

Ethernet & 4-20 mA Output Transmitter for Thermocouple Types J, K, T, E, N, R, S



Features

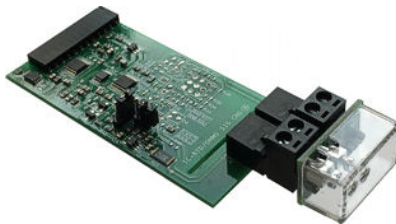
- Ethernet Serial Data I/O, Modbus TCP or Laurel ASCII protocol
- 4-20 mA or 0-10V transmitter output, 16 bits, jumper selectable, isolated
- Dual 120 mA solid state relays for alarm or control, isolated
- Factory calibrated for thermocouple types J, K, T, E, N, R, S each in one range
- User selectable input span from entire thermocouple range down to 15.0°
- Analog output resolution 0.0015% of span (16 bits), accuracy $\pm 0.02\%$ of span
- Fast update rate to 50 or 60 per second
- DIN rail mount housing only 22.5 mm wide, detachable screw-clamp connectors
- 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 thermocouple transmitter provides a linearized, highly accurate, stable and repeatable transmitter output for thermocouple types J, K, T, E, N, R or S. The thermocouple type and temperature range, specified in °C or °F, are user-selectable. The temperature range can be as wide as the entire span of the thermocouple type, or as narrow as 150 counts (such as 15.0°), limited only by considerations of electrical noise and digital filtering time constants.

All ranges for all thermocouple types are digitally calibrated at the factory, with calibration factors stored in EEPROM on the signal conditioner board. This allows temperatures sensors and signal conditioner boards to be changed in the field without recalibrating the meter. A cold junction compensation (CJC) unit is calibrated as a system with the signal conditioner board. That unit encloses the thermocouple junctions and the junction temperature sensor in the same isothermal space so as to minimize cold junction compensation errors.



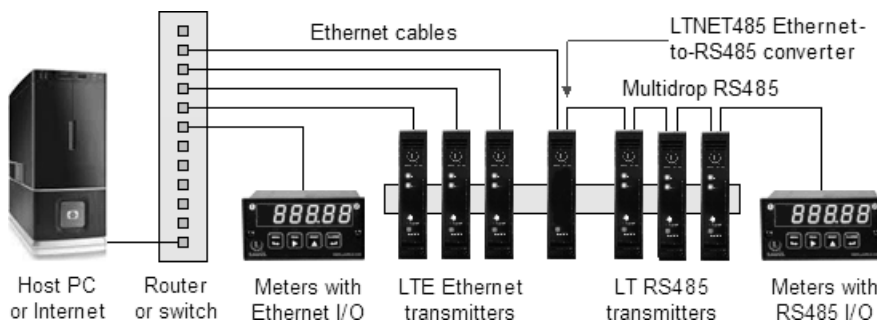
Fast read rate at up to 50 or 60 conversions per second while integrating the signal over a full power line cycle is provided by Concurrent Slope (Pat 5,262,780) analog-to-digital conversion.

High read rate is ideal for peak or valley capture and for real-time computer interface and control.

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.

Standard features of Laureate LTE transmitters include:

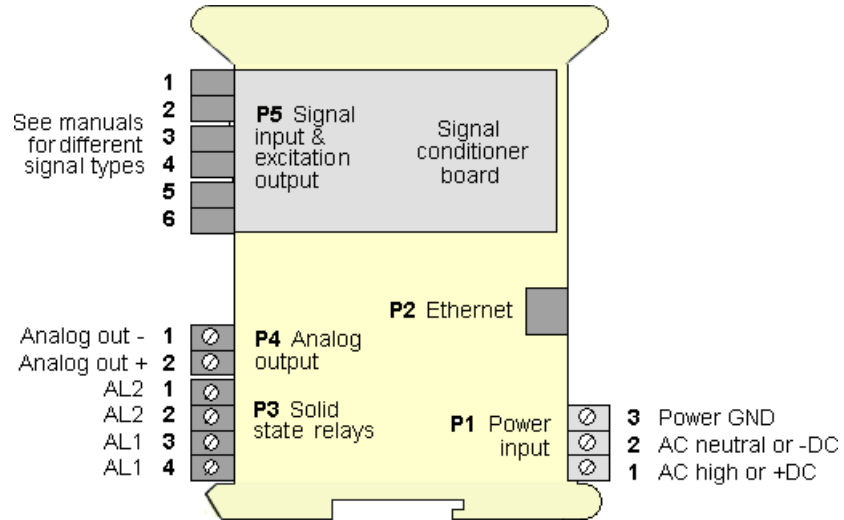
- **Ethernet I/O, isolated.** Supported protocols are Modbus RTU and ASCII (tunneled via Modbus TCP) and Laurel ASCII. The latter is simpler than the Modbus protocol and is recommended when all devices are Laureates. Note that RS232 or RS485 data I/O in lieu of Ethernet is provided by our LT Series transmitters.
- **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.
- **Universal 85-264 Vac power.** Low-voltage 10-48 Vdc or 12-32 Vac power is optional.



