

## E2S Intrinsically Safe Pressure Transducer

### FEATURES

- FM, ATEX, IECEx Intrinsically-Safe approvals, FM Non Incendive approval
- Ranges vac through 1400 bar
- IP66/67 Ingress rating
- Wide selection of electrical & process connections available
- Customizable configurations
- External magnetic offset & span adjustment
- Barometric pressure ranges available (standard & custom ranges)
- SIL 3 Capable

### TYPICAL USES

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



E2S Pressure Transducer



### PERFORMANCE SPECIFICATIONS

Reference Temperature:	21 °C ±2 °C
Static Accuracy:	±0.25 % of span, ±0.50 % of span, ±1.0 % of span (0...100 mbar range only available in ±0.50 % and ±1.0 % accuracy) Terminal Point Method includes: hysteresis, linearity, repeatability, offset and span
Stability:	≤±0.25 % of span/year at reference conditions

### ENVIRONMENTAL SPECIFICATIONS

Thermal Coefficients:	Offset: ±0,09 % / 10 K (-40 to 125 °C) Span: ±0,09 % / 10 K (-40 to 125 °C)
Temperature Limits:	Storage: -50 °C to 125 °C Operating: -40 °C to 80 °C Media: -40 °C to 80 °C
Humidity:	0-100 % R.H. (non-condensing)

### FUNCTIONAL SPECIFICATIONS

Response Time (Output):	4 ms
Gauge/Compound Pressure Ranges:	-1 to 1400 bar Vacuum to 20,000 psi (see Table 6 at page 7)
Shock:	80 g, 6 ms, Haversine
Vibration:	Random: 10 g RMS 20-2000 Hz
Absolute Pressure Ranges:	0 to 1 up to 0 to 35 bar absolute 0 to 500 psia
Pressure:	Proof: 1,2x to 2x Burst: 3x to 8x (see Table 1 at page 2)

### KEY BENEFITS

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

### ELECTRICAL SPECIFICATIONS

Circuit Protection:	Reverse polarity protected
Output Signal:	Supply Voltage: (unregulated) Min. Max
0-5 Vdc (3 Wire)	9 Vdc 36 Vdc
1-5 Vdc (3 Wire)	9 Vdc 36 Vdc
1-6 Vdc (3 Wire)	9 Vdc 36 Vdc
0-10 Vdc (3 Wire)	14 Vdc 36 Vdc
1-11 Vdc (3 Wire)	14 Vdc 36 Vdc
0,1-5 Vdc (3 Wire)	9 Vdc 36 Vdc
0,1-10 Vdc (3 Wire)	14 Vdc 36 Vdc
0,5-4,5 Vdc (3 Wire)	9 Vdc 36 Vdc
4-20 mA (2 Wire)	9 Vdc 36 Vdc
20-4 mA (2 Wire)	9 Vdc 36 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

## E2S Intrinsically Safe Pressure Transducer

### 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 (1.4404)  
 C 316L Stainless steel, liquid isolated (1.4404)  
 D A286

Process Connection: Stainless steel 316L (1.4404)

### NON-WETTED MATERIAL

Housing: Stainless steel 316L (1.4404)

### APPROVALS

EMC: EU Directive 2014/30/EU  
CE Industrial EN 61326-1, EN 61326-2-3

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

RoHS: 2011/65/EU

Emissions: EN55011 (CISPR 11) Class A, Group 1  
FCC (47 CFR 15)

### HAZARDOUS AREA CERTIFICATIONS

#### Intrinsically Safe Installations

**FM**  
Class I, Division 1, Group A, B, C, D T4 -40 °C < Ta < 80 °C

**ATEX/IECEX**  
Class 1, Zone 0, AEx ia IIC T4 Ga -40°C < Ta < 80°C  
Class I, Zone 2, AEx ic IIC T4 Gc -40 °C < Ta < 80 °C

