

ASHCROFT®
E2X EXPLOSION PROOF
PRESSURE TRANSDUCER
INSTALLATION MANUAL



A failure resulting in injury or damage may be caused by excessive overpressure, excessive vibration or pressure pulsation, excessive instrument temperature, corrosion of the pressure containing parts, or other misuse. Consult Ashcroft Inc., Stratford, Connecticut, USA before installing if there are any questions or concerns.

OVERPRESSURE:

Pressure spikes in excess of the rated over-pressure capability of the transducer may cause irreversible electrical and/or mechanical damage to the pressure measuring and containing elements.

Fluid hammer and surges can destroy any pressure transducer and must always be avoided. A pressure snubber should be installed to eliminate the damaging hammer effects. Fluid hammer occurs when a liquid flow is suddenly stopped, as with quick closing solenoid valves. Surges occur when flow is suddenly begun, as when a pump is turned on at full power or a valve is quickly opened.

Liquid surges are particularly damaging to pressure transducers if the pipe is originally empty. To avoid damaging surges, fluid lines should remain full (if possible), pumps should be brought up to power slowly, and valves opened slowly. To avoid damage from both fluid hammer and surges, a surge chamber should be installed.

Symptoms of fluid hammer and surge's damaging effects:

- Pressure transducer exhibits an output at zero pressure (large zero offset).
- Pressure transducer output remains constant regardless of pressure
- In severe cases, there will be no output.

©2021 Ashcroft Inc., 250 East Main Street, Stratford, CT 06614-5145, USA, Tel: 203-378-8281, Fax: 203-385-0499, www.ashcroft.com. All sales subject to standard terms and conditions of sale. e2x_transducer_i&m_011-10267_RevA_04-23-21

FREEZING

Prohibit freezing of media in pressure port. Unit should be drained (mount in vertical position with electrical termination upward) to prevent possible over- pressure damage from frozen media.

STATIC ELECTRICAL CHARGES:

Any electrical device may be susceptible to damage when exposed to static electrical charges. To avoid damage to the transducer, observe the following:

- Operator/installer should follow the proper ESD (electrostatic discharge) protection procedures before handling the pressure transducer.
- Ground the body of the transducer BEFORE making any electrical connections

- When disconnecting, remove the ground LAST! Note: The shield and drain wire in the cable (if supplied) is not connected to the transducer body, and is not a suitable ground.

VENT

All units with a pressure range less than 500 psi include a small Porex filter in the unit. This is necessary to equalize the internal pressure of the unit with the atmospheric pressure. While the Porex filter is hydrophobic, if it not properly protected it may be a source of water ingress.

WARNING
ASHCROFT® E2X PRESSURE TRANSMITTER,
TYPICAL DIMENSIONS AND CONSTRUCTION

GROUNDING

Installer must connect the device to appropriate earthing connection. This can be done via metallic plumbing, use of metallic conduit/ junction box, and/or earthing clamp/strap.

DESCRIPTION

The Ashcroft® Model E2X is ideal for a broad range of pressure sensing requirements found in general and heavy industrial applications as well as applications in test and measurement. The E2X offers a wide variety of material, process and electrical connections to meet your application requirements. It is designed for use with both liquids and gases it provides an accurate, reliable and highly repeatable output. This is accomplished through the use of an onboard microprocessor that is programmed during a unique digital compensation process to provide an extremely linear performance over the entire specified pressure and temperature range.

SPECIFICATIONS

Reference condition: 70°F (21°C)

Accuracy: ±0.25%, ±0.50% or ±1.00% of Span Terminal Point (* includes linearity, hysteresis, repeatability zero offset and span)

Repeatability: ≤ ±0.1 % of Span

Stability: ±0.25% of Span / Year

Zero / Span Adjustment: ±5% of Span

Standard Ranges: VAC to 20,000 psi

ENVIRONMENTAL SPECIFICATIONS

Enclosure Rating:

IP67 Standard (FM Certified)

IP66 & NEMA 4X (Self-Certified by Ashcroft Inc.)

Temperature Limits:

Storage Temp: -50 to 125°C

Operating Ambient Temp: See drawing 825A030 Rev. B for ambient temperature limits.

