

Cable-Extension Position Transducer

Precision Potentiometric Output
Ranges: 0-2 to 0-100 inches
Instrument Grade



PT101



Specification Summary:

GENERAL
 Full Stroke Range Options 0-2 to 0-100 inches
 Output Signal Options voltage divider (potentiometer)
 Accuracy *see ordering information*
 Repeatability $\pm 0.02\%$ full stroke
 Resolution essentially infinite
 Measuring Cable *see ordering information*
 Enclosure Material powder-painted and anodized aluminum
 Sensor plastic-hybrid precision potentiometer
 Potentiometer Cycle Life *see ordering information*
 Maximum Retraction Acceleration *see ordering information*
 Weight 2 lbs. max.

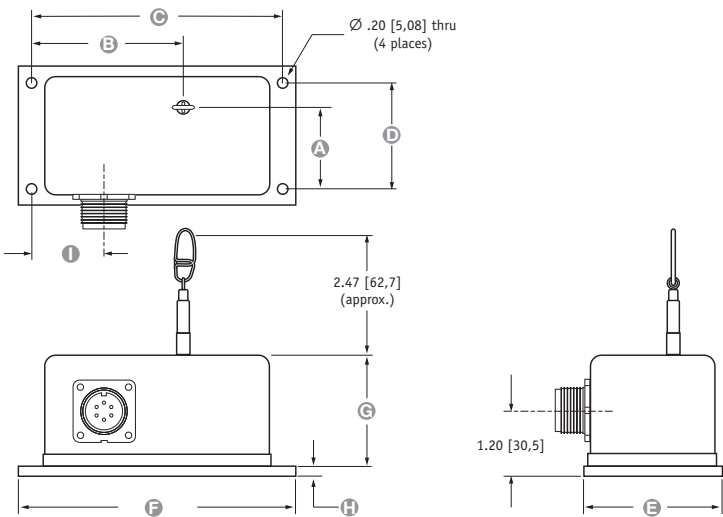
ELECTRICAL
 Input Resistance Options 500, 1K, 5K, 10K or bridge
 Maximum Input Voltage *see ordering information*
 Power Rating *see ordering information*
 Output Signal Change Over Full Stroke Range $94\% \pm 4\%$ of input voltage

ENVIRONMENTAL
 Enclosure NEMA 1
 Temperature Coefficient of Sensing Element 88 PPM/ $^{\circ}$ F
 Humidity 100% RH @ 90 $^{\circ}$ F (32 $^{\circ}$ C)
 Operating Temperature -40 $^{\circ}$ to 200 $^{\circ}$ F (-40 $^{\circ}$ to 90 $^{\circ}$ C)
 Vibration up to 10 G's to 2000 Hz maximum

Based on Celesco's original string pot design dating back to the late 1960's, the PT101 has become a standard throughout the years for literally thousands of applications including aircraft structural testing, hydraulic cylinder control, valve stem opening, and factory automation.

Available in full stroke ranges up to 100-inches, the PT101 provides a voltage feedback signal linearly proportional to the position of its traveling stainless steel measuring cable. Additionally the PT101 installs in minutes and doesn't require perfect parallel alignment. Simply secure the base to a fixed surface and attach the measuring cable to your moving object.

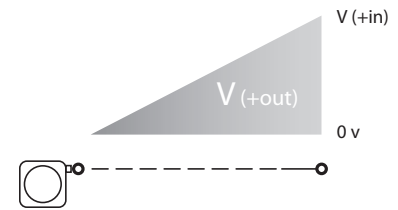
fig. 1: Top Exit Option



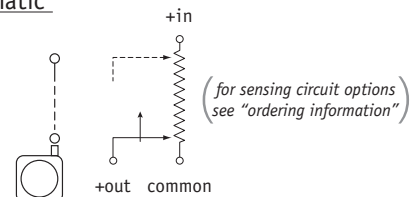
| Range | A | B | C | D | E | F | G | H | I |
|--------------|-------------|-------------|--------------|-------------|--------------|--------------|-------------|-----------|-------------|
| 2", 10", 20" | 1.34 [34,0] | 2.88 [73,1] | 4.75 [120,6] | 2.00 [50,8] | 2.63 [66,8] | 5.25 [133,4] | 2.10 [53,3] | .16 [4,1] | 1.37 [34,8] |
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| 75", 80" | 2.45 [62,2] | 2.38 [60,4] | 6.75 [171,4] | 2.50 [63,5] | 3.63 [92,2] | 7.50 [190,5] | 2.86 [72,6] | .19 [4,8] | 1.37 [34,8] |
| 100" | 3.10 [78,7] | 2.47 [62,8] | 7.38 [187,5] | 3.00 [76,2] | 4.25 [108,0] | 8.00 [203,2] | 3.79 [96,3] | .19 [4,8] | 3.69 [93,7] |

