

Data Sheet

E2X-E2F Explosion-Proof Pressure Transducer For Hydrogen Applications

FEATURES

- E2X- Flameproof, intrinsically safe and non-incendive approval for explosion-proof/hazardous applications.
- E2F- Flameproof approval for explosion-proof/hazardous applications.
- FM, ATEX and IECEx approvals
- IP66/67 Ingress rating
- Thick sensing diaphragm using proven CVD technology:
 - 316L SS ranges to 5000 psi/350 bar
 - A286 ranges to 20,000 psi/1400 bar
- External magnetic offset & span adjustment

TYPICAL USES

- Hydrogen filling stations
- Hydrogen compressors
- Hydrogen storage tanks
- Reactor vessels
- Fuel cells for vehicles



E2X
Pressure Transducer



PERFORMANCE SPECIFICATIONS

Reference Temperature:	21°C ±2°C
Static Accuracy:	±0.25% of span, ±0.50% of span, ±1.0% of span, Terminal Point Method includes: hysteresis, linearity, repeatability, offset and span
Stability:	±0.25% year at reference conditions

ENVIRONMENTAL SPECIFICATIONS

Thermal Coefficients:	Offset: ±0.009% /°C from -40°C to 80°C Span: ±0.009% /°C from -40°C to 80°C
Temperature Limits:	Storage: -58°F to 257°F (-50°C to 125°C) Operating: -40°F to 176°F (-40°C to 80°C) Media: -40°F to 176°F (-40°C to 80°C)
Humidity:	0-100% (non-condensing)

FUNCTIONAL SPECIFICATIONS

Response Time (Output)	4 ms
Gauge/Compound Pressure Ranges:	VAC to 20,000 psig/vac to 1400 bar
Shock:	80g, 6 ms, Haversine
Vibration:	Random: 10g RMS 20-2000 Hz
Proof Pressure:	1.2x - 1.5x
Burst Pressure:	5x - 8x

KEY BENEFITS

- Highly configurable
- Easy calibration of offset and span

ELECTRICAL SPECIFICATIONS

Circuit Protection: Reverse polarity protected

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

INTRINSICALLY SAFE INSTALLATIONS

Supply Voltage Output

9-28Vdc: 0-5Vdc, 1-5Vdc, 1-6Vdc, 0-10Vdc, 1-11Vdc, 0.1-5Vdc, 0.1-10Vdc, 0.5-4.5Vdc

9-30Vdc: 4-20mA, 20-4mA (2-wire)

NON-INCENDIVE/NON-SPARKING INSTALLATIONS

Supply Voltage Output

9-28Vdc: 0-5Vdc, 1-5Vdc, 1-6Vdc, 0-10Vdc, 1-11Vdc, 0.1-5Vdc, 0.1-10Vdc, 0.5-4.5Vdc

9-30Vdc: 4-20mA, 20-4mA (2-wire)

Adjustability: ±5% of span non-interactive offset & span

Supply Current: <8 mA (Vout)

Current Source/Sink for Voltage Output: 1 mA (source)/ 0.1 mA (sink) MAX.

Withstand/Breakdown: 100 Vdc/Vac, optional 500 Vdc/Vac

Data Sheet

E2X-E2F Explosion-Proof Pressure Transducer For Hydrogen Applications

PHYSICAL SPECIFICATIONS

Ingress Rating: IP66 (NEMA 4X) (STD.)
IP67 (IP69K Consult Factory)

WETTED MATERIAL

Diaphragm:	Sensor:	Material
	B	316L Stainless steel
	D	A286

Process Connection: 316L Stainless steel

NON-WETTED MATERIAL

Housing: 316L Stainless steel

EMC TESTING

EMC: Directive 2014/30/EU, and EN61326-1,
EN61326-2-3 (Industrial Env.)

