



12 Series Explosion-Proof, Pressure, Vacuum, and Differential Pressure Switches

DUAL SEAL
CERTIFIED



UNITED ELECTRIC
CONTROLS

Installation and Maintenance Instructions

Please read all instructional literature carefully and thoroughly before starting. Refer to the final page for the listing of Recommended Practices, Liabilities and Warranties.

GENERAL



MISUSE OF THIS PRODUCT MAY CAUSE EXPLOSION AND PERSONAL INJURY. THESE INSTRUCTIONS MUST BE THOROUGHLY READ AND UNDERSTOOD BEFORE PRODUCT IS INSTALLED.



THIS PRODUCT IS SUITABLE FOR USE IN CLASS I, DIVISIONS 1 & 2, GROUPS A, B, C AND D; CLASS II, DIVISIONS 1 & 2, GROUPS E, F AND G; CLASS III; OR NON-HAZARDOUS LOCATIONS ONLY. -50°C (-58°F) $\leq T_{\text{amb.}} \leq 80^{\circ}\text{C}$ (176°F), ENCLOSURE TYPE 4X.



THIS PRODUCT IS ATEX AND IECEx CERTIFIED FOR EQUIPMENT CATEGORY 2. SUITABLE FOR APPROPRIATE USE IN GAS ZONE 1 AND DUST ZONE 21 APPLICATIONS.

EN 60079-0:2012, EN 60079-1:2007, EN 60079-31:2009

IEC 60079-0:Ed.6, IEC 60079-1:Ed.6, IEC 60079-31:Ed.2

0539 DEMKO 08 ATEX 0717128x



IECEx UL 14.0072X



II 2 G Ex d IIC T6 Gb

Ex d IIC T6 Gb



II 2 D Ex tb IIIC T80°C Db

Ex tb IIIC T80°C Db

IP66

IP66

$-50^{\circ}\text{C} \leq T_{\text{amb.}} \leq +80^{\circ}\text{C}$

$-50^{\circ}\text{C} \leq T_{\text{amb.}} \leq +80^{\circ}\text{C}$

UE declarations and third-party issued Agency certifications are available for download at www.ueonline.com.



PRIOR TO INSTALLATION, CHECK THE WETTED PARTS MATERIAL FOR COMPATIBILITY TO THE PROCESS MEDIA.



THE DUAL SEAL DEVICE METHOD OF PRIMARY SEAL FAILURE ANNUNCIATION IS VISIBLE LEAKAGE FROM THE ENCLOSURE. DEPENDING UPON MEDIA SENSED, ADDITIONAL METHODS OF LEAK DETECTION MAY BE REQUIRED.



PROOF PRESSURE* LIMITS STATED WITHIN THE LITERATURE AND PRINTED ONTO THE PRODUCT HOUSING MUST NEVER BE EXCEEDED, EVEN BY SURGES IN THE SYSTEM. OCCASIONAL OPERATION OF THE PRODUCT UP TO PROOF PRESSURE IS ACCEPTABLE (E.G., START-UP, TESTING). CONTINUOUS OPERATION SHOULD NOT EXCEED THE DESIGNATED OVER RANGE PRESSURE** OR WORKING PRESSURE RANGE***.

*Proof Pressure - the maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage (e.g., start-up testing). The product may require set-point adjustment after reaching proof pressure.

**Over Range Pressure - the pressure value to which a pressure sensor may be continuously subjected without causing damage and while maintaining set point repeatability.

***Working Pressure Range - the pressure range within which two opposing sensors can be safely operated while maintaining set point repeatability.



THE EPOXY RESIN SHALL NOT BE SUBJECTED TO A TEMPERATURE GREATER THAN 125°C .



THIS PRODUCT DOES NOT HAVE ANY FIELD REPLACEABLE PARTS. ANY SUBSTITUTION OF COMPONENTS WILL INVALIDATE THIRD-PARTY ISSUED APPROVALS AND CERTIFICATIONS, AND MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 1 LOCATION.

The 12 Series switch utilizes a diaphragm or a piston sensor to detect a pressure change. The response, at a predetermined set point, actuates a SPDT or DPDT snap-acting switch, converting a pressure signal into an electrical signal. Control set point may be varied by turning the internal slotted adjustment screw according to procedures outlined in Part II-Adjustments.

Please refer to product bulletin for product specifications. Product bulletin may be found at www.ueonline.com.

