



4-20 mA & Serial Data Output Transmitter for AC RMS Voltage or Current Input



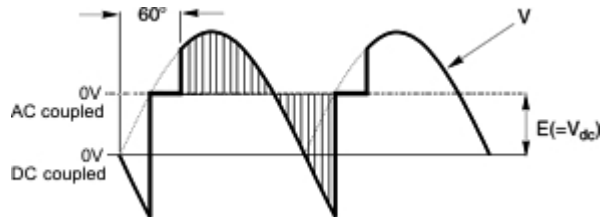
Features

- 4-20 mA, 0-20 mA, 0-10V or -10V to +10V transmitter output, 16 bits, isolated
- RS232 or RS485 serial data output, Modbus or Laurel ASCII protocol, isolated
- Dual 120 mA solid state relays for alarm or control, isolated
- True AC RMS measurement in one 50/60 Hz AC line cycle
- 0.2, 2, 20, 200, 300V and 600V AC voltage ranges
- 2, 20, 200 mA and 5A AC current ranges
- All input ranges user-selectable and factory calibrated
- AC or DC coupling for signals from DC to 10 kHz
- Measurements from 0% to 100% of full scale
- 0.03% accuracy of full scale at crest factor to 3.0
- Universal 85-264 Vac / 90-300 Vdc or 10-48 Vdc / 12-32 Vac power



Description

The Laureate 4-20 mA output, AC RMS input transmitter provides six voltage input ranges and four current input ranges, all factory calibrated and jumper selectable. A special 5.000A range utilizes a built-in 0.01Ω shunt to accept the output of 5A current transformers, with no need for a stepdown transformer. The current readings can easily be scaled digitally as needed.



True RMS precision circuitry is used to determine the root-mean-square of complex waveforms from DC to 10 kHz. Spikes up to 3.0 times the maximum of each range are accurately measured.

Accuracy is 0.03% of full scale* for signals from DC to 15 kHz and signal amplitude down to 0. The crest factor (V_p / V_{rms}) is 3.0 at full scale, increasing to 300 for a signal amplitude of 1% of full scale.

True RMS readings in as little as one 50/60 Hz AC line cycle are unmatched in the industry. Such a high read rate allows anomalies to be detected and alarmed before they become expensive problems. On/off control and alarm can be achieved dual solid state relays, which are standard. Transmitter can also capture peak and valley for times as short as one 50/60 Hz AC power line cycle.

AC or DC coupling is jumper selectable. AC coupling accommodates signals from 10 Hz to 10 kHz for applications such as measuring the ripple on a DC power supply. DC coupling accommodates signals from 0 Hz to 10 kHz. Multiple integral cycles are averaged for signals above 50/60 Hz. A single cycle is captured for signals from 3 Hz to 50/60 Hz. Below 3 Hz and at DC, the capture rate is every 333 ms.

Standard features of Laureate LT transmitters include:

- **4-20 mA, 0-10V or -10V to +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 500Ω (or lower) load for 10V compliance, or 10V into a 5 kΩ (or higher) load for 2 mA compliance.
- **Serial communications output**, isolated. User selectable RS232 or RS485, half or full duplex. Three protocols are user selectable: Modbus RTU, Modbus ASCII, or Laurel ASCII. Modbus operation is fully compliant with Modbus Over Serial Line Specification V1.0 (2002). The Laurel ASCII protocol allows up to 31 Laureate devices to be addressed on the same RS485 data line. It is simpler than the Modbus protocol and is recommended when all devices are Laureates.
- **Dual solid state relays**, isolated. Available for local alarm or control. Rated 120 mA at 130 Vac or 170 Vdc.
- **Universal 85-264 Vac power.** Low-voltage 10-48 Vdc or 12-32 Vac power is optional.

Easy Transmitter programming is via Laurel's Instrument Setup Software, which runs on a PC under MS Windows. This software can be downloaded from this website at no charge. The required transmitter-to-PC interface cable is available from Laurel (P/N CBL04).



