



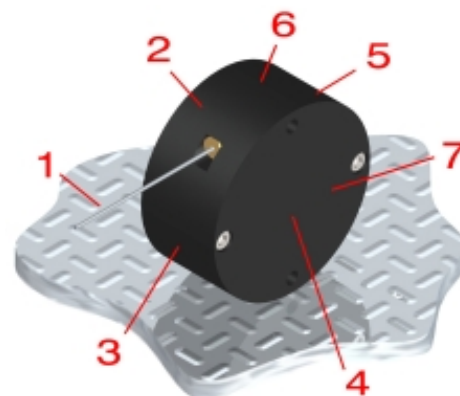
Data Sheet - Series 170 Subminiature Position Transducer

Subminiature Size, Flexible Mounting

Shaded characteristics are verified during production and test. All others are for REFERENCE and information only.

Key Features

1. 2.0-Inch (51-mm) Maximum Travel
2. Analog Signal Using Precision Conductive Plastic Potentiometer
3. AccuTrak™ Grooved Drum for Enhanced Repeatability
4. Bearing-Mounted Rotating Components
5. Optional Flexible Mounting Bases
6. Integrated Left-Hand and Right-Hand Mounting
7. DirectConnect™ Sensor-To-Drum Technology = Zero Backlash, No Torsion Springs or Clutches



Potentiometer Specifications

Potentiometer Type	1-turn, precision, conductive plastic
Resistance: Value, Tolerance	5K ohms, $\pm 10\%$
Travel: Electrical, Mechanical	340°, 340° min
Mechanical Life	100 million shaft revolutions min
Output Signal	analog signal from 0 to supply voltage (voltage divider circuit)
Power Rating	1.0 W at 158° F (70° C)
Supply Current	12 mA max
Supply Voltage	35 VDC max (using voltage divider circuit)
Independent Linearity Error	$\pm 0.5\%$ max per VRCI-P-100A
Output Smoothness	0.1% max
Insulation Resistance	1000 Mohms at 500 VDC min
Dielectric Strength	1000 VDC min
Resolution	infinite signal
Operating Temperature	-85° to +257° F (-65° to +125° C)
Shock, Vibration	100 g for 6 ms, 10 to 2000 Hz at 15 g per Mil-R-39023
Temperature Coefficient	± 400 ppm/°C max

