

SECTION 8

Counters & Timers

(Analog / Digital)

- Laurel
- Hecon
- Simpson
- Yokogawa (YCA)

Counters and Timers from the following manufacturers are also available but not shown in catalog:

- Texmate
- Triplet (LFE)



SERIES
COUNTERS



LAUREL ELECTRONICS, INC.

LAUREATE™ Counter / Timer Series

Available for frequency, rate, total, time, and quadrature.
Exceptional accuracy at high read rates, plus extensive
output options and programmable features to solve tough
application problems at minimum cost.



Basic Features

- 6 LED digits, 0.56" high
- Update rate to 25/s
- Programmable scale factor
- NEMA-4X, 1/8 DIN front panel
- Detachable screw-terminal connectors
- Isolated sensor excitation output
- Crystal accuracy for rate & time
- Inverse period method for rate
- Adaptive digital noise filtering
- Peak & valley capture
- Easy setup via front panel or PC

Selectable Features

- **Display color:** Red or green.
- **Signal conditioner:**
 - 1) Dual channel pulse input
 - 2) Process meter & totalizer
 - 3) Quadrature
- **Alarm/control outputs:**
 - 1) Dual 8A, 250V contact relays
 - 2) Dual solid state relays
- **Isolated analog output:**
 - 1) 4-20 mA
 - 2) 0-10V (selectable at connector)
- **Communications:**
 - 1) RS232, point to point
 - 2) RS485, addressable
 - 3) MODBUS (RTU or ASCII)
 - 4) Parallel BCD output
- **Power to meter:**
 - 1) Worldwide 95-240V ac $\pm 10\%$
 - 2) Low-voltage 12-34V ac or 10-48V dc



Frequency & Pulse Rate Meter

Two independent channels A & B can display frequency from 0.005 Hz to 1 MHz or scaled rate in engineering units. Pulse signals from ± 12 mV to 250V ac. Display update rate to 25/sec. For example, with two channels, you can toggle the display to show two speeds sensed by proximity switches.

Pulse Counter / Totalizer

Two independent channels A & B can count up from zero to a preset limit, or count down from a preset value to zero. Readings can be in pulse counts or in engineering units, such as gallons. Optional dual relays add control capability.

Combined Rate & Totalizer

Toggle the display from scaled rate to scaled total by pressing a front panel key or an external switch. Great for flow applications, where the display can show either flow in gpm or volume in gallons.

Arithmetic Combination of Two Channels

Combine the two pulse input channels A & B to display A+B, A-B, A/B, AxB, or A/B-1. This feature is applicable to both rate and total. For example, combine two flow rates for net flow or net volume. Take the ratio of two rates to mix chemicals. Display A/B-1 (draw) to monitor elongation of material between rollers.

Pulse Input Batch Controller

A flexible, low-cost controller to automate repetitive fill operations. At the push of a button, toggle the display between the current batch total, grand total or number of batches, and flow rate. Cycling can be automatic with a programmable delay, or be based on an external input.

Stopwatch & Process Timer

Trigger on the leading or trailing edges of signals applied to channels A & B to time individual events to 0.2 μ s resolution, display accumulated time of multiple events to 999,999 hours, or display the average time of repetitive events. The display can be in 6-digit decimal format or in HH.MM.SS.

Phase Angle Meter

Display the lead or lag in degrees from 0° to 360° between two signals of the same period applied to channels A & B. Resolution can be set to 1°, 0.1° or 0.01°. Ideal for AC power monitoring, where the error is less than 0.01%.

Process Meter & Totalizer

Display scaled rate or total based on 4-20 mA, 0-1 mA or 0-10 V process signals. For example, display rate or volume from a 4-20 mA flow transducer. Square root extraction is standard for use with differential pressure flow transducers.

Quadrature Position & Rate Meter

Use of a quadrature signal conditioner allows the meter to display scaled position or rate based on the A & B signals from a quadrature encoder. Count x1, x2 or x4 transitions at a combined rate of 250 kHz. A great way to measure speed accurately in high vibration environments.

