

## M-12 SERIES

Premium performance  
12mm diameter AC LVDT

### SPECIFICATIONS

- ◆ Premium performance at competitive price
- ◆ Low 100ppm/°C temperature coefficient
- ◆ Low phase shift
- ◆ Metric 12mm housing diameter
- ◆ Stroke ranges from  $\pm 10$  to  $\pm 100$ mm
- ◆ Stainless steel housing
- ◆ Magnetically shielded
- ◆ Imperial or metric threaded core

The **M-12 Series** of layer-wound LVDTs offer premium performance at standard LVDT pricing. The M-12 series are wound with state-of-the-art, computerized winding machines on a ribless bobbin, resulting in the smooth transfer function required for the most demanding materials testing and position feedback applications. Precision distribution and tapering of the layer windings provide an excellent stroke to length ratio, without sacrificing sensor linearity.

A constant sum of the secondary output voltages throughout the linear range insures compatibility with ratiometric signal conditioning schemes for even lower temperature coefficients

The M-12 Series coil designs have been optimized to provide the lowest possible temperature coefficient of sensitivity, while maintaining suitability for operation with extended cable lengths. An internal high-permeability magnetic shield provides protection in the noisiest electromagnetic environments, while the high-quality AISI 304 Series stainless steel housing protects the LVDT from corrosion in aggressive environments.

Like in most of our LVDTs, the M-12 windings are vacuum impregnated with a specially formulated, high temperature, flexible resin, and the coil assembly is potted inside its housing with a two-component epoxy. This provides excellent protection against hostile environments such as high humidity, vibration and shock.



### FEATURES

- ◆ Small 12mm diameter case
- ◆ Low temperature coefficient of sensitivity
- ◆ Excellent stroke to length ratio
- ◆ Smooth transfer function
- ◆ Constant sum of secondary output voltages
- ◆ Electromagnetic shielding
- ◆ AISI 304 Series stainless steel case

### APPLICATIONS

- ◆ Materials testing extensometers
- ◆ Cylinder position feedback
- ◆ Hydraulic spool valve position feedback
- ◆ Roller gap positioning
- ◆ Automotive suspension testing
- ◆ Flight simulators
- ◆ Aircraft flight control feedback

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### PERFORMANCE SPECIFICATIONS

| ELECTRICAL SPECIFICATIONS       |                       |             |             |             |             |              |
|---------------------------------|-----------------------|-------------|-------------|-------------|-------------|--------------|
| Parameter                       | M-12 10               | M-12 20     | M-12 30     | M-12 50     | M-12 65     | M-12 100     |
| Stroke range, inch [mm]         | ±0.39 [±10]           | ±0.79 [±20] | ±1.18 [±30] | ±1.97 [±50] | ±2.56 [±65] | ±3.94 [±100] |
| Sensitivity, V/V/inch [mV/V/mm] | 1.07 [42.0]           | 0.54 [21.2] | 0.25 [10.0] | 0.25 [9.9]  | 0.22 [8.8]  | 0.18 [7.1]   |
| Output at stroke ends (*)       | 420mV/V               | 424mV/V     | 300mV/V     | 495mV/V     | 573mV/V     | 710mV/V      |
| Sum of secondary outputs (**)   | 1.44 V/V              | 1.0 V/V     | 0.6 V/V     | 0.8 V/V     | 0.94 V/V    | 0.7 V/V      |
| Phase shift, degree             | +3°                   | +2°         | +2°         | +3°         | -2°         | -3°          |
| Input impedance (PRIMARY)       | 570Ω                  | 1100Ω       | 1540Ω       | 780Ω        | 1200Ω       | 1000Ω        |
| Output impedance (SECONDARY)    | 540Ω                  | 400Ω        | 600Ω        | 825Ω        | 1100Ω       | 1700Ω        |
| Non-linearity                   | ±0.25% of FR, maximum |             |             |             |             |              |
| Input (excitation) voltage      | 3 VRMS sine wave      |             |             |             |             |              |
| Input (excitation) frequency    | 500Hz to 10kHz        |             |             |             |             |              |
| Test frequency                  | 2.5kHz                |             |             |             |             |              |
| Null voltage                    | 0.5% of FRO, maximum  |             |             |             |             |              |

| ENVIRONMENTAL SPECIFICATIONS & MATERIALS     |   |
|--|---|
| Operating temperature                        | -65°F to +300°F [-55°C to 150°C]  |
| Temperature coefficient of sensitivity (***) | 0.018% per degree F [0.01% per degree C]  |
| Shock survival                               | 500 g (11ms half-sine)  |
| Vibration tolerance                          | 20 g up to 2KHz   |
| Housing material                             | AISI 304 Series stainless steel   |
| Electrical connection                        | Six lead-wires, 26 AWG, PTFE insulated, 1 foot [0.3m] long<br>(longer wires optional) |
| IEC 60529 rating                             | IP61  |

#### Notes:

Dimensions are in inch [mm]

All values are nominal unless otherwise noted

Electrical specifications are for the test frequency indicated in the table

FR: Full Range is the stroke range, end to end; FR=2xS for ±S stroke range

FRO (Full Range Output): Algebraic difference in outputs measured at the ends of the range

