



# LAUREATE™ Digital Panel Meters

## Unmatched Features, Speed & Accuracy

### Standard Features

#### Choice of 5 signal conditioners:

- DC volts, amps, process, strain
- Load cell, 6-wire, to 20 mV FS
- True RMS volts & amps
- Thermocouple
- RTD & Ohms

#### Exceptional accuracy

- 0.01% of FS for DC, load, process
- 0.1% of FS for AC RMS
- 0.3°C for thermocouples
- 0.1°C for RTDs

#### Scalable to engineering units

- 5 digits to  $\pm 99,999$  or  $\pm 99,990$
- All ranges factory calibrated
- Three scaling methods: scale & offset, two-point, or signal input

#### High-speed data collection

- 50 or 60 conversions/sec
- Adaptive digital noise filter
- Peak hold & auto-tare

#### Universal power

- 85-264 Vac and 90-300 Vdc

#### Isolated 5, 10 & 24 Vdc output

- Powers 4 load cells in parallel

#### Red or green LED display

### Options

#### Relay outputs

- Dual/quad 8 A, 250 V mechanical
- Dual/quad AC/DC solid state

#### Isolated analog output

- 4-20 mA, 0-10V or  $\pm 10$  V
- 16 bits, isolated & linearized

#### Isolated serial communications

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

#### Isolated low-voltage power

- 10-48 Vdc or 12-32 Vac

#### Extended main board

- Custom curve linearization
- Rate from successive readings



Laureate™ digital panel meters are a cost-effective solution to a wide range of monitoring and control applications, offering performance and programmable features not found in other meters. Exceptional flexibility is provided by software and hardware options for control, analog output, and serial communications.

The meters are economical, fit in a standard 1/8 DIN panel cutout, and are sealed to NEMA-4X from the front.

#### Fast Response, High Accuracy

Accuracy is an exceptional 0.01% of FS for DC, process and load cell signals, and 0.1% of FS for AC RMS from 0% to 100% of FS. Measurements are taken at 60 readings per second (50 for 50 Hz operation) with 16-bit resolution for fast control, true peak and valley readings, and an analog output that accurately tracks the input. An adaptive digital filter can select the best time constant for noise rejection, yet responds rapidly to actual changes in signal level.

The peak or valley value of the input can be displayed at the push of a button. Auto-tare can zero the display for any input signal.

#### Scalable to Five Full Digits

Input signals may be displayed as voltage or current, or be scaled to five digits from -99,999 to +99,999 for display in engineering units. Three calibration methods are selectable: scale and offset ( $y = mx + b$ ), two-point method ( $(x_1, y_1)$ ,  $(x_2, y_2)$ ), and calibration using actual transducer signals.

All ranges are calibrated at the factory with calibration factors stored in EEPROM on the signal conditioner board, so that recalibration is not needed when changing ranges or boards.

#### Choice Signal Conditioners

Five signal conditioners accommodate most industrial DC, AC, strain, load cell, temperature and resistance signals.

#### Isolated Excitation Power

Isolated 5, 10, or 24 Vdc output power can drive 2-wire transmitters or up to four 350 ohm load cells in parallel, thereby eliminating an external power supply.

#### Isolated Relay Options

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

#### Isolated Analog Output Option

An isolated 16-bit 4-20 mA, 0-10V, or  $\pm 10$ V isolated analog output is available for transmission to other instruments or to a central control room. The output is linearized and scaled to the meter reading.

#### 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) and simpler Laurel ASCII protocol are fully supported.

#### Rate & Nonlinear Curve Fits

An Extended main board can display rate from successive readings and perform custom curve linearization, for example to extend the range of transducers.

