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

Meters by Application

DC Volts & Amps
AC Power Monitoring
Process Meters
Flow Rate Total Batch
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Frequency, Rate, RPM
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Pulse Input or Analog Input Batch Controller

Automatic batch control for repetitive liquid fill operations

c UL US LISTED
RoHS
Made in California

Standard Features

- **Provides automatic control for repetitive liquid fill operations**
- **Accepts turbine flow meter pulse signals from 0 Hz to 1 MHz**
- **Accepts 4-20 mA, 0-1 mA or 0-10V analog flow meter signals**
- **6-digit display scalable to ±999,999**
- **Selectable display of batch total, grand total, number of batches, or flow rate**
- **Counts up from 0 to preset or down from preset to 0**
- **Dual 8A relays for control with settable delay between cycles**
- **Isolated 5, 10 or 24 Vdc excitation supply**
- **Universal AC power, 85-264 Vac**
- **External controls for reset, meter hold and decimal points**
- **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**
- **1 or 2 analog outputs: Isolated, 4-20 mA, 0-20 mA, 0-10V, -10 to +10V**
- **Serial communications: RS232, RS485, Modbus RS485, USB, USB-to-RS485 converter**

Description

The Laureate batch controller is a low cost, powerful and highly accurate batching controller for repetitive fill operations. It can use the Laureate FR dual channel pulse input signal conditioner for use with turbine flow meters, or the Laureate V-to-F analog signal conditioner for use with 4-20 mA, 0-1 mA or 0-10V conditioned flow meter signals. Relay control can be provided by two or four 8A contact relays, or by two or four 130 mA AC/DC solid state relays. Fill operations are repeated continually with a programmable delay from 10 ms to 199.99 sec, or based on an external control input.

Three items are tracked by the batch control software. These can each be scaled to engineering units of total or flow rate and displayed by the controller's six-digit LED display:

- **Item #1** is the current batch total, which can be set up to count up from zero to a preset limit, or down from a preset limit to zero.
- **Item #2** can be assigned to grand total or number of batches.
- **Item #3** is the flow rate.

Two or four relays can be used. Relay #1 is assigned to batch total to control the filling operation. Relays #2, #3 and #4 can each be assigned by the user to Items #1, #2 or #3. For example, Relay #2 can be assigned to Item #1 (batch total) with a lower setpoint to serve as a pre-warn and slow down the fill rate near the batch setpoint, and Relay #3 can be assigned to the total number of batches to terminate the batching when a present number of bottles have been filled.

An optional serial communications board allows the batch controller to transmit Items #1, #2 and #3, as well as peak for item #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 relays for alarm or control.

Batch Control with Turbine Flowmeters

The pulse-input batch controller utilizes the FR dual channel signal conditioner, which accepts pulses from turbine flow meters and most industrial transducers with a pulse output such as proximity switches with PNP or NPN output, TTL or CMOS logic, or magnetic pickup pulses down to 12 mV. The same signal is applied in parallel to the A and B input channels, which 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 of volume 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.

Batch Control with Conditioned Flow Signals

The analog input batch controller utilizes the Laureate VF voltage-to-frequency converter signal conditioner to accept 4-20 mA, 0-1 mA or 0-1V conditioned flow meter signals, which it then converts to a frequency of 10 kHz to 110 kHz. This allows the controller to totalize flow, to count up to a preset value, or to count down to zero from a preset value for batch control. Again, one of the relays is dedicated to ON/OFF batch control, while the other relay is available to slow down rate near the setpoint or to provide another alarm or control function based on rate or total.

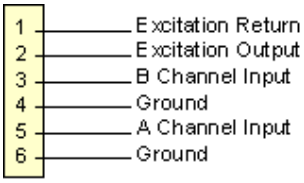
Other Features

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.

Batch Controller Specifications

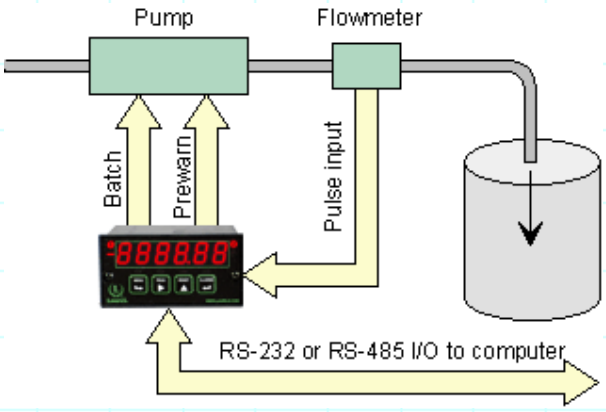
Display	
Readout	6 LED digits, 7-segment, 14.2 mm (.56"), red or green
Display Range	-999999 to +999999, XXXXEX scientific notation beyond 999999
Zero Adjust	-999999 to +999999
Span Adjust	0 to 999999
Indicators	Four LED lamps
Pulse Inputs (FR signal conditioner)	
Signal Types	AC, pulses from NPN, PNP transistors, contact closures, magnetic pickups.
Ch A Frequency, Max	1 MHz
Ch B Frequency, Max	250 kHz
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)
Conversion Technique	Inverse period
Delay between batches	Selectable 10 ms to 199.99 s
Analog Input (V-to-F signal conditioner)	
Signal Types	0-1 mA, 4-20 mA, 0-10V
Conversion Technique	Inverse period applied to 10 kHz- 110 kHz
Update Rate	50 ms (max)
Gate Time	Selectable 10 ms to 199.99 s
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 ±5%, 100 mA
10 Vdc	10 Vdc ±5%, 120 mA
24 Vdc	24 Vdc ±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 (single-output option)

