

Products by Type

Digital Panel Meters
Electronic Counters
Programmable Timers
Transmitters, 4-20 mA
Transmitters, Modbus
Large Digit Displays
Bar Graph Displays
Meter/Counter Options
Meter Accessories
Data Logging Systems
Serial-to-Analog
4-20 mA Loop Splitters

Laureate™ Load Cell & Microvolt Digital Panel Meter

20 mV - 500 mV full-scale ranges, 4- or 6-wire connection



Meters by Application

DC Volts & Amps
AC Power Monitoring
Process Meters
Flow Rate Total Batch
Weight, Load, Stress
Frequency, Rate, RPM
Temperature Control
Resistance in Ohms
Pulse & Analog Totals
Timing Products
Position Length Speed
Mixing, Ratio, Sum
Remote Serial Display

Standard Features

- 20, 50, 100, 250 & 500 mV ranges
- 5-digit resolution with span from 0 to ±99,999
- Zero from -99,999 to +99,999
- Selectable fixed right-hand zero with rounding
- Isolated 10 Vdc supply to power up to four 350-ohm load cells in parallel
- 4- or 6-wire hookup to avoid lead resistance effects
- Ratiometric operation to cancel variations in excitation supply
- Up to 60 conversions per second
- Peak or valley display
- Auto-tare with tare value stored in memory
- External controls for reset, meter hold, decimal points, and tare
- Universal AC power, 85-264 Vac
- NEMA 4X, 1/8 DIN case
- Certified to UL 61010C-1 (UL mark), EN 61010-1 (CE mark), and RoHS).

Options:

- Low voltage power: 10-48 Vdc or 12-32 Vac
- 2 or 4 output relays, electromechanical or solid state
- Analog output: Isolated, 4-20 mA, 0-20 mA, 0-10V, -10 to +10V
- Serial communications: RS232, RS485, Modbus RS485, USB, USB-to-RS485 converter

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Description



The Laureate™ load cell & microvolt meter is a high-sensitivity monitor and controller for use with load cells, strain gauges and microvolt input signals where high accuracy and stability are required.

- **DC microvoltmeter operation** provides sensitivity down to 20 mV full scale with 1 μ V resolution. A display span of 99,999 counts with sensitivity of 0.2 μ V per count can be obtained by applying a digital multiplier of five. A moving average digital filter assures quiet readings in electrically noisy environments.
- **Load cell operation** allows six-wire hookup and scaling for direct readout in engineering units, such as pounds, kilograms or PSI. Scaling can be via front panel pushbuttons or a computer. Zero may be set from -99,999 to +99,999. Range may be scaled from 0 to \pm 99,999. Digital scaling and calibration eliminate drift caused by potentiometers in non-microcomputer based meters.

Meter accuracy is 0.01% of full scale \pm 2 counts with an ideal load cell. Custom curve linearization, which is available with the optional Extended main board, can extend the working range of real-world load cells. Custom curve linearization also allows high accuracy to be achieved with lower cost, less linear load cells.

An built-in isolated 10 Vdc excitation supply can provide up to 120 mA of current at 10V to power four 350-ohm load cells in parallel. The meter operates in a ratiometric mode to eliminate errors due to supply variations. When excitation sense inputs are used in 6-wire connection, the meter compensates for variation in resistance of the transducer leads, thereby allowing long cable runs.

High read rates at up to 60 or 50 conversions per second while integrating the signal over a full power cycle are provided by Concurrent Slope (US Pat 5,262,780) analog-to-digital conversion. High read rates are ideal for peak or valley capture, real-time computer interface, and control. Peak and valley values are automatically captured. These may be displayed via a front panel pushbutton command or control signal at the rear connector, or be transmitted as serial data.

Digital filtering is selectable for electrically noisy environments, including a batch averaging filter and an adaptive moving average filter which provides a choice of 8 time constants from 80 ms to 9.6 s. When a significant change in signal level occurs, that filter adapts by briefly switching to the shortest time to follow the change, then reverts back to the selected time constant. In a selectable Auto filter mode, the filter time constant is self-selected based on detected signal noise.



