E2F Explosion-Proof Pressure Transducer

Features

- Flameproof approval for explosion-proof, hazardous applications.
- FM, CSA, ATEX and IECEx approvals
- Ranges vac through 20,000 psi
- IP66/67 Ingress rating
- Wide selection of process connections available
- Customizable configurations
- External magnetic offset & span adjustment
- Barometric pressure ranges available (standard & custom ranges)

Typical Uses

- Oil field equipment
- Upstream oil & gas production
- Natural gas compression
- Alternative energy projects
- Engine monitoring
- Process & pneumatic sensing
- Hydrogen applications

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, (0-1.5# Range only available in ±0.5% and 1.0% accuracy) 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
Shock:	80g, 6 ms, Haversine
Vibration:	Random: 10g RMS 20-2000 Hz
Absolute Pressure Ranges:	0 to 500 psia
Proof Pressure:	1.2X - 2X (See Table 1 on page 2)
Burst Pressure:	3X - 8X (See Table 1 on page 2)

Key Benefits

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

Electrical Specifications

Circuit Protection:	Reverse polarity protected
Supply Voltage Output **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)
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:
	A	17-4PH® Stainless steel
	B	316L Stainless steel
	C	316L Stainless steel, liquid isolated
	D	A286
Process Connection:	316L Stainless steel	

Non-wetted Material

Housing:	316L Stainless steel

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

	A Sensor - 17-4PH® SS		B Sensor - 316L SS		C Sensor - 316L SS ISO		D Sensor - A286	
Sensor Range	Proof	Burst	Proof	Burst	Proof	Burst	Proof	Burst
(psi)								
1.5					3.3X	5X		
5					3X	5X		
10					2X	5X		
15					2X	5X		
30					2X	5X		
45	1.9X	8X	1.4X	8X	3.1X	5X		
50	2.9X	8X	2.2X	8X	2.8X	5X		
60	2.4X	8X	1.8X	8X	2.3X	5X		
75	1.9X	8X	1.5X	8X	1.9X	5X		
100	2X	8X	1.5X	8X	3.0X	5X		
150	2X	8X	1.5X	8X	2X	4X		
200	2X	8X	1.5X	8X	3.0X	3X		
300	1.9X	8X	1.5X	8X	2X	3X		
500	2X	8X	1.2X	5X	2X	3X		
750	1.9X	8X	1.2X	5X				
1000	2X	8X	1.2X	5X				
1500	1.9X	8X	1.2X	5X				
2000	2X	8X	1.2X	5X				
3000	1.9X	5X	1.2X	5X				
5000	1.5X	5X	1.2X	5X			2.4X	5X
7500	1.5X	3X					1.6X	5X
10000	1.2X	3X					1.2X	5X
15000	1.7X	3X					1.7X	5X
20000	1.3X	3X					1.3X	5X
(Compound)								
VAC#					2X	5X		
V&15#					2X	5X		
V&30#					2X	5X		
V&45#	2X	8X	1.5X	8X	3X	7.7X		
V&60#	2X	8X	1.5X	8X	2X	5X		
V&100#	2X	8X	1.5X	8X	3.3X	6X		
V&150#	2X	8X	1.5X	8X	2X	4X		
V&200#	2X	8X	1.5X	8X	3X	4.5X		
V&300#	2X	8X	1.5X	8X	2X	3X		
(psia)								
15					2X	5X		
30					2X	5X		
70					2X	5X		
150					2X	4X		
300					2X	3X		
500					2X	3X		