Choice of Options Boards

Same modular construction and option boards as for analog input Laureate meters: dual relays for alarm or control, isolated analog out, and serial communications. Please see the Ordering Guide.



LAUREL ELECTRONICS, INC.

LAUREATE™ Counter / Timer Specifications

Case

Dimensions 48 x 96 x 102 mm (1/8 DIN)
Panel cutout 45 x 92 mm (1/8 DIN)
Connectors Screw clamp plugs

Display

Type 7-segment LEDs + 4 LED indicators
Display color Red or green
Digit height 0.56" (14.2 mm)
Range -999999 to 999999

FR Signal Conditioner

Inputs AC, magnetic pickups, pulses from
NPN or PNP transistors, contact closures
Channel A frequency 0 Hz to 1 MHz
Channel B frequency 0 Hz to 250 kHz
Crystal time base calibration ± 2 ppm
Span tempco ± 1 ppm/ $^{\circ}$ C (typ)
Long term drift ± 5 ppm/year
Frequency Measurement 1/period
Update rate Gate time +30 ms +1 period
Gate time 0 to 199.99 sec (selectable)
Scale factor $\pm 10^{-10}$ to $\pm 10^6$

VF Signal Conditioner

Inputs 4-20 mA, 0-1 mA, 0-10V
Span error 0.015% of FS ± 1 count
Span tempco 0.003% of reading/ $^{\circ}$ C
Zero tempco 0.001% of FS/ $^{\circ}$ C

QD Signal Conditioner

Input types Differential or single-ended
Transitions monitored x1, x2 or x4
Max pulse rate 250 kHz at x1, 125 kHz at x2,
..... 62.5 kHz at x4
Error correction Zero index (Z-channel)
Position error No error contributed by meter

Power Input

Voltage 95-240V ac or 95-300V dc, $\pm 10\%$
Low voltage option 12-34V ac or 10-48V dc
Power frequency DC or 47-440 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

Excitation Output (std)

5V dc 100 mA
10V dc 120 mA
24V dc 50 mA
Output isolation 50V dc

Analog Output (opt)

Output levels 4-20 mA or 0-10V (selectable)
Output error $< 0.05\%$ of full scale
Compliance at 20 mA 12V (0-600 ohm load)
Compliance at 10V 2 mA (5 kOhm load)
Update rate 60/s at 60 Hz, 50/s at 50 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

Relay Outputs (opt)

Relay types Dual contact or solid state
Contact relays 8A at 250V ac or 24V dc
Solid state relays 120 mA at 125V ac
or 240 mA at 150V dc
Update rate 60/s at 60 Hz, 50/s at 50 Hz
Setpoint setup Via front panel or PC
Isolation 300V rms, 2.3 kV rms for 1 min

Serial Communications (opt)

Serial formats RS232, RS485, MODBUS
Data rates, max 19200 bps
Data update rate 60/s at 60 Hz, 50/s at 50 Hz
Isolation 250V rms, 2.3 kV rms for 1 min

Environmental

Operating temperature 0° C to 55° C
Storage temperature -40° C to 85° C
Protection NEMA-4X when panel mounted

Safety & EM Certifications

USA & Canada U/L listed
Europe CE certified per EN 61010-1:1993

LAUREATE™ Counter / Timer Ordering Guide

Create a model number like **L60100FR**. This is for a 6-digit frequency meter, red LEDs, 95-240V ac power, and dual 8A relays.

☐ Laureate Main Counter Board

L5 Standard, green LEDs
L6 Standard, red LEDs
L7 Extended, green LEDs
L8 Extended, red LEDs

☐ Power

0 95-240V ac or 95-300V dc
1 12-34V ac or 10-48V dc

☐ Setpoint Output

0 None
1 Dual 8A contact relays
2 Dual solid state relays

☐ Analog Output

0 None
1 4-20 mA or 0-10V

☐ Digital Interface

0 None
1 RS232
2 RS485
3 Parallel BCD
4 MODBUS

☐ Input Type

FR Frequency
With Main Boards L5 & L6:
Scalable to $\pm 999,999$ for frequency, rate, square root of rate, totalizing, stopwatch, time interval.
With main boards L7 & L8:
Above plus rate and total simultaneously, linearization of nonlinear inputs, ratio, draw, arithmetic functions (A+B, A-B, A*B, A/B, A/B-1), phase angle, up/down counting, batch control.