Easy scale and offset are provided by Laureate DC, process and load cell meters by either of two selectable methods: With the coordinate reading method, the meter reads the high and low signal values, and the user enters the desired high and low reading values. The meter then calculates the span multiplier and offset. This method is ideal if an external calibration reference is available. With the manual coordinate method, the user enters the high and low input values in Volts plus the desired high and low reading values. This method is suitable if no external calibration reference is available.

Auto-tare is standard for weighing applications to subtract the weight of an empty container and may be controlled by an external pushbutton contact closure or a logic signal. Additional capabilities for weighing applications are provided by the Laureate weight & scale meter.

Designed for flexibility. Optional plug-in boards for communications and control include an analog output board, dual or quad relay boards, and serial communications boards. 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.

Specifications

DC Microvoltmeter Inputs

Input Range mV	Resolution	Input Resistance	Error at 25°C
±20.000	1 µV	1 GOhm	0.01% FS ± 2 counts
±50.000	1 µV		
±100.00	10 µV		
±250.00	10 µV		
±500.00	10 µV		

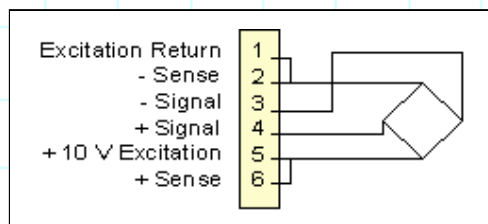
Load Cell Inputs

Full-Scale Input, mV	Zero Adjust	Span Adjust	Input Resistance	Error at 25°C
±20.000	-99,999 to +99,999	0 to ±99,999	1 GOhm	0.01% FS ± 2 counts
±50.000				
±100.00				
±250.00				
±500.00				

DC Microvolts & Load Cell

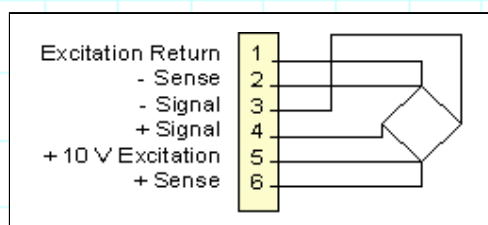
Accuracy	
Error at 25°C	0.01% FS ± 2 counts
Span Tempco	0.0015% of reading/°C
Zero Tempco	0.1 µV/°C
Load Cell Linearization	Provided by Extended meter version
Noise Rejection	
CMR, DC to 60 Hz	130 dB
NMR at 50/60 Hz	90 dB with min filtering
A-to-D Conversion	
Technique	Concurrent Slope™ (Pat 5,262,780)
A-to-D Rate	60/s at 60 Hz, 50/s at 50 Hz
Output Update	56/s at 60 Hz, 47/s at 50 Hz
Display Update	3.5/s at 60 Hz, 3/s at 50 Hz
Display	
Readout	5 LED digits, 7-segment, 14.2 mm (.56"), red or green.
Range	-99999 to 99999 or -99990 to 99990 (count by 10)
Indicators	Minus sign, 2 red LED lamps
Power	
Voltage, standard	85-264 Vac or 90-300 Vdc (DC operation not UL approved)
Voltage, optional	12-32 Vac or 10-48 Vdc

