

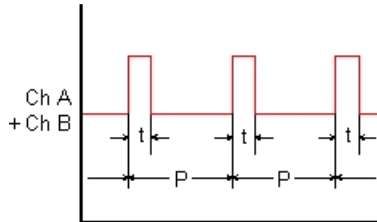


Features

- Measures ON or OFF period as a percentage of total period
- Resolution of 1%, 0.1% or 0.01%.
- Trigger on positive or negative pulse edges.
- Frequency from 0.005 Hz to 10 kHz
- 6-digit red or green LED display
- Universal AC power Input, 85-264 Vac
- Isolated 5, 10 or 24 Vdc excitation output
- NEMA 4X, 1/8 DIN case
- Optional serial I/O: Ethernet, USB, RS232, RS485, Ethernet-to-RS485 converter
- Optional relay outputs: 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



Duty cycle is a measure of ON or OFF period as a percentage of total period. Duty cycle is determined by averaging an integral number of periods over a gate time which is selectable from 10 ms to 199.99 s. The same signal is applied to Channels A and B. The meter divides the average pulse width by the period between pulses and expresses this ratio in percent. A resolution of 1%, 0.1% or 0.01% is selectable. By selecting leading or falling pulse edges, the ON or OFF duty cycle can be displayed.

The Laureate duty cycle meter uses the FR dual-channel signal conditioner board and Extended counter main board. For time intervals longer than 199.99 s, duty cycle can be measured by using the A and B channels to totalize AC line cycles and having the counter display the ratio of the two totals scaled in percent.

Duty cycle measurement is used to monitor modulated proportional control systems and pulse-modulated systems, such as radars, lasers or packet radio.

The Laureate dual-channel signal conditioner accepts inputs from proximity switches with a PNP or NPN output, TTL or CMOS logic, magnetic pickups, contact closures, and AC signals from 12 mV to 250 Vac. Jumper selections provide optimum operation for different sensor types and noise conditions. A built-in isolated 5, 10, or 24 Vdc excitation supply can power proximity switches and other sensors.

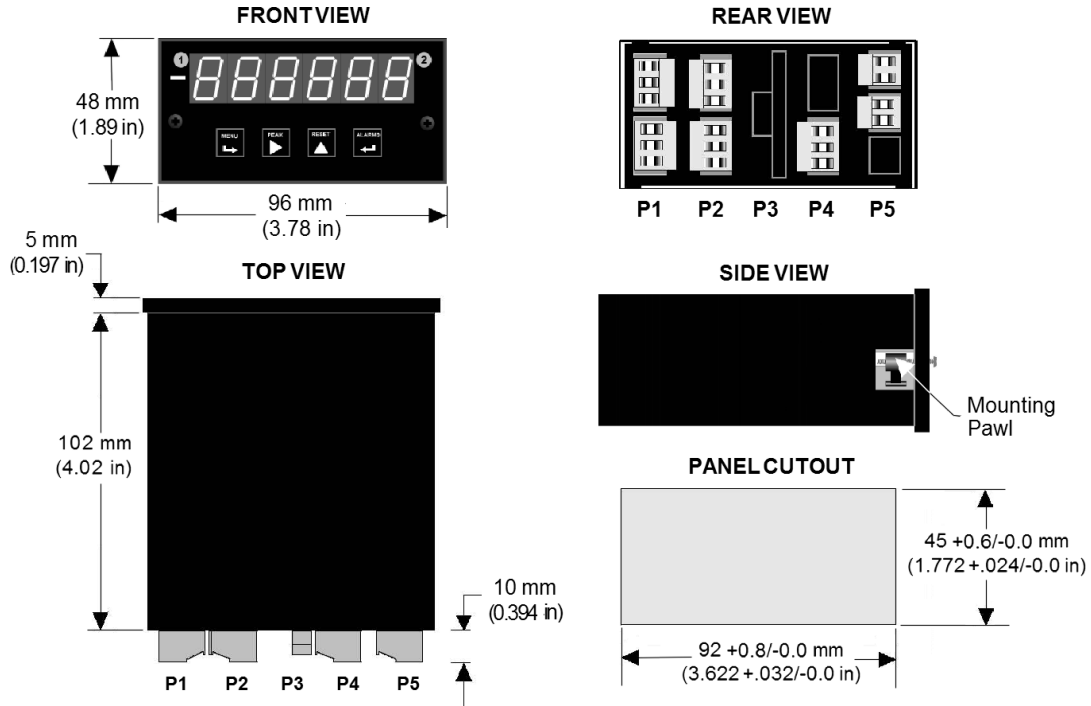
Designed for system use. Optional plug-in boards include Ethernet and other serial communication boards, dual or quad relay boards, and an isolated analog output board. Laureates may be powered from 85-264 Vac or optionally from 12-32 Vac or 10-48 Vdc. The display is available with red or green LEDs. 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. A built-in isolated 5, 10, or 24 Vdc excitation supply can power transducers and eliminate the need for an external power supply. All power and signal connections are via UL / VDE / CSA rated screw clamp plugs.

