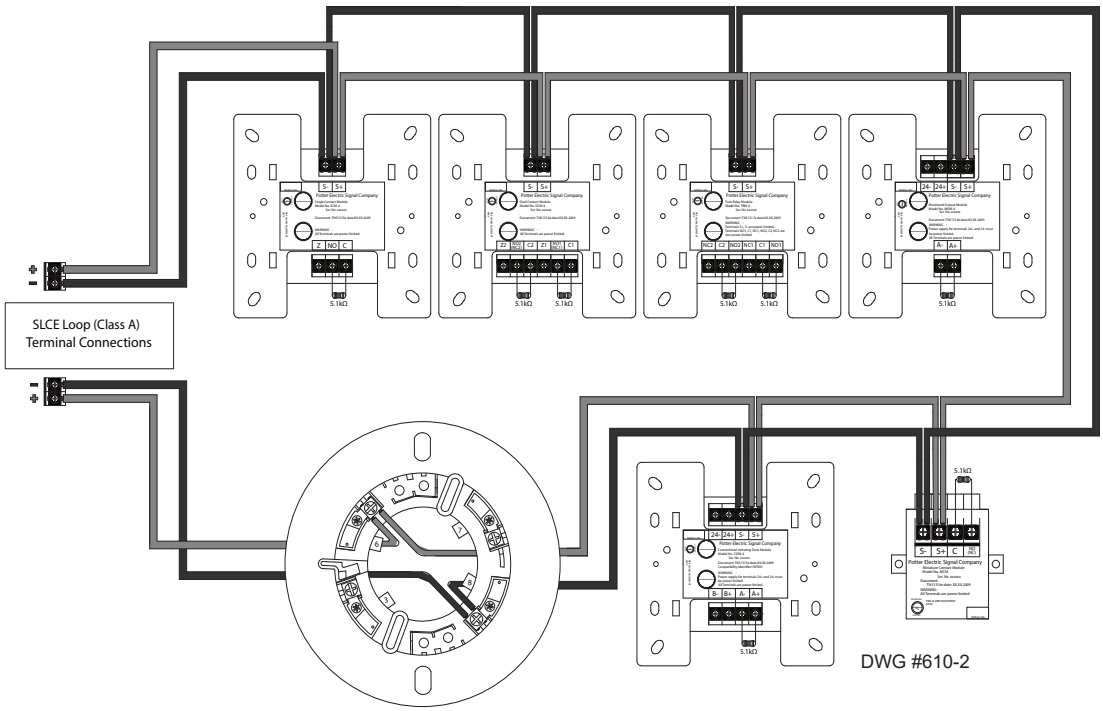

Figure 12. Nohmi Protocol Example of SLC Wired Class A

For Class B, installation of the CA-6075 is not required.

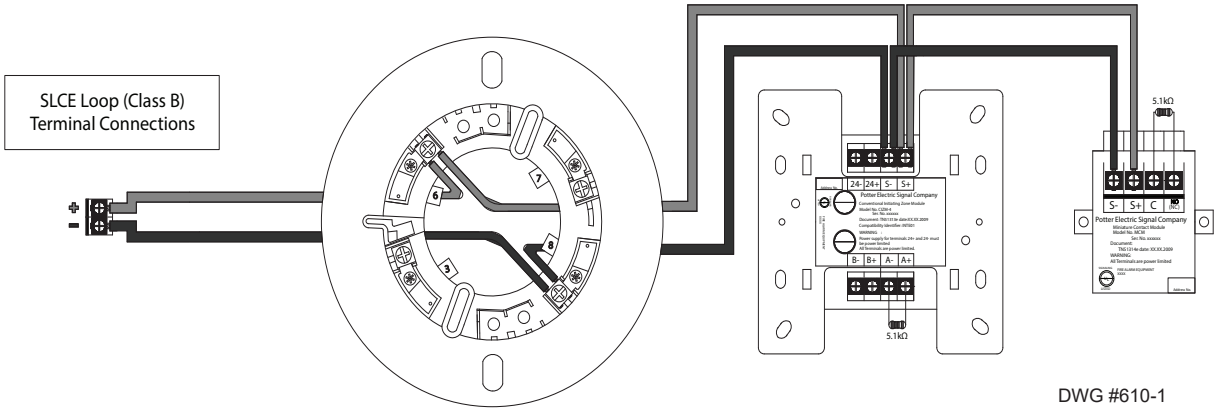

Figure 13. Nohmi Protocol Example of SLC as Class B

P-Link Expansion Bus Circuits

All expansion devices are supervised via the RS-485 connection. Wiring is fully supervised and power limited. Any connection to ground of 0 ohms will be annunciated as a ground fault.
P-Link Current = 1 Amp
P-Link Voltage = 20.0 VDC - 27.3 VDC
Maximum wire length = 6,500 feet.
Maximum wire resistance = Maximum wiring resistance is based on load.
Calculate using the following equation
(Total P-Link Alarm Current) x (Wire Resistance) < 6 volts.

The worst case P-Link current draw cannot exceed the 1 amp. P-Link wiring gauges and lengths are calculated using the worst-case current draw values from the table below. The worst case current draw numbers are used only for wiring calculations, refer to the battery calculation worksheet for normal standby and alarm currents.

P-Link Accessory	**Worst Case current draw (ma)**
PAD100-SLCE (PAD Protocol)	200
SLCE-127 (Nohmi Protocol)	200
PSN-1000/PSN-1000(E)	10
RA-6075R	25
RA-6500R / RA-6500F	25
UD-1000/UD-2000	25
LED-16/LED-16F	25
DRV-50	25
RLY-5	35
FIB-1000	30
FCB-1000	25
SPG-1000	40
MC-1000	10
IDC-6	20
NCE-1000	50
NCF-1000	95
PSK-1000	19

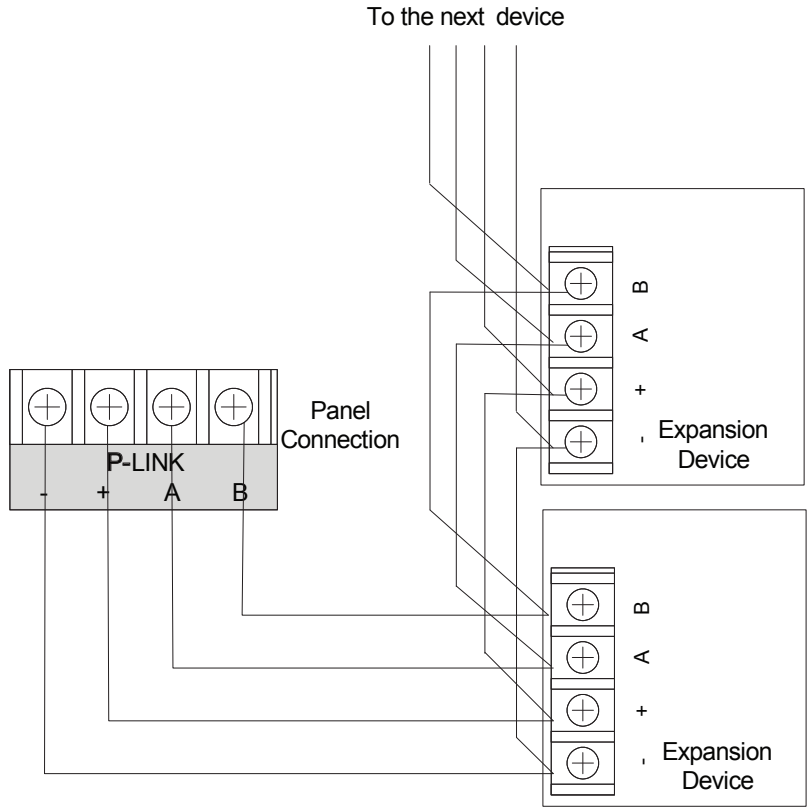

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Figure 14. Example of P-Link Class B Wiring

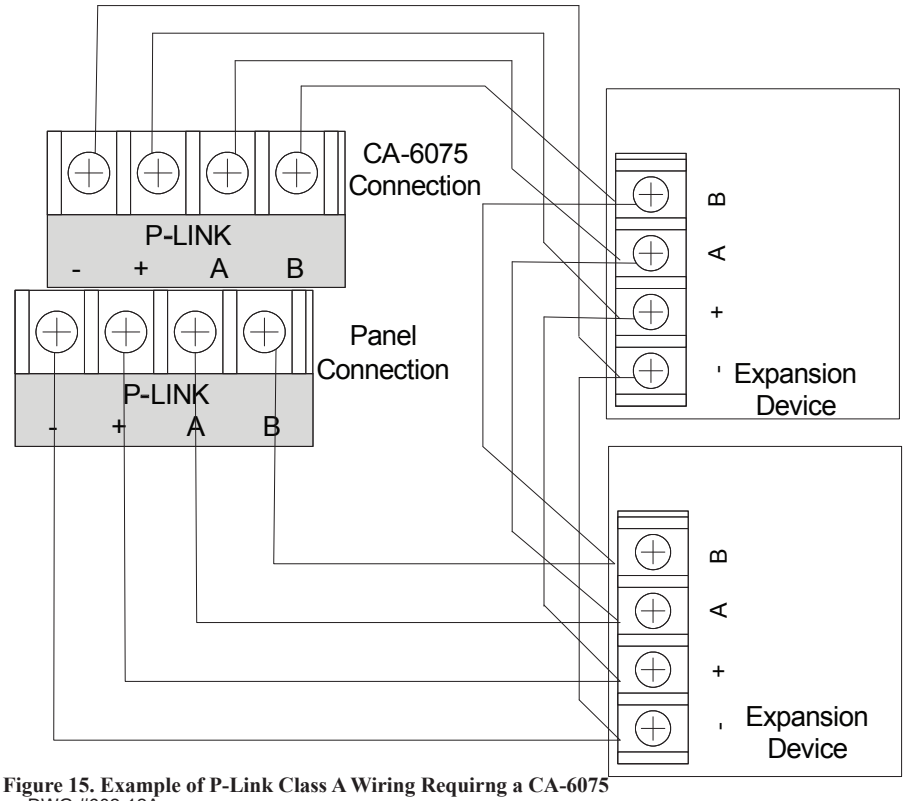


Figure 15. Example of P-Link Class A Wiring Requirng a CA-6075
DWG #602-12A

The panels can be programmed to support the following P-Link devices:

PAD100-SLCE/SLCE-127

The panels can be programmed to support one PAD100-SLCE (PAD protocol) or one SLCE-127 (Nohmi protocol) loop expander if the built-in SLC loop is disabled. The expansion cards support up to 100 addressable points. The expansion cards support both Class B and Class A wiring.

Remote Annunciator/Keypad Circuits (RA-6500R, RA-6500F, RA-6075R)

A maximum of 31 annunciators in any combination may be connected to the main fire control panel. The RA-6500R and RA-6500F provide a 4x40 character LCD display, along with standard function and numeric keys. The RA-6075R provides a 2x16 character LCD, along with standard function and numeric keys.

UD-1000/UD-2000

The panel can be programmed to support the UD-1000/UD-2000 digital alarm communicator transmitter (DACT). The DACT may be enabled, disabled or bypassed depending on the mode of operation. When the DACT is disabled, the panels are not capable of transmitting any alarms off premises through the DACT.

The DACT provides for up to two phone lines for communication to a monitoring station. The DACT communicates using the SIA-DCS or Ademco Contact ID protocols. When enabled, the DACT automatically monitors each phone line or voltage and has the ability to seize the line and connect with a remote receiver. Once the communication is complete, the DACT will hang up the phone line.

The UD-1000 is provided with an RJ-11 jack for each phone line. The UD-2000 is provided with terminal blocks for each phone line connection. In order for the DACT to work properly, it must be installed on a plain old telephone service (POTS) or equivalent as deemed by the authority having jurisdiction. The DACT must be installed before any other equipment to ensure it can seize the line and disconnect any other lines.

Phone lines are high voltage and should be run in a separate conduit from other circuits. The wire conductors connecting the DACT to the phone system should be 26 AWG or larger.

LED-16/LED-16F (LED Annunciator)

The panel can be programmed to support up to 10 total LED-16/LED-16F and/or DRV-50 modules. Each LED-16/LED-16F can display alarm/supervisory/trouble conditions for up to 16 zones. Each LED is assigned to a zone, when that zone becomes active, the LED will illuminate. Five (5) non-programmable system LEDs are also provided, which annunciate the overall system condition (Power, Earth, Silenced, Alarm, Supervisory & Trouble).

DRV-50 (LED Driver)

The panel can be programmed to support up to 10 total DRV-50 and/or LED-16/LED-16F modules. The DRV-50 has 50 LED outputs that can be individually mapped to any zone. The DRV-50 also has four (4) programmable supervised dry contact inputs, and five (5) non-programmable system LED outputs, which annunciate the overall system condition (Power, Earth, Silenced, Alarm, Supervisory, & Troubles).

RLY-5 (Relay Board)

The panel can be programmed to support up to 31 RLY-5 modules. The RLY-5 provides 5 Form-C relay outputs which can be individually mapped to any zone. The Relays have a contact rating of 24VDC / 3.0A, 125VAC / 3A, and Power Factor of 1.0. These outputs are non-power limited and not supervised.

Note: If the power supply connected to the relays is power-limited, then the outputs are power limited.

