

**BALLUFF**

Available from Cross Automation 800.866.4568

 **ICROPULSE™** **Ex**  
Explosion Proof Linear Transducer



CLASS I, DIV I

CENELEC

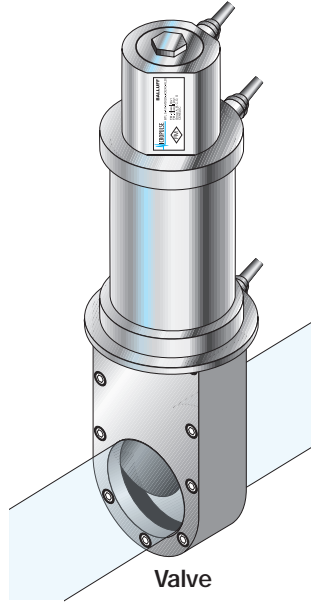
 **ICROPULSE™**



**Technical Description**

Obtaining position feedback or liquid level information is a critical part of many automation processes. Without accurate, reliable measurement feedback, quality and productivity suffer. The Micropulse line of linear transducers has been providing a high level of linear measurement for years. Now with the Micropulse Ex, this proven measurement technology is available for use in the most hazardous locations.

Micropulse Ex transducers incorporate some of the most advanced features found in any magnetostrictive linear transducer. Patented auto-tuning electronics help reduce maintenance and repair cost. Auto-tuning also compensates for any performance changes caused by temperature fluctuations, allowing the Micropulse to provide consistent, stable accuracy over a temperature range of -40 to 185°F. Enhanced wave-guide material provides a higher level of resistance to



**Valve**

shock and vibration. Inherently accurate, the Micropulse Ex features resolution to <math><2\mu\text{m}</math> and linearity of  $\pm 0.02\%$

Micropulse Ex transducer packs years of Micropulse refinements into a self-contained, stainless steel housing rated IP68. Micropulse Ex meets FM and CENELEC approvals, eliminating the need for intrinsically safe barriers and creating a gain in price and performance.



**Features**

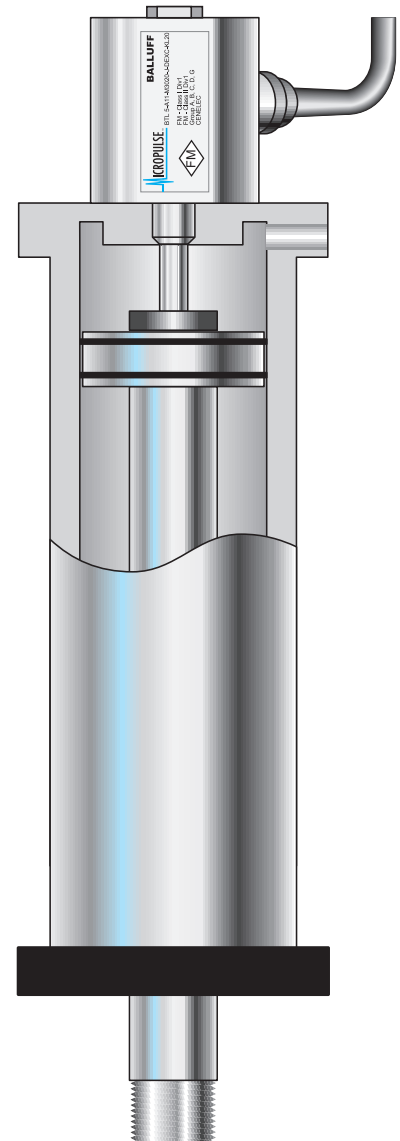
- Meets the highest FM and CENELEC approvals
- Eliminate the need for IS barriers
- Completely self-contained unit
- Solid stainless steel housing sealed to IP68 standards
- Operates from 24Vdc or  $\pm 15\text{Vdc}$
- Analog or digital output options interface with any control system

**Approvals**

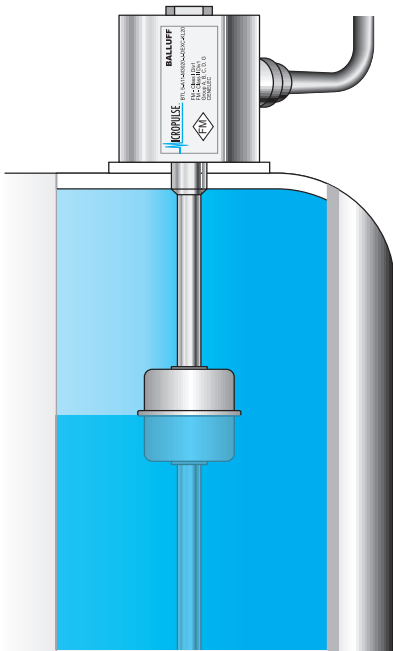
- FM- Class I Div 1, Group A,B,C,D
- FM - Class II div 1, Group E,F,G
- Cenelec - II 2 G Ex d IIC T6 IP68