(\*): Unit for output at stroke ends is millivolt out, per volt of excitation (RMS)

(\*\*): Unit for Sum of secondary outputs is volt out, per volt of excitation (RMS)

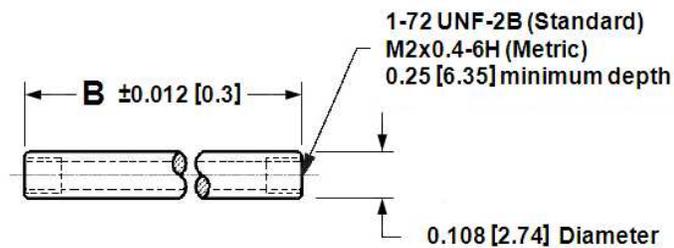
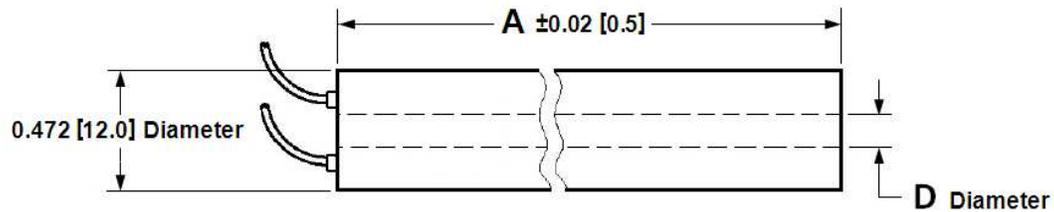
(\*\*\*): Excitation frequency dependent (Call factory for additional information)

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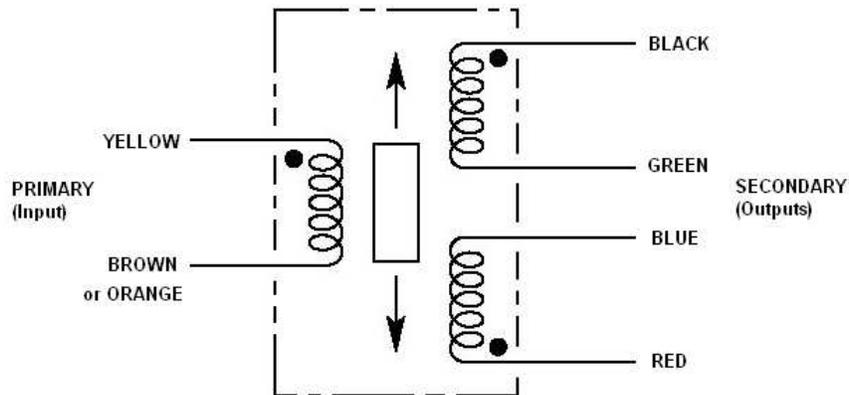
### MECHANICAL SPECIFICATIONS

| Parameter            | M-12 10     | M-12 20     | M-12 30     | M-12 50     | M-12 65     | M-12 100    |
|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Main body length "A" | 2.64 [67]   | 3.82 [97]   | 4.61 [117]  | 6.10 [155]  | 7.87 [200]  | 11.22 [285] |
| Core length "B"      | 1.42 [36]   | 1.81 [46]   | 1.81 [46]   | 1.81 [46]   | 2.36 [60]   | 2.95 [75]   |
| Bore diameter "D"    | 0.122 [3.1] | 0.122 [3.1] | 0.122 [3.1] | 0.122 [3.1] | 0.134 [3.4] | 0.134 [3.4] |



*Dimensions are in inch [mm]*

### WIRING INFORMATION



*Connect Green to Blue for differential output*

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### ORDERING INFORMATION

| Description  | Model           | Part Number  |
|--|-----------------|--------------|
| ±10mm LVDT   | M-12 10         | 02561036-000 |
| ±20mm LVDT   | M-12 20         | 02561037-000 |
| ±30mm LVDT   | M-12 30         | 02561038-000 |
| ±50mm LVDT   | M-12 50         | 02561039-000 |
| ±65mm LVDT   | M-12 65         | 02561043-000 |
| ±100mm LVDT  | M-12 100        | 02561040-000 |
| <b>OPTIONS</b>   |                 |              |
| 5.0 KHz calibration  |                 | XXXXXXXX-002 |
| Metric threaded core option (M2x0.4-6H threads)            |                 | XXXXXXXX-006 |
| 5.0 KHz calibration AND metric threaded core option        |                 | XXXXXXXX-008 |
| 10 foot long lead-wires                                    | Consult factory | XXXXXXXX-040 |
| <b>ACCESSORIES</b>   |                 |              |
| Core connecting rod, 6 inches long, 1-72 threads           |                 | 05282945-006 |
| Core connecting rod, 12 inches long, 1-72 threads          |                 | 05282945-012 |
| Core connecting rod, 24 inches long, 1-72 threads          |                 | 05282945-024 |
| Core connecting rod, 36 inches long, 1-72 threads          |                 | 05282945-036 |
| Core connecting rod, 6 inches long, M2x0.4 metric threads  |                 | 05282976-006 |
| Core connecting rod, 12 inches long, M2x0.4 metric threads |                 | 05282976-012 |
| Mounting block   |                 | 04560956-000 |

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