



INSTALLATION MANUAL

DUAL PRESSURE SWITCH MODULE WITH & WITHOUT BYPASS

DIOM P/N: 800095-A

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Table of Contents

1	FOREWORD	1
1.1	Warnings	1
1.2	Safety Precautions	1
2	GENERAL	2
2.1	Description.....	2
2.2	Variants	2
2.3	Product Dimensions	2
2.3.1	With Bypass Key Switch	2
2.3.2	Standard (without Bypass).....	3
2.4	Specifications	3
2.4.1	Electrical	3
2.4.2	Environmental.....	3
3	INSTALLATION	4
3.1	Opening the Module	4
3.1.1	With Bypass Key Switch	4
3.1.2	Standard (without Bypass).....	5
3.2	Configuring the Module.....	5
3.3	Configuration Testing	6
3.4	Closing the Module.....	8
3.4.1	With Bypass Switch	8
3.4.2	Standard (without Bypass).....	8
3.5	Mounting the Module	8
3.5.1	Direct Mounting.....	9
3.5.2	Flange Mounting Kit.....	9
3.5.3	Magnetic Mounting Kit.....	10
3.6	Wiring the Module	10
3.7	System Activation	11
4	SERVICE AND MAINTENANCE.....	12
4.1	General.....	12
4.2	Post Discharge, System Recharge, and Return to Service	12
5	APPENDIX A.....	13

Table of Figures

Figure 1 – Bypass Variant Envelope Dimensions Top View	2
Figure 2 – Bypass Variant Envelope Dimensions Side View.....	3
Figure 3 – Standard Variant Envelope Dimensions Top View	3
Figure 4 – Standard Variant Envelope Dimensions Side View	3
Figure 5 – Environmental Limitations	3
Figure 6 – Exploded View with Bypass.....	4
Figure 7 – Exploded View Standard	5
Figure 8 – Configuration Board Overview.....	5
Figure 9 – Switch Position Details	6
Figure 10 – Threaded Insert	8
Figure 11 – Threaded Insert Dimensions	9
Figure 12 – Flange Mounting Kit.....	9
Figure 13 – Flanges Installed	10
Figure 14 – Magnetic Mounting Kit	10
Figure 15 – Magnets Installed	10
Figure 16 – Cable Harness Install Exploded View.....	11
Figure 17 – Harness Pinout Diagram	11

List of Tables

Table 1 – Variant Specifications	2
Table 2 – Configuration Specification With Bypass	6
Table 3 – Configuration Specification Standard	6
Table 4 – Testing Reference With Bypass	7
Table 5 – Testing Reference Standard	8
Table 6 – Pinout Details.....	11

1 FOREWORD

1.1 Warnings

Safety precautions are essential when any electrical or mechanical equipment is involved. These precautions should be followed when handling, servicing, and recharging Firetrace Fire Suppression Systems and equipment. If safety precautions are overlooked or ignored, personal injury or property damage may occur.

The following symbols are used throughout this manual. Always heed these precautions. They are essential to the safe use of the equipment described in this manual.



DANGER:

This danger symbol identifies immediate hazards and provides specific instructions or procedures, which if not correctly followed WILL result in severe personal injury or death.



WARNING:

This warning symbol identifies specific instructions or procedures, which if not correctly followed, COULD result in severe personal injury or death.



CAUTION:

This caution symbol identifies specific instructions or procedures, which if not correctly followed, COULD result in minor personal injury or equipment or property damage.

1.2 Safety Precautions

The following safety precautions should always be followed:



WARNING

Pressurized (charged) cylinders are extremely hazardous and if not handled properly are capable of causing property damage, bodily injury, or death. Always wear safety glasses and make sure the discharge plugs are properly in place before system installation, servicing, or other general handling.

Read and understand this manual and the other documents referenced herein.

Wear safety glasses when working with pressurized cylinders and charging equipment.

Make sure that the ball valve (attached to the top of the cylinder valve) is closed (lever is in "OFF" position), the detection tubing has been removed from the cylinder valve and the safety caps installed before removing the cylinder from the installation and before performing any charging, leak tests or salvage operations.

Follow all the safety procedures included on the cylinder nameplate and in this manual.

Never assume that a cylinder is empty. Treat all cylinders as if they are fully charged.

Any questions concerning the information contained in this Manual should be addressed to:

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www.firetrace.com

2 GENERAL

2.1 Description

The Dual Pressure Switch Module gives the ability to monitor the health of the Firetrace fire suppression system and deliver a shutdown / notification signal in the event of a system discharge due to fire in a single package solution. The pressure switch module also contains an integrated end-of-line adapter to help simplify the installation process. A signal bypass key switch is also included for ease of servicing.

