



Features



- Five precalibrated resistance ranges from 20.000 ohm to 200.00 kohm
- 2.0000 Mohm resistance range with factory modification
- 1 mohm resolution on 20 ohm scale
- 2, 3 or 4-wire connection with lead resistance compensation
- Highly accurate and repeatable
- Up to 60 conversions per second
- Peak or valley display
- Universal AC power, 85-264 Vac
- 1/8 DIN case sealed to NEMA-4X from front panel
- Optional serial I/O: Ethernet, USB, RS232, RS485, Ethernet-to-RS485 converter
- Optional relay output: dual or quad relays, contact or solid state
- Optional isolated analog output: 4-20 mA, 0-20 mA, 0-10V, -10 to +10V
- Optional low voltage power: 10-48 Vdc or 12-32 Vac



Description

The **Laureate Ohmmeter** is ideal for high-speed, high-accuracy resistance measurements in a production environment, such as contact resistance measurements. It is factory calibrated for five jumper selectable resistance ranges from 20 ohm to 200 kohm. Accuracy is an exceptional $\pm 0.01\%$ of full scale ± 2 counts. Resolution is one part in 20,000. In the 20-ohm range, resolution is 1 milliohm, making the meter suitable for contact resistance and conductance measurements. An additional 2 Mohm range is available with a factory modification.

Meter connections can be via 2, 3 or 4 wires. With 4-wire hookup, 2 wires are used for excitation and two separate wires are used to sense the voltage across the resistance to be measured, thereby eliminating any lead resistance effects. With 3-wire hookup, the meter senses the combined voltage drop across the resistance to be measured plus two excitation leads. It also senses the voltage drop across one excitation lead, and then subtracts twice this voltage from the combined total. This technique effectively subtracts lead resistance if the excitation leads are the same.

All resistance ranges are digitally calibrated at the factory, with calibration factors stored in EEPROM on the signal conditioner

board. This allows ranges and signal conditioner boards to be changed in the field without recalibrating the meter. If desired, the meter can easily be calibrated using external standards plus scale and offset in software.

Multiple relay operating modes are selectable in software. One of these is band deviation setpoint operation, where a deviation limit (such as 50 counts) is set up around both sides of the setpoint. The relay closes (or opens) when the reading falls within the deviation band, and opens (or closes) when the reading falls outside of this band. This mode sets up a passband around the setpoint and is often used for component testing.

Designed for system use. Optional plug-in boards include Ethernet and other serial communication boards, dual or quad relay boards, and an isolated analog output board. Laureates may be powered from 85-264 Vac or optionally from 12-32 Vac or 10-48 Vdc. The display is available with red or green LEDs. The 1/8 DIN case meets NEMA 4X (IP65) specifications from the front when panel mounted. Any setup functions and front panel keys can be locked out for simplified usage and security. All power and signal connections are via UL / VDE / CSA rated screw clamp plugs.

Specifications

Range	Resolution	Accuracy	Excitation Current
0-20.000 ohm *	1 mohm	$\pm 0.01\%$ of range ± 2 counts	5 mA
0-200.00 ohm *	10 mohm		500 μ A
0-2000.0 ohm *	100 mohm		50 μ A
0-20000 ohm*	1 ohm		5 μ A
0-200.00 kohm *	10 ohm		500 nA
0-2.0000 Mohm **	100 ohm		500 nA

* Jumper-selectable, precalibrated range.

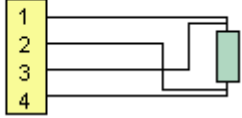
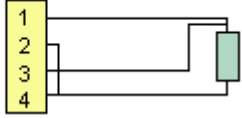
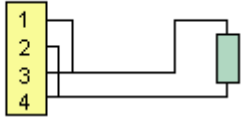
** Factory-set fixed range



