PT1DN

Cable Actuated Sensor
Industrial Grade
DeviceNET® Communication

Absolute Linear Position to 50 inches (1270 mm)

Aluminum and Polycarbonate Enclosure

Compact Design

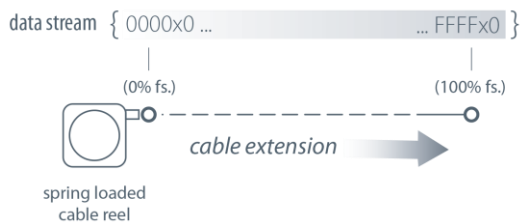**IP65 • NEMA 4 Protection**

3.3" [83 mm]   3.9" [98 mm]

The PT1DN communicates to your PLC over DeviceNET® and provides a precision position feedback signal for full-scale measurement ranges from 2 to 50 inches. Because the PT1DN uses a potentiometer as its sensing element, the position signal is "absolute" and does not have to be reset to a "home" position upon startup.

The PT1DN is part of our compact line of cable-extension transducers and is perfect where space is limited.

data stream { 0000x0 ...   ... FFFFx0 }

(0% fs.)   (100% fs.)

cable extension

spring loaded
cable reel

General

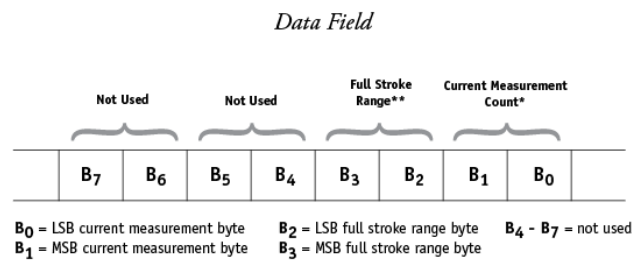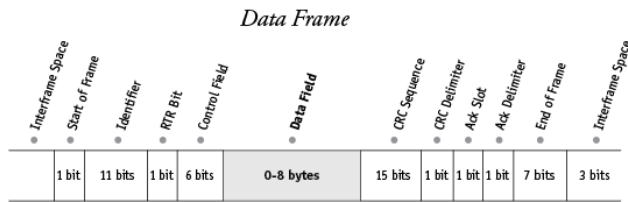|	
Full Stroke Range	0-2 to 0-50 inches
Electrical Interface	CANbus ISO 11898
Protocol	DeviceNET version 2.0
Accuracy	± 0.25% to ± 0.10% full stroke (see ordering information)
Repeatability	± 0.02% full stroke
Resolution	± 0.003% full stroke
Measuring Cable	.019-in. dia. nylon-coated stainless steel
Enclosure	glass-filled polycarbonate and black anodized aluminum
Sensor	plastic-hybrid precision potentiometer
Potentiometer Cycle Life	see ordering information
Maximum Retraction Acceleration	see ordering information
Weight	1 lb. max.

Electrical

Input Voltage	bus powered
Input Current	40 mA
Address Setting/Node ID	0...63 set via DIP switches (default setting: 63)
Baud Rate	125K, 250K or 500K set via DIP switches
EDS File	available @ http://www.celeso.com/download

Environmental

Environmental Suitability	NEMA 4, IP 67
Operating Temperature	0° to 185°F (-17° to 85°C)
Vibration	up to 10 g to 2000 Hz maximum

I/O Format

Data Frame

	1 bit	11 bits	1 bit	6 bits	0–8 bytes	15 bits	1 bit	1 bit	1 bit	7 bits	3 bits

Interframe Space · Start of Frame · Identifier · RTR Bit · Control Field · **Data Field** · CRC Sequence · CRC Delimiter · Ack Slot · Ack Delimiter · End of Frame · Interframe Space

Data Field

	Not Used		Not Used		Full Stroke Range**		Current Measurement Count*	
	B_7	B_6	B_5	B_4	B_3	B_2	B_1	B_0

B_0 = LSB current measurement byte B_2 = LSB full stroke range byte $B_4 - B_7$ = not used
B_1 = MSB current measurement byte B_3 = MSB full stroke range byte

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*Current Measurement Count

The **C**urrent **M**easurement **C**ount (**CMC**) is the output data that indicates the present position of the measuring cable.

The CMC is a 16-bit value that occupies the first two bytes (B_0 and B_1) of the data field. B_0 is the LSB (least significant byte) and B_1 is the MSB (most significant byte).

The CMC starts at 0000H with the measuring cable fully retracted and continues upward to the end of the stroke range stopping at FFFFH. This holds true for all ranges.

**Full Stroke Range

The **F**ull **S**troke **R**ange (**FSR**) is a 16-bit value in the data field that expresses the full range of the sensor in inches. This value can be used to convert the actual count to units of measurement should the application require it.

