

# Laureate™ Pulse Input Batch Controller

With three relay outputs for automated batch control



## Features

- 6-digit display scalable to  $\pm 999,999$
- Selectable display of batch total, grand total or number of batches, and rate.
- Single 10 A relay for batch total, with settable delay between cycles.
- Two optional additional relays assignable to batch total for prewarn, grand total or number of batches, and rate.
- Count up from 0 to preset or down from preset to 0.
- Frequency input from 0 Hz to 1 MHz.
- Signals from turbine flowmeters, magnetic pickups, NPN or PNP transistors, digital logic, or AC from 12 mV to 250 Vac.
- Selectable "count by" of 10 or 100 with rounding.
- Isolated 5, 10 or 24 Vdc excitation supply to power sensors.
- Choice of isolated plug-in options for control and computer interface:  
[dual relays](#), [4-20 mA & 0-10 V analog output](#), [RS-232/485 I/O](#),  
[parallel BCD output](#), [low voltage AC & DC power](#).
- [NEMA 4X, 1/8 DIN case](#).
- Certified to UL 3101-1, CAN/CSA-C22.2, EN 61010-1 (CE Mark)

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## Description



The Laureate batch controller is a powerful and highly accurate production workhorse in the form of a compact 1/8 DIN panel meter. It can display the current batch total (Item #1), grand total or number of batches (Item #2), and flow rate (Item #3). All displayed values are scaled to engineering units of volume or flow.

A 10 A contact relay serves as the batch relay to control repetitive fill operations. It repeats the batch cycles continually with a programmable delay from 10 ms to 199.99 sec, or based on an external control input. The batch total (Item #1) can be set up to count up from zero to a preset limit, or down from a preset limit to zero. The single-relay board fits in the slot which would otherwise be available for the analog output board.

An optional [dual relay board](#) (10 A contact or 0.12 A AC/DC solid state relays) is normally used. Either relay can be assigned to the batch total (Item #1) to serve as a pre-warn to slow down filling near the setpoint, to the grand total or number of batches (Item #2), or to flow rate (Item #3).

An optional [RS-232 or RS-485 board](#) allows the batch controller to transmit Items #1, #2 and #3, as well as peak for #3 (rate). If required, all four items can be displayed simultaneously by augmenting the batch controller with up to three Laureate remote displays. Each of these can have its own analog output and dual relays for alarm or control.

The batch controller utilizes the Extended counter main board and FR dual channel signal conditioner board to accept a wide range of pulse signals, in particular those from turbine flowmeters. The same signal is applied in parallel to the A and B channels.



## Fast, High Accuracy Measurement

The A and B channels of the FR dual-channel signal conditioner are used independently. Either channel can accept pulse rates from 0.005 Hz to 250 kHz, which exceeds the working range of turbine flow meters.

- **Channel A** is used for totalizing. The measured total is scaled mathematically for control and display in engineering units, such as liters.
- **Channel B** is used for rate. The pulse frequency is determined by timing an integral number of periods over a specified gate time (plus 30 ms and 0-2 periods), and then taking the inverse of period. The inverse period approach allows much greater accuracy and faster update times than conventional rate meters which count signal pulses over a specified time interval. Update times can be as high as 25/sec. Rate in engineering units, such as liters per second, is obtained by multiplying the input by a scale factor.

For either total or rate, displayed values can be up to six digits (999,999) with a selectable decimal point.

## Flowmeter Signal Conditioner

The FR dual-channel signal conditioner accepts pulses from all types of turbine flowmeters and most industrial transducers with a pulse output such as proximity switches with PNP or NPN output, TTL or CMOS logic, magnetic pickup pulses down to 12 mV, as well as AC inputs up 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, and eliminate the need for an external power supply.

## Other Features

The [1/8 DIN case](#) of Laureate meters and counters meets NEMA 4X (IP-65) standards from the front for high pressure wash-down when panel mounted. All power and signal connections are via UL / VDE / CSA rated screw clamp plugs, which are standard.

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## Specifications

Display	
Readout	6 digits, 7-segment, 14.2 mm (.56")
Color	Red or green LED
Range	-999999 to +999999, XXXXEX scientific notation beyond 999999
Indicators	Four LED lamps
Inputs	
Types	Pulses from NPN, PNP transistors, contact closures, magnetic

Signal ground	pickups, AC
Channel A Frequency	Common ground for channels A & B
Channel B Frequency	0 Hz to 1 MHz (totalizing), 0.005 Hz to 1 MHz (rate)
Selectable Hysteresis	0 Hz to 250 kHz (totalizing), 0.005 Hz to 250 kHz (rate)
	-12 mV to +12 mV, +30 mV to +60 mV, -30 mV to -20 m),
	-150 mV to +150 mV, +350 mV to +600 mV, -600 mV to -350
	mV, -1.15V to +1.15V, +1.25V to +2.1V, -2.1V to -1.25V
Rolloff Filter	Selectable: 1 MHz, 30 kHz or 250 Hz
Debounce Time	Selectable: 0, 3, 50 ms