Media Temp: See drawing 825A030 Rev. B for media temperature limits.
* (0-100% R.H. non-condensing)

Temperature Coefficients: Zero & Span ±0.009%/°C within -40 to 80°C

Vibration: Random: 10g RMS 20-2000 Hz

Shock: 80g Peak, 6 msec, 3 axes, haversine

Proof pressure: 1.2X -2X the range

Burst pressure: 3X-8X the range minimum



ELECTRICAL SPECIFICATIONS

Supply Voltage:

Explosion Proof Installations	
Supply Voltage	Output
9-36Vdc	4-20mA, 20-4mA (2-wire), 0-5Vdc, 1-5Vdc, 1-6Vdc, 0.1-5Vdc, 0.5-4.5Vdc
14-36Vdc	0-10Vdc, 1-11Vdc, 0.1-10Vdc

For Intrinsically Safe and Non-Incendive Installations refer to Entity Parameters on Ashcroft drawing 825A030 (wiring and installation).

Supply Current: <8 mA (Vout)

Response Time (Output): 4msec

Power-Up Response Time: 100msec

Current Source/Sink for Voltage Output:

1mA (Source) / 0.1mA (Sink) maximum

Withstand/Breakdown: 100 Vdc / 100 Vac.

Optional 500Vdc / 500Vac

Insulation Resistance: >100M @ 30V

RoHS2: Yes

MECHANICAL SPECIFICATIONS

Process Connections: Male NPT (1/8, 1/4 and 1/2), Female NPT (1/8, 1/4 and 1/2), 1/16-20 UNF

SAE (Male and Female), MIL 33656 (UNJF 1/16-20 w/ 37° Cone), G1/4" B EN837-1, G1/2" B EN837-1, G1/4" A DIN3852-E, Autoclave HP 1/16" (AMINCO), 1/8" BSP Tapered Thread, 1/4" BSP Tapered Thread, 1/2" BSP Tapered Thread, 1/4" Male VCR, 1/4" Female VCR, R1/8 ISO 7/1, 1.5" Tri-Clamp, 2.0" Tri-Clamp

Electrical Connections: 1/2" Conduit with Flying Leads: 18AWG 3 conductor, non-vented, M20 Conduit with Cable/Flying Leads.

Diaphragm Materials: 17-4PH SS, 316SS or A286

Electrical connection: See drawing 825A030 Rev. B for installation requirements.

INSTALLATION AND ASSEMBLY

All supply lines should be arranged so that

there are no mechanical forces acting on the device.

For units with NPT type pressure fittings apply Teflon® tape or an equivalent sealant to the threads before installing. When tightening, apply a wrench to the hex wrench flats located just above the pressure fitting. DO NOT tighten by using a pipe wrench on the housing.

Process connection:

- By authorized and qualified personnel only.
- All lines need to be depressurized when the instrument is being connected.

- Appropriate steps must be taken to protect the device from pressure surges.

- Check the suitability of the device for the media to be measured.

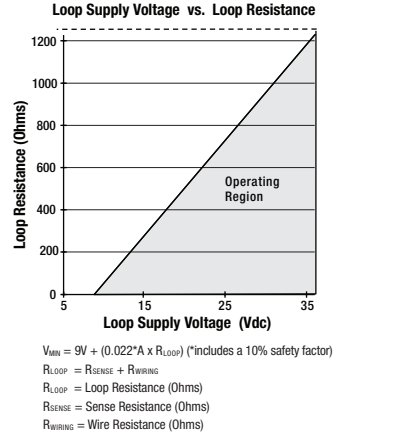
- Maximum pressures shall be observed.

- Check that all connections are tight before use.

If during installation the pressure measuring lines are already under pressure, the zero point cannot be checked and nosettings can be adjusted. In these cases, the device should only be connected electrically first.

Electrical connection: See drawing 825A030 Rev. B for installation requirements.

FOR TRANSMITTERS WITH 4-20mA OUTPUT
SIGNAL, THE MINIMUM VOLTAGE AT THE
TERMINAL IS 9VDC



NOTE: See power supply requirement chart for maximum supply voltage limits

Noise

For minimum noise susceptibility, avoid running the transducers cable in a conduit that contains high current AC power cables. Where possible avoid running the cable near inductive equipment.

Shielded Cable

Units with shielded cable electrical termination, connect the drain wire to the guard terminal on the read out device or measuring instrument, if available. In all other cases connect to the ground or to the power supply negative terminal.