Date code format on nameplate is "YYWW" for year and week.

Part I - Installation

Tools Needed

1-1/6" Open end wrench

MOUNTING



ALWAYS LOCATE THE PRODUCT WHERE SHOCK, VIBRATION AND AMBIENT TEMPERATURE FLUCTUATIONS ARE MINIMAL. DO NOT MOUNT IN AMBIENT TEMPERATURE AREAS EXCEEDING 176°F (80°C).



IF SEVERE PRESSURE SURGES ARE EXPECTED, CONSIDER THE USE OF A PRESSURE SNUBBER.



FOR PRESSURE MODELS, MOUNT USING PRESSURE CONNECTION: ALWAYS USE A WRENCH ON PRESSURE CONNECTION WRENCH FLAT. (SEE FIGURE 1)

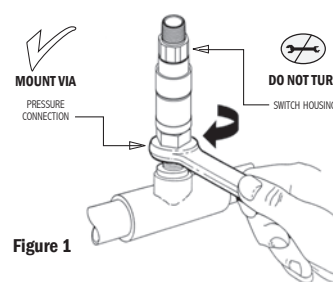


Figure 1

FOR DIFFERENTIAL PRESSURE MODELS, MOUNT AGAINST A RIGID SUPPORT USING THE MOUNTING BRACKET ATTACHED TO THE SENSOR ASSEMBLY. THEN CONNECT THE HIGH AND LOW PRESSURE CONNECTIONS (HIGH PRESSURE PORT IS ON THE LEFT, WHEN FACING THE UNIT).



FOR ASSEMBLIES WITH JUNCTION BOXES, IT IS RECOMMENDED THAT THE PRODUCT BE MOUNTED VERTICALLY WITH THE PRESSURE CONNECTION DOWN.



THE PRODUCT MAY BE MOUNTED IN ANY POSITION. HOWEVER, IF INSTALLATION LOCATION RESULTS IN FREQUENT EXPOSURE TO LIQUID IT IS RECOMMENDED THAT THE PRODUCT BE MOUNTED VERTICALLY WITH THE PRESSURE CONNECTION DOWN. IF PRODUCT IS TO BE SET AFTER MOUNTING, VERIFY THAT ADJUSTMENT OPENING IS ACCESSIBLE, "FRONT" MARKING ON NAMEPLATE MUST FACE THE OPERATOR.



NOTE: Due to product sensitivity on sensor Type W, it is recommended that these models be mounted vertically with pressure connection facing down. Other types of mounting may cause slight set-point shifts, which may require readjustment.

Panel Mounting via 1/2" NPTM or M20 Electrical Connection

When panel mounting, mount through 7/8" clearance hole in panel. Use 1/2" or M20 conduit nut to secure in place. Always support the product by holding a wrench on the hex.

TO ATTACH CONDUIT CONNECTION, HOLD ELECTRICAL CONNECTION STEADY WITH WRENCH ON HEX, THEN THREAD ON CONDUIT.



Surface Mounting Bracket Kit (P/N 62169-13) (see Fig. 6)

Open the adjustment cover and orient the unit so that adjustment opening will be accessible when the switch is mounted. Close the adjustment cover ensuring that the bracket does not interfere with the cover as this serves as the Dual Seal device method of primary seal failure annunciation and venting. Failure to install the unit correctly with the mounting bracket may result in improper venting of the adjustment cover.

WIRING

DISCONNECT ALL SUPPLY CIRCUITS BEFORE WIRING PRODUCT. WIRE IN ACCORDANCE WITH LOCAL AND NATIONAL ELECTRICAL CODES. THE WIRES SHOULD BE PROTECTED AGAINST MECHANICAL DAMAGE BY USE OF A CONDUIT OR OTHER SUITABLE MEANS.



ELECTRICAL RATINGS STATED IN THE LITERATURE AND PRINTED ONTO THE PRODUCT HOUSING MUST NOT BE EXCEEDED. OVERLOAD ON A SWITCH CAN CAUSE FAILURE ON THE FIRST CYCLE.



DIN CONNECTOR (OPTION M515, FIGURE 4) IS NOT APPROVED FOR CLASS I, DIV. 1 HAZARDOUS LOCATIONS/FLAMEPROOF ATMOSPHERES.