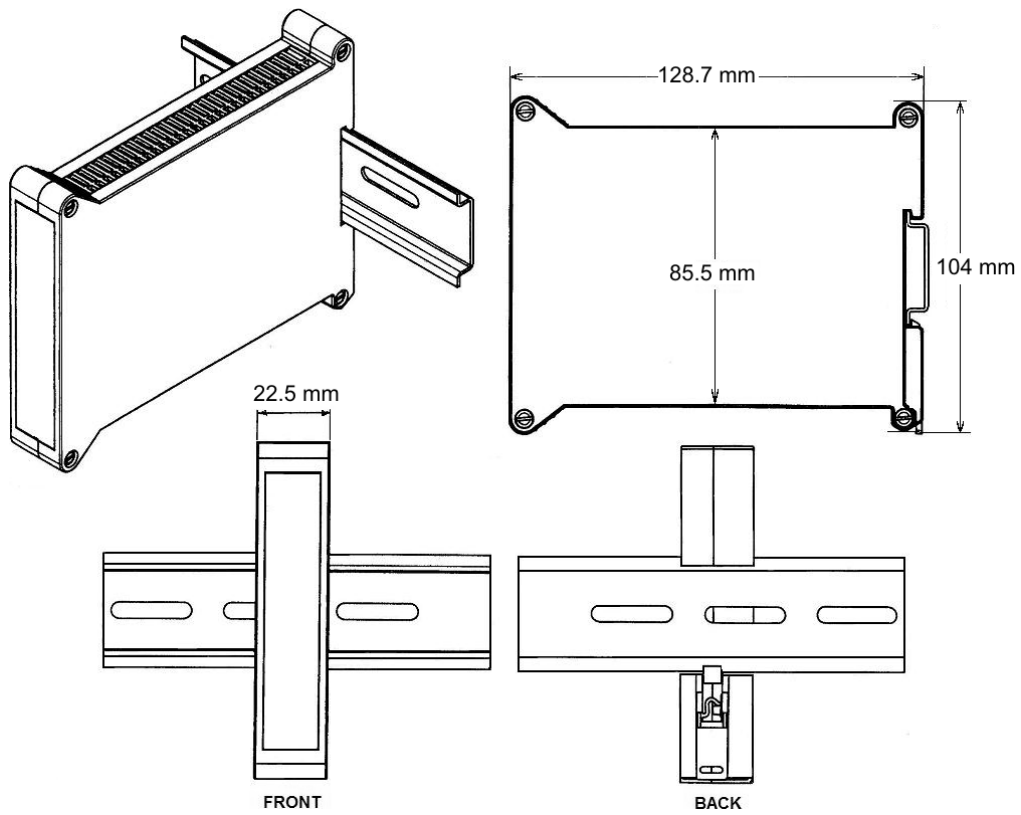
Specifications

| TC Types | Range | Conformity Error |
|---|--|---------------------------------------|
| J | -210°C to +760°C (-347°F to +1400°F) | ±0.09°C (±0.16°F) |
| K | -244°C to +1372°C (-408°F to +2501°F) | ±0.1°C (±0.17°F) |
| T | 0°C to +400°C (32°F to 752°F) -257°C to 0°C (-430°F to +32°F) | ±0.03°C (±0.05°F) ±0.2°C (±0.36°F) |
| E | -240°C to +1000°C (-400°F to +1830°F) | ±0.18°C (±0.32°F) |
| N | -245°C to +1300°C (-410°F to +2370°F) | ±0.10°C (±0.17°F) |
| R | -45°C to +1768°C (-49°F to +3214°F) | ±0.17°C (±0.31°F) |
| S | -46°C to +1768°C (-51°F to +3213°F) | ±0.12°C (±0.22°F) |
| Analog Input | | |
| Calibration | NIST Monograph 125 (IPITS-68) | |
| Input Resistance & Current | 1 GΩ, 100 pA | |
| Max Lead Resistance | 1 kΩ max for rated accuracy | |
| Overall Error at 25°C | ±0.01 of full scale ±2 counts | |
| Span Tempco | ±0.003% of reading/°C | |
| Ref Junction Tempco | ±0.02 deg/deg | |
| Over-Voltage Protection | 125 Vac | |
| NMR at 50/60 Hz | 80 dB plus selectable filter from 80 ms to 9.6 s time constant | |
| CMR, DC-60 Hz | 120 dB with 500Ω imbalance | |
| CMV, DC-60 Hz | 250 Vac from power and earth grounds | |
| Open Sensor Indication | 0 mA or > 20 mA output, selectable | |
| Analog Output (standard) | | |
| Output Levels | 4-20 mA, 0-20 mA, 0-10 Vdc (jumper selectable) | |
| Compliance, 4-20 mA | 10V (0-500Ω load) | |
| Compliance, 0-10V | 2 mA (5 kΩ load or higher) | |
| Output Resolution | 16 bits (65,536 steps) | |
| Output Error | ±0.02% of output span ± overall input error | |
| Output Isolation | 250V rms working, 2.3 kV rms per 1 minute test | |
| Step response time | 50 ms | |
| Dual Relay Output (standard) | | |
| Relay Type | Two solid state relays, SPST, normally open, Form A | |
| Load Rating | 120 mA at 140 Vac or 180 Vdc | |
| Serial Communications (standard) | | |
| 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 | |
| Power Input | | |