When purchased, the module comes in a kit that includes:

- Dual Pressure Switch Module
- Cable Harness
 - P/N 203210
- Replacement Nameplate
 - To align the nameplate with the mounting orientation of the module

2.2 Variants

The Dual Pressure Switch Module is offered in two main variants. Each variant includes two pressure switches utilizing either a supervisory and activation pressure switch or two activation pressure switches. The “Standard” variant only contains a combination of these two pressure switches and no signal bypass or end-of-line adapter. The second variant adds the bypass key switch and integrated end-of-line to provide additional functionality and ease of install. Table 1 below gives an overview of the different variants highlighting part numbers, fire suppression system pressures they are used with, and the pressure switch types used.

Table 1 – Variant Specifications

	Kit P/N	Module P/N	System Pressure	Pressure Switch 1	Set Point	Pressure Switch 2	Set Point
With Bypass	603305	601305	195psi	Activation	70psi	Supervisory	150psi
	603315	601315	150psi	Activation	70psi	Supervisory	99psi
	603325	601325	Any	Activation	70psi	Activation	70psi
Standard	603400	601400	195psi	Activation	70psi	Supervisory	150psi
	603410	601410	150psi	Activation	70psi	Supervisory	99psi
	603420	601420	Any	Activation	70psi	Activation	70psi