FOR ATEX INSTALLATION, AN EXTERNAL GROUNDING SCREW (OPTION M460) IS REQUIRED FOR NON-METALLIC CONDUIT SYSTEMS. (SEE FIGURE 2)



FOR ATEX INSTALLATION IN HAZARDOUS LOCATIONS, THE WIRING TO THE PRESSURE SWITCH MUST ONLY BE CONNECTED IN THE SAFE AREA OR BY AN APPROVED TERMINAL BOX CERTIFIED TO EN STANDARDS 60079-0:2012, 60079-1:2007, 60079-31:2009, 60079-7:2007, IEC 60079-0:ED.6, IEC 60079-1:ED.6, IEC 60079-31:ED.1, IEC 60079-7:ED.4



1/2" NPT (male) or M20 (male) conduit connection is provided on top of the prod-

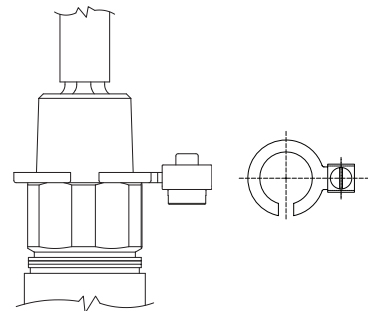
uct with 72" long, 18 AWG leadwires. The product is available with SPDT or DPDT operation. External grounding screw and clamp is provided with option M460 for ATEX installation with non-metallic conduit systems (See Figure 2).

Factory Sealed Leadwires are color coded:

TERMINALS	SPDT	DPDT	
		Circuit 1	Circuit 2
Common	Brown	Brown	Yellow
Normally Closed	Red	Red	Black
Normally Open	Blue	Blue	Violet
Ground	Green	Green	

Option M460 External Grounding Screw

Figure 2



DIN Connector with 4 Male Terminals (see Figure 4)

Connector conforms to DIN 43650. Use a female mating DIN connector (not UE supplied).

Coding: TERMINALS

Terminal #1	Common
Terminal #2	Normally Closed
Terminal #3	Normally Open
	Ground

Part II - Adjustments

Tools Needed

Flathead screwdriver with 3/16" or 1/4" wide blade

1. Connect control to pressure source.
2. With power disconnected, slide cover toward electrical terminations while twisting it to overcome friction.
3. Connect power to terminals or leads.
4. Insert screwdriver into adjustment slot and turn clockwise to **increase** setting or counter clockwise to **decrease** setting. (See Figure 3)

For setting on RISE, apply desired pressure and turn adjustment clockwise until switch actuates (circuit across N.O. and COM terminals closes).

For setting on FALL, apply pressure equal to normal system operating pressure. Reduce source pressure to setpoint value. Turn adjustment counter clockwise until switch actuates (circuit across N.C. and COM terminals closes).

Zone Hazardous Locations Flameproof Gap and Joint Details

Electrical conduit fitting threaded connection: M20 x 1.5, 7 threads minimum engagement

Dimensions

Dimensional drawings for all models may be found at www.ueonline.com

Standard Configuration

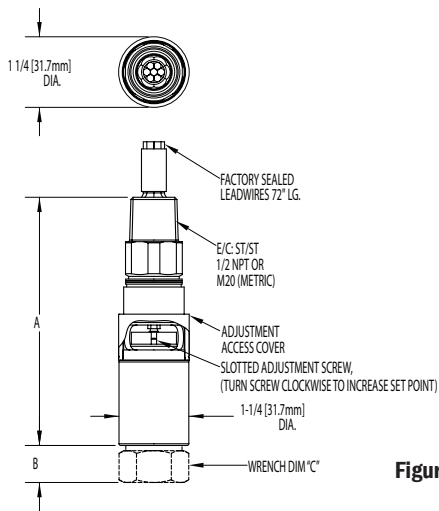
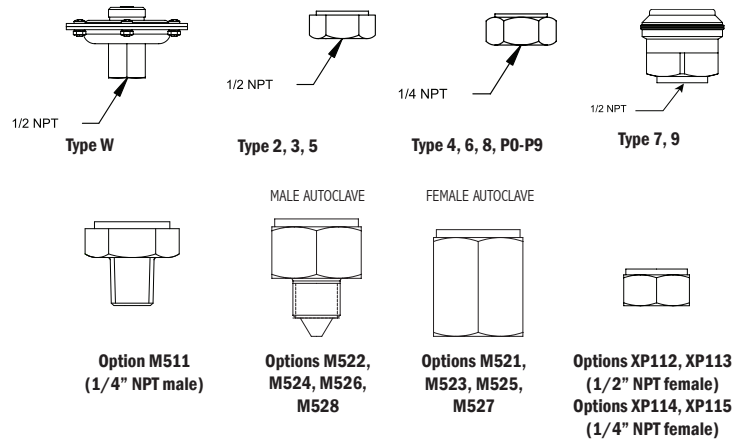