Other Specifications

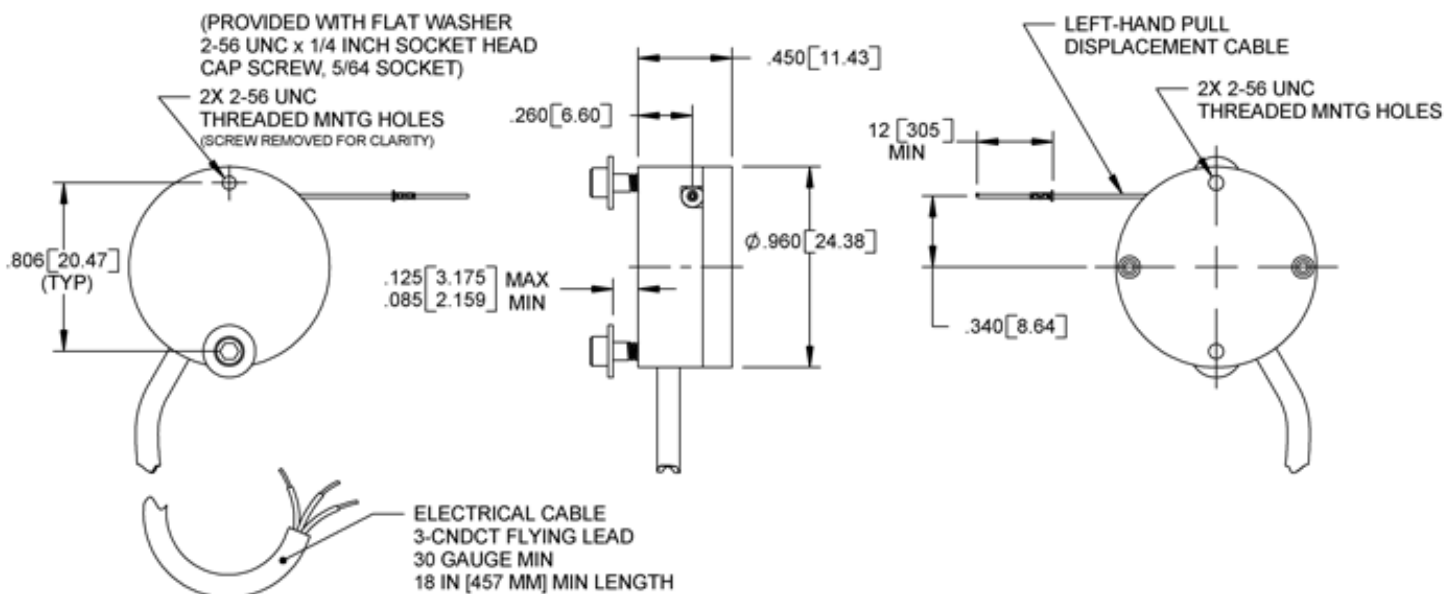
Case Materials	precision-machined anodized 2024 aluminum
Displacement Cable	0.018-inch (0.46-mm) dia., 7-by-7 stranded stainless steel, 40-lb (177-N) min breaking strength
Displacement Cable Hardware	1 each of 300196 loop sleeve , 300292 copper sleeve , 300688 ball-end plug , 300495 pull ring , 160026 brass swivel , and 301003 nickel swivel ; all items provided uncrimped
Nominal Mass	1 oz (28 g)
Displacement Cable Tension and max Cable Acceleration (Nominal): Opt. 1	1.5 oz 0.4 N min 4 oz 1.1 N max 20 g max
Displacement Cable Tension and max Cable Acceleration (Nominal): Opt. 2	1.5 oz 0.4 N min 12 oz 3.3 N max 40 g max
Environmental Protection	NEMA 3S / IP 54, DO-160D (ED-14D) Env. Cat. E1E1ABSHXFDXSAXXXXXXXXXXX

Model Numbers and Ordering Codes

170-0161-ab	position transducer (2.0-inch (51-mm) range)
Example: 170-0161-1N (cable tension: -010, no base)	

Variable	Value	Description
a	1	cable tension: -010
a	2	cable tension: -020
b	N	no base
b	B	base: L (150/170 only); pn 150015

Drawing



Electrical Connection for Increasing Output with Displacement Cable Extraction

<i>Wire Color</i>	<i>Signal</i>
black	input, V+
white	output, signal, S+
red	ground, common, V-, S-

For crimping of hardware to displacement cable, consider the [160001-01 installation kit](#).

Need something not shown? Complete a [Custom Solution Request](#).

All dimensions are REFERENCE and are in inches [mm] • Data Sheet Series 170 Rev.-

[Firstmark Controls](#) • info@firstmarkcontrols.com

An ISO9001:2000/AS9100B-Compliant Company
1176 Telecom Drive • Creedmoor, NC 27522 USA
Phone: 1-919-956-4203 • Fax: 919-682-3786 • Toll Free: 1-866-912-6232

Business hours: Mon-Fri, 8:00am to 5:00pm (Eastern time)

All specifications subject to change without notice.
© 1996-2008 Firstmark Controls All rights reserved.