2.3 Product Dimensions

2.3.1 With Bypass Key Switch

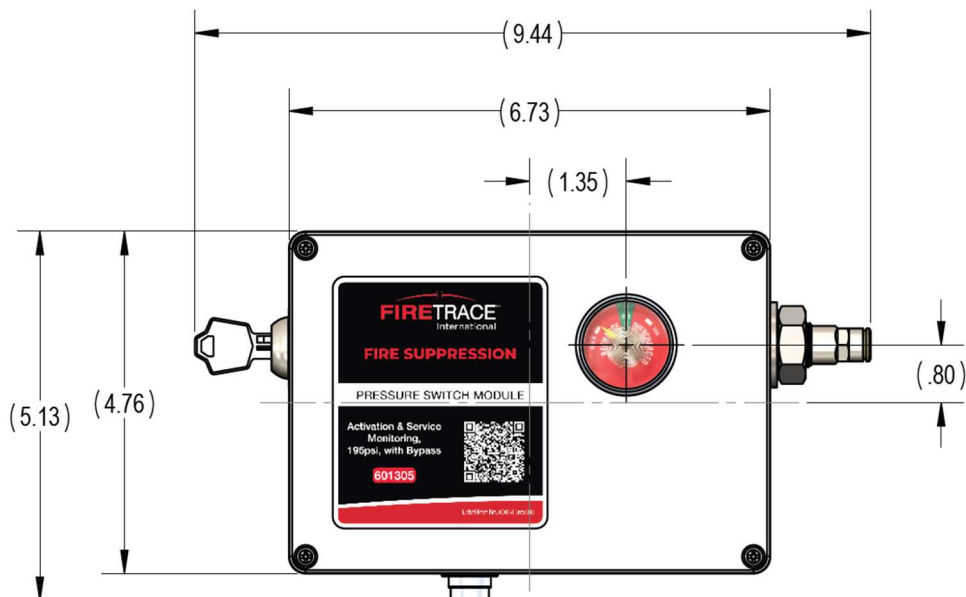


Figure 1 – Bypass Variant Envelope Dimensions | Top View

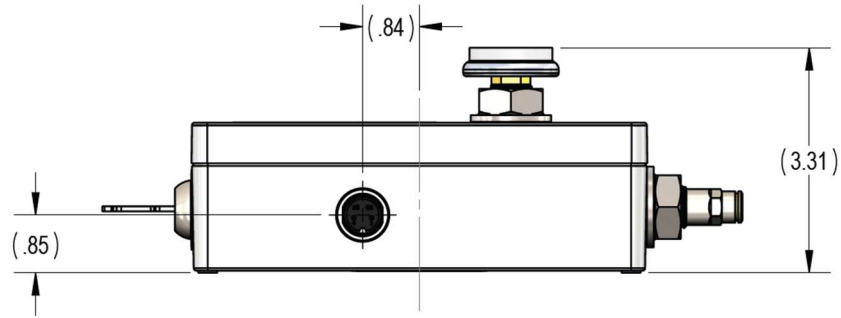


Figure 2 – Bypass Variant Envelope Dimensions | Side View

2.3.2 Standard (without Bypass)

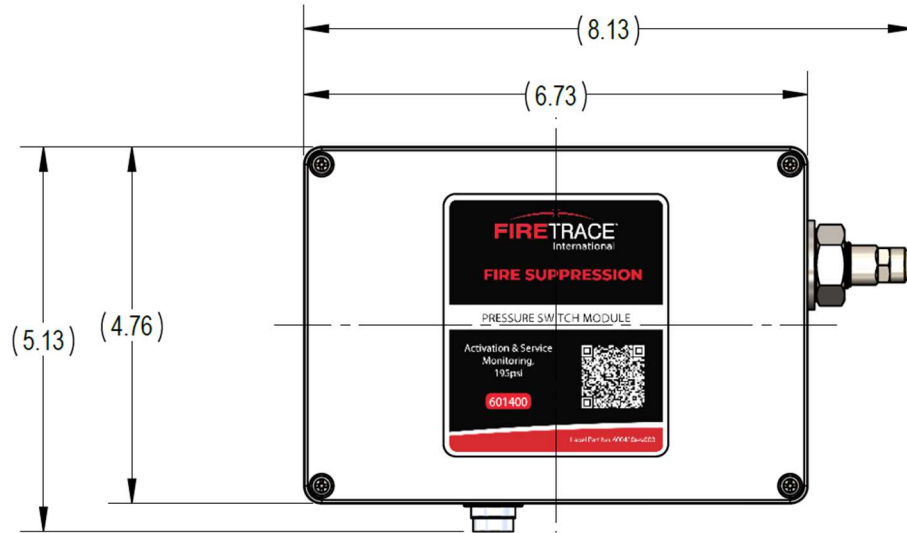


Figure 3 – Standard Variant Envelope Dimensions | Top View

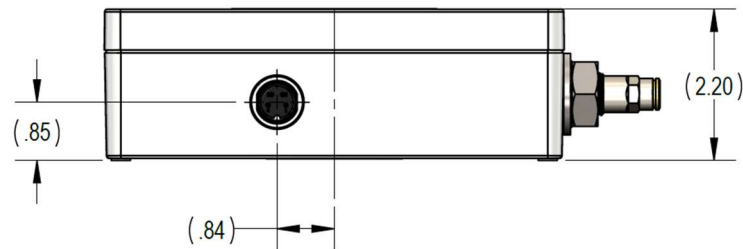


Figure 4 – Standard Variant Envelope Dimensions | Side View

2.4 Specifications

2.4.1 Electrical

The electrical limitations below are for both variants of the Dual Pressure Switch Module, with and without bypass key switch.

Max Voltage: 24V
Max Current: 2A

2.4.2 Environmental

Variant	IP	Operating Temp
With Bypass	N/A	-40°F to 150°F -40°C to 65.6°C
Standard	IP64	-40°F to 150°F -40°C to 65.6°C

Figure 5 – Environmental Limitations

3 INSTALLATION

The Dual Pressure Switch Module is an easy addition to any Firetrace fire suppression system installation. There are only a few simple steps to complete prior to mounting the box in its desired location and connecting it to the detection tubing network.

1. Open the pressure switch module to gain access to the configuration panel
2. Set the toggle switches to the specified position based on the configuration required for the installation
3. Close the pressure switch module
4. Secure the Dual Pressure Switch Module in place
5. Wire the pressure switch module using the supplied cable harness
6. Insert tubing into the slip-on fitting to connect the module to the detection network
7. Pressurize the Firetrace detection tubing.

The rest of the installation of the Firetrace fire suppression systems should follow the instructions called out in the specific DIOM of the system being installed. Reference the following sections for more detail on each of the steps outlined above.

3.1 Opening the Module

3.1.1 With Bypass Key Switch



Figure 6 – Exploded View | with Bypass

Reference the number callouts in **Figure 6** above for the process below

1. Remove pressure gauge (1) from integrated end-of-line adapter (4)
2. Remove retaining nut (2) from integrated end-of-line adapter (4)
3. Remove bonded washer (3) from integrated end-of-line adapter (4)
4. Unscrew the four screws (5) in the corner of the box
5. Remove cover