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Ordering Code Example:	E2F	B	3	C	F02	42	CF	X	10	F	100#	-XNH
Model												
E2F - Flame proof	E2F											
Sensor Materials - See Table 2 on page 4 for more options												
A - 17-4PH® Stainless steel												
B - 316L Stainless steel		B										
C - 316L Stainless steel (liquid isolated)												
D - A286												
Accuracy												
3 - 0.25% span (not available with 1.5 psi range)			3									
5 - 0.50% span												
7 - 1.00% span												
Calibration Chart												
N - Without calibration chart												
C - With Traceable calibration certificate				C								
Pressure Connections - See Table 3 on page 5 for more options												
F02 - (¼ NPT Female)					F02							
Output Type - Consult factory for additional outputs												
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												
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				
Flying Lead 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												
XX - 01 to 99									10			
Unit of Length												
F - Feet										F		
M - Meter												
N - Inches												
Pressure Ranges - Coding example only, see Table 5 on page 7 for more options												
100# - 100 psig											100#	
Options (if choosing an option(s) must include an "X")												-X__
NN - Paper tag												
NH - Stainless steel tag												NH
6B - Cleaned for Oxygen service												
6W - Cleaned to ASME B40.100 Level IV, NOT marked for oxygen service												
1L - SIL certification for E2 series transducer												

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				bar	Sensor Material				inHg	Sensor Material			
	A 17-4PH® SS	B 316L SS	C 316 ISO	D A286		A 17-4PH® SS	B 316L SS	C 316 ISO	D A286		A 17-4PH® SS	B 316L SS	C 316 ISO	D A286
1.5#			•											
5#			•		400MB			•		10IM			•	
10#			•		600MB			•		20IM			•	
15#			•		1BR			•		30IM			•	
30#	•	•	•		1.6BR	•	•	•		50IM	•	•	•	
45#	•	•	•		2BR	•	•	•		100IM	•	•	•	
50#	•	•	•		2.5BR	•	•	•		200IM	•	•	•	
60#	•	•	•		4BR	•	•	•		300IM	•	•	•	
75#	•	•	•		6BR	•	•	•		500IM	•	•	•	
100#	•	•	•		10BR	•	•	•		1000IM	•	•	•	
150#	•	•	•		16BR	•	•	•		VACIM			•	
200#	•	•	•		20BR	•	•	•		V&30IM			•	
250#	•	•	•		25BR	•	•	•		V&60IM	•	•	•	
300#	•	•	•		40BR	•	•			V&100IM	•	•	•	
500#	•	•	•		60BR	•	•			V&200IM	•	•	•	
750#	•	•			100BR	•	•			30IMA			•	
1000#	•	•			160BR	•	•			50IMA			•	
1500#	•	•			200BR	•	•			100IMA			•	
2000#	•	•			250BR	•			•	200IMA			•	
2500#	•	•			400BR	•			•	300IMA			•	
3000#	•	•			600BR	•			•	500IMA			•	
5000#	•	•		•	1000BR	•			•	1000IMA			•	
7500#	•			•	1400BR				•	20&32IMA			•	
10000#	•			•	VACBR			•		26&32IMA			•	
15000#	•			•	V&1BR			•		700&1100MBA			•	
20000#	•			•	V&1.6BR	•	•	•		900&1100MBA			•	
VAC#			•		V&2BR	•	•	•						
V&15#			•		V&4BR	•	•	•						
V&30#	•	•	•		V&6BR	•	•	•						
V&45#	•	•	•		1BRA			•						
V&60#	•	•	•		1.6BRA			•						
V&100#	•	•	•		2BRA			•						
V&150#	•	•	•		2.5BRA			•						
V&200#	•	•	•		4BRA			•						
V&300#	•	•	•		6BRA			•						
15#A			•		10BRA			•						
30#A			•		16BRA			•						
50#A			•		20BRA			•						
100#A			•		25BRA			•						
120#A			•											
200#A			•											
300#A			•											
500#A			•											

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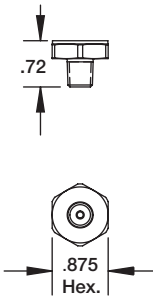
Table 3 - Pressure Connection Dimensions