ALL DIMENSIONS ARE IN INCHES [MM] tolerances are ± 0.02 in. (± 0.5 mm) unless otherwise noted

Electrical Output Signal



Schematic



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PT101 Cable-Extension Transducer: Precision Potentiometric Output

Ordering Information:

Model Number:

PT101 - - **1** - **1** - **0**

order code: R A B C D E F G

Sample Model Number:

PT101 - 0025 - 111 - 1110

- R** range: 25 inches
- A** measuring cable tension: standard - 5 oz.
- B** cable exit: top
- C** sensing circuit: 500 ohms
- D** electrical connection: 6-pin plastic connector

Full Stroke Range:

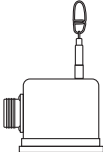
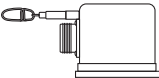
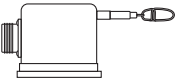
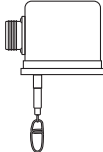
| R order code: | 0002 | 0005 | 0010 | 0015 | 0020 | 0025 | 0030 | 0040 | 0050 | 0060 | 0075 | 0080 | 0100 |
|----------------------------|-----------------------|-------|---------------------|--------|-----------------------|--------|---------------------|--------|-----------------------|--------|--------|--------|---------|
| full stroke range, min: | 2 in. | 5 in. | 10 in. | 15 in. | 20 in. | 25 in. | 30 in. | 40 in. | 50 in. | 60 in. | 75 in. | 80 in. | 100 in. |
| accuracy (% of f.s.): | 0.25% | | 0.15% | | 0.10% | | 0.15% | | 0.10% | | | | |
| potentiometer cycle life*: | 2.5 x 10 ⁶ | | 5 x 10 ⁵ | | 2.5 x 10 ⁵ | | 5 x 10 ⁵ | | 2.5 x 10 ⁵ | | | | |

*-1 cycle is defined as the travel of the measuring cable from full retraction to full extension and back to full retraction

Measuring Cable Tension:

| A order code: | 1 | | H | | 2* | | 3* | |
|-----------------------|--|------------------|---------------|------------------|--|---------|-----------|--|
| | standard tension | | high tension | | *note – outline dimensions for these options are not controlled on this datasheet! | | | |
| | tension, ±20% | max acceleration | tension, ±40% | max acceleration | | | | |
| 2, 10, 20 inch range: | 12 oz. | • 11 g | 65 oz. | • 53 g | 72 oz. | 144 oz. | | |
| 5, 25, 50 inch range: | 5 oz. | • 2 g | 26 oz. | • 11 g | 30 oz. | 60 oz. | | |
| 15, 30 inch range: | 8 oz. | • 3 g | 43 oz. | • 23 g | 48 oz. | 96 oz. | | |
| 40 inch range: | 6 oz. | • 4 g | 33 oz. | • 16 g | 30 oz. | 72 oz. | | |
| 60 inch range: | 13 oz. | • 4 g | 22 oz. | • 8 g | 26 oz. | 52 oz. | | |
| 75, 80 inch range: | 10 oz. | • 3 g | 40 oz. | • 12 g | 20 oz. | 40 oz. | | |
| 100 inch range: | 13 oz. | • 5 g | 52 oz. | • 20 g | 26 oz. | 52 oz. | | |
| measuring cable: | .019-in. dia. nylon-coated stainless steel | | | | .024-in. dia. stainless steel | | | |

Measuring Cable Exit:

| G order code: | 1 | 2 | 3 | 4 |
|----------------------|---|---|---|---|
| | top exit (see fig. 1) | front exit (see fig. 3) | rear exit (see fig. 3) | bottom exit (see fig. 2) |
| |  |  |  |  |