Range Type	Offset Value	Span Value
0 to Positive Pressure Range	0	Full Range
0 to Vacuum	Vacuum	0
Compound (Vac to pressure range)	Vacuum	Full Range
Absolute	Absolute Zero	Full Range Absolute

Offset and Span adjustments

1. **WARNING!** Disconnect the E2X transducer from the control system prior to performing offset and span adjustments.
2. Activate calibration mode by first cycling power off and on, and then within 30 seconds tap the Ashcroft calibration magnet near the specified area on the E2X label. The initial code to enter the calibration mode is 1-3-1 (Tap the unit for one second, release. Tap unit for three seconds, release, tap unit for one second, release).

1. When the calibration mode has been activated the output signal on the transducer will drive from over range to under range.
2. At the offset pressure record output offset to be used in the span adjustment in step 4. Increase pressure to 100% of span, this will allow you to adjust the span of the unit. The span is adjustable to +/- 5% of full scale.
3. Tap the magnet near specified area on the E2X label. Adjust span to desired span value plus the offset value recorded in step 3. (The span will increase from its current value up to +5% of scale. Once the output has reached the max value, the span will jump to -5% and continue to increase. (Note - holding the magnet in position while adjusting the span will increase the speed at which the span increases or decreases. Once you get close to your desired setting you should tap the magnet against the unit for finer adjustment. If you scroll past your desired value, repeat step three until you have reached your desired span value.
4. Decrease the pressure to 0% of span, this will allow you to adjust the zero of the unit. The offset is adjustable to +/- 5% of full scale.

NOTE: Checkboxes provided on the label must be marked during installation. Installer - be sure to check each box as appropriate to indicate the protection methods used on a particular installation.

ASHCROFT® INDUSTRIAL CONTROL EQUIPMENT FOR HAZARDOUS LOCATIONS		Ashcroft Inc. 250 East Main Street, Stratford, CT 06614 www.ashcroft.com	
RANGE: 0 / 150 PSIG ACCURACY: ± 0.25 % of SPAN PROOF: 290 PSIG OUTPUT: 4 - 20 mA WETTED MAT'L: 17-4PH, 316L SS		RED: V+ BLACK: V- WHITE: N/C GREEN: CASE GND BARE: DRAIN	
FM APPROVED FM18US0309X CL I DIV1 GRP ABCD T4 CL II DIV1 GRP EFG T4 CL III T4 CL I DIV2 GRP ABCD T4 CL II DIV2 GRP EFG T4 CL III T4		IECEx FM18ATEX0080X EU Type FMG 20.0016X CL I Zone 0 AEx ia IIC T4 Ga CL I Zone 2 AEx ic IIC T4 Gc Zone 22 AEx ic IIIC T135°C Dc -40°C<Tamb<80°C CL I Zone 1 AEx db IIC T4 Gb CL I Zone 21 AEx tb IIIC T135°C Db -40°C<Tamb<80°C CL II 1 D Ex ia IIIC T135°C Da CL II 2 G Ex db IIC T4 Gb CL II 2 D Ex tb IIIC T135°C Db	
FACTORY SEALED REFER TO INSTALLATION MANUAL FOR SPECIFIC CONDITIONS OF USE		SUPPLY: 9-30 VDC	
ZERO-SPAN ADJUST			
DO NOT USE FOR OXYGEN SERVICE			
WARNING: A failure resulting in injury or damage may be caused by pressure beyond full scale, excessive vibration or pressure pulsation, excessive instrument temperature, corrosion of the pressure containing parts or other misuse.			

MAINTENANCE

The device does not require maintenance. In order to ensure reliable operation and a long service life of the device we recommend regular checking of the device as follows:

- Check the function in connection with system components.
- Check the tightness of the pressure connection lines.
- Check the electrical connections.

The exact test cycles have to be adapted to the operating and environmental conditions. The operating manuals of all other devices are also to be observed if there is an interaction of different device components.

TRANSPORT

The product must be protected against severe impacts therefore transport is to be effected only in the packaging intended for transport.

SERVICE

The E2X is not for repair. All defective or faulty devices are to be sent directly to Ashcroft Inc. We would ask you to coordinate all device returns with our inside sales department. Our inside sales department will issue an RMA number and give instructions on how to ship the return.

