

# 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.

<u>Captive core option</u>: 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 (±DC voltage), HCD (Hermetically sealed, ±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: <u>http://www.meas-spec.com/datasheets.aspx</u>

MEAS acquired Schaevitz Sensors and the **Schaevitz<sup>™</sup>** 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



# PERFORMANCE SPECIFICATIONS

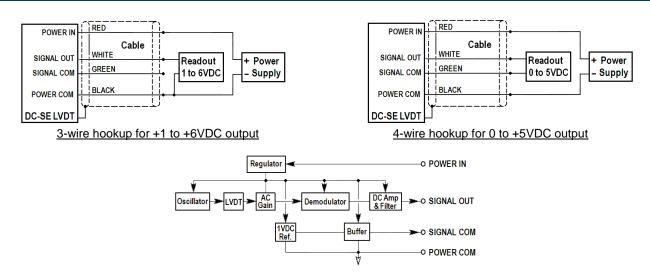
	ELECTRICAL SPECIFICATIONS						
DC-SE 100	DC-SE 250	DC-SE 500	DC-SE 1000	DC-SE 2000	DC-SE 4000	DC-SE 6000	
0.10 [2.54]	0.25 [6.35]	0.50 [12.7]	1.0 [25.4]	2.0 [50.8]	4.0 [101.6]	6.0 [152.4]	
50	20	10	5	2.5	1.25	0.833	
1.97	0.787	0.394	0.197	0.098	0.0492	0.0328	
+8.5 to +28VDC							
1mV/VDC, maximum; 0.2mV/VDC, typical							
10mA maximum; 6mA typical							
0 to +5VDC (4 wire), +1 to +6VDC (3 wire) - Increases when the core is displaced towards the cable							
5mA maximum							
±0.25% of FR, maximum							
10 mVRMS, maximum							
0.125% of FSO							
0.028%/ºF [0	.05%/C], max	imum					
200 Hertz @ -3dB							
ENVIR	ONMENTA		ATIONS & M	ATERIALS			
-13°F to +185°F [-25°C to 85°C] Operating; -65°F to +257°F [-55°C to 125°C] Survival							
250 g (11ms half-sine)							
10 g up to 2kHz							
AISI 400 Series stainless steel							
Cable with 4 conductor, 28AWG, stranded copper, braided shield and polyurethane jacket,							
39 inches [1 meter] long							
	0.10 [2.54] 50 1.97 +8.5 to +28V/ 1mV/VDC, m 10mA maxim 0 to +5VDC ( 5mA maximu ±0.25% of FR 10 mVRMS, r 0.125% of FS 0.028%/°F [0 200 Hertz @ ENVIR -13°F to + 250 g (11) 10 g up to AISI 400 S Cable with	0.10 [2.54] 0.25 [6.35] 50 20 1.97 0.787 +8.5 to +28VDC 1mV/VDC, maximum; 0.2m 10mA maximum; 6mA typie 0 to +5VDC (4 wire), +1 to 5mA maximum ±0.25% of FR, maximum 10 mVRMS, maximum 0.125% of FSO 0.028%/⁰F [0.05%/C], max 200 Hertz @ -3dB ENVIRONMENTAL -13°F to +185°F [-25°C 250 g (11ms half-sine) 10 g up to 2kHz AISI 400 Series stainles Cable with 4 conductor	0.10 [2.54] 0.25 [6.35] 0.50 [12.7]   50 20 10   1.97 0.787 0.394   +8.5 to +28VDC 1mV/VDC, maximum; 0.2mV/VDC, typic   10mA maximum; 6mA typical 0 to +5VDC (4 wire), +1 to +6VDC (3 wir   5mA maximum ±0.25% of FR, maximum   10 mVRMS, maximum 0.125% of FSO   0.028%/°F [0.05%/C], maximum 200 Hertz @ -3dB   ENVIRONMENTAL SPECIFIC   -13°F to +185°F [-25°C to 85°C] Ope 250 g (11ms half-sine)   10 g up to 2kHz AISI 400 Series stainless steel   Cable with 4 conductor, 28AWG, strateging 260 strateging	0.10 [2.54] 0.25 [6.35] 0.50 [12.7] 1.0 [25.4]   50 20 10 5   1.97 0.787 0.394 0.197   +8.5 to +28VDC 1mV/VDC, maximum; 0.2mV/VDC, typical 10mA maximum; 6mA typical 0 to +5VDC (4 wire), +1 to +6VDC (3 wire) - Increases w   0 to +5VDC (4 wire), +1 to +6VDC (3 wire) - Increases w 5mA maximum 10 mVRMS, maximum   10 mVRMS, maximum 0.125% of FR, maximum 0.125% of FSO 0.028%/°F [0.05%/C], maximum   200 Hertz @ -3dB ENVIRONMENTAL SPECIFICATIONS & M   -13°F to +185°F [-25°C to 85°C] Operating; -65°F 250 g (11ms half-sine)   10 g up to 2kHz AISI 400 Series stainless steel Cable with 4 conductor, 28AWG, stranded copper, H	0.10 [2.54] 0.25 [6.35] 0.50 [12.7] 1.0 [25.4] 2.0 [50.8]   50 20 10 5 2.5   1.97 0.787 0.394 0.197 0.098   +8.5 to +28VDC 1mV/VDC, maximum; 0.2mV/VDC, typical 10mA maximum; 6mA typical 0 0   10mA maximum; 6mA typical 0 0 the core is of 5mA maximum   0 to +5VDC (4 wire), +1 to +6VDC (3 wire) - Increases when the core is of 5mA maximum 5mA maximum   10 mVRMS, maximum 0.125% of FR, maximum 0.125% of FSO   0.028%/°F [0.05%/C], maximum 0.028%/°F [0.05%/C], maximum 200 Hertz @ -3dB   ENVIRONMENTAL SPECIFICATIONS & MATERIALS   -13°F to +185°F [-25°C to 85°C] Operating; -65°F to +257°F [-55 250 g (11ms half-sine)   10 g up to 2kHz AISI 400 Series stainless steel AISI 400 Series stainless steel   Cable with 4 conductor, 28AWG, stranded copper, braided shield 5 5	0.10 [2.54] 0.25 [6.35] 0.50 [12.7] 1.0 [25.4] 2.0 [50.8] 4.0 [101.6]   50 20 10 5 2.5 1.25   1.97 0.787 0.394 0.197 0.098 0.0492   +8.5 to +28VDC 1mV/VDC, maximum; 0.2mV/VDC, typical 0.098 0.0492   10mA maximum; 6mA typical 0 0 10 5   0 to +5VDC (4 wire), +1 to +6VDC (3 wire) - Increases when the core is displaced towards   5mA maximum 40.25% of FR, maximum   10 mVRMS, maximum 0.125% of FSO   0.028%/PF [0.05%/C], maximum 0.028%/PF [0.05%/C], maximum   200 Hertz @ -3dB ENVIRONMENTAL SPECIFICATIONS & MATERIALS   -13°F to +185°F [-25°C to 85°C] Operating; -65°F to +257°F [-55°C to 125°C] S   250 g (11ms half-sine) 10 g up to 2kHz   AISI 400 Series stainless steel Cable with 4 conductor, 28AWG, stranded copper, braided shield and polyuretha	

