



LEGEND SERIES

MODEL LGS -Single Preset Counter/Rate Indicator

MODEL LGD - Dual Preset Counter/Rate Indicator

MODEL LGB - Four Preset Batch/Counter/Rate Indicator

MODEL LGM - Six Preset Counter/Rate Indicator

DESCRIPTION

The Legend Series consist of four different models that are multi-function count and rate indicators. There can be up to six presets and six programmable outputs depending upon the unit. The count and rate displays have separate programmable decimal point settings. The unit also has rate peak and valley displays that show the highest and lowest rate readings since they were reset (*peak and valley readings are not retained when power is removed*). There are five Programmable User Inputs, three external remote inputs and two front panel function keys, which allow the user to select from a variety of functions. The two line by eight character alphanumeric display with English menus, allows for easy viewing and simple programming of the units. The four scroll through indication displays can be programmed to show other parameters and if desired, automatically scroll at one of the two programmable rates. A program disable DIP switch used with an external User Input can be utilized to protect the settings and guarantee that no unwanted changes occur during operation.

The standard RS485 serial communication feature provides the capability of two-way communication between the Legend unit and other compatible equipment such as a printer, a programmable controller, or a host computer. The Baud Rate is programmable and ranges from 1200 to 9600. The unit address number can be programmed from 00-99. Up to thirty-two units can be installed on a single pair of wires, each with an individual address. The Count value(s), Preset(s), Rate, Peak, Valley, etc can all be interrogated or changed. The output(s), counters(s), rate and peak readings can be reset, by sending the proper command codes via serial communications or by activating a programmable user input. When a user input, selected for the print request function, is activated, the values specified in the Program Print Options module can be transmitted to a printer.

Optional Programming Software (SFLGP) for IBM® compatible PCs is available to program all of the Legend configuration parameters such as User Inputs, count modes, etc. The software allows unit configurations to be created, uploaded, downloaded, and saved to a file for rapid programming of the Legend.

The Legend offers a choice of seven programmable counting modes for use in applications requiring Bi-directional, Anti-coincidence, and Quadrature counting. A separate external inhibit terminal can be used in conjunction with any of the count modes. The input circuitry is switch selectable to accept signals from a variety of input sources. A unit may be programmed to register counts on both edges of the input signal providing frequency doubling capability.

A Legend unit will indicate an overflow condition when the capacity of a Count display (*Process, Batch, or Total*) is exceeded, by flashing the word "OVERFLOW" in the appropriate display.

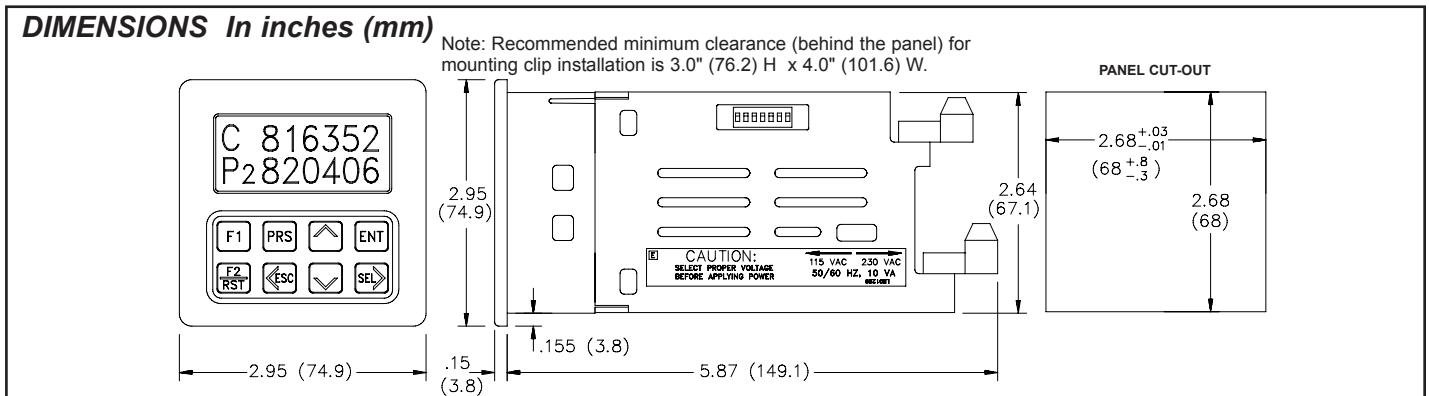
All count values and program setting are retained when unit power is removed in nonvolatile memory.