| 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 | |
| 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. | |

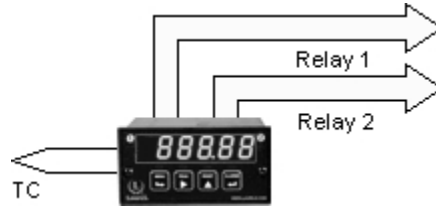
Pinout



Mechanical



Operation as a Fast ON/OFF Controller or Supervisory Monitor



With the optional dual solid state relay output option, which has a typical response time of only 17 ms, Laureate temperature meters and transmitters can serve as extremely fast and accurate ON/OFF controllers for closed-loop temperature control. They can also serve as supervisory process monitors and provide alarms or shutoffs when processes exceed normal limits.

Multiple setpoint operating modes are individually selectable for each relay. Relay duty cycles and chatter can be minimized with programmable hysteresis and time delays. A band deviation operating mode can be selected for each relay, where an alarm is generated whenever the reading is a selected number of counts above or below the setpoint. The relay modes are non-latching.

Ordering Guide

Create a model a model number in this format: **LTE20JC**

| | |
|---------------------------|---|
| Transmitter Type | LTE Laureate 4-20 mA & Ethernet Transmitter |
| Main Board | 2 Standard Main Board |
| Power | 0 Isolated 85-264 Vac or 90-300 Vdc 1 Isolated 12-32 Vac or 10-48 Vdc |
| Thermocouple Input | <p>JC Thermocouple Type J, -210°C to 760°C JF Thermocouple Type J, -347°F to 1400°F KC Thermocouple Type K, -347°C to 1372°C KF Thermocouple Type K, -408°F to 2501°F TC Thermocouple Type T, -257°C to 400°C TF Thermocouple Type T, -430°F to 752°F EC Thermocouple Type E, -240°C to 1000°C EF Thermocouple Type E, -400°F to 1830°F NC Thermocouple Type N, -240°C to 1000°C NF Thermocouple Type N, -410°F to 2370°F SC Thermocouple Type S, -46°C to 1768°C SF Thermocouple Type S, -51°F to 3214°F RC Thermocouple Type R, -45°C to 1768°C RF Thermocouple Type R, -49°F to 3213°F</p> <p>Note: The same signal conditioner board can be user configured for all thermocouple types listed and °C or °F.</p> |