VF1 4-20 mA

VF2 0-1 mA

VF3 0-10 V

VF4 Special range. Contact factory.

With main boards L5 & L6:

Simultaneous scaled rate and total from process signals. Selectable square root extraction.

With main boards L7 & L8:

Above plus linearization of nonlinear inputs, batch control, and 1/rate (time).

QD Quadrature

With main boards L5 & L6:

Scalable to $\pm 999,999$ to read out position from shaft encoders.

With main boards L7 & L8:

Scalable to $\pm 999,999$ to read out rate or position from shaft encoders.

HECON



Time Counter with DIN dimensions for AC and DC Operation

Type 891

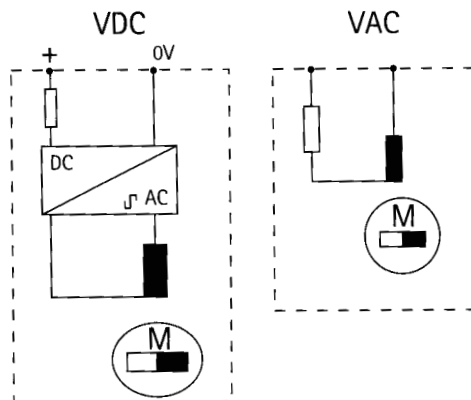


- Low-cost
- DIN dimensions 24 x 48 mm, 48 x 48 mm or 72 x 72 mm
- Highly legible display
- Simple installation
- No reset

Technical data

Display	7 digit, 0 ...99999.99 h
Digit height	5 mm, visual
Supply voltage Vop	acc. to order information + 10 % (230 VAC + 15 %)
Power consumption	0.5 VA or 85 - 750 mW on DC
Operating temperature	- 10 ... + 50 degrees C
Storage temperature	- 20 ... + 70 degrees C
El. connection	screw terminals for cables of max. 2.5 mm ² and AMP connector 6.3 x 0.8 mm
Mounting	with clamping frame (Ordering code 2 891 016)
Mounting position	roller axis horizontal
Protection class (IEC 144)	front IP 66; screw terminals IP 20, AMP connector IP 00
Vibro stability	30 m/s ² (10 ... 500 Hz) acc. to IEC 068-2-6
Shock stability	800 m/s ² (6 ms) acc. to IEC 068-2-27
General design	acc. to DIN VDE 0700
Weight	approx. 50 g.
Approvals	UL : 130453 (M)
Reset	none

