



LAUREL[®]

ELECTRONICS INC.

Laureate[™] High-Performance Instruments for Demanding Industrial Applications



Digital Panel Meters
Counters & Timers
Setpoint Controllers
Large Digit Displays
4-20 mA Transmitters
RS485 Transmitters
Ethernet Transmitters
Serial-to-Analog Converters
Isolated Serial Communications



Authorized Distributor:

WESCHLER INSTRUMENTS

phone: 800-903-9870 440-378-6580

fax: 800-903-9590 440-238-0660

www.weschler.com info@weschler.com

LAUREATE™ Digital Panel Meters

Available for all popular industrial analog signals. High performance, extensive output options and programmable features solve application problems at minimum cost.

Basic Features

- Programmable, scalable, modular
- 5 LED digits, 14.2 mm (0.56") high
- 1/8 DIN size, NEMA-4X front panel
- Detachable screw-clamp connectors
- 5V, 10V or 24V sensor excitation output
- All inputs and outputs mutually isolated
- All ranges factory calibrated
- 0.01% full scale accuracy for DC signals
- Read rate to 60/sec
- Adaptive input noise filtering
- Peak & valley capture, tare, auto-tare



Selectable Features

- **Types of main board:**
 - 1) Standard or weight meter
 - 2) Basic or Extended capabilities
 - 3) Red or green LED display
- **Signal conditioner (isolated):**
 - 1) DC (voltage, current, process, strain)
 - 2) AC rms (voltage & current)
 - 3) Load cell & microvolt
 - 4) Thermocouple
 - 5) RTD and ohms
- **Alarm & control outputs (isolated):**
 - 1) Two or four 8A, 250V mechanical relays
 - 2) Two or four 120 mA solid state relays
- **Analog output (isolated):**
 - 1) 4-20 mA, 0-20 mA, 0-10V, -10V to +10V
- **Communications (isolated):**
 - 1) RS232, point to point
 - 2) RS485, dual RJ11 or RJ45 connectors
 - 3) USB
 - 4) USB-to-RS485 converter
 - 5) Ethernet
 - 6) Ethernet-to-RS485 converter
- **Power to meter (isolated):**
 - 1) Worldwide 85-264V ac or 95-300V dc
 - 2) Low-voltage 12-34V ac or 10-48V dc

DC Voltmeter & Ammeter

Five voltage ranges and four current ranges are jumper selectable, with factory calibration factors stored in EEPROM. Error is less than 0.01% of FS. Easy scaling and a 200 mV range allow use with current shunts, while a 5A range allows use with current transformers. Fast read rate for peak capture, analog output, and fast relay response.

Process & Strain Meter

Sensitivity to ± 200 mV full scale for strain gauges and process signals. Zero and span adjustment from 0 to $\pm 99,999$ counts. Error less than 0.01% of FS. An isolated 5V, 10V or 24V sensor excitation supply is built in. Four-wire ratiometric operation compensates for changes in excitation voltage.

Load Cell & Microvolt Meter

Sensitivity to ± 20 mV full scale for load cell and microvolt signals. Zero and span adjustment from 0 to $\pm 99,999$ counts. Error less than 0.01% of FS. Isolated 10V excitation can drive up to four 350 ohm load cells in parallel. Four-wire connection compensates for excitation variations. Six-wire connection eliminates effects of lead resistance.

True AC rms Voltmeter & Ammeter

Measurements with AC or DC coupling can be as fast as one AC line cycle. Five voltage ranges and four current ranges are jumper selectable with calibration factors stored in EEPROM. A built-in 5A range and easy scaling allow use with external current transformers. Error is less than 0.1% of full scale for AC signals from 0.1% to 100% of FS, 10 Hz to 10 kHz, with a crest factor up to 3.0.

Scale Meter

Meter with special firmware for weighing applications: auto-tare or manual tare, auto-zero, display toggle between gross or net weight, scale calibration using known weights, count by 1, 2, 5, 10, 20, 50 or 100 with rounding, display to 999,990.

Thermocouple Meter / Controller

Select thermocouple types J, K, T, E, N, S, R, readout in $^{\circ}\text{C}$ or $^{\circ}\text{F}$, and resolution of 1° or 0.1° . Optional plug-in boards convert the meter to an On/Off temperature controller and transmitter.

RTD Meter/Controller & Resistance Meter

Select Pt100, Ni120, Cu10 RTD types, readings in $^{\circ}\text{C}$ or $^{\circ}\text{F}$, and 1° , 0.1° or 0.01° resolution. Or select resistance ranges from 20 to 200,000 ohms with linearization for transducers whose output is a changing resistance. Ratiometric operation with 3 or 4-wire connection compensates for changes in excitation voltage.

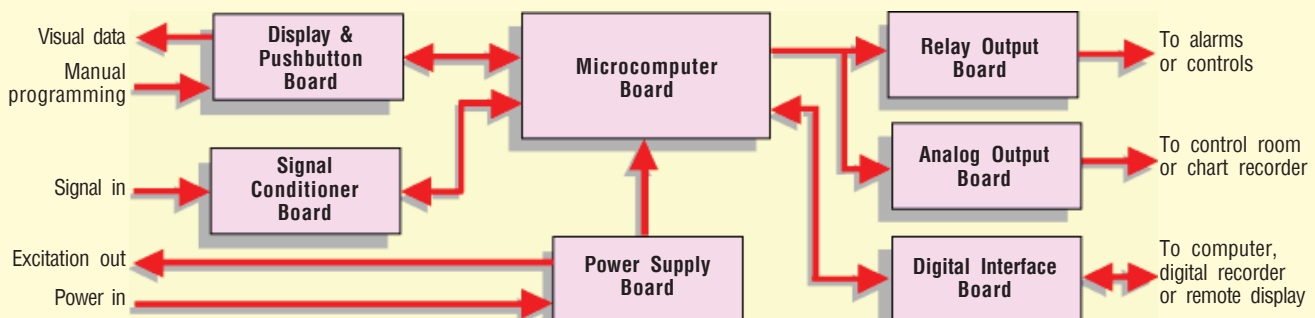
Choice of Up to Three Options Boards:

Relay Output : Two or four 8A mechanical relays or 120 ma AC/DC solid state relays.

Analog Output: 4-20 mA, 0-20 mA 0-10V, or -10V to +10V isolated transmitter output user scaled to the displayed reading.

Communications: Choice of RS232, RS485, USB or Ethernet I/O. Dual RS485 jacks wired in parallel allow daisy chaining. PC-based Node Manager Software discovers and sets up Ethernet nodes. The Modbus protocol and the simpler Custom ASCII protocols are fully supported.

Modular construction using up to 7 plug-in boards applies to all Laureate 1/8 DIN instruments.