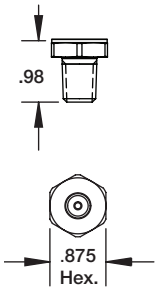
⅛ NPT Male
Code: M01

MAWP: 20,000 psi



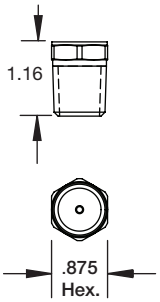
¼ NPT Male
Code: M02

MAWP: 20,000 psi



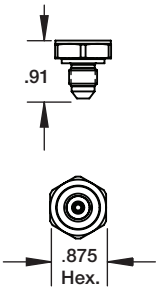
½ NPT Male
Code: M04

MAWP: 10,000 psi



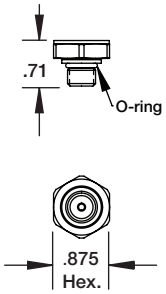
7/16-20 UNJF-3A 37° Flare (SAE AS4395)
Code: M76

MAWP: 20,000 psi



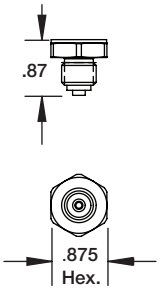
7/16-20 UNJF-2A SAE-Male (SAE J1926 O-Ring Boss seal)
Code: MEK

MAWP: 10,000 psi



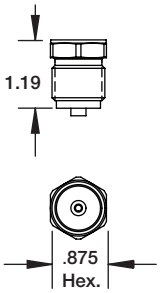
G¼ B-Male (EN837-1)
Code: MG2

MAWP: 20,000 psi



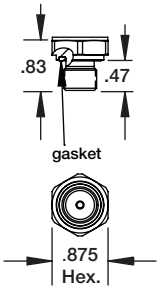
G½ B Male (EN837-1)
Code: MG4

MAWP: 20,000 psi



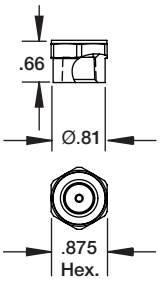
G¼ A-MALE (stud end DIN 3852-E G¼)
Code: MGA

MAWP: 10,000 psi



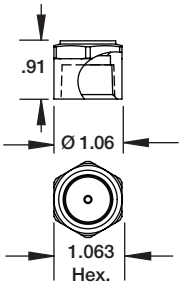
¼-18 NPT Female
Code: F02

MAWP: 10,000 psi



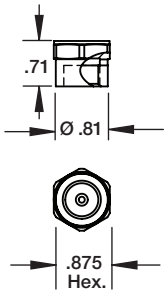
½-14 NPT Female
Code: F04

MAWP: 5,000 psi



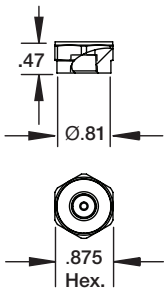
9/16-18 UNF-2B Female
Code: F09

MAWP: 25,000 psi



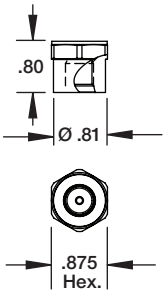
⅛-27 NPT Female
Code: F01

MAWP: 10,000 psi



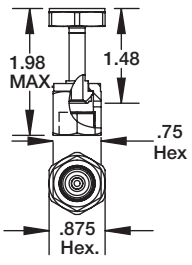
7/16-20 UNF-2B SAEJ1926
Code: FRW

MAWP: 9,100 psi



¼˝ VCR® gland with 9/16-18 Female Swivel Nut
Code: FV2

MAWP: 5,100 psi



¼˝ VCR® gland with 9/16-18 Male Swivel Nut
Code: MV2

MAWP: 5,100 psi

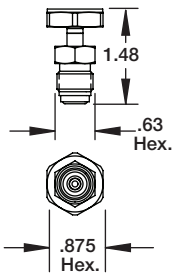


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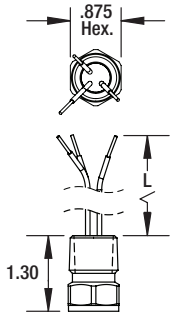
Table 4 - Electrical Connection Dimensions