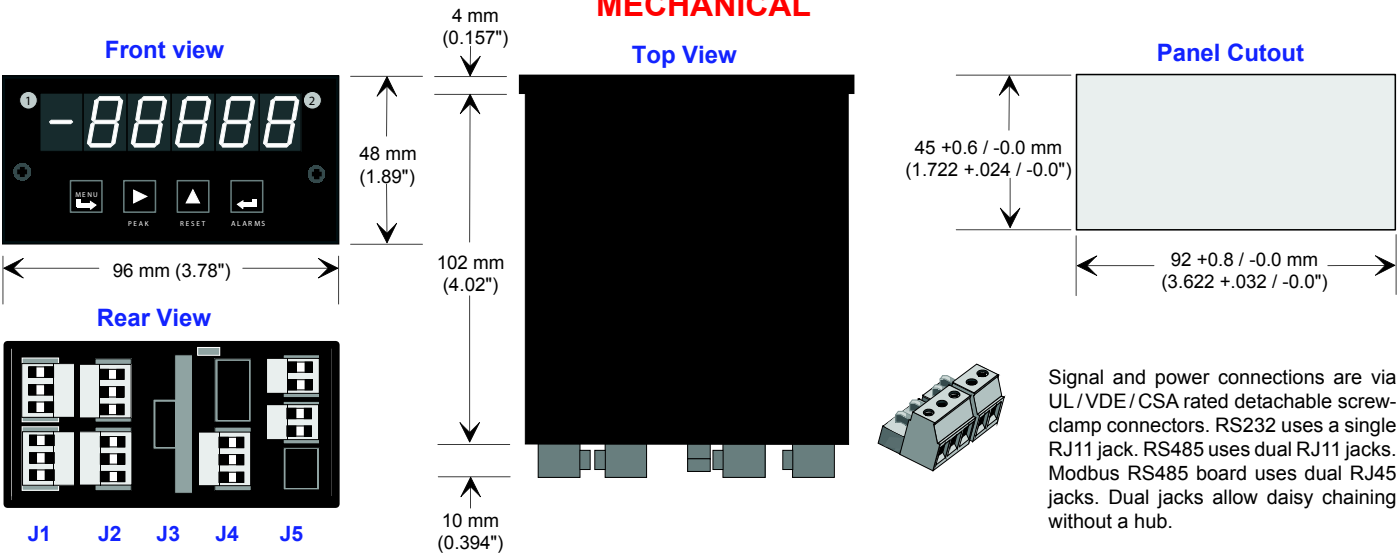
#### Easy Setup

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

# SPECIFICATIONS

<p><b>Display</b>                  Type ..... Five 7-segment, 14.2 mm (.56") high LED                  LED digits plus 4 LED indicators                  Display color ..... Red or green                  Display range ..... -99999 to +99999                  or -99990 to +99990</p> <p><b>A-to-D Conversion</b>                  Technique ..... Concurrent Slope™, Pat. 5,262,780                  A to D rate ..... 60/s at 60 Hz, 50/s at 50 Hz                  Output update rate ..... 56/s at 60 Hz, 47/s at 50 Hz                  Display update rate ..... 3.5/s at 60 Hz, 3/s at 50 Hz</p> <p><b>Accuracy at 25°C</b>                  DC volts, DC amps, ratio ..... 0.01% FS ± 2 counts                  Load cell ..... 0.01% FS ± 2 counts</p>	<p>True RMS ..... 0.1% FS, 0.1%-100%, 10 Hz-10 kHz                  Resistance ..... 0.01% FS ± 2 counts                  Thermocouple ..... 0.3°C max                  RTD ..... 0.1°C max</p> <p><b>Temperature Stability</b>                  Span tempco ..... 0.003% of reading / °C                  Zero tempco ..... 0.003% of FS / °C                  TC ref. junction accuracy ..... 1°C, 10-40°C ambient</p> <p><b>Noise Rejection</b>                  CMV, DC to 60 Hz ..... 250 Vac working,                  2.3 kV rms for 1 minute test                  CMR, DC to 60 Hz ..... 130 dB                  NMR to 50/60Hz line ..... 90 dB with min filtering                  Additional filtering ..... Digital, adaptive</p>	<p><b>Environmental</b>                  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 mounted in panel</p> <p><b>Operating Power</b>                  Voltage (std) ..... 85-264 Vac or 90-300 Vdc                  Voltage (opt) ..... 12-32 Vac or 10-48 Vdc                  Power frequency ..... DC or 47 Hz to 440 Hz</p> <p><b>Isolated Excitation Power Output</b>                  Output levels ..... 120 mA @ 10 Vdc                  100 mA @ 5 Vdc, 50 mA @ 24 Vdc                  Isolation to power ground ..... 50 Vp</p>
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## MECHANICAL



## ORDERING GUIDE

One entry required per box. Configure a model number in this format: **L10010DCV1**. Laurel Electronics reserves the right to change pricing at any time.