### Rate Conversion

Frequency Technique	Inverse period
Delay between batch cycles	Selectable 10 ms to 199.99 s
Display Update Time	Same as conversion time
Output Update Time	Same as conversion time

### Rate Accuracy

Time Base	Crystal calibrated to $\pm 2$ ppm
Span Tempco	$\pm 1$ ppm/ $^{\circ}$ C (typ)
Long-term Drift	$\pm 5$ ppm/year

### Power

Voltage, std.	85-264 Vac and 90-370 Vdc
Voltage, opt.	8-28 Vac and 9-37 Vdc
Frequency	DC or 49-440 Hz
Power isolation	Safety-rated to 250 Vac, meter ground to earth ground, DC to 60 Hz, 4.2 kVp per High Voltage Test

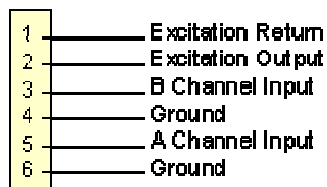
### Excitation Output

5 Vdc	5 Vdc $\pm 5\%$ , 100 mA max
10 Vdc	10 Vdc $\pm 5\%$ , 120 mA max
24 Vdc	24 Vdc $\pm 5\%$ , 50 mA max
Output isolation	50 Vdc to meter ground

### Environmental

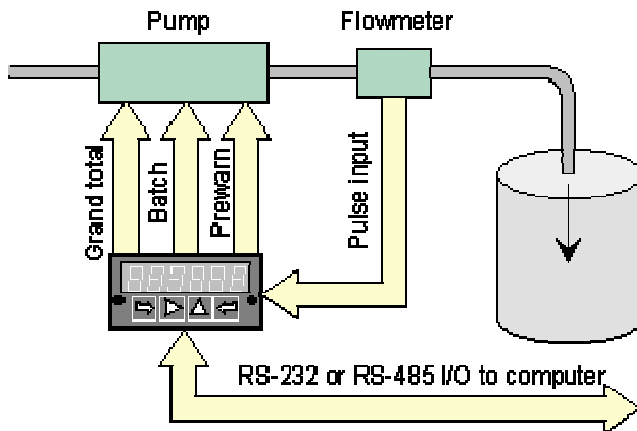
Operating Temperature	0 $^{\circ}$ C to 55 $^{\circ}$ C
Storage Temperature	-40 $^{\circ}$ C to 85 $^{\circ}$ C
Relative Humidity	95% at 40 $^{\circ}$ C, non-condensing
Protection	NEMA-4X (IP-65) when panel mounted

### Electrical Connections



## Typical Applications

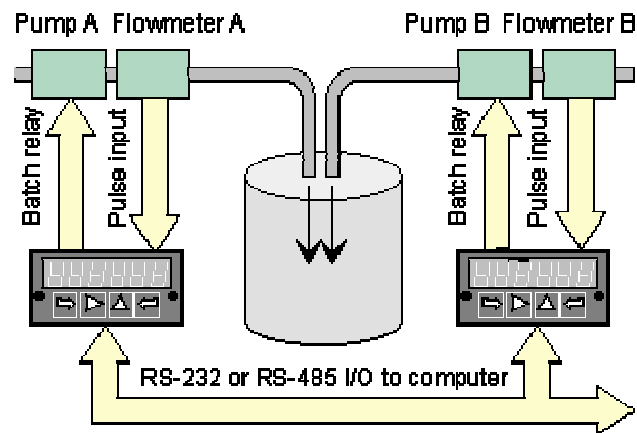
### Drum Filling Application Utilizing Three Relay Outputs



In this drum filling application, the Laureate utilizes its maximum of three relays to control the pump.

The Prewarn relay slows down the pump near the preset to avoid overshoot. The Batch relay stops the pump at the preset. The Grand Total relay stops the filling operation once a predetermined number of drums have been filled.

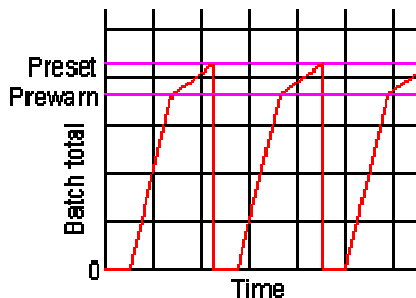
### Controlling the Mixing of Materials



Multiple Laureate batch controllers can be used in combination to control the mixing of materials in the proper ratio. Each feed line is equipped with its own pump, flowmeter, and Laureate.