**Applications**

- Liquid level measurement
- Turbine applications
- Grain elevator
- Petroleum applications
- Mining
- Paint manufacturing
- Valve Control



**Cylinder**



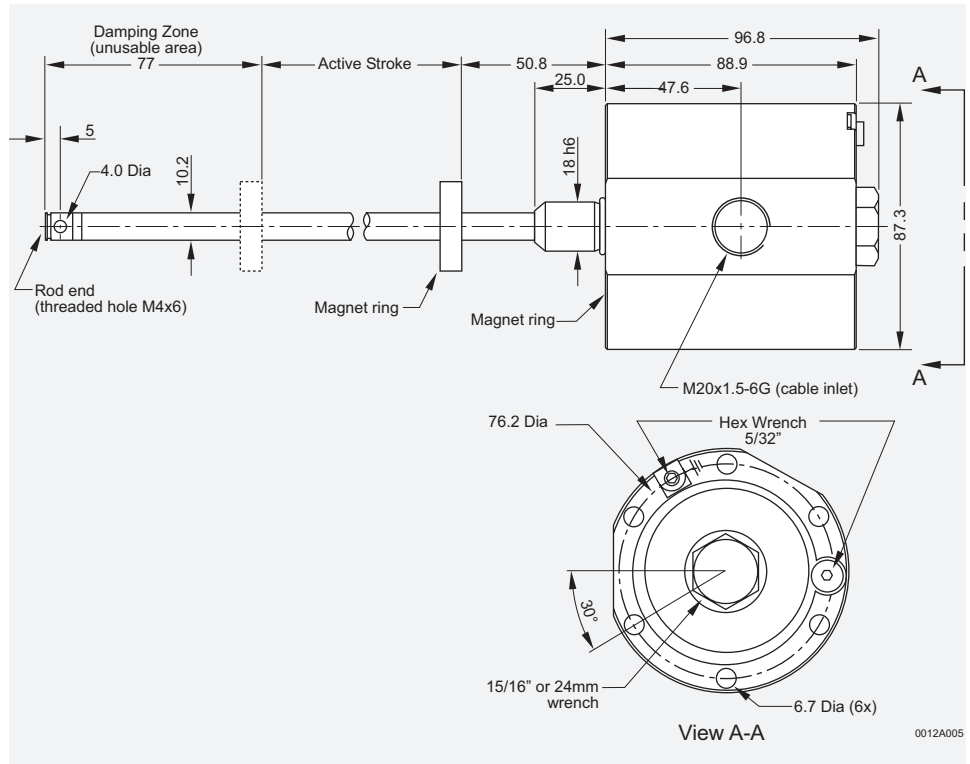
**Liquid Level**

**Micropulse  
Ex**

Dimensions  
General Specifications

Series	
Approvals	
Output Signals	

Explosion Proof
FM - Class 1 Div 1, Group A,B,C,D
Analog & Digital Pulse



**Ordering Code**

BTL-5-\_-\_-\_-J-DEXC-KL20 (see next page)

Measurement type	
Measurement range	
Shock rating	
Vibration rating	
Environmental protection	
Housing material	
Pressure rating (rod)	
Operating temperature	
Storage temperature	
Humidity	
Connection type	
Compatible magnets	
Approvals	

Linear displacement
51mm (2 in) to 3556mm (140 in)
100 g for 6 ms (100 g for 2 ms continuous) per IEC 68 2-27
12g, 10 to 2000 Hz per IEC 68-2-6
IP68
316 stainless steel
600 bar (8700 PSI) max
-40 to + 185° F
-40 to + 212° F
<90% non-condensing
Terminal blocks via rigid conduit (see accessories for approved conduit adapter)
See accessories
FM - Class I Div 1, Groups A,B,C,D
Class II Div 1m Groups E,F,G
CENELEC - II 2 Eex d IIC T6 IP68

Rigid conduit adapter must be ordered separately.

Compatible magnets are found on page 5.

**Warning:**

Proper installation of the Micropulse Ex is essential. All installation instructions and precautions are outlined in the Micropulse Ex manual, provided with every unit. Pre-sale copies are available at <http://www.balluff.com/explosionproof> or by request.



