

# DC-EC Series – General purpose DC LVDT



- High level  $\pm 10\text{VDC}$  output
- Stroke ranges from  $\pm 0.05$  to  $\pm 10\text{in}$
- 0.25% linearity
- Reverse polarity protection
- Double magnetic shielding
- Stainless steel housing
- Imperial or metric threaded core

## DESCRIPTION

The **DC-EC Series** DC operated LVDTs combine a computer-designed AC LVDT with custom integral signal conditioning to achieve premium performance. Operating on a nominal  $\pm 15\text{VDC}$  supply, the DC-EC Series delivers an extremely linear, low noise, yet high frequency response  $\pm 10\text{VDC}$  output.

Innovative design and manufacturing techniques further enhance the DC-EC performance and cost efficiency. The micro-miniature components employed were meticulously selected for maximum stability and thermal performance. Vacuum encapsulation of all elements affords excellent shock and vibration tolerance, while double magnetic shielding provides the utmost protection from stray fields.

Like in most of our LVDTs, the DC-EC 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.

Available in a variety of stroke ranges from  $\pm 0.05$  to  $\pm 10$  inches, the DC-EC Series can be configured with a number of standard options including metric threaded core, guided core and small diameter/low mass core.

Captive core option: The DC-EC features an optional captive core design (available for most models) that greatly simplifies installation. The core rod and bearing assembly includes a Bronze bearing on the front end for self-alignment, while a PTFE sleeve allows low-friction travel through the stainless steel boreliner (spool tube). The core rod and the bearing assembly are both field serviceable.

Also see our other LVDTs with built-in signal conditioning: **DC-SE** (single-ended DC voltage), **HCD** (Hermetically sealed,  $\pm\text{DC}$  voltage), **HC-485** (RS485 digital output), and the **HCT** (4-20mA, 2-wire loop).

Measurement Specialties, Inc. (NASDAQ MEAS) offers many other types of sensors and signal conditioners. Data sheets can be downloaded from our web site at: <http://www.meas-spec.com/datasheets.aspx>

MEAS acquired Schaevitz Sensors and the **Schaevitz™** trademark in 2000.

## FEATURES

- Bi-polar DC operation
- Shock and vibration tolerant
- Captive core option (*available on select models*)
- AISI 400 Series stainless steel housing
- CE compliant
- Calibration certificate supplied with each unit

## APPLICATIONS

- Materials testing
- Z-axis position feedback for punch-presses
- Microscope X-Y stage position control
- Medical imaging
- Automotive suspension testing
- Flight simulators

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## PERFORMANCE SPECIFICATIONS

| ELECTRICAL SPECIFICATIONS         |                                                                                                  |                   |                  |                 |               |               |               |              |               |
|-----------------------------------|--------------------------------------------------------------------------------------------------|-------------------|------------------|-----------------|---------------|---------------|---------------|--------------|---------------|
| Parameter                         | DC-EC 050                                                                                        | DC-EC 125         | DC-EC 250        | DC-EC 500       | DC-EC 1000    | DC-EC 2000    | DC-EC 3000    | DC-EC 5000   | DC-EC 10000   |
| Stroke range                      | ±0.050<br>[±1.27]                                                                                | ±0.125<br>[±3.17] | ±0.25<br>[±6.35] | ±0.5<br>[±12.7] | ±1<br>[±25.4] | ±2<br>[±50.8] | ±3<br>[±76.2] | ±5<br>[±127] | ±10<br>[±254] |
| Sensitivity, VDC/inch             | 200                                                                                              | 80                | 40               | 20              | 10            | 5             | 3.3           | 2.0          | 1.0           |
| Sensitivity, VDC/mm               | 7.9                                                                                              | 3.15              | 1.6              | 0.79            | 0.39          | 0.20          | 0.13          | 0.079        | 0.039         |
| Frequency response<br>Hertz @-3dB | 500                                                                                              | 500               | 500              | 200             | 200           | 200           | 200           | 200          | 200           |
| Input voltage                     | ±15VDC                                                                                           |                   |                  |                 |               |               |               |              |               |
| Input current                     | ±25mA                                                                                            |                   |                  |                 |               |               |               |              |               |
| Output at stroke ends             | ±10VDC (Positive and increasing when the core is displaced from null position towards the cable) |                   |                  |                 |               |               |               |              |               |
| Non-linearity                     | ±0.25% of FR, maximum                                                                            |                   |                  |                 |               |               |               |              |               |
| Output ripple                     | 25mVRMS, maximum                                                                                 |                   |                  |                 |               |               |               |              |               |
| Stability                         | 0.125% of FSO                                                                                    |                   |                  |                 |               |               |               |              |               |
| Output impedance                  | 1 Ohm                                                                                            |                   |                  |                 |               |               |               |              |               |

| ENVIRONMENTAL SPECIFICATIONS & MATERIALS |                                                                                                                                                       |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature                    | +32°F to +160°F [0°C to 70°C]                                                                                                                         |
| Survival temperature                     | -65°F to +200°F [-55°C to 95°C]                                                                                                                       |
| Shock survival                           | 250 g (11ms half-sine)                                                                                                                                |
| Vibration tolerance                      | 10 g up to 2kHz                                                                                                                                       |
| Housing material                         | AISI 400 Series stainless steel                                                                                                                       |
| Electrical connection                    | Cable with 4 conductors, 28AWG stranded copper, braided shield and polyurethane jacket, 39 inches [1 meter] long. <b>Shield is connected to case.</b> |
| IEC 60529 rating                         | IP61                                                                                                                                                  |