LAUREL® ELECTRONICS INC., 3183-G Airway Ave., Costa Mesa, CA 92626 USA • Tel: 714-434-6131 • www.laurels.com

LAUREATE™ Panel Meter Specifications

Case

Dimensions 48 x 96 x 102 mm (1/8 DIN)
Panel cutout 45 x 92 mm (1/8 DIN)
Connectors Screw clamp plugs

Display

Display 5 LED digits + LED indicators
Digit color Red or green
Digit height 14.2 mm (0.56")
Range -99999 to 99999

A-to-D Conversion

A-to-D rate 60/s at 60 Hz, 50/s at 50 Hz
Display update 3.5/s at 60 Hz, 3/s at 50 Hz

Noise Rejection

CMR, DC to 60 Hz 130 dB
NMR at 50/60 Hz 90 dB with no filtering

Max Error at 25°C

DC, strain, load cell ±0.01% of FS ±2 counts
AC rms ±0.1% of FS, 10 Hz to 10 kHz
TC conformity error, typ ±0.2°C (±0.4°F)
RTD conformity error, typ ... ±0.04°C (±0.07°F)
Resistance ±0.01% of range ±2 counts

Temperature Coefficients

Span tempco 0.003% of reading / °C
Zero tempco 0.1 digit / °C
TC reference junction 1°C, 10-40°C

Power Input

Voltage 85-264V ac or 95-300V dc
Low voltage option 12-34V ac or 10-48V dc
Power frequency DC or 47-1000 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

Excitation Output (std)

5V dc 100 mA
10V dc 120 mA
24V dc 50 mA
Isolation 50V

Analog Output (opt)

Output levels 4-20 mA, 0-10V, -10V to +10V
Output error < 0.01% of full scale
Compliance at 20 mA ... 12V (0-600 ohm load)
Compliance at 10V 2 mA (5 kOhm load)
Isolation 250V rms, 2.3 kV rms for 1 min

Relay Outputs (opt)

Relay types 2 or 4, mechanical or solid state
Mechanical relays 8A at 250V ac or 24V dc
Solid state 120 mA at 140 Vac or 180 Vdc
Update rate 60/s at 60 Hz, 50/s at 50 Hz
Setpoint setup Via front panel or PC
Isolation 250V rms, 2.3 kV rms for 1 min

Communications (opt)

Data types RS232, RS485, USB, Ethernet
Serial protocols Modbus or Custom ASCII
Baud rates 300 to 19200 baud
Isolation 250V rms, 2.3 kV rms for 1 min

Environmental

Operating temperature 0°C to 55°C
Storage temperature -40°C to 85°C
Protection NEMA-4X when panel mounted

Safety Certifications

Safety ... ETL certified to UL 61010-1 (Intertek)
EMI CE certified
Hazardous materials RoHS compliant

LAUREATE™ Panel Meter Ordering Guide

Panel Meter Type

L Laureate panel meter
LW Laureate weight meter
(for process or load cell input)

Main Board & Display Color

1 Standard, green LEDs
2 Standard, red LEDs
3 Extended, Green LEDs
4 Extended, Red LEDs
Extended adds custom curve linearization
and rate from successive readings.

Power

0 85-264V ac or 95-300V dc
1 12-34V ac or 10-48V dc

Relay Output

0 None
1 Two 8A Form C contact relays
2 Two 120 mA solid state relays
3 Four 8A Form C contact relays
4 Four 120 mA solid state relays

Analog Output

0 None
1 4-20 mA, 0-10V, -10V to +10V

Communications

0 None
1 RS232
2 RS485 with dual RJ11
4 RS485 with dual RJ45
5 USB
6 USB-to-RS485 converter
7 Ethernet
8 Ethernet-to-RS485 converter

Input Type

DC Input (jumper selectable)

DCV1 ±200.00 mV
DCV2 ±2.0000 V
DCV3 ±20.000 V
DCV4 ±200.00 V
DCV5* ±600.0 V
DCV6 ±300.0 V
DCA1 ±2.0000 mA
DCA2 ±20.000 mA
DCA3 ±200.00 mA
DCA4 ±5.000 A

AC Input (jumper selectable)

RMV1 200.00 mV
RMV2 2.0000 V
RMV3 20.000 V
RMV4 200.00 V
RMV5* 600.0 V
RMV6 300.0 V
RMA1 2.0000 mA
RMA2 20.000 mA
RMA3 200.00 mA
RMA4 5.000 A

* 600V ranges are not ETL certified.

Process Signal Input (e.g., 4-20 mA)

P 4-20 mA = 0-10000
P1 Custom Scaling

Strain Gauge Input (4-wire ratio)

SG 0-200 mV = 0-20000
SG1 Custom Scaling

Load Cell Input (4 or 6-wire ratio)

WM1 Custom Scaling

Thermocouple Input (jumper selectable)

JC -210 to 760°C
JF -347 to 1400°F
KC -244 to 1372°C
KF -408 to 2501°F
TC -257 to 400°C
TF -430 to 752°F
EC -240 to 1000°C
EF -400 to 1830°F
NC -245 to 1300°C
NF -410 to 2370°F
SC -46 to 1768°C
SF -51 to 3214°F
RC -45 to 1768°C
RF -49 to 3213°F

RTD Input (jumper selectable)

P385C Pt100, -202 to 850°C
P385F Pt100, -331 to 1562°F
P392C Pt100, -202 to 631°C
P392F Pt100, -331 to 1168°F
N672C Ni120, -100 to 260°C
N672F Ni120, -148 to 500°F
C427C Cu10, -100 to 260°C
C427C Cu10, -148 to 500°F

Ohms Input (jumper selectable)

R1 0-20.000 ohms
R2 0-200.00 ohms
R3 0-2.0000 kohms
R4 0-20.000 kohms
R5 0-200.00 kohms
R6 0-2.0000 Mohms (factory special)

Create a model number like **L20100DCV1**.



LAUREATE™ Counter / Timer Series

Available for frequency, rate, total, time, and quadrature.
Exceptional accuracy at high read rates, plus extensive output options and programmable features to solve tough application problems at minimum cost.

Basic Features

- 6 LED digits, 14.2 mm (0.56") high
- Update rate to 25/s
- Programmable scale factor
- NEMA-4X, 1/8 DIN front panel
- Detachable screw-clamp connectors
- Isolated sensor excitation output
- Quartz crystal accuracy for rate & time
- Inverse period method for rate
- Adaptive digital noise filtering
- Peak & valley capture
- Easy setup via front panel or PC

Selectable Features

- **Display color:** Red or green.
- **Signal conditioner (isolated):**
 - 1) Dual channel pulse input
 - 2) Process meter & totalizer
 - 3) Quadrature
- **Alarm & control outputs (isolated):**
 - 1) Two or four 8A, 250V mechanical relays
 - 2) Two or four 120 mA solid state relays
- **Analog outputs (isolated):**
 - 1) Single 4-20 mA, 0-10V, -10V to +10V
 - 2) Dual 4-20 mA, 0-10V, -10V to +10V
- **Communications (isolated):**
 - 1) RS232, point to point
 - 2) RS485, dual RJ11 or RJ45 connectors
 - 3) USB
 - 4) USB-to-RS485 converter
 - 5) Ethernet
 - 6) Ethernet-to-RS485 converter
- **Power to counter (isolated):**
 - 1) Worldwide 85-264V ac or 95-300V dc
 - 2) Low-voltage 10-34V ac or 10-48V dc



Frequency, Pulse & Flow Rate

Display two independent pulse or AC channels A and B as a 6-digit frequency from 0.005 Hz to 1 MHz, or as a scaled rate in engineering units, all with quartz crystal accuracy. Signals sources can be PNP or NPN proximity switches, contact closures, digital logic, magnetic pickups down to 12 mV, or or AC lines up to 250 Vac.

