



# LAUREATE™ Counter Series

## Instruments with Scalable Readout & Control

### Signal Conditioners

#### Dual-channel pulse input

- Input types: contact closures, AC, NPN or PNP transistors, or digital logic to 2 MHz.
- Functions: frequency, period, rate, time interval, stopwatch, phase angle, square root, up/down total, ratio, draw, A+B, A-B, A\*B, batching, custom curves.

#### V-to-F converter input

- Input types: 0-1 mA, 4-20 mA, 0-10 V analog
- Functions: rate, rate and total, square root, batching, 1/rate (time), custom curves.

#### Quadrature input

- Input types: low-level differential or single-ended logic level. Count x1, 2 or 4 to 250 kHz and zero channel input.
- Functions: scaled display of position and length, or rate.

### Standard Features

- Six scalable LED digits
- 85-264 Vac & 90-370 Vdc power
- Isolated sensor excitation
- NEMA-4X, 1/8 DIN front panel
- Screw-terminal connectors

### Options

#### Dual-setpoint controller boards

- 10 Amp, 250 Vac contact relays
- Isolated solid state relays

#### Isolated analog output board

- Isolated 0-10 Vdc and 0-20 mA, linearized to reading

#### Isolated communication boards

- RS-232 board for point-to-point
- RS-485 board for multidrop
- Parallel BCD output

#### Isolated low-voltage power

- 9-37 Vdc and 8-28 Vac

#### "Extended" main boards for advanced features



The Laureate™ counter series is a low-cost solution to a wide range of monitoring and control applications related to count, frequency, speed, flow rate, timing, totalizing, batching or position.

Exceptional flexibility is provided by plug-in circuit boards for a choice of main assemblies, displays, power supplies, signal conditioners, analog outputs, dual setpoint controllers, and communication interfaces. Advanced circuit design and software provide exceptional performance and programmable features not available in any other similarly priced instrument.

#### FR Version: Dual-channel Counter, Timer, Ratemeter

Two channels accept PNP or NPN outputs, TTL or CMOS logic signals, magnetic pickups, contact closures, low level outputs from turbine flow meters, or AC line inputs up to 250 Vac. Inverse period is used to calculate frequency or rate up to six places. The basic version is capable of measuring two rates, totals (up or down) or periods simultaneously, A-to-B time interval, and square root of both inputs.

The extended version is capable of the above plus measuring rate and total of one channel simultaneously, rate of one channel and total of the other, up/down counting with external control for up or down, square root of rate and total, phase angle, ratio, draw, arithmetic functions (A+B, A-B, A\*B, A/B, A/B-1), stopwatch, batching, and linearization of nonlinear inputs.

#### VF Version: V-to-F Converter

This version accepts analog inputs such as 0-1 mA, 4-20 mA or 0-10 V, which it then displays in engineering units by scaling the

input linearly or performing square root extraction. For instance, a 0-1 mA signal may be displayed in watts or kilowatts, and a 4-20 mA signal may be displayed in gallons per minute.

The Extended version adds totalizing, batching and custom curve capabilities. It allows rate to be integrated to totals, and batch control by counting up from zero to a preset value, or down from a preset value to zero. Levels or flow of irregularly shaped tanks may be linearized to read out directly in gallons or gallons per minute.

#### QD Version: Quadrature Input

The quadrature meter accepts signals from quadrature encoders and displays the result as position, length or rate. The signals may be counted by 1, 2 or 4 to 250 kHz. The up (+) and down (-) counts are totalized, scaled and displayed in engineering units from -999,999 to +999,999. Zero index (or Z-channel) error correction is standard.

#### Isolated Excitation Power

Isolated 5, 10 or 24 Vdc output power is available to drive sensors, thereby eliminating the expense of an external power supply.

#### Isolated Relay Output Options

Boards with dual 10 amp contact relays or opto-isolated AC/DC solid state relays are available for alarm and control. A third relay may be added to the FR version for batching control.

#### Isolated Analog Output Option

A 0-10V and 0-20mA isolated analog output board is available to drive a chart recorder or remote display, for transmis-

sion to a central control room, or for analog closed loop control. This output is linearized and scaled to the meter reading via the front panel pushbuttons.