Specifications

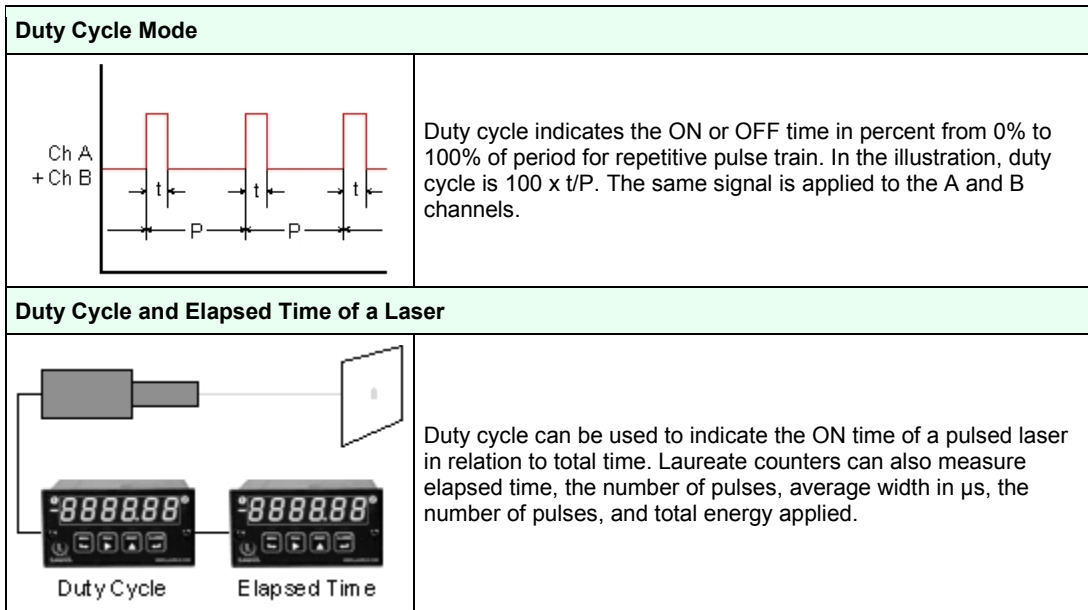
Duty Cycle Mode	
Item Displayed	ON or OFF duty cycle of periodic pulse waveshape
Display Units	1%, 0.1%, 0.01%
Frequency Range	0.005 Hz to 10 kHz
Accuracy	0.01%, 0.005 Hz to 500 Hz, 0.1% at 5 kHz, 1% at 10 kHz
Maximum Timing Interval	199.99 s
Display	
Readout	6 LED digits, 7-segment, 14.2 mm (.56"), red or green
Range	-999999 to +999999
Indicators	Four LED lamps

Inputs	
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)
Update Rate	
Conversion Interval	Gate time + 30 ms + 0-2 signal periods
Gate Time	Selectable 10 ms to 199.99 s
Time Before Zero Output	Selectable 10 ms to 199.99 s
Power	
Voltage, standard	85-264 Vac or 90-300 Vdc (DC operation not ETL certified)
Voltage, optional	12-32 Vac or 10-48 Vdc
Power frequency	DC or 47-63 Hz
Power consumption	1.2W @ 120 Vac, 1.5W @ 240 Vac, 1.3W @ 10 Vdc, 1.4W @ 20 Vdc,
(typical, base meter)	1.55W @ 30 Vdc, 1.8W @ 40 Vdc, 2.15W @ 48 Vdc
Power isolation	250V rms working, 2.3 kV rms per 1 min test
Analog Output (optional)	
Output Levels	4-20 mA, 0-20 mA, 0-10V, -10 to +10V (jumper selectable)
Current compliance	2 mA at 10V (> 5 kΩ load)
Voltage compliance	12V at 20 mA (< 600Ω 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 120 mA at 140 Vac or 180 Vdc for solid state relays
Output common	Isolated commons for dual relays or each pair of quad relays
Isolation	250V rms working, 2.3 kV rms per 1 min test
Serial Data I/O (optional)	
Board Selections	Ethernet, Ethernet-to-RS485 server, USB, USB-to-RS485 server, RS485 (dual RJ11), RS485 Modbus (dual RJ45), RS232
Protocols	Modbus RTU, Modbus ASCII, Laurel ASCII protocol
Data Rates	300 to 19200 baud
Digital Addresses	247 (Modbus), 31 (Laurel ASCII),
Isolation	250V rms working, 2.3 kV rms per 1 min test
Environmental	
Operating Temp.	0°C to 55°C
Storage Temp.	-40°C to 85°C
Relative Humidity	95% at 40°C, non-condensing
Protection	NEMA-4X (IP-65) when panel mounted
Signal Connections	
<pre> 1 ———— Excitation Return 2 ———— Excitation Output 3 ———— B Channel Input 4 ———— Ground 5 ———— A Channel Input 6 ———— Ground </pre>	

Mechanical



Application Examples



Ordering Guide

Create a model a model number in this format: **L7000FR, IPC**

Main Board	L7 Extended Main Board, Green LEDs L8 Extended Main Board, Red LEDs
	Note 1: Use of the Extended Main Board also makes this counter suitable for A-B time interval, stopwatch, frequency, rate, period, square root of rate, up or down total, arithmetic functions, simultaneous rate and total, duty cycle, batching, and custom curve linearization. Note 2: If the meter is to be used for power factor, please so indicate in a note at the time order.
Power	0 Isolated 85-264 Vac 1 Isolated 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 Single isolated 4-20 mA, 0-20 mA, 0-10 V, -10 to +10V 2 Dual isolated 4-20 mA, 0-20 mA, 0-10V
Digital Interface (isolated)	0 None 1 RS-232 2 RS485 (dual RJ11 connectors) 4 RS485 Modbus (dual RJ45 connectors) 5 USB 6 USB-to-RS485 converter 7 Ethernet 8 Ethernet-to-RS485 converter
Input Type	FR Dual-Channel Pulse Input Signal Conditioner
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 Clear front panel cover sealed to NEMA 4X / IP65 BOX1 NEMA-4X wall-mount enclosure BOX2 BOX1 plus IPC