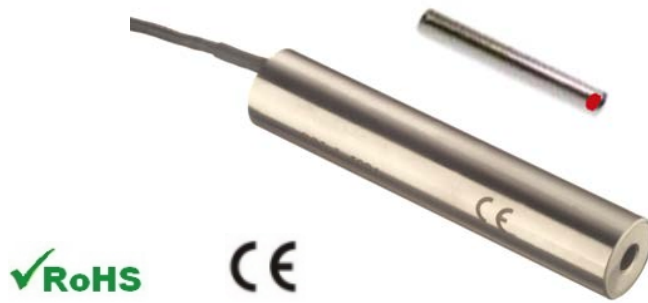


# DC-SE Series – General purpose DC LVDT



- Single-Ended DC operation
- Low 6mA current consumption
- Stroke ranges from 0.1 to 6 inches
- 0.25% linearity
- Stainless steel housing
- Double magnetic shielding
- EMI/ESD protected
- 1 meter long shielded cable
- Captive core option

## DESCRIPTION

The DC-SE Series LVDTs operate on a single-ended DC power supply, and provide either a 0 to +5VDC or +1 to +6VDC output signal (wiring dependent) over their full range of displacement. The extremely linear and low noise output makes the DS-SE Series the perfect choice for interfacing to unipolar inputs of analog-to-digital converters, PLC's, and various data collection systems.

The DC-SE is internally regulated, thus providing immunity to line ripple and allowing operation from unregulated power sources of between 8.5 and 28VDC. The very low typical 6mA current draw is ideal for remote or battery powered applications. The highly stable oscillator provides excellent temperature performance throughout the operating temperature range, while synchronous demodulation insures superb noise rejection.

The built-in EMI/ESD protection and the shielded cable permit operation in noisy industrial environments, with double magnetic shielding providing the utmost protection from stray fields.

Like in most of our LVDTs, the DC-SE 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 0.1 to 6 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-EC ( $\pm$ DC voltage), HCD (Hermetically sealed,  $\pm$ DC voltage), HC-485 (RS485 digital output), and the HCT-IS (Intrinsically safe, 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

- Unipolar DC operation
- Low power consumption
- 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

- Factory floor automation
- Position feedback
- Data collection
- Process control
- Metrology
- Portable / battery powered measurements
- General industrial

# DC-SE Series – General purpose DC LVDT

## PERFORMANCE SPECIFICATIONS

| ELECTRICAL SPECIFICATIONS                |                                                                                                                  |             |             |            |            |             |             |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------|-------------|------------|------------|-------------|-------------|
| Parameter                                | DC-SE 100                                                                                                        | DC-SE 250   | DC-SE 500   | DC-SE 1000 | DC-SE 2000 | DC-SE 4000  | DC-SE 6000  |
| Stroke range                             | 0.10 [2.54]                                                                                                      | 0.25 [6.35] | 0.50 [12.7] | 1.0 [25.4] | 2.0 [50.8] | 4.0 [101.6] | 5.0 [152.4] |
| Sensitivity, VDC/inch                    | 50                                                                                                               | 20          | 10          | 5          | 2.5        | 1.25        | 0.833       |
| Sensitivity, VDC/mm                      | 1.97                                                                                                             | 0.787       | 0.394       | 0.197      | 0.098      | 0.0492      | 0.0328      |
| Input voltage                            | +8.5 to +28VDC                                                                                                   |             |             |            |            |             |             |
| Line regulation                          | 1mV/VDC, maximum; 0.2mV/VDC, typical                                                                             |             |             |            |            |             |             |
| Input current                            | 10mA maximum; 6mA typical                                                                                        |             |             |            |            |             |             |
| Output voltage                           | 0 to +5VDC (4 wire), +1 to +6VDC (3 wire) - Increases when the core is displaced towards the cable               |             |             |            |            |             |             |
| Output current                           | 5mA maximum                                                                                                      |             |             |            |            |             |             |
| Non-linearity                            | ±0.25% of FR, maximum                                                                                            |             |             |            |            |             |             |
| Output ripple & noise                    | 10 mVRMS, maximum                                                                                                |             |             |            |            |             |             |
| Stability                                | 0.125% of FSO                                                                                                    |             |             |            |            |             |             |
| Temp. coefficient of sensitivity         | 0.028%/°F [0.05%/C], maximum                                                                                     |             |             |            |            |             |             |
| Frequency response                       | 200 Hertz @ -3dB                                                                                                 |             |             |            |            |             |             |
| ENVIRONMENTAL SPECIFICATIONS & MATERIALS |                                                                                                                  |             |             |            |            |             |             |
| Temperature range                        | -13°F to +185°F [-25°C to 85°C] Operating; -65°F to +257°F [-55°C to 125°C] Survival                             |             |             |            |            |             |             |
| 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 conductor, 28AWG, stranded copper, braided shield and polyurethane jacket, 39 inches [1 meter] long |             |             |            |            |             |             |