Pulse Counter / Totalizer

Independently count up from zero to a preset limit, or count down from a preset value to zero with two independent pulse or AC channels A and B. Readings can be scaled to engineering units, such as gallons. Channel B can also be used to reverse count direction or inhibit counting of Channel A.

Combined Rate & Total

Toggle the display from scaled rate to scaled total by pressing a front panel key or an external switch. Great for flow applications to show either flow in gpm or volume in gallons.

Combination of Two Channels

Combine two pulse input channels A and B with separate scaling to display and alarm A+B, A-B, AxB, A/B, or A/B-1. Applicable to rate or total. For example, add two flows for total flow, subtract two flows for net flow, or take the ratio of two flows for mixing. Monitor A/B-1 (draw) for elongation of material between rollers.

Pulse Input Batch Controller

Automate repetitive fill operations with our low cost controller. Cycling can be automatic with a programmable delay, or can be controlled externally. Press a button to display the current batch total, grand total, number of batches, or flow rate.

Stopwatch & Process Timer

Trigger on the leading or trailing edges of signals applied to channels A and B to time individual or repetitive events to 0.2 μ s resolution, or display accumulated time to 999,999 hours. The display can be in 6-digit decimal format for hours, minutes or seconds, or be in HH.MM.SS format.

Phase Angle, Power Factor or Duty Cycle

Display the phase lead or lag from -180° to +180° between two signals A and B with an error of less than 0.01% of full scale. Set resolution to 1°, 0.1° or 0.01°. Display AC power factor from 1.000 to 0.000 with three decimal places. Or display duty cycle, On or Off period as a percent of total period, with a resolution of 1%, 0.1% or 0.01%.

Process Signal Totalizer

Display scaled rate and total based on 4-20 mA, 0-1 mA or 0-10 V process signals. For example, display rate or volume (time integrated rate) from a 4-20 mA flow transducer. Square root extraction is standard for use with differential pressure flow sensors.

Quadrature Position & Rate Meter

Display scaled position or rate from the A and B signals of a quadrature encoder. Count transitions at a combined rate to 250 kHz. A great way to measure position or speed accurately in high vibration environments.

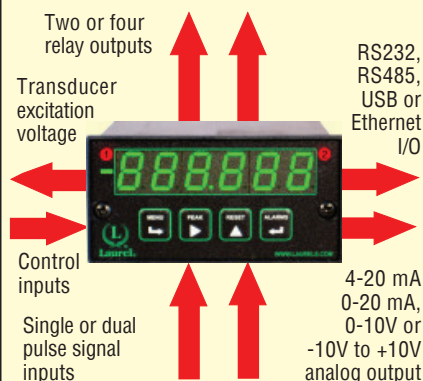
Choice of Options Boards

Relay Output: Two or four 8A mechanical relays or 120 ma AC/DC solid state relays.

Analog Output: 4-20 mA, 0-20 mA 0-10V, or -10V to +10V user scaled to the reading.

Communications: Choice of RS232, RS485, USB or Ethernet I/O. Dual RS485 jacks wired in parallel allow daisy chaining. PC-based Node Manager Software discovers and sets up Ethernet nodes. The Modbus protocol and the simpler Custom ASCII protocols are fully supported.

Isolated Inputs & Outputs of Laureate Counters & Timers



A transducer excitation output is standard with most signal types to power transducers or two-wire transmitters.

Two or four optional relays can add alarm or control. Relay operating modes include actuation above or below the setpoint, latching or non-latching, multiple hysteresis modes, and a band deviation mode.

One or two isolated analog outputs linearized to the display can turn the meter into a transmitter. Each output span can be scaled for any portion of the input span.

Serial communication can be RS232, RS485, USB or Ethernet. These can be used for meter setup or for remote reading. RS485 and Ethernet allow the meters to be networked. The Modbus protocol is fully supported.



LAUREATE™ Counter / Timer Specifications

Case

Dimensions 48 x 96 x 102 mm (1/8 DIN)
Panel cutout 45 x 92 mm (1/8 DIN)
Connectors Screw clamp plugs

Display

Display 6 LED digits + LED indicators
Display color Red or green
Digit height 14.2 mm (0.56")
Range -999999 to 999999

FR Signal Conditioner (dual pulse inputs)

Inputs AC, magnetic pickups, pulses from
NPN or PNP sensors, contact closures
Applications Rate, total, timing, A+B, A-B,
AxB, A/B, A/B-1, duty cycle,
phase angle, power factor
Input levels ± 12 mV to 250V ac
Channel A frequency 0 Hz to 1 MHz
Channel B frequency 0 Hz to 250 kHz
Stopwatch timing 1 μ s to 999999 hrs
Crystal time base calibration ± 1 ppm
Span tempco ± 1 ppm/°C (typ)
Long term drift ± 5 ppm/year
Frequency Measurement 1/period
Update time Gate time +30 ms +1 period
Gate time 0 to 199.99 sec (selectable)
Scale factor $\pm 10^{-10}$ to $\pm 10^6$

VF Signal Conditioner (analog input)

Inputs 4-20 mA, 0-1 mA, 0-10V
Span error 0.01% of FS ± 1 count
Span tempco 0.003% of reading/°C
Zero tempco 0.001% of FS/°C
Applications Rate or total from analog input

QD Signal Conditioner (quadrature inputs)

Input types Differential or single-ended
Transitions monitored x1, x2 or x4
Max transitions /sec 250 k
Error correction Zero index (Z-channel)
Position error No error contributed by meter
Applications Position or rate from encoder

Power Input

Voltage 85-264V ac or 95-300V dc
Low voltage option 12-34V ac or 10-48V dc
Power frequency DC or 47-1000 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

Excitation Output (std)

5V dc 100 mA
10V dc 120 mA
24V dc 50 mA
Output isolation 50V dc

Analog Output (opt)

Output levels 4-20 mA, 0-10V, -10V to +10V
Output error < 0.01% of full scale
Compliance at 20 mA ... 12V (0-600 ohm load)
Compliance at 10V 2 mA (5 kOhm load)
Isolation 250V rms, 2.3 kV rms for 1 min

Relay Outputs (opt)

Relay types 2 or 4, mechanical or solid state
Mechanical relays 8A at 250V ac or 24V dc
Solid state 120 mA at 140 Vac or 180 Vdc
Update rate 60/s at 60 Hz, 50/s at 50 Hz
Setpoint setup Via front panel or PC
Isolation 250V rms, 2.3 kV rms for 1 min

Communications (opt)

Data types RS232, RS485, USB, Ethernet
Serial protocols Modbus or Custom ASCII
Baud rates 300 to 19200 baud
Isolation 250V rms, 2.3 kV rms for 1 min

Environmental

Operating temperature 0°C to 55°C
Storage temperature -40°C to 85°C
Protection NEMA-4X when panel mounted

Safety Certifications

Safety ... ETL certified to UL 61010-1 (Intertek)
EMI CE certified
Hazardous materials RoHS compliant

LAUREATE™ Counter / Timer Ordering Guide

Create a model number like **L60100FR**.

