

A2X EXPLOSION/FLAME PROOF PRESSURE TRANSDUCER INSTRUCTION SHEET



⚠ WARNING! READ ⚠ BEFORE INSTALLATION

1. GENERAL:

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.

2. OVERPRESSURE:

Pressure spikes in excess of the rated overpressure 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.

FREEZING:

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

3. 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.

4. WARNING/AVERTISSEMENT

- DO NOT OPEN UNIT WHEN ENERGIZED

NE PAS OUVRIR L'APPAREIL LORSQU'IL EST SOUS TENSION

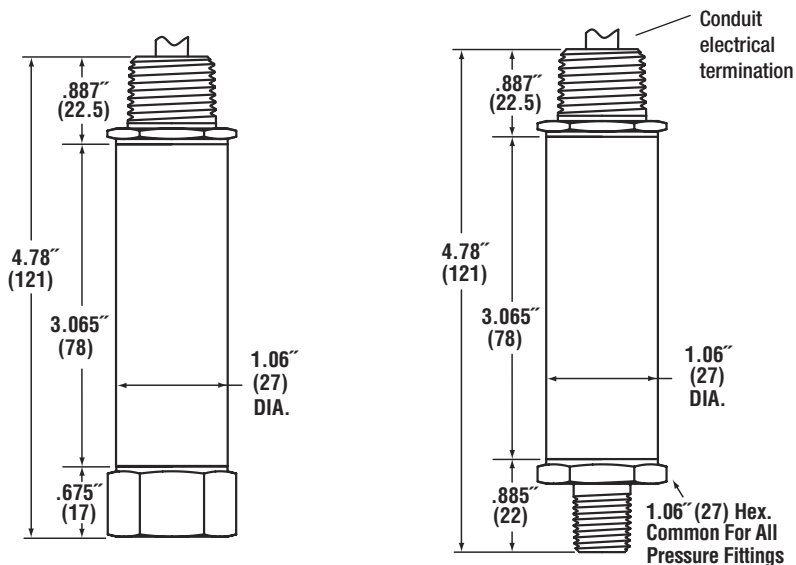
- EXPLOSION HAZARD - DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS

RISQUE D'EXPLOSION. NE PAS DÉBRANCHER TANT QUE LE CIRCUIT EST SOUS TENSION, À MOINS QU'IL NE S'AGISSE D'UN EMPLACEMENT NON DANGEREUX

- EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2

RISQUE D'EXPLOSION - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATÉRIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2

Ashcroft® A2X Pressure Transmitter, Typical Dimensions and Construction*



*Dimensions and construction details may vary based on product specified.

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Mounting

The A2X transmitter requires no special mounting hardware, and can be mounted in any plane with negligible position error. Although the unit can withstand normal vibration without damage or significant output effects, it is always good practice to mount the transducer where there is minimum vibration.

For units with NPT type pressure fittings apply Teflon® tape or an equivalent sealant to the threads before installing.

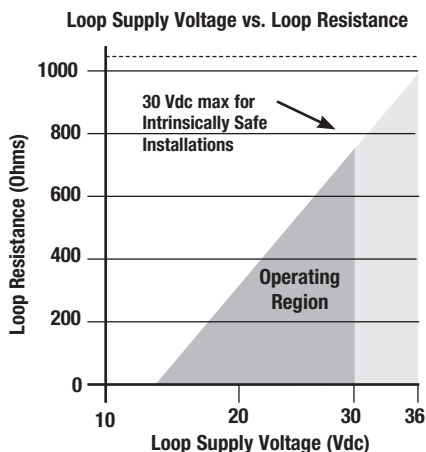
When tightening, apply a wrench to the hex wrench flats located just above the pressure fitting. DO NOT tighten by using a pipe wrench on the housing.

Power Supply

Output Signal	Power Supply Voltage	
	Min	Max
0-5Vdc	10V	30V
1-5Vdc	10V	30V
1-6Vdc	10V	30V
0-10V	14V	30V
4-20mA*	12V	30V**

* For transmitters with 4-20mA output signal, the minimum voltage at the terminals is 12Vdc. However, the minimum supply voltage should be calculated using the following graph and formula.