**CSA**  
Class 1, Division 1, Groups A, B, C, D T4, Ex ia -40°C < Ta < 80°C

Ex ia IIC T4 Ga -40°C < Ta < 80°C  
Ex ic IIC T4, Gc -40°C < Ta < 80°C

**ATEX**  
II 1 G Ex ia IIC T4 Ga -40°C < Ta < 80°  
II 3 G Ex ic IIC T4 Gc -40 °C < Ta < 80 °C

**IECEX**  
Ex ia IIC T4 Ga -40°C < Ta < 80°C  
Ex ic IIC T4 Gc -40°C < Ta < 80°C

#### Non-Incendive Installations

**FM**  
Class I, Division 2, Group A, B, C, D T4 -40 °C < Ta < 80 °C

**CSA**  
Class 1, Division 2, Groups A, B, C, D T4, -40°C < Ta < 80°C

### TABLE 1: PROOF & BURST PRESSURE MULTIPLIERS

Sensor Range	A Sensor - 17-4PH		B Sensor - 316 L		C Sensor - 316L ISO		D Sensor - A286	
	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	2x	8x	1.5x	8x	2x	5x		
60	2x	8x	1.5x	8x	2x	5x		
75	1.9x	8x	1.5x	8x	1.9x	5x		
100	2x	8x	1.5x	8x	3.0x	5x		
150	1.9x	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	2x	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	3.3x	7.7x		
V&60#	2x	8x	1.5x	8x	2x	5x		
V&100#	2x	8x	1.5x	8x	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		



## E2S Intrinsically Safe Pressure Transducer

ORDERING CODE	EXAMPLE:	E2S	B	3	C	MG4	42	DA	M	10	M	100BR	XNH
<b>Model</b>													
E2S	E2S Pressure Transducer; Intrinsically Safe	E2S											
<b>Sensor Materials - See Table 3 on page 4 for compatible ranges</b>													
A	17-4PH Stainless steel		B										
B	316L Stainless steel (1.4404)												
C	316L Stainless steel (1.4404); liquid isolated												
D	A286												
<b>Accuracy</b>													
3	0,25 % of span (not available for pressure range 0 ... 100 mbar)			3									
5	0,50 % of span												
7	1,00 % of span												
<b>Calibration Chart</b>													
N	Without calibration certificate												
C	Traceable calibration certificate				C								
<b>Pressure Connections - See Table 3 on page 5 for more connection styles</b>													
MG4	G 1/2 B Male (EN837-1)					MG4							
<b>Output Type</b>													
05	0-5 Vdc												
10	0-10 Vdc												
11	1-11 Vdc												
12	1-10 Vdc												
13	0.1-5 Vdc												
15	1-5 Vdc												
16	1-6 Vdc												
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>													
DA	Hirschmann angle connector acc. EN175301-803 Form A							DA					
<b>Mating Connector</b>													
M	With mating connector								M				
X	Without mating connector												
<b>Cable Length</b>													
<b>Max cable length of 9 m (30ft) for outputs 05, 10, 11, 12, 13, 15, 16 and 45. Max cable length of 30 m (99ft) for outputs 24 and 42</b>													
00	No cable												
XX	01 to 99									10			
<b>Unit of Length</b>													
F	Feet											M	
M	Meter												
N	Inches												
0	No cables												
<b>Pressure Ranges - Coding example only, see Table 5 on page 7 for more options</b>													
100BR	100 bar											100BR	
<b>Options (If choosing an option(s) must include a "X")</b>													
<b>Cleaning</b>													
6B	Cleaned for oxygen application ( not available with liquide (not available with liquid isolated sensor)												
6W	Cleaned for oxidizing processes other than Oxygen												
<b>Marking/Tagging</b>													
NH	Stainless steel tag wired (Information is required by the customer)												XNH
NN	Paper tag (Information is required by the customer)												
<b>Others</b>													
1L	SIL certification for E2 series Transducer												
<b>Testing/Certificates</b>													
CD2	Certificate according to EN 10204 2.2												



## E2S Intrinsically Safe Pressure Transducer

### ACCESSORY

Offset and Span Adjustment Magnet 266A143-01

Accessories must be ordered separately

**TABLE 2 - SENSOR PRESSURE RANGE**

psi	Sensor Material				bar	Sensor Material				inHg	Sensor Material			
	A 17-PH	B 316L	C 316 ISO	D A286		A 17-PH	B 316L	C 316 ISO	D A286		A 17-PH	B 316L	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			•											
300#A			•											
500#A			•											