Frequency	DC or 47-63 Hz
Power Isolation	250V rms working, 2.3 kV rms per 1 min test
Excitation Output (standard)	
5 Vdc	5 Vdc \pm 5%, 100 mA
10 Vdc	10 Vdc \pm 5%, 120 mA
24 Vdc	24 Vdc \pm 5%, 50 mA
Output Isolation	50 Vdc to meter ground
Analog Output (optional)	
Output Levels	4-20 mA, 0-20 mA, 0-10V, -10 to +10V (jumper selectable)
Current compliance	2 mA at 10V (\geq 5 kOhm load)
Voltage compliance	12V at 20 mA (\leq 600 Ohm load)
Scaling	Zero and full scale adjustable from -99999 to +99999
Resolution	16 bits (0.0015% of full scale)
Isolation	250V rms working, 2.3 kV rms per 1 min test
Relay Outputs (optional)	
Relay Types	2 Form C contact relays or 4 Form A contact relays (NO) 2 or 4 Form A, AC/DC solid state relays (NO)
Current Ratings	8A at 250 Vac or 24 Vdc for contact relays 130 mA at 140 Vac or 180 Vdc for solid state relays
Output common Isolation	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	RS232, RS485, Modbus RS485, USB, USB-to-RS485 converter
Protocols	Modbus RTU, Modbus ASCII, simpler Laurel ASCII
Data Rates	300 to 19200 bps
Digital Addresses	247 (Modbus), 31 (Laurel ASCII),
Isolation	250V rms working, 2.3 kV rms per 1 min test
Signal Connections	
Environmental	
Operating Temp.	0°C to 60°C
Storage Temp.	-40°C to 85°C
Relative Humidity	95% at 40°C, non-condensing
Protection	NEMA-4X (IP-65) when panel mounted

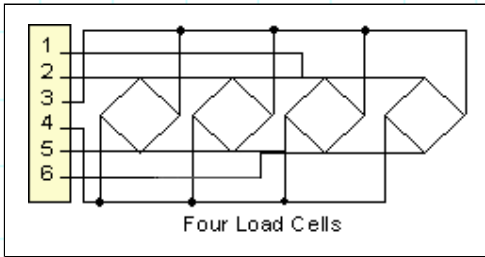


Load Cell Meter Connections

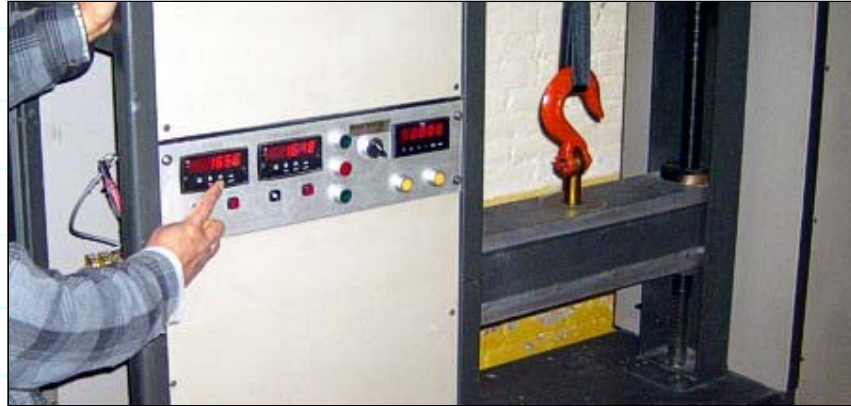
In 4-wire connection, the excitation and sense lines are tied together. The meter can make ratiometric corrections for supply voltage variations, but not compensate for variations in lead resistance. This connection is often used with short cable runs.



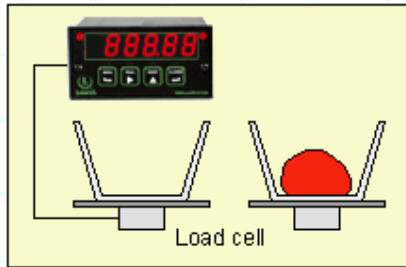
In 6-wire connection, the sense lines are separate from the excitation lines, thereby eliminating effects due to variations in lead resistance. This allows long cable runs in outdoor environments with temperature extremes.



For large scales, up to four 350 ohm load cells can be powered by a single Laureate, whose excitation output is rated 120 mA at 10 V. The excitation and sense points of the four bridges are connected in parallel through a summing box.