Display	
Readout Color Indicators	5 digits, 7-segment, 14.2 mm (.56") Red or green LED 2 red LED lamps
Accuracy	
Accuracy at 25°C Span tempco	±0.01% of range ± 2 counts ±0.003% of reading/°C
Electrical	
Connection Max applied voltage Overvoltage protection Open sensor indication	2, 3 or 4-wire 100 mV 125 Vac Flashes full-scale
A-to-D Conversion	
Technique A-to-D Rate Output Update Display Update	Concurrent Slope (Pat 5,262,780) 60/s at 60 Hz, 50/s at 50 Hz 56/s at 60 Hz, 47/s at 50 Hz 3.5/s at 60 Hz, 3/s at 50 Hz
Power	
Voltage, standard Voltage, optional Frequency Power Isolation	85-264 Vac or 90-300 Vdc (DC operation not UL approved) 12-32 Vac or 10-48 Vdc DC or 47-63 Hz 250V rms working, 2.3 kV rms per 1 min test
Analog Output (optional)	
Output Levels Current compliance Voltage compliance Scaling Resolution Isolation	4-20 mA, 0-20 mA, 0-10V, -10 to +10V (jumper selectable) 2 mA at 10V (> 5 kOhm load) 12V at 20 mA (< 600 Ohm load) Zero and full scale adjustable from -99999 to +99999 16 bits (0.0015% of full scale) 250V rms working, 2.3 kV rms per 1 min test
Relay Outputs (optional)	
Relay Types Current Ratings Output common Isolation	2 Form C contact relays or 4 Form A contact relays (NO) 2 or 4 Form A, AC/DC solid state relays (NO) 8A at 250 Vac or 24 Vdc for contact relays 120 mA at 140 Vac or 180 Vdc for solid state relays Isolated commons for dual relays or each pair of quad relays 250V rms working, 2.3 kV rms per 1 min test
Serial Data I/O (optional)	
Board Selections Protocols Data Rates Digital Addresses Isolation	Ethernet, Ethernet-to-RS485 server, USB, USB-to-RS485 server, RS485 (dual RJ11), RS485 Modbus (dual RJ45), RS232. Modbus RTU, Modbus ASCII, Laurel ASCII protocol 300 to 19200 baud 247 (Modbus), 31 (Laurel ASCII), 250V rms working, 2.3 kV rms per 1 min test
Environmental	
Operating Temp. Storage Temp. Relative Humidity Protection	0°C to 55°C -40°C to 85°C 95% at 40°C, non-condensing NEMA-4X (IP-65) when panel mounted