### Notes:

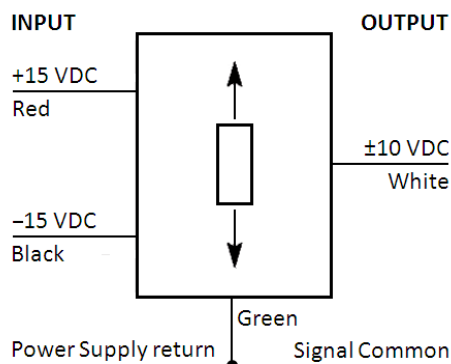
All values are nominal unless otherwise noted

Dimensions are in inch [mm] unless otherwise noted

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

FSO (Full Scale Output): Largest absolute value of the outputs measured at the ends of the range

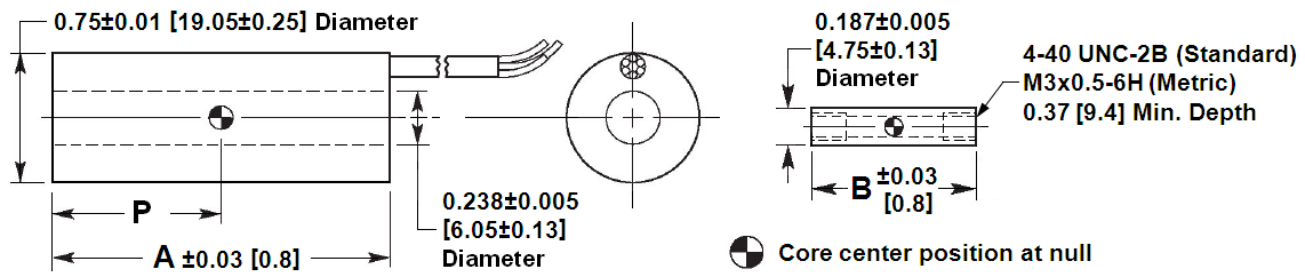
## WIRING INFORMATION



# DC-EC Series – General purpose DC LVDT

## MECHANICAL SPECIFICATIONS – NON-CAPTIVE CORE (STANDARD)

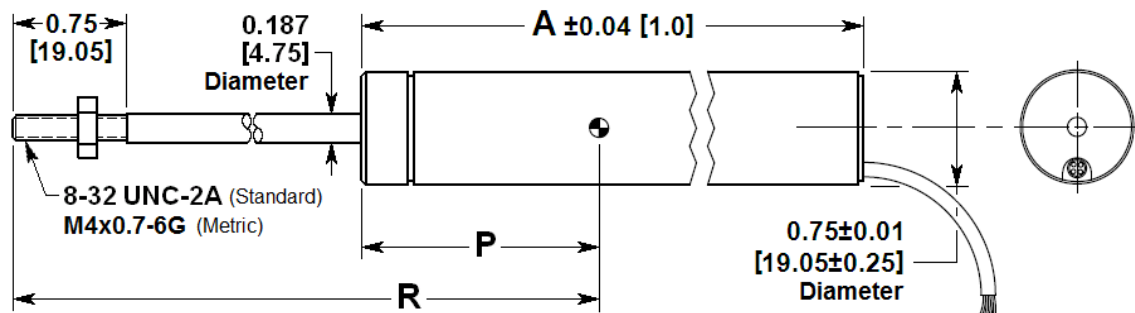
| Parameter                  | DC-EC 050      | DC-EC 125      | DC-EC 250      | DC-EC 500       | DC-EC 1000      | DC-EC 2000       | DC-EC 3000       | DC-EC 5000       | DC-EC 10000      |
|----------------------------|----------------|----------------|----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
| Main body length<br>"A"    | 2.10<br>[53.3] | 2.93<br>[74.4] | 3.80<br>[96.5] | 5.49<br>[139.4] | 7.75<br>[196.9] | 11.12<br>[282.4] | 16.32<br>[414.5] | 20.15<br>[511.8] | 35.38<br>[898.7] |
| Core length<br>"B"         | 0.75<br>[19.1] | 1.25<br>[31.8] | 2.00<br>[50.8] | 3.00<br>[76.2]  | 3.80<br>[96.5]  | 5.30<br>[134.6]  | 6.20<br>[157.5]  | 6.20<br>[157.5]  | 12.00<br>[304.8] |
| Core center at null<br>"P" | 0.50<br>[12.7] | 0.93<br>[23.6] | 1.35<br>[34.3] | 2.20<br>[55.9]  | 3.18<br>[80.8]  | 5.3<br>[134.6]   | 7.55<br>[191.8]  | 9.53<br>[242.1]  | 16.58<br>[421.1] |
| Body weight oz<br>[gram]   | 2.19<br>[62]   | 2.44<br>[69]   | 2.58<br>[73]   | 2.93<br>[83]    | 4.24<br>[120]   | 5.47<br>[155]    | 9.39<br>[266]    | 11.47<br>[325]   | 15.71<br>[445]   |
| Core weight oz<br>[gram]   | 0.07<br>[2]    | 0.11<br>[3]    | 0.18<br>[5]    | 0.28<br>[8]     | 0.35<br>[10]    | 0.46<br>[13]     | 0.49<br>[14]     | 0.60<br>[17]     | 0.85<br>[24]     |