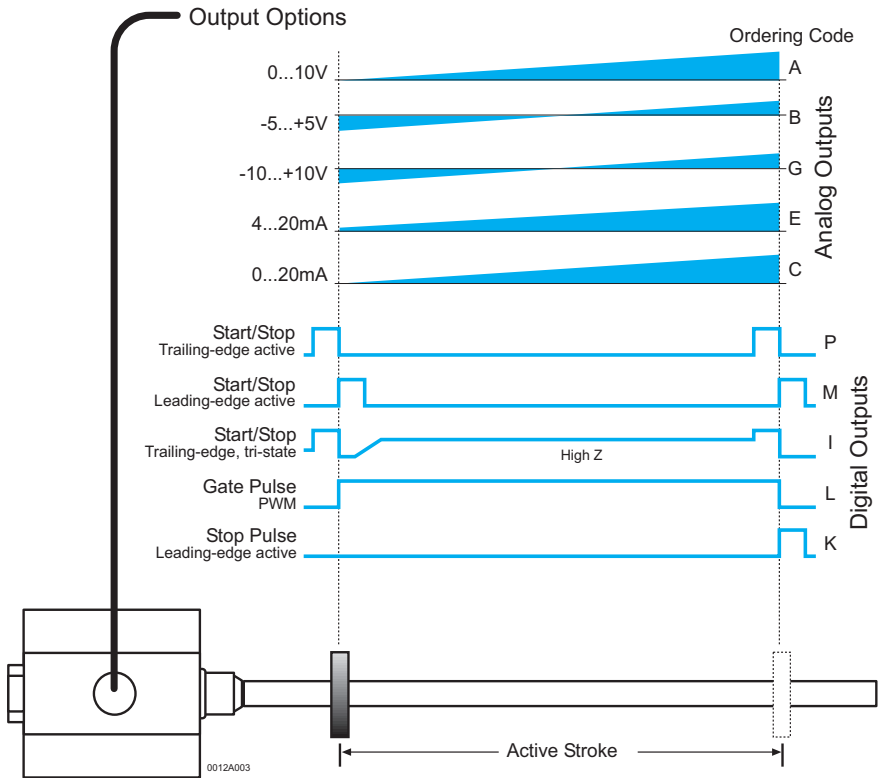
Electrical Interface	Analog Voltage	Analog Current	Digital Start/Stop & PWM
Electrical Type	A, B, G	E, C	P, M, I, L, K, N
Part No. Code	A, B, G	E, C	P, M, I, L, K, N
Output	0...+10V, -5...+5V, -10...+10V	0...20 mA, 4...20 mA	RS422/RS485 Compatible START/STOP or PWM
Output Load	>2K $\Omega$ (5 mA max)	>500 $\Omega$	>per spec
Resolution	<0.1 mV	<0.2 $\mu$ A	Controller dependent
Non-linearity	$\pm$ 100 $\mu$ m to 500 mm stroke, $\pm$ 0.02 % over 500 mm stroke	$\pm$ 100 $\mu$ m to 500 mm stroke, $\pm$ 0.02 % over 500 mm stroke	$\pm$ 100 $\mu$ m to 500 mm stroke, $\pm$ 0.02 % over 500 mm stroke
Repeatability (resolution + hysteresis)	0.5 mV or 5 $\mu$ m (whichever is greater)	0.5 mV or 5 $\mu$ m (whichever is greater)	0.5 mV or 5 $\mu$ m (whichever is greater)
Hysteresis	$\leq$ 4 $\mu$ m	$\leq$ 4 $\mu$ m	$\leq$ 4 $\mu$ m
Sampling rate	500 Hz stroke >2000 mm 1000 Hz stroke <2000 mm	500 Hz stroke >2000 mm 1000 Hz stroke <2000 mm	500 Hz stroke >2000 mm 1000 Hz stroke <2000 mm
Temperature Coefficient	[150 $\mu$ V/ $^{\circ}$ C + (5 ppm/ $^{\circ}$ C*P*V/ NL)]* $\Delta$ T	[0.6 $\mu$ A/ $^{\circ}$ C + (10 ppm/ $^{\circ}$ C*P*V/NL)] * $\Delta$ T	(6 $\mu$ m + 5 ppm *stroke length)/ $^{\circ}$ C
Operating voltage	24 Vdc $\pm$ 20% or 15 Vdc $\pm$ 2%	24 Vdc $\pm$ 20% or 15 Vdc $\pm$ 2%	24 Vdc $\pm$ 20% or 15 Vdc $\pm$ 2%
Operating current	<150 mA (at 1K Hz sampling rate)	<150 mA (at 1K Hz sampling rate)	<150 mA (at 1K Hz sampling rate)

**Notes:**

Analog voltage output versions incorporate both rising and falling outputs. Analog current version must be ordered as rising or falling outputs.