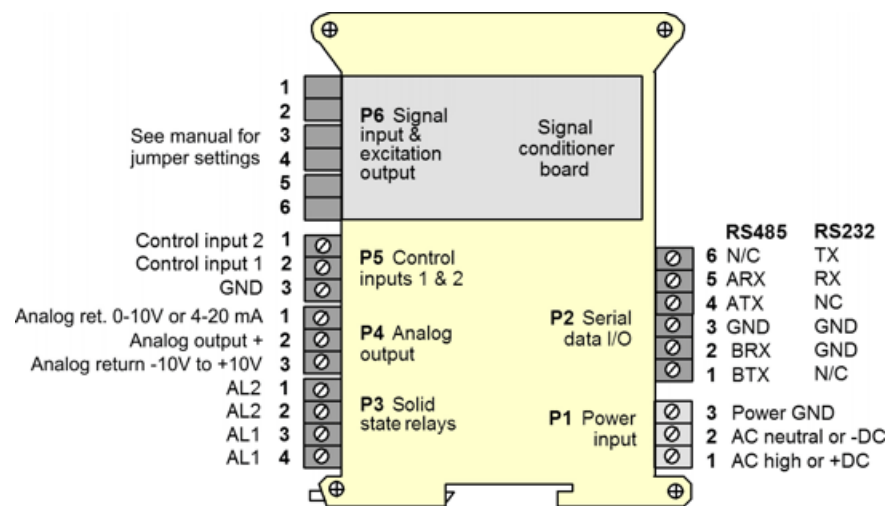
Specifications

Analog Input	Range	Resolution	Input Ohms	Error at 25°C
Voltage Ranges 0% to 100% of FS, 10 Hz to 10 kHz	200.00 mV 2.0000 V 20.000 V 200.00 V	10 μV 100 μV 1 mV 10 mV	1 MΩ	± 0.03% of FS
	600.0 V*	100 mV	1 MΩ	± 0.3% of FS
Current Ranges 0% to 100% of FS, 10 Hz to 10 kHz	2.0000 mA 20.000 mA 200.00 mA	0.1 μA 1 μA 10 μA	100 Ω 10 Ω 1 Ω	± 0.03% of FS
	5.000 A	1 mA	0.01 Ω	± 0.4% of FS
Analog Output (standard)				
Output Levels Compliance at 20 mA Compliance at 10V Output Resolution Output Accuracy Output Isolation	4-20 mA, 0-20 mA, 0-10 Vdc, -10 to +10 Vdc (user selectable) 10V (0-500Ω load) 2 mA (5 kΩ load) 16 bits (65,536 steps) 0.02% of output span plus conversion accuracy 250V rms working, 2.3 kV rms per 1 minute test			
Serial Communications (standard)				
Signal Types Data Rates Output Isolation Serial Protocols Modbus Modes Modbus Compliance Digital Addressing	RS232 or RS485 (half or full duplex) 300, 600, 1200, 2400, 4800, 9600, 19200 baud 250V rms working, 2.3 kV rms per 1 min test Modbus RTU, Modbus ASCII, Laurel ASCII RTU or ASCII Modbus over Serial Line Specification V1.0 (2002) 247 Modbus addresses. Up to 32 devices on an RS485 line with no repeater			
Dual Relay Output (standard)				
Relay Type Load Rating	Two solid state relays, SPST, normally open, Form A 120 mA at 140 Vac or 180 Vdc			
Power Input				
Standard Power Low Power Option Power Frequency Power Isolation Power Consumption	85-264 Vac or 90-300 Vdc 10-48 Vdc or 12-32 Vac DC or 47-63 Hz 250V rms working, 2.3 kV rms per 1 min test 2Watts			
Mechanical				
Dimensions Mounting Electrical Connections	129 x 104 x 22.5 mm case 35 mm rail per DIN EN 50022 Plug-in screw-clamp connectors			
Environmental				
Operating Temperature Storage Temperature Relative Humidity Cooling Required	0°C to 55°C -40°C to 85°C 95% at 40°C, non-condensing Mount transmitters with ventilation holes at top and bottom. Leave 6 mm (1/4") between transmitters, or force air with a fan.			