[top](#)

[News](#) • [Representatives](#) • [Request Literature](#) • [CAD Models](#) • [Calculators](#)

[top](#)



Providing the Ultimate Solutions in Precision
Displacement Sensors

[Order](#) • [Site](#)
[Map](#)

[Home](#) [All Products](#) [Support](#) [Special Offers](#) [Contact Us](#)

Home

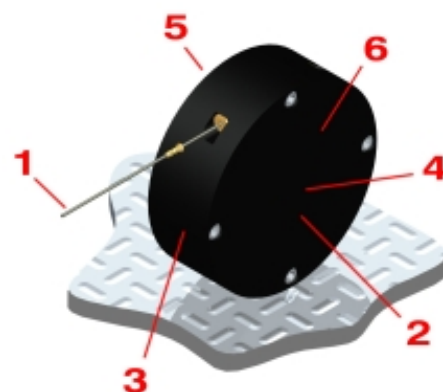
Data Sheet - Series 173, 174, 175 and 176 Subminiature Position Transducer

Subminiature Size, Easy Mounting

Shaded characteristics are verified during production and test. All others are for REFERENCE and information only.

Key Features

1. 6.5-Inch (165-mm) Maximum Travel (Series 176)
2. Analog Signal Using Precision Conductive Plastic Potentiometer
3. AccuTrak™ Grooved Drum for Enhanced Repeatability
4. Bearing-Mounted Rotating Components
5. Optional Flexible Mounting Bases
6. DirectConnect™ Sensor-To-Drum Technology = Zero Backlash, No Torsion Springs or Clutches



Potentiometer Specifications

Potentiometer Type	1-turn, precision, conductive plastic
Resistance: Value, Tolerance	5K ohms, $\pm 10\%$
Travel: Electrical, Mechanical	340°, 340° min
Mechanical Life	100 million shaft revolutions min
Output Signal	analog signal from 0 to supply voltage (voltage divider circuit)
Power Rating	1.0 W at 158° F (70° C)
Supply Current	12 mA max
Supply Voltage	35 VDC max (using voltage divider circuit)
Independent Linearity Error	$\pm 0.5\%$ max per VRCI-P-100A
Output Smoothness	0.1% max
Insulation Resistance	1000 Mohms at 500 VDC min
Dielectric Strength	1000 VDC min
Resolution	infinite signal
Operating Temperature	-85° to +257° F (-65° to +125° C)
Shock, Vibration	100 g for 6 ms, 10 to 2000 Hz at 15 g per Mil-R-39023
Temperature Coefficient	± 400 ppm/°C max

Other Specifications

Case Materials	precision-machined anodized 2024 aluminum				
Displacement Cable	0.018-inch (0.46-mm) dia., 7-by-7 stranded stainless steel, 40-lb (177-N) min breaking strength				
Displacement Cable Hardware	1 each of 300196 loop sleeve , 300292 copper sleeve , 300688 ball-end plug , 300495 pull ring , 160026 brass swivel , and 301003 nickel swivel ; all items provided uncrimped				
Series	173 (Opt. 1)	173 (Opt. 2)	174	175	176
Nominal Mass	1 oz (28 g)	1 oz (28 g)	2 oz (57 g)	3 oz (85 g)	4 oz (113 g)
Displ. Cable Tension (Nom., Min)	0.5 oz (0.1 N)	2 oz (0.6 N)	3 oz (0.8 N)	2 oz (0.6 N)	2.5 oz (0.7 N)
Displ. Cable Tension (Nom., Max)	4 oz (1.1 N)	10 oz (2.8 N)	12 oz (3.3 N)	10 oz (2.8 N)	8 oz (2.2 N)
Displ. Cable Accel. (Nom., Max)	8 g	17 g	9 g	8 g	6 g
Environmental Protection	NEMA 3S / IP 54, DO-160D (ED-14D) Env. Cat. E1E1ABSHXFDXSAXXXXXXXXXXX				