## E2S Intrinsically Safe Pressure Transducer

**TABLE 3 - PRESSURE CONNECTION DIMENSIONS IN MM [INCH]**

<p><b>1/8 NPT MALE</b> Code: M01 MAWP: 1400 bar / 20,000 psi</p>	<p><b>1/4 NPT MALE</b> Code: M02 MAWP: 1400 bar / 20,000 psi</p>	<p><b>1/2 NPT MALE</b> Code: M04 MAWP: 700 bar / 10,000 psi</p>	<p><b>7/16-20 UNJF-3A 37° FLARE (SAE AS4395)</b> Code: M76 MAWP: 1400 bar / 20,000 psi</p>	<p><b>7/16-20 UNJF-2A SAE-MALE (SAE J1926 O-RING BOSS SEAL)</b> Code: MEK MAWP: 700 bar / 10,000 psi</p>
<p><b>G 1/4 B-MALE (EN837-1)</b> Code: MG2 MAWP: 1400 bar / 20,000 psi</p>	<p><b>G 1/2 B MALE (EN837-1)</b> Code: MG4 MAWP: 1400 bar / 20,000 psi</p>	<p><b>G 1/4 A-MALE (STUD END DIN 3852-E)</b> Code: MGA MAWP: 700 bar / 10,000 psi</p>	<p><b>1/4-18 NPT FEMALE</b> Code: F02 MAWP: 700 bar / 10,000 psi</p>	<p><b>1/2-14 NPT FEMALE</b> Code: F04 MAWP: 345 bar / 5,000 psi</p>
<p><b>9/16-18 UNF-2B FEMALE</b> Code: F09 MAWP: 1600 bar / 25,000 psi</p>	<p><b>1/8 -27 NPT FEMALE</b> Code: F01 MAWP: 700 bar / 10,000 psi</p>	<p><b>7/16-20 UNF-2B SAEJ1926</b> Code: FRW MAWP: 627 bar / 9,100 psi</p>	<p><b>1/4" VCR GLAND WITH 9/16-18 FEMALE SWIVEL NUT</b> Code: FV2 MAWP: 350 bar / 5,100 psi</p>	<p><b>1/4" VCR GLAND WITH 9/16-18 MALE SWIVEL NUT</b> Code: MV2 MAWP: 350 bar / 5,100 psi</p>

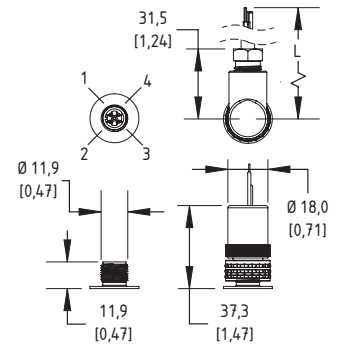
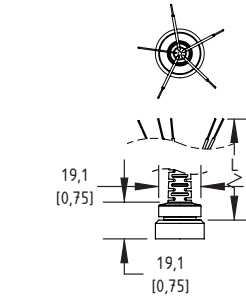
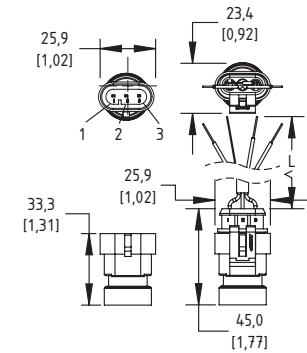
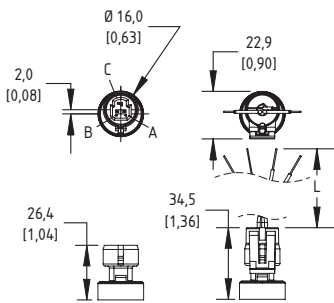