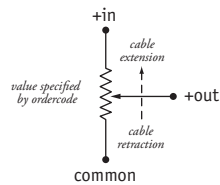
Sensing Circuit:

| D order code: | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------------|----------|-----------|-----------|-------------|-----------------------|---------------------------------|
| | 500 ohm* | 1000 ohm* | 5000 ohm* | 10,000 ohm* | fixed bridge (2 mV/V) | adjustable bridge (0...30 mV/V) |
| | | | | | *tolerance ±10% | |

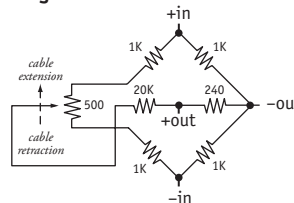
max. input voltage and power rating, options 1-4

| | 2-inch, 5-inch range | 10-inch to 100-inch range |
|-----------------|----------------------|---------------------------|
| 500-ohms: | 20 V AC/DC (1 W) | 30 V AC/DC (2 W) |
| 1K to 10K-ohms: | 30 V AC/DC (1 W) | 30 V AC/DC (2 W) |

circuit, options 1-4

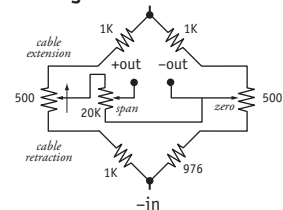


fixed bridge circuit



full scale output: 2 mV/V
zero adjust: not available

adjustable bridge



full scale output: adjustable from 0 to 30mV/V
zero adjust: to 50% of full stroke

PT101 Cable-Extension Transducer: Precision Potentiometric Output

Ordering Information (cont.):

Electrical Connection:

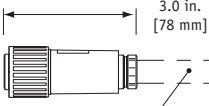
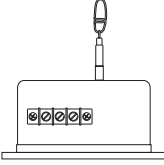
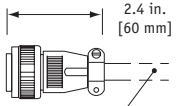

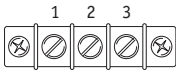
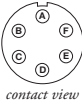
| Order code: | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|---|---|--|---|---|------|------|---|--------|------|---|-------|-------|---|---|-------|---|----------|---------|---|------|---|--------|---|-------|--|------------|----------|--------|-----|------|------|-------|--------|------|-------|-------|-------|-------|---|-------|
| | 6-pin plastic connector with mating plug | terminal strip | 6-pin metal connector with mating plug | 25-ft. instrumentation cable 24 AWG, shielded | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1/2 - 5/16" [14 - 8 mm] cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S | | 3/8-in. [9 mm] max cable dia. 16 AWG max conductor size connector: MS3102E-14S-6P mating plug: MS3106E-14S-6S | 25 ft. x 0.2-in. dia. [7,5 M x 5 mm dia.] 24 AWG, shielded | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6-pin mating plug: | Terminal Strip: | | 25-ft. instrumentation cable: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>pin</th> <th>standard</th> <th>bridge</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>+ in</td> <td>+ in</td> </tr> <tr> <td>B</td> <td>common</td> <td>- in</td> </tr> <tr> <td>C</td> <td>+ out</td> <td>- out</td> </tr> <tr> <td>D</td> <td>-</td> <td>+ out</td> </tr> </tbody> </table> | pin | standard | bridge | A | + in | + in | B | common | - in | C | + out | - out | D | - | + out |  <table border="1"> <thead> <tr> <th>terminal</th> <th>signals</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+ in</td> </tr> <tr> <td>2</td> <td>common</td> </tr> <tr> <td>3</td> <td>+ out</td> </tr> </tbody> </table> | terminal | signals | 1 | + in | 2 | common | 3 | + out | <table border="1"> <thead> <tr> <th>color code</th> <th>standard</th> <th>bridge</th> </tr> </thead> <tbody> <tr> <td>RED</td> <td>+ in</td> <td>+ in</td> </tr> <tr> <td>BLACK</td> <td>common</td> <td>- in</td> </tr> <tr> <td>GREEN</td> <td>+ out</td> <td>+ out</td> </tr> <tr> <td>WHITE</td> <td>-</td> <td>- out</td> </tr> </tbody> </table> | color code | standard | bridge | RED | + in | + in | BLACK | common | - in | GREEN | + out | + out | WHITE | - | - out |
| pin | standard | bridge | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | + in | + in | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | common | - in | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | + out | - out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | - | + out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| terminal | signals | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | + in | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | common | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | + out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| color code | standard | bridge | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RED | + in | + in | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BLACK | common | - in | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GREEN | + out | + out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| WHITE | - | - out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | contact view | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

fig. 2: Bottom Exit Option

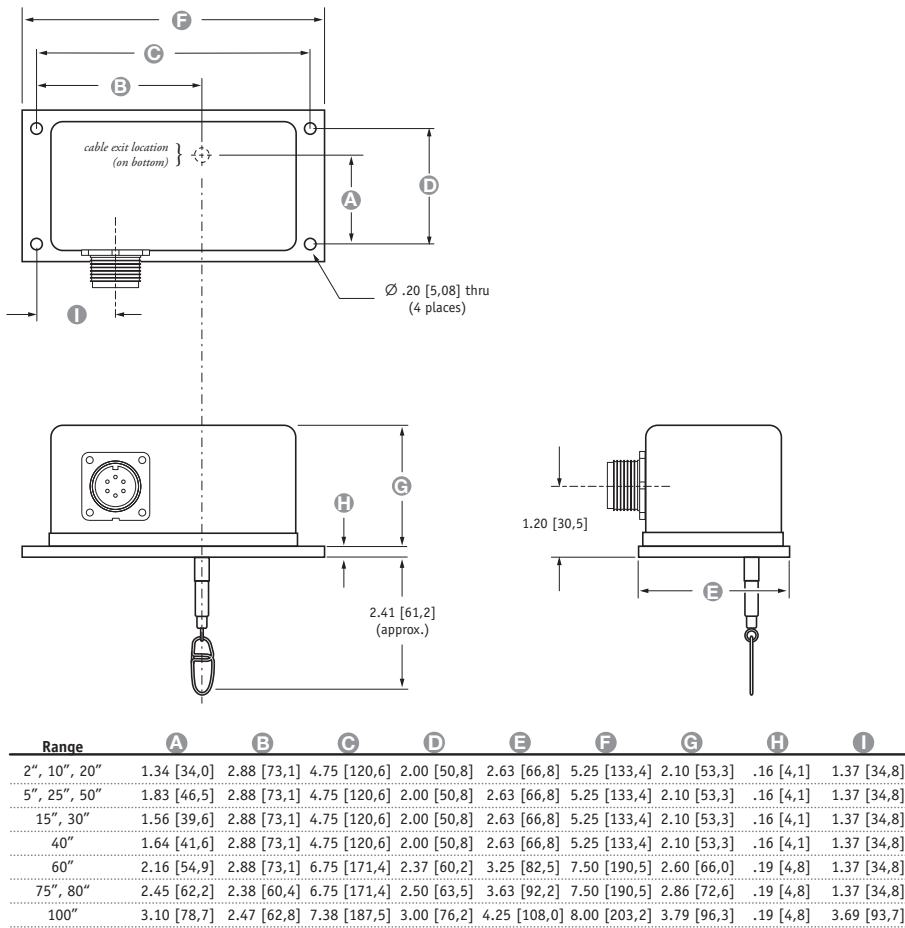
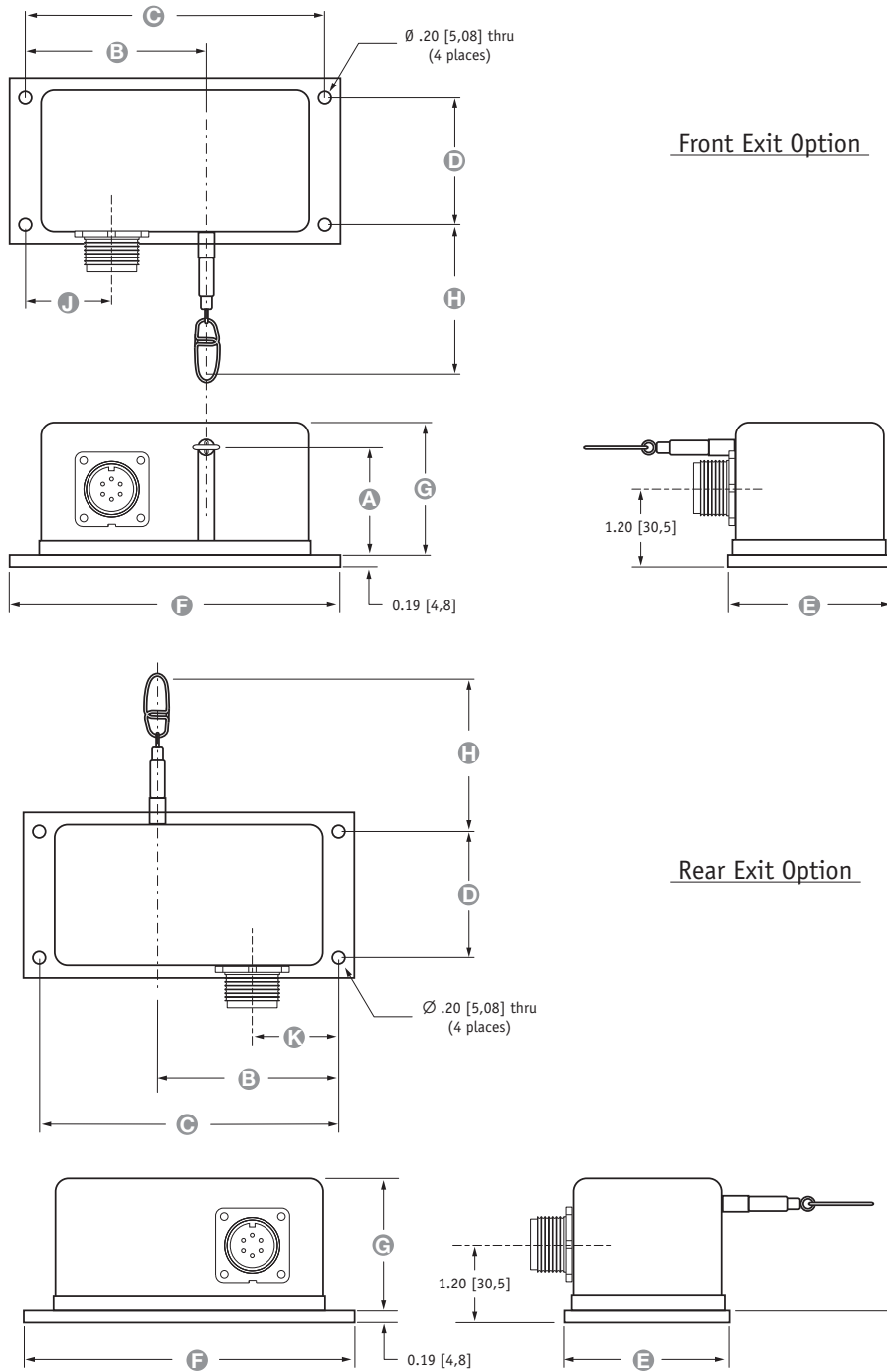


fig. 3: Front and Rear Exit Options



| Range | A | B | C | D | E | F | G | H | I | J | K |
|--------------|-------------|-------------|--------------|-------------|--------------|--------------|-------------|-------------|-----------|--------------|--------------|
| 2", 10", 20" | 1.34 [34,0] | 2.87 [72,9] | 4.75 [120,6] | 2.00 [50,8] | 2.63 [66,8] | 5.25 [133,4] | 2.10 [53,3] | 2.57 [65,3] | .16 [4,1] | 1.37 [34,8] | 1.37 [34,8] |
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| 75", 80" | 2.45 [62,2] | 2.38 [60,4] | 6.75 [171,4] | 2.50 [63,5] | 3.63 [92,2] | 7.50 [190,5] | 2.86 [72,6] | 2.69 [68,3] | .19 [4,8] | 5.38 [136,7] | 5.38 [136,7] |
| 100" | 3.10 [78,7] | 2.47 [62,8] | 7.38 [187,5] | 3.00 [76,2] | 4.25 [108,0] | 8.00 [203,2] | 3.79 [96,3] | 2.90 [73,7] | .19 [4,8] | 3.69 [93,7] | 3.69 [93,7] |

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