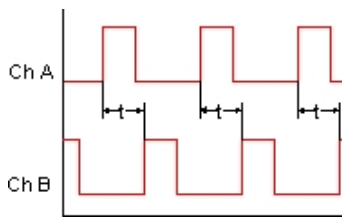




## Features

- Ethernet Serial Data I/O, Modbus TCP or Laurel ASCII protocol
- 4-20 mA or 0-10V transmitter output, 16 bits, jumper selectable, isolated
- Dual 120 mA solid state relays for alarm or control, isolated
- 5V, 10V or 24V dc transducer excitation output, isolated
- Transmits average time of periodic events with width from 1  $\mu$ s to 199.999 s
- Resolution to 0.2  $\mu$ s, rep rated to 250 kHz
- Inputs from NPN or PNP proximity switches, contact closures, digital logic, or magnetic pickups down to 12 mV
- Analog output resolution 0.0015% of span (16 bits), accuracy  $\pm$ 0.02% of span
- Universal 85-264 Vac / 90-300 Vdc or 10-48 Vdc / 12-32 Vac power
- Power over Ethernet (PoE) jumper selectable with 10-48 Vdc supply

## Description



The Laureate time interval transmitter can transmit pulse width or time delay between individual pulses to a resolution of 0.2  $\mu$ s for periodic events. It can also transmit average pulse width or average time delay between multiple pulses.

**Time interval** is measured between inputs on channels A and B. Timing starts when a pulse is applied to Channel A (selectable positive or negative edge), and ends when a pulse is applied to Channel B (selectable positive or negative edge). In case of a single pulsed signal, the A and B inputs can be tied together. A positive or negative slope may be selected to start timing, and the opposite slope must be selected to stop timing. Timing is achieved by counting 5.5 MHz clock pulses. Multiple integral time intervals are averaged over a gate time which is selectable from 10 ms to 199.99 s and also controls the maximum output rate.

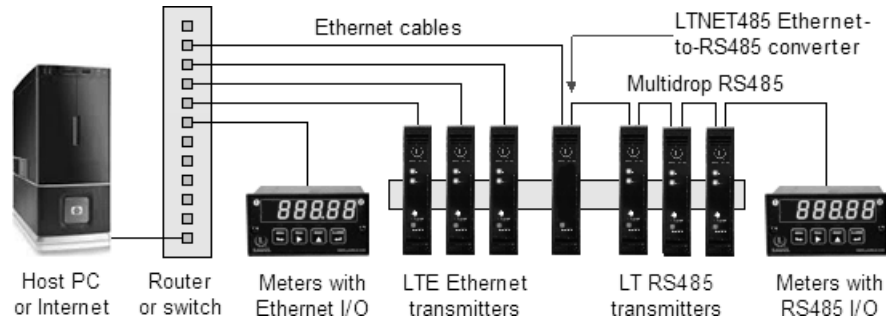
The dual-channel signal conditioner used for pulse detection accepts inputs from proximity switches with PNP or NPN output, TTL or CMOS logic, magnetic pickups, contact closures, and other signals from 12 mV to 250 Vac. Jumper selections provide optimum operation for different sensor types and noise conditions. A built-in 5V, 10V or 24V dc excitation supply can power proximity switches and other sensors, and eliminate the need for an external power supply.

## Standard features of Laureate LTE transmitters include:

- **Ethernet I/O, isolated.** Supported protocols are Modbus RTU and ASCII (tunneled via Modbus TCP) and Laurel ASCII. The latter is simpler than the Modbus protocol and is recommended when all devices are Laureates. Note that RS232 or RS485 data I/O in lieu of Ethernet is provided by our LT Series transmitters.
- **4-20 mA, 0-20 mA or 0-10V analog transmitter output,** isolated, jumper-selectable and user scalable. All selections provide 16-bit (0.0015%) resolution of output span and 0.02% output accuracy of a reading from -99,999 to +99,999 counts that is also transmitted digitally. Output isolation from signal and power grounds eliminates potential ground loop problems. The supply can drive 20 mA into a 500 ohm (or lower) load for 10V compliance, or 10V into a 5K ohm (or higher) load for 2 mA compliance.
- **Dual solid state relays,** isolated. Available for local alarm or control. Rated 120 mA at 130 Vac or 180 Vdc.
- **Transducer excitation output,** isolated. User selectable 5V@100 mA, 10V@120 mA or 24V@50 mA.
- **Universal 85-264 Vac power.** Low-voltage 10-48 Vdc or 12-32 Vac power is optional.

