

# Series 210-220

## Long Stroke AC LVDTs

The Series 210-220 AC LVDTs offer precision linear displacement measurements for applications with strokes from 0.5 to 60 inches. The transducers have been designed with an extremely low temperature coefficient, and non-linearity of less than  $\pm 0.25\%$  F.S. Variable pitch secondary windings are incorporated into the design with computer controlled winding machines to minimize package length to stroke ratio, and assure a uniform product.



### KEY FEATURES

<b>Ranges from <math>\pm 0.25"</math> to <math>60"</math></b>	<b>Non-linearity <math>\leq 0.25\%</math></b>
<b>Low Temperature Coefficient</b>	<b>Stainless Steel Construction</b>
<b>High Sensitivity</b>	<b>Splashproof</b>

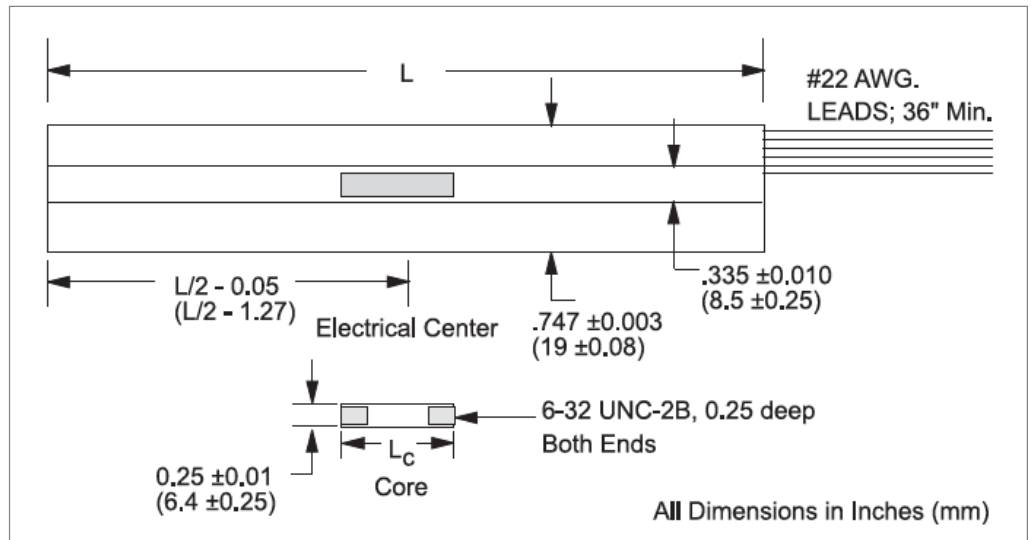
### TRANSDUCER SPECIFICATIONS

MODEL	FULL STROKE $\pm$ Inches (mm)	MAX. USABLE STROKE $\pm$ Inches (mm)	BODY LENGTH L Inches (mm)	CORE P/N	CORE LENGTH Lc Inches (mm)	CORE MASS Grams	INPUT IMPEDANCE Ohms	DC INPUT RESISTANCE Ohms	OUTPUT IMPEDANCE Ohms	PHASE ANGLE Degrees
0215-0000	0.25 (6.4)	0.65 (16.5)	2.50 (63.5)	C005-0108	1.00 (25.4)	5.1	205	22	265	13
0216-0000	0.50 (12.7)	0.95 (24.1)	3.25 (82.6)	C005-0108	1.00 (25.4)	5.1	235	31	310	17
0217-0000	1.00 (25.4)	1.45 (36.8)	4.50 (114.3)	C005-0113	1.25 (31.8)	6.6	195	36	205	19
0218-0000	2.00 (50.8)	2.70 (68.9)	7.50 (190.5)	C005-0107	1.50 (38.1)	8.1	200	46	255	22
0219-0000	3.00 (76.2)	3.80 (96.5)	10.00 (254.0)	C005-0106	1.90 (48.3)	10.9	225	57	285	25
0220-0000	5.00 (127.0)	5.95 (151.1)	15.00 (381.0)	C005-0105	2.50 (63.5)	14.7	360	89	460	31
0221-0000	7.50 (190.5)	8.45 (214.6)	21.50 (546.1)	C005-0104	4.00 (101.6)	24.5	235	55	235	30
0222-0000	10.00 (254.0)	11.00 (279.4)	28.00 (711.2)	C005-0103	5.50 (139.7)	34.4	330	72	285	31
0223-0000	15.00 (381.0)	16.40 (416.6)	40.00 (1016)	C005-0100	7.00 (177.8)	44.4	450	57	395	25
0224-0000	20.00 (508.0)	21.30 (541.0)	50.00 (1270)	C005-0100	7.00 (177.8)	44.4	660	100	580	30
0225-0000	25.00 (635.0)	26.20 (665.5)	60.00 (1524)	C005-0100	7.00 (177.8)	44.4	210	41	355	28
0226-0000	30.00 (762.0)	31.30 (795.0)	70.00 (1778)	C005-0100	7.00 (177.8)	44.4	200	45	410	30