** For Intrinsically Safe Installations max, supply voltage is 30Vdc. Refer to Ashcroft drawing #825A022 for wiring and installation requirements.



$V_{min} = 12V + (.022A \times RL)$ (includes a 10% safety factor)

$RL = RS + RW$

RL = Loop Resistance (ohms)

RS = Sense Resistance (ohms)

RW = Wire Resistance (ohms)

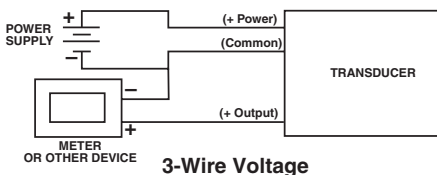
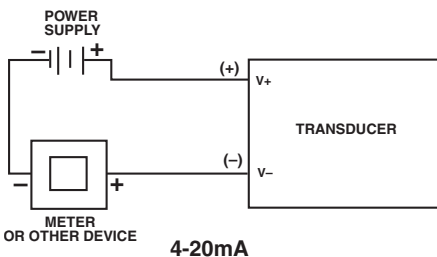
Noise

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

Sintered Metal Filter

All units less than 500 psi include a small metal sintered filter at the top of the unit. This is necessary to equalize the internal pressure with atmospheric pressure but can be a point of moisture ingress.

A2X Wiring Diagrams



A2X transducer has internal transient protection: for safety, limit line-to-ground voltage to 36 Vdc max.

HAZARDOUS AREA CERTIFICATIONS

Explosion Proof* – cUL: Specify A2X

Class I, Div. 1 & 2, Groups A, B, C and D

Class II, Div. 1 & 2, Groups E, F and G

Flame Proof* – ATEX: Specify A2X

Compliance with standards

European ATEX Directive 2014/34/EU

EN 60079-0:2018 EN 60079-1:2014

CE 2813 Ex II 2 G

Ex db IIC T4 Gb

-40°C ≤ Tamb. ≤ 125°C

DEMKO 04 ATEX 0237942

Intrinsically Safe (applies to 4-20mA) FM/CSA:

Intrinsic Safety FM

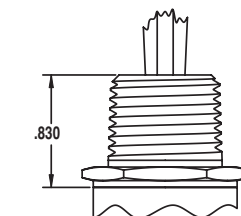
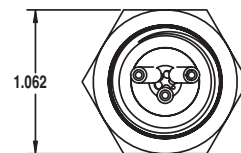
Class I, II and III Div. 1 and 2, Groups A, B, C, D, F and G per entity requirements (see Ashcroft drawing # 825A022)

Non-Incendive: FM/CSA

Class I, II and III Div. 2, Groups A, B, C, D, F and G, no barriers needed (see Ashcroft drawing # 825A022)

* Model A2X enclosure is intended for installation using metallic conduit and requires installer to comply with appropriate codes to complete proper installation to meet the assigned hazardous area designation.

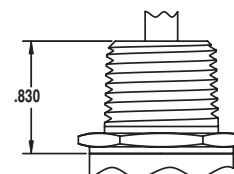
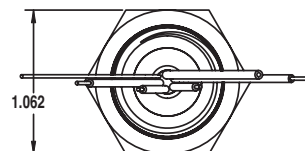
Wire Color	Voltage Output	Current Output
Red	(+) Power	(+) Power
White	(+) Output	None
Black	(-) Power	(-) Power



FLYING LEADS
ELECTRICAL TERMINATION
CONDUIT - 1/2 NPT MALE
(C2), (C5)

* Installation of conduit leads should be limited to 3m to maintain CE compliance

Wire Color	Voltage Output	Current Output
Red	(+) Power	(+) Power
White	(+) Output	None
Black	(-) Power	(-) Power



SHIELDED CABLE (PIG TAIL)
ELECTRICAL TERMINATION
CONDUIT - 1/2NPT MALE
(C1), (C6), (C7), (P7)

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4.3 FM INSTALLATION GUIDELINES

INSTALLATION FOR FM INTRINSICALLY SAFE CLASS 1, DIVISION 1 & 2 GROUPS A, B, C & D & CLASS II, GROUPS E, F & G & CLASS III

