LAUREATE™ Counter Series

Instruments with Scalable Readout & Control

Signal Conditioners

Dual-channel pulse input

- Contact closures, AC, NPN or PNP transistors, digital logic to 1 MHz.
- For 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

- 0-1 mA, 4-20 mA, 0-10 V analog.
- For rate, totalized rate, batch control, 1/rate, (time), custom curves.

Quadrature input

- Low-level differential or single-ended logic level. Count x1, x2 or x4 to 250 kHz plus zero channel.
- For 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

Ordering Options

Signal conditioner (isolated)

Relay outputs (isolated)

- Dual/quad 8 A, 250V mechanical
- Dual/quad 120 mA solid state

Analog outputs (isolated)

- 4-20 mA, 0-10 V or -10 to +10 V
- 16 bits, isolated & linearized

Serial data I/O (isolated)

- RS485, RS232
- Ethernet
- Ethernet-to-RS485 converter
- USB 2.0
- USB-to-RS485 converter
- Modbus or Laurel ASCII protocol

Power options

- 85-264 Vac or 90-300 Vdc
- 12-34 Vac or 10-48 Vdc

Laureate™ counters are low-cost solutions 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 a choice of assemblies for display, power, signal inputs, analog outputs, relay outputs, and communications. The electronics 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 simultenous 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. For example, the total in gallons or rate in gallons/minute may be displayed froma 4-20 mAflow meter signal. 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 1, 2 or 4 transitions from qua-drature encloders at a combined rate to 250 kHz. Zero index 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 need for an external power supply.

Isolated Relay Output Options

Setpoint options for alarm and control: are dual or quad 8A Form C contact relays, and dual or quad optoisolated AC/DC 130 mA Fom A solid state relays. The relays can each be latching or nonlatching, and operate in a hysteresis or band deviation mode.

Isolated Analog Output Option

Single or dual isolated 16-bit 4-20 mA, 0-10V, or ±10V isolated analog outputs are available for transmission to other instruments or to a central control room. The output are linearized and scaled to the meter reading or to an internally stored value.

Isolated Communication Options

Ethernet, USB 2.0, RS485 or RS232, serial interface boards allow Laureates to communicate with computers, PLCs or printers. The Modbus protocol (RTU or ASCII) is fully supported, as is the simpler Laurel ASCII protocol.

Easy Setup

All Laurete meters can be programmed from the front panel or via Windows-based Instrument Setup Software on a PC.

LAUREL® ELECTRONICS INC., 3183-G Airway Ave., Costa Mesa, CA 92626 USA. Tel: (714) 434-6131

SPECIFICATIONS

Display
Type ..... Six 7-segment, 14.2 mm (.56") high LED digits plus LED indicators
Display color ..... Red or green
Display range ..... -999999 to 999999
Display scaling ..... ± 999999 for zero & full scale

Frequency Conversion
Technique 1/period
Update ..... Gate time + 30 ms + 2 input periods
Gate Time ..... Selectable 0 to 199.99 sec
Scale factor ..... $\pm 10^{-10}$ to $\pm 10^{6}$

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/°C (typ)
Long term drift ..... ± 5 ppm/year

VF Signal Conditioner
Inputs ..... 0-10 V, 0-1 mA, 4-20 mA
Span error ..... 0.01% of full scale ± 1 count

QD Signal Conditioner
Inputs ..... Quadrature encoders to 250 kHz
Polarity ..... Differential or single-ended
Error correction ..... Zero index (Z-channel)

Contact Relay Options (isolated)
Relay type ..... 2 or 4 mechanical or solid state
Rating, mechanical ..... 8A at 250 Vac or 24 Vdc
Rating, solid state ..... 120 mA at 140 Vac or 180 Vdc

Analog Output Options (isolated)
Number of outputs ..... 1 or 2
Output levels ..... 0-10V, 0-20 mA, 4-20 mA
Compliance ..... 2 mA at 10V, 12V at 20 mA
Scaling resolution ..... 16 bits

Serial Data I/O Options (isolated)
Formats ..... Ethernet, USB 2.0, RS485, RS232 Ethernet-to-RS485, Ethernet-to-USB
Protocols ..... Modbus (RTU or ASCII), Laurel ASCII
Data rates ..... 300 to 19,200 baud

Meter Isolation
CMV, DC to 60 Hz ..... 250 Vac working, 2.3 kV rms for 1 minute test

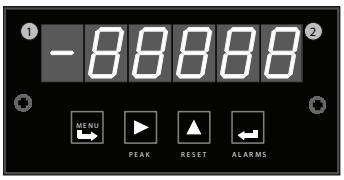
Operating Power
Voltage (std) ..... 85-264 Vac or 90-300 Vdc
Voltage (opt) ..... 12-34 Vac or 10-48 Vdc
Power frequency ..... DC or 47-440 Hz