3.1.2 Standard (without Bypass)

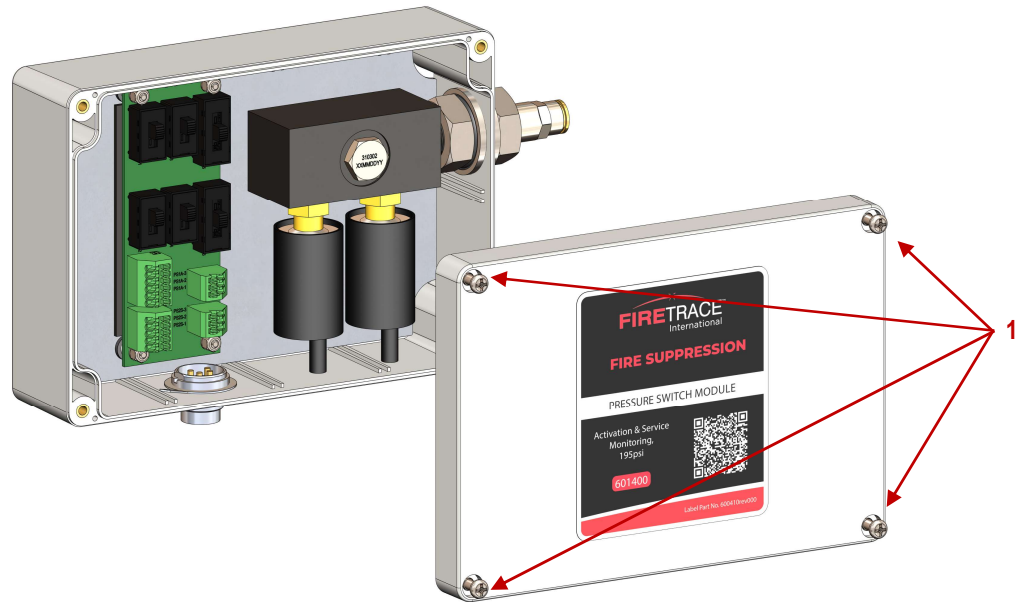


Figure 7 – Exploded View | Standard

Reference the number callouts in **Figure 7** above for the process below

1. Unscrew the four screws (1) in the corner of the box
2. Remove cover

3.2 Configuring the Module

The Dual Pressure Switch Module utilizes a series of adjustable toggle switches on a circuit board to configure the available pressure switch and bypass key switch states. In **Figure 8**, the toggle switches numbered for identification and highlight which pressure switch they are tied to. These toggle switch numbers will be referenced in **Table 2** & **Table 3**. The identification numbers for the toggle switches are screen-printed onto the PCB

The bypass key switch can be configured to perform distinct functions on each of the pressure switches when the key is moved to the bypass position.

