NASHCROFT E2F EXPLOSION/FLAME PROOF PRESSURE TRANSDUCER **INSTALLATION MANUAL**



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.

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

Symptoms of fluid hammer and surge's damaging effects:

should be installed.

- 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.

©2022 Ashcroft Inc., 250 Fast Main Street. Stratford, CT 06614-5145, USA. Tel: 203-378-8281, Fax: 203-385-0499, www.ashcroft.com. All sales subject to standard terms and conditions of sale. e2f transducer i&m 011-10283 RevB 04-27-22

FREEZING

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

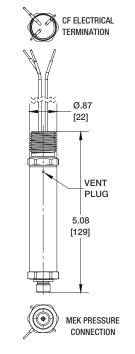
STATIC ELECTRICAL CHARGES:

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
- 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.

All units with a pressure range less than 500 psi include a small Porex filter in the unit. This is necessary to equalize the internal pressure of the unit with the atmospheric pressure. While the Porex filter is hydrophobic, if it not properly protected it may be a source of water ingress

WARNING ASHCROFT® E2F PRESSURE TRANSMITTER. TYPICAL DIMENSIONS AND CONSTRUCTION



GROUNDING

Installer must connect the device to appropriate earthing connection. This can be done via metallic plumbing, use of metallic conduit/ junction box, and/or earthing clamp/strap. DESCRIPTION

The Ashcroft® Model E2F is ideal for a broad range of pressure sensing requirements found in general and heavy industrial applications as well as applications in test and measurement. The E2F offers a wide variety of material, process and electrical connections to meet your application reguirements. It is designed for use with both liquids and gases it provides an accurate, reliable and highly repeatable output. This is accomplished through the use of an onboard microprocessor that is programmed during a unique digital compensation process to provide an extremely linear performance over the entire specified pressure and temperature range.

SPECIFICATIONS

Reference condition: 70 °F (21 °C)

Accuracy: $\pm 0.25\%$, $\pm 0.50\%$ or $\pm 1.00\%$ of Span Terminal Point (* includes linearity. hysteresis, repeatability zero offset and span)

Repeatability: $\leq \pm 0.1 \%$ of Span Stability: ±0.25% of Span / Year

Zero / Span Adjustment: ±5% of Span Standard Ranges: VAC to 20,000 psi

ENVIRONMENTAL SPECIFICATIONS

Enclosure Rating:

IIP67 Standard (FM Certified)

IP66 & NEMA 4X (Self-Certified by Ashcroft Inc.) **Temperature Limits:**

Storage Temp: -50 to 125 °C

Operating Ambient Temp: See drawing 825A030 for ambient temperature limits

Media Temp: See drawing 825A030 for media temperature limits.

* (0-100% R.H. non-condensing)

Temperature Coefficients: Zero & Span ±0.009%/°C within -40 to 80 °C

Vibration: Random: 10g RMS 20-2000 Hz **Shock:** 80g Peak, 6 msec, 3 axes, haversine

Proof pressure: 1.2X -2X the range **Burst pressure:** 3X-8X the range minimum **ELECTRICAL SPECIFICATIONS**









Power-Up Response Time: 100 msec **Current Source/Sink for Voltage Output:** 1mA (Source) / 0.1 mA (Sink) maximum Withstand/Breakdown: 100 Vdc / 100 Vac. Optional 500 Vdc / 500 Vac Insulation Resistance: >100M @ 30V RoHS2: Yes **MECHANICAL SPECIFICATIONS**

Supply Voltage:

9-36 Vdc

Explosion Proof Installations

Supply Voltage Output

Process Connections: Male NPT (1/8, 1/4 and

1/2), Female NPT (1/8, 1/4 and 1/2), 7/16-20 UNF SAE (Male and Female), MIL 33656 (UNJF ⁷/₁₆-20 w/ 37° Cone). G½" B EN837-1. G½" B EN837-1, G1/4" A DIN3852-E, Autoclave HP ⁷/₁₆" (AMINCO), ¹/₈" BSP Tapered Thread. 1/4" BSP Tapered Thread, 1/2" BSP Tapered Thread. ¼" Male VCR. ¼" Female VCR. R1/8 ISO 7/1,1.5" Tri-Clamp, 2.0" Tri-Clamp

Electrical Connections: ½" Conduit with Flying Leads: 18AWG 3 conductor, nonvented, M20 Conduit with Cable/Flying Leads.

Diaphragm Materials: 17-4PH Stainless steel, 316 Stainless steel or A286

INSTALLATION AND ASSEMBLY

14-36Vdc 0-10 Vdc. 1-11 Vdc. 0.1-10 Vdc **Supply Current:** <8 mA (Vout) All supply lines should be arranged so that Response Time (Output): 4 msec

> 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. Process connection:

4-20 mA, 20-4 mA (2-wire), 0-5 Vdc, 1-5 Vdc, 1-6V dc, 0.1-5 Vdc, 0.5-4.5 Vdc

the device.

 By authorized and qualified personnel only. All lines need to be depressurized when

there are no mechanical forces acting on

- the instrument is being connected.
- Appropriate steps must be taken to protect the device from pressure surges.
- Check the suitability of the device for the media to be measured.
- Maximum pressures shall be observed. Check that all connections are tight before use.