Immunity:	Standard	Level
	61000-4-2 (ESD)	±4kV/±8kV (Contact/Air)
	61000-4-3 (Radiated RF)	10 V/m to 1GHz, 3 V/m to 2GHz, 1 V/m to 2.7GHz
	61000-4-4 (EFT/Burst)	±1kV (5/50ns, 5kHz)
	61000-4-5 (Surge)	±1kV, Earth to Shield over all I/O lines
	61000-4-6 (Conducted RF)	3V (0.15 to 80MHz)
	61000-4-8 (Line Freq. Magnetic)	30A/m

Emissions: EN 55011 (CISPR 11) Class A, Group 1 & FCC (47 CFR 15)

HAZARDOUS AREA CERTIFICATIONS

Explosion/Flame/Dust Ignition Proof Installations (E2X - E2F) -

FM:

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

ATEX/IECEx:

Class I, Zone 1, AEx db IIC T4 Gb -40°C < Ta < 80°C
Class II, 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

Intrinsically Safe Installations (E2X only) -

FM:

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

ATEX/IECEx:

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

Non-Incendive (E2X only) -

FM:

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, T4 -40°C < Ta < 80°C

**TABLE 1: PROOF & BURST
PRESSURE MULTIPLIERS**

Sensor Range	B Sensor - 316L SS		D Sensor - A286	
	Proof	Burst	Proof	Burst
(psi)				
30				
45	1.5×	8×		
50	1.5×	8×		
60	1.5×	8×		
75	1.5×	8×		
100	1.5×	8×		
150	1.5×	8×		
200	1.5×	8×		
300	1.5×	8×		
500	1.2×	5×		
750	1.2×	5×		
1000	1.2×	5×		
1500	1.2×	5×		
2000	1.2×	5×		
3000	1.2×	5×		
5000	1.2×	5×	1.5×	5×
7500			1.5×	5×
10000			1.2×	5×
15000			1.2×	5×
20000			1.2×	5×
(Compound)				
V&30#				
V&45#	1.5×	8×		
V&60#	1.5×	8×		
V&100#	1.5×	8×		
V&150#	1.5×	8×		
V&200#	1.5×	8×		
V&300#	1.5×	8×		

Data Sheet

E2X-E2F Explosion-Proof Pressure Transducer For Hydrogen Applications

ORDERING CODE	Example:	E2X	B	3	C	F02	42	CC	X	10	F	100#	-XNH
Model													
E2X - Explosion proof		E2X											
E2F - Flame proof													
Sensor Materials - See Table 2 on page 4 for more options													
B - 316L Stainless steel			B										
D - A286													
Accuracy													
3 - 0.25% span				3									
5 - 0.50% span													
7 - 1.00% span													
Calibration Chart													
N - Without calibration chart													
C - With calibration chart					C								
Pressure Connections - See Table 3 on page 5 for more options													
F02 - (1/4 NPT Female)						F02							
Output Type													
05 - 0-5 Vdc													
10 - 0-10 Vdc													
11 - 1-11 Vdc													
12 - 0.1-10 Vdc													
13 - 0.1-5 Vdc													
15 - 1-5 Vdc													
16 - 1-6 Vdc													
24 - 20-4 mA													
42 - 4-20 mA							42						
45 - 0.5-4.5 Vdc non-ratiometric													
00 - Custom													
Electrical Connections - See Table 4 on page 6 for more options													
CC - (1/2 NPT conduit w/cable)								CC					
Mating Connector													
X - Without mating connector									X				
Cable Length													
Max cable length of 30ft for outputs 05, 10, 11, 12, 13, 15, 16 and 45. Max cable length of 99ft for outputs 24 and 42													
00 - No cable													
XX - 01 to 99										10			
Unit of Length													
F - Feet											F		
M - Meter													
N - Inches													
0 - No cable													
Pressure Ranges - Coding example only													
100# - 100 psig												100#	
Options (if choosing an option(s) must include an "X")													
NN - Paper tag													-X
NH - Stainless steel tag													NH

Accessory	Part Number
Offset and Span Adjustment Magnet	266A143-01
Accessories must be ordered separately	

