

# Series 100

## Linear Velocity Transducers

The Series 100 Linear Velocity Transducers provide a simple yet accurate means of measuring linear velocity. They consist of high coercive force permanent magnet cores which induce sizable DC voltage while moving concentrically within shielded coils. The basic design permits operation **without external excitation** while the generated output voltage varies linearly with core (magnet) velocity. These transducers are ideal for seismology, hydraulic ram speed, drilling rate, and any other application where an instantaneous velocity measurement is required.



### KEY FEATURES

- Self-Generating DC Voltage Output
- Magnetically Shielded
- High Sensitivity
- High Frequency Response

### ELECTRICAL SPECIFICATIONS

| MODEL NUMBER                                                  | MAGNET DIMENSIONS<br>Inches (mm) |              | NOM. OUTPUT SENSITIVITY<br>mV/in/sec<br>(mV/mm/sec) | ELECTRICAL IMPEDANCE<br>Coils Connected in Series |           | REPLACEMENT MAGNETS | FREQUENCY RESPONSE*<br>Hz |             |
|---------------------------------------------------------------|----------------------------------|--------------|-----------------------------------------------------|---------------------------------------------------|-----------|---------------------|---------------------------|-------------|
|                                                               | WORKING RANGE                    | USABLE RANGE | Open Circuit                                        | R Ohms                                            | L Henries | Magnet Number       | Load = 10R                | Load = 100R |
| 0100-0000                                                     | 0.5 (12)                         | 1.3 (33)     | 120 (5)                                             | 2000                                              | 0.085     | M000-0000           | 350                       | 1500        |
| 0100-0001                                                     | 0.5 (12)                         | 1.3 (33)     | 54 (2)                                              | 2000                                              | 0.085     | M000-0008           | 350                       | 1500        |
| 0101-0000                                                     | 1.0 (25)                         | 1.9 (48)     | 90 (4)                                              | 2500                                              | 0.065     | M000-0001           | 600                       | 1500        |
| 0101-0001                                                     | 1.0 (25)                         | 1.9 (48)     | 40 (2)                                              | 2500                                              | 0.065     | M000-0009           | 600                       | 1500        |
| 0111-0000                                                     | 1.0 (25)                         | 2.3 (58)     | 550 (22)                                            | 13000                                             | 1.6       | M000-0002           | 120                       | 600         |
| 0111-0001                                                     | 1.0 (25)                         | 2.3 (58)     | 250 (10)                                            | 13000                                             | 1.6       | M000-0010           | 120                       | 600         |
| 0112-0000                                                     | 2.0 (50)                         | 3.4 (86)     | 550 (22)                                            | 19000                                             | 2.9       | M000-0003           | 100                       | 500         |
| 0112-0001                                                     | 2.0 (50)                         | 3.4 (86)     | 250 (10)                                            | 19000                                             | 2.9       | M000-0011           | 100                       | 500         |
| 0113-0000                                                     | 3.0 (75)                         | 4.2 (107)    | 550 (22)                                            | 25000                                             | 3.2       | M000-0004           | 120                       | 500         |
| 0113-0001                                                     | 3.0 (75)                         | 4.2 (107)    | 250 (10)                                            | 25000                                             | 3.2       | M000-0012           | 120                       | 500         |
| 0114-0000                                                     | 4.0 (100)                        | 5.5 (140)    | 550 (22)                                            | 32000                                             | 4.0       | M000-0005           | 120                       | 400         |
| 0114-0001                                                     | 4.0 (100)                        | 5.5 (140)    | 250 (10)                                            | 32000                                             | 4.0       | M000-0013           | 120                       | 400         |
| 0122-0000                                                     | 6.0 (150)                        | 8.0 (203)    | 425 (17)                                            | 11500                                             | 1.9       | M000-0006           | 95                        | 450         |
| 0122-0001                                                     | 6.0 (150)                        | 8.0 (203)    | 160 (6)                                             | 11500                                             | 1.9       | M000-0014           | 95                        | 450         |
| 0123-0000                                                     | 9.0 (225)                        | 11.0 (279)   | 425 (17)                                            | 17000                                             | 2.8       | M000-0007           | 95                        | 450         |
| 0123-0001                                                     | 9.0 (225)                        | 11.0 (279)   | 160 (6)                                             | 17000                                             | 2.8       | M000-0015           | 95                        | 450         |
| 0124-0001                                                     | 12.0 (300)                       | 15.0 (381)   | 175 (7)                                             | 22000                                             | 3.7       | M000-0023           | 95                        | 450         |
| 0125-0001                                                     | 16.5 (412)                       | 18.5 (470)   | 175 (7)                                             | 29000                                             | 5.1       | M000-0024           | 90                        | 430         |
| 0126-0001                                                     | 20.0 (500)                       | 22.0 (559)   | 175 (7)                                             | 34000                                             | 6.2       | M000-0025           | 90                        | 430         |
| 0127-0001                                                     | 24.0 (600)                       | 26.0 (660)   | 175 (7)                                             | 42000                                             | 7.3       | M000-0028           | 90                        | 430         |
| Operating Temperature Range: -50°F to +200°F (-46°C to +93°C) |                                  |              |                                                     |                                                   |           |                     |                           |             |
| Max. Non-Linearity: < ±2.5% of Reading                        |                                  |              |                                                     |                                                   |           |                     |                           |             |

\* Output voltage is attenuated < 1% of the constant velocity value.

Polarity of Output: Voltage at Red lead is positive with respect to that at Black when north pole of magnet is closest to, and traveling towards, lead end of LVT.

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## MECHANICAL SPECIFICATIONS

| MODEL NUMBER | COIL HOUSING DIMENSIONS, Inches (mm) |              |              |            |                       | MAGNET DIMENSIONS, Inches (mm) |             |         |                       |
|--------------|--------------------------------------|--------------|--------------|------------|-----------------------|--------------------------------|-------------|---------|-----------------------|
|              | $C_A$                                | $L_A$        | $(OD)_A$     | $(ID)_A$   | WEIGHT $W_A$<br>Grams | $L_C$                          | $(OD)_C$    | THREAD  | WEIGHT $W_C$<br>Grams |
| 0100-0000    | 1.34 (34)                            | 3.17 (81)    | 0.374 (9.5)  | 0.13 (3.3) | 20                    | 2.38 (60)                      | 0.125 (3.2) | 1-72 NF | 3.5                   |
| 0100-0001    | 1.34 (34)                            | 3.17 (81)    | 0.374 (9.5)  | 0.13 (3.3) | 20                    | 1.63 (41)                      | 0.125 (3.2) | 1-72 NF | 2.5                   |
| 0101-0000    | 1.88 (48)                            | 4.24 (108)   | 0.374 (9.5)  | 0.13 (3.3) | 25                    | 3.00 (76)                      | 0.125 (3.2) | 1-72 NF | 4.5                   |
| 0101-0001    | 1.88 (48)                            | 4.24 (108)   | 0.374 (9.5)  | 0.13 (3.3) | 25                    | 2.25 (57)                      | 0.125 (3.2) | 1-72 NF | 3.8                   |
| 0111-0000    | 2.25 (57)                            | 5.06 (129)   | 0.624 (15.9) | 0.19 (4.8) | 110                   | 3.50 (89)                      | 0.187 (4.8) | 4-40 NC | 11                    |
| 0111-0001    | 2.25 (57)                            | 5.06 (129)   | 0.624 (15.9) | 0.19 (4.8) | 110                   | 2.75 (70)                      | 0.187 (4.8) | 4-40 NC | 10                    |
| 0112-0000    | 3.25 (83)                            | 7.06 (179)   | 0.624 (15.9) | 0.19 (4.8) | 150                   | 4.50 (114)                     | 0.187 (4.8) | 4-40 NC | 15                    |
| 0112-0001    | 3.25 (83)                            | 7.06 (179)   | 0.624 (15.9) | 0.19 (4.8) | 150                   | 3.75 (95)                      | 0.187 (4.8) | 4-40 NC | 14                    |
| 0113-0000    | 4.25 (108)                           | 9.06 (230)   | 0.624 (15.9) | 0.19 (4.8) | 200                   | 5.25 (133)                     | 0.187 (4.8) | 4-40 NC | 17                    |
| 0113-0001    | 4.25 (108)                           | 9.06 (230)   | 0.624 (15.9) | 0.19 (4.8) | 200                   | 4.50 (114)                     | 0.187 (4.8) | 4-40 NC | 16                    |
| 0114-0000    | 5.38 (137)                           | 11.31 (287)  | 0.624 (15.9) | 0.19 (4.8) | 240                   | 6.75 (171)                     | 0.187 (4.8) | 4-40 NC | 22                    |
| 0114-0001    | 5.38 (137)                           | 11.31 (287)  | 0.624 (15.9) | 0.19 (4.8) | 240                   | 6.00 (152)                     | 0.187 (4.8) | 4-40 NC | 21                    |
| 0122-0000    | 7.63 (194)                           | 15.81 (402)  | 0.749 (19)   | 0.30 (7.6) | 420                   | 9.25 (235)                     | 0.25 (6.3)  | 4-40 NC | 54                    |
| 0122-0001    | 7.63 (194)                           | 15.81 (402)  | 0.749 (19)   | 0.30 (7.6) | 420                   | 8.50 (216)                     | 0.23 (5.8)  | 4-40 NC | 51                    |
| 0123-0000    | 11.1 (282)                           | 22.81 (579)  | 0.749 (19)   | 0.30 (7.6) | 610                   | 11.75 (298)                    | 0.25 (6.3)  | 4-40 NC | 69                    |
| 0123-0001    | 11.1 (282)                           | 22.81 (579)  | 0.749 (19)   | 0.30 (7.6) | 610                   | 11.00 (279)                    | 0.23 (5.8)  | 4-40 NC | 66                    |
| 0124-0001    | 14.1 (358)                           | 29.00 (737)  | 0.749 (19)   | 0.30 (7.6) | 810                   | 14.25 (362)                    | 0.23 (5.8)  | 4-40 NC | 88                    |
| 0125-0001    | 18.6 (472)                           | 38.00 (965)  | 0.749 (19)   | 0.30 (7.6) | 1120                  | 18.75 (476)                    | 0.23 (5.8)  | 4-40 NC | 121                   |
| 0126-0001    | 22.1 (561)                           | 45.00 (1143) | 0.749 (19)   | 0.30 (7.6) | 1360                  | 22.25 (565)                    | 0.23 (5.8)  | 4-40 NC | 147                   |
| 0127-0001    | 26.1 (663)                           | 53.00 (1346) | 0.749 (19)   | 0.30 (7.6) | 1520                  | 26.25 (667)                    | 0.23 (5.8)  | 4-40 NC | 156                   |

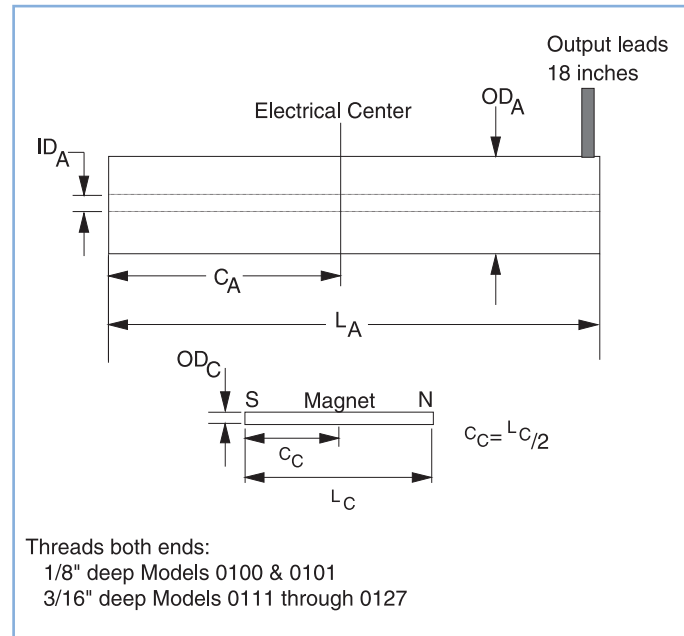
## FIXTURING FOR LINEAR OPERATION

Unlike LVDTs, these transducers do not produce a voltage output unless the magnet is moving. This makes it impossible to electrically identify the correct location of the magnet for linear operation. Users must mechanically position the magnet in the LVT at a known reference point.

As shown in the Dimensional Drawing, the location of the electrical center of the coils is known, and can be used as a reference point. The midpoint of the linear stroke is found by aligning the center of the magnet,  $C_C$ , with the electrical center,  $C_A$ , of the coils. Once in position, the magnet can be moved 1/2 the linear range in either direction.

The transducer housing can be secured with a split block or clamping arrangement. The use of set screws should be avoided, as this may cause internal damage if overtightened.

## DIMENSIONAL DIAGRAM



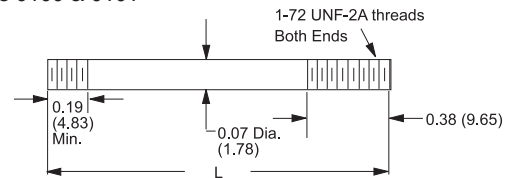
## CORE EXTENSION RODS *(Sold Separately)*

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

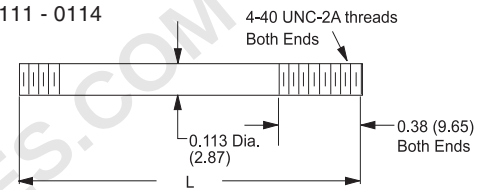
strokes may be used to facilitate installation. Using extension rods shorter than recommended may reduce the LVT's usable measurement range.

| CORE<br>EXTENSION ROD                                                                               | LENGTH L<br>Inches (mm) | RECOMMENDED FOR USE<br>WITH TRANSDUCER MODEL |
|-----------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------|
| 0.070 inch (1.78 mm) diameter rod with<br>1-72 UNF-2A Thread both ends                              |                         |                                              |
| C006-0057                                                                                           | 3.255 (82.68)           | 0100-0000/ -0001<br>0101-0000/ -0001         |
| 0.113 inch (2.87 mm) diameter rod with<br>4-40 UNC-2A Thread both ends                              |                         |                                              |
| C006-0233                                                                                           | 3.50 (88.9)             | 0111-0000/ -0001                             |
| C006-0234                                                                                           | 4.50 (114.3)            | 0112-0000/ -0001                             |
| C006-0235                                                                                           | 5.50 (139.7)            | 0113-0000/ -0001                             |
| C006-0236                                                                                           | 6.50 (165.1)            | 0114-0000/ -0001                             |
| 0.187 inch (4.75 mm) diameter rod with 4-40 UNC-2A Thread<br>one end, 10-32 UNF-2A Thread other end |                         |                                              |
| C006-0072                                                                                           | 8.50 (215.9)            | 0122-0000/ -0001                             |
| C006-0073                                                                                           | 13.00 (330.2)           | 0123-0000/ -0001                             |
| C006-0074                                                                                           | 16.00 (406.4)           | 0124-0001                                    |
| C006-0075                                                                                           | 20.50 (520.7)           | 0125-0001                                    |
| C006-0076                                                                                           | 24.00 (609.6)           | 0126-0001                                    |
| C006-0121                                                                                           | 28.00 (711.2)           | 0127-0001                                    |

Models 0100 & 0101



Models 0111 - 0114



Models 0122 - 0127