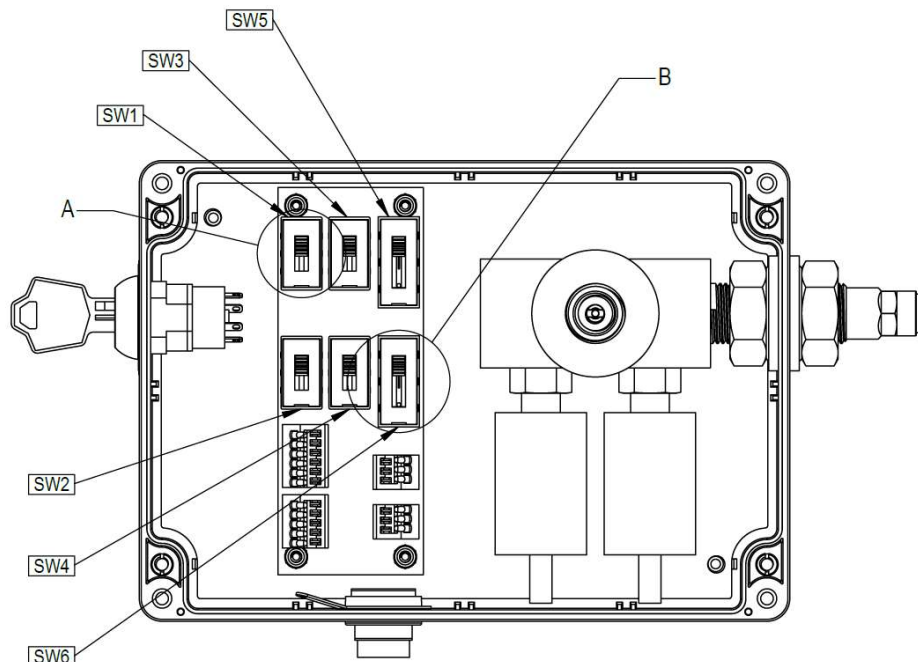


Figure 8 – Configuration Board Overview

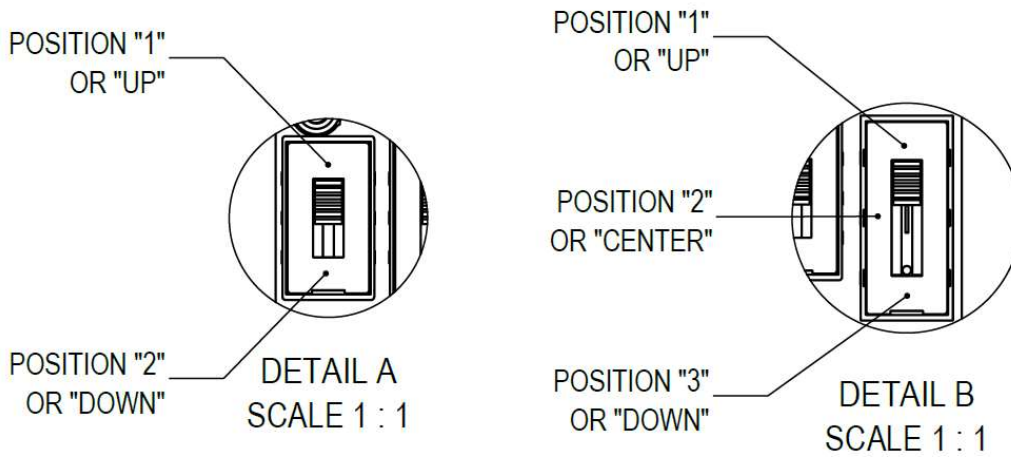


Figure 9 – Switch Position Details

Table 2 – Configuration Specification | With Bypass

Install Requirements	PS1*	PS2*	Module Config #	SW1	SW3	SW5	SW2	SW4	SW6
Bypass Both Activation & Service	NC	NC	1	1	1	1	1	1	1
	NC	NO	2	1	1	1	2	2	3
	NO	NO	3	2	2	3	2	2	3
	NO	NC	4	2	2	3	1	1	1
Bypass Activation, Force Service **	NC	NC	5	1	1	1	1	2	3
	NC	NO	6	1	1	1	2	1	1
	NO	NO	7	2	2	3	2	1	1
	NO	NC	8	2	2	3	1	2	3
Bypass Only Activation	NC	NC	9	1	1	1	1	2	2
	NC	NO	10	1	1	1	2	2	2
	NO	NO	11	2	2	3	2	2	2
	NO	NC	12	2	2	3	1	2	2
No Bypass	NC	NC	13	1	2	2	1	2	2
	NC	NO	14	1	2	2	2	2	2
	NO	NO	15	2	2	2	2	2	2
	NO	NC	16	2	2	2	1	2	2

* Pressure switch configured to either normally open (NO) or normally closed (NC). Reference Table 1 for pressure switch details.

** when in Bypass, service switch changes state

Table 3 – Configuration Specification | Standard

Install Requirements	PS1*	PS2*	Module Config #	SW1	SW3	SW5	SW2	SW4	SW6
No Bypass	NC	NC	1	1	2	2	1	2	2
	NC	NO	2	1	2	2	2	2	2
	NO	NO	3	2	2	2	2	2	2
	NO	NC	4	2	2	2	1	2	2

* Pressure switch configured to either normally open (NO) or normally closed (NC). Reference Table 1 for pressure switch details

3.3 Configuration Testing

A continuity test using the continuity test function on a multi-meter can be performed on the Dual Pressure Switch Module to verify the configuration is what is needed or to verify proper functionality of the pressure switches during servicing. **Table 4 & Table 5** below specifies the state of each pressure switch when the module is in either a pressurized or unpressurized state and when the bypass key switch is in the normal or bypass position for the module with the bypass functionality.

1. Note the configuration # the module has been set to
2. Set the key switch position to "Normal"
3. Connect the module to the detection circuit.
4. Connect the leads to the first pressure switch being tested to a multi-meter set to the continuity test function.
 - a. Reference **Table 6** in **Section 3.6** below for pinout details on the cable harness.
5. Verify the first pressure switch is in the correct state when normal and unpressurized.
6. Connect the multi-meter to the leads for the second pressure switch.
7. Verify the second pressure switch is in the correct state when normal and unpressurized.
8. Turn the key switch to the "Bypass" position.
9. Verify the second pressure switch is in the correct state for when bypassed and unpressurized.
10. Connect the multi-meter to the leads of the first pressure switch.
11. Verify the first pressure switch is in the correct state for when bypassed and unpressurized.
12. Pressurize the detection network.
13. Verify the first pressure switch is in the correct state for when bypassed and pressurized.
14. Connect the multi-meter to the leads for the second pressure switch.
15. Verify the second pressure switch is in the correct state for when bypassed and pressurized.
16. Turn the key switch to the "Normal" position.
17. Verify the second pressure switch is in the correct state for when normal and pressurized.
18. Connect the multi-meter to the leads of the first pressure switch.
19. Verify the first pressure switch is in the correct state for when normal and pressurized.

Table 4 – Testing Reference | With Bypass

Module Config #	Key Switch Position	PS1 (Unpressurized)	PS2 (Unpressurized)	PS1 (Pressurized)	PS2 (Pressurized)
1	Normal	Closed	Closed	Open	Open
	Bypass	Open	Open	Open	Open
2	Normal	Closed	Open	Open	Closed
	Bypass	Open	Closed	Open	Closed
3	Normal	Open	Open	Closed	Closed
	Bypass	Closed	Closed	Closed	Closed
4	Normal	Open	Closed	Closed	Open
	Bypass	Closed	Open	Closed	Open
5	Normal	Closed	Closed	Open	Open
	Bypass	Open	Closed	Open	Closed
6	Normal	Closed	Open	Open	Closed
	Bypass	Open	Open	Open	Open
7	Normal	Open	Open	Closed	Closed
	Bypass	Closed	Open	Closed	Open
8	Normal	Open	Closed	Closed	Open
	Bypass	Closed	Closed	Closed	Closed
9	Normal	Closed	Closed	Open	Open
	Bypass	Open	Closed	Open	Open
10	Normal	Closed	Open	Open	Closed
	Bypass	Open	Open	Open	Closed
11	Normal	Open	Open	Closed	Closed
	Bypass	Closed	Open	Closed	Closed
12	Normal	Open	Closed	Closed	Open
	Bypass	Closed	Closed	Closed	Open
13	Normal	Closed	Closed	Open	Open
	Bypass	Closed	Closed	Open	Open
14	Normal	Closed	Open	Open	Closed

