ASHCROFT®
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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, CSA, 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
- Barometric pressure ranges available (standard & custom ranges)

TYPICAL USES

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

E2X
Pressure Transducer

TruAccuracy

FM APPROVED

KEY BENEFITS

- **Highly configurable**
- **Easy calibration of offset and span**

PERFORMANCE SPECIFICATIONS

Reference Temperature:	70 °F ±3.6 °F, (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: ±0.005% /°F from -40 °F to 257 °F (±0.009% /°C from -40 °C to 125 °C) Span: ±0.005% /°F from -40 °F to 257 °F (±0.009% /°C from -40 °C to 125 °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:	80 g, 6 ms, Haversine
Vibration:	Random: 10 g RMS 20-2000 Hz
Proof Pressure:	1.2X - 1.5X
Burst Pressure:	5X - 8X

ELECTRICAL SPECIFICATIONS

Circuit Protection:	Reverse polarity protected

EXPLOSION PROOF INSTALLATIONS (E2X and E2F)
9-36 Vdc: 4-20 mA, 20-4 Ma (2-wire), 0-5 Vdc, 1-5 Vdc, 1-6 Vdc, 0.1-5 Vdc, 0.5-4.5 Vdc
14-36 Vdc: 0-10 Vdc, 1-11 Vdc, 0.1-10 Vdc

INTRINSICALLY SAFE INSTALLATIONS (E2X Only)
Supply Voltage: Output
9-28 Vdc: 0-5 Vdc, 1-5 Vdc, 1-6 Vdc, 0.1-5 Vdc, 0.5-4.5 Vdc
14-28 Vdc: 0-10 Vdc, 1-11 Vdc, 0.1-10 Vdc
9-30 Vdc: 4-20 mA, 20-4 mA (2-wire)

NON-INCENDIVE INSTALLATIONS (E2X Only)
Supply Voltage: Output
9-28 Vdc: 0-5 Vdc, 1-5 Vdc, 1-6 Vdc, 0.1-5 Vdc, 0.5-4.5 Vdc
14-28 Vdc: 0-10 Vdc, 1-11 Vdc, 0.1-10 Vdc
9-30 Vdc: 4-20 mA, 20-4 mA (2-wire)

Adjustability:	±5% of span non-interactive offset & span
Supply Current:	<8 mA (Vout)
Curent Source/Sink for Voltage Output	1 mA (source)/ 0.1 mA (sink) MAX.
Withstand/Breakdown	100 Vdc/Vac, optional 500 Vdc/Vac

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

CSA:
Ex db IIC T4 Gb
Class I, Division 1, Groups A, B, C and D T4
Class II, Division 1, Groups E, F and G T135 °C
Ex tb IIIC T135 °C Db
Class III, Division 1 T135 °C

EX db IIC T4 Gb -40 °C ≤ Ta ≤ 80 °C
EX db IIC T135 °C Db -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

CSA:
Ex ia IIC T4 Ga
Class I, Division 1, Groups A, B, c and D T4, Ex ia
Ex ia IIIC T135 °C Da
Class II,, Division 1, Groups E, F and G T135 °C
Class III, Division 1 T135 °C

Ex ia IIC T4 Ga -40 °C ≤ Ta ≤ 80 °C
Ex ia IIIC T135 °C D -40 °C ≤ Ta ≤ 40°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<40 °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<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

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

CSA:
Ex ic IIC T4 Ge
Class 1, Division 2, Groups A, B, C and D T4
Ex ic IIIC T135 °C Dc
Class II, Division 2, Groups F, G T135 °C
ClassIII, Division 2 T135 °C

EX ic IIC Gc -40 °C ≤ Ta ≤ 80 °C
Ex ic IIIC T135 °C Dc -40 °C ≤ Ta ≤ 80 °C

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TABLE 1: PROOF & BURST PRESSURE MULTIPLIERS

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

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ORDERING CODE Example:	E2X	B	3	C	F02	42	CF	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 - (¼ 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												
CF - (½ NPT conduit w/flying leads)							CF					
Mating Connector												
X - Without mating connector								X				
Cable Length Max cable length of 30 ft for outputs 05, 10, 11, 12, 13, 15, 16 and 45. Max cable length of 99 ft 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")												-X__
NN - Paper tag												
NH - Stainless steel tag												NH

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

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TABLE 2 - SENSOR PRESSURE RANGE

psi	Sensor Material B 316L SS	Sensor Material D A286	bar	Sensor Material B 316L SS	Sensor Material D A286	inHg	Sensor Material B 316L SS	Sensor Material D 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#	•							

TruAccuracy — What Does It Mean?