FCB-1000 (Fire Communications Bridge)

The panels support one FCB-1000. The FCB-1000 provides a remotely-located IP connection into the panel. All IP reporting can be designated to pass through the FCB-1000 instead of through the on-board internet connection.

FIB-1000 (Fiber Interface Bridge)

The panels support up to 31 FIB-1000s. The FIB-1000 can be used to convert the standard 4 wire P-Link bus to/

from fiber optic cable. The FIB-1000 uses multi-mode fiber, and is capable of Class A operation.

SPG-1000 (Serial/Parallel Gateway)

The panel supports up to 31 SPG-1000 modules. The SPG-1000 can be used to drive a serial and/or parallel printer.

MC-1000 (Multi-Connect)

The panels support up to 31 MC-1000 modules. The MC-1000 allows multiple ARC series panels to report to the central station through a shared phone line or Internet connection.

PSN-1000/E (Power Supply Expander)

The panel can be programmed to support up to 31 PSN-1000/PSN-1000(E) Power Expanders. Each power expander provides 6 NAC circuits (3A max), and 2 dry contact input circuits. The PSN-1000/PSN-1000(E) reconditions/repeats the P-Link bus that provides additional distance and power.

IDC-6 (Initiating Device Circuit)

The panel supports up to 31 IDC-6 modules. Each IDC-6 provides 6 additional conventional Class B inputs or 3 Class A inputs.

NCE-1000 (Network Card Ethernet)

The panel supports up to 31 NCE-1000 and 200 per system. It is used to network the fire alarm panels using CAT5 Ethernet cable. It is fully supervised and is capable of Class B and Class A operation.

NCF-1000 (Network Card Fiber)

The panel supports up to 31 NCF-1000 and 200 per system. It is used to network the fire alarm panels using fiber optic cable. The NCF-1000 allows the user to install SFP (small form-factor pluggable) modules to utilize either single mode or multi-mode fiber. It is fully supervised and is capable of both Class B and Class A operation.

PSK-1000

The panel supports up to 31 PSK-1000 programmable soft keys. The PSK-1000 is sidecar panel that offers 16 programmable switches to enable and disable zones.

Releasing Device Circuit

The releasing circuit is fully supervised and power limited. The releasing device circuit is a NAC that is programmed to control a releasing device such as a solenoid or squib.

When the control panel is programmed for releasing, additional features are allowed specific to releasing. A PAD100-NAC (NAC) notification appliance circuit may be connected to a releasing device as well and operate as a releasing circuit. When the NAC is used for releasing, it must have a regulated power supply that has a battery back-up equal to that of the panel or greater.

The output is a constant 24 VDC, regulated output. When connected to a releasing device, the circuit is a special application circuit and listed with the devices as outlined in Section 6 of this document.

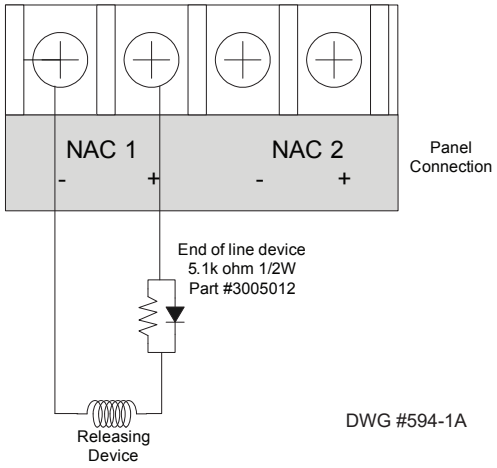


Figure 16. NAC Releasing Circuit Wiring with EOLD Assembly

The maximum current is 3 amps. The maximum line impedance is calculated using the following formula.

Rmax (ohm) = (24V-Vmin-0.95V)/I total
Vmin is the lowest voltage operation of the connected devices.
I total is the total current of the connected devices.

When a NAC is used as a releasing circuit, the End of Line Diode (EOLD) assembly must be installed. The EOLD is Potter part number 3005012 and must be installed in accordance with the installation manual.

When the ARC-100 is used as a release system installed according to NFPA 12A or NFPA 2001 the system must include a mechanical or electrical means to manually release the agent.

According to UL 10th Edition, the disabling of a releasing circuit shall be accomplished by a physical switch activated without the use of the software. When a releasing circuit is disabled a supervisory signal will be annunciated at the FACP.

Municipal Box Connection

When programmed as a municipal box connection, the circuit power is limited, supervised for open and short circuit conditions, and provides a local energy connection.

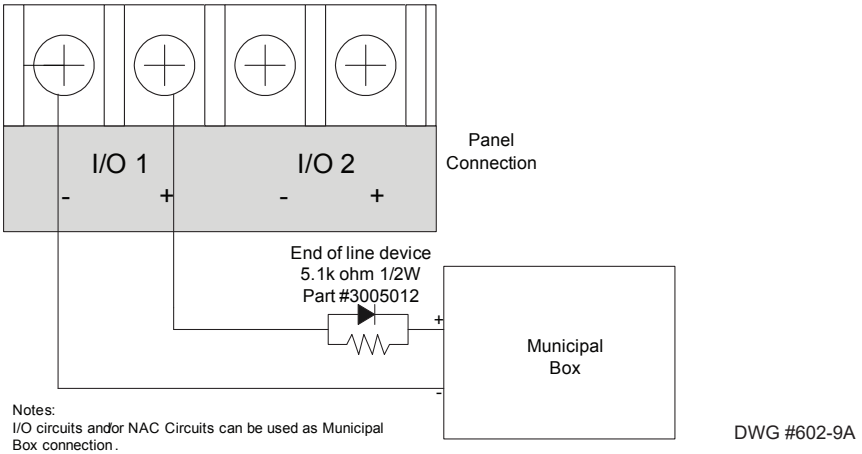


Figure 17. Municipal Box Wiring Example

Trip current = NAC1and NAC2 = 3 Amps, I/O1 and I/O2 = 1 Amp

Max Voltage = 24 VDC

The panel has ground fault detection on municipal box connection circuits. The impedance to ground for ground fault detection is 0 ohms.

Reverse Polarity Communication Line Circuit

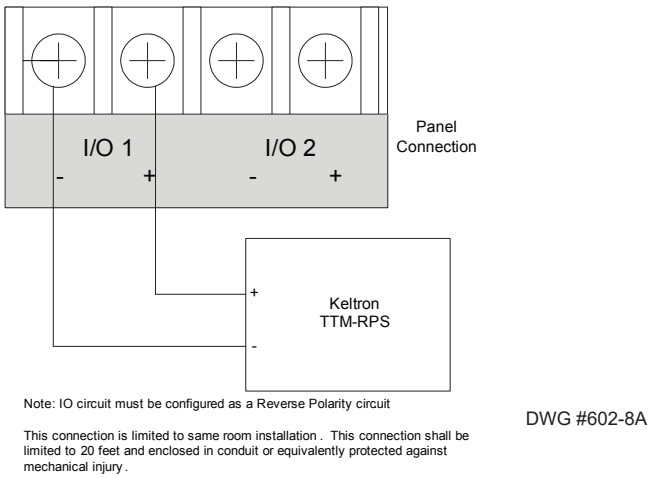


Figure 18. Example of Reverse Polarity I/O Circuit Wiring

Only the I/O circuits on the panel can be programmed as reverse polarity circuits. The short circuit current is rated at *24 VDC and 14 mA maximum*.

When configured for reverse polarity, the panel will indicate alarm and trouble events to a remote site. Alarms will override trouble conditions.

The panel has ground fault detection on reverse polarity circuits. The impedance to ground for ground fault detection is 0 ohms.

The connection between the FACP and the remote device shall be limited to 20 feet and enclosed in conduit or equivalently protected against mechanical injury.

Relay Outputs

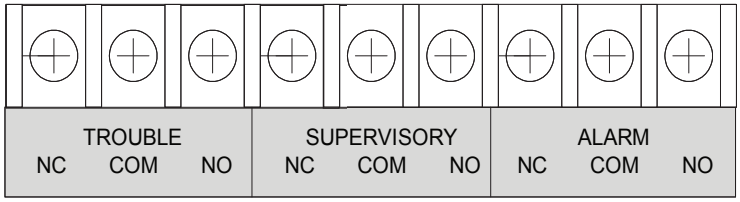


Figure 19. Panel's Dedicated Relay Outputs

The panel has three dedicated common relays. The dedicated trouble relay is a failsafe trouble relay that changes position anytime a trouble condition occurs.

The contact rating is 24VDC / 3.0A, 125VAC / 3A, Power Factor: 1.0. These outputs are non-power limited and not supervised. However, they are power-limited if the power supply to the connected devices is power-limited.

General Wiring Information

The cabinet has various conduit knockouts located around the cabinet for ease of wire installation. In addition, this method provides a means to separate different types of circuit to reduce electrical interference, transient voltage or voltage ratings.

The enclosure requires the use of power limited and non-power limited wiring on the main board as well as within the enclosure. Power limited wiring is to remain separated from non-power limited by a minimum or 0.25 inches and all cabling should be insulated to the higher voltage.

When the panel is installed, the National Electrical Code (NEC, NFPA 70) should be followed for the proper installation and separation of power limited and non-power limited circuits. The mixing of power limited and non-power limited should be avoided. Refer to the following figure for suggested wiring routing.

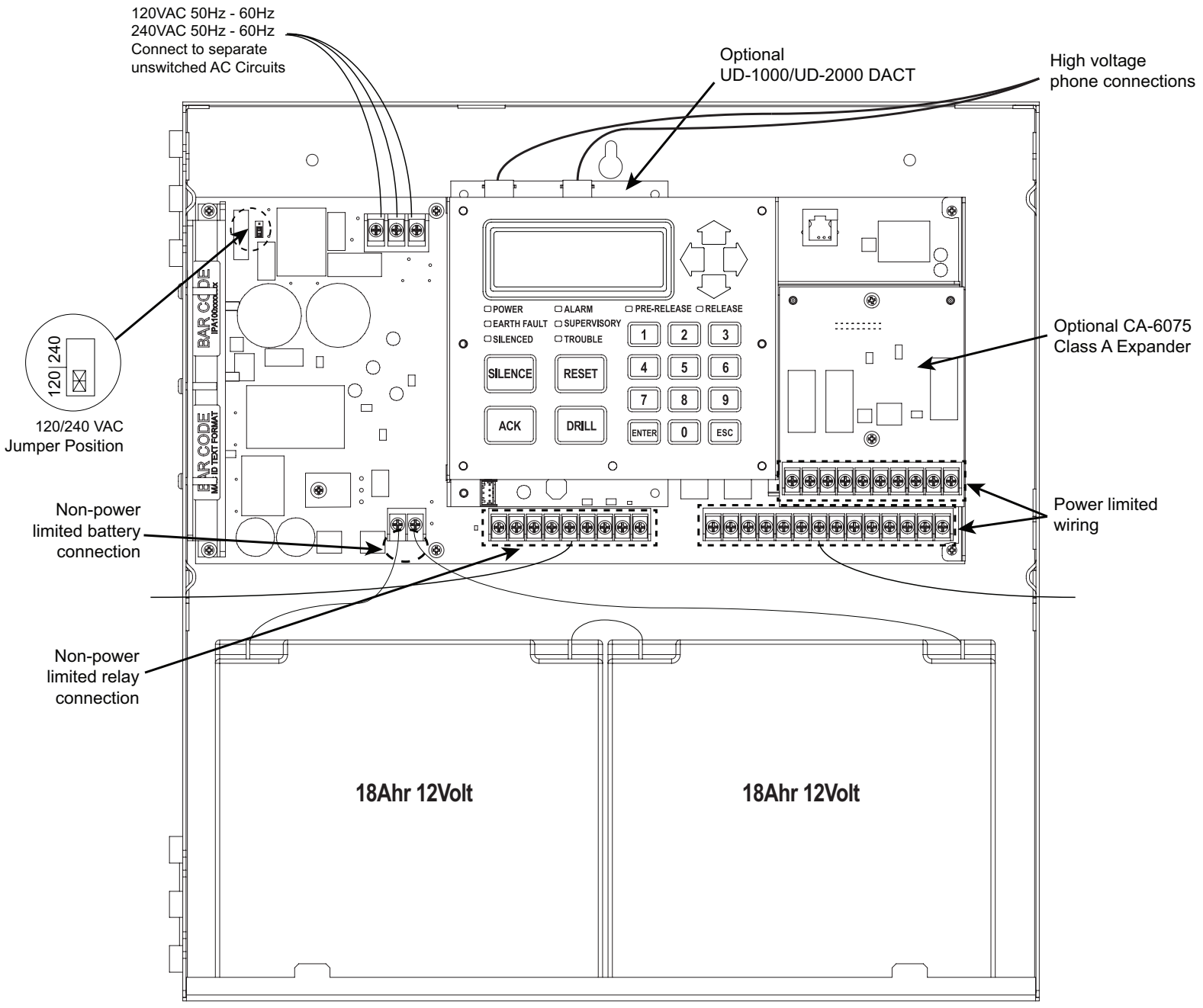


Figure 20. Example of Panel's Wire Routing

2. Operation

System Type:	Auxiliary Central Station (Protected Premises Unit) Proprietary (Protected Premises Unit) Remote Station (Protected Premises Unit) Local
System Service:	Automatic Fire Alarm Manual Fire Alarm Sprinkler Supervisory Waterflow Alarm Releasing Service for Pre-Action, Deluge and Agent
System Signal:	Radio Frequency Digital Alarm Communicator (DAC) March Time Non-Coded Reverse Polarity Other Technologies

3. Functionality

The panel utilizes a signaling line circuit for communication to various sensors and modules. The system polls the loop between every 4 to 5 seconds. The system is completely supervised and is designed to comply with UL 864. The control panel uses a proprietary protocol to digitally communication with various sensors and modules to determine the status of each. When the panel response from the sensor or module is within a pre-determined range or status, the control will process the commands accordingly.