Data Sheet

E2X-E2F Explosion-Proof Pressure Transducer For Hydrogen Applications

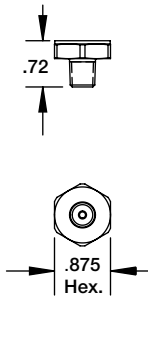
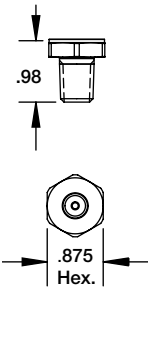
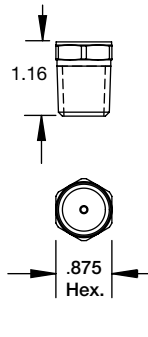
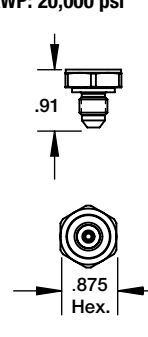
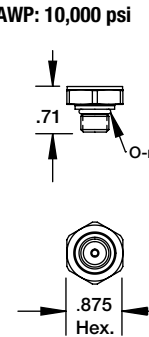
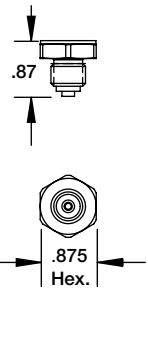
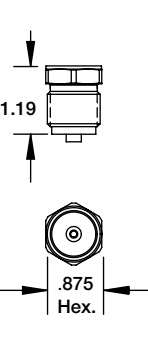
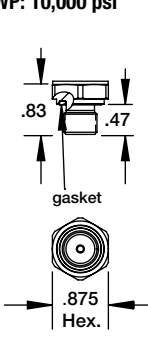
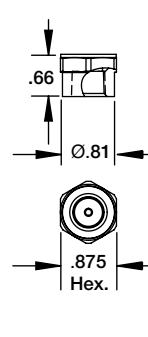
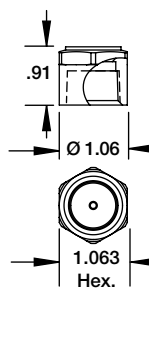
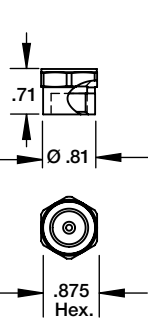
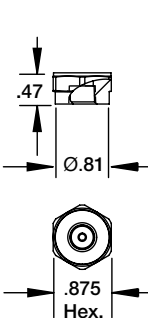
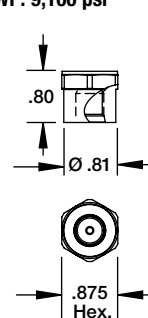
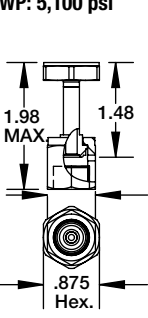
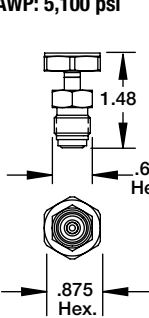
TABLE 2 - SENSOR PRESSURE RANGE

psi	Sensor Material		bar	Sensor Material		inHg	Sensor Material	
	B	D		B	D		B	D
	316L SS	A286		316L SS	A286		316L SS	A286
30#	•		1.6BR	•		50IM	•	
45#	•		2BR	•		100IM	•	
50#	•		2.5BR	•		200IM	•	
60#	•		4BR	•		300IM	•	
75#	•		6BR	•		500IM	•	
100#	•		10BR	•		1000IM	•	
150#	•		16BR	•		V&30IM		
200#	•		20BR	•		V&60IM	•	
250#	•		25BR	•		V&100IM	•	
300#	•		40BR	•		V&200IM	•	
500#	•		60BR	•				
750#	•		100BR	•				
1000#	•		160BR	•				
1500#	•		200BR	•				
2000#	•		250BR		•			
2500#	•		400BR		•			
3000#	•		600BR		•			
5000#	•	•	1000BR		•			
7500#		•	1400BR		•			
10000#		•	V&1.6BR	•				
15000#		•	V&2BR	•				
20000#		•	V&4BR	•				
V&30#	•		V&6BR	•				
V&45#	•							
V&60#	•							
V&100#	•							
V&150#	•							
V&200#	•							
V&300#	•							

Data Sheet

E2X-E2F Explosion-Proof Pressure Transducer For Hydrogen Applications

TABLE 3 - PRESSURE CONNECTION DIMENSIONS

<p>1/8 NPT Male Code: M01 MAWP: 20,000 psi</p>	<p>1/4 NPT Male Code: M02 MAWP: 20,000 psi</p>	<p>1/2 NPT Male Code: M04 MAWP: 10,000 psi</p>	<p>7/16-20 UNJF-3A 37° Flare (SAE AS4395) Code: M76 MAWP: 20,000 psi</p>	<p>7/16-20 UNJF-2A SAE-Male (SAE J1926 O-Ring Boss seal) Code: MEK MAWP: 10,000 psi</p>
				
