

# ASHCROFT®

## E2 PRESSURE TRANSDUCER

### INSTALLATION MANUAL

**WARNING! READ BEFORE INSTALLATION**

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.

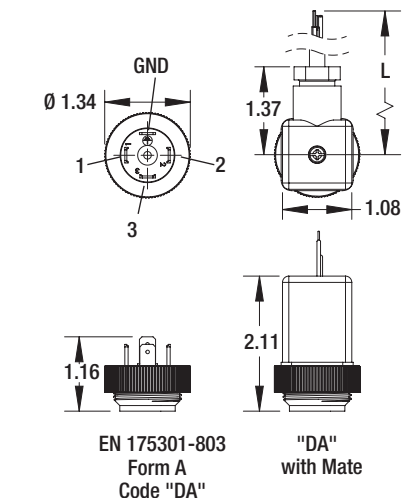
Liquid surges are particularly damaging to pressure transducers if the pipe is originally empty. To avoid damaging surges, fluid lines should remain full (if possible), pumps should be brought up to power slowly, and valves opened slowly. To avoid damage from both fluid hammer and surges, a surge chamber should be installed.

Symptoms of fluid hammer and surge's damaging effects:

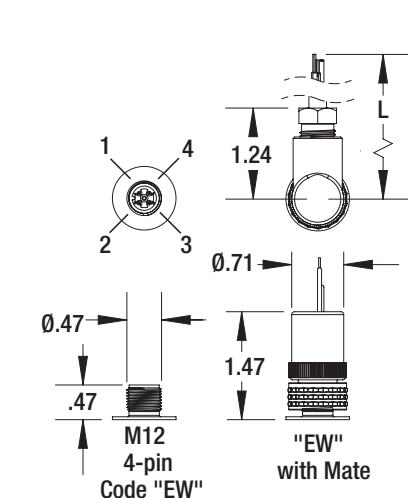
- Pressure transducer exhibits an output at zero pressure (large zero offset).
- Pressure transducer output remains constant regardless of pressure
- In severe cases, there will be no output.

©2019 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.  
e2\_transducer\_i&m\_RevB\_08-13-19

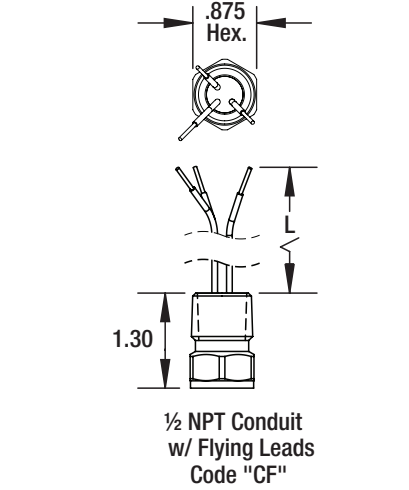
DA		Hirschmann EN 175301-803 Form A		
Pin	Voltage Output	4-20mA Output	Wire Color	
1	V+	V+	Red	
2	Common	V-	Black	
GND	Case GND	Case GND	Green	
3	Output	N/A	White	



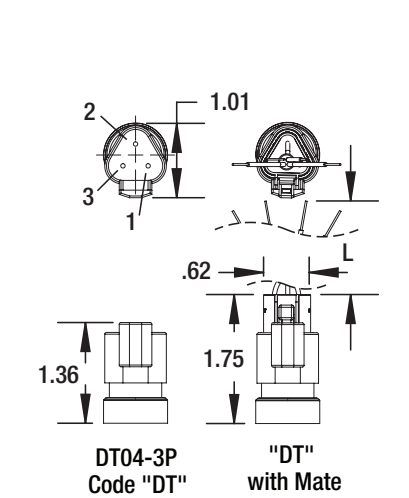
EW		M12 4-PIN		
Pin	Voltage Output	4-20mA Output	Wire Color	
1	V+	V+	Red	
2	Output	N/A	White	
3	Case GND	Case GND	Green	
4	Common	V-	Black	