The control panel user interface requires the use of a key to open the outer door. Advanced features will require an additional user code to be entered using a combination of numbers.

The panel is completely programmable through the use of a computer program. Remote programming is detailed later in this section.

The control panel includes three relay contacts for additional monitoring or building functions.

The first relay is a failsafe, dedicated Trouble Relay. This relay changes state during any trouble condition. This relay is not programmable and no additional mapping to this relay can take place.

The second relay is a dedicated Supervisory Relay. This relay changes state during any supervisory condition. This relay is not programmable and no additional mapping to this relay can take place.

The third relay is a dedicated Alarm Relay. This relay changes state during any alarm condition. This relay is not programmable and no additional mapping to this relay can take place.

The ARC-100 has two NACs and two I/O circuits. Each NAC is rated for 3 amps at 24 VDC. Each I/O circuit is configurable as a NAC rated for 1 amp at 24 VDC, or as a dry contact input. The NACs may be operated in Class A with the addition of a CA-6075 Class A Expander.

NACs may be programmed to provide steady (constant) voltage, a cadence pattern, releasing service or synchronized strobes. Full synchronization is maintained system-wide. The NACs may be programmed as silenceable or non-silenceable. Anytime a NAC has been silenced, the condition will be indicated by the silenced LED. If a NAC that is programmed as silenceable is silenced and another alarm event mapped to that NAC occurs, the NAC will resound and the silenced LED will extinguish.

The Low AC report delay period is programmable from 30 minutes up to 30 hours. For UL installations and applications the installer must set the time delay between 30 minutes and 90 minutes.

Supervisory Signal Operation – Zones programmed as supervisory zones can be programmed as latching or non-latching.

Trouble Signal Operation – Any fault or off normal that would impair the system is annunciated as a trouble condition. The trouble condition is specifically displayed on the LCD display so the trouble can be corrected. When a trouble occurs the buzzer sounds every ten seconds for one second, the trouble LED illuminates and the trouble relay changes state.

The panel transfers from AC to battery instantly upon AC failure or brownout. The trouble relay will indicate the low AC condition after the Low AC Report Delay has elapsed.

The control panel can utilize an optional digital alarm communicator transmitter, (UD-1000/UD-2000). The UD-1000/UD-2000 is a two line dialer with the capability to report in the Ademco Contact ID or the Security Industry Association's Digital Communications Standard (SIA-DCS).

When equipped with a UD-1000/UD-2000, the status changes of the panel are remotely communicated to a monitoring station. Programming options allow for selecting separate accounts for alarm/trouble/supervisory/test events. When a UD-1000/UD-2000 is not installed, the panel will operate as a local system.

The DACT will provide a daily test to a remote monitoring point daily. The daily test time is programmable. If two phone lines are utilized, the DACT will alternate between lines on each daily call. If multiple accounts are programmed, then multiple daily tests will be conducted alternating on each line.

The panel may be equipped with 31 PSN-1000 series intelligent power expanders. The PSN-1000/PSN-1000(E) is a 10 amp notification power supply and P-Link (RS-485) repeater. The power supply connects to the P-Link bus from the control panel and is operated and supervised from the panel.

The power supply has six (6) Class B or three (3) Class A power outputs. Each output is regulated and power limited with a 3 Amp maximum rating. In addition, the PSN-1000s have two (2) programmable dry contact inputs. The dry contact inputs are Class B, supervised inputs.

The power supply operates on either 120 or 220 VAC power and has a regulated 24 VDC output. In addition, the panel can charge up to 55 AH batteries and will house 18 AH batteries.

The power supplies are programmed and controlled through the main control panel P-Link bus. The panel displays any troubles or off normal conditions of the power supply and the events are stored in the panel history buffer.

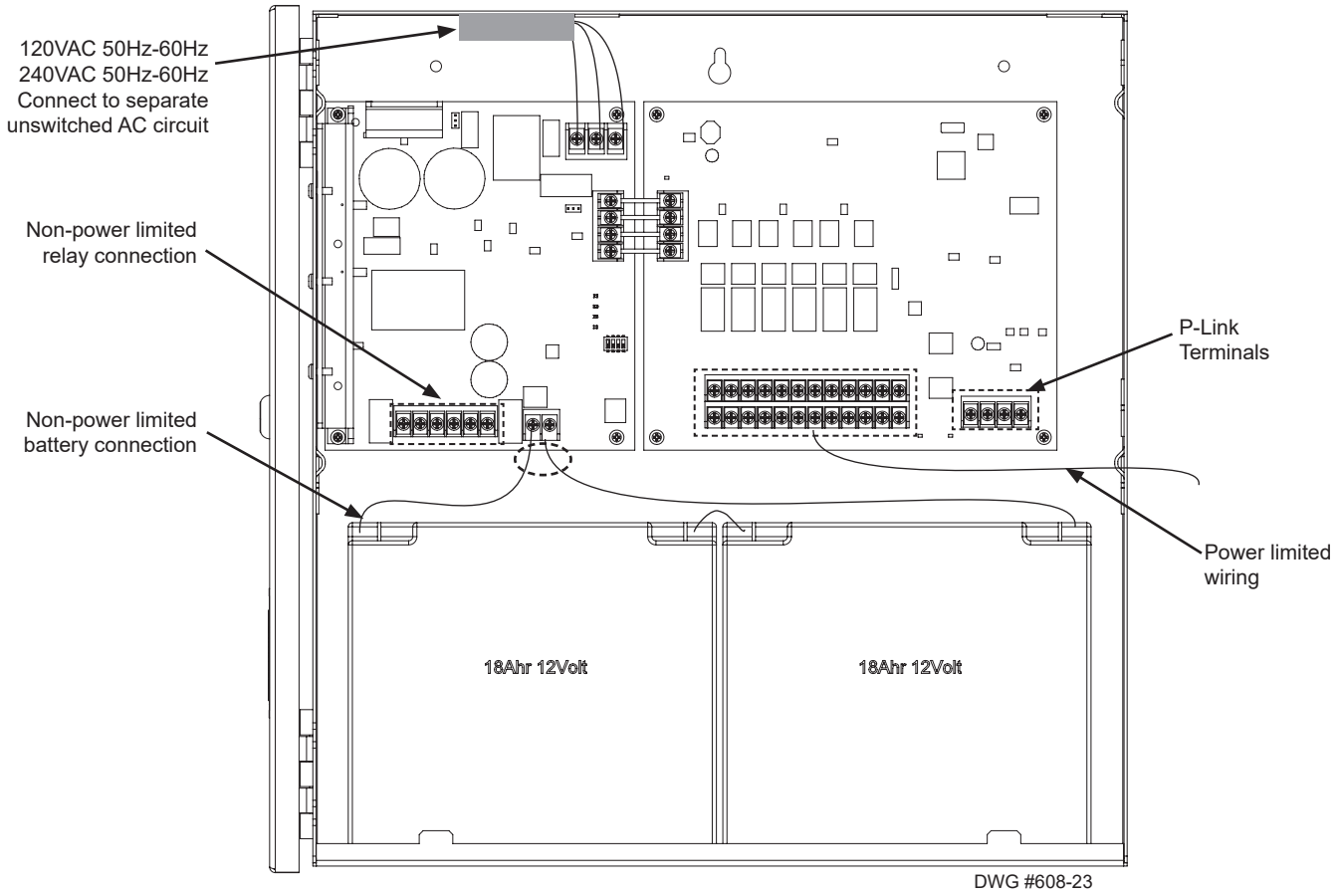


Figure 21. PSN-1000 Wiring Example

The panels may be equipped with <u>one</u> PAD100-SLCE (PAD Protocol) or a Nohmi Protocol SLCE-127 board if the built-in SLC is disabled. The PAD100-SLCE and SLCE-127 boards utilize a signaling line circuit for communication to various sensors and modules. The system polls the loop between every 4–5 seconds. Both boards support a maximum of 100 addressable devices configured in any combination of smoke sensors, heat detectors, input modules or output modules.

The PAD100-SLCE and the SLCE-127 outputs are supervised and regulated. Circuits are low voltage and power limited. All wiring must be separated by at least 0.25 inches and the wire insulation must be for the higher voltage. Refer to Figure 19 for suggested wire routing.

The PAD100-SLCE and the SLCE-127 are supplied with a mounting bracket which allows it to be mounted into a compatible fire enclosure. Please refer to the figures shown below:

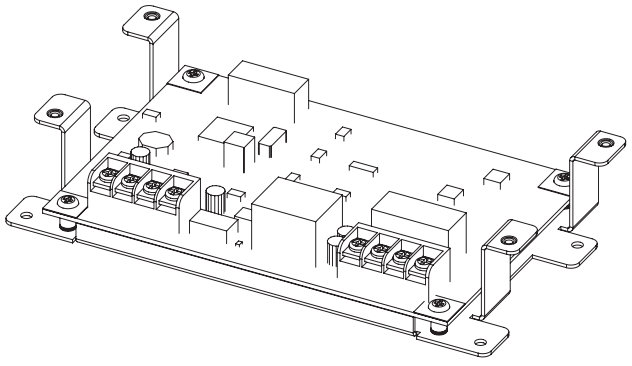


Figure 22. PAD100-SLCE / SLCE-127 Board & Showing Mounting Bracket

When the panels are equipped with a LED-16/LED-16(F) module, alarm/supervisory/trouble conditions display for up to 16 zones. Blank zone labels are provided for use with the LED-16s. Zone names/identifiers can be typed or written on the supplied card-stock, and then inserted into the LED-16/LED-16F as shown below.

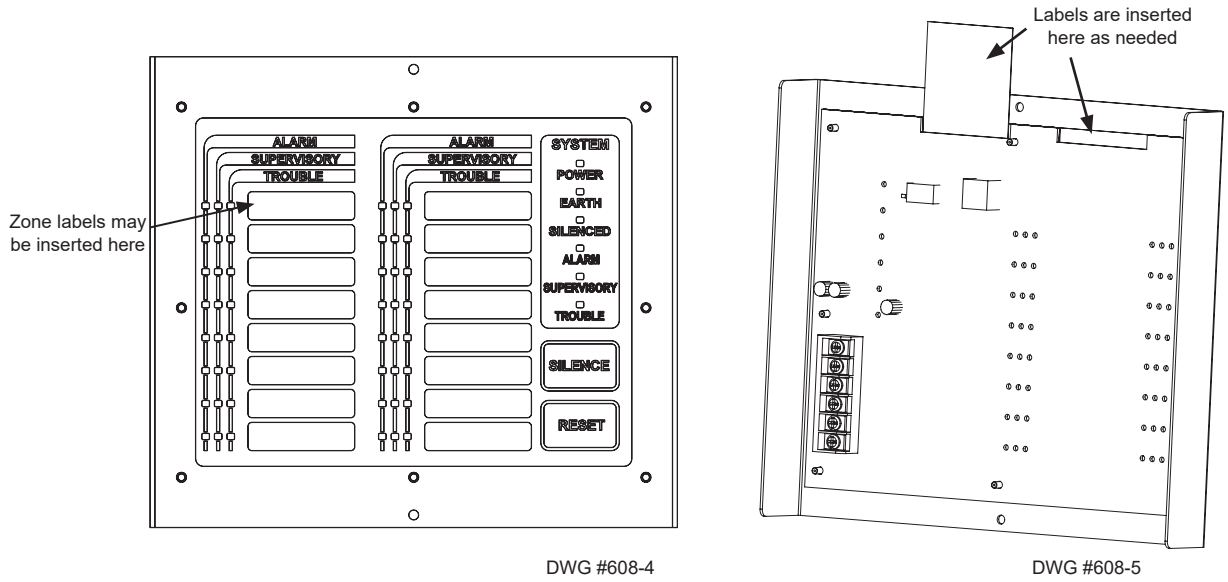


Figure 23. LED-16/LED-16(F) Module & Board

The LED-16s are controlled over the 4-wire P-Link connection. The higher current required for the LED outputs can be provided by the panel, or from an auxiliary power source as shown below. The auxiliary power can be any fire listed 24VDC source, and is fully supervised.

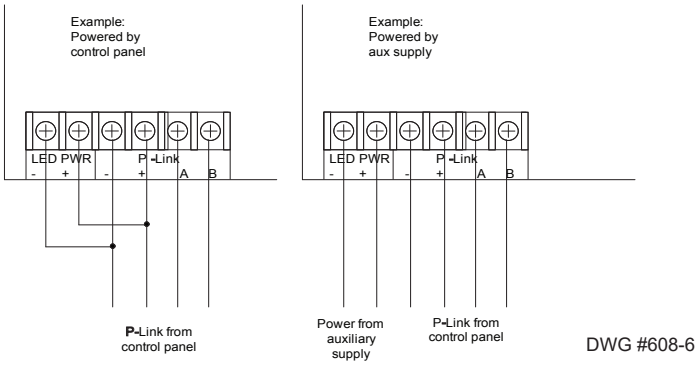


Figure 24. Examples of Wiring a LED-16/LED-16(F) Module to Control Panel or Auxiliary Power Supply

The panel may be equipped with a DRV-50 (LED Driver) module, which can be individually mapped to any zone. The DRV-50 is controlled over the 4-wire P-Link connection. The DRV-50 mounts in a mounting bracket as shown below. This can then be mounted into any of the compatible fire enclosures, or the AE-2, AE-8 or AE-14 accessory cabinets.