☐ **Laureate Main Counter Board**
L5 Standard, green LEDs
L6 Standard, red LEDs
L7 Extended, green LEDs
L8 Extended, red LEDs
(See Input Type for Extended capabilities)

☐ **Power**
0 85-264V ac or 95-300V dc
1 12-34V ac or 10-48V dc

☐ **Relay Output**
0 None
1 Two 8A Form C contact relays
2 Two 120 mA solid state relays
3 Four 8A Form C contact relays
4 Four 120 mA solid state relays

☐ **Analog Output**
0 None
1 .. Single 4-20 mA, 0-10V, -10V to +10V
2 Dual 4-20 mA, 0-10V, -10V to +10V

☐ **Digital Interface**
0 None
1 RS232
2 RS485 with dual RJ11
4 RS485 with dual RJ45
5 USB

6 USB-to-RS485 converter
7 Ethernet
8 Ethernet-to-RS485 converter

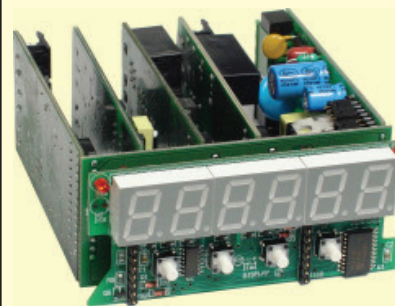
☐ **Input Type**
FR Frequency
With Main Boards L5 & L6, scalable to $\pm 999,999$ for frequency, rate, total, stopwatch or time interval. Main Boards L7 & L8 add rate and total simultaneously, custom curve linearization, arithmetic functions applied to channels A & B (A+B, A-B, AxB, A/B, A/B-1), phase angle, power factor, duty cycle, up/down counting, and batch control.

VF1 4-20 mA
VF2 0-1 mA
VF3 0-10 V

With Main Boards L5 & L6, simultaneous scaled rate and total from process signals, with selectable square root extraction. Main Boards L7 & L8 add custom curve linearization, batch control, and 1/rate (time).

QD Quadrature
With Main Boards L5 & L6, scalable to $\pm 999,999$ for position from shaft encoders. Main Boards L7 & L8 add scalable rate.

Modular Architecture



Up to five simultaneous plug-in boards and extensive programmable features are hallmarks of Laureate 1/8 DIN digital panel meters, counters, timers and serial input displays. This technical approach allows cost-effective solutions to challenging measurement and control problems as well as low-cost, display-only instruments. Please contact Laurel or your Laurel distributor to discuss your application.

With many other meter suppliers, I/O options are mutually exclusive. Not so with Laurel.



LAUREL® ELECTRONICS INC., 3183-G Airway Ave., Costa Mesa, CA 92626 USA • Tel: 714-434-6131 • www.laurels.com

Analog Input LAUREATE™ LT & LTE Series Transmitters

Available for most industrial pulse signals. Includes isolated analog output, serial data I/O, two relays.

Basic Features

- Analog output: 4-20 mA, 0-20 mA, 0-10V or -10V to +10V, 16 bits, isolated.
- Serial data output, isolated, Modbus or Laurel ASCII protocol.
- Two 120 mA AC/DC solid state relays
- Sensor excitation output, isolated.
- 35 mm DIN rail mount
- Only 22.5 mm (0.89") thick
- Detachable screw clamp connectors
- Easy setup using free Windows software
- Exceptional accuracy at fast update rates

Model Specific Features

- **Power to transmitter (Isolated):**
 - 1) Worldwide 85-264V ac or 95-300V dc
 - 2) Low voltage 12-34V ac or 10-48V dc
 - 3) Power over Ethernet (LTE models)
- **Serial data I/O (Isolated):**
 - 1) RS232 & RS485 (LT models)
 - 2) Ethernet (LTE models)
- **Signal conditioner (Isolated):**
 - 1) DC (voltage, current, process, strain)
 - 2) AC rms (voltage & current)
 - 3) Load cell & microvolt
 - 4) Thermocouple
 - 5) RTD and ohms

Counterparts to Laureate 1/8 DIN Meters

Laureate LT and LTE Series analog input transmitters utilize the same signal conditioner boards as Laureate 1/8 DIN size digital panel meters and duplicate their signal processing capabilities. An analog output, a serial data output, and dual relays are standard. All inputs and outputs are mutually isolated. The analog output is scalable for a user-selected portion of the input signal.

Digitally Addressable Serial I/O

LT transmitters can be digitally addressed on an RS485 bus and transmit a scaled digital reading. The serial connection can be via 3 wires (half duplex) or 5 wires (full duplex). LTE transmitters can be connected to a local area network (LAN) via a standard Ethernet cable. They are automatically discovered by Laurel's Node Manager Software.

DC Voltage & Current Input

Five voltage ranges and four current ranges are jumper selectable, with factory calibration factors stored in EEPROM. The error is less than 0.01% of full scale. Easy scaling and a 200 mV range allow use with current shunts, while a 5A range allows use with current transformers. Fast read rate up to 60/sec for an accurate analog output, peak capture, and fast relay response.

Process & Strain Input

Zero and span adjustment from -99,999 to 99,999 internal counts and sensitivity to ± 200 mV full scale for strain gauges and process signals. Error is less than 0.01% of FS. An isolated 5V, 10V or 24V transducer excitation supply is built in. Ratiometric operation compensates for variations in excitation voltage.

Load Cell & Microvolt Input

Zero and span adjustment from 0 to $\pm 99,999$ internal counts and sensitivity to ± 20 mV full scale for load cell and microvolt signals. Error is less than 0.01% of FS. Isolated 10V excitation can drive up to four 350 ohm load cells in parallel. Four-wire connection compensates for excitation variations. Six-wire connection eliminates effects of lead resistance.

True AC rms Voltage & Current Input

Measurements can be as fast as one AC line cycle. Five voltage ranges and four current ranges are



jumper selectable with factory calibration factors stored in EEPROM. A built-in 5A range and easy scaling allow use with current current transformers. Error is less than 0.1% of FS for AC signals from 10 Hz to 10 kHz and 0.1% to 100% of full scale with a crest factor up to is 3.0.

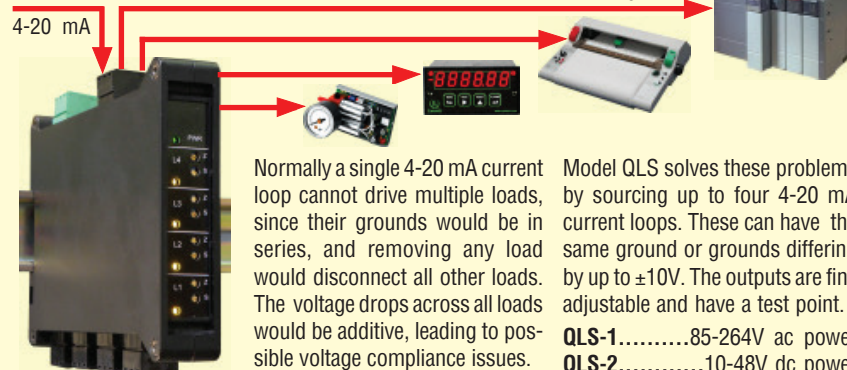
Thermocouple Input

Select thermocouple types J, K, T, E, N, S, R, data output in °C or °F, and resolution of 1° or 0.1°. Dual solid state relays, which are standard, can provide alarms and convert the transmitter to an On/Off temperature controller.