\*Temperature coefficient variables:

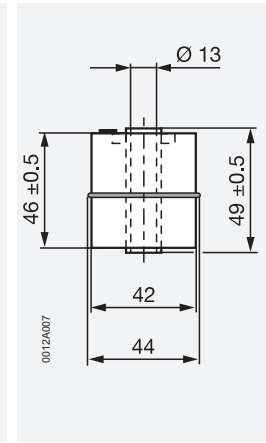
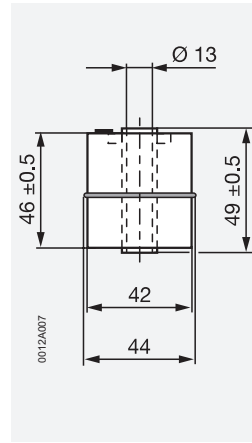
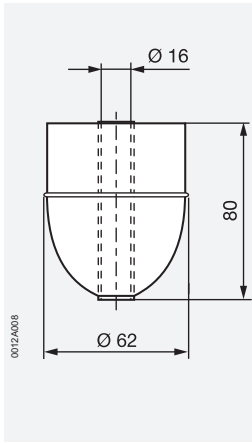
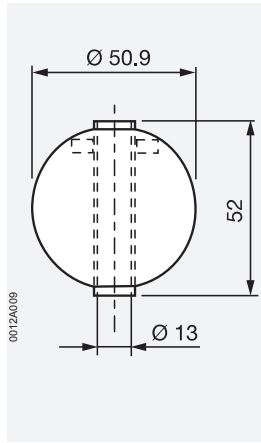
- V = output range in V
- $\Delta$ I = output range in ma
- T = temperature change
- P = magnet position



Output options for the Micropulse Ex

- FM - Class I Div 1  
Group A, B, C, D
- FM - Class II Div 1  
Group E, F, G
- Cenelec - II 2 G Ex d  
IIC T<sub>B</sub> IP68

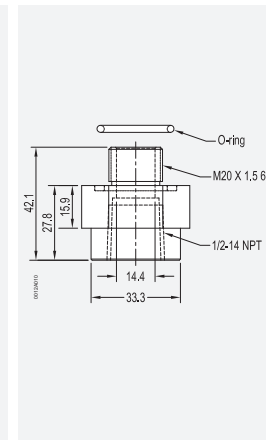
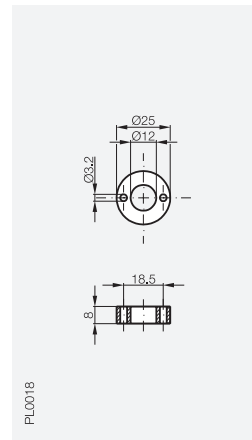
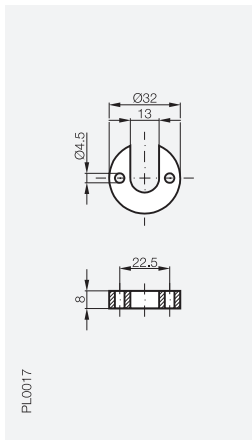
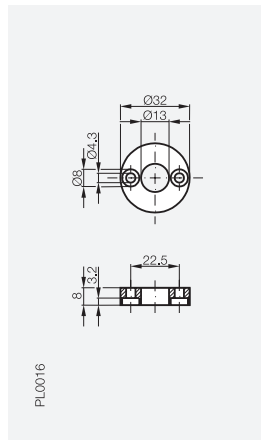
Product Type	Ex rated float magnet	M12x1	M12x1	M12x1
	<b>Sphere</b>	<b>Bullet</b>	<b>Barrel</b>	<b>Barrel</b>



<b>Ordering Code</b>	<b>BTL-2-S-5113-4K-EX</b>	<b>BTL-2-S-6216-4K-EX</b>	<b>BTL-2-S-4414-4Z01-EX</b>	<b>BTL-2-S-4414-4Z-EX</b>
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Min density	0.7 g/cm <sub>3</sub>	0.6 g/cm <sub>3</sub>	0.85 g/cm <sub>3</sub>	0.7 g/cm <sub>3</sub>
Immersion depth in 1 g/cm <sub>3</sub> (H <sub>2</sub> O)	26	41	45	30
Immersion depth in 0.7 g/cm <sub>3</sub>	40	57	sinks	39