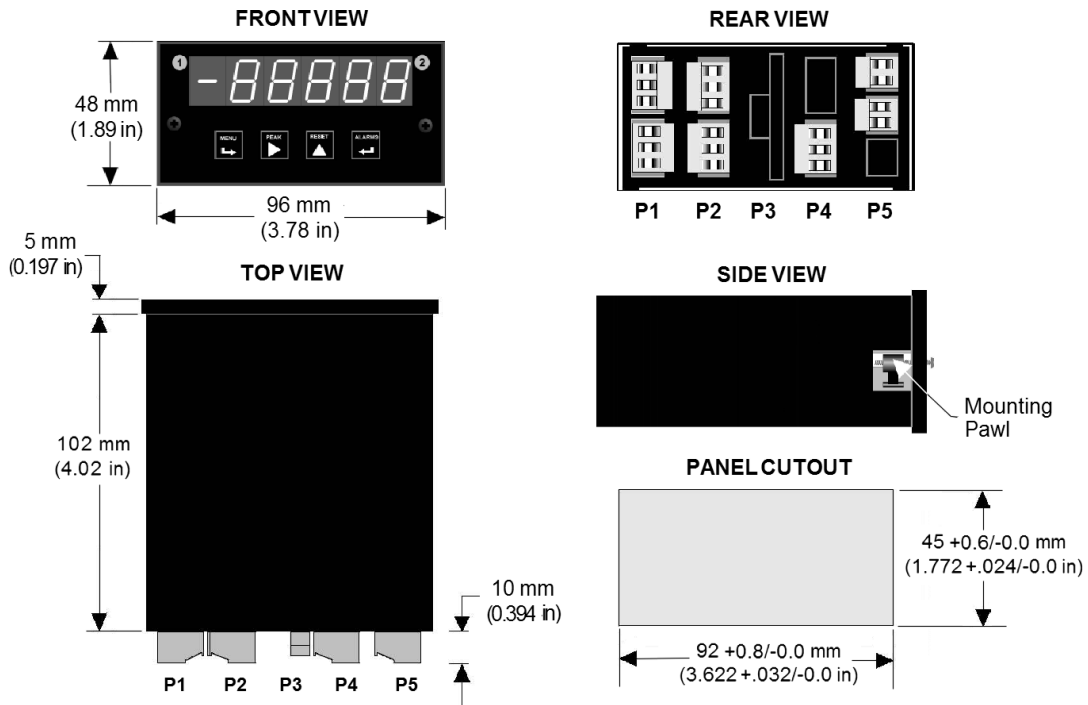


Resistance Measurement with Excitation & Lead Compensation

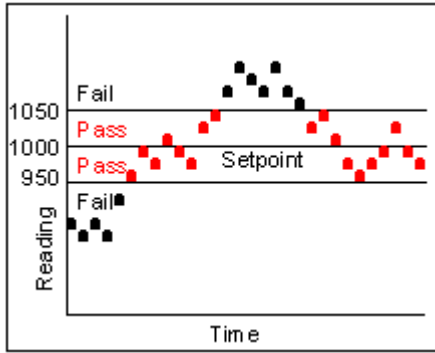
<p>4-wire Resistance</p> <p>-Excitation 1 +Excitation 2 -Signal input 3 +Signal input 4</p> 	<p>In 4-wire hookup, different pairs of leads are used to apply the excitation current and sense the voltage drop across the unknown resistance, so that the IR drop across the excitation leads is not a factor.</p>
<p>3-wire Resistance</p> <p>-Excitation 1 +Excitation 2 -Signal input 3 +Signal input 4</p> 	<p>In 3-wire hookup, the meter senses the combined voltage drop across the unknown resistance plus two excitation leads. It also senses the voltage drop across one excitation lead, and then subtracts twice this voltage from the combined total. This technique effectively subtracts all lead resistance and compensates for ambient temperature changes if the two excitation leads are identical.</p>
<p>2-wire Resistance</p> <p>-Excitation 1 +Excitation 2 -Signal input 3 +Signal input 4</p> 	<p>In 2-wire hookup, the meter senses the combined voltage drop across the unknown resistance and both lead wires. The voltage drop across the lead wires can be measured by shorting out the resistance during meter setup, and this voltage is then automatically subtracted from the combined total. However, changing resistance of the lead wires due to ambient temperature changes will not be compensated.</p>

Ohmmeter hookup can be via 2, 3 or 4 wires to the J5 connector. The meter applies a fixed excitation current for each resistance range.

Mechanical



Application Example: Deviation Limit for Pass/Fail Testing



A **deviation limit** (50 mohm in this example) is set up around both sides of a setpoint. The relay closes (or opens) when the reading falls within the deviation band, and opens (or closes) when the reading falls outside of this band. This mode sets up a passband around the setpoint and can be used for contact resistance testing.

Ordering Guide

Create a model a model number in this format: **L1110P385C, IPC**

DPM Type	L Laureate Digital Panel Meter
Main Board	1 Standard Main Board, Green LEDs 2 Standard Main Board, Red LEDs
Power (isolated)	0 85-264 Vac 1 12-32 Vac or 10-48 Vdc
Relay Output (isolated)	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 (isolated)	0 None 1 Isolated 4-20 mA, 0-20 mA, 0-10 V, -10 to +10V
Digital Interface (isolated)	0 None 1 RS232 2 RS485 (dual RJ11 connectors) 4 RS485 Modbus (dual RJ45 connectors) 5 USB 6 USB-to-RS485 device server 7 Ethernet 8 Ethernet-to-RS485 device server
Resistance Input (isolated)	R1 0-20 ohms R2 0-200 ohms R3 0-2 kohms R4 0-20 kohms R5 0-200 kohms
Add-on Options	BL Blank Lens without Button Pads CBL01 RJ11-to-DB9 Cable CBL02 USB-to-DB9 Adapter CBL05 USB Cable, A to B IPC Splash-proof Cover BOX1 NEMA-4 Enclosure BOX2 NEMA-4 Enclosure plus IPC