The full stroke measurement range occupies the second two bytes (B_2 and B_3) of the data field.

B_2 is the LSB (least significant byte) and B_3 is the MSB (most significant byte).

This value is expressed in inches.

Example:

Hex Value	Decimal Equivalent	Full Stroke Range
001E	30	30 inches

Converting CMC to Inches

If required, the CMC can easily be converted to a linear measurement expressed in inches instead of just counts.

This is accomplished by first dividing the CMC by 65,535 (total counts over the range) and then multiplying that value by the FSR:

$$\left(\frac{CMC}{65,535} \right) \text{X} \quad FSR$$

Example:

If the full stroke range is **30 inches** and the current position is **OFF2 Hex** (4082 Decimal) then,

$$\left(\frac{4082}{65,535} \right) \text{X} \quad 30.00 \text{ inches} = 1.87 \text{ inches}$$

Address Setting (Node ID), Baud Rate and Bus Termination Settings

Address Setting (Node ID)

The Address Setting (Node ID) is set via 6 switches located on the 8-pole DIP switch found on the DeviceNET controller board located inside the transducer.

The DIP switch settings are binary starting with switch number **1** ($= 2^0$) and ending with switch number **6** ($= 2^5$).

DIP-1 (2^0)	DIP-2 (2^1)	DIP-3 (2^2)	DIP-4 (2^3)	DIP-5 (2^4)	DIP-6 (2^5)	address (decimal)
0	0	0	0	0	0	0
1	0	0	0	0	0	1
0	1	0	0	0	0	2
...	...	...	...	...	...	...
1	1	1	1	1	1	63

↑ = "0"   ↓ = "1"

Baud Rate

The transmission baud rate may be either factory preset at the time of order or set manually at the time of installation.

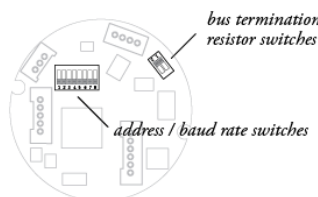The baud rate can be set using switches **7** & **8** on the 8-pole DIP switch found on the DeviceNET controller board located inside the transducer.

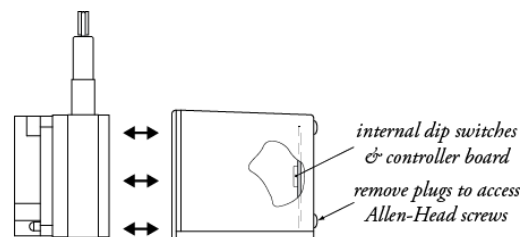| DIP-7	DIP-8	baud rate
0	0	125k
1	0	250k
0	1	500k
1	1	125k

↑ = "0"   ↓ = "1"

Bus Termination

The setting of the internal bus termination resistor may be specified upon order or manually changed by the end user at the time of installation.
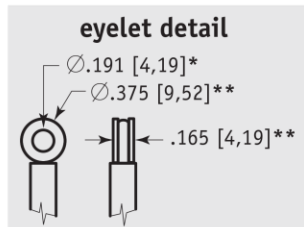
The bus termination resistor is activated setting switches **1** & **2** on the 2-pole DIP switch (located on the internal DeviceNET controller board) to the "ON" position.

↑ = "ON" (resistor active)
↓ = "OFF" (resistor not active)
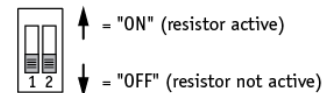
DeviceNET Controller Board and DIP Switch Location

bus termination resistor switches

address / baud rate switches

to gain access to the controller board, remove four Allen-Head Screws and remove rear cover.

internal dip switches & controller board

remove plugs to access Allen-Head screws

Outline Drawing

eyelet detail

⌀.191 [4,19]*
⌀.375 [9,52]**
.165 [4,19]**

Range	A
2, 10	1.04 [26,4]
5, 25, 50	0.58 [14,7]
15, 30	0.82 [20,8]
20, 40	0.74 [18,8]
	inches [mm]

⌀.20 [5,1]
4 places

A

2.75 [69,9]

0.38 [9,5]

1.50 [38,1]

0.91 [23]

see detail

⌀.38 [9,7]

1.50 ± .13 [38,2 ± 3,2]

⌀.37 [9,4]

1.98 [50,2]

1.19 [30,2]

3.25 [82,6]

0.19 [4,7]

0.170 [4,32]

2.33 [59,1]

0.09 [2,2]