Model Numbers and Ordering Codes

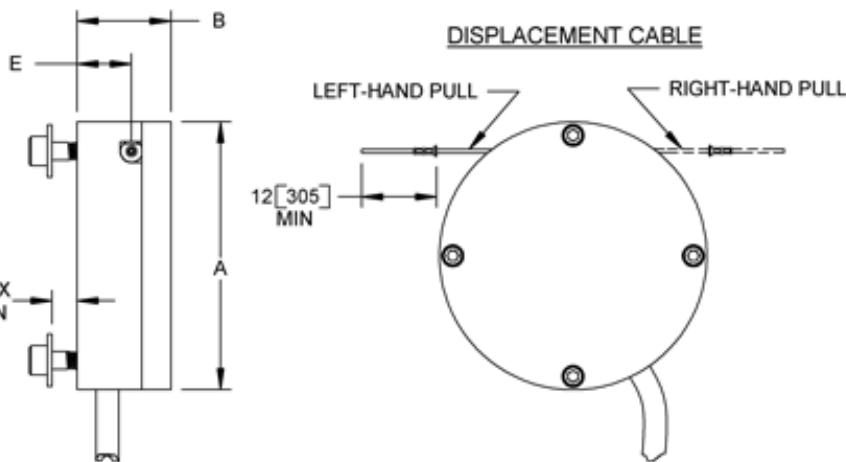
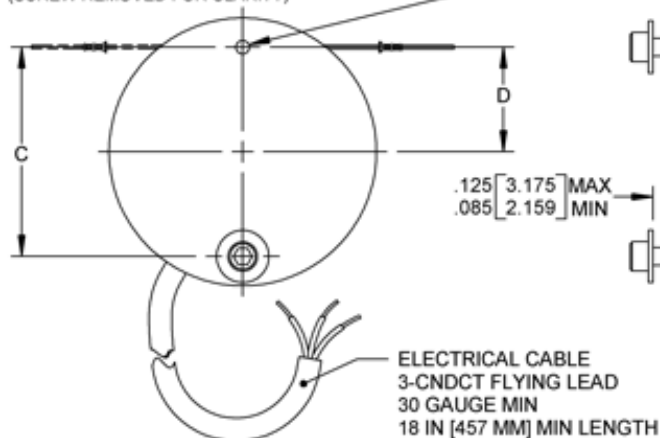
173-0241-abc	position transducer (3.00-inch (76-mm) range)
174-0321-abc	position transducer (4.00-inch (102-mm) range)
175-0401-abc	position transducer (5.00-inch (127-mm) range)
176-0521-abc	position transducer (6.50-inch (165-mm) range)
Example: 173-0241-L2N (left-hand displacement cable pull, cable tension: -020, no base)	

Variable	Value	Description
a	L	left-hand displacement cable pull
	R	right-hand displacement cable pull
b	1	cable tension: -010 (173 only)
	2	cable tension: -020 (173 only)
	3	cable tension: -030 (174, 175, and 176 only)
c	N	no base
	C	base: L (173 only); pn 173015
	D	base: L (174/175 only); pn 174015
	E	base: L (176 only); pn 176015

Drawing

SERIES 173, 174, 175 - 2X 2-56 UNC THREADED MNTG HOLES
(PROVIDED WITH FLAT WASHERS AND 2-56 UNC x 1/4 INCH SOCKET HEAD CAP SCREWS, 5/64 SOCKET)

SERIES 176 - 2X 4-40 UNC THREADED MNTG HOLES
(PROVIDED WITH FLAT WASHERS AND 4-40 UNC x 1/4 INCH SOCKET HEAD CAP SCREWS, 3/32 SOCKET)
(SCREW REMOVED FOR CLARITY)



SERIES	A	B	C	D	E
173	1.28 [32.5]	.45 [11.4]	1.00 [25.4]	.50 [12.7]	.260 [6.60]
174	1.705 [43.31]	.49 [12.5]	1.425 [36.20]	.713 [18.1]	.260 [6.60]
175	1.99 [50.5]	.52 [13.2]	1.425 [36.20]	.845 [21.46]	.275 [6.99]
176	2.46 [63.3]	.52 [13.2]	1.425 [36.20]	1.104 [28.04]	.275 [6.99]

Electrical Connection for Increasing Output with Displacement Cable Extraction		
<i>Left-Hand Pull</i> black white red	<i>Right-Hand Pull</i> red white black	<i>Signal</i> input, V+ output, signal, S+ ground, common, V-, S-

For crimping of hardware to displacement cable, consider the [160001-01 installation kit](#).

Need something not shown? Complete a [Custom Solution Request](#).

