

### GENERAL-PURPOSE SINGLE-CHANNEL CONDITIONERS FOR INPUT OF PRESSURE, FORCE, TORQUE, WEIGHT AND OTHER VARIABLES MEASURED BY CONVENTIONAL DC-EXCITED STRAIN GAGE TRANSDUCERS.

The 5D70 delivers filtered analog output of  $\pm 5$  VDC, while the 5D70V produces  $\pm 10$  VDC. For both models, advanced analog design directly addresses the problem of measurement inaccuracy in industrial environments of high electromechanical noise. Exceptional signal stability and accuracy over a remarkably wide range of sensor inputs are achieved through...

- **remotely sensed excitation, user-selectable**
- **chopper-stabilized low-drift amplification**
- **configurable low-pass active filtering**
- **“absolute” software-based calibration**
- **effective signal isolation & ESD protection**

THE 5D70 / 5D70V OVERCOMES ERRORS THAT TRADITIONALLY PLAGUE THE STRAIN-GAGE MEASUREMENT PROCESS.

For steady indication and smooth, dependable control action, the 5D70(V) can provide a true average value of the measured variable, even in the face of substantial dynamic content. Two high-level, noise-free analog outputs are provided. For the 5D70 (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 multiplemodule applications). Both the 5D70 and the 5D70V feature...

- **Powerful low-pass active filtering**, 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
- **Selectable excitation** using remote sensing of bridge voltage and slaved to an extremely stable reference voltage
- **Input impedance in excess of 10,000 M $\Omega$**  is presented to signal leads to eliminate cable resistance as a source of error (allowable cable length has virtually no practical limits)
- **High noise rejection**, eliminating errors from common-mode pickup and groundloop coupling, with 1500 VAC isolation between input and output terminals and between I/O and power supply / communications terminals
- **High ESD immunity and extensive EMI protection** further assure data integrity in harsh industrial environments

# MODEL 5D70/5D70V

## DC STRAIN GAGE 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:** Conventional 4-arm strain gage bridges, 120  $\Omega$  to 10 k $\Omega$ ; zero range is 20% of the stated full scale; a screw terminal is provided for user-supplied shunt calibration resistor (see diagram, below, for typical cabling)

**Input Ranges (Nominal, Full-Scale):** See table; selectable when the 5D70(V) is configured (NOTE: the highest range selection accommodates actual inputs as high as 25 mV/V)

**Excitation:** Nominal 2.00 VDC @ 50 mA, 5.00 VDC @ 60 mA, or 10.00 VDC @ 90 mA; selectable when the 5D70(V) is configured

**Accuracy:** Dependent on range and excitation; see table

**Amplifier:**

**Common-Mode Range:**  $\pm$ 1 V operating<sup>1</sup>

**Common-Mode Rejection Ratio (at 1 V of Common Mode):** -100 dB at DC; -120 dB at 60 Hz<sup>1</sup>

**Input Impedance (Differential and Common-Mode):** Greater than 10,000 M $\Omega$

**Offset:** Initial:  $\pm$ 4  $\mu$ V; vs. temperature:  $\pm$ 0.10  $\mu$ V/°C; vs. time:  $\pm$ 5  $\mu$ V/month

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

**Gain Stability:** vs. temperature:  $\pm$ 25 ppm/°C; vs. time:  $\pm$ 10 ppm/month

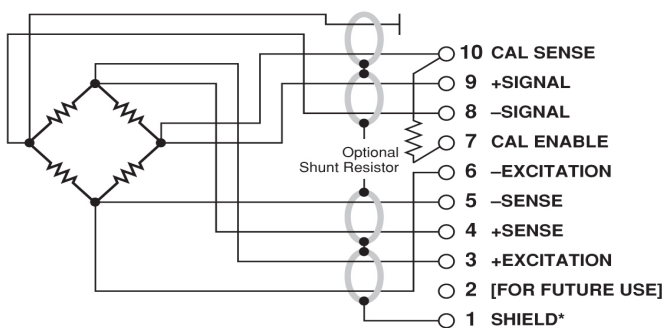
**Analog Filters:** 0.2, 2, 20, 200, or 2000 Hz, independently selectable for each output

**Analog Outputs:** Filtered  $\pm$  0 to 5 VDC (for the Models 5D70 and 5D70S) or  $\pm$ 0 to 10 VDC (for the Model 5D70V), with linearity maintained for 20% overrange; for the 5D70 (only), Output B is switchable via logic "Enable" line<sup>2</sup>

**Logic Inputs (Enable<sup>2</sup>, Not Calibrate A, Not Calibrate B):** 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 $\Omega$ ; all inputs assume 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)

**Transducer Field Connector**  
(Phoenix Style Pluggable Screw Terminals)



<sup>1</sup> With respect to bridge center (midpoint of excitation). \* Not isolated.

<sup>2</sup> "Enable" line not available on the **Models 5D70V and 5D70S** ("S" Option), which provide alternative screw-terminal connection for single-point applications. For these units, both outputs are continuously available.

<sup>3</sup> The first five ranges apply only when the 5D70(V) is set to an excitation of 10 VDC, and are not available for earlier 5D70 modules.

**5D70(V) Ranges and Accuracy per Excitation Setting<sup>3</sup>**

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

Range (mV/V)	Excitation		
	2 VDC	5 VDC	10 VDC
0.10	—	—	0.25
0.15	—	—	0.20
0.20	—	—	0.15
0.25	—	—	0.10
0.375	—	—	0.06
0.50	0.25	0.15	0.05
0.75	0.20	0.10	0.04
1.00	0.15	0.05	0.02
1.50	0.10	0.03	0.02
2.00	0.05	0.02	0.02
3.00	0.03	0.02	0.02
4.00	0.02	0.02	0.02
6.00	0.02	0.02	0.02
8.00	0.02	0.02	0.02
12.00	0.02	0.02	0.02
16.00	0.02	0.02	0.02