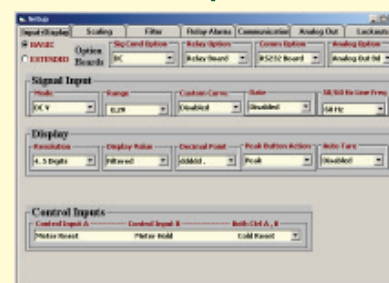
RTD & Resistance Input

Select Pt100, Ni120, Cu10 RTD types, data output in °C or °F, and 1°, 0.1° or 0.01° resolution. Or select resistance ranges from 20 to 200,000 ohms. Custom curve linearization accommodates transducers whose output is a changing resistance. 3 or 4-wire connection compensates for lead resistance.

QLS Quad Loop Splitter/Retransmitter



Instrument Setup Software



Laurel's Windows based Instrument Setup Software is used to program LT and LTE transmitters. This software recognized the Laureate hardware and brings up the appropriate menu choices. Programming is by making menu selections and entering values. The resulting setup files can be saved to disk. The software can also be used with Laureate panel meters and counters as an alternative to programming these via front panel keys.



Analog Input LAUREATE™ LT & LTE Series

DIN Rail Transmitter Specifications

Analog Output (std)

Output levels 4-20 mA, 0-10V, -10V to +10V
Output resolution 16 bits (65,536 steps)
Compliance at 20 mA ... 12V (0-600 ohm load)
Compliance at 10V 2 mA (5 kOhm load)
Isolation 250V rms, 2.3 kV rms for 1 min

Relay Output (std)

Relay type 2 each AC/DC solid state
Load rating 120 mA at 140V ac or 180V dc
Update rate 60/s at 60 Hz, 50/s at 50 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

Serial Communications (std)

Data type, LT Series RS232 or RS485
Data type, LTE Series Ethernet
Serial protocols Modbus or Laurel ASCII
Baud rates 300 to 19200 baud
Isolation 250V rms, 2.3 kV rms for 1 min

Power Input

Standard voltage 85-264V ac or 95-300V dc
Low voltage option 12-34V ac or 10-48V dc
Power over Ethernet (PoE) ... Available with LTE
Power frequency DC or 47-1000 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

Excitation Output (std)

5V dc 100 mA
10V dc 120 mA
24V dc 50 mA
Isolation 50V

DC , Process & Strain Input

Voltage ranges ± 200.00 mV to $\pm 600.0V$
Current ranges ± 2.0000 mA to $\pm 5.000A$
Accuracy $\pm 0.01\%$ of full scale
Zero & span adjustment -99999 to +99999

AC rms Input

Voltage ranges 200.00 mV to 600.0V
Current ranges 2.0000 mA to 5.000A
Accuracy $\pm 0.01\%$ of full scale
Zero & span adjustment -99999 to +99999
Update rate 60/s at 60 Hz, 50/s at 50 Hz

Load Cell & Microvolt Input

Voltage ranges ± 20.000 mV to ± 500.00 mV
Accuracy $\pm 0.01\%$ of full scale
Zero & span adjustment -99999 to +99999
Electrical hookup 4 or 6 wires

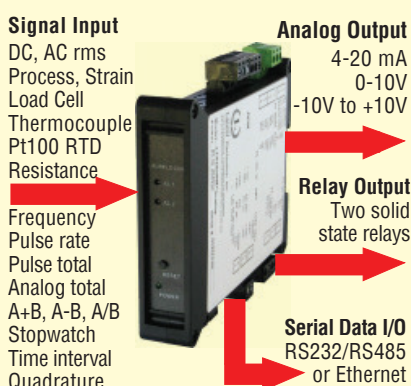
Thermocouple Input

Thermocouple types J, K, T, E, N, R, S
Transmitted units..... °C or °F to 0.1° resolution
TC conformity error, typ $\pm 0.2^{\circ}C$ ($\pm 0.4^{\circ}F$)

RTD & Ohms Input

RTD types Pt100, Ni120, Cu10
Transmitted units... °C or °F to 0.01° resolution
RTD conformity error, typ ... $\pm 0.04^{\circ}C$ ($\pm 0.07^{\circ}F$)
Resistance 20.000 ohms to 2.0000 Mohms
Electrical hookup 3 or 4 wires
Resistance error ... $\pm 0.01\%$ of range ± 2 counts

Transmitter Inputs & Outputs



Mechanical

Case dimensions 129 x 104 x 22.5 mm
Mounting 35 mm DIN rail per EN 50022
Connectors Removable screw clamps

Environmental

Operating temperature 0°C to 55°C
Storage temperature -40°C to 85°C
Protection NEMA-4X when panel mounted

Safety Certifications

Safety ... ETL certified to UL 61010-1 (Intertek)
EMI CE certified
Hazardous materials RoHS compliant

Transmitter Ordering Guide

Create a model number like **LT20DCV1**.

☐ Transmitter Output

LT 4-20 mA, RS232/RS485, 2 relays
LTE 4-20 mA, Ethernet, 2 relays

☐ Main Board Type

2 Standard analog input
4 Extended analog input

☐ Power

0 85-264V ac or 95-300V dc
1 12-34V ac or 10-48V dc
2 Power over Ethernet (LTE models)

☐ Input Type

DC Input (jumper selectable)

DCV1 ± 200.00 mV
DCV2 ± 2.0000 V
DCV3 ± 20.000 V
DCV4 ± 200.00 V
DCV5* ± 600.0 V
DCV6 ± 300.0 V
DCA1 ± 2.0000 mA
DCA2 ± 20.000 mA
DCA3 ± 200.00 mA
DCA4 ± 5.000 A

AC Input (jumper selectable)

RMV1 200.00 mV
RMV2 2.0000 V
RMV3 20.000 V
RMV4 200.00 V
RMV5* 600.0 V
RMV6 300.0 V
RMA1 2.0000 mA
RMA2 20.000 mA
RMA3 200.00 mA
RMA4 5.000 A

* 600V ranges are not ETL certified.

Process Signal Input (e.g., 4-20 mA)

P 4-20 mA = 0-10000
P1 Custom Scaling

Strain Gauge Input (4-wire ratio)

SG 0-200 mV = 0-20000
SG1 Custom Scaling

Load Cell Input (4 or 6-wire ratio)

WM1 Custom Scaling

Thermocouple Input (jumper selectable)

JC -210 to 760°C
JF -347 to 1400°F
KC -244 to 1372°C
KF -408 to 2501°F
TC -257 to 400°C

TF -430 to 752°F
EC -240 to 1000°C
EF -400 to 1830°F
NC -245 to 1300°C
NF -410 to 2370°F
SC -46 to 1768°C
SF -51 to 3214°F
RC -45 to 1768°C
RF -49 to 3213°F

RTD Input (jumper selectable)

P385C Pt100, -202 to 850°C
P385F Pt100, -331 to 1562°F
P392C Pt100, -202 to 631°C
P392F Pt100, -331 to 1168°F
N672C Ni120, -100 to 260°C
N672F Ni120, -148 to 500°F
C427C Cu10, -100 to 260°
C427C Cu10, -148 to 500°F

Ohms Input (jumper selectable)

R1 0-20.000 ohms
R2 0-200.00 ohms
R3 0-2.0000 kohms
R4 0-20.000 kohms
R5 0-200.00 kohms
R6 0-2.0000 Mohms (factory special)



Pulse Input LAUREATE™ LT & LTE Series Transmitters

Available for most industrial pulse signals. Includes isolated analog output, serial data I/O, two relays.