## E2S Intrinsically Safe Pressure Transducer

**TABLE 4 - ELECTRICAL CONNECTION DIMENSIONS IN MM [INCH]**

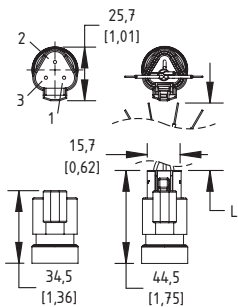
Maximum temperature range listed

METRI PACK 3-PIN	AMP SUPERSEAL 3-PIN	OVER-MOLD CABLE	M12 4-PIN
Code: GN – IP67 (NEMA 4X)	Code: AP – IP66 (NEMA 4X)	Code: FC, FV – IP67 (NEMA 4X)	Code: EW, RW – IP66 (NEMA 4X)
-40 °C to 85 °C	-40 °C to 85 °C	-40 °C to 85 °C	-40 °C to 85 °C



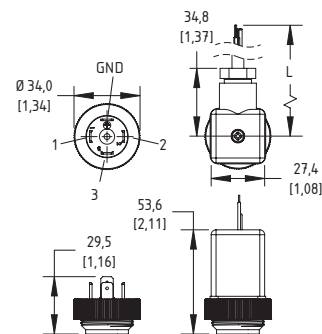
**DEUTSCH DT04 3-PIN**  
Code: DT – IP66 (NEMA 4X)

-40 °C to 85 °C



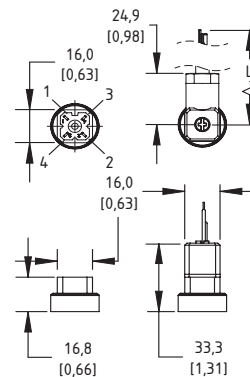
**HIRSCHMAN EN 175301-803 FORM A**  
Code: DA – IP66 (NEMA 4X)

-40 °C to 85 °C



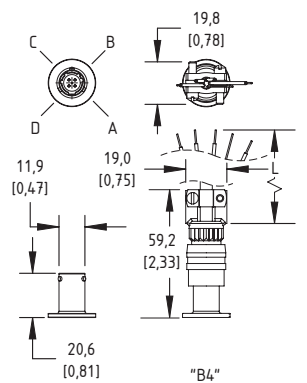
**MINI-HIRSCHMAN**  
Code: HM – IP66 (NEMA 4X)

-40 °C to 85 °C



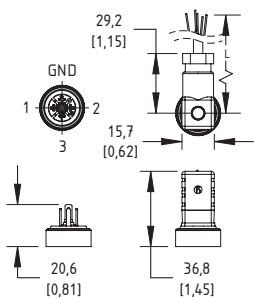
**MIL DTL 26482 8 4-PIN**  
Code: B4 – No IP or NEMA rating

-25 °C to 105 °C



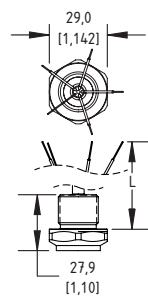
**HIRSCHMAN EN 175301-803 FORM C**  
Code: DC  
IP66 (NEMA 4X)

-40 °C to 85 °C



**M20 CONDUIT WITH CABLE**  
Code: MC, MV<sup>(1)</sup> – IP67 (NEMA 4X)

-40 °C to 125 °C



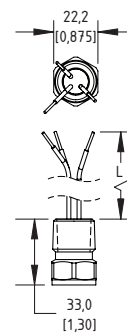
**1/2" NPT CONDUIT WITH CABLE**  
Code: CC, CV<sup>(1)</sup> – IP67 (NEMA 4X)

-40 °C to 125 °C



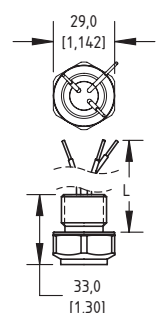
**1/2" NPT CONDUIT WITH FLYING LEADS**  
Code: CF  
IP67 (NEMA 4X)

-40 °C to 125 °C



**M20 CONDUIT WITH FLYING LEADS**  
Code: MF  
IP67 (NEMA 4X)

-40 °C to 125 °C



(1) indicates vented cable

Ashcroft Instruments GmbH

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For more information on support and local partners please visit our web page at [ashcroft.eu](http://ashcroft.eu) or follow the QR-Code