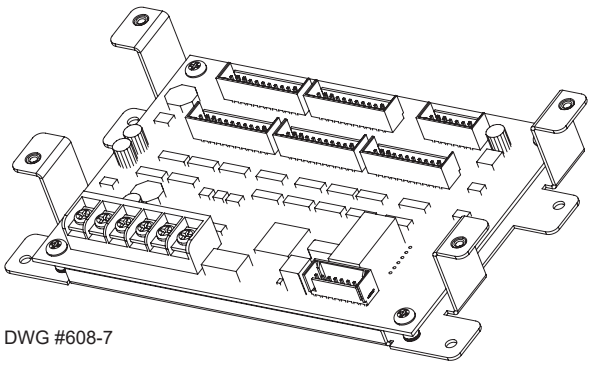


Figure 25. DRV-50 Board Showing Mounting Bracket

The 50 programmable LED outputs are located on connectors P1-P5, each containing 10 LED outputs and two 5VDC outputs. The system LEDs & PZT control outputs are located on connector P6. LEDs are wired as shown below, no external resistor is required. All outputs are power limited. All connections to P1-P6 are limited to same room installation.

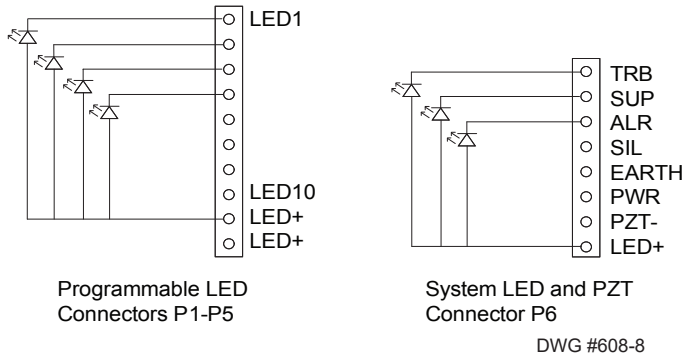


Figure 26. DRV-50 "P1-P5" and "P6" Connectors

The 4 programmable dry-contact inputs are located on connector P7. All input circuits are power limited and use UL listed 5.1k EOL resistor (Potter part #3005013). The inputs can be programmed for any of the contact input functions available for other input circuits available on the panel. Inputs I1-I4 are Class B dry contact inputs only. All contact inputs are fully supervised. Ground fault detection impedance is 0 ohms.

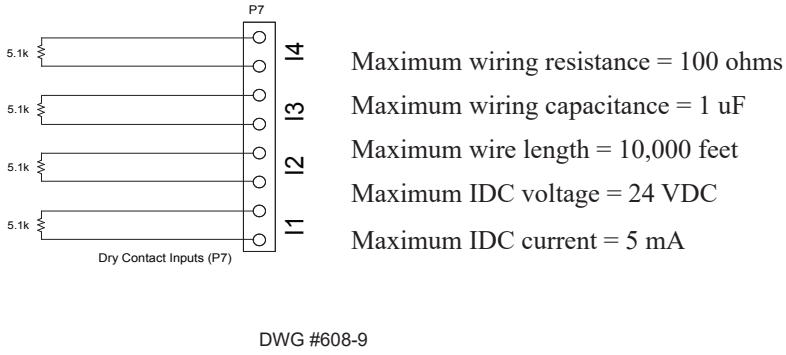


Figure 27. DRV-50 Dry Contact Input "P7" Connector

The higher current required for the DRV-50 outputs can be provided by the panel, or from an auxiliary power source as shown below. The auxiliary power can be any fire listed 24VDC source, and is fully supervised. Output power must be 16 VDC-33 VDC, and must be power limited.

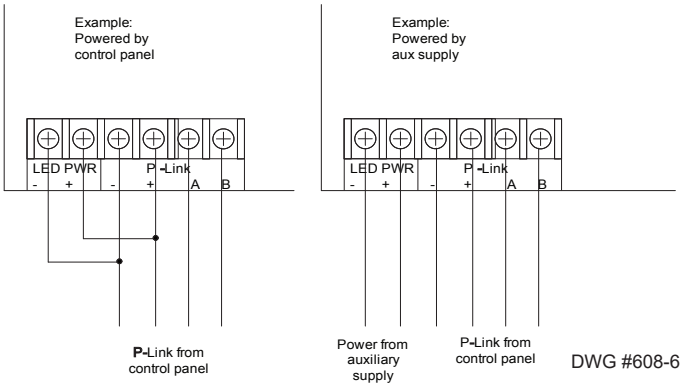


Figure 28. Examples of Wiring DRV-50 from Control Panel or Auxiliary Power Supply

The panel may be equipped with a RLY-5 (Relay Board) module, which is controlled over the 4-wire P-Link connection. The RLY-5 mounts in a mounting bracket as shown below. The RLY-5 can be mounted inside the panel cabinet, or the AE-2, AE-8 or AE-14 accessory cabinets.

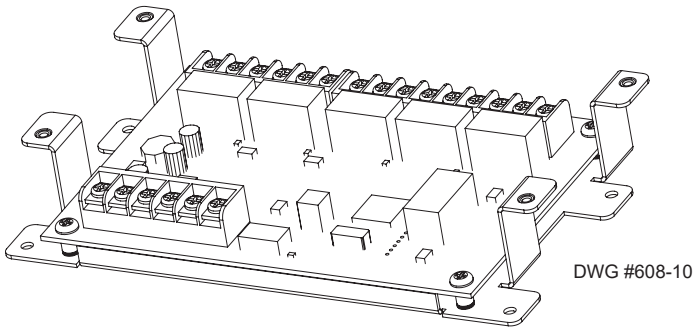


Figure 29. RLY-5 Board Showing Mounting Bracket

The RLY-5 higher current required for the relay outputs can be provided by the panel, or from an auxiliary power source as shown below. The auxiliary power can be any fire listed 24VDC source, and is fully supervised. Output power must be 16VDC-33VDC, and must be power limited.

- Relay contacts are rated for 120VAC/24VDC, 3 Amp (resistive).
- All connections to relay contacts shall be power limited.
- Not to be used for off-premise signaling.

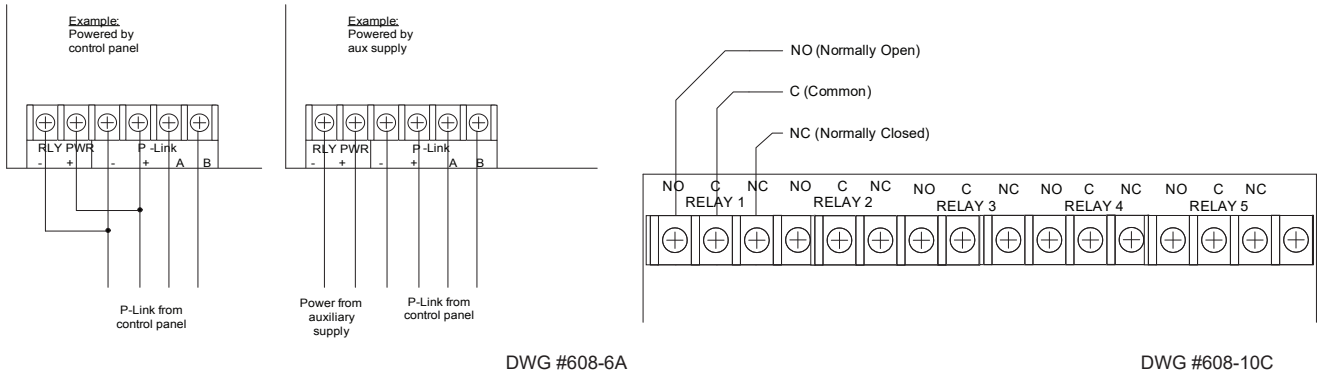


Figure 30. RLY-5 Wiring to Control Panel / Auxiliary Power Supply & RLY-5 Normally Open / Normally Closed Contacts

When the FCB-1000 (Fire Communications Bridge) is added to the panel, a remotely-located IP connection is provided into the panel. The FCB-1000 can be mounted inside the AE-2, AE-8 or AE-14 accessory enclosure. The optional rack-mount kit (FCB-1000RM) includes a standard 19 inch rack-mount enclosure, which can then be installed directly in an equipment rack.

Note: The Ethernet/IP connection is limited to same room installation. This connection shall be limited to 20 feet, and enclosed in conduit or equivalently protected against mechanical injury.

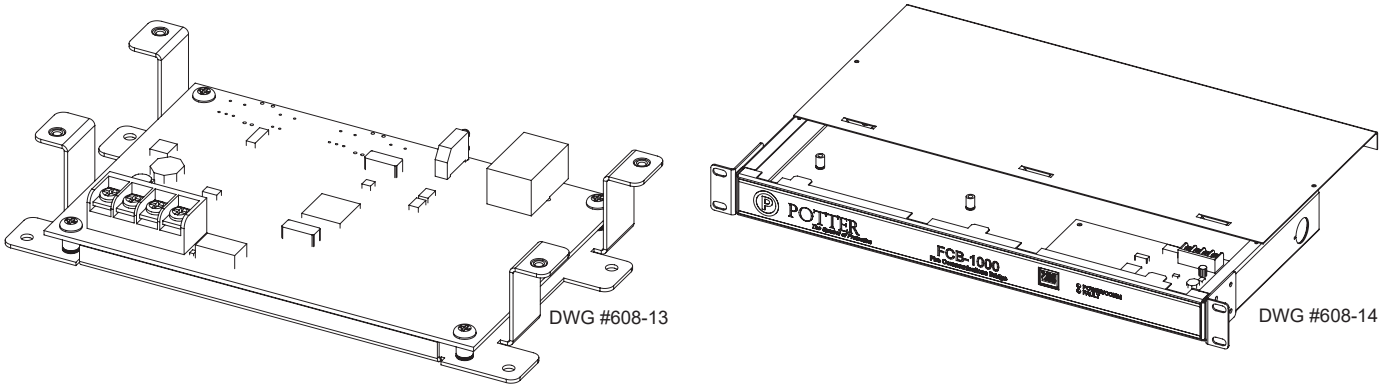
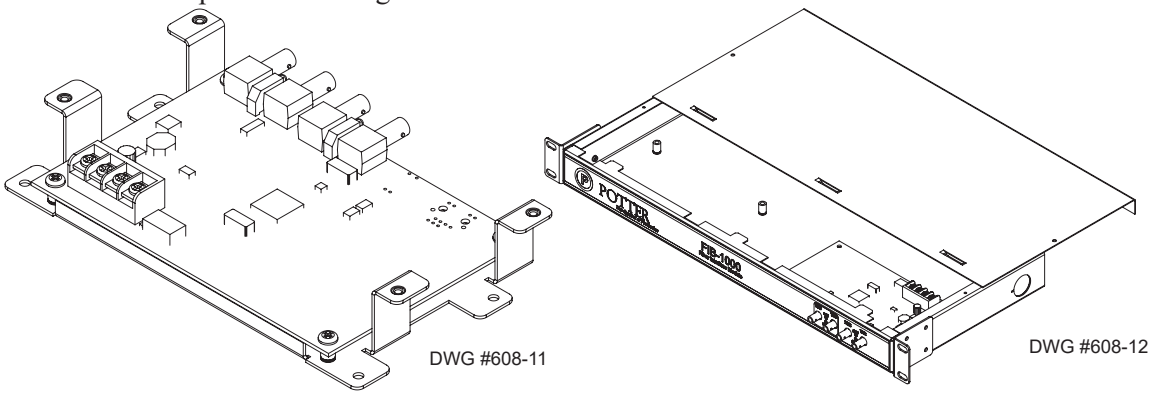


Figure 31. FCB-1000 Bridge & FCB-1000RM Showing Rack Mount

When the panel is equipped with the FIB-1000 (Fiber Interface Bridge) optional board, the standard 4 wire P-Link bus may be converted to/from the fiber optic cable.

The FIB-1000 can be mounted inside the AE-2, AE-8 or AE-14 accessory enclosure. The optional rack-mount kit (FIB-1000RM) includes a standard 19 inch rack-mount enclosure, which can then be installed directly in an equipment rack.