Basic Features

- Analog output: 4-20 mA, 0-20 mA, 0-10V or -10V to +10V, 16 bits, isolated.
- Serial data output, isolated, Modbus or Laurel ASCII protocol.
- Two 120 mA AC/DC solid state relays
- Sensor excitation output, isolated.
- 35 mm DIN rail mount
- Only 22.5 mm (0.89") thick
- Detachable screw clamp connectors
- Easy setup using free Windows software
- Exceptional accuracy at fast update rates

Model Specific Features

- **Power to transmitter (isolated):**
 - 1) Worldwide 85-264V ac or 95-300V dc
 - 2) Low voltage 12-34V ac or 10-48V dc
 - 3) Power over Ethernet (LTE models)
- **Serial data I/O (isolated):**
 - 1) RS232 & RS485 (LT models)
 - 2) Ethernet (LTE models)
- **Signal conditioner (isolated):**
 - 1) Dual channel pulse input
 - 2) Voltage-to-frequency converter
 - 3) Quadrature input

Counterparts to Laureate 1/8 DIN Counters

Laureate LT and LTE Series pulse input transmitters utilize the same signal conditioner boards as Laureate 1/8 DIN size counters and duplicate their signal processing capabilities. For example, generate 4-20 mA from a pulse rate, a pulse total, or a time interval.

An analog output, a serial data output, and dual relays are standard. All inputs and outputs are mutually isolated. The analog output is scalable for a user-selected portion of the input signal.

Digitally Addressable Serial I/O

LT transmitters can be digitally addressed on an RS485 bus and transmit a scaled digital reading. The serial connection can be via 3 wires (half duplex) or 5 wires (full duplex). LTE transmitters can be connected to a local area network (LAN) via a standard Ethernet cable. They are automatically discovered by Laurel's Node Manager Software.

Frequency, Pulse & Flow Rate

Transmit two independent pulse or AC channels A and B as a 6-digit frequency from 0.005 Hz to 1 MHz, or as a scaled rate in engineering units, all with quartz crystal accuracy. Signal sources can be PNP or NPN proximity switches, contact closures, digital logic, magnetic pickups down to 12 mV, or AC lines up to 250 Vac.



Pulse Counter / Totalizer

Independently count up from zero to a preset limit, or count down from a preset value to zero with two independent pulse or AC channels A and B. The transmitted data can be scaled to engineering units, such as gallons. Channel B can also be used to reverse the count direction or inhibit counting of Channel A.

Combined Rate & Total

Toggle the transmitter output from scaled rate to scaled total by applying an external input. Great for flow applications, such as transmitting either flow in gpm or volume in gallons.

Combination of Two Channels

Combine two pulse input channels A and B after scaling to transmit and alarm A+B, A-B, AxB, A/B, or A/B-1. Applicable to rate or total. For example, add two flows for total flow, subtract two flows for net flow, or take the ratio of two flows for mixing. Monitor A/B-1 (draw) for elongation of material between rollers.

Stopwatch & Process Timer

Trigger on the leading or trailing edges of signals applied to channels A and B to time individual or repetitive fast events to 0.2 μ s resolution, or transmit accumulated time of multiple events to 999,999 hours. Digital data can be in 6-digit decimal format for hours, minutes or seconds, or be in HH.MM.SS format.

Phase Angle, Power Factor or Duty Cycle

Transmit phase lead or lag from -180° to +180° between two signals A and B with an error of less than 0.01% of full scale. Set resolution to 1°, 0.1° or 0.01°. Transmit AC power factor from 1.000 to 0.000 with three decimal places. Or transmit duty cycle as On or Off period as a percent of total period with a resolution of 1%, 0.1% or 0.01%.

Process Signal Totalizer

Transmit scaled rate or total based on 4-20 mA, 0-1 mA or 0-10V process signal input, which is internally converted to a frequency. For example, transmit rate or volume (time integrated rate) from a 4-20 mA flow transducer signal. Square root extraction is standard for use with differential pressure flow sensors.

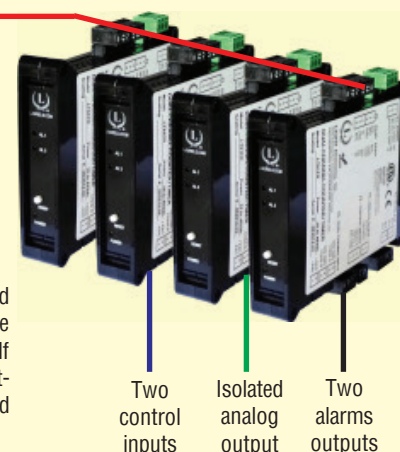
Quadrature Position & Rate

Transmit scaled position or rate from the A and B signals of a quadrature encoder. Count transitions at a combined rate to 250 kHz. A great way to measure position or speed accurately in high vibration environments.

Daisy Chaining of LT Transmitters



Up to 31 LT transmitters can be daisy chained on an RS485 line from a PC or PLC. The electrical connection can be via 3 wires (half duplex) or 5 wires (full duplex). Each transmitter can have two relay outputs, and isolated analog output, and two control inputs.



Pulse Input LAUREATE™ LT & LTE Series

DIN Rail Transmitter Specifications

Analog Output (std)

Output levels 4-20 mA, 0-10V, -10V to +10V
Output resolution 16 bits (65,536 steps)
Compliance at 20 mA ... 12V (0-600 ohm load)
Compliance at 10V 2 mA (5 kOhm load)
Isolation 250V rms, 2.3 kV rms for 1 min

Relay Output (std)

Relay type 2 each AC/DC solid state
Load rating 120 mA at 140V ac or 180V dc
Update rate 60/s at 60 Hz, 50/s at 50 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

Serial Communications (std)

Data type, LT Series RS232 or RS485
Data type, LTE Series Ethernet
Serial protocols Modbus or Custom ASCII
Baud rates 300 to 19200 baud
Isolation 250V rms, 2.3 kV rms for 1 min

Power Input

Standard voltage 85-264V ac or 95-300V dc
Low voltage option 12-34V ac or 10-48V dc
Power over Ethernet (PoE) ... Available with LTE
Power frequency DC or 47-1000 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

FR Signal Conditioner (dual pulse inputs)

Inputs AC, magnetic pickups, pulses from
NPN or PNP transistors, contact closures
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
Frequency Measurement 1/period
Update time Gate time +30 ms +1 period
Gate time 0 to 199.99 sec (selectable)
Scale factor ±10⁻¹⁰ to ±10⁶

VF Signal Conditioner (process totalizing)

Inputs 4-20 mA, 0-1 mA, 0-10V
Span error 0.01% of FS ±1 count
Span tempco 0.003% of reading/°C
Zero tempco 0.001% of FS/°C

QD Signal Conditioner (quadrature inputs)

Input types Differential or single-ended
Transitions monitored x1, x2 or x4
Max transitions /sec 250 k
Error correction Zero index (Z-channel)
Position error No error contribution

Excitation Output (std)