All dimensions are REFERENCE and are in inches [mm] • Data Sheet Series 173-176 REV.-

[Firstmark Controls](#) • info@firstmarkcontrols.com
An ISO9001:2000/AS9100B-Compliant Company
1176 Telecom Drive • Creedmoor, NC 27522 USA
Phone: 1-919-956-4203 • Fax: 919-682-3786 • Toll Free: 1-866-912-6232

Business hours: Mon-Fri, 8:00am to 5:00pm (Eastern time)
All specifications subject to change without notice.
© 1996-2008 Firstmark Controls All rights reserved.



Providing the Ultimate Solutions in Precision
Displacement Sensors

[Order](#) • [Site
Map](#)

[Home](#) | [All Products](#) | [Support](#) | [Special Offers](#) | [Contact Us](#)

Home

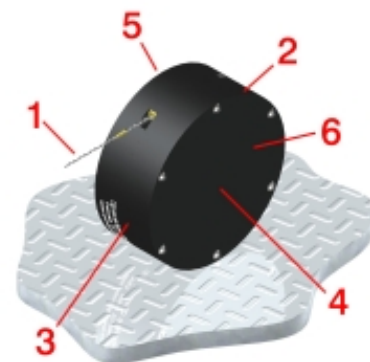
Data Sheet - Model 174-0321T High-Frequency-Response Position Transducer

For Crash Test, Impact Testing, and High-Acceleration Applications

Shaded characteristics are verified during production and test. All others are for REFERENCE and information only.

Key Features

1. 4-Inch (102-mm) Maximum Travel
2. Analog Signal Using Precision Conductive Plastic Potentiometer
3. AccuTrak™ Grooved Drum for Enhanced Repeatability and Longer Cable Life
4. Bearing-Mounted Rotating Components
5. High-Tension Displacement Cable
6. DirectConnect™ Sensor-To-Drum Technology = Zero Backlash, No Torsion Springs or Clutches



Potentiometer Specifications

Potentiometer Type	1-turn, precision, conductive plastic
Resistance: Value, Tolerance	5K ohms, $\pm 10\%$
Travel: Electrical, Mechanical	340°, 340° min
Mechanical Life	100 million shaft revolutions min
Output Signal	analog signal from 0 to supply voltage (voltage divider circuit)
Power Rating	1.0 W at 158° F (70° C)
Supply Current	12 mA max
Supply Voltage	35 VDC max (using voltage divider circuit)
Independent Linearity Error	$\pm 0.5\%$ max per VRCI-P-100A
Output Smoothness	0.1% max
Insulation Resistance	1000 Mohms at 500 VDC min
Dielectric Strength	1000 VDC min
Resolution	infinite signal
Operating Temperature	-85° to +257° F (-65° to +125° C)
Shock, Vibration	100 g for 6 ms, 10 to 2000 Hz at 15 g per Mil-R-39023
Temperature Coefficient	± 400 ppm/°C max