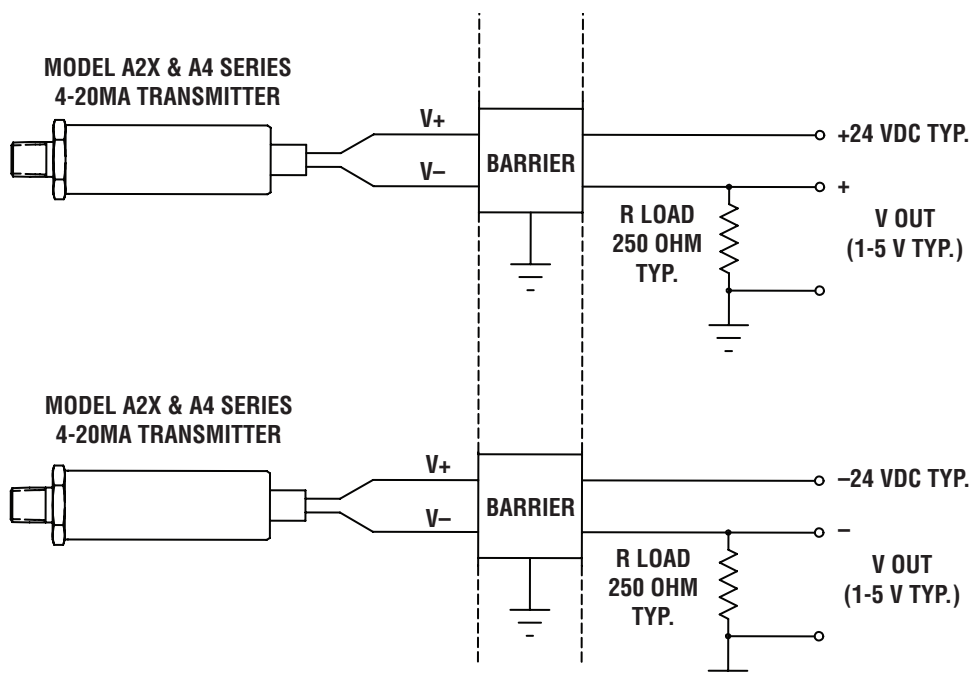
INSTALLATION NOTES≥

- V_{oc} OR $V_t \leq 30VDC$
 I_{sc} OR $I_t \leq 100mA$
 $C_a \geq 0.053\mu F + C_{cable}$
 $L_a \geq 0.364\mu H + L_{cable}$
1. THE INTRINSIC SAFETY ENTITY CONCEPT ALLOWS THE INTERCONNECTION OF TWO INTRINSICALLY SAFE DEVICES FM APPROVED WITH ENTITY PARAMETERS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM WHEN: U_o OR V_{oc} OR $V \leq V_{max}$, I_o OR I_{sc} OR $I \leq I_{max}$, C_a OR $C_o \geq C_i + C_{cable}$, L_a OR $L_o \geq L_i + L_{cable}$, P_o P_i .
 2. THE NONINCENDIVE FIELD WIRING CONCEPT ALLOWS INTERCONNECTION OF NONINCENDING FIELD WIRING APPARATUS WITH ASSOCIATED NONINCENDIVE FIELD APPARATUS USING ANY OF THE WIRING METHODS PERMITTED FOR NONHAZARDOUS (UNCLASSIFIED) LOCATIONS WHEN: U_o OR V_{oc} OR V_t V_{max} , I_o OR I_{sc} OR I_t I_{max} , C_a OR $C_o + C_{cable}$, L_a OR L_o $L_i + L_{cable}$, P_o P_i .
 3. FOR DIVISION 1 INSTALLATIONS, THE CONFIGURATION OF ASSOCIATED APPARATUS SHALL BE FM APPROVED UNDER ENTITY CONCEPT.
 4. FOR DIVISION 2 INSTALLATIONS USING NONINCENDIVE FIELD WIRING CONCEPTS THE ASSOCIATED APPARATUS SHALL BE FM APPROVED UNDER THE ENTITY CONCEPT OR NONINCENDIVE FIELD WIRING CONCEPT.
 5. FOR DIVISION 2 INSTALLATIONS THE ASSOCIATED APPARATUS IS NOT REQUIRED TO BE FM APPROVED UNDER ENTITY CONCEPT OR NONINCENDIVE FIELD WIRING CONCEPT IF THE A2X(4-20mA) & A4 SERIES PRESSURE TRANSDUCER IS INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) FOR DIVISION 2 WIRING METHODS EXCLUDING NONINCENDIVE FIELD WIRING.
 6. CONTROL EQUIPMENT CONNECTED TO THE ASSOCIATED APPARATUS SHALL NOT USE OR GENERATE MORE THAN 250VRMS OR VDC.
 7. DIVISION 1 INSTALLATIONS SHOULD BE IN ACCORDANCE WITH ANSI/ISA RP12.06.01, "INSTALLATION OF INTRINSICALLY SAFE SYSTEMS FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70).
 8. ASSOCIATED APPARATUS MANUFACTURERS INSTALLATION DRAWING SHALL BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT.
 9. RUN SHIELDED INTERCONNECTION CABLE WITH SHIELD CONNECTED TO FM APPROVED ASSOCIATED APPARATUS GROUND.
 10. WARNING – DO NOT OPEN WHEN ENERGIZED.
 11. WARNING – DO NOT DISCONNECT EQUIPMENT UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS.