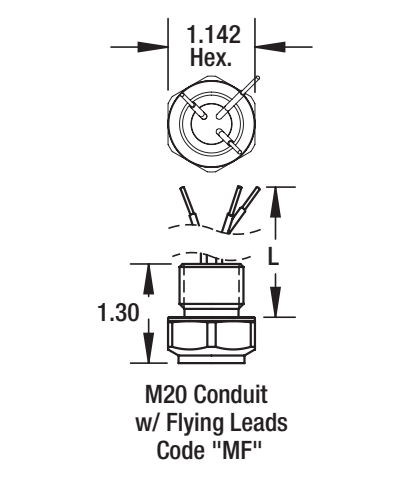
CF		1/2" NPT Conduit With Flying Leads		
Pin	Voltage Output	4-20mA Output	Wire Color	
-	V+	V+	Red	
-	Common	V-	Black	
-	Case GND	Case GND	Green	
-	Output	N/A	White	



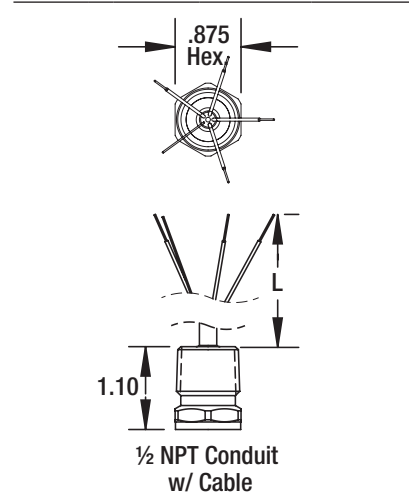
DT		DEUTSCH DT06-3S		
Pin	Voltage Output	4-20mA Output	Wire Color	
1	V+	V+	Red	
2	Output	V-	White	
3	Common	V-	Black	



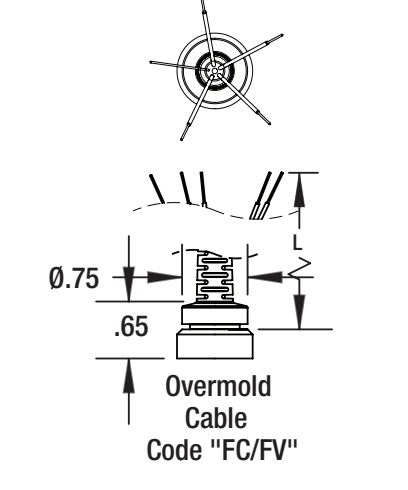
MF		M20 Conduit Flying Leads		
Pin	Voltage Output	4-20mA Output	Wire Color	
-	V+	V+	Red	
-	Common	V-	Black	
-	Output	N/A	White	
-	Case GND	Case GND	Green	



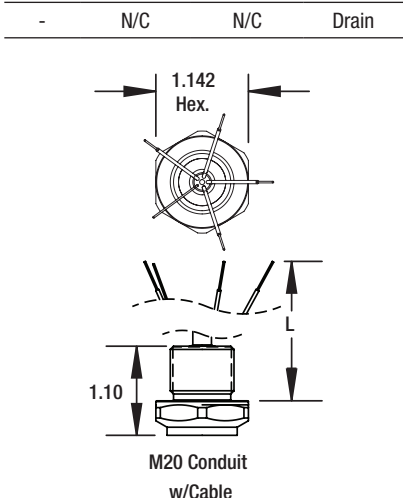
CC, CV		1/2" NPT Conduit With Cable		
Pin	Voltage Output	4-20mA Output	Wire Color	
-	V+	V+	Red	
-	V-	V-	Black	
-	Case GND	Case GND	Green	
-	N/C	N/C	Drain	



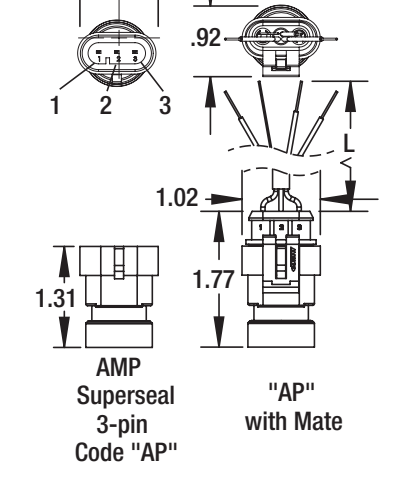
FC, FV		Over-mold Cable		
Pin	Voltage Output	4-20mA Output	Wire Color	
-	V+	V+	Red	
-	Common	V-	Black	
-	Output	N/A	White	
-	Case GND	Case GND	Green	



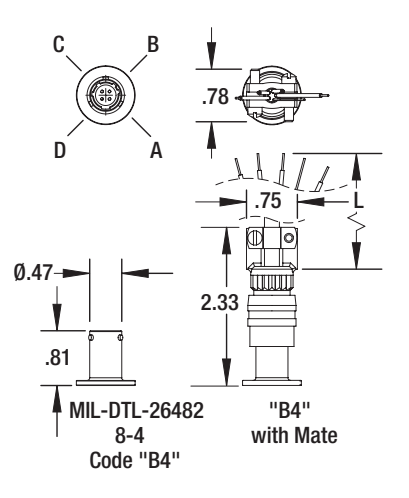
MC, MV		M20 Conduit With Cable		
Pin	Voltage Output	4-20mA Output	Wire Color	
-	V+	V+	Red	
-	V-	V-	Black	
-	Output	Output	White	
-	Case GND	Case GND	Green	
-	N/C	N/C	Drain	



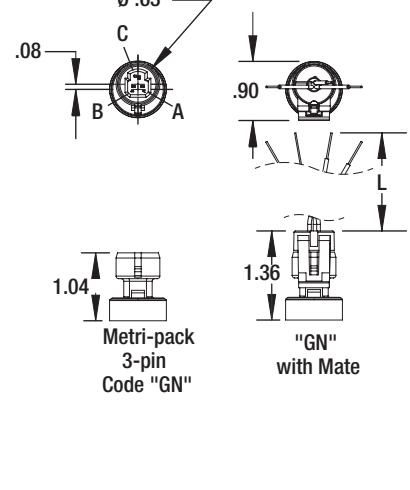
AP		AMP Superseal 3-Pin		
Pin	Voltage Output	4-20mA Output	Wire Color	
1	Common	V-	Black	
2	Output	V-	White	
3	V+	V+	Red	



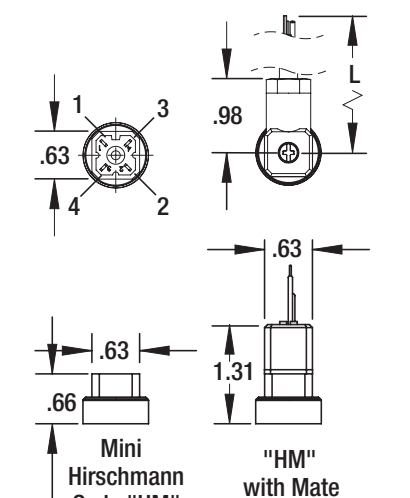
B4		MIL DTL 26482 4-Pin		
Pin	Voltage Output	4-20mA Output	Wire Color	
A	V+	V+	Red	
B	Output	N/A	White	
C	Case GND	Case GND	Green	
D	Common	V-	Black	



GN		3-Pin Metri Pack		
Pin	Voltage Output	4-20mA Output	Wire Color	
A	Common	V-	Black	
B	V+	V+	Red	
C	Output	V-	White	



HM		Mini-Hirschmann GW41F		
Pin	Voltage Output	4-20mA Output	Wire Color	
1	V+	V+	Red	
2	Common	V-	Black	
3	Output	V-	White	
4	Case GND	Case GND	Green	



## 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:

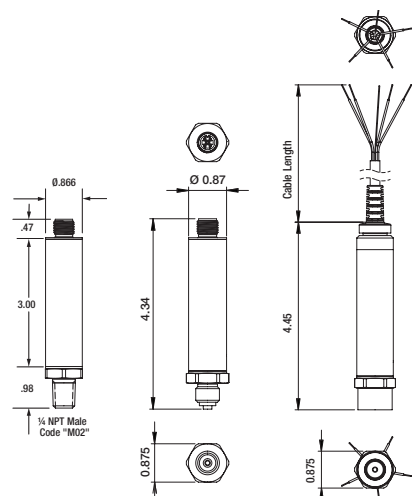
Any electrical device may be susceptible to damage when exposed to static electrical charges. To avoid damage to the transducer, observe the following:

- Operator/installer should follow the proper ESD (electrostatic discharge) protection procedures before handling the pressure transducer.

- 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.

## ASHCROFT® E2 PRESSURE TRANSMITTER, TYPICAL DIMENSIONS AND CONSTRUCTION



## ASHCROFT® E2 PRESSURE TRANSMITTER, AVAILABLE OPTIONAL HAZARDOUS LOCATION APPROVALS



## DESCRIPTION

The Ashcroft® Model E2 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 E2 offers a wide

variety of material, process and electrical connections to meet your application requirements. 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:** ±0.25%, ±0.50% or ±1.00% of Span Terminal Point (\* includes linearity, hysteresis, repeatability zero offset and span)

**Repeatability:** ≤ ±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:** IP66 standard, IP67 and IP69K Consult Factory

**Temperature Limits:**

**Storage Temp:** -50 to 125°C

**Operating Ambient Temp:** -40 to 125°C

**Media Temp:** -40 to 125°C

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

**Temperature Coefficients:** Zero & Span ±0.009%/°C within -40 to 125°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

## FUNCTIONAL SPECIFICATIONS

### ELECTRICAL SPECIFICATIONS

**Analog Output:** 4-20 mA, 20-4 mA (2-wire), 1-5Vdc, 1-6Vdc, 0-5Vdc, 0-10Vdc, 1-11Vdc, 0.1-5Vdc, 0.1-10Vdc, 0.5V-4.5Vdc

**Supply Voltage:**

9-36Vdc: (4-20mA, 1-5Vdc, 1-6Vdc, 0.1-5Vdc, 0.1-10Vdc)

14-36Vdc: (0-10Vdc, 0-11Vdc, 0.1-10Vdc)

**Supply Current:** <8 mA (Vout)

**Response Time (Output):** 4msec <8 mA

**Power-Up Response Time:** 100msec

**Current Source/Sink for Voltage Output:** 1 mA (Source) / 0.1mA (Sink) maximum

**Withstand/Breakdown:** 100 Vdc / 100 Vac. Optional 500Vdc / 500Vac

**EMC:** CE Industrial EN 61326-1, EN 61326-2-3, EN 61326-3

**ESD:** 4KV Contact/8KV Air IEC 61000-4-2

**RFI:** 10V/m 80-1000MHz IEC 61000-4-3

**EFT:** IEC 61000-4-4

**Surge:** IEC 61000-4-5 (shielded cable)

**Common Mode:** IEC61000-4-6

**Radiated Power Frequency:** IEC61000-4-8

**Conducted Emissions:** EN55011/FCC

**CE:** EMC

**Insulation Resistance:** >100M @ 30V

**RoHS2:** Yes

## MECHANICAL SPECIFICATIONS

**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), G1/4" B EN837-1, G1/2" 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, 1/4" Male VCR, 1/4" Female VCR, R1/8 ISO 7/1

**Electrical Connections:** Cable (vented and non-vented), 1/2" Conduit with shielded cable: 24AWG+drain vented or non-vented, 1/2" Conduit with Flying Leads: 18AWG 3 conductor, non-vented, M20 Conduit with Cable/ Flying Leads, Mini Hirschmann G, Bendix 4-pin MIL-DTL-26482(3112), M12 (4-pin), Form A EN175301-803 (DIN A43650), Form C EN 175301-803 (DIN C 43650), Deutsch DT04-3P or DTM04-3P, AMP Superseal, Me-tri-Pack 3-Pin Packard.

**Diaphragm Materials:** 17-4PH SS, 316SS or A286

## INSTALLATION AND ASSEMBLY

All supply lines should be arranged so that there are no mechanical forces acting on the device.

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:**

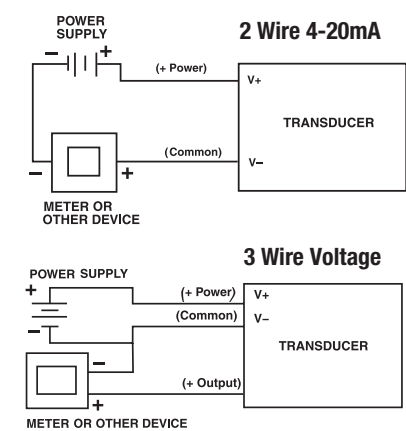
- By authorized and qualified personnel only.

- All lines need to be depressurized when 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.

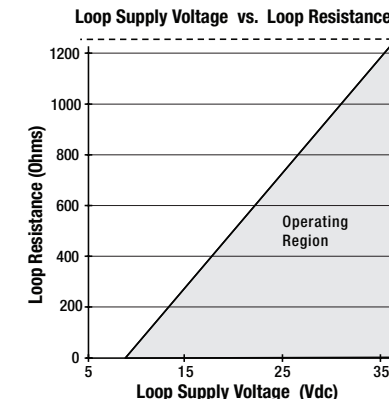
**Electrical connection:**

- By authorized and qualified personnel only.
- The electrical connection of the device shall be performed according to local electrical codes
- Turn off power before connecting the device.
- Connect only to Class 2 power supply



Power Supply Requirements		
Output Signal	Min Supply	Max Supply
0-5Vdc	9Vdc	36Vdc
1-5Vdc	9Vdc	36Vdc
1-6Vdc	9Vdc	36Vdc
0-10Vdc	14Vdc	36Vdc
1-11Vdc	14Vdc	36Vdc
0.1-5Vdc	9Vdc	36Vdc
0.1-10Vdc	14Vdc	36Vdc
0.5-4.5Vdc	9Vdc	36Vdc
4-20mA	9Vdc	36Vdc
20-4mA	9Vdc	36Vdc

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



$$V_{MIN} = 9V + (0.022 \cdot A \times R_{LOOP}) \text{ (*includes a 10\% safety factor)}$$

$$R_{LOOP} = R_{SENSE} + R_{WIRING}$$

$$R_{LOOP} = \text{Loop Resistance (Ohms)}$$

$$R_{SENSE} = \text{Sense Resistance (Ohms)}$$

$$R_{WIRING} = \text{Wire Resistance (Ohms)}$$

## Noise

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 E2G transducer from the control system prior to performing offset and span adjustments.
2. 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 E2G 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.

3. At the offset pressure record output offset to be used in the span adjustment in step 4.
4. Increase pressure to 100% of span, this will allow you to adjust the span of the unit. The span is adjustable to +/- 5% of full scale.
4. Tap the magnet near specified area on the E2G 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 your desired span value.

5. 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.

6. Tap magnet near specified area on the E2G label. Adjust the offset to the desired value. (The offset will increase from its current value up to +5% of scale. Once the offset output has reached the max value, the zero will jump to -5% and 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 you scroll past your desired value, repeat step 6 until you have reached your desired offset value.

7. Once you have completed step 6, you can repeat step 3 through 6 to adjust or check your calibration
8. 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.

## MAINTENANCE

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

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.

DC	Hirshman EN 175301-803 Form C		
Pin	Voltage Output	4-20mA Output	Wire Color
1	V+	V+	Red
2	Common	V-	Black
3	Output	N/A	White
GND	Case GND	Case GND	Green