Dimensions are in inch [mm]

## MECHANICAL SPECIFICATIONS – CAPTIVE CORE OPTION

| Parameter                              | DC-EC 050      | DC-EC 125       | DC-EC 250       | DC-EC 500       | DC-EC 1000      | DC-EC 2000       | DC-EC 3000       |
|----------------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|
| Main body length<br>"A"                | 2.48<br>[63.0] | 3.31<br>[84.1]  | 4.18<br>[106.7] | 5.87<br>[149.1] | 8.13<br>[206.5] | 11.50<br>[292.1] | 16.70<br>[424.2] |
| Core rod position at null<br>"R"       | 3.78<br>[96.0] | 4.36<br>[110.7] | 4.85<br>[123.2] | 6.04<br>[153.4] | 7.90<br>[200.7] | 10.52<br>[267.2] | 15.27<br>[387.9] |
| Center of core position at null<br>"P" | 0.84<br>[21.3] | 1.27<br>[32.3]  | 1.69<br>[42.9]  | 2.54<br>[64.5]  | 3.52<br>[89.4]  | 5.22<br>[132.6]  | 7.89<br>[200.4]  |
| Weight oz<br>[gram]                    | 2.97<br>[84]   | 3.32<br>[94]    | 3.53<br>[100]   | 4.02<br>[114]   | 5.61<br>[159]   | 7.2<br>[204]     | 11.68<br>[331]   |



Dimensions are in inch [mm]

# DC-EC Series – General purpose DC LVDT

## ORDERING INFORMATION

| Description      | Model      | Part Number  |
|------------------|------------|--------------|
| ±0.050 inch LVDT | DC-EC 050  | 02560981-000 |
| ±0.125 inch LVDT | DC-EC 125  | 02560982-000 |
| ±0.25 inch LVDT  | DC-EC 250  | 02560983-000 |
| ±0.5 inch LVDT   | DC-EC 500  | 02560984-000 |
| ±1 inch LVDT     | DC-EC 1000 | 02560985-000 |

| Description   | Model       | Part Number  |
|---------------|-------------|--------------|
| ±2 inch LVDT  | DC-EC 2000  | 02560986-000 |
| ±3 inch LVDT  | DC-EC 3000  | 02560987-000 |
| ±5 inch LVDT  | DC-EC 5000  | 02560988-000 |
| ±10 inch LVDT | DC-EC 10000 | 02560989-000 |

| OPTIONS                                                                           |                          |              |
|-----------------------------------------------------------------------------------|--------------------------|--------------|
| Metric threaded core (M3 x 0.5-6H)                                                | ALL DC-EC                | XXXXXXXX-006 |
| Guided core                                                                       | ALL DC-EC                | XXXXXXXX-010 |
| Small-diameter/low-mass core ( <i>consult factory for mass &amp; dimensions</i> ) | ALL DC-EC                | XXXXXXXX-020 |
| Captive core                                                                      | DC-EC 050 thru 3000 only | XXXXXXXX-200 |

**Note:** Add multiple option dash numbers together to determine proper ordering suffix

Example: DC-EC 1000, ±1 inch, with metric threaded and guided core, P/N 02560985-016

| ACCESSORIES                                                |                 |              |
|------------------------------------------------------------|-----------------|--------------|
| Dual rail DC power supply (±15VDC)                         | Model PSD 40-15 | 02291339-000 |
| Core connecting rod, 6 inches long, 4-40 threads           |                 | 05282946-006 |
| Core connecting rod, 12 inches long, 4-40 threads          |                 | 05282946-012 |
| Core connecting rod, 24 inches long, 4-40 threads          |                 | 05282946-024 |
| Core connecting rod, 36 inches long, 4-40 threads          |                 | 05282946-036 |
| Core connecting rod, 6 inches long, M3x0.5 metric threads  |                 | 05282977-006 |
| Core connecting rod, 12 inches long, M3x0.5 metric threads |                 | 05282977-012 |
| Mounting block                                             |                 | 04560950-000 |

Refer to our "[Accessories for LVDTs](#)" data sheet for our LVDT signal conditioning instrumentation and other accessories.

## TECHNICAL CONTACT INFORMATION

| NORTH AMERICA                                                                                                                                                                                                                                                                   | EUROPE                                                                                                                                                                                                                                                               | ASIA                                                                                                                                                                                                                                                                                                                                |
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