Cable-Extension Position Transducer

DeviceNET®
**Ranges: 0-10 to 0-250 inches**
Industrial Grade

PT5DN

Specification Summary:

GENERAL
Full Stroke Ranges . . . . 0-10 to 0-250 inches
Electrical Interface . . . . CANbus ISO 11898
Protocol . . . . DeviceNET version 2.0
Accuracy . . . . ± 0.25% to ± 0.10% full stroke
Repeatability . . . . ± 0.02% full stroke
Resolution . . . . ± 0.003% full stroke
Measuring Cable . . . . stainless steel or thermoplastic
Enclosure Material . . . . hard anodized aluminum
Sensor . . . . plastic-hybrid precision potentiometer
Potentiometer Cycle Life . . . . *see ordering information*
Maximum Retraction Acceleration . . . . *see ordering information*
Weight . . . . 5 lbs. 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 4/6, IP 67
Operating Temperature . . . . -40º to 185ºF (-40º to 85ºC)
Vibration . . . . up to 10 G's to 2000 Hz maximum
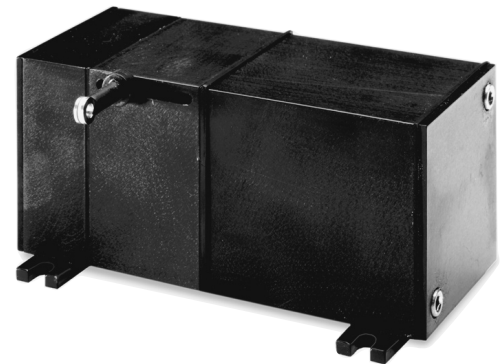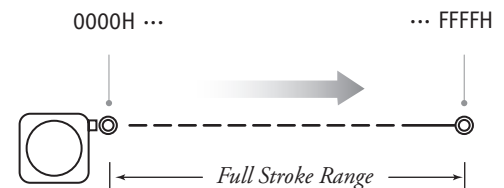
The PT5DN, using a high cycle plastic-hybrid potentiometer, communicates via DeviceNET protocol with programmable controllers in factories and harsh environments requiring linear position measurements in ranges up to 250".

As a member of Celesco's innovative family of NEMA 4 rated cable-extension transducers, the PT5DN installs in minutes by simply mounting it's body to a fixed surface and attaching it's cable to the movable object. Perfect parallel alignment not required.
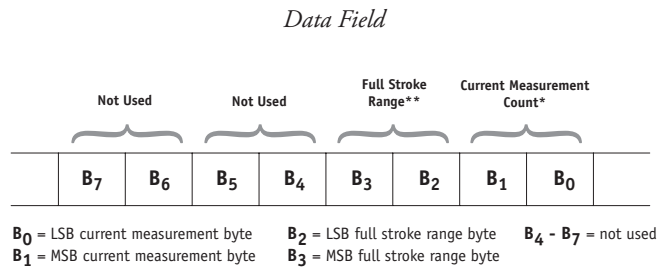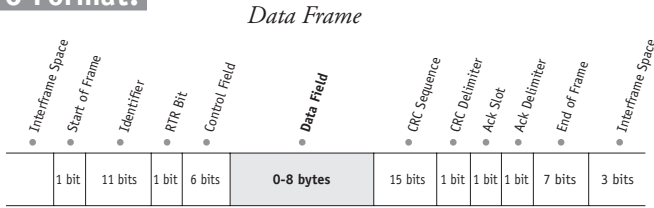
Outline Drawing

0.69 [17,5]   5.32 [135,0]
4.00 [101,6]
3.50 [88,9]
0.67 [17,0]
0.28 [7,1]
cable fully retracted
cable fully extended
Ø.190 [4,83] thru
1.06 [26,9]   (A)
0.21 [5,3]
3.19 [81,0]
0.19 [4,8]   6.8 [172,6]
0.70 [17,8]
2.19 [55,6]

"A" Dimension

stroke range	measuring cable S47 • V62	N34
10	0.08 [2,0]	0.05 [1,2]
15	0.12 [3,0]	0.07 [1,8]
20	0.16 [3,9]	0.09 [2,4]
30	0.23 [5,9]	0.14 [3,5]
40	0.31 [7,9]	0.19 [4,7]
50	0.39 [9,9]	0.23 [5,9]
60	0.47 [11,8]	0.28 [7,0]
80	0.62 [15,8]	0.37 [9,4]
100	0.78 [19,7]	0.46 [11,7]
125	0.97 [24,7]	0.58 [14,7]
150	1.16 [29,6]	0.69 [17,6]
200	n/a	0.92 [23,5]
250	n/a	1.16 [29,3]

ALL DIMENSIONS ARE IN INCHES [MM]
tolerances are 0.03 inches [0,8 mm]
unless otherwise noted

Output Signal

0000H ···   ··· FFFFH
Full Stroke Range

PT5DN • Cable-Extension Transducer: DeviceNET®

I/O Format:

Data Frame

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

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

*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:

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

Example:

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

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

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.

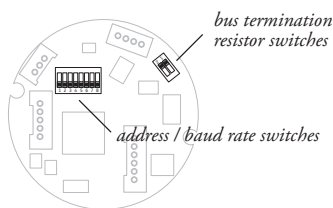| DIP-7	DIP-8	baud rate
0	0	125k
1	0	250k
0	1	500k
1	1	125k

↑ = "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)
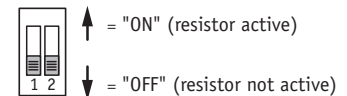
DeviceNET Controller Board and DIP Switch Location

bus termination resistor switches

address / baud rate switches

⚠ **Caution! Do Not Remove Spring-Side End Cover**
removing spring-side end cover could cause spring to become unseated and permanently damaged.
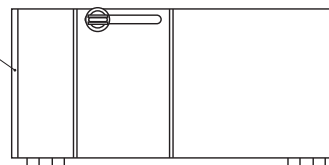
internal dip switches & controller board
to gain access to the controller board, remove four Allen-Head Screws and remove end cover bracket.