**Discovery and configuration** of Laureate Ethernet Nodes is easily achieved with Laurel's Node Manager Software, and the discovered transmitters can then be programmed using Laurel's Instrument Setup Software. Both softwares run on a PC under MS Windows and can be downloaded at no charge.



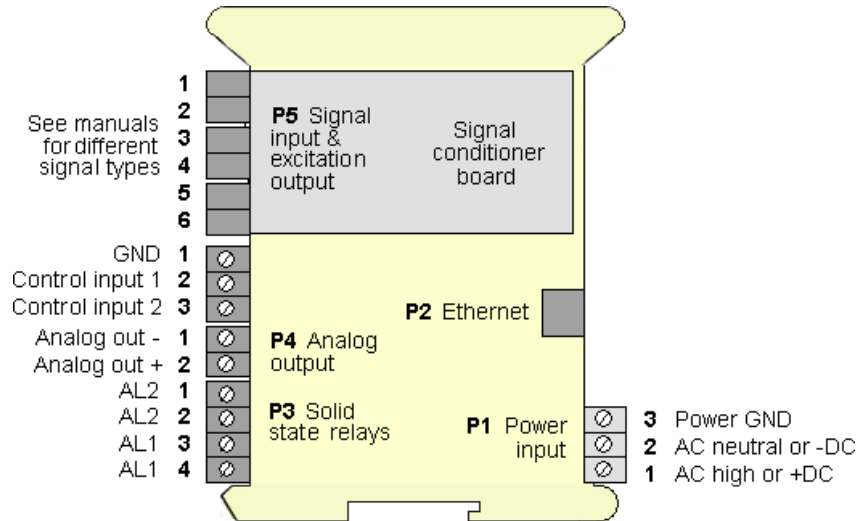


## Specifications

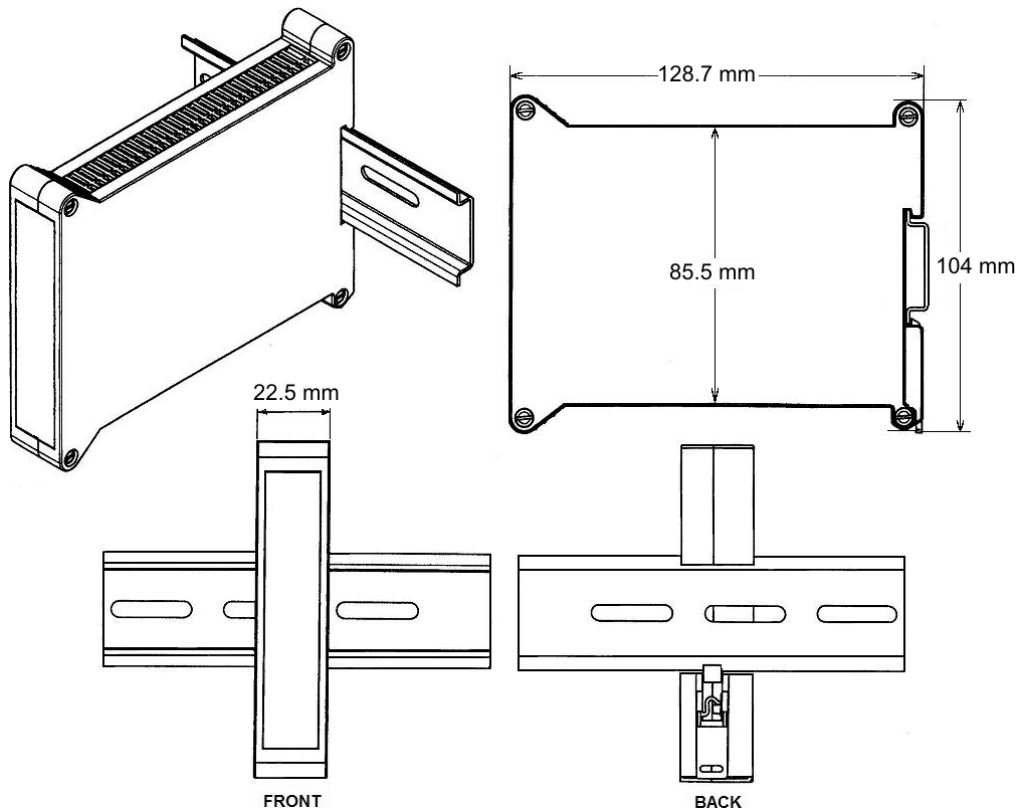
<b>Pulse Input</b>	
Signal Types	AC, pulses from NPN, PNP transistors, contact closures, magnetic pickups
Signal Ground	Common ground for channels A & B.
Minimum Signal	Nine ranges from (-12 to +12 mV) to (+1.25 to +2.1V).
Maximum Signal	250 Vac
Maximum Frequency	1 MHz, 30 kHz, 250 Hz (selectable).
Contact Debounce	0, 3, 50 ms (selectable).
Time Base Accuracy	Quartz crystal calibrated to $\pm 2$ ppm.
Span Tempco	$\pm 1$ ppm/ $^{\circ}$ C (typ)
Long-term Drift	$\pm 5$ ppm/year
<b>Time Interval Mode</b>	
Timing Start	Channel A pulse, + or - edges
Timing Stop	Channel B pulse, + or - edges
Update Rate	Gate time + 30 ms + 0-2 time intervals
Gate Time	Selectable 10 ms to 199.99 s
Time Before Zero Output	Selectable 10 ms to 199.99 s
<b>Resolution</b>	
0 - 199.999 s	1 ms
0 - 99.9999 s	100 $\mu$ s
0 - 9.99999 s	10 $\mu$ s
0 - .999999 s	1 $\mu$ s
0 - .099999 s	0.2 $\mu$ s (after averaging)
<b>Analog Output (standard)</b>	
Output Levels	4-20 mA and 0-10 Vdc (selectable)
Compliance, 4-20 mA	10V ( 0-500 $\Omega$ load )
Compliance, 0-10V	2 mA ( 5 k $\Omega$ load )