	Bypass	Closed	Open	Open	Closed
15	Normal	Open	Open	Closed	Closed
	Bypass	Open	Open	Closed	Closed
16	Normal	Open	Closed	Closed	Open
	Bypass	Open	Closed	Closed	Open

Table 5 – Testing Reference | Standard

Module Config #	PS1 (Unpressurized)	PS2 (Unpressurized)	PS1 (Pressurized)	PS2 (Pressurized)
1	Closed	Closed	Open	Open
2	Closed	Open	Open	Closed
3	Open	Open	Closed	Closed
4	Open	Closed	Closed	Open

3.4 Closing the Module

3.4.1 With Bypass Switch

Reference **Figure 6** in **Section 3.1.1** above for part callouts

1. Place lid on top of the box
2. Partially screw cover screws (5) in place
3. Lube bonded washer (3)
4. Install bonded washer (3) over EOL (4) threads, seat to cover
5. Thread retaining nut (2) to hand tight then screw one more full turn with wrench
6. Tighten all four cover screws (5)
7. Install gauge (1)

3.4.2 Standard (without Bypass)

Reference **Figure 7** in **Section 3.1.2** above for part callouts.

1. Place lid on top of the box
2. Tighten all four cover screws (1)

3.5 Mounting the Module

The Dual Pressure Switch Module can be mounted in several different ways using the M4 SS threaded inserts located on the back of the box (see **Figure 10** below). The module can be mounted threading directly to the inserts, attaching flanges to allow for the use of self-tapping screws, or by attaching magnets to the box to secure the module in its mounting location. Tighten screws to hand tight to avoid stripping the threaded inserts away from the box. Thread locker should be used in higher vibration environments.

If mounted in a vertical orientation, remove the nameplate from the module and apply the supplied nameplate so that the content is readable.

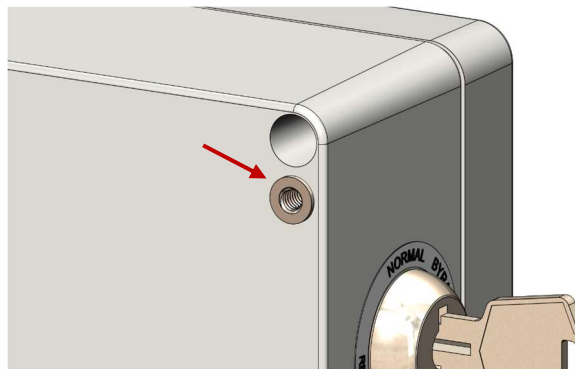


Figure 10 – Threaded Insert

CAUTION

Overtightening the screws threaded into the threaded inserts can result in stripping the threaded inserts away from the box.

The use of stainless-steel screws can result in seizing of screw in the threaded insert. Leading to overtightening.

3.5.1 Direct Mounting

Holes will need to be predrilled at the mounting location to allow for screws to be threaded in from behind. **Figure 10** below gives the hole location dimensions of the threaded inserts. **Appendix A** also contains a printable drill guide to aid in the mounting process. **Do not use stainless-steel screws.** Seizing of the screw inside the threaded insert can occur, resulting in overtightening, and the potential stripping of the threaded inserts away from the box