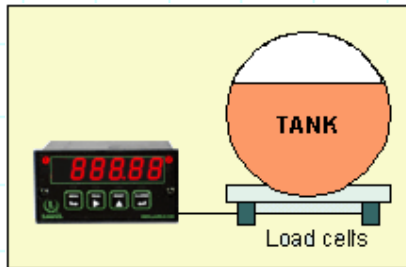


Sample Load Cell Meter Applications



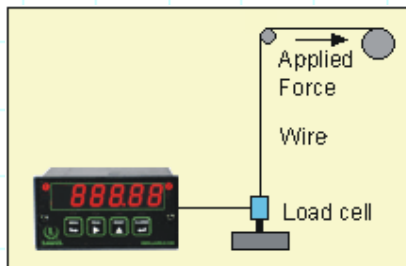
Auto-Tare

To read the net weight of an object, the empty container is first weighed, and an external button is pushed to zero out the display. The meter will then read net weight when an object is added to the empty container. The tare value is stored in memory for subsequent readings.



Determining Volume Using Load Cells

An easy way to determine volume of an irregularly shaped tank with no need for linearizing is to weigh the tank using load cells. The meter will automatically tare out the weight of the empty tank and then scale the load cell signals to units of volume, such as gallons.



Peak Capture for Tensile Strength of Wire

Peak readings are automatically captured at rates up to 60 per second, while the display updates at a legible 3.5 per second. The peak reading can be recalled at the push of a button or be always displayed. It can also be transmitted to a computer via RS-232 or RS-485.

Ordering Guide

Laureate™ Load Cell & Microvolt Panel Meters

Select the buttons to build a model number in this format: **L20000WM, IPC**

		Quantity	1
DPM Type	<input checked="" type="radio"/> L Laureate Digital Panel Meter		\$220
Main Board	<input type="radio"/> 1 Standard Main Board, Green LEDs		NC
	<input type="radio"/> 2 Standard Main Board, Red LEDs		NC
	<input type="radio"/> 3 Extended Main Board, Green LEDs		\$40
	<input type="radio"/> 4 Extended Main Board, Red LEDs		\$40
	Note: Extended capability is only required for custom curve linearization or for display of time rate of change, such as flow rate from changing tank weight.		
Power	<input type="radio"/> 0 Isolated 85-264 Vac		NC
	<input type="radio"/> 1 Isolated 12-32 Vac or 10-48 Vdc		\$30
Relay Output	<input type="radio"/> 0 None		NC
	<input type="radio"/> 1 Two 8A Contact Relays		\$80
	<input type="radio"/> 2 Two Solid State Relays		\$55
	<input type="radio"/> 3 Four Contact Relays		\$100
	<input type="radio"/> 4 Four Solid State Relays		\$75
Analog Output	<input type="radio"/> 0 None		NC
	<input type="radio"/> 1 Isolated 4-20 mA, 0-20 mA, 0-10 V, -10 to +10V		\$90
Digital Interface	<input type="radio"/> 0 None		NC
	<input type="radio"/> 1 Isolated RS232		\$60
	<input type="radio"/> 2 Isolated RS485		\$80
	<input type="radio"/> 4 Isolated RS485 Modbus		\$90
	<input type="radio"/> 5 USB		\$60
	<input type="radio"/> 6 USB-to-RS485 converter		\$100
Signal Input	Load Cells (6-wire ratio)		
	<input type="radio"/> WM Field Scalable. Default scaling is 0-20 mV = 0-100.00		\$55
	<input type="radio"/> WM1 Custom Scaling. In the write-in field of your order, specify min input, min reading; max input, max reading. Full-scale input is 20-500 mV. Excitation is 10 V for up to four 350-ohm load cells.		\$55
Add-on Options	<input type="checkbox"/> BL Blank Lens without Button Pads		NC
	<input type="checkbox"/> CBL01 RJ11-to-DB9 Cable		\$19
	<input type="checkbox"/> CBL02 USB-to-DB9 Adapter		\$39
	<input type="checkbox"/> CBL05 USB Cable, A to B		\$15
	<input type="checkbox"/> IPC Splash-proof Cover		\$40
	<input type="checkbox"/> BOX1 NEMA-4 Enclosure		\$140
	<input type="checkbox"/> BOX2 NEMA-4 Enclosure plus IPC		\$180



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