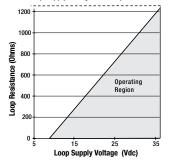
If during installation the pressure measuring lines are already under pressure, the zero point cannot be checked and no settings can be adjusted. In these cases, the device should only be connected electrically first.

Electrical connection:

See drawing 825A030 B for installation requirements.

EMC			
MC:	Directive 2014/30/EU, and EN61326-1, EN61326-2-3 (Industrial Env.)		
nmunity:	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	
missions:	EN 55011 (CISPR 11) Class A, G	roup 1 & FCC (47 CFR 15)	
	·		

FOR TRANSMITTERS WITH 4-20 mA OUTPUT SIGNAL. THE MINIMUM VOLTAGE AT THE **TERMINAL IS 9 VDC** Loop Supply Voltage vs. Loop Resistance



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

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

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

Shielded Cable

Units with shielded cable electrical termination, connect the drain wire to the guard terminal on the read out device or measuring instrument, if available. In all other cases connect to the ground or to the power supply negative terminal.

Range Type	Offset Value	Span Value
0 to Positive Pressure Range	0	Full Range
0 to Vacuum	Vacuum	0
Compound (Vac to pressure range)	Vacuum	Full Range
Absolute	Absolute Zero	Full Range Absolute

Offset and Span adjustments

- 1. WARNING! Disconnect the E2F transducer from the control system prior to performing offset and span adjustments. Activate calibration mode by first cycling
- power off and on, and then within 30 seconds tap the Ashcroft calibration magnet near the specified area on the E2F label. The initial code to enter the calibration mode is 1-3-1 (Tap the unit for one second, release. Tap unit for three seconds. release, tap unit for one second, release)

When the calibration mode has been activated the output signal on the transducer will drive from over range to under range.

- 2. At the offset pressure record output offset to be used in the span adjustment in step 4. Increase pressure to 100% of span, this will allow you to adjust the span of the unit. The span is adjustable to \pm -5% of full span. 3. Tap the magnet near specified area on
- the E2F label. Adjust span to desired span value plus the offset value recorded in step 3. (The span will increase from its current value up to +5% of scale. Once the output has reached the max value, the span will jump to -5% and continue to increase. (Note - holding the magnet in position while adjusting the span will increase the speed at which the span increases or decreases. Once you get close to your desired setting you should tap the magnet against the unit for finer adjustment. If you scroll past your desired value, repeat step three until you have reached vour desired span value.
- 4. Decrease the pressure to 0% of span. this will allow you to adjust the zero of the unit. The offset is adjustable to +/- 5% of full scale.

NASHCROFT

FOR HAZARDOUS LOCATIONS

FACTORY SEALED

ACCURACY:

PROOF:

OUTPUT:

a particular installation.

NOTE: Checkboxes provided on the label must be marked during installation. Installer

be sure to check each box as appropriate to indicate the protection methods used on

0 / 150 PSIG

290 PSIG

4 - 20 mA

WARNING-SPECIAL CONDITION OF USE-SEE INSTALLATION DWG. 825A030

REFER TO INSTALLATION MANUAL FOR SPECIFIC CONDITIONS OF USE

CL I DIV1 GRP ABCD T4 CL I Zone 1 AEx db IIC T4 Gb II 2 G Ex db IIC T4 Gb
CL II DIV1 GRP EFG T4 Zone 21 AEx tb IIIC T135°C Db

ZERO-SPAN ADJUST

DO NOT USE FOR OXYGEN SERVICE

WARNING: A failure resulting in injury or damage may be caused by pressure

beyond full scale, excessive vibration or pressure pulsation, excessive instrument

temperature, corrosion of the pressure containing parts or other misuse.

-40°C≤Tamb≤80°C

M20x1.5 THD

WETTED MAT'L: 17-4PH. 316L SS

± 0.25 % of SPAN

MAINTENANCE

5. Tap magnet near specified area on the

E2F label. Adjust the offset to the desired

value. (The offset will increase from its

current value up to +5% of scale. Once

continue to increase. (Note - holding the

magnet in position while adjusting the

offset will increase the speed at which

the offset increases or decreases. Once

you get close to your desired setting you

should release the magnet and tap it

against the unit for finer adjustment. If

step 6 until vou have reached vour de-

6. Once you have completed step 6, you can

7. Once you have verified the calibration, the

unit will exit the calibration mode after 30

seconds of magnetic inactivity. This will be

signaled by the output of the transducer

driving to over range, under range and

back to the normally calibrated output.

repeat step 3 through 6 to adjust or check

sired offset value.

vour calibration

Ashcroft Inc.

www.ashcroft.com

WHITE: N/C

BARE: DRAIN

RFD.

BLACK:

FM 18ATEX0080X EU IECEX FMG 20.001

IP67

East Main Street, Stratford, CT 06614

V+

GREEN: CASE GND

9-36 VDC

vou scroll past your desired value, repeat

the offset output has reached the max

value, the zero will jump to -5% and

The device does not require maintenance. In order to ensure reliable operation and a long service life of the device we recommend regular checking of the device as follows:

- Check the function in connection with system components.
- Check the tightness of the pressure connection lines.
- Check the electrical connections.