5V dc 100 mA
10V dc 120 mA
24V dc 50 mA
Isolation 50V

Mechanical

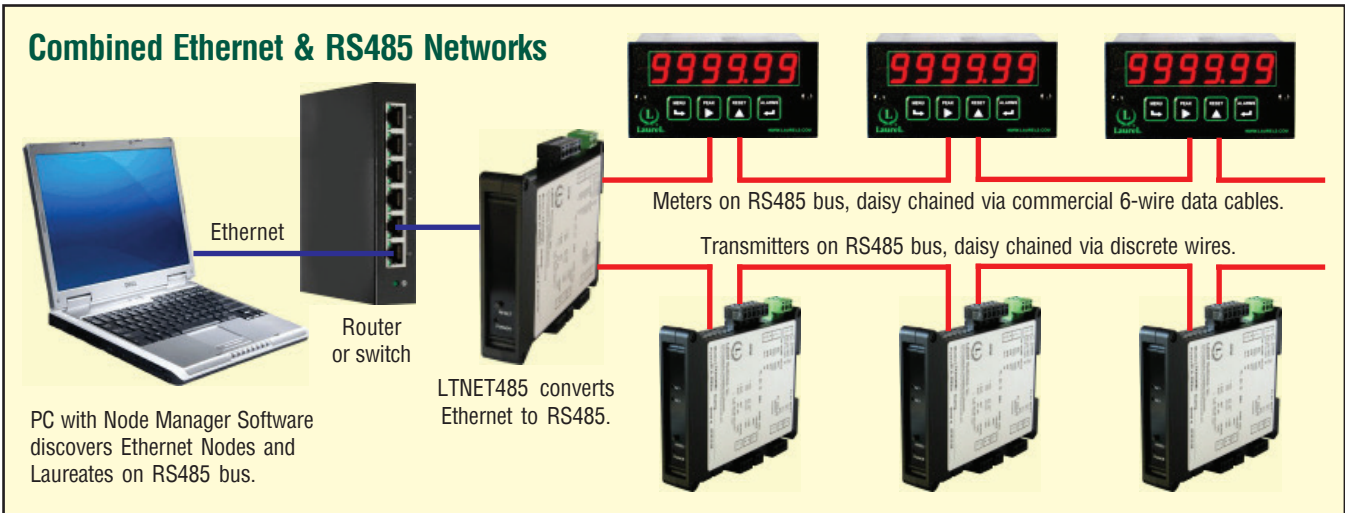
Case dimensions 129 x 104 x 22.5 mm
Mounting 35 mm DIN rail per EN 50022
Connectors Removable screw clamps

Environmental

Operating temperature 0°C to 55°C
Storage temperature -40°C to 85°C
Protection NEMA-4X when panel mounted

Safety Certifications

Safety ... ETL certified to UL 61010-1 (Intertek)
EMI CE certified
Hazardous materials RoHS compliant



Transmitter Ordering Guide

Create a model number like **LT60FR**.



Transmitter Output

LT 4-20 mA, RS232/RS485, 2 relays
LTE 4-20 mA, Ethernet, 2 relays



Main Board Type

6 Standard pulse input
8 Extended pulse input



Power

0 85-264V ac or 95-300V dc
1 12-34V ac or 10-48V dc
2 Power over Ethernet (LTE models)



Input Type

FR Frequency
With Main Board 6, scalable to ±999,999 for frequency, rate, period, total, stopwatch, or time interval.
With Main Board 8, add simultaneous rate and total, custom curve linearization, arithmetic functions applied to channels A&B (A+B, A-B, AxB, A/B, A/B-1), phase angle, power factor, duty cycle, dynamic up/down counting, and batch control.

VF1 4-20 mA
VF2 0-1 mA
VF3 0-10 V

With Main Board 6, simultaneous scaled rate and total from analog process signals. Selectable square root extraction. With Main Board 8, add custom curve linearization, batch control, and 1/rate (time).

QD Quadrature
With Main Board 6, scalable to ±999,999 for position from shaft encoders. With Main Board 8, scalable rate or position.



LAUREATE™ Serial Input Meter

Six-digit serial-input remote display
with optional relay and analog outputs.
Extracts readings from ASCII data strings.



Basic Features

- Extracts readings from RS232, RS485, USB or Ethernet serial data.
- 6-digit red or green numeric LED display.
- Modbus or Laurel ASCII protocol.
- Digitally addressable.
- Easy setup using Windows software.
- NEMA-4X, 1/8 DIN front panel

Selectable Features

- Two or four 8A, 250V ac contact relays or 120 mA AC/DC solid state relays.
- One or two 4-20 mA or 0-10V isolated analog outputs, 16 bits.
- Worldwide 85-264V ac or 10-48V dc power



Serial Data Input, 6-Digit Readout

The Laureate serial input meter can extract data values from ASCII strings that contain multiple data values and non-numeric characters, such as Start and Stop characters. It displays the extracted data value as a number up to 6 digits.

Relay & Analog Output Options

Two or four optional relays can respond to extracted data values or to control characters for local alarm or control. One or two optional isolated analog outputs can turn the unit into a digital-to-analog converter and 4-20 mA transmitter. Each analog output span can be programmed for a specific numerical input span.

Ordering Guide

Create a model number like L60207.

- ☐ **Laureate Main Counter Board**
 - L5 Green LEDs
 - L6 Red LEDs
- ☐ **Power**
 - 0 85-264V ac or 95-300V dc
 - 1 12-34V ac or 10-48V dc
- ☐ **Relay Output**
 - 0 None
 - 1 Two 8A contact relays
 - 2 Two 120 mA solid state relays
 - 3 Four 8A contact relays
 - 4 Four 120 mA solid state relays
- ☐ **Analog Output**
 - 0 None
 - 1 4-20 mA, 0-10V, -10V to +10V
 - 2 Dual 4-20 mA, 0-10V
- ☐ **Serial Data Input (required)**
 - 1 RS232
 - 2 RS485 with dual RJ11
 - 4 RS485 with dual RJ45
 - 5 USB
 - 7 Ethernet

LAUREATE™ LTS & LTSE Serial-to-Analog Converters

Serial input, analog output DIN rail
transmitters with two relay outputs

Basic Features

- RS232 or RS485 serial input (Model LTS)
- Ethernet serial data input (Model LTSE)
- Modbus or Laurel ASCII protocol
- 4-20 mA, 0-20 mA, 0-10V or -10V to +10V isolated analog output
- Programmable analog output span
- Two 120 mA solid state relays (standard)
- 35 mm DIN rail mount
- Only 22.5 mm (0.89") thick
- Detachable screw clamp connectors

Selectable Features

- Worldwide 85-264V ac or 10-48V dc power

Serial Data Input, Analog Output

The LTS transmitter accepts RS232 or RS485 data, while model LTSE accepts Ethernet data. Like the Laureate Serial Input Meter, both can extract data values from ASCII strings that contain multiple data values and non-numeric characters. You can select character positions, start and stop ASCII characters, the number of characters to skip, and the number of characters to convert. You can then program the analog output span so that it corresponds to a specific numerical input span. Two 120 mA AC/DC solid state relays are included and can respond to data values or to control characters.

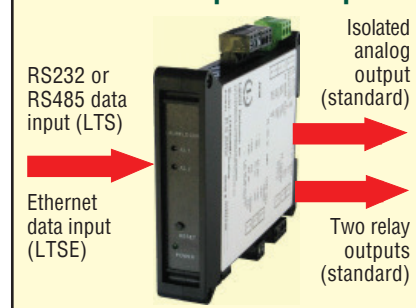


Ordering Guide

Create a model number like LTS60. Includes isolated analog output and two 120 mA AC/DC solid state relays.

