

### HIGHLY-RELIABLE CONDITIONERS FOR MEASUREMENT OF DISPLACEMENT, FORCE, PRESSURE AND OTHER PARAMETERS OBTAINED WITH A LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT).

The **5D30** delivers filtered analog output of  $\pm 5$  VDC, while the **5D30V** produces  $\pm 10$  VDC. Based on the synchronous carrier-demodulator principle, both models can handle a remarkably wide range of signals (from 16 to 4000 mV/V, full scale)—with no special “long-stroke” cabling required for high-output sensors. Three selectable operating frequencies are provided to best match the user’s specific transducer. Exceptional signal stability and accuracy over the entire input range are achieved through...

- **regulated, remotely sensed AC excitation**
- **precise linearity / symmetry correction and signal phase adjustment via software commands**
- **high-stability amplification**
- **configurable low-pass active filtering**
- **“absolute” and “two-point” software calibration**
- **effective signal isolation & ESD protection**

ADVANCED LINEARITY AND NEGATIVE SYMMETRY CORRECTION FOR TRANSDUCERS THAT MAY REQUIRE IT. LVDT sensors that exhibit typical nonlinearity and/or asymmetry can be easily accommodated. By applying simple software commands, you can fit the output curve to your linear, symmetric “ideal.” Two high-level, noise-free analog outputs are provided. For the **5D30** (only), one output may be switched on and off by setting the logic state of an “enable” line (thus eliminating the need for an external multiplexer in multiple-module applications). Powerful low-pass active filtering is independently selectable for each output, for removal of unwanted high-frequency measurement-signal components and the elimination of aliasing errors, if the module’s output is subsequently sampled.

INTERNAL “ABSOLUTE” CALIBRATION COUPLED WITH HIGH-ACCURACY “TWOPOINT (DEADWEIGHT)” CALIBRATION. Because of normal cable loading effects, it is a practical necessity to calibrate any LVDT/CABLE/ INSTRUMENT system after installation, using a known input standard. The “absolute” calibration provided by the **5D30(V)** normally yields a very good first approximation. Conventional “zero and span” calibration may then be easily performed— with the module fully “in place”—using the Configurator Software supplied with the **5D30(V)**. This procedure includes any necessary phase-shift compensation, symmetry trimming, and midscale linearity adjustments. When calibrated “in place,” the **5D30(V)** offers excellent stability and interchangeability of units. As long as an initially calibrated **5D30(V)**’s setup configuration is exactly transferred to the **5D30(V)** that replaces it, no recalibration is usually required to maintain the stated accuracy (see table, below).

# MODEL 5D30/5D30V

## LVDT CONDITIONER

### [5D SERIES]

## SPECIFICATIONS

**Housing:** Extruded aluminum casing; mountable to panel, fixture, or DIN-rail

**Dimensions:** See 5D SERIES Product Bulletin

**Power Requirements:** 24 VDC  $\pm$  10%; 100 mA nom.; 150 mA max.

**Input Overvoltage Protection:** Up to 240 VAC rms on all Signal and Excitation lines

**ESD Protection:** Up to 4 kV on all connections

**Isolation:** 1500 VAC between input and output terminals; 1500 VAC between I/O terminals and power supply / communications terminals

**Operating Temperature Range:** -10° C to 70° C  
(14° F to 158° F)

**Operating Relative Humidity:** 5% to 95%, noncondensing

**Transducer Types:** Virtually any variable transformer transducer, including 4-, 5-, and 6-wire LVDT's and 3- and 5-wire Variable Reluctance Transducers<sup>1</sup> (see diagram, below, for typical cabling)

**Input Ranges (Nominal, Full-Scale):** See table; selectable when the 5D30(V) is configured (NOTE: the highest range selection accommodates actual inputs as high as 4000 mV/V)

### Amplifier:

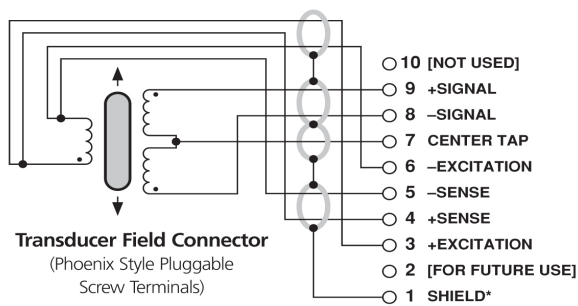
**Normal-Mode Range:** 15 V rms operating; 240 V rms without damage

**Input Impedance (Differential):** Greater than 350 k $\Omega$

**Offset:** Initial:  $\pm$ 0.05% of full scale; vs. temperature:  $\pm$ 25 ppm/ $^{\circ}$ C; vs. time:  $\pm$ 10 ppm/month

**Gain Accuracy:**  $\pm$ 0.02% of full scale typical, following calibration; see table

**Gain Stability:** vs. temperature:  $\pm$ 25 ppm/ $^{\circ}$ C; vs. time:  $\pm$ 10 ppm/month



\* Not isolated.

**Analog Filters:** 0.2, 2, 20, 200, or 2000 Hz, independently selectable for each output<sup>3</sup>

**Analog Outputs:** Filtered  $\pm$  0 to 5 VDC (for the Models 5D30 and 5D30S) or  $\pm$ 0 to 10 VDC (for the Model 5D30V), with linearity maintained for 20% overrange; for the 5D30 (only), Output B is switchable via logic "Enable" line<sup>4</sup>

**Logic Input (Enable)<sup>4</sup>:** Nominal 0 - 5 V, where 5 V = Logic 1 ("true");  $\pm$ 25 V without damage; noise immunity 1 V; internal pull-up nom. 5 k $\Omega$ ; input assumes Logic 1 state in the absence of connection

**Status Indicator Light:** Green/Yellow/Red; indicates module input and communications status (see 5D SERIES Product Bulletin)

**Excitation Voltage:** Nominal 3 VAC rms

**Excitation Frequency:** 3.27, 5.00, or 10.00 kHz; selectable when the 5D30(V) is configured

**Accuracy:** Dependent on range and excitation; see table<sup>2</sup>

### 5D30(V) Ranges and Accuracy per Excitation Setting

(Accuracy given as % of full scale overall expected maximum error, following calibration)

Range (mV/V)	Excitation Frequency (kHz)	
	3.27 or 5.00	10.00
16	0.03	0.04
25	0.03	0.04
40	0.02	0.03
64	0.02	0.02
100	0.02	0.02
160	0.02	0.02
250	0.02	0.02
400	0.02	0.02
640	0.02	0.02
1000	0.02	0.02
1600	0.03	0.03
2500	0.05	0.05

<sup>1</sup> May require user-supplied half-bridge resistors.

<sup>2</sup> The full-scale accuracies given in the table refer to the 5D30(V)'s response to substantially *undistorted* waveform inputs. Any phase shift must be compensated for during calibration. Some gain deviation from LVDT data-sheet specifications is normally to be expected as a result of loading the transducer's finite output impedance with intrinsic cable capacitance. The degree of this error will vary with cable type and length.

<sup>3</sup> The value of the highest corner frequency is *dependent on the selected excitation frequency*: for an excitation of 10.00 kHz, it is 2000 Hz; for 5.00 kHz, it is 1400 Hz; and for 3.27 kHz, it is 1100 Hz.

<sup>4</sup> "Enable" line not available on the **Models 5D30V and 5D30S** ("S" Option), which provide alternative screw-terminal connection for single-point applications. For these units, both outputs are continuously available.