<p>G1/4 B-Male (EN837-1) Code: MG2 MAWP: 20,000 psi</p>	<p>G1/2 B Male (EN837-1) Code: MG4 MAWP: 20,000 psi</p>	<p>G1/4 A-MALE (stud end DIN 3852-E G1/4) Code: MGA MAWP: 10,000 psi</p>	<p>1/4-18 NPT Female Code: F02 MAWP: 10,000 psi</p>	<p>1/2-14 NPT Female Code: F04 MAWP: 5,000 psi</p>
				
<p>9/16-18 UNF-2B Female Code: F09 MAWP: 25,000 psi</p>	<p>1/8 -27 NPT Female Code: F01 MAWP: 10,000 psi</p>	<p>7/16-20 UNF-2B SAEJ1926 Code: FRW MAWP: 9,100 psi</p>	<p>1/4" VCR gland with 9/16-18 Female Swivel Nut Code: FV2 MAWP: 5,100 psi</p>	<p>1/4" VCR gland with 9/16-18 Male Swivel Nut Code: MV2 MAWP: 5,100 psi</p>
				

Data Sheet

**E2X-E2F Explosion-Proof Pressure Transducer
For Hydrogen Applications**

TABLE 4 - ELECTRICAL CONNECTION DIMENSIONS

Maximum temperature range listed

**½ NPT Conduit
With Flying Leads**

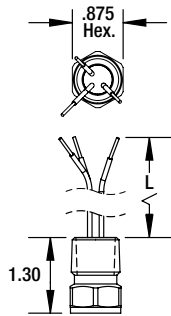
**Code: CF
IP67 (NEMA 4X)**

-40°F to 176°F (-40°C to 80°C)

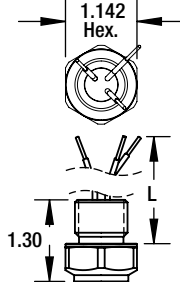
**M20 Conduit
With Flying Leads**

**Code: MF
IP67 (NEMA 4X)**

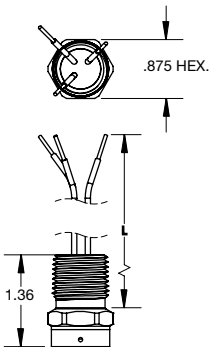
-40°F to 176°F (-40°C to 80°C)



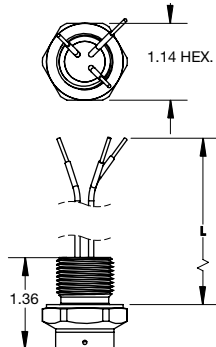
Unvented



Unvented



Vented

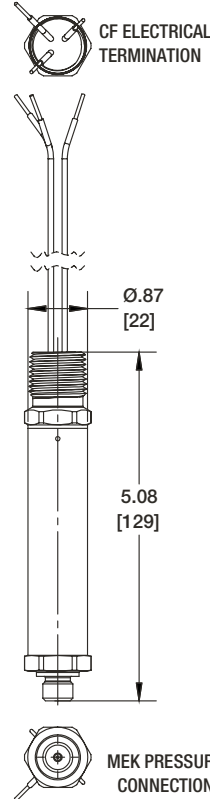


Vented

Vented conduit supplied on units
with pressure range ≤ to 500#

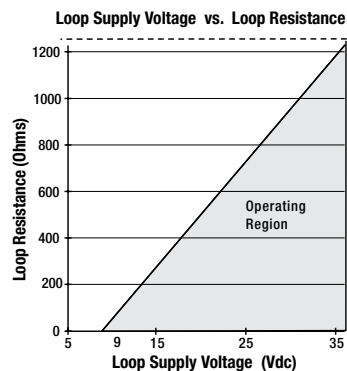
DIMENSIONS

For reference only, consult Ashcroft for specific dimensional drawings



LOOP SUPPLY VOLTAGE CHART

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



$V_{MIN} = 9V + (0.022 \cdot A \times R_{LOOP})$ (*includes a 10% safety factor)
 $R_{LOOP} = R_{SENSE} + R_{WIRING}$
 $R_{LOOP} = \text{Loop Resistance (Ohms)}$
 $R_{SENSE} = \text{Sense Resistance (Ohms)}$
 $R_{WIRING} = \text{Wire Resistance (Ohms)}$

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