3.85 [97,8] max.
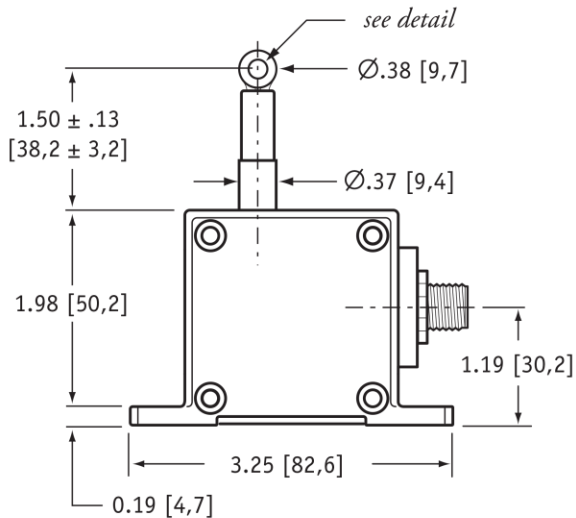
DIMENSIONS ARE IN INCHES [MM]
tolerances are 0.03 IN. [0.5 MM] unless otherwise noted.
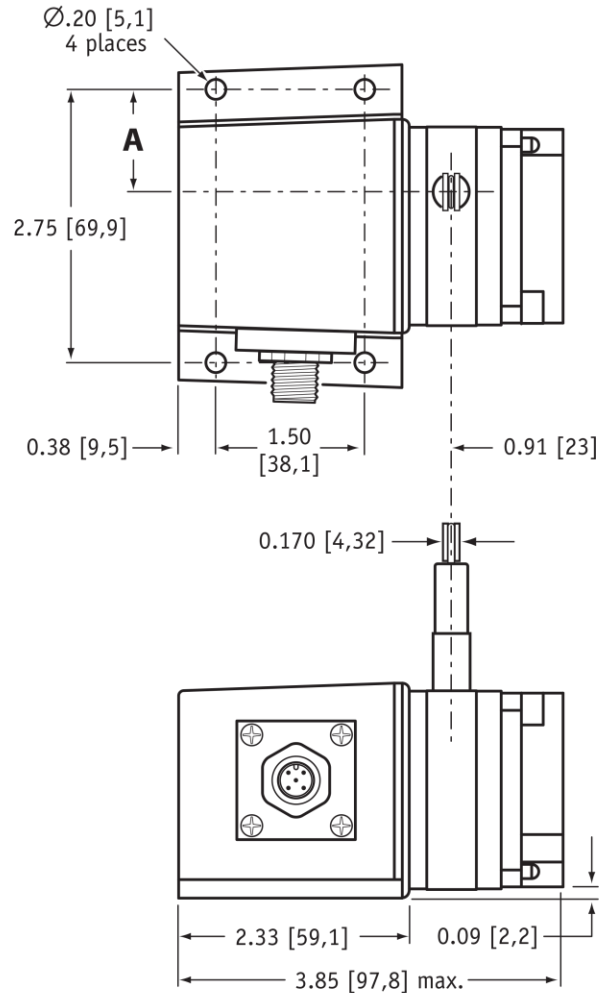
* tolerance = +.005 −.001 [+.13 −.03]
** tolerance = +.005 −.005 [+.13 −.13]

Ordering Information

Model Number:

PT1DN - ___ - ___ - ___ - ___ - ___ - ___
order code: Ⓡ Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Sample Model Number:

PT1DN - 30 - UP - SG - 500 - TR - SC5

Ⓡ	range:	30 inches
Ⓐ	measuring cable exit:	up
Ⓑ	cable guide:	spring-loaded guide
Ⓒ	baud rate:	500 k bits/sec.
Ⓓ	terminating resistor:	yes
Ⓔ	electrical connection:	5 meter cordset with straight plug
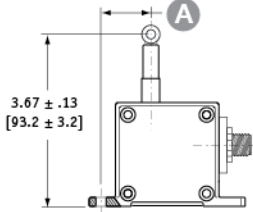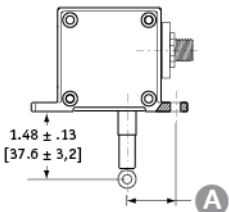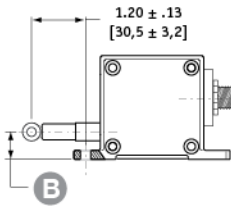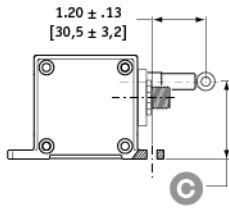
Ordering Information (cont.)

