

## Data Sheet

# E2F Explosion-Proof Pressure Transducer For Hydrogen Applications

### FEATURES

- 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 Stainless steel ranges to 5000 psi/350 bar
  - A286 Stainless steel ranges to 20,000 psi/1400 bar
- External magnetic offset & span adjustment
- Barometric pressure ranges available (standard & custom ranges)
- SIL 3 capable

### TYPICAL USES

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



**E2F**  
Pressure Transducer



### 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

### KEY BENEFITS

- Highly configurable
- Easy calibration of offset and span
- SIL Certified

### ELECTRICAL SPECIFICATIONS

Circuit Protection: Reverse polarity protected

#### SUPPLY VOLTAGE

**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

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

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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 Stainless steel

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)	±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 Proof/Flameproof/Dust Ignition Proof Installations

##### FM:

Class I Division 1, Groups A, B, C, D T4, -40°C < Ta < 80°C  
Class II Division 1, Groups 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  
Class II, Zone 21, AEx tb IIIC T135°C Db -40°C < Ta < 80°C

##### CSA:

Class I, Division 1, Groups A, B, C and D T4  
Class II, Division 1, Groups E, F and G T135°C  
Class III, Division 1, T135°C

Ex db IIC T4 Gb  
Ex tb IIIC T135°C Db

##### ATEX:

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

##### IECEX:

Ex db IIC T4 Gb -40°C < Ta < 80°C  
Ex tb IIIC T135°C Db -40°C < Ta < 80°C

### TABLE 1: PROOF & BURST PRESSURE MULTIPLIERS

Sensor Range	B Sensor - 316L SS		D Sensor - A286 SS	
	Proof	Burst	Proof	Burst
<b>(psi)</b>				
30				
45	1.4X	8X		
50	2.2X	8X		
60	1.8X	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	2.4X	5X
7500			1.6X	5X
10000			1.2X	5X
15000			1.7X	5X
20000			1.3X	5X
<b>(Compound)</b>				
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		

## Data Sheet

# E2F Explosion-Proof Pressure Transducer For Hydrogen Applications

ORDERING CODE	Example:	E2F	B	3	C	F02	42	CF	X	10	F	100#	-XNH
<b>Model</b>													
E2F - Flame proof		E2F											
<b>Sensor Materials - See Table 2 on page 4 for more options</b>													
B - 316L Stainless steel			B										
D - A286 Stainless steel													
<b>Accuracy</b>													
3 - 0.25% span				3									
5 - 0.50% span													
7 - 1.00% span													
<b>Calibration Chart</b>													
N - Without calibration chart													
C - With calibration chart					C								
<b>Pressure Connections - See Table 3 on page 5 for more options</b>													
F02 - (1/4 NPT Female)						F02							
<b>Output Type - Note: Consult factory for additional outputs</b>													
05 - 0-5 Vdc (not available with X1L variation)													
10 - 0-10 Vdc (not available with X1L variation)													
11 - 1-11 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													
<b>Electrical Connections - See Table 4 on page 6 for more options</b>													
CF - (1/2 NPT conduit w/flying leads)								CF					
<b>Mating Connector</b>													
X - Without mating connector									X				
<b>Cable Length</b>													
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			
<b>Unit of Length</b>													
F - Feet											F		
M - Meter													
N - Inches													
0 - No cable													
<b>Pressure Ranges - Coding example only</b>													
100# - 100 psig												100#	
<b>Options (if choosing an option(s) must include an "X")</b>													
NN - Paper tag													-X
NH - Stainless steel tag													NH
6B - Cleaned for oxygen service													
6W - Cleaned per ASME B40.100 Level IV, NOT marked for oxygen service													
1L - SIL certification for E2 series transducer													

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

## 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#	•							



### 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 E2F has  $\pm 0.25\%$  accuracy out of the box. Zero and span setting errors are already included in the  $\pm 0.25\%$  accuracy spec.