Product Type	magnet	magnet	magnet	Adapter
	<b>Ø32 ring</b>	<b>Ø32 open ring</b>	<b>Ø25 ring</b>	<b>rigid conduit</b>



<b>Ordering Code</b>	<b>BTL-P-1013-4R</b>	<b>BTL-P-1013-4S</b>	<b>BTL-P-1012-4R</b>	<b>BTL-5-EXP-PROOF-ADAPTER</b>
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Material	Aluminum	Aluminum	Aluminum	Stainless Steel
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**MICROPULSE™ Ex**

Explosion Proof Linear Transducer



**Ordering Code- Analog Output**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
B	T	L	-	5	-	A	1	1	-	M	0	3	0	5	-	J	-	D	E	X	C	-	K	L	2	0

**Balluff - Transducer - Linear**

**Generation 5**

**Output**

- A = 0 to 10 Vdc      I = differential Start/Stop with tri-state
- B = -5 to +5 Vdc    K = differential Stop - leading edge active
- C = 0 to 20 mA      L = differential pulse width modulated
- E = 4 to 20 ma      M = differential Start/Stop - leading edge active
- G = -10 to +10 Vdc P = differential Start/Stop - trailing edge active

**Supply Voltage**

- 1 = +24 V DC (± 20%), 2 = ±15 Vdc (± 2%)

**Output Signal**

- Characteristic
- 1 = increasing and decreasing (voltage output only)
- 0 = increasing only (current output)
- 7 = decreasing only (current output)

**Stroke Length** (in millimeters)

*see table of standard lengths*

**Housing Style**

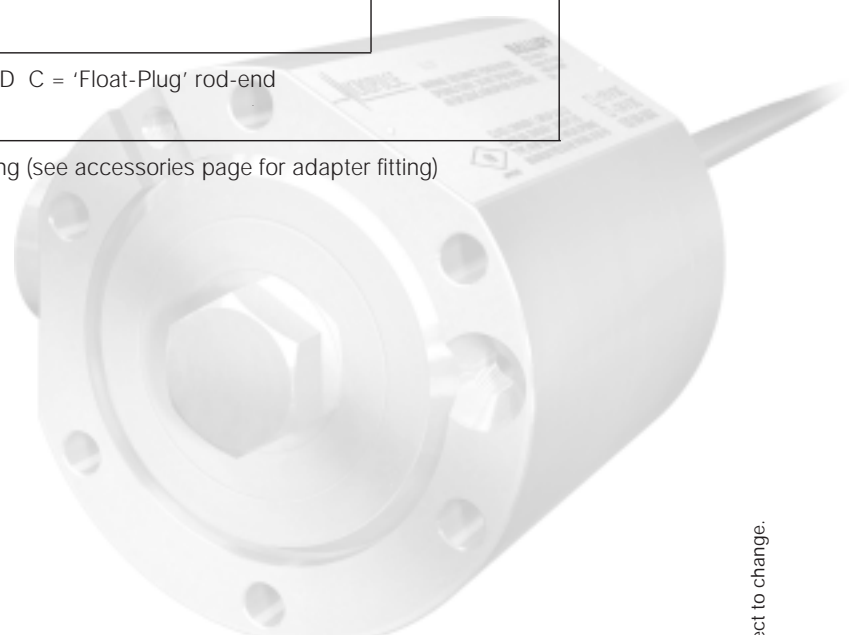
- J = Rod Style, Smooth Flange, O-ring seal

**Rating Code**

- DEX = Explosion-Proof - Class 1 Div 1, Groups A,B,C,D C = 'Float-Plug' rod-end

**Electrical Connection Style**

- KL20 = Internal screw terminals, M20 x 1.5 thread fitting (see accessories page for adapter fitting)



<b>Standard Stroke Length</b>			
inches	mm	inches	mm
2	0051	30	0762
3	0076	32	0813
3.5	0090	36	0914
4	0102	40	1016
5	0127	42	1067
6	0152	48	1220
7	0178	50	1270
8	0203	54	1372
9	0230	60	1524
10	0254	66	1676
11	0280	69	1753
12	0305	72	1829
13	0330	78	1981
15	0381	84	2134
16	0407	89	2261
18	0457	98	2490
20	0508	108	2743
22	0560	118	2997
24	0610	120	3048
26	0661	126	3200
28	0711	140	3556

Available from Cross Automation 800.866.4568

<http://www.balluff.com>

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