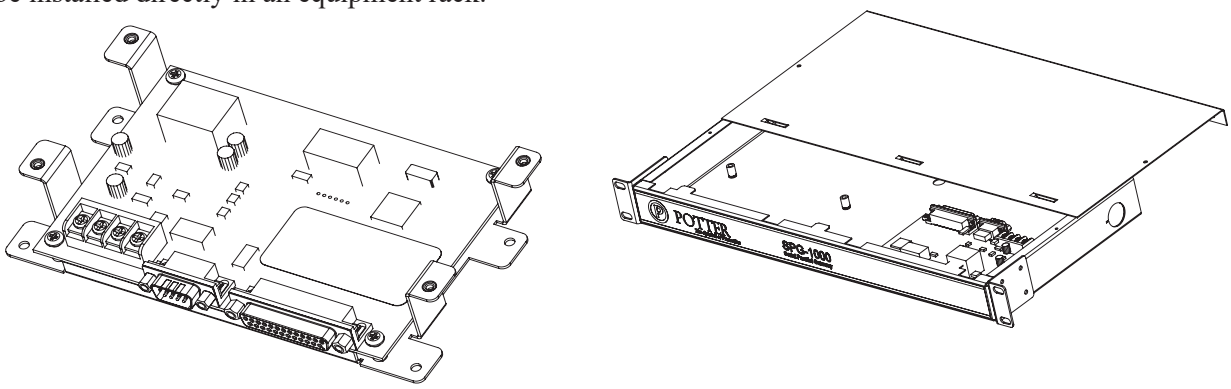
- Utilizes multimode 62.5/125 micron fiber optic cable (wave length = 820 nm)
- Tolerates up to 12 db of signal loss



DWG #608-11 DWG #608-12

Figure 32. FIB-1000 Bridge & FIB-1000RM Showing Rack Mount

An optional SPG-1000 serial/parallel gateway (printer driver) board can be mounted inside the AE-2, AE-8 or AE-14 accessory enclosure. A rack-mount kit (SPG-1000RM) includes a standard 19 inch rack-mount enclosure, which can then be installed directly in an equipment rack.



DWG #608-15 DWG #608-16

Figure 33. SPG-1000 Serial Parallel Gateway Board & Rack Mount

Note: Serial/Parallel printer connection is limited to same room installation. This connection shall be limited to 20 feet, and enclosed in conduit or equivalently protected against mechanical injury.

When the panel is equipped with the MC-1000 (Multi-Connect Module) optional board, up to 63 panels may be interconnected to report to the central station through a shared phone line or Internet connection.

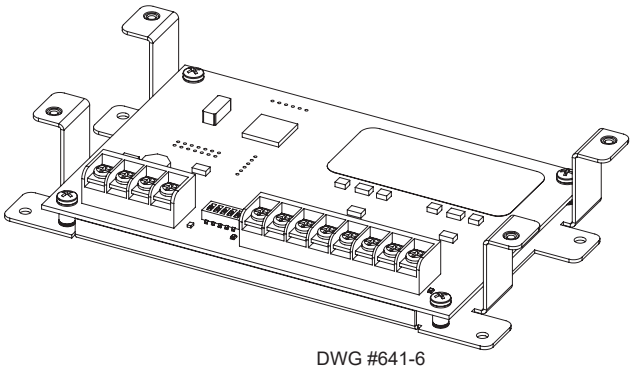


Figure 34. MC-1000 Multi-Connect Board & MC-1000 Showing Bracket Mount

The panel supports up to thirty one (31) IDC-6 modules. The IDC-6 is controlled over the 4 wire P-Link connection. . It can be mounted in PSN-1000 or either of the AE-2, AE-8 or AE-14 accessory cabinets..

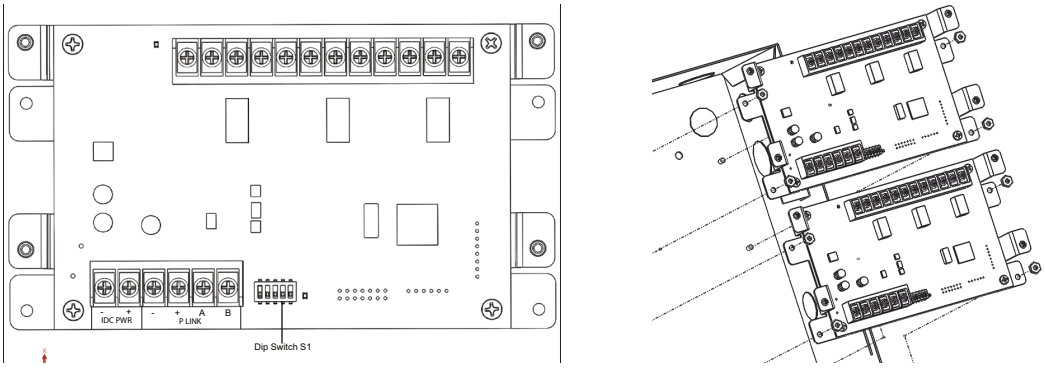


Figure 35. IDC-6 Initiating Device Circuit Expander and IDC-6 Installation

The IDC-6 higher current required for the inputs can be provided by the panel, or from an auxiliary power source as shown below. The auxiliary power can be any fire listed 24VDC source, and is fully supervised. IDC-6 operating voltage range is 15VDC-28VDC, and must be power limited.

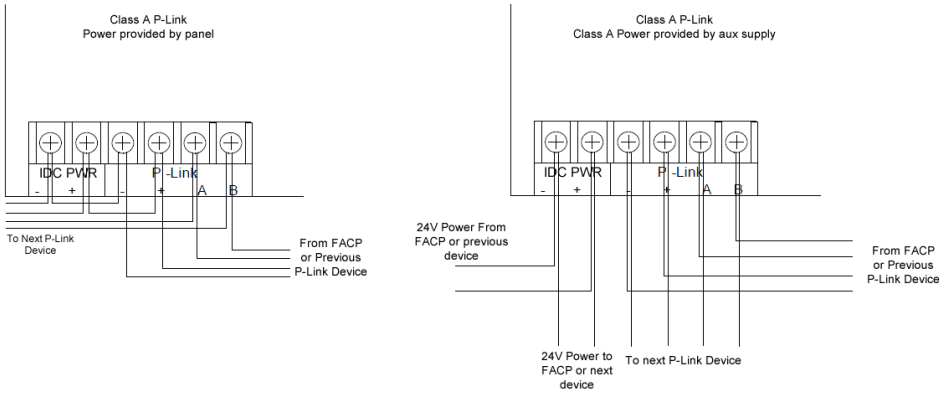


Figure 36. IDC-6 Class A Wiring

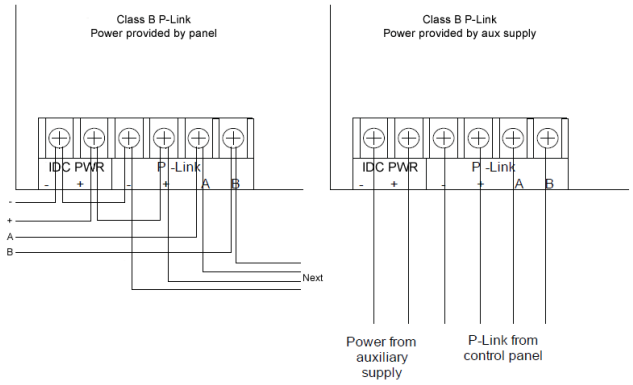


Figure 37. IDC-6 Class B Wiring

The NCE-1000 is used to network the fire alarm control panels via CAT5 Ethernet cable. It is fully supervised and is capable for Class B and Class A operation. The NCE-1000 can be used as a Class A extender which extends the length of the Ethernet connection from 300 feet to 600 feet. The NCE-1000 may be mounted in either the control panel cabinet, the PSN- 1000/E, the AE-2, AE-8 or AE-14. When wiring Class A or B, the connection between the FACP and the module shall be limited to 20 feet and enclosed in conduit or equivalently protected against mechanical injury. A maximum of 31 NCE-1000s can be installed per panel, with a maximum of 200 panels per network. Please refer to installation manual 5406326.

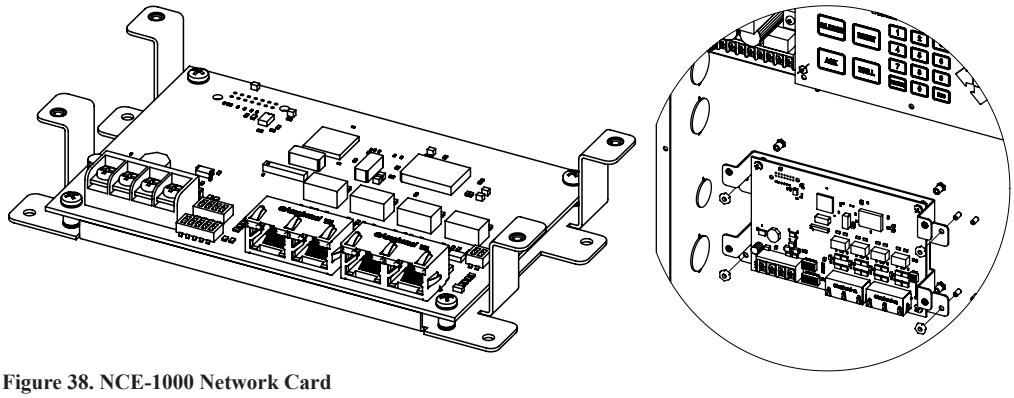


Figure 38. NCE-1000 Network Card

The NCF-1000 is used to network the fire alarm control panels using fiber optic cable. The NCF-1000 allows the user to install SFP (small form-factor pluggable) modules to utilize either single mode or multi-mode fiber. It is fully supervised and is capable of both Class B and Class A operation. The NCF-1000 may be mounted in either the control panel cabinet, the PSN-1000/E, the AE-2, AE-8 or AE-14. The connection between the FACP and the module shall be limited to 20 feet and enclosed in conduit or equivalently protected against mechanical injury. A maximum of 31 NCF-1000s can be installed per panel with a maximum of 200 panels per network. Please refer to installation manual 5406424.

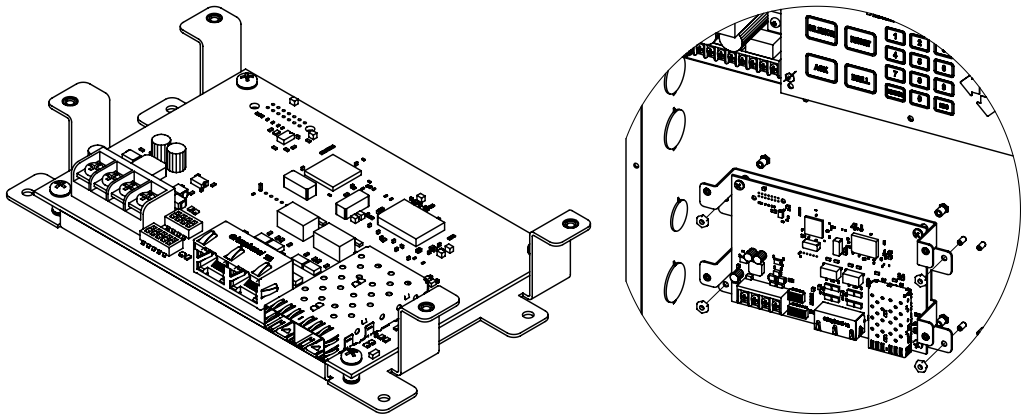


Figure 39. NCF-1000 Network Card Fiber

The control panel has an interface display for allowing users, technicians and installers the ability to recognize the status and input changes to the control panel. The display consists of three parts — the 80 character LCD display, the keypad and LEDs.

The keypad on the control panel is utilized for common user functions and system programming. The common user function buttons the following:

ACK – When pressed acknowledges the status change of the panel.

Signal Silence – When the button is pressed will silence outputs that are programmed as silenceable.

System Reset – When this button is pressed, the system will reset the panel to a normal condition. Once the reset is complete, any off normal status will be displayed.

Fire Drill – When programmed, the Fire Drill button will activate the programmed outputs to simulate an actual alarm without creating an alarm event.

The display has the following LEDs:

Power – A green LED that illuminates any time AC power is present

Alarm – A red LED that flashes any time an input programmed as an alarm device is active and has not been acknowledged. The LED will illuminate steady after all alarm conditions have been acknowledged.

Pre-Release – An amber LED that illuminates when a releasing zone is in a Pre-Discharge mode.

Release – A red LED that is on steady when a releasing output is active.

Earth Fault – An amber LED that flashes any time a ground fault is present on one of the control panel circuits and has not been acknowledged. The LED will illuminate steady after all earth faults have been acknowledged.

Supervisory – An amber LED that flashes any time an input programmed as supervisory is active and has not been acknowledged. The LED will illuminate steady after all supervisory conditions have been acknowledged.

Signal Silence – An amber LED that will illuminate any time the signal silence is active.

Trouble – An amber LED that flashes any time a trouble condition on the system is present and has not been acknowledged. The LED will illuminate steady after all trouble conditions have been acknowledged.

The control panel has the following functions:

Drift Compensation – The system employs drift compensation as a false alarm preventive measure. The drift compensation is controlled as part of the smoke head and not part of the control panel.

Calibrated Smoke Detector Sensitivity Testing – The control panel polls the smoke sensors for the current AD value approximately once every four seconds. Approximately every 4 minutes, the control panel polls the smoke sensors for the dirty value and compares the dirty value of the sensor to the alarm threshold. If the dirty value is 50% of the alarm threshold, a sensor trouble will be annunciated. A technician may also request the status of any sensor in the system through the front panel menu. In addition, a report can be printed that provides the level of sensitivity and the current level.

Remote Programming – The control panel is capable of being programmed remotely via the optional UD-1000/UD-2000 communicator. The remote modem calls the panel from a remote location and if programmed to answer phone calls it will pick up the call. Before the panel will accept any changes to the configuration data, an on-site user must enable the panel for remote access via the front panel keypad.

Positive Alarm Sequence – The control panel is programmable for Positive Alarm Sequence. When a zone is programmed as positive alarm sequence and an automatic sensor is activated, the user has up to 15 seconds to acknowledge the alarm. Failure to acknowledge the alarm will activate the evacuation appliances. If the alarm is acknowledged, the user has up to 180 seconds to reset the system. Failure to reset the system after the

acknowledgment timer will result in the evacuation signal being activated.