The exact test cycles have to be adapted to the operating and environmental conditions. The operating manuals of all other devices are also to be observed if there is an interaction of different device components.

TRANSPORT

The product must be protected against severe impacts therefore transport is to be effected only in the packaging intended for transport. SERVICE

E2F Transducers are not for repair. All defective or faulty devices are to be sent directly to Ashcroft Inc. We would ask you to coordinate all device returns with our inside sales department. Our inside sales department will issue an RMA number and give instructions on how to ship the return.

WARNING

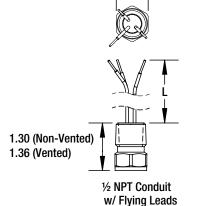
Remaining process media in and on dismantled measuring instruments may cause danger to persons, environment and equipment. Take reasonable precautions! Clean the instrument thoroughly if necessary. To return the unit please choose the original packaging or a packaging intended for transport.

DISPOSAL

Incorrect disposal can put the environment at risk. Kindly help us protecting the environment and dispose of or recycle the used products in accordance with the relevant regulations.

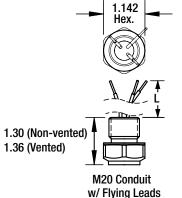
Flying Leads 4-20 mA Voltage Pin Ouput Output Color ٧+ Common (V-) Black Output N/C White Case GND Case GND Green

2 NPT Conduit With



IF	M20 X 1.5 Leads	Conduit F	lying
Pin	Voltage	4-20 mA	Wire
	Ouput	Output	Color
-	V+	V+	Red
-	Common (V-)	V-	Black
-	Output	N/C	White
-	Case GND	Case GND	Greer

Code "CF"



Code "MF"

WARNING: Special Conditions of Use. See Installation Drawing 825A030

E2F PRESSURE TRANSDUCER

Ashcroft Drawing 825A030

General Notes

- Control equipment connected to Associated Apparatus must not use or generate more than 250 Vrms or Vdc.
- Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
- Run shielded interconnection cable with shield connected to FM approved associated apparatus ground.

Warnings

- Do not disconnect equipment unless area is known to be non-hazardous.
- Substitution of components may impair suitability for hazardous (classified) locations.
- No revision to drawing without prior approval from FM

Special Conditions of Use

- The pressure transducer does not withstand a 500 Vrms dielectric strength test between the circuit and the earth ground. This must be taken into account during installation.
- Flamepaths are not for repair.
- The equipment has flying lead conductors that exit the enclosure. A suitably certified Ex d or Ex e terminal box is required to be connected to equipment enclosure for completing to external supply circuit.
- Installer must connect the device to appropriate earthing connection. This can be done via metallic plumbing, use of metallic conduit/ junction box, and/or earthing clamp/strap

©2022 Ashcroft Inc., 250 East Main Street, Stratford, CT 06614-5145, USA Tel: 203-378-8281, Fax: 203-385-0499, www.ashcroft.com. All sales subject to standard terms and conditions of sale. e2f transducer i&m 011-10283 RevB 04-14-22

E2F EXPLOSION/FLAME/DUST IGNITION PROOF INSTALLATION

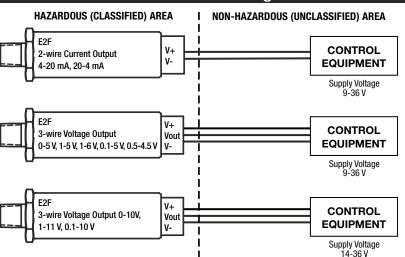
Class I, Division 1, Group A, B, C, D T4 -40° C \leq Ta \leq 80 $^{\circ}$ C Class II, Division 1, Group E, F, G T4 -40° C \leq Ta \leq 80 $^{\circ}$ C Class III T4 -40° C \leq Ta \leq 80 $^{\circ}$ C

Class I, Zone 1, AEx db IIC T4 Gb -40° C \leq Ta \leq 80°C Zone 21, AEx tb IIIC T135°C Db -40° C \leq Ta \leq 80°C

II 2 G Ex db IIC T4 Gb -40° C \leq Ta \leq 80 $^{\circ}$ C

II 2 D Ex tb IIIC T135°C Db -40°C \leq Ta \leq 80°C

- Installation should be in accordance with the National Code (ANSI / NFPA 70)
- Dust-tight conduit seal must be used when installed in Class II and Class III environments
- Use conduit and connectors suitable for the application. Seal all conduit using approved NEC procedures and local codes.



HAZARDOUS AREA CERTIFICATIONS APPROVED FM18US0309X CL I Div 1 A,B,C,D T4 CL II Div 1 E,F,G T4 CL III T4 FM FM18ATEX0080 EU IECEX FM G 20.0016X CL I, Zone 1 AEx db IIC T4 -40°C ≤ Ta ≤ 80°C Zone 21, AEx tb IIC 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 \leq Ta \leq 80°C

Factory Sealed M20X1.5 THD or ½ Male NPT IP67