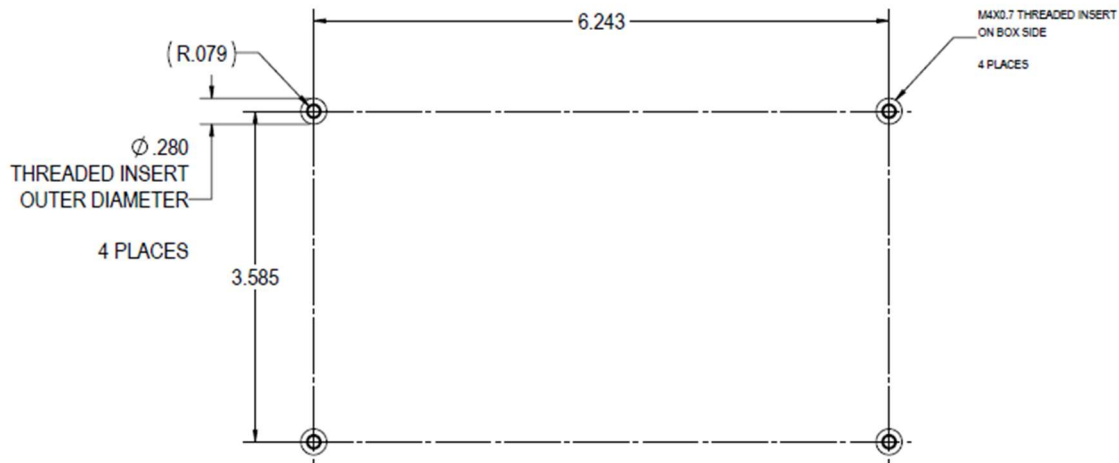


Figure 11 – Threaded Insert Dimensions

3.5.2 Flange Mounting Kit

Option to attach flanges to the box to allow for the use of self-tapping screws. The flanges are secured to the module using the supplied hardware. Adjust flange so that the lip is flush with the side of the box. **Figure 12** below highlights what is provided in the Flange Mounting Kit (P/N 111152). **Figure 13** below shows the flanges installed on the module.

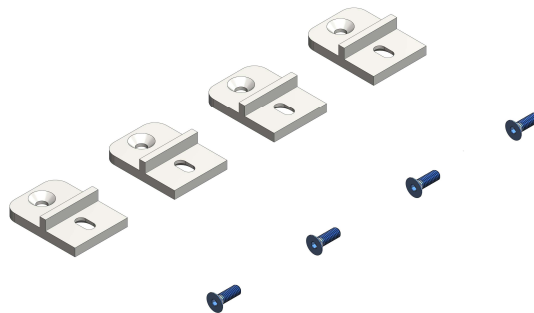


Figure 12 – Flange Mounting Kit



Figure 13 – Flanges Installed

3.5.3 Magnetic Mounting Kit

The magnets are secured to the module using the supplied hardware. Magnets are a non-destructive option for mounting the module in place. The non-permanent nature of this option allows for minor adjustments of the box during installation. **Figure 14** below highlights what is provided in the Magnetic Mounting Kit (P/N 111151). **Figure 15** below shows the magnets installed on the module.

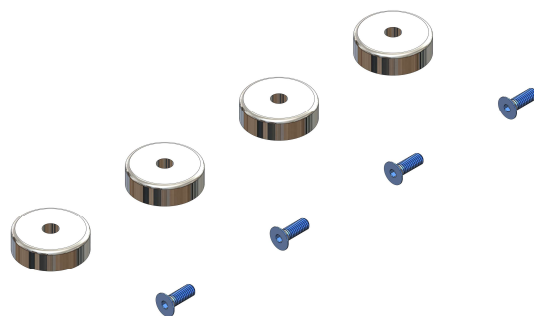


Figure 14 – Magnetic Mounting Kit

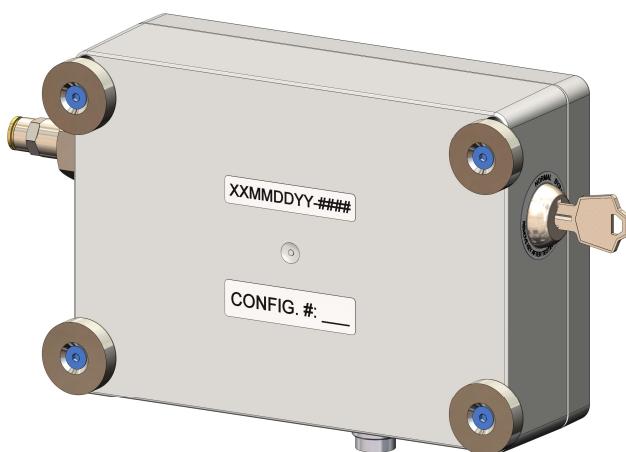


Figure 15 – Magnets Installed

3.6 Wiring the Module

The cable harness (P/N 203210) needs to be properly secured to the box when installed. Ensure the female connector on the harness is pushed all the way in before tightening the connector body to the male connector on the box. Tighten to finger tight. **Figure 17** below details the pin locations on the harness. **Table 6** indicates the relationship between each pin and wire and the pressure switch associated with them. Cable shielding can be utilized by connecting directly to the shielding in the cable, if needed.