Alarm Verification – The control panel is programmable to enable alarm verification in compliance with UL 864 and NFPA 72. Zones with smoke sensors programmed as alarm verification when activated will delay the notification circuits from activating for up to 60 seconds. If the smoke sensor is still in the alarm condition after the programmed delay, the evacuation signals will activate.

Note: Alarm activation requiring activation of two or more automatic detection devices shall not utilize alarm verification or any other time delay.

Manual Release/Abort – The control panel is capable of releasing service. When the control panel is programmed for agent releasing the abort feature is allowed when a pre-discharge timer is programmed as well. The manual release will override the active abort and begin the countdown timer.

For Clean Agent systems installed in compliance with NFPA 12A or NFPA 2001 must be equipped with a mechanical or electrical manual release as part of the system. In addition, an output circuit must be programmed with the pre-discharge timer.

The control panel maintains the date and time independently of the main or secondary power. The date and time can be changed through the front keypad menu. In addition, daylight savings time may be programmed into the system, the dates of the time change are programmable if this feature is selected.

When an appropriate pass code is entered via the key pad into the control panel, the user may disable a device within the system. Any addressable point, NAC or suppression circuit may be disabled. When a device or circuit is disabled, the panel will indicate the off-normal condition. When the device or circuit is enabled, the trouble will clear and the panel will operate in a normal fashion. More than one device or circuit may be disabled at any one time. The circuits may individually be enabled and not affect the others.

The control panel controls the alarm threshold of the smoke detectors programmed as part of the system. The alarm threshold is limited to the listed value of the smoke detector. The selectable range of sensitivity is 1.5 percent per foot obscuration to 3.5 percent per foot obscuration. The alarm threshold may be adjusted in the computer software.

The control panel may be programmed for Day and Night mode smoke detector alarm threshold. The smoke detectors must be programmed for the day and night mode in addition to the Day/Night mode being enabled. In addition, the programmer must select the days and times for the days and nights. Up to fifty holidays may be programmed for the night mode (more sensitive) setting. The alarm threshold is only programmable for the listed range of the detector.

The control panel utilizes a concept of software zones for mapping inputs to outputs. Inputs and outputs are mapped to a single or multiple zones and when an input activates, all of the outputs within the same zone are activated. The panel also supports Cross Zoning, Counting Zones or a combination of a Cross/Count Zone. Cross zoning requires two inputs from separate zones in order to activate an output. A counting zone requires two inputs within the same zone to activate an output. The combination of a Cross/Counting Zone is two inputs in different zone or two inputs within the same zone to activate an output.

4. Programming Options

The control panel is configured using a PC based programming tool. The panel stores the site specific configuration data in non-volatile memory.

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES

This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below.

Topic	Feature or Option	Permitted in UL (Y/N)	Possible Settings	Setting(s) Permitted in UL864?	Comment
Misc	Idle LCD Message	Y	Yes/No	All Settings Allowed	

Topic	Feature or Option	Permitted in UL (Y/N)	Possible Settings	Setting(s) Permitted in UL864?	Comment
Misc	Display Events	Y	Initial Event Newest Event	Initial Event	Auto display of first event
Misc	SLC Blink	Y	Normal/Slow/Off	All Settings Allowed	
Misc	Alarm Verification Time	Y	0-60 Sec	All Settings Allowed	
Misc	Waterflow Delay	Y	0-255 Sec	All Settings Allowed	
Misc	AC Report Delay	Y	30 Minutes to 30 Hours	1-3 Hours	For UL864 use 1-3 Hr
Misc	DH Low AC Dropout Delay	Y	No delay, 15 Sec, 1 minute, 5 minute	All Settings Allowed	
Misc	Autotest Time	Y	Time of Day	All Settings Allowed	
Misc	Autotest Interval	Y	1-24 Hours	All Settings Allowed	
Misc	Strobes Active When Silenced	Y	Yes/No	All Settings Allowed	
Misc	50 Hz AC	Y	Yes/No	All Settings Allowed	
Misc	CO Tone on Annunciators	Y	Yes/No	All Settings Allowed	
Misc	Low Temp Events Are Supervised	Y	Yes/No	All Settings Allowed	
Misc	Disable 24 hours PZT Resound	Y	Yes/No	All Settings Allowed	
Misc	Display AM/PM	Y	AM/PM, 24 Hour	All Settings Allowed	
Misc	Synchronize to Network Time	Y	Yes/No	All Settings Allowed	
Misc	SNTP Server	Y	North-America.Pool.NTP.org	All Settings Allowed	
Misc	Time Zone	Y	24 Time Zone Selections	All Settings Allowed	
Misc	DST Enabled	Y	Yes/No	All Settings Allowed	
Misc	DST Start	Y	Month/Day	All Settings Allowed	
Misc	DST End	Y	Month/Day	All Settings Allowed	
Zone	Zone Style	Y	Alarm Supervisory PAS Auxiliary Releasing Fire Drill Waterflow Alert System Alarm System Supervisory System Trouble CO Alarm CO Supervisory	All Settings Allowed	
Zone	Alarm Count	Y	1-10	All Settings Allowed	
Zone	Silenceable	Y	Yes/No	All Settings Allowed	
Zone	Silence Inhibit	Y	Yes/No	All Settings Allowed	

Topic	Feature or Option	Permitted in UL (Y/N)	Possible Settings	Setting(s) Permitted in UL864?	Comment
Zone	Auto Silence	Y	Yes/No	All Settings Allowed	
Zone	Auto Unsilence	Y	Yes/No	All Settings Allowed	
Zone	Restore Delay	Y	0-300 Sec	Full range allowed	
Zone	Latching	Y	Yes/No	All Settings Allowed	
Zone	Local	Y	Yes/No	All Settings Allowed	
Zone	Output Pattern	Y	Constant ANSI Temp 3 March Code Double Time ANSI Temp 4	All Settings Allowed	
Zone	Day Sensitivity	Y	1.1%-3.5%	Full range allowed	Within listed range of sensor
Zone	Night Sensitivity	Y	1.1%-3.5%	Full range allowed	Within listed range of sensor
Zone	Heat Setting	Y	135F-185F	Full range allowed	Within listed range of sensor
Zone	Low Temp Heat Sens	Y	0F-135F	Full range allowed	
Zone	Enable ROR	Y	Yes/No	All Settings Allowed	
Zone	Combo ROR/ Fixed Setting	Y	135F-174F	All Settings Allowed	Within listed range of sensor
Releasing	Abort Type	N	ULI, IRI, AHJ, NYC	ULI	
Releasing	Pre-Release Timer	Y	0-60 Sec	Full range allowed	Length of time of pre-release
Releasing	Pre-Release Pattern	Y	Constant ANSI Temp 3 March Code Double Time ANSI Temp 4	All Settings Allowed	Pattern from NAC during Pre-Release
Releasing	Manual Release Timer	Y	0-30 Sec	Full settings allowed	Length of time of pre-release
Releasing	Manual Release Timer Allowed	Y	Yes/No	All Settings Allowed	Specifies whether Man-Release is Cancellable
Releasing	Soak Time	Y	0-25 Minutes 0-255 Minutes	Full range allowed	Length of time the release circuit is active post release

Topic	Feature or Option	Permitted in UL (Y/N)	Possible Settings	Setting(s) Permitted in UL864?	Comment
SLC Point	Type PAD Protocol	Y	Photo Detector (PD) Fixed Heat Detector (HD) CO Detector (CO) Combination Photo/Heat Detector (PHD) Duct Detector (DUCT) Duct Detector w/Relay (DUCTR) Duct Detector Remote Test Switch (DRTS) Duct Remote LED Indicator (MS-RA) Duct LED w/Test Switch (MS-KA/P/R) Mini Input Module (MIM) Speaker Module (SM) Pull Station Module Single Action (PSSA) Pull Station Module Dual Action (PSDA) Relay Module (RM) Notification Appliance Circuit (NAC) Twin Relay & Twin Input (TRTI) Double Input Module (DIM) One Relay & One Input (OROI) Zone Module (ZM) Remote LED (LED) Remote LED w/Key (LEDK) Single Input Module (SIM)	All Settings Allowed	Specifies use/type of SLC device for PAD Protocol
SLC Point	Function PAD Protocol	Y	Sensor Only Sensor with Sound Base (AB) Sensor with Relay Base (RB) Sensor with Low Frequency Sounder Base (LFSB) Sensor with Speaker Base (SPKB) Sensor with Duct Relay Addr Relay General Purpose Addr Relay Zone Trouble Addr Relay HVAC Shutdown Addr Relay Reset Followers Addr NAC General Purpose Addr NAC Release Solenoid Addr Zone Module General Purpose Output Zone Trouble Output	All Settings Allowed	Specifies use/type of SLC device for PAD Protocol

Topic	Feature or Option	Permitted in UL (Y/N)	Possible Settings	Setting(s) Permitted in UL864?	Comment
SLC Point	Function Nohmi Protocol	Y	Photo Detector (PSA) Photo Duct Detector (DSA) Photo/Heat Detector (PSHA) Fixed Heat Detector (FHA) Combination Fixed / ROR Heat Detector (RHA) Conv. Zone Module (CIZM) Mini Contact Mod (MCM) Single Contact Mod (SCM) Dual Contact Mod (DCM) Mon. Output Mod (MOM) Twin Relay Mod (TRM) Sounder Base (ASB) Relay Base (ARB	All Settings Allowed	Specifies use/type of SLC device for Nohmi Protocol
SLC Point	Dry Contact Input Functions PAD and Nohmi Protocol	Y	Pull Station Water Flow Supervisory Tamper Fire Drill Trouble Monitor Aux Abort Release Follower Reset Silence Fire Alarm Disable Inputs Disable Outputs Disable Inputs and Outputs Lamp Test CO Alarm CO Supervisory HVAC Reset Medical Alert Tornado Alert Process Alert Security Alert	All Settings Allowed	Applies to all dry-contact input devices & circuits Disable Inputs, Disable Outputs, and Disable Inputs / Outputs cannot be assigned to a Releasing Zone to comply with UL 10th Edition.
SLC Point	Alarm Verif	Y	Yes/No	All Settings Allowed	
SLC Point	Supervisory	Y	Yes/No	All Settings Allowed	
NACs	Function	Y	General Purpose AMSECO Sync Gentex Sync Gentex Sync with T4 System Sensor Sync Wheelock Sync Constant Output Resettable Output Door Holder Output ANSII Output City Tie Output Release Solenoid Output Sounder Base Power	All Settings Allowed	Specifies use of NAC circuit(s)
Day/Night	Smoke Sensitivity	Y	Full listed range of smoke detector	All Settings Allowed	Up to 50 holidays where day mode is not active.

Topic	Feature or Option	Permitted in UL (Y/N)	Possible Settings	Setting(s) Permitted in UL864?	Comment
DACT	Daily Test Call	Y	Any time of day	All Settings Allowed	Alternates between line 1 and 2 if line 2 is enabled.
E-Mail	Email Status Reports	N	Alarms, Troubles, Supervisory, Test, History & Status Reports		
IP-Reporting	IP Based Central Station Reporting	Y	Alarm, Supervisory, Trouble & Test Reports	All Settings Allowed	

Network Programming

Programming of a networks system uses all the above options. In addition, reference points are used to associate points between panels. Panels are also assigned to buildings allowing interactions between buildings via these reference points. Please refer to 8830161 Network Programming Guide and www.pottersignal.com for more information.

5. Testing/Maintenance

The control panel has one fuse on the board for the AC power over current protection.

The AC fuse is rated at 8A 250VAC Time-Lag and screened onto the main board as F1.

The batteries are to be replaced at least once every four years. The batteries are required to be UL recognized batteries with a date of manufacture permanently marked on the battery. The battery is to be tested at least annually and if the battery is showing signs of failure, it is to be replaced.

The battery is to remain in the cabinet with nothing on or around the batteries. Only properly sized sealed lead acid batteries are to be used with the control panel. Use of another battery or not providing the proper clearance may result in a fire or an explosions.

The control panel is required to be installed in accordance with local and state building codes and NFPA 72 (National Fire Alarm Code).

The control panel and related system is required to be inspected and tested in accordance with NFPA 72.

6. Compatibilities

NAC Appliances

Please refer to Potter document 5403592 NAC Compatibility Document.

Two Wire Smoke Detectors

None listed with the control panel, all devices listed the PAD100-ZM or CIZM, please refer to the PAD100-ZM or CIZM Installation Sheet.

Note: PAD100-ZM and CIZM modules require a 24 VDC power source. When using the CIZM, the power source must be 19.0 VDC – 26.4 VDC. When using the PAD100-ZM, the power source must be 19.6 VDC – 28 VDC. Power source must be power limited, and UL1481 listed.

Releasing Compatibility Refer to Document #5403625

Network Compatibility

The IPA series, AFC/ARC series and the PFC-4064 can be interconnected via the NCE and NCF network cards.