Ashcroft's TruAccuracy™ specification is exclusively based on terminal point methodology instead of statistically derived schemes like 'best fit straight line'.

TruAccuracy™ means the Ashcroft E2X-E2F has ±0.25% accuracy out of the box. Zero and span setting errors are already included in the ±0.25% accuracy spec.

The E2X-E2F is ready to be installed with no additional calibration adjustments required.

A unit from another manufacturer advertised as ±0.25% best fit straight line may actually be a ±1.25% to ±2.25% device. Using best fit straight line method, the accuracy spec does not include zero and span setting errors, which can be as much as ±1.00% each.

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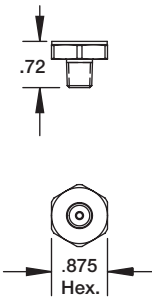
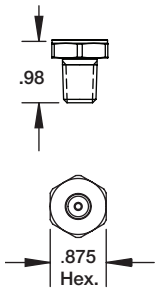
TABLE 3 - PRESSURE CONNECTION DIMENSIONS

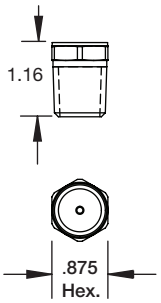
⅛ NPT Male
Code: M01
MAWP: 20,000 psi



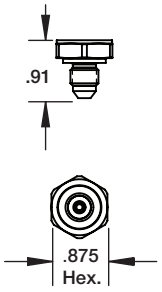
¼ NPT Male
Code: M02
MAWP: 20,000 psi



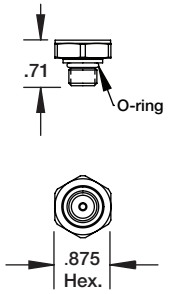
½ NPT Male
Code: M04
MAWP: 10,000 psi



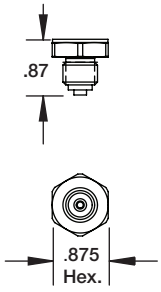
7/16-20 UNJF-3A 37° Flare (SAE AS4395)
Code: M76
MAWP: 20,000 psi



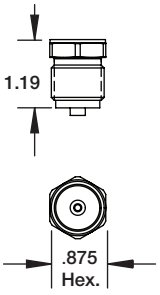
7/16-20 UNJF-2A SAE-Male (SAE J1926 O-Ring Boss seal)
Code: MEK
MAWP: 10,000 psi



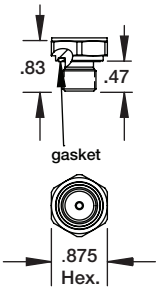
G¼ B-Male (EN837-1)
Code: MG2
MAWP: 20,000 psi



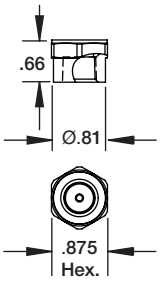
G½ B Male (EN837-1)
Code: MG4
MAWP: 20,000 psi



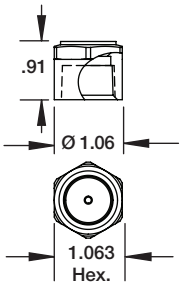
G¼ A-MALE (stud end DIN 3852-E G¼)
Code: MGA
MAWP: 10,000 psi



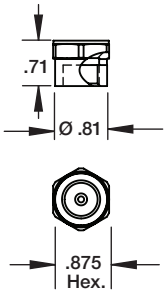
¼-18 NPT Female
Code: F02
MAWP: 10,000 psi