Full Stroke Range:

Ⓡ order code:	2	5	10	15	20	25	30	40	50
full stroke range, min:	2 in.	5 in.	10 in.	15 in.	20 in.	25 in.	30 in.	40 in.	50 in.
accuracy (% of f.s.):	0.25%		0.15%				0.10%		
potentiometer cycle life:	2,500,000 cycles		500,000 cycles				250,000 cycles		
cable tension (20%):	12 oz.	5 oz.	12 oz.	9 oz.	6 oz.	5 oz.	9 oz.	6 oz.	5 oz.
max. cable acceleration:	11 g	3 g	11 g	5 g	4 g	3 g	5 g	4 g	3 g

Cable Exit:
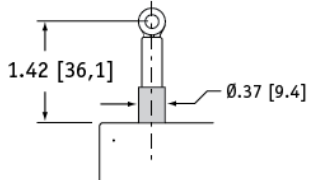
Ⓐ order code:	UP	DN	FR	BK
direction:	up	down	front	back

3.67 ± .13 [93.2 ± 3.2]

1.48 ± .13 [37.6 ± 3,2]

1.20 ± .13 [30,5 ± 3,2]

1.20 ± .13 [30,5 ± 3,2]
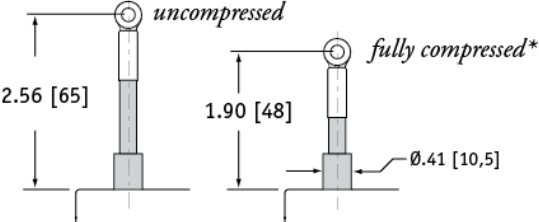
measurement range —	2	5	10	15	20	25	30	40	50
Ⓐ	1.04 in. 26,4 mm	0.58 in. 14,7 mm	1.04 in. 26,4 mm	0.82 in. 20,8 mm	0.74 in. 18,8 mm	0.58 in. 14,7 mm	0.82 in. 20,8 mm	0.74 in. 18,8 mm	0.58 in. 14,7 mm
Ⓑ	0.75 in. 19,1 mm	0.29 in. 6,1 mm	0.75 in. 19,1 mm	0.53 in. 13,5 mm	0.45 in. 11,5 mm	0.29 in. 6,1 mm	0.53 in. 13,5 mm	0.45 in. 11,5 mm	0.29 in. 6,1 mm
Ⓒ	1.43 in. 36,3 mm	1.89 in. 48,0 mm	1.43 in. 36,3 mm	1.65 in. 41,9 mm	1.73 in. 43,9 mm	1.89 in. 48,0 mm	1.65 in. 41,9 mm	1.73 in. 43,9 mm	1.89 in. 48,0 mm

Cable Guide:

Ⓑ order code:	blank	SG
	standard cable guide	spring-loaded guide

cushions impact from accidental free release

1.42 [36,1]   Ø.37 [9.4]

uncompressed

2.56 [65]

*fully compressed**

1.90 [48]   Ø.41 [10,5]

note: start of full stroke range begins at full compression point (except 2-inch and 5-inch ranges).
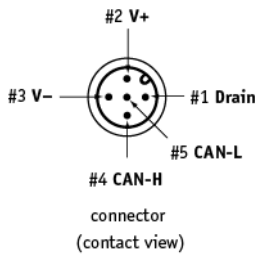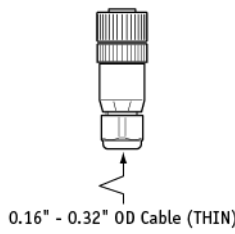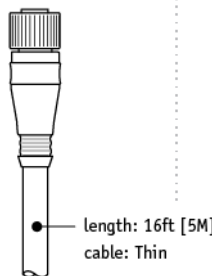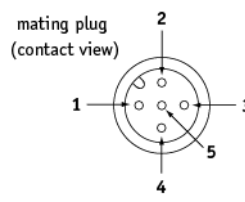
Baud Rate:

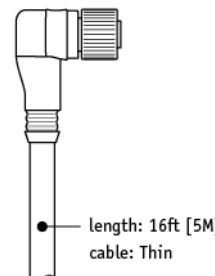| Ⓒ order code:	125	250	500
	125 kbaud	250 kbaud	500 kbaud

Terminating Resistor:

order code:	TR	NR
	terminating resistor	no terminating resistor

Electrical Connection:

order code:	blank	MC5	SC5	NC5
	5-pin micro-connector (no mating plug supplied)	5-pin micro-connector w/ mating plug	5-pin micro-connector and 5 meter length cordset w/straight mating plug	5-pin micro-connector and 5 meter length cordset w/90° mating plug

#2 V+
#3 V− ● #1 Drain
#5 CAN-L
#4 CAN-H

connector
(contact view)

0.16" - 0.32" OD Cable (THIN)

length: 16ft [5M]
cable: Thin

length: 16ft [5M]
cable: Thin

mating plug
(contact view)

pin	signal	wire color
1	drain	brown
2	V+	white
3	V-	blue
4	Can-H	black
5	Can-L	grey

PT1DN 12/01/2015