SLC Devices *PAD Series refers to PAD100, PAD200 and PAD300 **PAD100 and PAD200 Only

Nohmi Protocol	PAD Protocol
PSA – Photoelectric Smoke Detector	PAD Series*-PD – Photo Detector
PSHA – Photoelectric Smoke Detector	PAD Series-HD – Fixed Heat Detector (PAD100 and PAD300 Only)
FHA – Fixed Temperature Heat Detector	PAD Series-CD – CO Detector (PAD100 and PAD300 Only)
RHA – Rate of Rise/fixed Temperature Heat Detector	PAD Series*-PHD – Combination Photo/Heat Detector
	PAD Series - PCD - Photo/CO Detector (PAD200 and PAD300)
	PAD Series - PHCD - Photo/Heat/CO Detector (PAD200 Only)
DSA – Photo Duct Detector	PAD Series*-DUCT – Duct Detector
APS-SA/DA – Addressable Pull Station (Single Action / Dual Action)	PAD Series*-DUCTR – Duct Detector w/Relay
AIB – Addressable Isolator Base	PAD Series-DD – Duct Detector Sensor (PAD300-DD only)
ASB – Addressable Sounder Base	PAD100-DRTS – Duct Detector Remote Test Switch
ARB – Addressable Relay Base	MS-RA – DUCT Remote LED Indicator
MCM – Miniature Contact Module	MS-KA/P/R – DUCT LED w/Test Switch
SCM-4 – Single Contact Module	PAD100-MIM – Mini Input Module
DCM-4 – Dual Contact Module	PAD100-SM – Speaker Module
TRM-4 – Twin Relay Module	PAD100-PSSA – Pull Station Module Single Action
MOM-4 – Monitored Output Module	PAD100-PSDA – Pull Station Module Dual Action
CIZM-4 – Conventional Input Zone Module	PAD Series-SB– Addressable Sounder Base (PAD100 and PAD300 Only)
SCI – Short Circuit Isolator	PAD Series-RB – Addressable Relay Base (PAD100 and PAD300)
	PAD Series-IB – Addressable Isolator Base (PAD100 and PAD300)
	PAD Series-IM – Isolator Module (PAD100 and PAD300 only)
	PAD100-RM – Relay Module
	PAD100-NAC – Notification Appliance Circuit
	PAD100-TRTI – Twin Relay-Twin Input
	PAD100-DIM – Double Input Module
	PAD100-OROI – One Relay-One Input
	PAD100-ZM – Zone Module
	PAD100-LED – Remote LED
	PAD100-LEDK – Remote LED w/Key
	PAD100-SIM – Single Input Module
	PAD Series* - LFSB - Low Frequency Sounder Base (PAD100 and PAD300 Only)
	PAD100-SPKB - Speaker Base

DACT/DACR Compatibility

UD-1000/UD-2000 DACT

The DACT transmits in Ademco Contact ID and Security Industries Association's Digital Communication Standards (SIA-DCS). Each account may be configured for Contact ID or SIA-DCS independent of the other accounts setting. Therefore some account(s) could be Contact ID and others could be SIA-DCS or vice versa. Similarly, accounts could be the same reporting type.

Compatible Receivers

Silent Knight Model 9500/9800 (Ademco MX8000)

Sur-Gard System III
SG-DRL3 (POTS Line Card)

IP Reporting Compatibility

Sur-Gard System III
SG-DRL3-IPCA (Network Line Card)

Notes:

Where the fire alarm transmitter is sharing on-premises communications equipment, the shared equipment shall be Listed.

Secondary power shall be provided for all equipment necessary for the transmission and reception of alarm, supervisory and trouble signals at the protected premises and supervising station.

The connection between the FACP and on-premises communications equipment shall be limited to 20 feet and enclosed in conduit or equivalently protected against mechanical injury.

RS-485 Devices

PAD100-SLCE	Provides a PAD protocol SLC loop with a maximum of 100 addressable points.
SLCE-127	Provides a Nohmi protocol SLC loop with a maximum of 100 addressable points.
RA-6500R / RA-6500F	4x40 character LCD Remote Annunciator
RA-6075R	2x16 character LCD Remote Annunciator
PSN-1000/E	10 Amp Power Expander
LED-16 / LED-16F	Device that displays alarm/supervisory/trouble conditions for up to 16 zones and five (5) non-programmable system LEDs that annunciate system's overall conditions (Power, Earth, Silenced, Alarm, Supervisory, & Troubles).
DRV-50	Device that provides 50 LED outputs can be individually mapped to any zone, four (4) programmable supervised dry contact inputs, and five (5) non-programmable system LEDs annunciate the overall system condition (Power, Earth, Silenced, Alarm, Supervisory, & Troubles).
RLY-5	Device that provides five (5) Form-C relay outputs which can be individually mapped to any zone.
FCB-1000	Device that provides remote IP connection.
FIB-1000	Device that converts the 4 wire P-Link bus to/from fiber optic cable.
MC-1000	Allows up to 63 ARC series panels to report to the central station through a shared phone line or Internet connection.
IDC-6	Device that provides six (6) additional conventional Class B inputs or three (3) Class A inputs that can be individually mapped to any zone.
NCE-1000	Device that is used to network fire alarm panels using CAT5 Ethernet cable.
NCF-1000	Device that is used to network fire alarm panels using fiber optic cable.
PSK-1000	The panel supports up to 31 PSK-1000 programmable soft keys. The PSK-1000 is sidecar panel that offers 16 programmable switches to enable and disable zones.

Class A Expander

CA-6075 Class A Expander

Printers

Keltron 90 Series Fire Alarm printer or other UL Listed fire alarm printer (Ancillary).

7. System Configurations

ARC-100 (100 Point System)

Model	Description	Local	Releasing Service	Auxiliary	Remote Station	Central Station	Proprietary
ARC-100	Main Board/Panel Assembly	Y	Y	Y	Y	Y	Y
CA-6075	Class A Expander	O	O	O	O	O	O
UD-1000/UD-2000	DACT	N	N	N	Y	Y	Y
PAD100-SLCE	PAD Protocol SLC Loop Expander	O	O	O	O	O	O
SLCE-127	Nohmi Protocol SLC Loop Expander	O	O	O	O	O	O
RA-6075R	LCD type remote Annunciator	O	O	O	O	O	O
RA-6500R, RA-6500F	LCD type remote Annunciator	O	O	O	O	O	O
PSN-1000	Fire Power Expander	O	O	O	O	O	O
LED-16/LED-16F	LED Annunciator	O	O	O	O	O	O
PSK-1000	16 programmable soft keys	O	O	O	O	O	O
DRV-50	LED Driver	O	O	O	O	O	O
RLY-5	Relay Expander	O	O	O	O	O	O
FCB-1000	Fire Communications Bridge	O	O	O	O	O	O
FIB-1000	Fiber Interface Bridge	O	O	O	O	O	O
SPG-1000	Serial/Parallel Gateway	O	O	O	O	O	O
MC-1000	Multi-Connect Module	O	O	O	O	O	O
IDC-6	Initiating Device Circuit	O	O	O	O	O	O
NCE-1000	Network Card Ethernet	O	O	O	O	O	O
NCF-1000	Network Card Fiber	O	O	O	O	O	O
3005013	End of line resistor	Y	Y	Y	Y	Y	Y
3005012	End of line resistor and diode	N	Y	Y	N	N	N

Y = Yes, required for applicable section.
N = No, not required for applicable section.
O = Optional, may or may not be used, has no affect on the applicable section.

8. System Power/Size

Panel	# NACs	Rating per NAC	SLC Power	Notes	Class
ARC-100	2 up to 4 if all I/O circuits configured as NACs	3 Amp	Maximum Load of 90.61 mA	One SLC Loop	SLC – Class A or B NAC – Class A or B P-Link – Class A or B I/O – Class B only All are low voltage and power limited

System Size

Accessories/subassemblies	Maximum System Size
ARC-100	100 maximum points any combination of detectors or modules
	2 notification circuits on the main board 2 I/O circuits
UD-1000/UD-2000	1 DACT

POTTER
The Symbol of Protection

Fire Panel Operating Instructions

Normal Standby	The green AC POWER LED will be illuminated and the user defined message on the LCD will be displayed. If the AC power is removed for more than 5 seconds, the green AC power LED will extinguish.
Acknowledging	Off normal events are acknowledged by pressing the ACK key while reviewing events. After all events have been acknowledged, the buzzer will deactivate and the associated LED will stop flashing and remain on continuously. During Positive Alarm Sequence operation the "ACK" key must be pressed within 15 seconds of the alarm initiation to activate the investigation timer.
Alarm Condition	The red ALARM LED will be illuminated anytime an alarm is occurring in the system. The LCD will display the number of inputs in alarm, and the buzzer will be activated. The buzzer will remain active until all alarms have been acknowledged, or until the Silence key is pressed.
Silencing Alarm	When the system is in Alarm, the notification circuits (strobes and horns) can be shut off by pushing the SILENCE button.
Resetting Alarm	After the condition that caused the alarm has been identified and corrected, the system may be reset to the Normal Standby by pressing the RESET button.
Supervisory Condition	When a supervisory condition is detected, the amber SUPERVISORY LED will illuminate and the buzzer will sound. The LCD display will indicate the number of supervisory events that are active. The local buzzer will sound until all supervisory events have been acknowledged.
Restoring Supervisory Condition	If the Supervisory condition is non-latching, once the device is restored to the normal condition, the supervisory event will clear. If the supervisory condition is latching, the device that was activated must be restored and the RESET pressed.
Trouble Condition	When a fault condition occurs, the amber TROUBLE LED will illuminate and the local buzzer will sound until the fault is removed or the ACK button is pressed acknowledging the trouble condition. If the buzzer is acknowledged and the fault is not removed within 24 hours, the buzzer will resound.
Silencing Trouble(s)	When a trouble is occurring, the local buzzer will sound until either all troubles have been acknowledged or the SILENCE button is pressed.
Ground Fault	When a conductor contacts and earth ground, the amber EARTH FAULT LED will illuminate and the LCD display will provide further information of where the fault is located.
Pre-Release (Releasing Panels Only)	The amber Pre-Release LED will illuminate when the system is in a count down timer for an agent release. Additionally, pre-release events and countdown timers are displayed on the LCD.
Release (Releasing Panels Only)	The red Release LED will illuminate when a release condition is active. Additionally, release events will be displayed on the LCD.
Agent Release Abort (Releasing Panels Only)	If the system is being used as an agent releasing panel and a pre-discharge timer is programmed, the release may be aborted by pressing the abort switch. For ULI installations, pushing the Abort will allow the timer to countdown until 10 seconds and then halt. Releasing and reactivating the Abort will set the timer to 10 seconds.
Testing and Maintenance	Test this system monthly or more frequently as required by the AHJ. Before conducting any testing contact the building personnel and the monitoring facility as applicable. When testing a system configured for releasing, activate the releasing disconnect switch to prevent accidental discharge of a suppression system. Test the circuits as outlined in the Installation Manual. Test in accordance with NFPA 72 Inspection, Testing and Maintenance Chapter(s) and any local requirements. The batteries should be marked with the date of installation and replaced every four years or sooner if battery trouble occurs. Batteries should be checked with a tester acceptable to the AHJ such as a Stone Technologies model STC612A or equivalent. In case of a fuse replacement, refer to the Installation Manual for the proper rating. Contact the agency below for service or operational questions.
All Call	When the button is pressed, all programmed speaker zones are selected and corresponding LEDs on the SB-8 and SB-24 will illuminate to indicate the zones are enabled. Speaker zones can be deselected individually by selecting the corresponding button or can relinquish all speaker zones by pressing the All Call button.
ECS Reset	When the RESET button is pressed, all active ECS events will relinquish.
CTRL	When the CTRL button is pressed, this allows operator consoles to request control of the system when a remote operator console is in use.
Control Requested	A steady amber LED indicates a LOC-1000 is requesting control of the system.
Remotely Controlled	A steady amber LED indicates a remote operating console is currently in control.
Locally Controlled	A steady red LED indicates the local operating console is currently in control.

For service, contact:

Name: _____

Company: _____

Address: _____

Telephone: _____

Frame and display instructions adjacent to the fire alarm panel.

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Appendix A: Battery Calculation Worksheets

Description	Quantity	Standby (mA)	Total Standby (mA)	Alarm (mA)	Total Alarm (mA)
Main board (ARC-100)	1	130	**130**	220	
LCD Remote RA-6075R		20		25	
LCD Remote RA-6500R or RA-6500F		20		25	
CA-6075 Class A Expander		12		44	
UD-1000/UD-2000 DACT		16		23	
PSN-1000/E Power Expander		15		15	
LED-16 or LED-16F P-Link Current LED-Current (if applicable, see Note 6)		25 15		25 210	
DRV-50 LED-Current (#LEDs x 5 mA; if applicable, see Note 6)		25 10		25 215	
RLY-5 Relay Current (if applicable, see Note 6)		25 10		35 135	
FCB-1000 Fire Communications Bridge		25		25	
FIB-1000 Fiber Interface Bridge		30		30	
SPG-1000 Serial Parallel Gateway		40		40	
MC-1000 Multi-Connect Module		10		10	
IDC-6 Initiating Device Circuit		20		20	
IDC PWR (See Note 6)					
Class B Input Zones (Per Zone)		5		45	
Class A Input Zones (Per Zone)		5		45	
NCE-1000		50		50	
NCF-1000		95		95	
PSK-1000		18		19	
NAC 1					
NAC 2					
I/O 1					
I/O 2					
Built-in SLC Current Draw - Calculated by SLC worksheet					
		Total (mA)		Total (ma)	
		Convert to Amps	x 0.001	Convert to Amps	x 0.001
(*Refer to maximum allowable standby current) Total A:				Total A:	
		Multiply by standby hours	x____	60 minutes per hour Alarm time (minutes) ***Example***: 5 minute alarm: enter 12 10 minute alarm: enter 6	÷ ____
		Total Standby AH		Total Alarm AH	
				+Total Standby AH	
				Total AH	
				Efficiency Factor	÷ 0.80
				Required AH	

*Maximum Allowable Standby Current (UL 24-Hour standby time) 7 AH .215 A 18 AH .582 A 33 AH 1.082 A 55 AH 1.815 A	**Important Notes:** 1) FACP enclosure can house up to two (2) 18 AH batteries. Larger batteries require accessory enclosure, part #SSU00500. 2) NFPA 72 requires 24 hours of standby power followed by 5 minutes alarm activation. 3) NFPA 12, 12A requires 24 hours and five minutes of alarm activation. 4) Door holder circuits configured to disconnect upon AC loss need not be included in the battery standby calculation since they will not draw power during that time. Door holders will contribute to standby current draw when AC is present. 5) Total current must not exceed power supply rating (5.0A). 6) LED/Relay/IDC-6 current must be accounted for in the battery calculation for the supplying source.