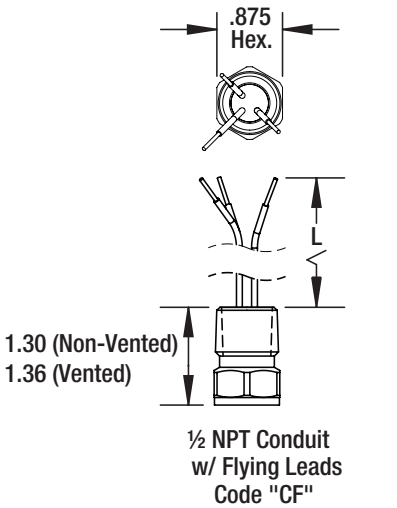
WARNING

Remaining process media in and on dismantled measuring instruments may cause danger to persons, environment and equipment. Take reasonable precautions! Clean the instrument thoroughly if necessary. To return the unit please choose the original packaging or a packaging intended for transport.

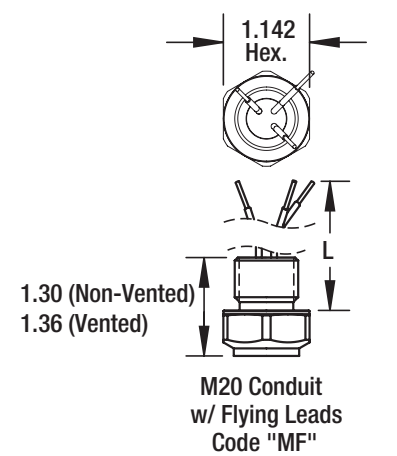
DISPOSAL

Incorrect disposal can put the environment at risk. Kindly help us protecting the environment and dispose of or recycle the used products in accordance with the relevant regulations.

CF	1/2 NPT Conduit With Flying Leads		
Pin	Voltage Output	4-20mA Output	Wire Color
-	V+	V+	Red
-	Common (V-)	V-	Black
-	Output	N/C	White
-	Case GND	Case GND	Green



MF	M20 X 1.5 Conduit Flying Leads		
Pin	Voltage Output	4-20mA Output	Wire Color
-	V+	V+	Red
-	Common (V-)	V-	Black
-	Output	N/C	White
-	Case GND	Case GND	Green



E2X PRESSURE TRANSDUCER

Ashcroft Drawing 825A030 Rev B

General Notes

- Control equipment connected to Associated Apparatus must not use or generate more than 250 Vrms or Vdc.
- Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.

- Run shielded interconnection cable with shield connected to FM approved associated apparatus ground.

Warnings

- Do not disconnect equipment unless area is known to be non-hazardous.
- Substitution of components may impair suitability for hazardous (classified) locations.
- No revision to drawing without prior approval from FM

Special Conditions of Use

- The pressure transducer does not withstand a 500Vrms dielectric strength test between the circuit and the earth ground. This must be taken into account during installation.
- Flamepaths are not for repair.
- The equipment has flying lead conductors that exit the enclosure. A suitably certified Ex d or Ex e terminal box is required to be connected to equipment enclosure for completing to external supply circuit.
- Installer must connect the device to appropriate earthing connection. This can be done via metallic plumbing, use of metallic conduit/junction box, and/or earthing clamp/strap

E2X INTRINSICALLY SAFE INSTALLATION

Class I, Division 1, Group A, B, C, D T4 -40°C < Ta < 80°C
Class II, Division 1, Group E, F, G T4 -40°C < Ta < 80°C
Class III, T4 -40°C < Ta < 80°C

Class I, Zone 0, AEx ia IIC T4 Ga -40°C < Ta < 80°C
Zone 20, AEx ia IIIC T135°C Da -40°C < Ta < 40°C
Class I, Zone 2, AEx ic IIC T4 Gc -40°C < Ta < 80°C
Zone 22 AEx ic IIIC T135°C Dc -40°C < Ta < 80°C

II 1 G Ex ia IIC T4 Ga -40°C < Ta < 80°C
II 1 D Ex ia IIIC T135°C Da -40°C < Ta < 40°C
II 3 G Ex ic IIC T4 Gc -40°C < Ta < 80°C
II 3 D Ex ic IIIC T135°C Dc -40°C < Ta < 80°C

Entity Parameters:

Ui < 30Vdc, Ii < 100mA, Pi < 0.7W, Li = Li = 32.8µH, Ci = 36.2nF [if e= 24, 42, Cx for 2-wire Current Output]
Ui < 28Vdc, Ii < 85mA, Pi < 0.7W, Li = 36µH, Ci= 72.9nF [if e= 05, 10, 11, 12, 13, 15, 16, 45, Vx for 3-wire Voltage Output]