- 2X8 TRANSMISSIVE LCD, NEGATIVE IMAGE, WITH LED BACKLIGHTING
- FOUR USER PROGRAMMABLE INDICATION DISPLAYS
- OPTIONAL PROGRAMMING SOFTWARE
- ENGLISH PROGRAMMING MENUS
- RATE, PEAK & VALLEY INDICATION
- ABILITY TO LOCKOUT OPERATOR ACCESS TO PROGRAMMING PARAMETERS
- ACCEPTS COUNT RATES UP TO 23 KHz (for Model LGS)
- BI-DIRECTIONAL COUNTING, UP/DOWN CONTROL
- QUADRATURE SENSING (Up to 4 times resolution)
- COUNT INHIBIT PIN AVAILABLE FOR ALL COUNT MODES
- SEPARATE INPUT SCALING FOR RATE & COUNT
- PROGRAMMABLE CONTROL INPUTS
- INPUTS ARE SWITCH SELECTABLE FOR MAGNETIC PICKUPS
- RELAY OUTPUT(S) (Field Replaceable)
- OUTPUT(S) ASSIGNABLE TO COUNT OR RATE
- SOLID STATE CURRENT SINKING OUTPUT(S)
- 115/230 VAC SWITCH SELECTABLE
- RS485 SERIAL COMMUNICATIONS
- NONVOLATILE MEMORY
- NEMA 4X/IP65 SEALED FRONT PANEL BEZEL



UL Recognized Component,
File # E137808



DESCRIPTION (Cont'd)

A Legend unit will indicate an overflow condition when the capacity of a Count display (*Process, Batch, or Total*) is exceeded, by flashing the word "OVERFLOW" in the appropriate display.

All count values and program setting are retained when unit power is removed in nonvolatile memory.

The choice of several reset cycle modes along with the compatibility of count and control inputs to other RLC products, provides added versatility for stand-alone and system counter needs.

The rate input uses the time interval method (1/tau) to calculate the rate value. This method insures high resolution at all input rates. The unit counts input pulses and after the programmable minimum update time elapses and the next count edge occurs, the unit will take the number of edges that occurred during the elapsed time to calculate the rate value. The minimum update time can be as low as 0.1 second per update, enabling quick response to rate changes. At slower rates, averaging can be accomplished by programming the Minimum and Maximum Update Time for the desired response. Extensive scaling capabilities allow practically any reading at very slow input rates.

The construction of the Legend series is a light weight high impact plastic case with a clear viewing window. The sealed front panel with the silicone rubber keypad meets NEMA 4X/IP65 specifications for wash-down and/or dusty environments, when properly installed. Plug-in style terminal blocks simplify installation and wiring change-outs.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

MODELS - LGS & LGD

The single preset unit has one NPN open collector output and the dual preset unit has two outputs which are activated from presets 1 and 2 respectively. Each output can be assigned to either Rate or Count display. An optional relay board can be installed that operates in parallel with the solid state output(s).

MODEL - LGB

The process counter is used to monitor the progress of the count within the batch. Presets 1 and 2 are assigned to the Process Counter and activate relay outputs 1 and 2 respectively.

Presets 3 and 4 can be assigned to either the Batch Counter, Totalizer, or Rate indicator. Presets 3 and 4 activate the NPN open collector outputs O3-SNK and O4-SNK respectively.