Built-in SLC Current Draw Worksheet (PAD Protocol)

Device Type	Qty	Standby (mA)	Total Standby (mA)	Alarm Standby (mA)	Total Alarm (m/A)
Photo detector (PAD Series - PD) *Note 7		.300		.300	
Photo/CO detector (PAD200-PCD amd PAD300-PCD)		.300		.300	
Photo/Heat/CO detector (PAD200-PCHD)		.300		.300	
Fixed heat detector (PAD100-HD and PAD300-HD)		.300		.300	
CO detector (PAD100-CD and PAD300-CD)		.300		.300	
Combination photo/heat detector (PAD Series-PHD) *Note 7		.300		.300	
Duct Smoke Detector (PAD300-DD)		.300		.300	
Duct detector (PAD Series-DUCT) *Note 7		.300		.300	
Duct detector w/relay (PAD Series-DUCTR) *Notes 4, 5 & 7		.500		.500	
Duct detector remote test switch (PAD100-DRTS)		10.0		15.0	
Mini input module (PAD100-MIM)		.200		.200	
Speaker Module (PAD100-SM)		.240		.240	
Pull station module single action (PAD100-PSSA)		.200		.200	
Pull station module dual action (PAD100-PSDA)		.200		.200	
Relay module (PAD100-RM)		.240		.240	
Notification appliance circuit (PAD100-NAC) *Note 2		.200		.200	
Twin relay-twin input module (PAD100-TRTI)		.240		.240	
Double input module (PAD100-DIM)		.240		.240	
One relay-one input module (PAD100-OROI)		.240		.240	
Zone module (PAD100-ZM) *Note 1		.240		.240	
Remote LED (PAD100-LED)		.240		.240	
Remote LED with key (PAD100-LEDK)		.200		.200	
Single input module (PAD100-SIM)		.240		.240	
Addressable sounder base (PAD100 and PAD300) *Note 3		.200		.200	
Addressable Low Frequency Sounder Base (PAD100 and PAD300) *Note 6		.200		.200	
Addressable Relay base (PAD100 and PAD300)		.200		.200	
Isolator base (PAD100 and PAD300)		.150		.150	
Isolator module (PAD100 and PAD300)		.150		.150	
SLC alarm LED Current	n/a	n/a		n/a	36.0
		SLC Standby Current		**SLC Alarm Current**	

* Note 1: PAD100-ZM requires 24VDC power source. Standby current = 15.0 mA. Alarm Current = 60.0 mA.
* Note 2: PAD100-NAC requires 24VDC power source. Standby current = 3.0 mA. Alarm Current = 8.0 mA.
* Note 3: PAD Series-SB requires 24VDC power source. Standby current = 4.0 mA. Alarm Current = 30.0 mA.
* Note 4: PAD Series-DUCTR requires 24VDC power source. Standby current = 30.0 mA. Alarm Current = 60.0 mA.
* Note 5: When connecting the MS-RA/MS-KA/P/R power source, Standby current = 45.0 mA. Alarm Current = 90.0 mA.
* Note 6: PAD Series-LFSB requires 24VDC power source. Standby current = 4.1 mA. Alarm Current = 156.6 mA.
* Note 7: PAD Series refers to PAD100, PAD200 and PAD300

SLC Current Draw Worksheet (PAD Protocol)
(Complete for configuring the PAD100-SLCE)

Device Type	Qty	Standby (mA)	Total Standby (mA)	Alarm Standby (mA)	Total Alarm (m/A)
PAD100-SLCE SLC board (PAD Protocol)		60	60	60	60
Photo detector (PAD Series - PD) *Note 7		.300		.300	
Photo/CO detector (PAD200 and PAD300)		.300		.300	
Photo/Heat/CO detector (PAD200-PCHD)		.300		.300	
Fixed heat detector (PAD100 - HD and PAD300- HD)		.300		.300	
CO detector (PAD100 and PAD300)		.300		.300	
Combination photo/heat detector (PAD Series-PHD) *Note 7		.300		.300	
Duct Smoke Detector (PAD300-DD)		.300		.300	
Duct detector (PAD Series-DUCT) *Note 7		.300		.300	
Duct detector w/relay (PAD Series-DUCTR) *Notes 4, 5 & 7		.500		.500	
Duct detector remote test switch (PAD100-DRTS)		10.0		15.0	
Mini input module (PAD100-MIM)		.200		.200	
Speaker Module (PAD100-SM)		.240		.240	
Pull station module single action (PAD100-PSSA)		.200		.200	
Pull station module dual action (PAD100-PSDA)		.200		.200	
Relay module (PAD100-RM)		.240		.240	
Notification appliance circuit (PAD100-NAC) *Note 2		.200		.200	
Twin relay-twin input module (PAD100-TRTI)		.240		.240	
Double input module (PAD100-DIM)		.240		.240	
One relay-one input module (PAD100-OROI)		.240		.240	
Zone module (PAD100-ZM) *Note 1		.240		.240	
Remote LED (PAD100-LED)		.240		.240	
Remote LED with key (PAD100-LEDK)		.200		.200	
Single input module (PAD100-SIM)		.240		.240	
Addressable sounder base ((PAD100-SB and PAD300 - SB) *Note 3		.200		.200	
Addressable Low Frequency Sounder Base (PAD100 and PAD300) *Note 6		.200		.200	
Addressable Relay base (PAD100 and PAD300)		.200		.200	
Isolator base (PAD100 and PAD300)		.150		.150	
Isolator module (PAD100-IM)		.150		.150	
SLC alarm LED Current	n/a	n/a		n/a	36.0
		SLC Standby Current		**SLC Alarm Current**	

* Note 1: PAD100-ZM requires 24VDC power source. Standby current = 15.0 mA. Alarm Current = 60.0 mA.
* Note 2: PAD100-NAC requires 24VDC power source. Standby current = 3.0 mA. Alarm Current = 8.0 mA.
* Note 3: PAD Series-SB requires 24VDC power source. Standby current = 4.0 mA. Alarm Current = 30.0 mA.
* Note 4: PAD Series-DUCTR requires 24VDC power source. Standby current = 30.0 mA. Alarm Current = 60.0 mA.

* Note 5: When connecting the MS-RA/MS-KA/P/R power source, Standby current = 45.0 mA. Alarm Current = 90.0 mA.
* Note 6: PAD Series-LFSB requires 24VDC power source. Standby current = 4.1 mA. Alarm Current = 156.6 mA.\
* Note 7: PAD Series refers to PAD100, PAD200 and PAD300

SLC Current Draw Worksheet (Nohmi Protocol) (Complete for configuring a SLCE-127)

Device Type	Qty	Standby (mA)	Total Standby (mA)	Alarm (mA)	Total Alarm (mA)
SLCE-127 SLC Board (Nohmi Protocol)		60	60	60	60
Analog photo smoke detector (PSA)		0.325		0.325	
Analog photo smoke / fixed heat detector (PSHA)		0.325		0.325	
Analog fixed temperature heat detector (FHA)		0.325		0.325	
Analog rate of rise/fixed temperature heat detector (RHA)		0.325		0.325	
Analog photo DUCT smoke detector (DSA)		0.325		0.325	
Conventional initiating zone module - 4 inch mount (CIZM-4) *Note 1		0.325		1.000	
Miniature contact module (MCM)		0.325		0.325	
Single contact module - 4 inch mount (SCM-4)		0.325		1.000	
Dual contact module - 4 inch mount (DCM-4)		0.325		1.000	
Monitored output module - 4 inch mount (MOM-4) *Note 2		0.325		1.000	
Twin relay module - 4 inch mount (TRM-4)		0.325		1.000	
Short circuit isolator (SCI)		0.325		2.34	
Analog sounder base (ASB) *Note 3		0.325		0.325	
Analog relay base (ARB) *Note 4		0.325		0.325	
Isolator base (AIB)		0.325		2.34	
SLC alarm LED Current	n/a	n/a		n/a	27.0
	SLC Standby Current			**SLC Alarm Current**	

* Note 1: CIZM requires 24VDC power source. Standby current Class A = 4.90 mA, Class B (8.5 mA). Alarm Current = 50.0 mA
* Note 2: MOM requires 24VDC power source. Standby current = 1.60 mA. Alarm Current = 1.60 mA
* Note 3: ASB requires 24VDC power source. Standby current = 5 mA. Alarm Current = 100 mA
* Note 4: ARB requires 24VDC power source. Standby current = 5 mA. Alarm Current = 50 mA

10. Installation Notes

Circuit board assembly is mounted in the cabinet using nine (9) fasteners as shown in the illustration below.

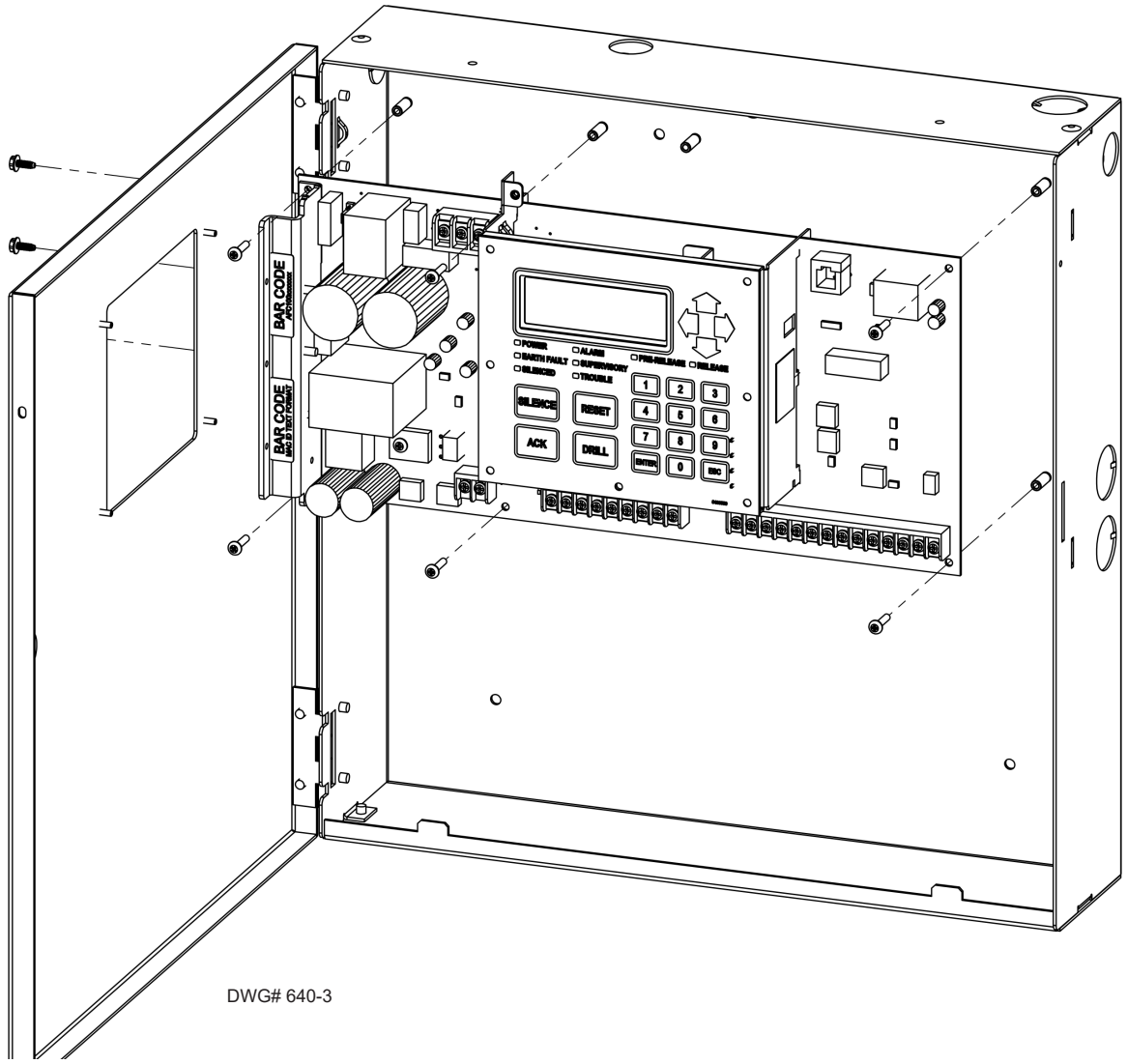

Figure 40. ARC-100 Cabinet Showing Circuit Board Assembly