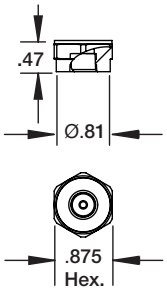
½-14 NPT Female
Code: F04
MAWP: 5,000 psi



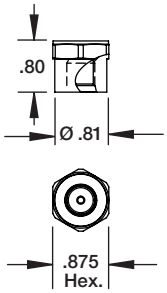
9/16-18 UNF-2B Female
Code: F09
MAWP: 25,000 psi



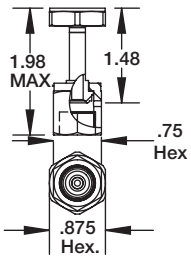
⅛ -27 NPT Female
Code: F01
MAWP: 10,000 psi



7/16-20 UNF-2B SAEJ1926
Code: FRW
MAWP: 9,100 psi



9/16-18 Female Swivel Nut (compatible with ¼ VCR® fitting)
Code: FV2
MAWP: 5,100 psi



9/16-18 Male Swivel Nut (compatible with ¼ VCR® fitting)
Code: MV2
MAWP: 5,100 psi

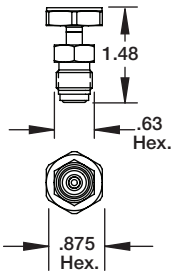


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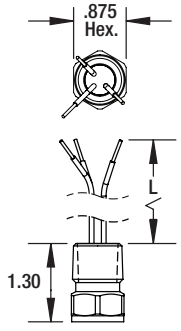
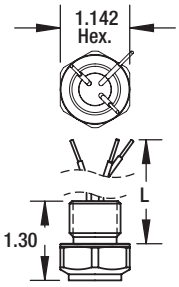
TABLE 4 - ELECTRICAL CONNECTION DIMENSIONS

Maximum temperature range listed

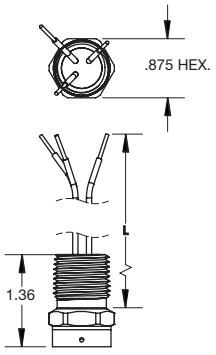
½ NPT Conduit With Flying Leads	M20 Conduit With Flying Leads
Code: CF IP67 (NEMA 4X)	Code: MF IP67 (NEMA 4X)
-40 °F to 176 °F (-40 °C to 80 °C)	-40 °F to 176 °F (-40 °C to 80 °C)



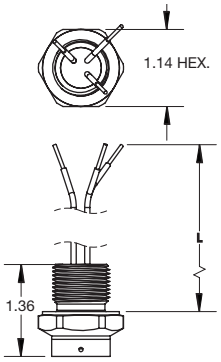
Unvented



Unvented



Vented

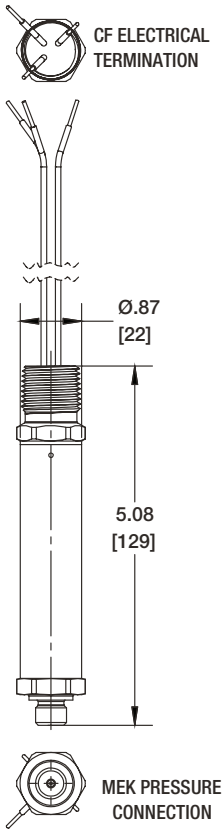


Vented

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

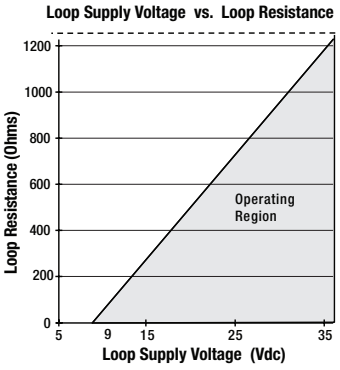
DIMENSIONS

For reference only, consult Ashcroft for specific dimensional drawings



LOOP SUPPLY VOLTAGE CHART

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



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

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