	4-20 mA, 0-20 mA, 0-10V (dual-output option)
Current compliance	2 mA at 10V (> 5 kOhm load)
Voltage compliance	12V at 20 mA (< 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 (dual analog outputs share the same ground)
Relay Outputs (minimum of 2 relays required)	
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	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	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
Environmental	
Operating Temperature	0°C to 60°C
Storage Temperature	-40°C to 85°C
Relative Humidity	95% at 40°C, non-condensing
Protection	NEMA-4X (IP-65) when panel mounted
Signal Connections	



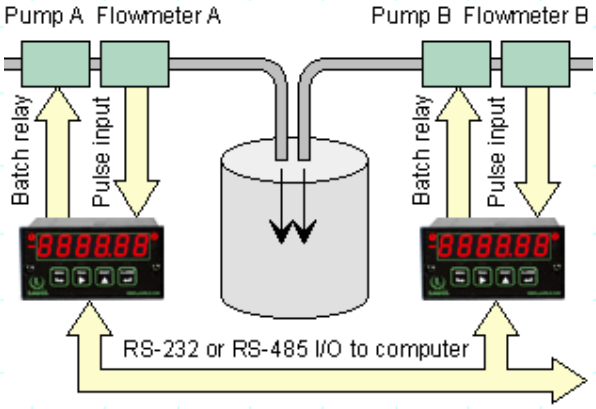
Typical Batching Applications

Drum Filling Application Utilizing Two Relay Outputs



In this drum filling application, the Laureate pulse-input batch controller utilizes uses its two relays to control a pump. The Prewarn relay slows down the pump near the preset to avoid overshoot. The Batch relay stops the pump at the preset.

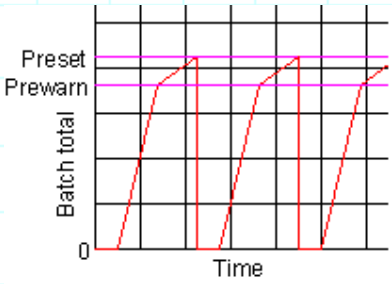
Controlling Chemical Mixing of Materials



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.

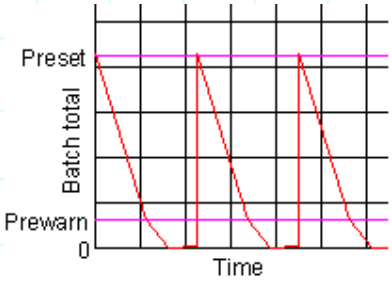
Controller setup and monitoring of the mixing operation are facilitated by optional serial communications. RS-485 allows a single data line to handle multiple controllers.

Up-Counting Batch Control



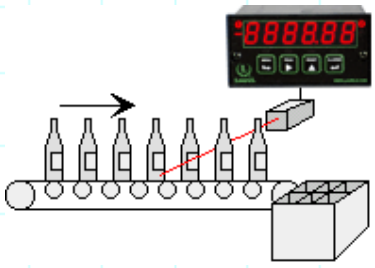
In up-counting batch control, the Laureate counts up from zero to a preset maximum. A prewarn level is available to slow down filling near the preset to avoid overshoot. A time delay can be programmed from the end of each batch to the start of the next batch.

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

Select the buttons to build a model number in this format: **L70100FR, IPC**

		Quantity 1
Main Board	○ **L7** Extended Main Board, Green LEDs	$270
	○ **L8** Extended Main Board, Red LEDs	$270
Power	○ **0** Isolated 85-264 Vac	NC
	○ **1** Isolated 12-32 Vac or 10-48 Vdc	$30
Relay Output	○ **0** None	NC
	○ **1** Two 8A Contact Relays	$80
	○ **2** Two Solid State Relays	$55
	○ **3** Four 8A Contact Relays	$100
	○ **4** Four Solid State Relays	$75
Analog Output	○ **0** None	NC
	○ **1** Single isolated 4-20 mA, 0-20 mA, 0-10V, -10 to +10V	$90
	○ **2** Dual isolated 4-20 mA, 0-20 mA, 0-10V	$135
Digital Interface	○ **0** None	NC
	○ **1** Isolated RS-232	$60
	○ **2** Isolated RS-485	$80
	○ **4** Isolated Modbus RS-485	$90
	○ **5** USB	$60
	○ **6** USB-to-RS485 converter	$100
Input Type	**Pulse Rate or Totalizing**	
	○ **FR** Dual-Channel Frequency	NC
	Voltage-to-Frequency Converter	
	○ **VF1** V-to-F Converter, 4-20 mA	NC
	○ **VF2** V-to-F Converter, 0-1 mA	NC
	○ **VF3** V-to-F Converter, 0-10 V	NC
	○ **VF4** V-to-F Converter, Special Range	$35
	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.	
Add-on Options	☐ **BL** Blank lens without button pads	NC
	☐ **CBL01** RJ11-to-DB9 cable	$19
	☐ **CBL02** USB-to-DB9 adapter	$39
	☐ **CBL05** USB Cable, A to B	$15
	☐ **IPC** Clear front panel cover sealed to NEMA 4X / IP65	$40
	☐ **BOX1** NEMA-4X wall-mount enclosure with 1/8 DIN cutout	$140
	☐ **BOX2** BOX1 plus IPC	$180

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