Ordering Information:

Model Number:

PT5DN - _____ - ___ - ___ - ___ - ___ - ___
order code: ℝ   Ⓐ   Ⓑ   Ⓒ   Ⓓ   Ⓔ

Sample Model Number:
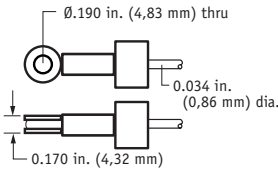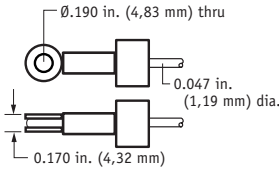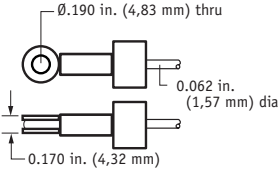
PT5DN - 50 - S47 - FR - 500 - TR - SC5

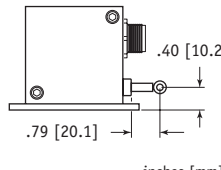|		
ℝ	range:	50 inches
Ⓐ	measuring cable:	.047 stainless steel
Ⓑ	measuring cable exit:	front
Ⓒ	baud rate:	500 k bits/sec.
Ⓓ	terminating resistor:	yes
Ⓔ	electrical connection:	5-meter cordset with straight plug
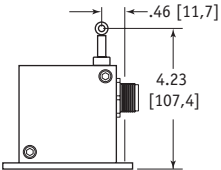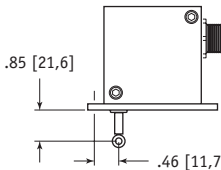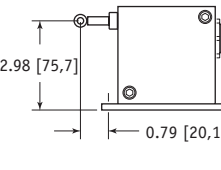
Full Stroke Range:

ℝ order code:	10	15	20	25	30	40	50	60	80	100	125	150	200	250
full stroke range, min:	10 in.	15 in.	20 in.	25 in.	30 in.	40 in.	50 in.	60 in.	80 in.	100 in.	125 in.	150 in.	200 in.	250 in.
accuracy (±% of f.s.):	.75%	.6%	.5%	.5%	.5%	.3%	.3%	.25%	.25%	.25%	.25%	.18%	.18%	.18%
repeatability (±% of f.s.):	.1%	.1%	.05%	.05%	.05%	.05%	.05%	.02%	.02%	.02%	.02%	.02%	.02%	.02%
potentiometer cycle life:	2,500,000 cycles						500,000 cycles					250,000 cycles		
cable tension (20%):	41 ounces												21 ounces	
max. cable velocity/acceleration:	300 in./sec • 5 G's												120 in./sec • 2 G's	

Measuring Cable:

Ⓐ order code:	N34	S47	V62
	.034 nylon-coated stainless steel	.047 stainless steel	.062 thermoplastic
	available in all ranges	*all ranges up to 150 inches*	*all ranges up to 150 inches*

Ø.190 in. (4,83 mm) thru — 0.034 in. (0,86 mm) dia. — 0.170 in. (4,32 mm)

Ø.190 in. (4,83 mm) thru — 0.047 in. (1,19 mm) dia. — 0.170 in. (4,32 mm)

Ø.190 in. (4,83 mm) thru — 0.062 in. (1,57 mm) dia. — 0.170 in. (4,32 mm)

Cable Exit:

Ⓑ order code:	UP	DN	FR	BK
	up	down	front	back

.46 [11,7]   4.23 [107,4]

.85 [21,6]   .46 [11,7]

2.98 [75,7]   0.79 [20,1]

.40 [10.2]   .79 [20.1]

inches [mm]

Baud Rate:

Ⓒ order code:	125	250	500
	125 kbaud	250 kbaud	500 kbaud
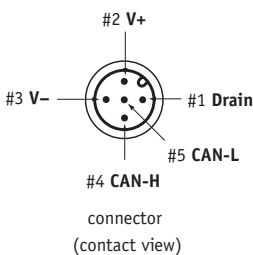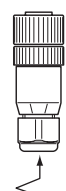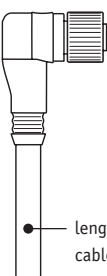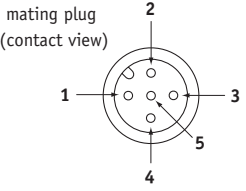
Terminating Resistor:

Ⓓ order code:	TR	NR
	terminating resistor	no terminating resistor

PT5DN | 89

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Ordering Information (cont.)

Electrical Connection:

❸ *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

blank:

#2 **V+**

#3 **V−**   #1 **Drain**

#5 **CAN-L**

#4 **CAN-H**

connector
(contact view)

MC5:

0.16" - 0.32" OD Cable (THIN)

mating plug
(contact view)

2

1   3

5

4

SC5:

length: 16ft [5M]
cable: Thin

NC5:

length: 16ft [5M]
cable: Thin

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

SUNSTAR   http://www.sensor-ic.com/ TEL:0755-83376549 FAX 0755-83376182 E-MAIL:szss20@163.con