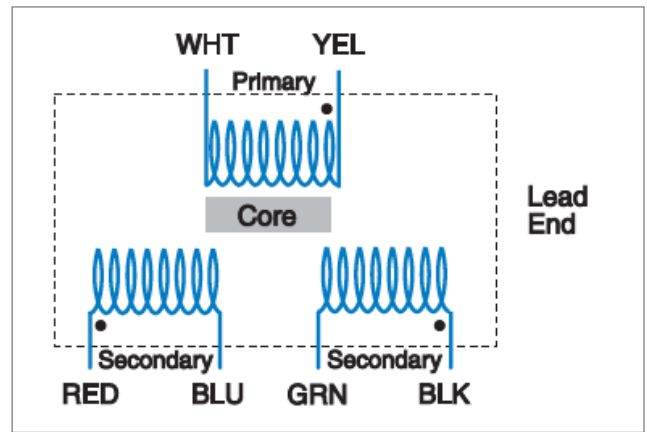
*(Specifications at reference frequency)*

<b>NON-LINEARITY</b>	$\leq \pm 0.25\%$ FS (Best Fit Straight Line)
<b>REFERENCE FREQUENCY</b>	Models 0215-0000 thru 0222-0000, 7.0 KHz; Models 0223-0000 thru 0226-0000, 3.0 KHz
<b>SENSITIVITY</b>	0.50 V/V $\pm 10\%$ at FULL SCALE
<b>INPUT VOLTAGE</b>	20 VRMS, Max.
<b>NULL VOLTAGE</b>	$< 1.0\%$ Excitation Voltage
<b>TEMPERATURE COEFFICIENTS</b>	$< \pm 0.001\%$ FS/ $^{\circ}$ F Zero, $< \pm 0.01\%$ Reading/ $^{\circ}$ F Span
<b>TEMPERATURE RANGE</b>	-67 $^{\circ}$ F to +257 $^{\circ}$ F (-55 $^{\circ}$ C to +125 $^{\circ}$ C) Operating -67 $^{\circ}$ F to +275 $^{\circ}$ F (-55 $^{\circ}$ C to +135 $^{\circ}$ C) Storage
<b>OUTER HOUSING AND BORE LINER</b>	300 Series Stainless Steel
<b>CORE</b>	Chrome Plated Iron/Nickel Alloy

**DIMENSIONAL DIAGRAM**

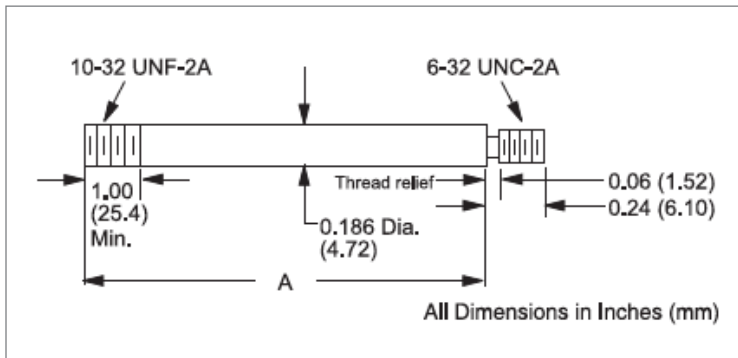


**SCHEMATIC**



**CORE EXTENSION RODS (Sold Separately)**

The recommended core extension rods are made of nonmagnetic stainless steel and are sized to allow the transducers to operate over their full range. Extension rods from models with longer strokes may be used to facilitate installation. Using extension rods shorter than recommended may reduce the LVDT's usable measurement range.