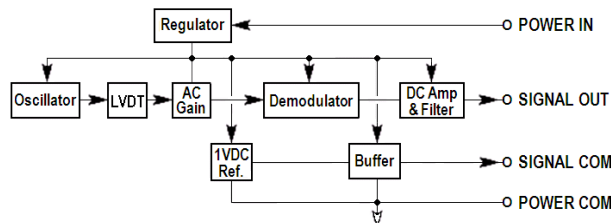
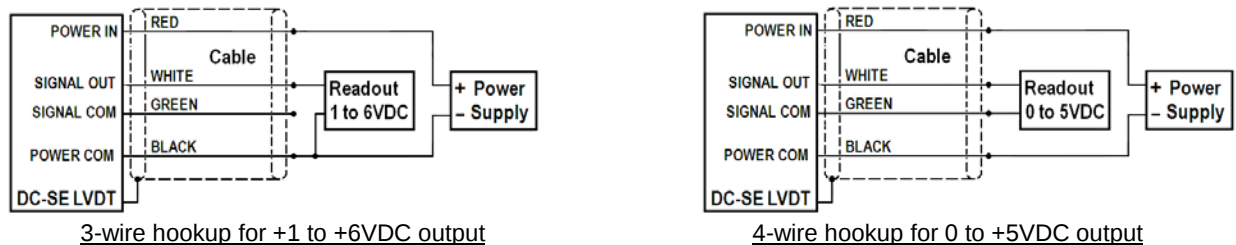
### Notes:

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=S for 0 to S stroke range

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

## WIRING SCHEMATIC & BLOCK DIAGRAM

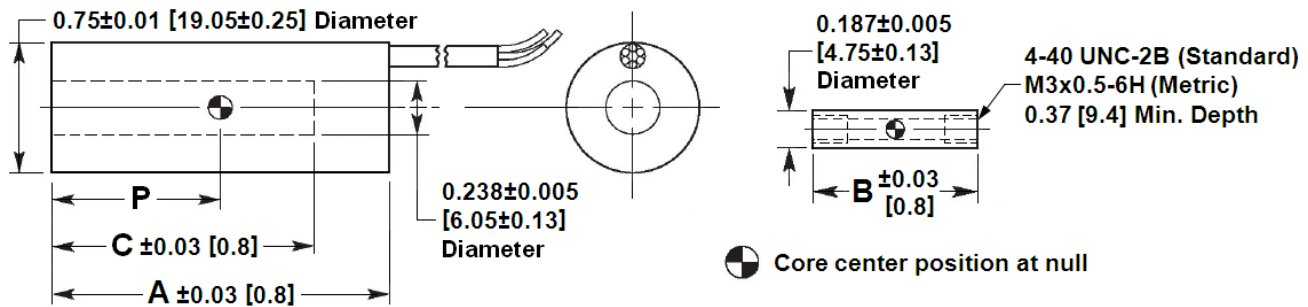


**Important:** NEVER connect SIG COM and PWR COM together; NEVER connect SIG COM to other DC-SE's

# DC-SE Series – General purpose DC LVDT

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

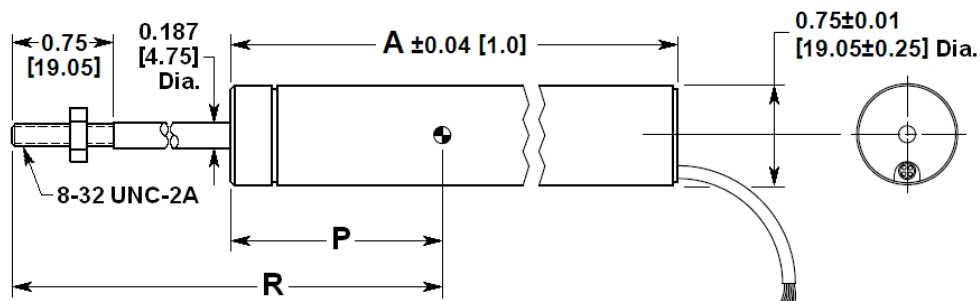
| Parameter                              | DC-SE 100       | DC-SE 250       | DC-SE 500       | DC-SE 1000      | DC-SE 2000      | DC-SE 4000       | DC-SE 6000       |
|----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|
| Main body length<br>"A"                | 3.51<br>[89.2]  | 4.36<br>[110.7] | 5.20<br>[132.1] | 6.89<br>[175.0] | 8.87<br>[225.3] | 12.25<br>[311.2] | 17.3<br>[439.4]  |
| Core length<br>"B"                     | 0.585<br>[14.9] | 1.10<br>[27.9]  | 1.80<br>[45.7]  | 3.00<br>[76.2]  | 3.80<br>[96.5]  | 5.30<br>[134.6]  | 6.20<br>[157.5]  |
| Length of bore<br>"C"                  | 1.21<br>[30.7]  | 2.06<br>[52.2]  | 2.91<br>[73.8]  | 4.59<br>[116.7] | 6.57<br>[166.8] | 9.95<br>[252.8]  | 15.06<br>[382.5] |
| Center of core<br>position at null "P" | 0.51<br>[13.0]  | 0.93<br>[23.6]  | 1.35<br>[34.3]  | 2.20<br>[55.9]  | 3.19<br>[81.0]  | 4.88<br>[124.0]  | 7.56<br>[192.0]  |
| Body weight oz<br>[gram]               | 2.54<br>[72]    | 3.21<br>[91]    | 3.39<br>[96]    | 4.38<br>[124]   | 6.25<br>[177]   | 8.33<br>[236]    | 10.48<br>[297]   |
| Core weight oz<br>[gram]               | 0.035<br>[1]    | 0.11<br>[3]     | 0.18<br>[5]     | 0.28<br>[8]     | 0.35<br>[10]    | 0.53<br>[15]     | 0.64<br>[18]     |



Dimensions are in inch [mm]

## MECHANICAL SPECIFICATIONS – CAPTIVE CORE OPTION

| Parameter                              | DC-SE 100      | DC-SE 250       | DC-SE 500       | DC-SE 1000      | DC-SE 2000      | DC-SE 4000       | DC-SE 6000       |
|----------------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|
| Main body length<br>"A"                | 3.85<br>[97.8] | 4.70<br>[119.4] | 5.54<br>[140.7] | 7.23<br>[183.6] | 9.21<br>[233.9] | 12.59<br>[319.8] | 17.64<br>[448.1] |
| Core rod position<br>at null "R"       | 3.69<br>[93.7] | 4.28<br>[108.7] | 4.75<br>[120.6] | 6.04<br>[153.4] | 7.90<br>[200.7] | 10.52<br>[267.2] | 15.27<br>[387.9] |
| Center of core<br>position at null "P" | 0.85<br>[21.6] | 1.27<br>[32.2]  | 1.69<br>[42.9]  | 2.54<br>[64.5]  | 3.53<br>[89.7]  | 5.22<br>[132.6]  | 7.90<br>[200.7]  |
| Weight, oz [gram]                      | 1.52 [43]      | 4.09 [116]      | 4.34 [123]      | 5.51 [156]      | 7.62 [216]      | 10.13 [287]      | 12.92 [366]      |



Dimensions are in inch [mm]

# DC-SE Series – General purpose DC LVDT

## ORDERING INFORMATION

| Description    | Model      | Part Number  |
|----------------|------------|--------------|
| 0.10 inch LVDT | DC-SE 100  | 02560990-000 |
| 0.25 inch LVDT | DC-SE 250  | 02560991-000 |
| 0.50 inch LVDT | DC-SE 500  | 02560992-000 |
| 1 inch LVDT    | DC-SE 1000 | 02560993-000 |

| Description | Model      | Part Number  |
|-------------|------------|--------------|
| 2 inch LVDT | DC-SE 2000 | 02560994-000 |
| 4 inch LVDT | DC-SE 4000 | 02560995-000 |
| 6 inch LVDT | DC-SE 6000 | 02560996-000 |

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

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

Example: DC-SE 1000, 1 inch stroke, with metric threaded and guided core, P/N 02560993-016

| ACCESSORIES                                                |                 |              |
|------------------------------------------------------------|-----------------|--------------|
| 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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