CAUTION

Cross threading can occur on the harness connector if connection is forced

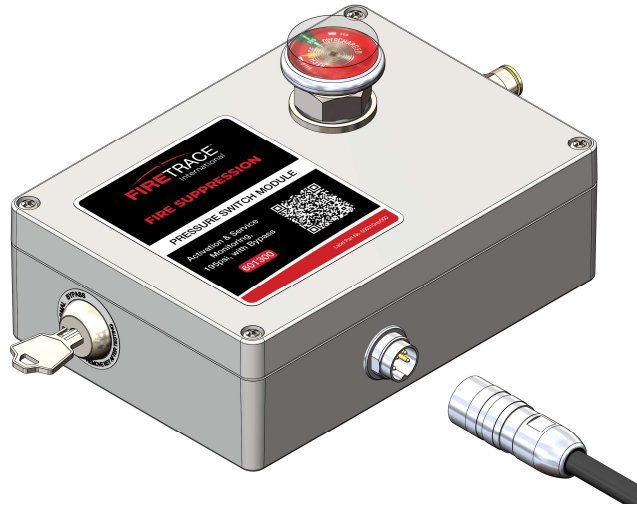


Figure 16 – Cable Harness Install | Exploded View

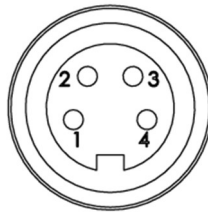


Figure 17 – Harness Pinout Diagram

Table 6 – Pinout Details

Pin	Wire Color	Pressure Switch
1	White	Supervisory / Activation (PS2)
2	Brown	Supervisory / Activation (PS2)
3	Green	Activation (PS1)
4	Yellow	Activation (PS1)
Shield	Green/Yellow	N/A

3.7 System Activation

1. Install the detection tubing throughout the enclosure. Ensure all necessary fittings and accessories are installed in accordance with the procedures specified in the DIOM of the Firetrace suppression unit being installed
2. With the unit ball valve in the closed position, thread the tube fitting into the ball valve attached to the top of the cylinder valve.
3. Install one end of the Firetrace detection tubing into the fitting.
4. Ensure the end of line adapter is installed at the opposite end of the detection tubing. Verify no accessories are installed in the end of line adapter.
 - a. If using the Dual Pressure Switch Module with the integrated end-of-line adapter, no end-of-line adapter needs to be installed as part of the detection network.
5. Attach the filling adapter into the end-of-line adapter.
6. Attach a regulated nitrogen supply onto the filling adapter.
7. Pressurize the detection tubing to the suppression unit's operating pressure.
8. Remove the nitrogen supply and filling adapter from the end-of-line adapter.
9. Thread the pressure gauge into the end of line adapter and verify that the tubing is pressurized to the correct pressure.
10. With the gauge still installed in the end-of-line adapter, test for leakage:

- a. Apply a soapy water solution to the cylinder valve connection, end of line adapter connection, and the pressure gauge connection.
 - b. Observe for bubble leaks.
 - c. After approximately 30 minutes, verify the pressure gauge reading. Any decrease in pressure is an indication of a leak.
 - d. If the system is determined to contain a leak, verify the installation procedures were properly followed for all fittings and accessories.
11. After confirming that there is no leakage within the detection tubing, SLOWLY rotate the ball valve lever counterclockwise, to the "ON" position.

4 SERVICE AND MAINTENANCE

4.1 General

A regular program of systematic maintenance must be established for continuous, proper operation of all Dual Pressure Switch Modules, and to avoid violating the warranty. A periodic maintenance schedule must be followed, and an inspection log maintained for ready reference. As a minimum, the log must record: (1) inspection interval, (2) inspection procedure performed, (3) maintenance performed, if any, as a result of inspection, and (4) name of inspector performing task. For any deficiencies that are found, appropriate corrective actions shall be taken immediately. Inspections should be taken on a weekly, monthly, semi-annual basis according to the connected Firetrace Suppression unit's manual.

1. Make a general visual inspection of the unit(s) for damaged or missing parts.
2. Ensure access to hazard areas and cylinders are unobstructed and that there are no obstructions to the operation of the equipment.
3. Inspect detection tubing in hazard area for abrasion, distortion, cuts, or dirt accumulation, and that there are no obstructions preventing tubing from sensing a fire should one occur.
4. The Pressure Gauge(s) are in the operable range.
5. Neither the Protected Equipment nor the Hazard has been replaced, modified, or relocated.
6. Ensure that the proper electrical connections are not damaged, missing, or modified.

4.2 Post Discharge, System Recharge, and Return to Service

An authorized Firetrace distributor must be consulted after a system has discharged. The units must be removed and recharged. To remove the connected Firetrace Suppression unit(s) please refer to that unit's manual to return to service.

5 APPENDIX A

Direct Mounting Hole Location Print Out

6

5

4

3

2

1

D

6.243

(R.079)

Ø .280

THREADED INSERT
OUTER DIAMETER

4 PLACES

M4X0.7 THREADED
INSERT ON BOX SIDE

4 PLACES

C

3.585

B

B

A

A

HOLE CUT-OUT GUIDE

1:1 SCALE

6

5

4

3

2

1