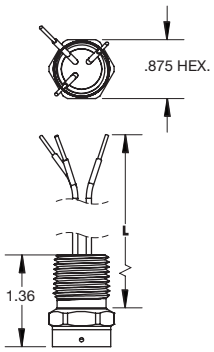
Maximum temperature range listed

½ NPT Conduit With Flying Leads

Code: CF
IP67 (NEMA 4X)
-40 °F to 176 °F (-40 °C to 80 °C)



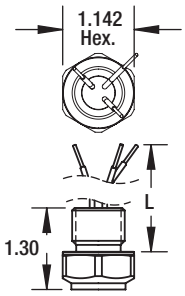
Unvented



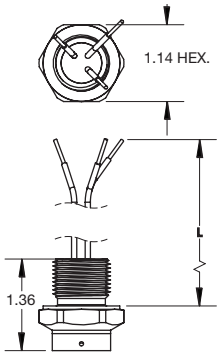
Vented

M20 Conduit With Flying Leads

Code: MF
IP67 (NEMA 4X)
-40 °F to 176 °F (-40 °C to 80 °C)



Unvented



Vented

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

Table 5 - Pressure Ranges

	PSI	bar	inHg
Vac.	VAC#	VACBR	VACIM
Compound	V&15#	V&1BR	V&30IM
	—	V&1.6BR	—
	V&30#	V&2BR	V&60IM
	V&45#	—	V&100IM
	V&60#	V&4BR	—
	—	V&6BR	—
	V&100#	—	V&200IM
	V&150#	—	—
	V&200#	—	—
	V&300#	—	—
Positive Pressure (psig)	1.5#	100MB	3IM
	5#	400MB	10IM
	—	600MB	—
	10#	—	20IM
	15#	1BR	30IM
	—	1.6BR	50IM
	30#	2BR	—
	—	2.5BR	—
	45#	—	—
	50#	—	100IM
	60#	4BR	
	75#	—	—
	—	6BR	—
	100#	—	200IM
	150#	10BR	300IM
	200#	—	—
	—	16BR	—
	250#	—	500IM
	300#	20BR	—
	—	25BR	—
	500#	—	1000IM
	—	40BR	—
	750#	—	—
	—	60BR	—
	1000#	—	—
	1500#	100BR	—
	2000#	160BR	—
	—	200BR	—
	2500#	—	—
	3000#	—	—
	—	250BR	—
	5000#	—	—
	—	400BR	—
	7500#	—	—
	—	600BR	—
	10000#	—	—
	15000#	1000BR	—
	20000#	—	—
Absolute Pressure (psia)	15#A	1BRA	30IMA
	—	1.6BRA	50IMA
	30#A	2BRA	—
	—	2.5BRA	—
	50#A	—	100IMA
	—	4BRA	—
	—	6BRA	—
	100#A	—	200IMA
	—	10BRA	300IMA
	200#A	—	—
	—	16BRA	500IMA
	300#A	20BRA	1000IMA
	500#A	25BRA	—

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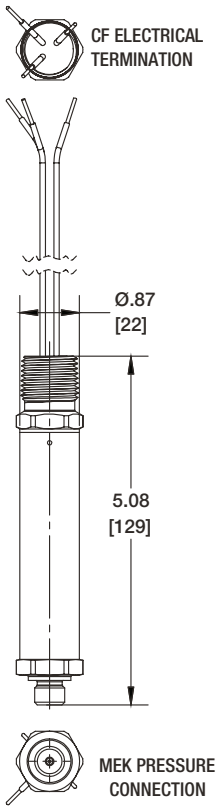
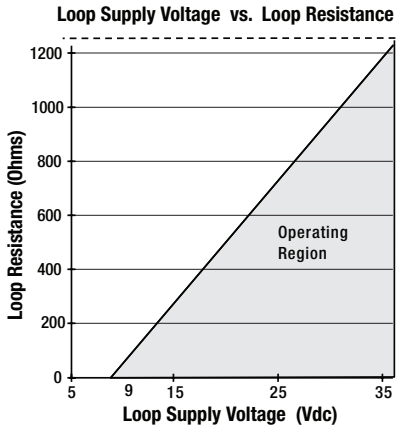
Dimensions

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*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

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

The 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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