MODEL - LGM

The Multi Preset unit has six Presets (1-6) which control NPN open collector outputs 01-SNK to 06-SNK respectively. Preset one through four are assigned to the count display. Presets 5 and 6 can be assigned to either the Rate or Count display.

| AVAILABLE INDICATION DISPLAYS AND PRESETS FOR EACH MODEL | | | |
|--|--|--|--|
| LGS | LGD | LGB | LGM |
| RATE PEAK VALLEY COUNT (1 Preset) | RATE PEAK VALLEY COUNT (2 Presets) | RATE PEAK VALLEY PROCESS BATCH TOTAL (4 Presets) | RATE PEAK VALLEY COUNT (6 Presets) |

SPECIFICATIONS

- DISPLAY:** 2x8, 0.3" (7 mm) high characters, negative image transmissive LCD, with yellow/green or red LED backlighting.
- POWER:**
AC Operation: 115/230 VAC $\pm 10\%$, 50/60 Hz, 10 VA, switch selectable.
DC Operation: +12 VDC $\pm 20\%$ @ 250 mA.
- MEMORY:** Non-volatile memory retains all programming information. Count and Preset values are written to non-volatile memory when power is interrupted. All other programming parameters are written to memory when programming mode is exited. If power is removed while in the programming menus, the parameters are restored to previously saved settings.
Data Retention: 10 years minimum
- SENSOR POWER:** +12 VDC $\pm 25\%$ @ 100 mA.
- INPUTS A and B:** DIP Switch selectable to accept count pulses from a variety of sources including switch contacts, outputs from CMOS or TTL circuits, and all standard RLC sensors.
LOGIC: Input trigger levels $V_{IL} = 1.5 V_{MAX}$; $V_{IH} = 3.75 V_{MIN}$.
Current sinking: Internal 7.8 K Ω pulled up internally to +12 VDC, $I_{MAX} = 1.6$ mA.

Current sourcing: Internal 3.9 K Ω pull-down, 7.3 mA @ 28 VDC_{MAX}.
Debounce: Damping capacitor provided for switch contact bounce.
 Limits count speed to 50 Hz and input pulse widths to 10 msec min.

MAGNETIC PICKUP:

Sensitivity: 200 mV peak.

Hysteresis: 100 mV.

Input impedance: 3.9 K Ω @ 60 Hz.

Maximum input voltage: ± 50 Vp

Note: For magnetic pickup input, the sink/source DIP switch must be in the SRC position.

6. **RATE ACCURACY:** $\pm 0.01\%$

7. **RATE MINIMUM INPUT FREQUENCY:** 0.01 Hz.

8. **MAXIMUM COUNT RATE IN KHZ:**

| MODEL | CNT + DIR | | QUAD | | | ADD/ADD | ADD/SUB |
|---------------------|-----------|----|------|----|-----|---------|---------|
| | X1 | X2 | X1 | X2 | X4 | X1* | X1* |
| LGS (Single Preset) | 23 | 11 | 9 | 7 | 5.5 | 23 | 12 |
| LGD (Dual Preset) | 20 | 10 | 8.5 | 7 | 5 | 20 | 10 |
| LGB (Batch) | 17 | 8 | 7 | 7 | 4 | 17 | 9 |
| LGM (Six Preset) | 15 | 7 | 7 | 7 | 3 | 15 | 8 |

Notes:

- Maximum count rates given are for Process counter set for Auto reset with the auto cycle preset set to an equivalent of 100 count pulses or greater. With auto cycle presets less than 100 count pulses, with Count SF = 0.5000 and Count Scale Multiplier = X1, would be 50.
- Maximum count rate given for X2 & X4 count modes are given for 50% duty cycle signals and Quad signals with 90° phase shift.
**Inputs A & B count rates summed.*

9. CONTROL INPUTS:

Programmable user inputs (3): Internal 10 K Ω pull-up to +5 VDC,

$V_{IL} = 1.0 V_{MAX}$; $V_{IH} = 4.0 V_{MIN}$, response time = 10 msec.