### Isolated Communication Options

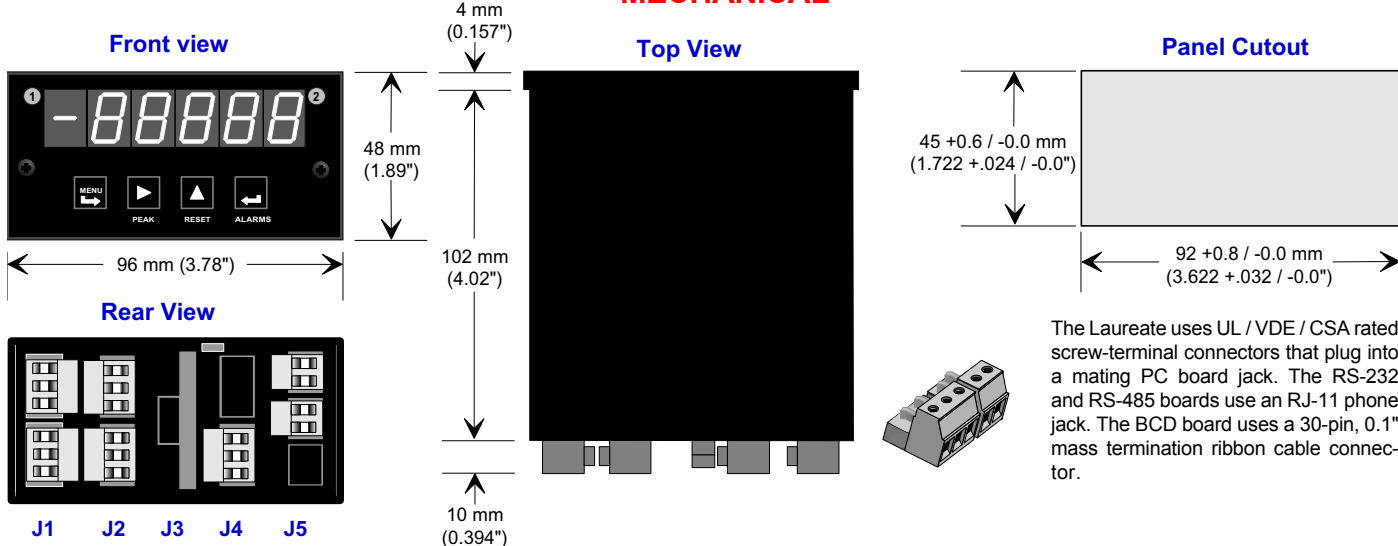
An RS-232 or RS-485 serial interface board allows the Laureate to communicate with computers, PLCs or printers at up to

19,200 bps. Accompanying PC software makes meter setup even easier. An isolated, three-state, parallel BCD output board is also available.

## SPECIFICATIONS

<p><b>Display</b>  Type ..... Six 7-segment, 14.2 mm (.56") high LED digits plus 4 LED indicators  Display color ..... Red or green  Display range ..... -999999 to 999999</p> <p><b>Conversion Technique</b>  Frequency measurement technique ..... 1/period  Rate ..... Gate time + 30 ms + 2 input periods  Gate Time ..... Selectable 0 to 199.99 sec  Scale factor ..... +/-10<sup>-10</sup> to +/-10<sup>6</sup></p> <p><b>FR Signal Conditioner</b>  Inputs .. AC, pulses from NPN or PNP transistors, contact closures, magnetic pickups  Channel A frequency ..... 0 Hz to 2 MHz  Channel B frequency ..... 0 Hz to 250 kHz</p>	<p>Crystal time base calibration ..... +/-2 ppm  Span tempco ..... +/-1 ppm/°C (typ)  Long term drift ..... +/-5 ppm/year</p> <p><b>VF Signal Conditioner</b>  Inputs ..... 0-10 V, 0-1 mA, 4-20 mA  Span error ..... 0.015% of full scale +/-1 count  Span tempco ..... 0.003% of reading/°C  Zero tempco ..... 0.001% of full scale/°C</p> <p><b>QD Signal Conditioner</b>  Inputs ..... Quadrature encoders to 250 kHz, differential or single-ended  Error correction ..... Zero index (Z-channel)</p> <p><b>Isolation (DC to 60 Hz)</b>  Safety rated to 250 Vac, 4.2 kVp per high voltage test</p>	<p><b>Environmental</b>  Operating temperature ..... 0°C to 55°C  Storage temperature ..... -40°C to 85°C  Relative humidity ..... 95% at 40°C, non-condensing  Protection ..... NEMA-4X when mounted in panel</p> <p><b>Operating Power</b>  Voltage (std) ..... 85 to 264 Vac or 90 to 370 Vdc  Voltage (opt) ..... 8 to 28 Vac or 9 to 37 Vdc  Power frequency ..... DC or 47 Hz to 440 Hz</p> <p><b>Isolated Excitation Power Output</b>  Output level ..... 5 Vdc, 5%, 120 mA  10 Vdc, 5%, 120 mA  24 Vdc, 5%, 50 mA</p>
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## MECHANICAL