HAZARDOUS (CLASSIFIED) AREA

CLASS I, DIVISION 1 & 2,
GROUPS A, B, C, & D;
CLASS II, DIVISION 1 & 2,
GROUPS E, F & G, CLASS III

NON-HAZARDOUS (UNCLASSIFIED) AREA



4.4 CSA INSTALLATION GUIDELINES

**INSTALLATION FOR CSA
NON-INCENDIVE CLASS I, DIV. 2, GROUPS A, B, C, D
CLASS II, DIV. 2, GROUPS E, F & G &
CLASS III**

INSTALLATION NOTES:

V_{max} 30VDC

I_{max} 100mA

C_i = 0.053uF

L_i = 0.364uH

1. THE NONINCENDIVE FIELD WIRING CONCEPT ALLOWS INTERCONNECTION OF NONINCENDING FIELD WIRING APPARATUS WITH ASSOCIATED NONINCENDIVE FIELD APPARATUS USING ANY OF THE WIRING METHODS PERMITTED FOR NON3HAZARDOUS (UNCLASSIFIED) LOCATIONS WHEN:
U_o OR V_{oc} V_{max}, I_o OR I_{sc} I_{max},
C_a OR C_o + C_{cabl}, L_a OR L_o L_i + L_{cabl}, P_o P_i.
2. FOR DIVISION 2 INSTALLATIONS USING NONINCENDIVE FIELD WIRING CONCEPTS THE ASSOCIATED APPARATUS SHALL BE CSA CERTIFIED UNDER THE ENTITY CONCEPT OR NONINCENDIVE FIELD WIRING CONCEPT.
3. FOR DIVISION 2 INSTALLATIONS THE ASSOCIATED APPARATUS IS NOT REQUIRED TO BE CSA CERTIFIED UNDER ENTITY CONCEPT OR NONINCENDIVE FIELD WIRING CONCEPT IF THEA2X (4-20mA) & A4 SERIES PRESSURE TRANSDUCER IS INSTALLED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE (CEC, CAN/CSA3C22.1) FOR DIVISION 2 WIRING METHODS EXCLUDING NONINCENDIVE FIELD WIRING.
4. CONTROL EQUIPMENT CONNECTED TO THE ASSOCIATED APPARATUS SHALL NOT USE OR GENERATE MORE THAN 250VRMS OR VDC.
5. ASSOCIATED APPARATUS MANUFACTURERS INSTALLATION DRAWING SHALL BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT.
6. RUN SHIELDED INTERCONNECTION CABLE WITH SHIELD CONNECTED TO FM APPROVED ASSOCIATED APPARATUS GROUND.
7. WARNING – TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING.