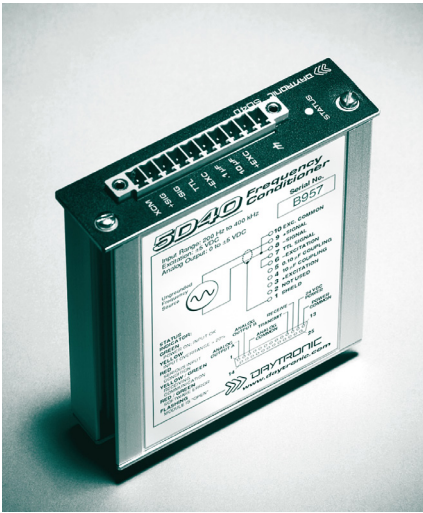


# DAYTRONIC

QUALITY, TRUSTED PRODUCTS SINCE 1954

## MODEL 5D40/5D40V

FREQUENCY CONDITIONER  
[5D SERIES]



The Models 5D40 and 5D40V are used with conventional frequency-generating transducers, such as tachometer pickups, turbine flowmeters, transistor or logic-circuit drivers, and “zerovelocity” (true digital output) sensors.

Both models accept sine, square, and irregular waveform inputs, plus TTL. The **5D40** delivers filtered analog output of **5 VDC**, while the **5D40V** produces **10 VDC**. Exceptional signal stability and accuracy over an unusually wide dynamic range—down to 0.1% of full scale—are achieved through....

- adjustable “cycle-by-cycle” tracking
- selectable input threshold levels
- capacitive coupling for magnetic pickup inputs
- “absolute” software-based calibration
- effective signal isolation & ESD protection

UNIQUE “CYCLE-BY-CYCLE” TRACKING EXTENDS ACCURATE FREQUENCY MEASUREMENT DOWN TO 0.1% OF FULL SCALE WITHOUT COMPROMISING DYNAMIC RESPONSE.

In addition to its standardized pulse-averaging circuit, the Model **5D40(V)** incorporates a new frequency-to-voltage conversion strategy that results in vastly superior overall dynamic response to changes in input frequency. When the unique tracking window feature is in operation (under 36% of full scale), a special circuit generates a “period reciprocal” output voltage (proportional to “1/t”), and a special comparator then determines whether, with respect to the present “1/t” value, each incoming pulse arrives within the current tracking window. If such is the case, no output adjustment is made. However, if a pulse comes too early (before the window “opens”), the present output is updated to approximate the “1/t” value at the pulse’s time of arrival. If the expected pulse has not yet arrived when the window period has elapsed, the output is made to track the “1/t” voltage until the pulse is detected.

Capacitive shunting (or “coupling”) of 0.1 microfarads is provided for magnetic pickup inputs, to eliminate false triggering by signal noise. For waveform inputs from approximately 2 Hz to 200 kHz, a “Smart Schmitt” trigger—in conjunction with a variable-sensitivity amplifier—adapts to signal amplitudes from 50 mV to 250 V, thus ensuring reliable triggering for all input levels. INTERNAL “ABSOLUTE” CALIBRATION ENSURES HIGH ACCURACIES, WITHOUT ELABORATE TRIAL AND ERROR. By virtue of the unusually high stability of the **5D40(V)** instrument, even higher accuracies can be achieved with additional softwarebased “two-point” calibration.

# MODEL 5D40/5D40V

## FREQUENCY CONDITIONER

### [5D SERIES]

## SPECIFICATIONS

**Housing:** Extruded aluminum casing; mountable to panel, fixture, or DIN-rail; for dimensions, see 5D SERIES Product Bulletin

**Power Requirements:** 24 VDC  $\pm$  10%; 140 mA nom.; 160 mA max.

**Input Overvoltage Protection:** Up to 240 VAC rms on all Signal and Excitation lines (except for "capacitive coupling" 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

### Frequency Input:

**Type:** Any AC or unipolar pulse signal, grounded or floating, regardless of waveform

**Sensitivity:** "Smart Schmitt" trigger and differential amplifier with four selectable gains accommodate signals from 50 mV to 250 V

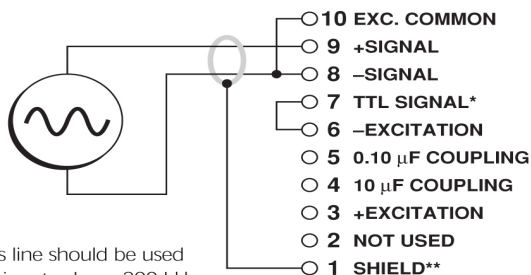
**Ranges (Nominal, Full-Scale):** See table; selectable when the 5D40(V) is configured (NOTE: the highest range selection accommodates actual inputs as high as 600 kHz)<sup>1</sup>

**Excitation:** 10 VDC (=  $\pm$ 5 VDC)  $\pm$  2% @ up to 70 mA

**Accuracy (as % of full scale overall expected maximum error,**

**following calibration):** From approximately 0.1% to 36% of input range:  $\pm$ 0.04%. Above 36% of input range:  $\pm$ 0.02%

## TRANSDUCER FIELD CONNECTOR



\* This line should be used for inputs above 200 kHz or below 2 Hz.

\*\* Not isolated.

### Differential Amplifier:

**Common-Mode Range:**  $\pm$ 1500 V

**Input Impedance:** Greater than 200 k $\Omega$  on all ranges

**TTL Input:** Internally pulled up to +5 V through 22 k $\Omega$ ; overvoltage protection to  $\pm$ 20 V

**Offset:** Initial:  $\pm$ 0.02% 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  
Gain Stability: vs. Temp:  $\pm$ 25 ppm/ $^{\circ}$ C; vs. time:  $\pm$ 10 ppm/month

**Analog Filters:** 0.2, 2, 20, 200, or 2000 Hz, independently selectable for each output<sup>1</sup>

**Analog Outputs:** Filtered 0 to 5 VDC (for the Models 5D40 and 5D40S) or 0 to 10 VDC (for the Model 5D40V), with linearity maintained for 20% overrange; for the 5D40 (only), Output B is switchable via logic "Enable" line<sup>2</sup>

**Logic Input (Enable<sup>2</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)

5D40(V) Ranges <sup>1</sup>	
Range (Hz, f.s.)	Range (Hz, f.s.)
200	10000
300	15000
400	20000
500	30000
750	40000
1000	60000
1500	80000
2000	100000
3000	150000
4000	200000
6000	300000
8000	400000

<sup>1</sup> Every range above 3000 Hz is derived from either the 2000-Hz or 3000-Hz ("source") range via division of the input signal. For this reason, the ripple frequency and speed of output response for any range above 3000 Hz will be determined by the pulse-averaging filter employed by the source range.

<sup>2</sup> "Enable" line not available on the Models 5D40V and 5D40S ("S" Option), which provide alternative screw-terminal connection for single-point applications. For these units, both outputs are continuously available.