Inhibit: Internal 10 K Ω pull-up to +5 VDC, $V_{IL} = 1.0 V_{MAX}$; $V_{IH} = 4.0 V_{MIN}$.

10. SERIAL COMMUNICATIONS:

Type: RS-485 Multi-point Balanced Interface (2 Wire).

(Can connect up to 32 units on a single pair of wires)

Baud Rate: Programmable from 1200 to 9600.

Maximum Addresses: Programmable from 00 to 99.

(Actual number on a single pair of wires is limited by serial hardware specifications)

Transmit Delay: Programmable for 0.002 or 0.100 second.

Data Format: 10 Bit Frame; 1 start bit, 7 data bits, 1 parity bit, and 1 stop bit. Parity is programmable for either ODD, EVEN, or No Parity.

11. OUTPUT(S):

Solid-State: Current sinking NPN open collector transistor.

$V_{CE} = 1V_{SAT}$ @ 100 mA max. $V_{OH} = 30$ VDC max.

(Internal Zener Diode Protection).

Relay(s): Mounted on field-replaceable P.C. board. Form C contacts rated at 5 amps @ 120 VAC/240 VAC or 28 VDC (*resistive load*), 1/8 H.P. @ 120 VAC (*inductive load*). The operate time is 5 msec nominal and the release time is 3 msec nominal.

Programmable Timed Output(s): Programmable time ranges from 0.01 to 99.99 seconds, $\pm 0.05\%$ - 11 msec max.

12. CERTIFICATIONS AND COMPLIANCES:

SAFETY

UL Recognized Component, File #E137808, UL508, CSA 22.2 No. 14

Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.

Type 4X Indoor Enclosure rating (Face only), UL50

IECEE CB Scheme Test Certificate # UL1581-176645/USA,

CB Scheme Test Report # 97ME50052-081391

Issued by Underwriters Laboratories, Inc.,

IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

IP65 Enclosure rating (Face only), IEC529

ELECTROMAGNETIC COMPATIBILITY

Immunity to EN 50082-2

| | | |
|---------------------------------|--------------|---|
| Electrostatic discharge | EN 61000-4-2 | Level 2; 4 Kv contact Level 3; 8 Kv air |
| Electromagnetic RF fields | EN 61000-4-3 | Level 3; 10 V/m 80 MHz - 1 GHz |
| Fast transients (burst) | EN 61000-4-4 | Level 4; 2 Kv I/O ¹ Level 3; 2 Kv power |
| RF conducted interference | EN 61000-4-6 | Level 3; 10 V/rms ¹ 150 KHz - 80 MHz |
| Power frequency magnetic fields | EN 61000-4-8 | Level 4; 30 A/m |

Emissions to EN 50081-2

| | | |
|-----------------|----------|--|
| RF interference | EN 55011 | Enclosure class A Power mains class A |
|-----------------|----------|--|

SPECIFICATIONS (Cont'd)

Note:

- When the unit is DC powered from terminal TBA pin 5 (common) and terminal TBA pin 3 (DC OUT/IN) a power line filter was installed, RLC #LFIL0000 or equivalent, so as not to impair the function of the unit. Refer to the EMC Installation Guidelines section of the manual for additional information.

13. ENVIRONMENTAL CONDITIONS:

Operating Temperature: 0 to 50°C

Storage Temperature: -40 to 70°C

Operating and Storage Humidity: 85% max. (non-condensing) from 0°C to 50°C.

Vibration According to IEC 68-2-6: 5 to 150 Hz, in X, Y, Z direction for 1.5 hours, 2 g's.

Shock According to IEC 68-2-27: Operational 20 g's (10g relay), 11 msec in 3 directions.

