



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 1 MHz.
- Functions: frequency, period, rate, time interval, stopwatch, phase angle, square root, up/down total, ratio, draw, A+B, A-B, A*B, A/B, A/B-1, batching, custom curves.

Process rate & total input

- Input types: 0-1 mA, 4-20 mA, 0-10 V analog.
- Functions: rate, totalized rate, 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 plus zero channel input.
- Functions: scaled display of position or speed.

Standard Features

- Six scalable LED digits
- 85-264 Vac or 90-300 Vdc power
- Isolated sensor excitation
- NEMA-4X, 1/8 DIN front panel
- Screw-terminal connectors

Options

Dual-setpoint controller boards

- Two 8A, 250 Vac contact relays
- Two isolated solid state relays

Isolated analog output board

- Isolated 4-20 mA or 0-10 Vdc
- Output scalable and linearized

Isolated communication boards

- RS232 for point-to-point I/O
- RS485 for multipoint I/O
- RS485 board & Modbus protocol

Isolated low-voltage power

- 9-37 Vdc and 8-28 Vac

Extended main board

- Choice of advanced features



Laureate™ counters are a low-cost solution to a wide range of monitoring and control applications related to frequency, rate, timing, pulse or analog totalizing, batch control, position or speed.

Exceptional flexibility is provided by modular architecture with a choice of main assemblies, display boards, power supplies, signal conditioners, analog outputs, relay boards, and communication interfaces. Advanced circuit design and software provide exceptional performance and programmable features not available in similarly low priced instruments.

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 can measure two rates or totals (up or down) simultaneously, and perform timing operations.

The Extended version is capable of the above plus simultaneous rate and total for one channel, rate of one channel and total of the other, up/down counting with external control for count direction, square root of rate and total, phase angle, duty cycle, two-channel arithmetic functions (A+B, A-B, A*B, A/B, A/B-1), batch control, and linearization of nonlinear inputs.

VF Version: Process Totalizer

This version accepts 0-1 mA, 4-20 mA or 0-10 V analog inputs, which it can then totalize or display as rate, all scaled to appropriate engineering units. Square root

extraction is standard. For example, a 4-20 mA flow meter signal may be displayed in totalized gallons or gallons per minute, and a 0-1 mA signal from a watt transducer may be displayed in kwatt-hours or kwatt. The Extended version adds batch control and custom curve linearization.

QD Version: Quadrature Input

Accurate position is displayed in engineering units from -999999 to +999999 by counting one, two or four transitions from quadrature encoders at a combined rate to 250 kHz. Zero index (or Z-channel) error correction is standard. The Extended version can also display speed.

Isolated Excitation Power

An isolated 5, 10 or 24 Vdc output is standard and can eliminate the expense of an external power supply.

Isolated Relay Outputs

Boards with dual 8A contact relays or dual opto-isolated AC/DC solid state relays are optional for alarm or control.

Isolated Analog Output

A 4-20 mA, 0-20mA or 0-10V isolated analog output board is optional to drive a recorder, for transmission to a control room, or for analog closed loop control. The output is linearized and scaled to the display.

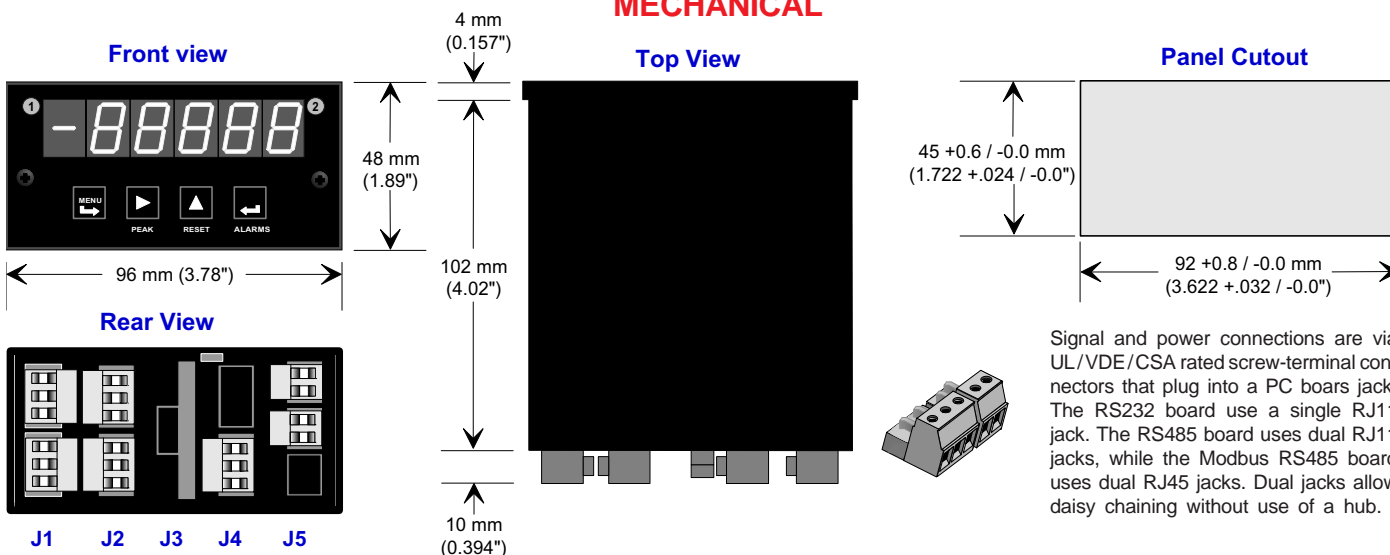
Isolated Communication Options

RS232 or RS485 serial interface boards allow Laureates to communicate with computers, PLCs or printers at up to 19,200 baud. The Modbus protocol (RTU or ASCII) is fully supported, as is the simpler Laurel ASCII protocol. Windows-based Instrument Setup software is standard.

SPECIFICATIONS

<p>Display 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>Conversion Technique Frequency measurement technique 1/period Rate Gate time + 30 ms + 2 input periods Gate Time Selectable 0 to 199.99 sec Scale factor $\pm 10^{-10}$ to $\pm 10^6$</p> <p>FR Signal Conditioner Inputs .AC, pulses from NPN or PNP transistors, contact closures, magnetic pickups Channel A frequency 0 Hz to 1 MHz Channel B frequency 0 Hz to 250 kHz Crystal time base calibration ± 2 ppm Span tempco ± 1 ppm/$^{\circ}$C (typ) Long term drift ± 5 ppm/year</p> <p>VF Signal Conditioner Inputs 0-10 V, 0-1 mA, 4-20 mA Span error 0.01% of full scale ± 1 count</p>	<p>Span tempco 0.003% of reading/$^{\circ}$C Zero tempco 0.001% of full scale/$^{\circ}$C</p> <p>QD Signal Conditioner Inputs Quadrature encoders to 250 kHz Polarity Differential or single-ended Error correction Zero index (Z-channel)</p> <p>Excitation Output (isolated) Output levels 5 Vdc @ 100 mA 10 Vdc @ 120 mA, 24 Vdc @ 50 mA Scaling ± 999999 for zero & full scale</p> <p>Dual Contact Relays (isolated) Relay type Form C Load rating 8A at 250 Vac or 24 Vdc</p> <p>Dual Solid State Relays (isolated) Relay type SPST, normally open, Form A Load rating 120 mA at 130 Vac or 170 Vdc</p> <p>Analog Output (isolated) Selectable outputs 0-10V, 0-20 mA, 4-20 mA Compliance 2 mA at 10V, 12V at 20 mA Scaling resolution 12 bits</p>	<p>Serial Data I/O (isolated) Formats RS232, RS485, Modbus RS485 Protocols Modbus (RTU or ASCII), Laurel ASCII Data rates 300 to 19,200 baud</p> <p>Meter Isolation (DC to 60 Hz) Safety rated to 250 Vac, 4.2 kV per high voltage test</p> <p>Environmental Operating temperature 0°C to 60°C Storage temperature -40°C to 85°C Relative humidity 95% at 40°C, non-condensing Protection NEMA-4X when panel mounted</p> <p>Operating Power Voltage (std) 85-264 Vac or 90-370 Vdc Voltage (opt) 12-34 Vac or 10-48 Vdc Power frequency DC or 47-440 Hz</p>
---	---	--

MECHANICAL



Signal and power connections are via UL / VDE / CSA rated screw-terminal connectors that plug into a PC boards jack. The RS232 board use a single RJ11 jack. The RS485 board uses dual RJ11 jacks, while the Modbus RS485 board uses dual RJ45 jacks. Dual jacks allow daisy chaining without use of a hub.

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"/> L Laureate™ with plug-in screw terminal connectors \$230</p> <p><input type="checkbox"/> Main Board</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"/> Power</p> <p>0 85-264 Vac, 90- 370 Vdc NC 1 12-34 Vac, 10-48 Vdc ... \$30</p> <p><input type="checkbox"/> Setpoint Output</p> <p>0 None NC 1 Dual 8A relays \$80 2 Dual solid state relays .. \$55</p> <p><input type="checkbox"/> Analog Output</p> <p>0 None NC 1 4-20 mA, 0-10 V \$90</p>	<p><input type="checkbox"/> Digital Interface</p> <p>0 None NC 1 RS232 \$60 2 RS485 \$80 3 RS485 w/ Modbus \$105</p> <p><input type="checkbox"/> Input Type</p> <p>FR .. Frequency NC <i>With main boards 5 & 6:</i> Scalable to $\pm 999,999$ for frequency, rate, square root of rate, up or down total, timing. <i>With main boards 7 & 8:</i> Above plus rate and total simultaneously, arithmetic functions (A+B, A-BA*B, A/B, A/B-1), phase angle, duty cycle, up/down counting, batch control, custom curve linearization.</p> <p>VF1 4-20 mA NC</p>	<p>VF2 0-1 mA NC VF3 0-10 V NC VF4 Special ranges Factory <i>With main boards 5 & 6:</i> V-to-F converter for rate, totalizing, and square root of rate from differential pressure flow meters. <i>With main boards 7 & 8:</i> Above plus linearization of nonlinear inputs, batch counting, 1/rate (time).</p> <p>QD Quadrature \$30 <i>With main boards 5 & 6:</i> Scalable to $\pm 999,999$ to read out position or length from shaft encoders.</p> <p>QDR ... Quadrature rate \$30 <i>With main boards 7 & 8:</i> Scalable to $\pm 999,999$ to read out rate or position from shaft encoders.</p>	<p>Your Local Laurel Electronics Distributor:</p>
---	--	--	---