#### 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

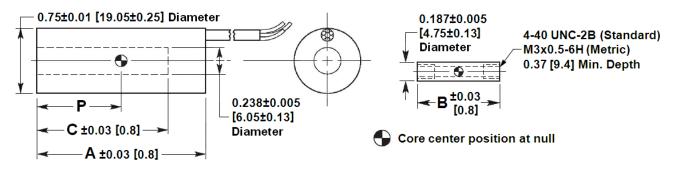


Important: NEVER connect SIG COM and PWR COM together; NEVER connect SIG COM to other DC-SE's



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

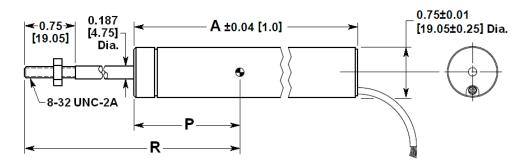
Parameter	DC-SE 100	DC-SE 250	DC-SE 500	DC-SE 1000	DC-SE 2000	DC-SE 4000	DC-SE 6000
Main body length	3.51	4.36	5.20	6.89	8.87	12.25	17.3
"A"	[89.2]	[110.7]	[132.1]	[175.0]	[225.3]	[311.2]	[439.4]
Core length	0.585	1.10	1.80	3.00	3.80	5.30	6.20
"B"	[14.9]	[27.9]	[45.7]	[76.2]	[96.5]	[134.6]	[157.5]
Length of bore	1.21	2.06	2.91	4.59	6.57	9.95	15.06
"C"	[30.7]	[52.2]	[73.8]	[116.7]	[166.8]	[252.8]	[382.5]
Center of core	0.51	0.93	1.35	2.20	3.19	4.88	7.56
position at null "P"	[13.0]	[23.6]	[34.3]	[55.9]	[81.0]	[124.0]	[192.0]
Body weight oz	2.54	3.21	3.39	4.38	6.25	8.33	10.48
[gram]	[72]	[91]	[96]	[124]	[177]	[236]	[297]
Core weight oz	0.035	0.11	0.18	0.28	0.35	0.53	0.64
[gram]	[1]	[3]	[5]	[8]	[10]	[15]	[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	3.85	4.70	5.54	7.23	9.21	12.59	17.64
"A"	[97.8]	[119.4]	[140.7]	[183.6]	[233.9]	[319.8]	[448.1]
Core rod position	3.69	4.28	4.75	6.04	7.90	10.52	15.27
at null "R"	[93.7]	[108.7]	[120.6]	[153.4]	[200.7]	[267.2]	[387.9]
Center of core	0.85	1.27	1.69	2.54	3.53	5.22	7.90
position at null "P"	[21.6]	[32.2]	[42.9]	[64.5]	[89.7]	[132.6]	[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]



#### **ORDERING INFORMATION**

Description	Model	Part Number	Description	Model	Part Number
0.10 inch LVDT	DC-SE 100	02560990-000	2 inch LVDT	DC-SE 2000	02560994-000
0.25 inch LVDT	DC-SE 250	02560991-000	4 inch LVDT	DC-SE 4000	02560995-000
0.50 inch LVDT	DC-SE 500	02560992-000	6 inch LVDT	DC-SE 6000	02560996-000
1 inch LVDT	DC-SE 1000	02560993-000			

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

<u>Note</u>: 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.

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