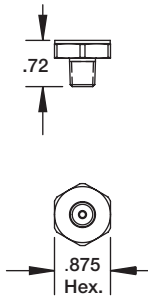
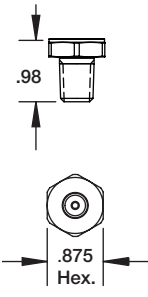
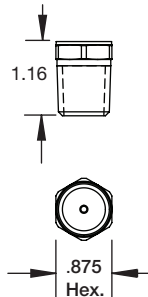
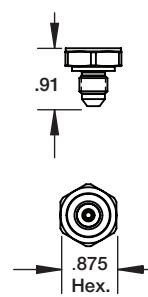
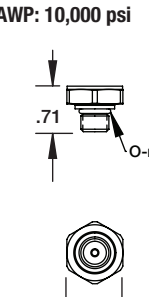
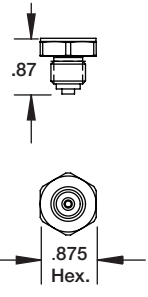
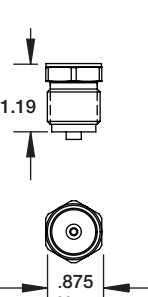
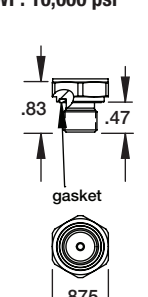
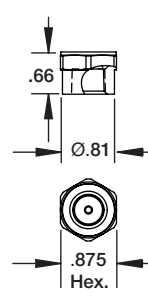
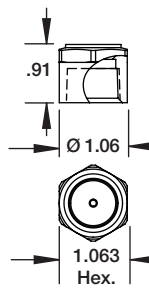
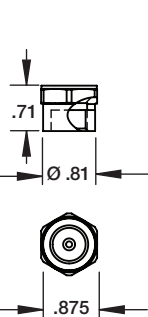
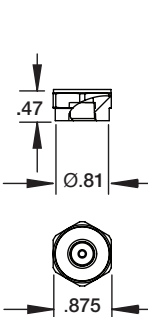
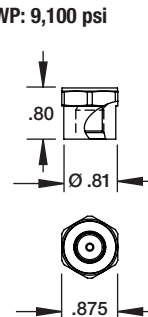
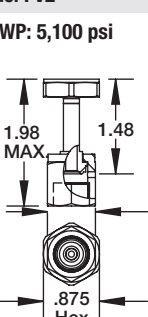
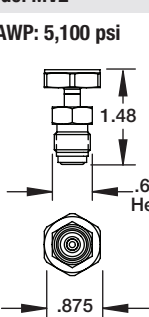
The E2F is ready to be installed with no additional calibration adjustments required.

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

**Data Sheet**

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

**TABLE 3 - PRESSURE CONNECTION DIMENSIONS**

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

# Data Sheet

## E2F Explosion-Proof Pressure Transducer For Hydrogen Applications

### TABLE 4 - ELECTRICAL CONNECTION DIMENSIONS

Maximum temperature range listed

**½ NPT Conduit  
With Flying Leads**

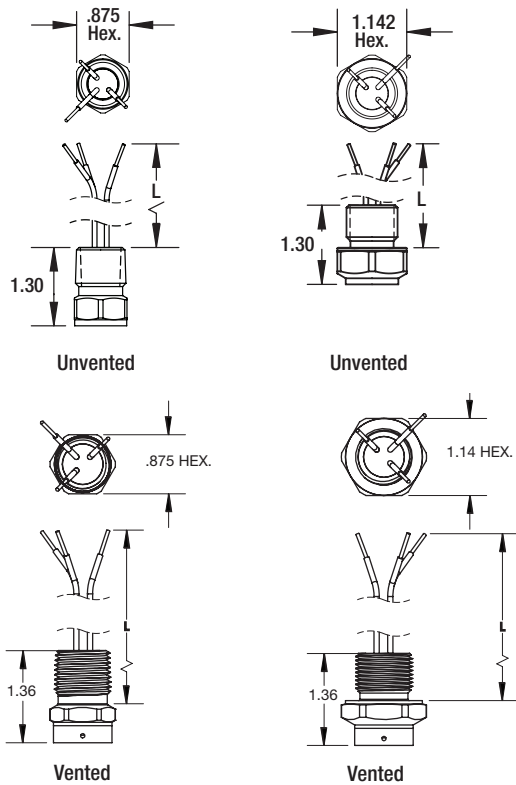
Code: CF  
IP67 (NEMA 4X)

-40 °F to 176 °F (-40 °C to 80 °C)

**M20 Conduit  
With Flying Leads**

Code: MF  
IP67 (NEMA 4X)

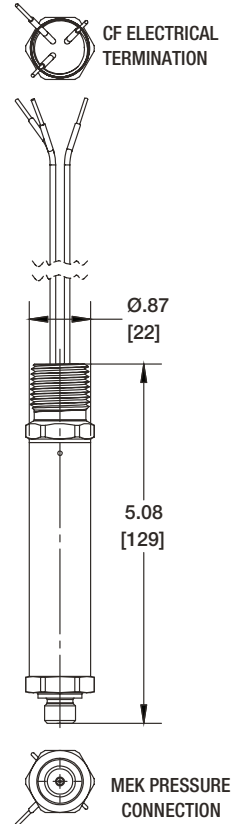
-40 °F to 176 °F (-40 °C to 80 °C)



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

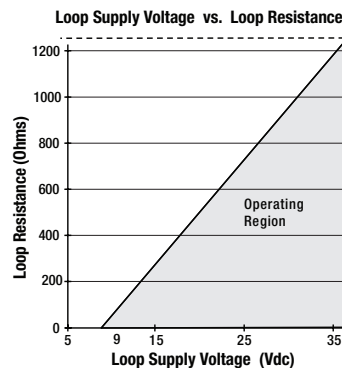
### DIMENSIONS

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 9 VDC



$V_{MIN} = 9V + (0.022 \cdot A \times R_{LOOP})$  (\*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