- ☐ **Serial Input**
 - LTS6 RS232/RS485 input
 - LTSE6 Ethernet in, analog & relay out
- ☐ **Power**
 - 0 85-264V ac or 95-300V dc
 - 1 12-34V ac or 10-48V dc
 - 3 Power over Ethernet (LTSE6 only)

LTS Series Inputs & Outputs



Processing Serial Data

The Laureate Serial Input Meter can serve as a remote 6-digit data display by extracting readings embedded in serial data strings from a PC or programmable instrument. This meter as well as our LTS or LTSE transmitters can convert digital readings to an isolated, scaled analog output for use by PLCs and other process control equipment. The Modbus protocol and the simpler Custom ASCII protocol are fully supported. Meters and transmitters can be multidropped on the same RS485 line.



LAUREL® ELECTRONICS INC., 3183-G Airway Ave., Costa Mesa, CA 92626 USA • Tel: 714-434-6131 • www.laurels.com

MAGNA Series Large Digit Displays



Features

- Choice of 2-1/2", 4", 6" or 8" digits heights for long viewing up to 100 m (320 ft).
- Choice of 4 or 6 digits.
- Choice of inputs: RS232/RS485 serial data, process signals (4-20 mA, 0-10V), weight / load cell, frequency, rate, pulse totalizer, 24-hour clock, elapsed time.
- Choice of 95-264V ac or 11-30V dc power.
- Choice of suspension, wall or panel mount.
- Optional extra-bright LEDs and weather cowl for outdoor installation.
- Optional relays, analog output, serial output
- Optional remote programming unit.
- Sealed to NEMA-4 (IP65) from all sides.
- EM certified (CE Mark).



Large Digits for Long Viewing Distances

MAGNA Series Large Digit Displays are available in four digit heights for viewing across a plant floor or outdoor yard. A rule of thumb is that viewing distance in feet is 40 times digit height in inches.

Signal conditioners are available for analog, pulse, or serial data signals. Outdoor versions are available with ultra-bright LEDs and a NEMA-4X (IP65) rated weather cowl, for example to display truck weight. Suspension mount is standard. Wall mount and panel mount are optional.



MAGNA Model	M2	M4	M6	M8
Digit Height	2.2" (57 mm)	4.0" (102 mm)	5.9" (150 mm)	7.9" (200 mm)
Case, W x H 4 digits	11.0" x 6.1" 279 x 155 mm	16.7" x 7.7" 436 x 196 mm	20.2" x 9.8" 514 x 248 mm	26.1" x 11.7" 824 x 248 mm
Case, W x H 6 digits	14.8" x 6.1" 38476 x 155 mm	24.3" x 7.7" 616 x 196 mm	29.3" x 9.8" 664 x 298 mm	38.6" x 11.7" 984 x 298 mm
Case Depth	3.0" (75 mm)	3.0" (75 mm)	3.0" (75 mm)	3.0" (75 mm)

Ordering Guide

- ☐ **Digit Height**
- M2 2-1/4" (57 mm)
M4 4" (102 mm)
M6 6" (144 mm)
M8 8" (200 mm)
- ☐ **Display Brightness**
- 0 Normal indoor brightness
1 Outdoor viewing brightness
- ☐ **Power**
- 0 95-265V ac
1 11-30V dc
- ☐ **Relay Output**
- 0 None
1 Two 5A, 250V ac relays
2 Four 5A, 250V ac relays
- ☐ **Analog Output**
- 0 None
1 4-20 mA
2 0-10V
- ☐ **Case & Mounting**
- 1 Black case, panel mount
2 Black case, wall mount
3 Black case, suspension mount

Signal Input

- SER24 RS232, 4 digits
SER26 RS232, 6 digits
SER44 RS485, 4 digits
SER46 RS485, 6 digits
CLK4 Clock/timer, HH:MM, 4 digits
CLK6 Clock/timer, HH:MM:SS, 6 digits
P4 Process input, 4-20 mA, 4 digits
P6 Process input, 4-20 mA, 6 digits
WM4 .. Strain gauge, 0.5-4 mV/V, 4 digits
WM6 . Strain gauge, 0.5-4 mV/V, 6 digits
FR4 . Freq, rate, total, quadrature, 4 digits
FR6 . Freq, rate, total, quadrature, 6 digits

Other Process Instrumentation



Bargraph Displays

The 1/8 DIN size BAR bargraph meter provides a 30-segment red or green LED bar display of process signals such as 4-20 mA, 0-20 mA, 1-5V or 0-10V. Transducer excitation is standard. Dual 5A relays are optional. The PRO-BAR is a large-size bargraph display with a 250 mm (10") scale and 50 red LED segments.

Ordering Numbers BAR or PB



88-PRO Loop Powered Process Meter

The 88-PRO may be connected directly to a 4-20 mA, 10-50 mA or 1-5 mA current loop, with no need for additional power. The display consists of highly legible 12.7 mm (0.5") LCD digits. The normal 3-1/2 digit display range of ± 1999 can be extended to ± 19990 or ± 199900 via jumper selectable dummy right-hand zeros. User controls at rear of meter. 1/8 DIN case, detachable screw terminal connectors.

Ordering Number 88-PRO



M-35 Microminiature Process Meter

The M-35 is the solution when panel space is limited or portability is desired. The bezel measures only 24 x 48 mm (0.94" x 1.89"), yet the height of the LED digits is a full 10 mm (0.4"). This is a fully scalable 3-1/2 digit process meter for 4-20 mA, 0-10 mA, 0-2V, 1-5V, or 0-10V signals. Easy screwdriver adjustments for zero and span. The unit is powered by isolated 10-30V dc. 1/32 DIN case, detachable screw terminal connectors.

Ordering Number M-35



LAUREL® ELECTRONICS INC., 3183-G Airway Ave., Costa Mesa, CA 92626 USA • Tel: 714-434-6131 • www.laurels.com

Authorized Distributor:

WESCHLER INSTRUMENTS

phone: 800-903-9870 440-378-6580

fax: 800-903-9590 440-238-0660

www.weschler.com info@weschler.com

High-Performance Instrumentation for Industrial Measurement & Control

Applications

- DC Voltage & Current
- AC RMS Voltage & Current
- 4-20 mA & 0-10V Process
- Strain, Load Cell, Microvolt
- Thermocouple
- RTD (Pt100, Ni120, Cu10)
- Resistance
- Weighing
- Custom Curve Linearization
- Square Root Extraction
- Stopwatch, Time Interval
- Frequency, Rate
- Pulse Signal Totalizing
- Process Signal Totalizing
- Ratio, Sum or Difference
- Phase Angle
- Power Factor
- Duty Cycle
- Batch Control
- Quadrature Position & Rate
- Serial-to-Analog Conversion
- Setpoint Control
- PC-Based Data Collection



Device Types

- Digital Panel Meters
- Electronic Counters
- Process Timers
- Setpoint Controllers
- 4-20 mA Loop Splitters
- 4-20 mA Transmitters
- RS485 Data Transmitters
- Ethernet Data Transmitters
- Serial Input Displays
- Large Digit Displays
- Bargraph Meters



LAUREL[®] ELECTRONICS INC.

3183-G Airway Ave., Costa Mesa, CA 92626, USA

Tel: 714-434-6131 ● Fax: 714-434-3766 ● Email: sales@laurels.com

Web: www.laurels.com