Other Specifications

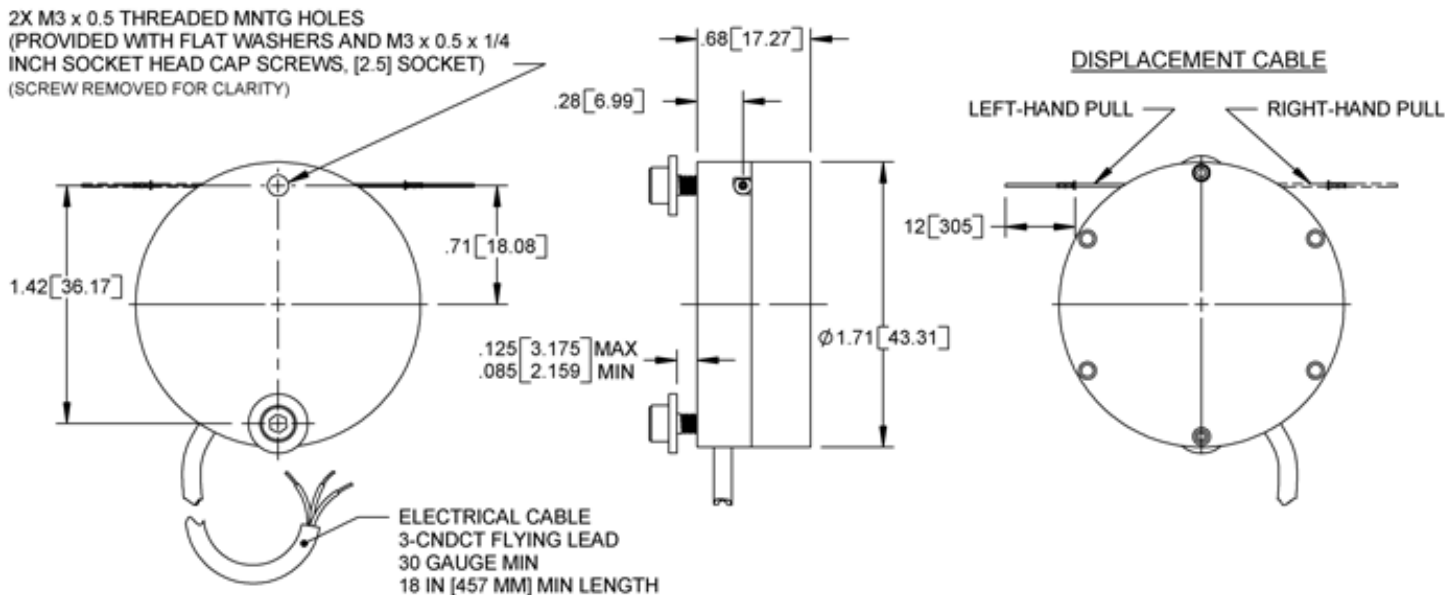
Case Materials	precision-machined anodized 2024 aluminum
Displacement Cable	0.024-inch (0.61-mm) dia., 7-by-7 stranded stainless steel, 70-lb (311-N) min breaking strength
Displacement Cable Hardware	1 each of 300196 loop sleeve , 300292 copper sleeve , 160032 copper sleeve , 300688 ball-end plug , 300495 pull ring , and 301003 nickel swivel ; all items provided uncrimped
Nominal Mass	3 oz (85 g)
Displacement Cable Tension (Nominal)	56 oz (15.5 N) min
Cable Acceleration (Nominal)	50 g's max
Environmental Protection	NEMA 3S / IP 54, DO-160D (ED-14D) Env. Cat. E1E1ABSHXFDXSAXXXXXXXXXXX

Model Numbers and Ordering Codes

174-0321Ta	position transducer (4.00-inch (102-mm) range)
Example: 174-0321T (left-hand displacement cable pull)	

Variable	Value	Description
a	-	left-hand displacement cable pull
	R	right-hand displacement cable pull

Drawing



Electrical Connection for Increasing Output with Displacement Cable Extraction

Left-Hand Pull	Right-Hand Pull	Signal
black	red	input, V+
white	white	output, signal, S+
red	black	ground, common, V-, S-

For crimping of hardware to displacement cable, consider the [160001-01 installation kit](#).

Need something not shown? Complete a [Custom Solution Request](#).

All dimensions are REFERENCE and are in inches [mm] Data Sheet Model 174-0321T Rev. -

[Firstmark Controls](#) • info@firstmarkcontrols.com

An ISO9001:2000/AS9100B-Compliant Company
1176 Telecom Drive • Creedmoor, NC 27522 USA
Phone: 1-919-956-4203 • Fax: 919-682-3786 • Toll Free: 1-866-912-6232

Business hours: Mon-Fri, 8:00am to 5:00pm (Eastern time)

All specifications subject to change without notice.
© 1996-2008 Firstmark Controls All rights reserved.

[top](#)

[News](#) • [Representatives](#) • [Request Literature](#) • [CAD Models](#) • [Calculators](#)

[top](#)