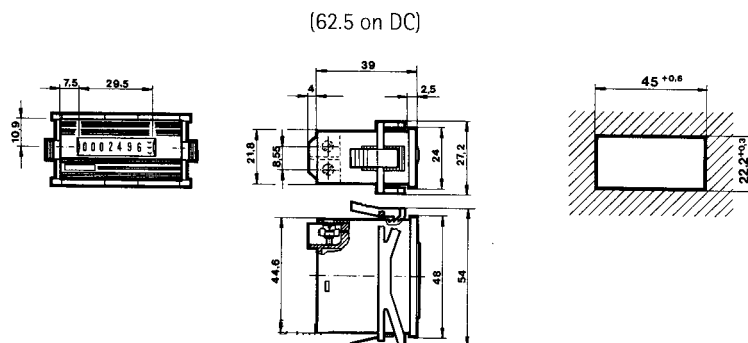
Connection diagram



HECON

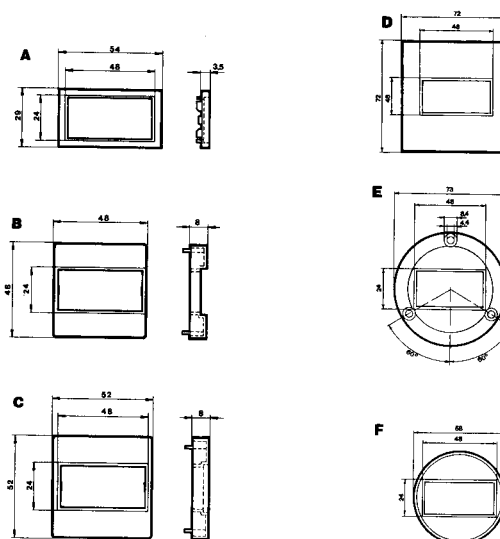
Dimensional Drawings

Type 891 Counter



Seal: Ordering code 2 405 231 (0.5 mm)

Type 891 Installation Frame



Dimensions in mm

Order Information

Counter

Voltage	50 Hz	60 Hz	Voltage	DC
24 VAC	0 891 201	0 891 202	12-24 VDC	0 891 321
115 VAC	0 891 203	0 891 204	36-60 VDC	0 891 322
230 VAC	0 891 211	0 891 206	110 VDC	0 891 323
100 VAC	0 891 213	0 891 214		
200 VAC	0 891 215	0 891 216		

Installation Frame

	Size	Installation cutout	Frame Ordering code	Seal Ordering code
A	54 x 29 mm	50 x 25 mm	2 405 218	2 405 232
B	48 x 48 mm	45 x 45 mm	2 405 219	2 405 233
C	52 x 52 mm	? 50 mm	2 405 220	2 405 234
D	72 x 72 mm	68 x 68 mm	1 405 672	2 405 235
E	? 73 mm	? 50 mm	2 405 223	2 405 237
F	? 58 mm	? 50 mm	2 405 224	2 405 236

Ordering codes printed in bold have priority delivery handling.

Elapsed Time Meters



Back of Panel Unmounted



New Big Look Panel Mounted



Square Case



Round Case



Conduit Case

Specifications

Accuracy:

Matches frequency control of power system.

Vibration Shock:

Meets ANSI Specification C39.1

Materials: Case of clear LEXAN®, frame of Noryl®, brass terminal studs, Lucite® Front covers.

Safety: Type 240 elapsed-time meters are recognized under the Component Program of Underwriters' Laboratories. (UL File #E44857)

Input Range: All Type 240 models available to operate on 120 or 208/240 volts AC, 50 or 60 Hertz; and 480 volts AC, 60 Hertz.

Sealing: All non-reset Type 240 models are weather resistant. Sealed window and no-through screw holes for flange or back-of-panel mounting protect motor, counter, and gearing from rain or panel wash-down.

Presentation: 6-digit counter in hours and tenths of hours or minutes and tenths of minutes.

Insulation Level: Operating at 120, 208, 240 or 480 volts, AC, will pass Hi-pot of 2000 Vrms for one minute.

Burden: 3 Watts typical

Dimensions: See page 23-24

Motor: Telechron, Model S-1.

Features:

- New back-of-panel model
- 2 1/2" and 3 1/2" New Big Look models
- 2 1/2" and 3 1/2" Round and Square models
- Conduit-case models
- Complete interchangeability physically and electrically with GE Types 235 and 236 models.
- Optional 3 stud mounting option is available on 3 1/2" New Big Look style 240 meters only.

Motor Volt AC	Nonreset Type		Reset Type	
	Register in Minutes	Register in Hours	Register in Minutes	Register in Hours

2 1/2-INCH NEW BIG LOOK — 60 Hz

120	240 213 AAAB	240 211 AAAB	240 214 AAAB	240 212 AAAB
208/240	240 213 ABAB	240 211 ABAB	240 214 ABAB	240 212 ABAB
480	240 213 ACAB	240 211 ACAB	240 214 ACAB	240 212 ACAB

3 1/2-INCH NEW BIG LOOK — 60 Hz

120	240 313 AAAB	240 311 AAAB	240 314 AAAB	240 312 AAAB
208/240	240 313 ABAB	240 311 ABAB	240 314 ABAB	240 312 ABAB
480	240 313 ACAB	240 311 ACAB	240 314 ACAB	240 312 ACAB