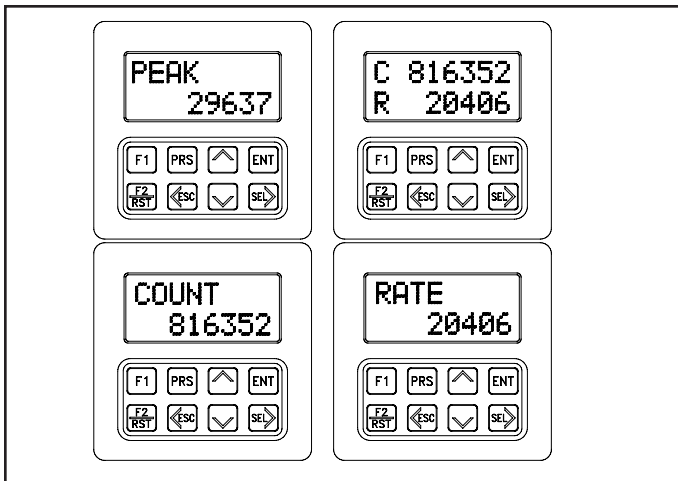
Altitude: Up to 2000 meters

- CONSTRUCTION:** High impact plastic case with clear viewing window. The front panel meets NEMA 4X/IP65 requirements for indoor use when installed properly. Installation Category II, Pollution Degree 2. Panel gasket and mounting clips included.

- WEIGHT:** 1.5 lbs. (0.68 Kg)

PROGRAMMING

The Legend Series provides an easy to use, menu driven programming interface. The English prompts, the front panel keypad, and the flashing display aids the operator during programming. In the normal run mode, the main display loop allows the user to scroll through the four programmable indication displays, using the direction keys. From the main loop, presets and scale factors can be accessed directly for changing parameters. All other parameters are accessed through the programming loop. In the programming loop, parameters can be viewed or changed and the operator can exit anywhere in the loop. Shown to the side is part of the main display loop and part of the programming loop of a Dual Preset Legend (LGD) unit. Also shown are four different views of the indication displays.



PROGRAMMABLE FUNCTIONS

PRESET(S)

Ranges from -99999 to 999999

Counter Load ranges from -99999 to 999999

SCALE FACTORS (RATE & COUNT)

Range from 0.0001 to 5.9999

COUNT SCALE MULTIPLIER

Multiplies the contents of the 9-digit internal counter or the 11-digit internal totalizer by a factor of 1, 0.1, 0.01 or 0.001 to view the desired number of significant digits on the 6-digit Counter display or the 8-digit Totalizer display.