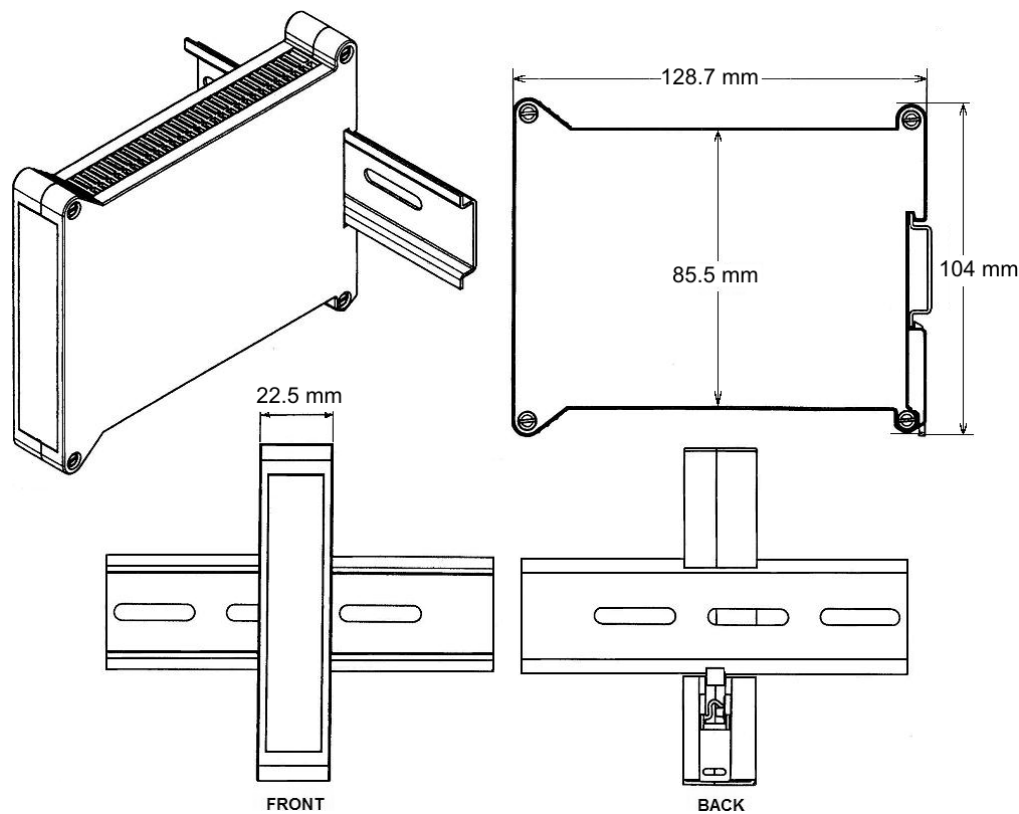
* Range ETL certified to 300.0 V. For purposes of accuracy calculation, the full scale range for the 200V and 600V scales is 2000V (20,000 counts), and the full scale range for the 5A scale is 20A (20,000 counts).



Pinout



Mechanical



Ordering Guide

Create a model a model number in this format: **LT20RMV4, CBL04**

Transmitter Type	LT Laureate 4-20 mA & RS232/RS485 output Transmitter
Main Board	2 Standard Main Board 4 Extended Main Board
	Note: Extended allows custom curve linearization and rate from successive readings.
Power	0 85-264 Vac or 90-300 Vdc 1 12-32 Vac or 10-48 Vdc
Signal Input	True AC RMS Volts RMV1 200.00 m RMV2 2.0000 V RMV3 20.000 V RMV4 200.00 V RMV5 600.0 V
	True AC RMS Amps RMA1 2.0000 mA RMA2 20.000 mA RMA3 200.00 mA RMA4 5.000 A
	Note: The same AC RMS signal conditioner can be user configured for AC Volts or AC Amps, and is precalibrated in EEPROM for all AC Volt and AC Amp ranges listed.
Accessories	CBL04 RS232 cable, 7ft. Connects RS232 screw terminals of LT transmitter to DB9 port of PC.
	CBL02 USB-to-RS232 adapter cable. Combination of CBL02 and CBL04 connects transmitter RS232 terminals to PC USB port.