Excitation Output (isolated)
Output levels ..... 120 mA @ 10 Vdc
100 mA @ 5 Vdc, 50 mA @ 24 Vdc

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

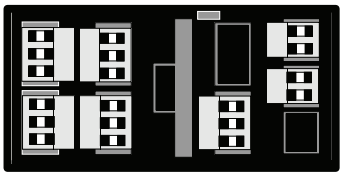
Certifications
ETL certifications ..... UL Standard 61010-1, CAN/CSA Std. C22.2 No. 61010-1
EMI and safety ..... CE Mark
Hazardous materials ..... RoHS compliant

Front view

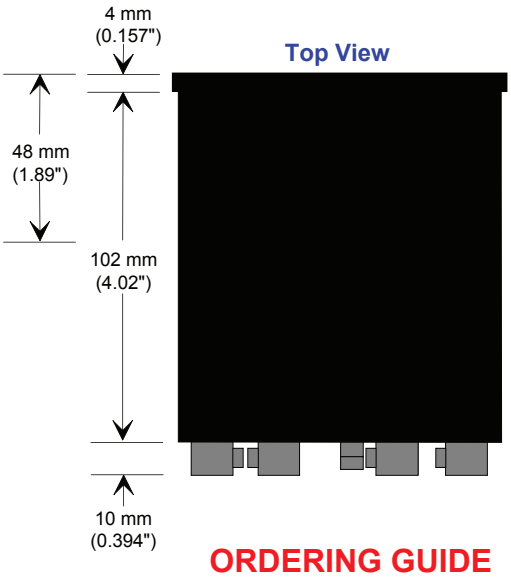


96 mm (3.78")

Rear View

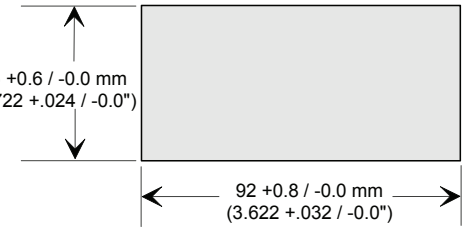


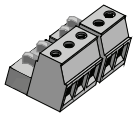
J1 J2 J3 J4 J5



Top View

Panel Cutout





Signal and power connections are via UL / VDE / CSA rated detachable screw-clamp connectors. RS232 uses a single RJ11 jack. RS485 uses dual RJ11 or RJ45 jacks for daisy chaining without a hub. Ethernet and USB use industry standard connectors.

ORDERING GUIDE

One entry required per box. Configure a model number in this format: ***L50010FR***

☐ **L** ..... Laureate™ with plug-in screw screw terminal connectors

☐ **Main Board**
5 ..... Counter with green LED
6 ..... Counter with red LED
7 .... Extended counter, green LED
8 ..... Extended counter, red LED

☐ **Power**
0 ..... 85-264 Vac, 95-300 Vdc
1 ..... 12-34 Vac, 10-48 Vdc

☐ **Relay Output**
0 ..... None
1 ..... Two 8A contact relays
2 ..... Two solid state relays
3 ..... Four 8A contact relays
4 ..... Four solid state relays

☐ **Analog Output**
0 ..... None
1 ..... 4-20 mA, 0-10V, ±10V
2 ..... Dual 4-20 mA or 0-10V

☐ **Digital Interface**
0 ..... None
1 ..... RS232 with RJ11
2 ..... RS485 with dual RJ11
4 ..... RS485 with dual RJ45
5 ..... USB
6 ..... USB-to-RS485 converter
7 ..... Ethernet
8 ..... Ethernet-to-RS485 conv

☐ **Input Type**
FR ..... Frequencyot tsyr
With main boards 5 & 6: Scalable to ± 999,999 for frequency, rate, timing, up or down total, square root of rate.
With main boards 7 & 8: 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.

VF1 ..... 4-20 mA
VF2 ..... 0-1 mA
VF3 ..... 0-10 V
VF4 ..... Special ranges
With main boards 5 & 6: V-to-F con-verter for rate, totalizing, and square root of rate from differential pressure flow meters.
With main boards 7 & 8: Above plus linearization of nonlinear inputs, batch counting, 1/rate (time).

QD ..... Quadrature
With main boards 5 & 6: Scalable to ±999,999 for position from shaft encoders.
With main boards 7 & 8: Scalable to ±999,999 for rate or position from shaft encoders.

Your Laurel Electronics Distributor:

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