MODEL	RECOMMENDED CORE EXTENSION ROD	DIMENSION A Inches (mm)
0215-0000	C006-0174	3.00 (76.2)
0216-0000	C006-0175	3.60 (91.4)
0217-0000	C006-0176	4.70 (119.4)
0218-0000	C006-0177	7.20 (182.8)
0219-0000	C006-0178	9.30 (236.2)
0220-0000	C006-0179	13.70 (348.0)
0221-0000	C006-0180	19.00 (482.6)
0222-0000	C006-0181	24.20 (614.7)
0223-0000	C006-0182	35.00 (889.0)
0224-0000	C006-0183	45.50 (1156)
0225-0000	C006-0184	56.00 (1422)
0226-0000	C006-0185	66.50 (1689)

# Series 210-220

## DC-DC System Operation Modified Versions

To facilitate prototyping, or in instances where a DC in - DC out system is preferred, any of the standard, high temperature or vented Series 210-220 can be used in conjunction with the Series 1000 Oscillator/Demodulator. The DC system provides the same level of performance as a stand-alone AC LVDT. The high level DC output voltage

can be directly interfaced with analog circuits as well as data acquisition cards, PLCs, or A/D converters. Each Oscillator/Demodulator can be customized to provide a zero offset and nonstandard gain, meeting specific user requirements. Detailed connection information can be found in the Accessories portion of this catalog.

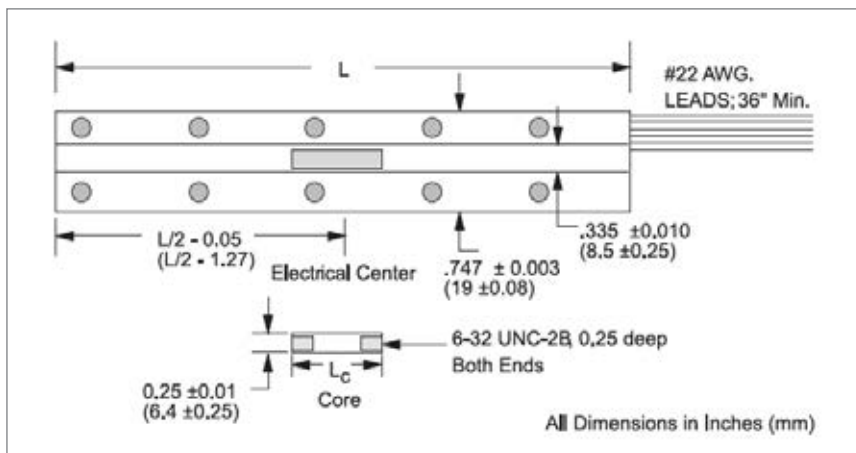
### SYSTEM SPECIFICATIONS (Combined Performance of LVDT and Oscillator/Demodulator)

<b>SELECTED OSCILLATOR/DEMOMULATOR</b>	Model 1000-0011: Models 0223-0000 thru 0226-0000 Model 1000-0012: Models 0215-0000 thru 0222-0000
<b>NON-LINEARITY</b>	$\leq \pm 0.25\%$ FS (Best Fit Straight Line)
<b>INPUT</b>	$\pm 14.5$ to $\pm 28.0$ VDC, $\pm 100$ mA Max., Internal regulation and input reversal protection provided
<b>OUTPUT</b>	Adjustable to $\pm 5.0$ VDC at end of linear stroke, via SPAN adjustment
<b>FREQUENCY RESPONSE (-3dB)</b>	Systems with 1000-0011: 500 Hz Min.; Systems with 1000-0012: 1000 Hz Min.
<b>OUTPUT RIPPLE</b>	$< 0.03$ VRMS Max.
<b>TEMPERATURE COEFFICIENTS</b>	$< \pm 0.0035\%$ FS/°F Zero, $< \pm 0.02\%$ Reading/°F Span
<b>TEMPERATURE RANGE</b>	LVDT: $-67^\circ\text{F}$ to $+257^\circ\text{F}$ ( $-55^\circ\text{C}$ to $+125^\circ\text{C}$ ) Operating LVDT: $-67^\circ\text{F}$ to $+275^\circ\text{F}$ ( $-55^\circ\text{C}$ to $+135^\circ\text{C}$ ) Storage  Osc/Dem: $+32^\circ\text{F}$ to $+158^\circ\text{F}$ ( $0^\circ\text{C}$ to $+70^\circ\text{C}$ ) Operating, $-67^\circ\text{F}$ to $+257^\circ\text{F}$ ( $-55^\circ\text{C}$ to $+125^\circ\text{C}$ ) Storage