Output Resolution	16 bits (65,536 steps)
Output Accuracy	$\pm 0.02\%$ of output span
Output Update Rate	Programmed gate time + 30 ms + 0-2 signal periods
Output Isolation	250V rms working, 2.3 kV rms per 1 minute test
<b>Serial Data Output (standard)</b>	
Type	10/100Base-T Ethernet per IEEE 802.3
Data Rates	300, 600, 1200, 2400, 4800, 9600, 19200 baud
Output Isolation	250V rms working, 2.3 kV rms per 1 min test
Serial Protocols	Modbus TCP, Modbus RTU, Modbus ASCII, Laurel ASCII
Modbus Compliance	Modbus over Serial Line Specification V1.0 (2002)
Digital Addresses	247 for Modbus, 31 for Laurel ASCII
<b>Transducer Excitation Output (standard)</b>	
Jumper Selection 1	10V @ 60 mA, isolated to 50V from signal ground
Jumper Selection 2	5V @ 50 mA, isolated to 50V from signal ground
Jumper Selection 3	15V @ 60 mA, non-isolated
<b>Power Input</b>	
Standard Power	85-264 Vac or 90-300 Vdc
Low Power Option	10-48 Vdc or 12-32 Vac
Power Frequency	DC or 47-63 Hz
Power Isolation	250V rms working, 2.3 kV rms per 1 min test
Power Consumption	2W typical, 3W with max excitation output

Mechanical	
Dimensions	129 x 104 x 22.5 mm case
Mounting	35 mm rail per DIN EN 50022
Electrical Connections	Plug-in screw-clamp connectors
Environmental	
Operating Temperature	0°C to 55°C
Storage Temperature	-40°C to 85°C
Relative Humidity	95% at 40°C, non-condensing
Cooling Required	Mount transmitters with ventilation holes at top and bottom. Leave 6 mm (1/4") between transmitters, or force air with a fan.