SQUARE CASE 2 1/2-INCH — 60 Hz

120	240 313 AAAD	240 611 AAAD	240 614 AAAD	240 612 AAAD
208/240	240 313 ABAD	240 611 ABAD	240 614 ABAD	240 612 ABAD
480	240 313 ACAD	240 611 ACAD	240 614 ACAD	240 612 ACAD

SQUARE CASE 3 1/2-INCH — 60 Hz

120	240 713 AAAD	240 711 AAAD	240 714 AAAD	240 712 AAAD
208/240	240 713 ABAD	240 711 ABAD	240 714 ABAD	240 712 ABAD
480	240 713 ACAD	240 711 ACAD	240 714 ACAD	240 712 ACAD

ROUND CASE 2 1/2-INCH — 60 Hz

120	240 633 AAAB	240 631 AAAB	240 634 AAAB	240 632 AAAB
208/240	240 633 ABAB	240 631 ABAB	240 634 ABAB	240 632 ABAB
480	240 633 ACAB	240 631 ACAB	240 634 ACAB	240 632 ACAB

ROUND CASE 3 1/2-INCH — 60 Hz

120	240 733 AAAB	240 731 AAAB	240 734 AAAB	240 732 AAAB
208/240	240 733 ABAB	240 731 ABAB	240 734 ABAB	240 732 ABAB
480	240 733 ACAB	240 731 ACAB	240 734 ACAB	240 732 ACAB

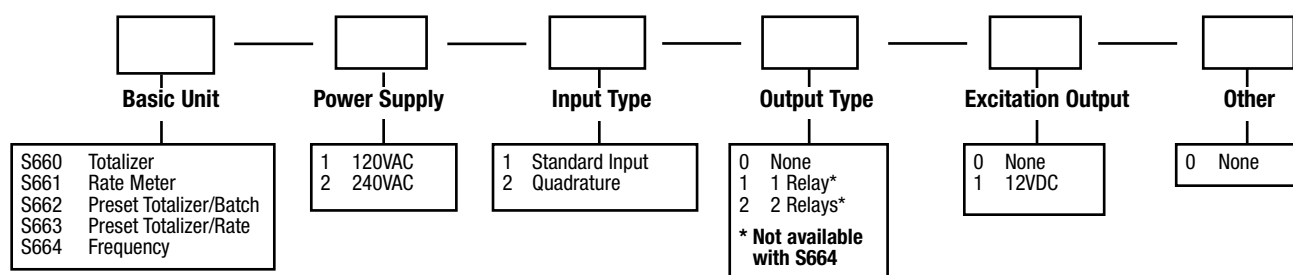
Digital Panel Indicators & Instruments

S660 Series Counters

- 6-digit bright LED display
- NEMA 4X rated front panel
- Simple menu-driven front panel programming with password protection
- Large buttons with audible and tactile feedback to prevent keystroke errors
- Optional plug-in relay card and excitation output
- Count speeds of up to 20KHz (30KHz S661, 35KHz S664)
- Only 3.12" deep and fits into standard 1/8 DIN cutout



Ordering information: To order, insert corresponding number code for each category. Example: S660-1-2-1-0-0



Counter Accessories

ENCODERS		MEASURING SYSTEM	COUPLINGS
SE-060	60 p.p.r.	Chariot	Flexible Couplings
SE-100	100 p.p.r.	46012 Chariot	46001 Connects encoder to 3/8" Shaft
SE-120	120 p.p.r.	12" Circumference Wheels	46002 Connects encoder to 1/4" or 5/16" shaft
SE-360	360 p.p.r.	46007 70A Durometer Black Tire	46003 Includes one flexible coupling (1/2" I.D.) and three reducing inserts (1/4", 5/16", 3/8")
SE-600	600 p.p.r.	46004 80A Durometer Polyurethane Tire	
		46005 83A Durometer Polyurethane Tire	
		46006 92A Durometer Polyurethane Tire	