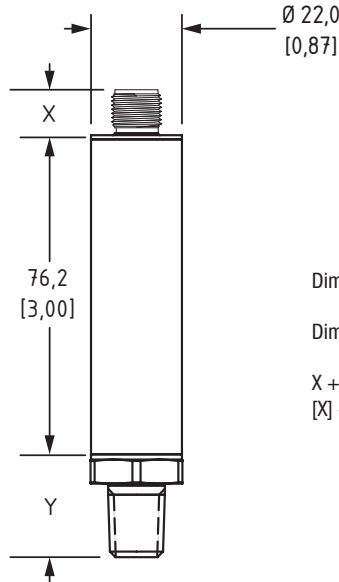
## E2S Intrinsically Safe Pressure Transducer

**TABLE 5 - PRESSURE RANGES**

Vac.	PSI	bar	inHg
	VAC#	VACBR	VACIM
	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#	—	—
	1.5#	100MB	3IM
	5#	400MB	10IM
	—	600MB	—
	10#	—	20IM
	15#i	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	—
	1000#	—	—
	15000#	1000BR	—
	20000#	—	—
	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
	—	20BRA	—
	500#A	—	—

**DIMENSIONS IN MM [INCH]**

For reference only, consult Ashcroft for specific dimensional drawings



Dimensions for X can be found on page 6

Dimensions for Y can be found on page 5

$X + Y + 76.2 \text{ mm} = \text{total length in mm}$   
 $[X] + [Y] + 3.00" = \text{total length in inches}$

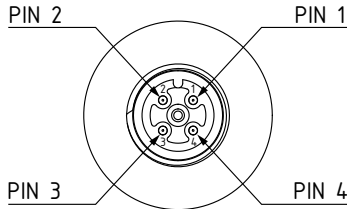


## E2S Intrinsically Safe Pressure Transducer

### PIN ASSIGNMENT

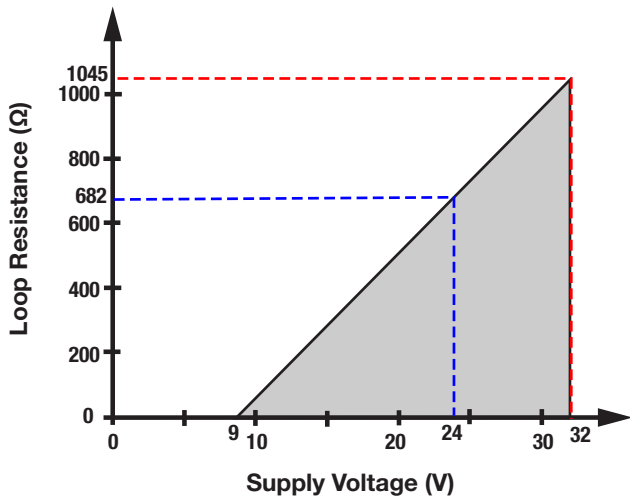
All other pin assignments are shown in the instruction manual

### CODE EW AND RW



	PIN 1	PIN 2	PIN 3	PIN 4
<b>EW CURRENT</b>	V+	Case ground	V-	V-
<b>EW VOLTAGE</b>	V+	Case ground	Common	Output
<b>RW CURRENT</b>	V+	V-	Case ground	V-
<b>RW VOLTAGE</b>	V+	Output	Case ground	Common

### LOAD LIMITATIONS 4-20 MA OUTPUT ONLY



- Maximum allowed loop resistance for a 32 VDC supply network
- Example (loop resistance of 682 Ω required a minimum supply voltage of 24 VDC)

$$V_{MIN} = 9 V + [0.022 A * x (R_L)]$$

(\*includes a 10% safety factor)

$$R_L = R_s + R_w$$

$R_L$  = Loop Resistance (Ω)  
 $R_s$  = Sense Resistance (Ω)

**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 E2S has ±0.25% of span accuracy out of the box. Zero and span setting errors are already included in the ±0.25% of span accuracy spec.

The E2S 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.