- The Intrinsic Safety Entity concept allows the interconnection of two intrinsically safe devices with entity parameters not specifically examined in combination as a system when: Uo or Voc ≤ Vmax, Io or Isc ≤ Imax, Ca or Co ≥ Ci + Ccable, La or Lo ≥ Li + Lcable, Po ≤ Pi.
- The Associated Apparatus must be FM Approved under Intrinsic Safety Entity concept.
- Dust-tight conduit seal must be used when installed in Class II and Class III environments.
- Installation should be in accordance with ANSI/ISA RP12.6 "Installation of Intrinsically Safe systems for Hazardous (Classified) locations" and the National Electrical Code (ANSI/NFPA80) Section 504 and 505 or in accordance with European Standard EN60079-14 and applicable National regulations.

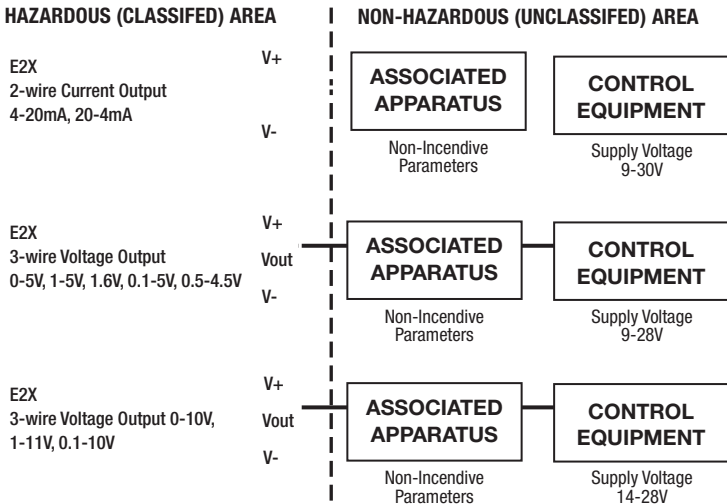
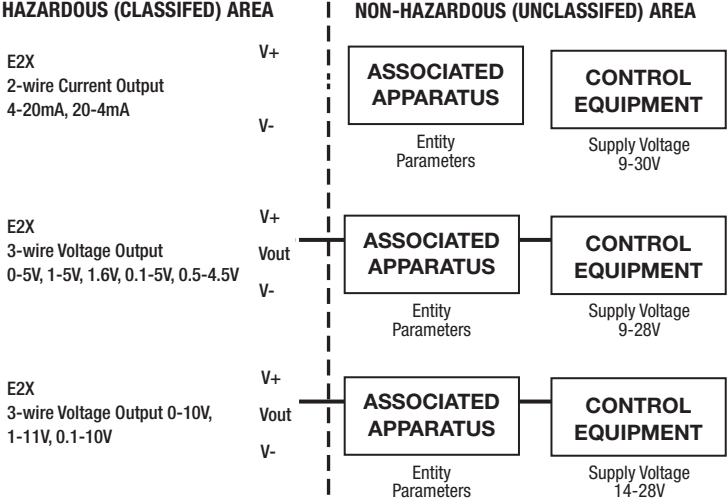
E2X NON-INCENDIVE INSTALLATION

Class I, Division 2, Group A, B, C, D T4 -40°C < Ta < 80°C
Class II, Division 2, Group E, F, G T4 -40°C < Ta < 80°C
Class III, -40°C < Ta < 80°C

Non-Incendive Parameters:

Ui < 30Vdc, Ii < 100mA, Pi < 0.7W, Li = Li = 32.8µH, Ci = 36.2nF [if e= 24, 42, Cx for 2-wire Current Output]
Ui < 28Vdc, Ii < 85mA, Pi < 0.7W, Li = 36µH, Ci= 72.9nF [if e= 05, 10, 11, 12, 13, 15, 16, 45, Vx for 3-wire Voltage Output]

- The Non-Incendive Field Wiring concept allows the interconnection of two devices with nonincendive parameters not specifically examined in combination as a system when: Uo or Voc/Vmax, Io or Isc Imax, Ca or Co ≥ Ci + Ccable, La or Lo ≥ Li + Lcable, Po ≤ Pi.
- The Associated Apparatus must be FM Approved under Intrinsic Safety Entity or Non-Incendive Field Wiring concept
- Dust-tight conduit seal must be used when installed in Class II and Class III environments.
- Installation should be in accordance with the National Electrical Code (ANSI/NFPA80) Section 504 and 505 or in accordance with European Standard EN60079 14 and applicable National regulations.