Figure 3

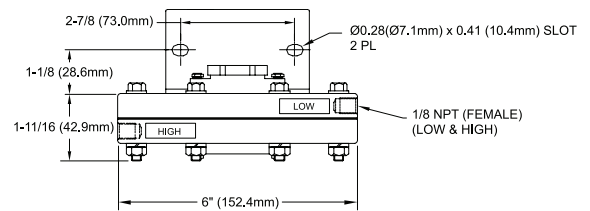
PRESSURE SWITCH / CONNECTION CHART

Type	Description	Dimension "A"		Dimension "B"		Dimension "C"	
		Inches	mm	Inches	mm	Inches	mm
2	1/2" NPT (female)	4.4	111.1	0.7	16.5	1-1/16	27.0
3, 5	1/2" NPT (female)	4.4	111.1	0.6	15.2	1-1/16	27.0
4, 6, 8	1/4" NPT (female)	4.4	111.1	0.6	15.2	1-1/16	27.0
7, 9	1/2" NPT (female)	4.0	100.3	1.6	40.6	1-1/8	28.6
P0-P9	1/4"NPT (female)	4.4	111.1	1.0	25.4	1-1/16	27.0
W1-W2	1/2"NPT (female)	4.0	100.3	2.2	55.9	1-1/16	27.0
W3-W4	1/2"NPT (female)	4.0	100.3	1.7	42.9	1-1/16	27.0
K1-K3	1/8"NPT (female)	4.4	111.1	1.7	42.9	N/A	N/A
K4-K6	1/8"NPT (female)	4.4	111.1	1.8	44.5	N/A	N/A
Option							
M511	1/4" NPT (male)			1.1	27.9	1-1/16	27.0
M521	LF4 Autoclave 1/4" (female)			1.2	29.7	1-1/16	27.0
M522	LM4 Autoclave 1/4" (male)			1.4	34.8	1-1/16	27.0
M523	LF6 Autoclave 3/8" (female)			1.4	36.1	1-1/16	27.0
M524	LM6 Autoclave 3/8" (male)			1.5	38.4	1-1/16	27.0
M525	HF4 Autoclave 1/4" (female)			1.2	29.7	1-1/16	27.0
M526	HM4 autoclave 1/4" (male)			1.3	32.8	1-1/16	27.0
M527	HF6 Autoclave 3/8" (female)			1.4	36.1	1-1/16	27.0
M528	HM6 Autoclave 3/8" (male)			1.5	37.6	1-1/16	27.0
XP112	1/2" NPT (female)			0.6	15.2	1-1/16	27.0
XP113	1/2" NPT (female)			0.6	15.2	1-1/16	27.0
XP114	1/4" NPT (female)			0.6	15.2	1-1/16	27.0
XP115	1/4" NPT (female)			0.6	15.2	1-1/16	27.0