### SERIES 210-220 MODIFIED FOR USE IN HIGH PRESSURE ENVIRONMENTS

The high pressure version of the Series 210-220 is suitable for operation in nonconductive and noncorrosive fluids or gasses at pressures up to 5,000 P.S.I. The vented housing

eliminates pressure differentials between the environment and the transducer's interior, allowing rapid and extreme pressure changes without damage or degradation in performance.



MODEL	STROKE ±Inches (mm)
0215-0003	0.25 (6.35)
0216-0005	0.50 (12.7)
0217-0005	1.00 (25.4)
0218-0010	2.00 (50.8)
0219-0014	3.00 (76.2)
0220-0011	5.00 (127)
0221-0005	7.50 (191)
0222-0007	10.00 (254)
0223-0005	15.00 (381)
0224-0004	20.00 (508)
0225-0004	25.00 (635)
0226-0003	30.00 (762)

## SERIES 210-220 MODIFIED FOR USE IN HIGH PRESSURE ENVIRONMENTS

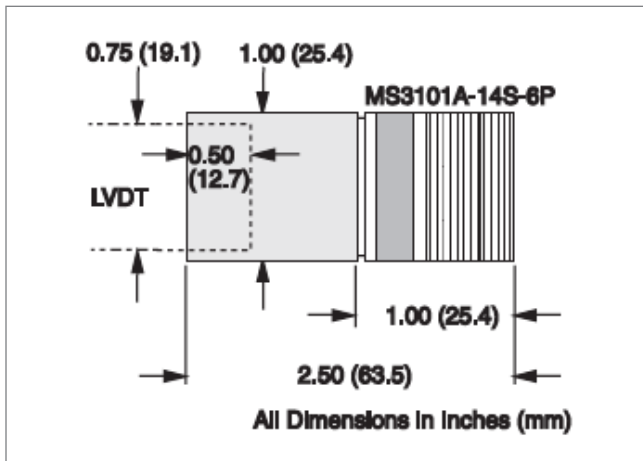
The High Temperature version of the Series 210-220 has been designed to operate in temperatures from -67°F to +400°F. The LVDTs are identical electrically and mechanically to the standard Series 210-220 transducers, providing the same high level of performance and reliability. To achieve the elevated operating temperature, materials such as the epoxy, solder, and magnet wire have been replaced by their high temperature equivalents.

MODEL	STROKE ±Inches (mm)
0215-0004	0.25 (6.35)
0216-0006	0.50 (12.7)
0217-0006	1.00 (25.4)
0218-0011	2.00 (50.8)
0219-0015	3.00 (76.2)
0220-0012	5.00 (127)
0221-0006	7.50 (191)
0222-0008	10.00 (254)
0223-0006	15.00 (381)
0224-0005	20.00 (508)
0225-0005	25.00 (635)
0226-0004	30.00 (762)

## SALES OPTIONS

The following options are available with this series of transducer. The option must be specified at the time an order is placed.

Option #	Description
X0006	±0.10% Max. Non-Linearity
X0009	Provide longer leads to a specified length
X0012	Replace leads with an integral connector type MS3101A-14S-6P; Adaptor for connector has 1.00" O.D.; mating connector included



For more detailed information about these options, please contact the factory.