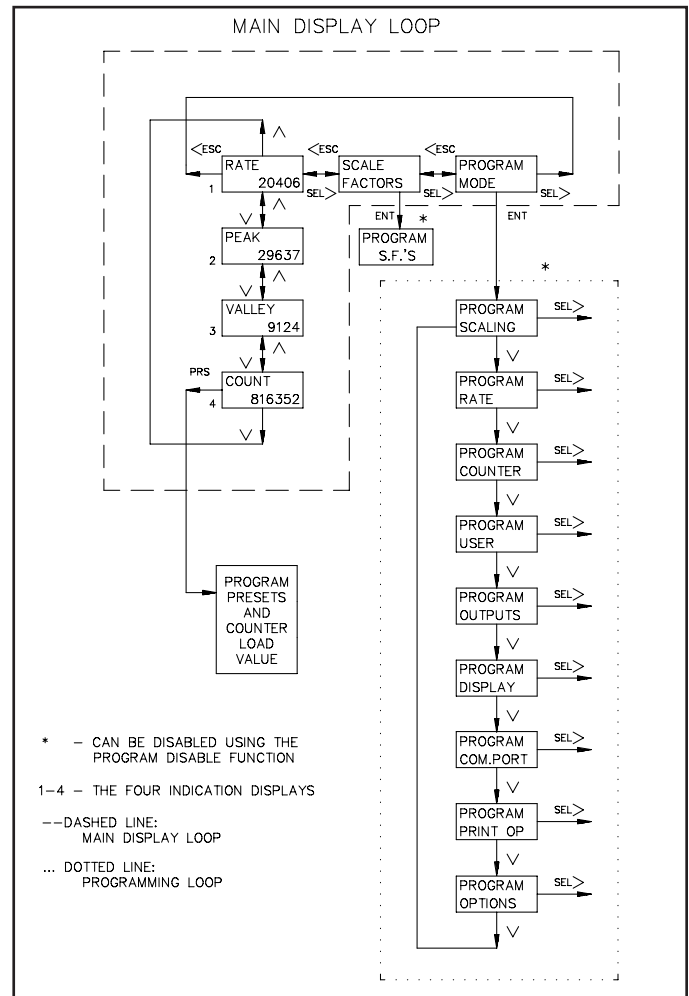
DECIMAL POINT

Separate decimal point location for Count and Rate displays.

0
0.0
0.00
0.000
0.0000
0.00000

RATE SCALE MULTIPLIERS

Multiplies the contents of the actual internal rate, pulses per second (PPS), by a factor of 0.01, 0.1, 1, 10, 100, or 1000 to view the desired number of



significant digits on the 6-digit Rate display. The desired time units that the rate is to be displayed, can also be programmed as per Second ($\times 1$), per Minute ($\times 60$), or per Hour ($\times 3600$).

UPDATE TIME

The Rate Minimum/Maximum Update Times range from 0.1 to 99.9 seconds which provides averaging capability for non-consistent pulse spacing.

COUNTING MODES

- Count with Direction
- Count with Direction (X2)
- Quadrature
- Quadrature (X2)
- Quadrature (X4)
- 2-Input Anti-coincidence Add/Add
- 2-Input Anti-coincidence Add/Subtract
- A separate Inhibit input, is available for all count modes.

RESET MODES

- Manual Reset
- Automatic Reset at Preset
- Reset at Beginning Of Output 1
- Reset at End Of Timed Output 1
- Reset at Beginning Of Output 2
- Reset at End Of Timed Output 2
- Reset at Beginning Of Output 1 or Output 2
- Reset at End Of Timed Output 1 or Output 2

MODEL LGB ONLY

- Reset at Beginning Of Output 3
- Reset at End Of Timed Output 3
- Reset at Beginning Of Output 4
- Reset at End Of Timed Output 4
- Reset at Beginning Of Output 3 or Output 4
- Reset at End Of Timed Output 3 or Output 4

| MODEL NO. | DESCRIPTION | OPTION w/RELAY BOARD | PART NUMBERS 115/230 VAC & +12 VDC |
|-----------|---|-------------------------|--|
| LGS | Single Preset Legend w/Yel-Grn Backlighting | No | LGS00001 |
| | Single Preset Legend w/Yel-Grn Backlighting | Yes | LGS00000 |
| | Single Preset Legend w/Red Backlighting | No | LGS00101 |
| | Single Preset Legend w/Red Backlighting | Yes | LGS00100 |
| LGD | Dual Preset Legend w/Yel-Grn Backlighting | No | LGD00001 |
| | Dual Preset Legend w/Yel-Grn Backlighting | Yes | LGD00000 |
| | Dual Preset Legend w/Red Backlighting | No | LGD00101 |
| | Dual Preset Legend w/Red Backlighting | Yes | LGD00100 |
| LGB | Four Preset Batch Legend w/Yel-Grn Backlighting | Yes | LGB00000 |
| | Four Preset Batch Legend w/Red Backlighting | Yes | LGB00100 |
| LGM | Multi Preset (6) Legend w/Yel-Grn Backlighting | N/A | LGM00001 |
| | Multi Preset (6) Legend w/Red Backlighting | N/A | LGM00101 |
| - | Legend Programming Software, 3.5", 1.44 M disk | N/A | SFLGP |
| - | Single Relay Board | N/A | RLYLG001 |
| - | Dual Relay Board | N/A | RLYLG002 |