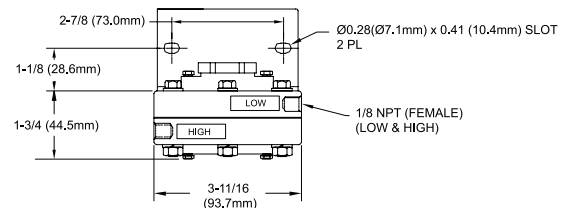
Pressure Connections



Differential Pressure Connections



Type K1-K3



Type K4-K6

Types K1-K3 and K4-K6 shown with mounting bracket attached

Option M515 DIN Connection

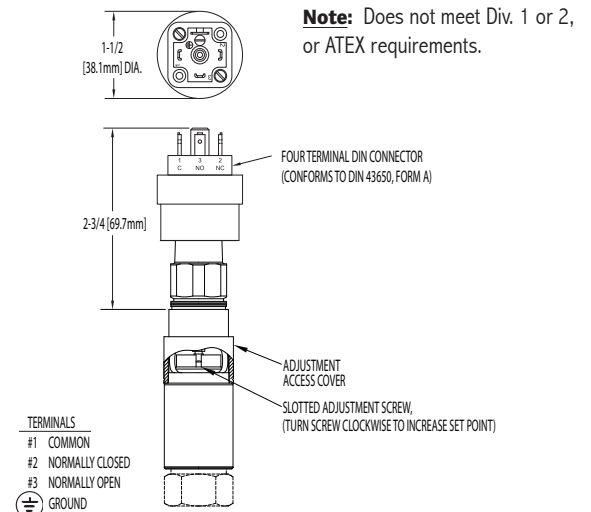
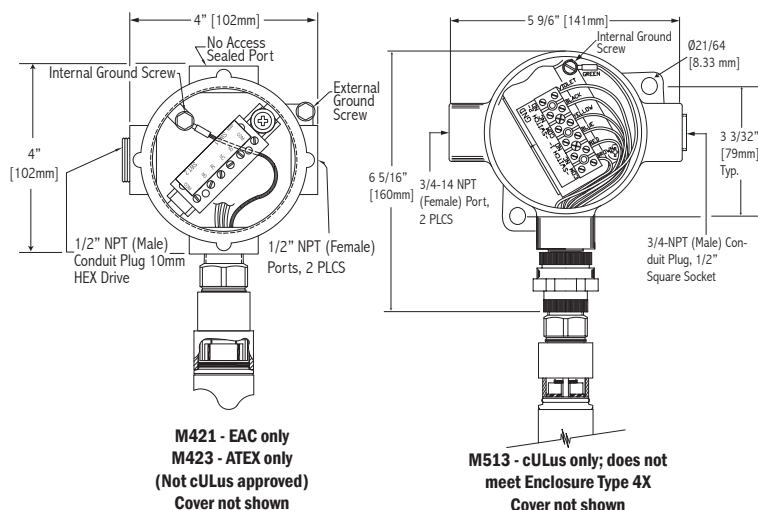


Figure 4

Option M421, M423 & M513 Junction Boxes



Option M430 Adjustment Cover Lock

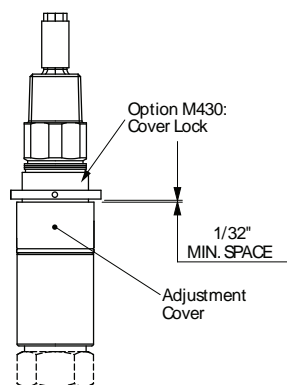


Figure 5

Note: A 1/32" min. space must be maintained between the bottom of the cover lock and the top of the adjustment cover to ensure proper dual seal annunciation and venting.

Surface Mounting Bracket (Kit P/N 62169-13)

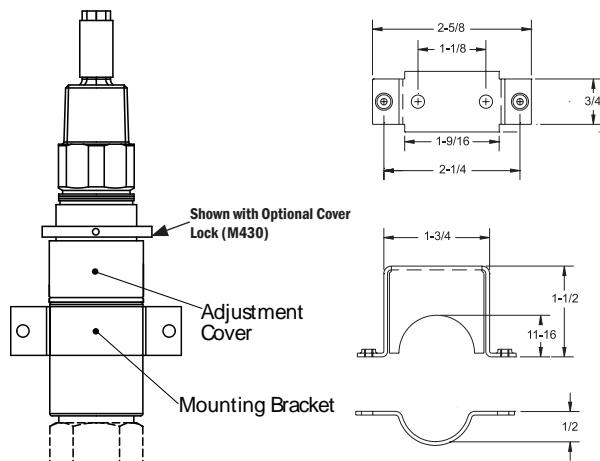


Figure 6

RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum temperature is acceptable on a limited basis (i.e., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. Orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or a faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- For all applications, a factory set unit should be tested before use.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts, INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 36 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF SELLER'S LIABILITY

Seller's liability to Buyer for any loss or claim, including liability incurred in connection with (i) breach of any warranty whatsoever, expressed or implied, (ii) a breach of contract, (iii) a negligent act or acts (or negligent failure to act) committed by Seller, or (iv) an act for which strict liability will be inputted to seller, is limited to the "limited warranty" of repair and/or replacement as so stated in our warranty of product. In no event shall the Seller be liable for any special, indirect, consequential or other damages of a like general nature, including, without limitation, loss of profits or production, or loss or expenses of any nature incurred by the buyer or any third party.

UE specifications subject to change without notice.



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