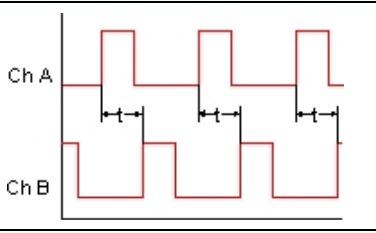
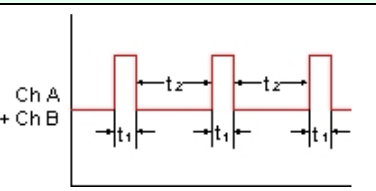
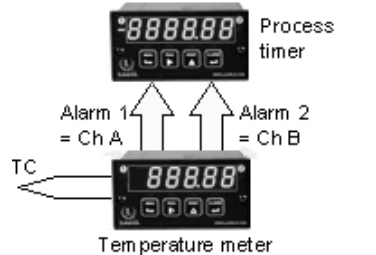
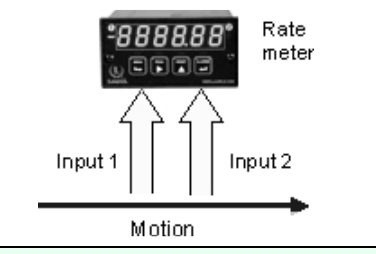
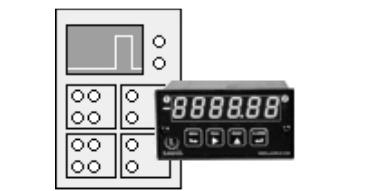
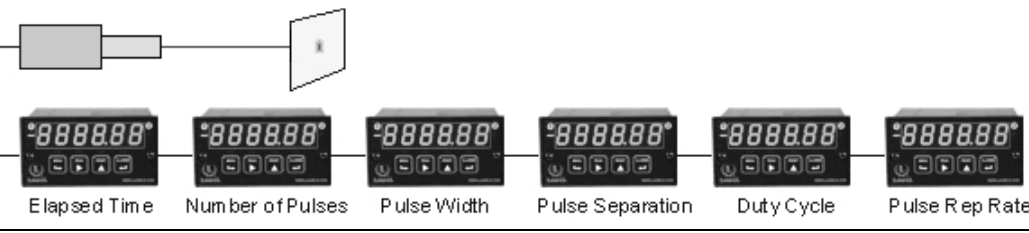
### Pinout



### Mechanical



## Application Examples of Time Averaging Meters and Transmitters

<b>Time Interval Mode for Time Delay</b>	
	<p>For periodic pulses applied to A and B channels, time delays can be measured down to 0.2 <math>\mu</math>s resolution from the rising or falling edge of A to the rising or falling edge of B (selectable).</p>
<b>Time Interval Mode for Time Delay</b>	
	<p>The width of periodic pulses (<math>t_1</math> or <math>t_2</math>) can be measured by tying the A and B channels together. As for time delay, readings are averaged over a user-selectable gate time.</p>
<b>Timing Process Dynamics</b>	
	<p>The start and stop pulses used for timing can be generated by the dual relay board in a Laureate panel meter or digital counter. For instance, the start and stop pulse edges can be created as temperature passes two alarm setpoints, or temperature cycles in a hysteresis control mode.</p>
<b>Rate Based on 1 / Time</b>	
	<p>The start and stop pulses used for timing can be generated by the dual relay board in a Laureate panel meter or digital counter. For instance, the start and stop pulse edges can be created as temperature passes two alarm setpoints, or temperature cycles in a hysteresis control mode.</p>
<b>Replacing an Oscilloscope with a Laureate Meter or Transmitter</b>	
	<p>An oscilloscope is great for viewing and timing pulses in a lab. However, in fixed installations where digital timing accuracy and control outputs are required, a low-cost Laureate time interval meter will be the instrument of choice. Resolution to 0.2 <math>\mu</math>s is feasible.</p>
<b>Instrumenting a Pulsed Laser System</b>	
	
<p>Some of the many possibilities in instrumenting a pulsed laser system with Laureate dual-channel counters: elapsed time, number of pulses, pulse width, pulse separation, duty cycle, and pulse rep rate.</p>	

## Ordering Guide

Create a model a model number in this format: **LTE600FR**

<b>Transmitter Type</b>	<b>LTE</b> Laureate Ethernet & 4-20 mA Transmitter
<b>Main Board</b>	<b>6</b> Standard Main Board
<b>Power</b>	<b>0</b> Isolated 85-264 Vac or 90-300 Vdc <b>1</b> Isolated 12-32 Vac or 10-48 Vdc
<b>Input Type</b>	<b>FR</b> Dual-Channel Frequency