HAZARDOUS AREA CERTIFICATIONS



FM18US0309X

CL I DIV 1 A,B,C,D T4
CL II DIV 1 E,F,G T4
CL III T4

CL I DIV 2 A,B,C,D T4
CL II DIV 2 E,F,G T4
CL III T4



CL I Zone 0 AEx ia IIC T4 Ga -40°C < Ta < 80°C
Zone 20, AEx ia IIIC T135°C Da -40°C < Ta < 40°C

CL 1 Zone 2 AEx ia IIC T4 Gc -40°C < Ta < 80°C
Zone 22 AEx ic IIIC T135°C Dc -40°C < Ta < 80°C

II 1 G Ex ia IIC T4 Ga -40°C < Ta < 80°C
II 1 D Ex ia IIIC T135°C Da -40°C < Ta < 40°C
II 3 G Ex ic IIC T4 Gc -40°C < Ta < 80°C
II 3 D Ex ic IIIC T135°C Dc -40°C < Ta < 80°C

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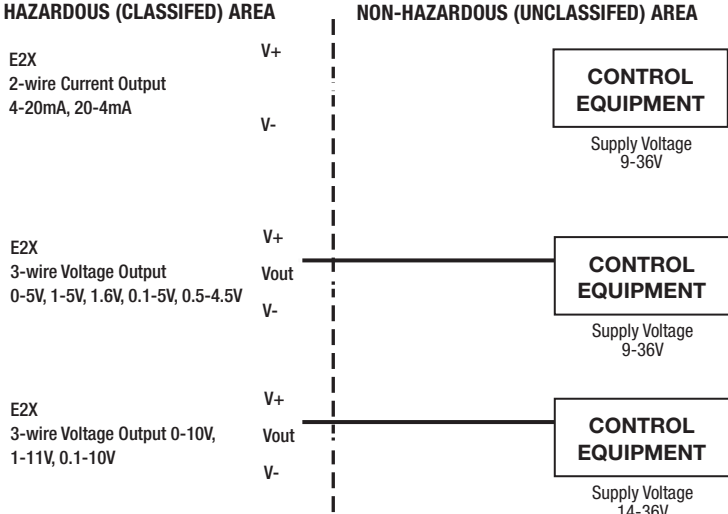
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- The equipment has flying lead conductors that exit the enclosure. A suitably certified Ex d or Ex e terminal box is required to be connected to equipment enclosure for completing to external supply circuit.
- Installer must connect the device to appropriate earthing connection. This can be done via metallic plumbing, use of metallic conduit/junction box, and/or earthing clamp/strap

E2X EXPLOSION/FLAME/DUST IGNITION PROOF INSTALLATION

Class I, Division 1, Group A, B, C, D T4 -40°C < Ta < 80°C
Class II, Division 1, Group E, F, G T4 -40°C < Ta < 80°C
Class III T4 -40°C < Ta < 80°C

Class I, Zone 1, AEx db IIC T4 Gb -40°C < Ta < 80°C
Zone 21, AEx tb IIIC T135°C Db -40°C < Ta < 80°C
II 2 G Ex db IIC T4 Gb -40°C < Ta < 80°C
II 2 D Ex tb IIIC T135°C Db -40°C < Ta < 80°C

- Installation should be in accordance with the National Code (ANSI / NFPA 70)
- Dust-tight conduit seal must be used when installed in lass II and Class III environments
- Use conduit and connectors suitable for the application. Seal all conduit using approved NEC procedures and local codes.



HAZARDOUS AREA CERTIFICATIONS



FM18US0309X

CL I Div 1 A,B,C,D T4
CL II Div 1 E,F,G T4
CL III T4



CL I, Zone 1 AEx db IIC T4 -40°C < Ta < 80°C
Zone 21, AEx tb IIIC T135°C Db -40°C < Ta < 80°C
II 2 G Ex db IIC T4 Gb -40°C < Ta < 80°C
II 2 D Ex tb IIIC T135°C Db -40°C < Ta < 80°C

Factory Sealed M20X1.5 THD or ½ Male NPT IP67