<p><input type="checkbox"/> <b>Laurete Series</b>                  L ..... Laureate panel meter                  LW ..... Laureate weight meter</p> <p><input type="checkbox"/> <b>Main Board</b>                  1 ..... DPM with green LEDs                  2 ..... DPM with red LEDs                  3 ..... Extended, green LEDs                  4 ..... Extended, red LEDs</p> <p><input type="checkbox"/> <b>Power</b>                  0 ..... 85-264 Vac, 90- 300 Vdc                  1 ..... 12-32 Vac, 10-48 Vdc</p> <p><input type="checkbox"/> <b>Relay Output</b>                  0 ..... None                  1 ..... Two 8A contact relays                  2 ..... Two solid state relays                  3 ..... Four 8A contact relays                  4 ..... Four solid state relays</p> <p><input type="checkbox"/> <b>Analog Output</b>                  0 ..... None                  1 ..... 4-20 mA, 0-10V, ±10V</p> <p><input type="checkbox"/> <b>Digital Interface</b>                  0 ..... None                  1 ..... RS232                  2 ..... RS485, ASCII protocol                  4 ..... RS485, Modbus protocol                  5 ..... USB                  6 ..... USB-to-RS485                  7 ..... Ethernet                  8 ..... Ethernet-to-RS485</p>	<p><input type="checkbox"/> <b>Input Type</b></p> <p><b>DC Volts</b>                  DCV1 ..... ± 200.00 mV                  DCV2 ..... ± 2.0000 V                  DCV3 ..... ± 20.000 V                  DCV4 ..... ± 200.00 V                  DCV5 ..... ± 600.0 V</p> <p><b>DC Amperes</b>                  DCA1 ..... ± 2.0000 mA                  DCA2 ..... ± 20.000 mA                  DCA3 ..... ± 200.00 mA                  DCA4 ..... ± 5.000 A</p> <p><b>RMS Volts</b>                  RMV1 ..... 200.00 mV                  RMV2 ..... 2.0000 V                  RMV3 ..... 20.000 V                  RMV4 ..... 200.00 V                  RMV5 ..... 600.0 V</p> <p><b>RMS Amperes</b>                  RMA1 ..... 2.0000 mA                  RMA2 ..... 20.000 mA                  RMA3 ..... 200.00 mA                  RMA4 ..... 5.000 A</p> <p><b>RTD Temperature, °C or °F</b>                  P385 ..... Pt 100, DIN alpha                  P392 ..... Pt 100, ANSI alpha                  N672 ..... Ni 120                  C427 ..... Cu 10</p>	<p><b>Ohms Input</b>                  R1 ..... 0-20 ohms                  R2 ..... 0-200 ohms                  R3 ..... 0-2 kohms                  R4 ..... 0-20 kohms                  R5 ..... 0-200 kohms                  R6 ..... 0-2 Mohms</p> <p><b>Thermocouples, °C or °F</b>                  JC, JF ..... Type J                  KC, KF ..... Type K                  TC, TF ..... Type T                  EC, EF ..... Type E                  NC, NF ..... Type N                  SC, SF ..... Type S                  RC, RF ..... Type R</p> <p><b>Process Signals (4-20 mA, etc.)</b>                  P ..... 4 to 20 mA = 0 to 10000                  P1 ..... Custom Scaling</p>	<p><i>Specify min input, min reading; max input, max reading.</i></p> <p><b>Strain Gauge, Potentiometer</b>                  (4-wire ratio, 200 mV to 20V FS)                  SG ..... 0-200 mV = 0-20000                  SG1 ..... Custom Scaling  <i>Specify min input, min reading; max input, max reading.</i></p> <p><b>Load Cells (6-wire ratio)</b>                  (6-wire ratio, 20 mV to 500 mV FS)                  WM1 ..... -99,999 to +99,999  <i>Specify min input, min reading; max input, max reading.</i></p>
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Your Local Laurel Electronics Distributor is:

