

# Cable-Extension Position Transducer

## Position and Velocity Output Signals

Ranges: 0-2 to 0-100 inches

Instrument Grade



# DV301



### Specification Summary:

#### GENERAL

Full Stroke Range Options ..... 0-2 to 0-100 inches  
 Measuring Cable ..... *see ordering information*  
 Enclosure Material..... powder-painted and anodized aluminum  
 Weight..... 2 lbs. max.

#### POSITION

Output Signal ..... voltage divider (potentiometer)  
 Accuracy .....  $\pm 0.25\%$  to  $\pm 0.10\%$  full stroke *see ordering information*  
 Repeatability.....  $\pm 0.02\%$  full stroke  
 Resolution ..... *essentially infinite*  
 Sensor ..... plastic-hybrid precision potentiometer  
 Input Resistance Options ..... 500, 1K, 5K or 10K  $\Omega$  –*see ordering information*  
 Power Rating, Watts ..... 2.0 at 70°F derated to 0 at 250° F  
 Maximum Input Voltage..... *see ordering information*  
 Output Signal Change Over Full Stroke Range.....  $94\% \pm 4\%$  of input voltage

#### VELOCITY

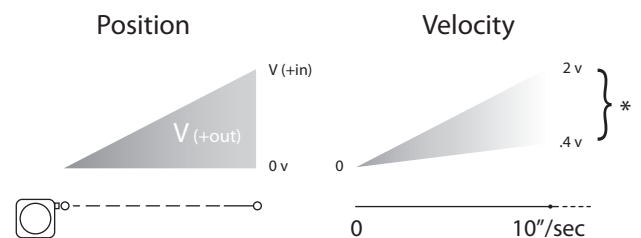
Output Signal ..... DC tachometer output  
 Linearity ..... better than  $\pm 0.10\%$  of output at any velocity  
 Repeatability.....  $\pm 0.10\%$  of reading  
 Maximum Velocity • Retraction Acceleration ..... *see ordering information*  
 Sensor ..... tach generator  
 Input Voltage ..... none required  
 Output Voltage @ 100 inches per minute..... *see ordering information*  
 Output Impedance..... 350 ohms  $\pm 10\%$   
 Output Ripple (when output  $\geq 280$  mV) .....  $\pm 3\%$  rms

#### ENVIRONMENTAL

Enclosure ..... NEMA 1  
 Operating Temperature ..... -40° to 200°F (-40° to 90°C)  
 Vibration..... up to 10 G's to 2000 Hz maximum

The DV301 is a combination position and velocity transducer for full-scale measurement ranges from 2 to 100 inches. A precision plastic-hybrid potentiometer provides accurate position feedback while a self-generating DC tachometer provides a velocity signal that is proportional to the speed of the traveling stainless-steel measuring cable.

### Output Signals



\*varies by stroke range – see ordering information

### Ordering Information:

#### Model Number:

DV301 -      -      1 -      1 0  
order code:      R      A      B      C      D      E      F      G

Sample Model Number:

**DV301 - 0025 - 111 - 1110**

- R** range: 25 inches
- A** measuring cable tension: standard - 5 oz.
- C** cable exit: top
- D** output signals: 500 ohm position / DC tachometer velocity
- E** electrical connection: 6-pin plastic connector



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**Full Stroke Range:**

Ⓜ order code:	0002	0005	0010	0015	0020	0025	0030	0040	0050	0060	0075	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.	100 in.
position accuracy (% of f.s.):	0.25%	0.25%	0.15%	0.15%	0.10%	0.15%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
potentiometer cycle life* <sup>1</sup> :	2.5 x 10 <sup>6</sup>	2.5 x 10 <sup>6</sup>	5 x 10 <sup>5</sup>	5 x 10 <sup>5</sup>	5 x 10 <sup>5</sup>	5 x 10 <sup>5</sup>	5 x 10 <sup>5</sup>	2.5 x 10 <sup>5</sup>	2.5 x 10 <sup>5</sup>	2.5 x 10 <sup>5</sup>	2.5 x 10 <sup>5</sup>	2.5 x 10 <sup>5</sup>
velocity output signal (±3%)* <sup>2</sup> :	322 mV	130 mV	322 mV	217 mV	322 mV* <sup>3</sup>	130 mV	217 mV* <sup>3</sup>	165 mV* <sup>3</sup>	130 mV* <sup>3</sup>	112 mV	91 mV	66 mV

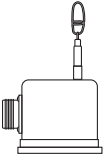
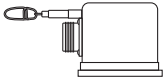
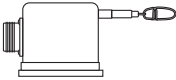
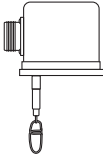
\*<sup>1</sup> – 1 cycle is defined as the travel of the measuring cable from full retraction to full extension and back to full retraction \*<sup>2</sup> – at the rate of 100 inches per minute \*<sup>3</sup> – output signal is reduced by 50% when **Measuring Cable Tension** options 2 or 3 is selected below

**Measuring Cable Tension:**

Ⓜ order code:	1	2**	3**
	standard tension* (max. acceleration)	increased tension*	high tension*
2, 10, 20 inch range:	30 oz. (25 G)	60 oz.	120 oz.
5, 25, 50 inch range:	14 oz. (5 G)	28 oz.	56 oz.
15, 30 inch range:	20 oz. (6 G)	40 oz.	80 oz.
40 inch range:	17 oz. (11 G)	34 oz.	68 oz.
60 inch range:	13 oz. (4 G)	26 oz.	52 oz.
75, 80 inch range:	18 oz. (5 G)	36 oz.	72 oz.
100 inch range:	26 oz. (10 G)	52 oz.	104 oz.
measuring cable:	.019-in. dia. nylon-coated stainless steel	.024-inch diameter stainless steel	.024-inch diameter stainless steel

\* – note: spring tension tolerance: ±20% \*\* – note: dimensions for Options 2, 3 are not controlled on this datasheet.

**Measuring Cable Exit:**

Ⓜ order code:	1	2	3	4
	top exit (see fig. 1)	front exit*	rear exit*	bottom exit*
				

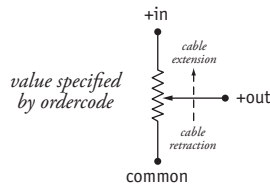
\* – note: dimensions for optional cable exits not controlled on this datasheet, please contact factory

**Output Signals:**

Ⓜ order code:	1	2	3	4
position sensing potentiometer:	500 ohms*	1000 ohms*	5000 ohms*	10,000 ohms*

\* – tolerance = ±10%

**position sensing circuit**



**velocity sensing circuit**



max. input voltage and power rating

	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)

Ordering Information (cont.):

Electrical Connection:

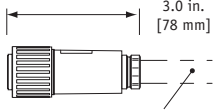
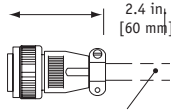


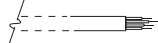
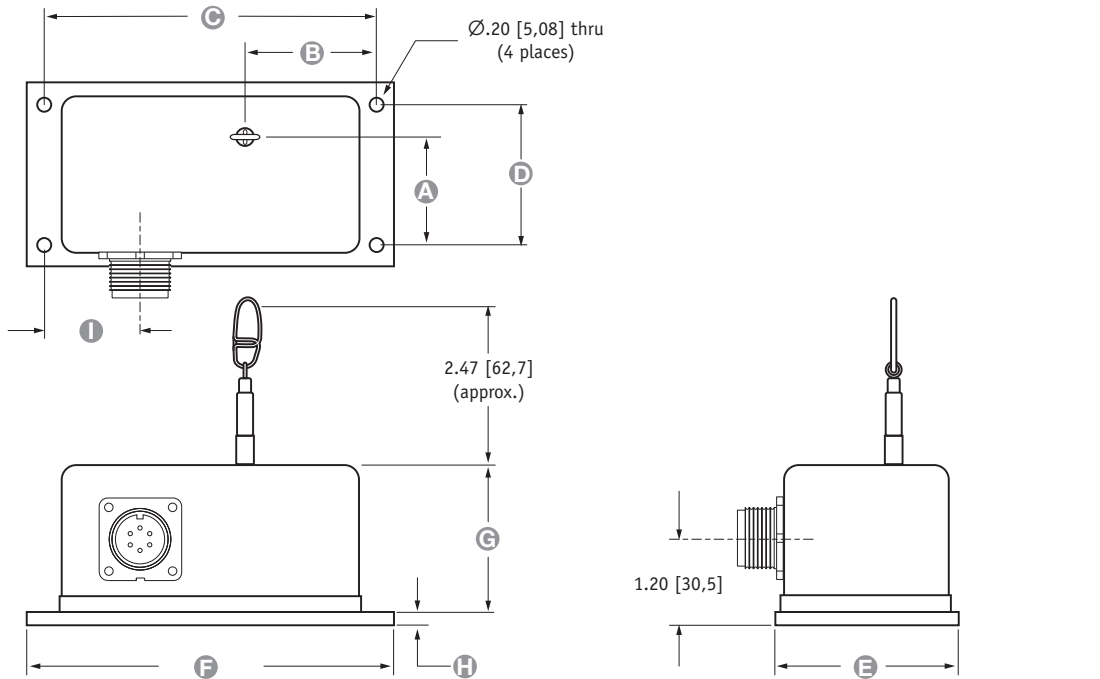
order code:	1	3	4																																																
	6-pin plastic connector with mating plug	6-pin metal connector with mating plug	25-ft. instrumentation cable 24 AWG, shielded																																																
																																																			
	3.0 in. [78 mm]	2.4 in. [60 mm]																																																	
	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																																																
	<p>6-pin mating plug:</p>  <table border="0"> <tr> <td>pin</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td>F</td> <td></td> </tr> <tr> <td>signal</td> <td>+ in</td> <td>common</td> <td>+ out</td> <td>-</td> <td>+ out</td> <td>- out</td> <td rowspan="2">} position</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td rowspan="2">} velocity</td> </tr> </table>		pin	A	B	C	D	E	F		signal	+ in	common	+ out	-	+ out	- out	} position								} velocity	<p>25-ft. instrumentation cable:</p>  <table border="0"> <tr> <td>color</td> <td>red</td> <td>black</td> <td>green</td> <td>white</td> <td>brown</td> <td></td> <td></td> </tr> <tr> <td>signal</td> <td>+ in</td> <td>common</td> <td>+ out</td> <td>-</td> <td>- out</td> <td></td> <td rowspan="2">} position</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td rowspan="2">} velocity</td> </tr> </table>	color	red	black	green	white	brown			signal	+ in	common	+ out	-	- out		} position								} velocity
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fig. 1: Top Exit Option



Range	A	B	C	D	E	F	G	H	I
2", 10", 20"	1.34 [34,0]	4.00 [101,6]	7.00 [177,8]	2.00 [50,8]	2.63 [66,8]	7.50 [190,5]	2.10 [53,3]	.16 [4,1]	1.37 [34,8]
5", 25", 50"	1.85 [47,0]	4.00 [101,6]	7.00 [177,8]	2.00 [50,8]	2.63 [66,8]	7.50 [190,5]	2.10 [53,3]	.16 [4,1]	1.37 [34,8]
15", 30"	1.51 [38,4]	4.00 [101,6]	7.00 [177,8]	2.00 [50,8]	2.63 [66,8]	7.50 [190,5]	2.10 [53,3]	.16 [4,1]	1.37 [34,8]
40"	1.67 [42,4]	4.00 [101,6]	7.00 [177,8]	2.00 [50,8]	2.63 [66,8]	7.50 [190,5]	2.10 [53,3]	.16 [4,1]	1.37 [34,8]
60"	2.19 [55,6]	3.88 [98,5]	7.00 [177,8]	2.37 [60,2]	3.25 [82,5]	7.50 [190,5]	2.60 [66,0]	.19 [4,8]	1.37 [34,8]
75", 80"	2.52 [64,0]	4.38 [111,3]	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"	3.18 [80,7]	5.18 [131,5]	7.38 [187,5]	3.00 [76,2]	4.25 [108,0]	8.00 [203,2]	3.80 [96,5]	.19 [4,8]	3.69 [93,7]

ALL DIMENSIONS ARE IN INCHES [MM] tolerances are ±0.02 in. [±0,5mm] unless otherwise noted

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