## ORDERING GUIDE

One entry required per box. Configure a model number in this format: **L50010FR**. Laurel Electronics reserves the right to change pricing at any time.

<p><input type="checkbox"/> <b>L</b> ..... Laureate™ with plug-in screw terminal connectors ..... \$220</p> <p><input type="checkbox"/> <b>Main Board</b></p> <p>5 ..... Meter with green LEDs .. NC  6 ..... Meter with red LEDs ..... NC  7 ..... Extended, green LEDs .. \$40  8 ..... Extended, red LEDs ..... \$40</p> <p><input type="checkbox"/> <b>Power</b></p> <p>0 ..... 85-264 Vac, 90- 370 Vdc NC  1 ..... 9-37 Vdc, 8-28 Vac ..... \$30</p> <p><input type="checkbox"/> <b>Setpoint Output</b></p> <p>0 ..... None ..... NC  1 ..... Dual 10 A relays ..... \$80  2 ..... Dual solid state relays .. \$55</p> <p><input type="checkbox"/> <b>Analog Output or Batch Relay</b></p> <p>0 ..... None ..... NC  1 ..... 0-20 mA, 0-10 V ..... \$90  2 ..... Batch relay for FR ..... \$50</p>	<p><input type="checkbox"/> <b>Digital Interface</b></p> <p>0 ..... None ..... NC  1 ..... RS-232 ..... \$60  2 ..... RS-485 ..... \$80  3 ..... BCD output ..... \$105</p> <p><input type="checkbox"/> <b>Input Type</b></p> <p><b>FR</b> .. Frequency ..... NC</p> <p><i>With main boards 5 &amp; 6:</i>  Scalable to +/-999,999 for frequency, rate, square root of rate, up or down total, period (two channels simultaneously), A-B time interval.</p> <p><i>With main boards 7 &amp; 8:</i>  Above plus rate and total simultaneously, linearization of nonlinear inputs, ratio, draw, arithmetic functions (A*B, A/B, A/B-1, A+B, A-B), phase angle, stopwatch, up/down counting, batch counting.</p>	<p><b>VF1</b> .... 4-20 mA ..... NC  <b>VF2</b> .... 0-1 mA ..... NC  <b>VF3</b> .... 0-10 V ..... NC  <b>VF4</b> .... Special ranges ..... Factory</p> <p><i>With main boards 5 &amp; 6:</i> V-to-F converter for rate or square root of rate from differential pressure or target type flow meters.</p> <p><i>With main boards 7 &amp; 8:</i> Above plus rate and total simultaneously, linear-</p>	<p>ization of nonlinear inputs, batch counting, 1/rate (time).</p> <p><b>QD</b> .... Quadrature ..... \$30  <i>With main boards 5 &amp; 6:</i> Scalable to +/-999,999 to read out position or length from shaft encoders.</p> <p><b>QDR</b> ... Quadrature rate ..... \$30  <i>With main boards 5 &amp; 6:</i> Scalable to +/-999,999 to read out rate from shaft encoders.</p>
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Your Local Laurel Electronics Distributor is:



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