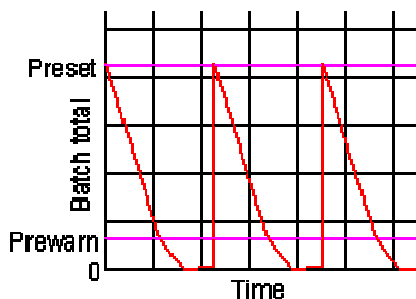
Controller setup and monitoring of the mixing operation are facilitated by optional serial communications. RS-485 allows a single data line to handle multiple controllers.

### Up-Counting Batch Control



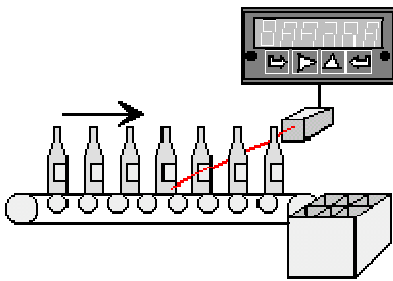
In up-counting batch control, the Laureate counts up from zero to a preset maximum. A prewarn level is available to slow down filling near the preset to avoid overshoot. A time delay can be programmed from the end of each batch to the start of the next batch.

### Down-Counting Batch Control



In down-counting batch control, the Laureate counts down from the preset maximum to zero. A prewarn level is available to slow down filling or emptying near zero. Again, a time delay can be programmed from the end of each batch to the start of the next batch.

### Discrete Filling and Batch Counting



The Laureate batch controller is ideal for discrete manufacturing as well as repetitive fill operations. In this example, the Laureate counts bottles which it then groups into sixpacks. Its Grand Total capability can be used to track bottles or sixpacks.

## Ordering Guide

### Laureate™ Pulse Input & Analog Input Batch Controller

Create a model number in this format: **L80201FR**. This example calls out a Laureate counter with an extended main board with red LEDs, 85-264 Vac & 90-370 Vdc power, three contact relays, no second output, RS-232 serial output, and a dual-channel frequency signal conditioner. Includes plug-in screw terminals.

<b>Main Board</b>	<input type="checkbox"/> <b>L7</b> Extended Main Board, Green LEDs.	\$260
	<input type="checkbox"/> <b>L8</b> Extended Main Board, Red LEDs.	\$260
<b>Power</b>	<input type="checkbox"/> <b>0</b> Isolated 85-264 Vac & 90-370 Vdc	NC
	<input type="checkbox"/> <b>1</b> Isolated 8-28 Vac & 9-37 Vdc.	\$30
<b>Setpoint Output</b>	<input type="checkbox"/> <b>0</b> None.	NC
	<input type="checkbox"/> <b>1</b> Dual 10A Contact Relays.	\$80
	<input type="checkbox"/> <b>2</b> Isolated Dual Solid State Relays.	\$55
<b>Second Output</b>	<input type="checkbox"/> <b>0</b> None.	NC
	<input type="checkbox"/> <b>1</b> Isolated 0-20 mA & 0-10 V.	\$90
	<input type="checkbox"/> <b>2</b> Batch Relay. Only used with pulse-input batching operation.	\$50
<b>Digital Interface</b>	<input type="checkbox"/> <b>0</b> None.	NC
	<input type="checkbox"/> <b>1</b> Isolated RS-232.	\$60
	<input type="checkbox"/> <b>2</b> Isolated RS-485.	\$80
	<input type="checkbox"/> <b>3</b> Isolated Parallel BCD Output.	\$105
<b>Input Type</b>	<b>Pulse Rate or Totalizing</b>	
	<input type="checkbox"/> <b>FR</b> Dual-Channel Frequency.	NC
	<b>Voltage-to-Frequency Converter</b>	
	<input type="checkbox"/> <b>VF1</b> V-to-F Converter, 4-20 mA.	NC
	<input type="checkbox"/> <b>VF2</b> V-to-F Converter, 0-1 mA.	NC
	<input type="checkbox"/> <b>VF3</b> V-to-F Converter, 0-10 V.	\$35
	<input type="checkbox"/> <b>VF4</b> V-to-F Converter, Special Range.	
In the write-in field of your order, specify min input, min reading; max input, max reading. Component changes by the factory may be required.		

<b>DPM Type</b>	<input checked="" type="checkbox"/> <b>L</b> Digital Panel Meter.		\$210
<b>Add-on Options</b>	<input checked="" type="checkbox"/> <b>EB</b> Extra Bright Red LED Display.	<input type="checkbox"/> Unselected.	\$30
	<input checked="" type="checkbox"/> <b>BL</b> Blank Lens without Button Pads.	<input type="checkbox"/> Unselected.	NC