



Technology Solutions

# TEK-LCD 7803B

*Explosion-Proof Pulse Input Flow Rate/Totalizer Indicator*



ACCESSORIES



## Introduction

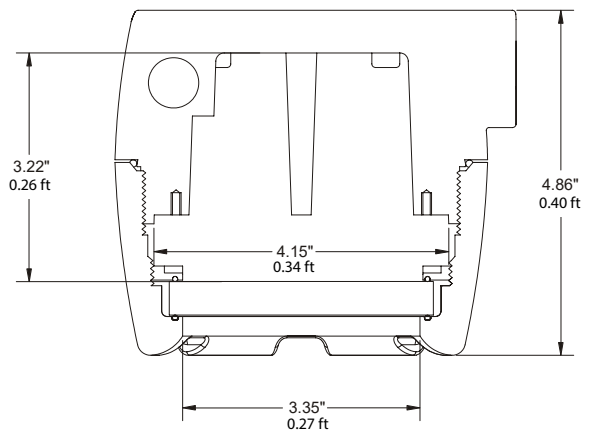
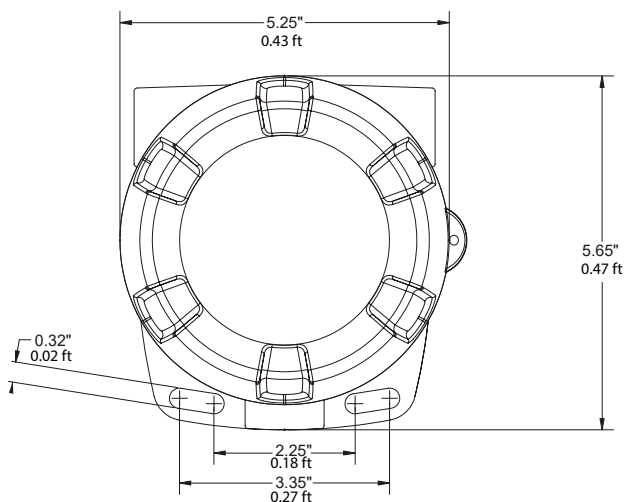
### The Tek-LCD 7803B Explosion-Proof Pulse Input Flow Rate/Totalizer Indicator

The Tek-LCD 7803B is an explosion-proof flow rate/totalizer Indicator that can display flow rate and total from a pulse output flowmeter. Its display has a five digit upper line for rate, a seven alpha-numeric character lower line for total, and comes standard with a backlight. The Tek-LCD 7803B carries FM, CSA, ATEX, and IECEx approvals for use in hazardous areas. It can be powered from an included battery or a 24 VDC external power supply. Some features that really make the Tek-LCD 7803B flow rate/totalizer Indicator stand out are its automatic unit conversions from flowmeter k-factor units, ability to log up to 1024 data points, and SafeTouch® through-glass buttons. These buttons allow the Tek-LCD 7803B to be programmed and operated through the glass, thus eliminating the need to remove the cover in a hazardous area.

## Features

- Automatic Rate, Total, and Grand Total Unit Conversions
- On-Board Data Logging
- Modbus Communications RS-485 Option
- All models Operates from -40°F to 158°F (-40 °C to 75 °C)
- Two Isolated Open Collector Pulse Outputs, Up to 5 kHz
- Open Collector, NPN, PNP, TTL, Switch Contact, Sine Wave (Coil), Square Wave, Opto-Isolated Inputs
- Isolated 4-20 mA Output for Rate, Total, or Grand Total
- Battery, DC, or Output Loop-Powered Models
- Explosion-Proof, IP68, NEMA 4X Enclosure
- 5-Digit 0.7" (0.05 ft) Top Display for Rate or Total
- 7 Alphanumeric Character 0.4" (0.03 ft) Lower Display for Rate, Total, Grand Total, Units, and Tag
- 13-Digit Totalizer with Total Overflow Feature

## Dimensional Drawings



# Specifications

## General

<b>Display</b>	Top: Five digits (0 to 99,999), 0.7" (0.05 ft) high, 7-segment, automatic lead zero blanking. Bottom: Seven characters, 0.4" (0.03 ft) high, 14-segment automatic lead zero blanking. Symbols: Total, grand total, battery power/low battery, high & low alarm, password lock, and SafeTouch button sleep mode/disable.
<b>Display Assignment</b>	Top Display: Rate or total; Bottom Display: Combinations of rate, total, grand total, units, and custom tag.
<b>Backlight</b>	White LED, 10 sec auto-off when battery powered. Backlight deactivated below temperature $\approx -4^{\circ}\text{F}$ ( $-20^{\circ}\text{C}$ )
<b>Display Update Rate</b>	Ambient $> -4^{\circ}\text{F}$ ( $-20^{\circ}\text{C}$ ): 1 Update/Second. Ambient $< -4^{\circ}\text{F}$ ( $-20^{\circ}\text{C}$ ): 1 Update/10 Seconds. <b>Note:</b> Update is dependent on gate settings.
<b>Over Range</b>	Display flashes 99,999
<b>Display Orientation</b>	Display may be mounted at $90^{\circ}$ increments up to $270^{\circ}$ from default orientation
<b>Programming Method</b>	Four SafeTouch through-glass buttons when cover is installed. Four internal push buttons when cover is removed.
<b>Recalibration</b>	Calibrated at the factory to read frequency in Hz. No recalibration required.
<b>Max/Min Display</b>	Max/Min readings reached by the process are stored until reset by the user or until power to the meter is cycled.
<b>Password Menu Options</b>	Three programmable password selections can be used for the following: restrict modification of settings, prevent resetting the total or grand total without the password, or permanently lock out the ability to change or reset the grand total or any grand total related settings(making a non-resettable grand total). Pass: Restricts modifications of programmed settings to require re-entering the password to make changes. Pass T: Restricts the reset of total to require re-entering the password. Disables the manual mode reset contact. Pass GT: Restricts the reset of grand total to require re-entering the password. May enable a non-resettable grand total and permanent lockout of grand total-related settings with a specific password.
<b>Alarm Indication</b>	Flashing display plus HI/LO indicators for rate alarms, SET for total alarms.
<b>Non-Volatile Memory</b>	All programmed settings and total are stored in nonvolatile memory for a minimum of ten years if power is lost.
<b>Power Options</b>	9-30 VDC, 2.2 W max; 4-20 mA Output Powered, 30 VDC max; battery power; 9-30 VDC power with battery backup; 4-20 mA Output Powered with Battery Backup
<b>Operating Temperature Range</b>	$-40^{\circ}\text{F}$ to $158^{\circ}\text{F}$ ( $-40^{\circ}\text{C}$ to $75^{\circ}\text{C}$ )
<b>Storage Temperature Range</b>	$-40^{\circ}\text{F}$ to $158^{\circ}\text{F}$ ( $-40^{\circ}\text{C}$ to $75^{\circ}\text{C}$ )
<b>Battery</b>	3.6 V Primary Lithium (Li-SOCl <sub>2</sub> ), non-rechargeable Model PDABAT36C. Expected service life & recommended replacement interval is dependant on the operating conditions.
<b>Isolation</b>	All models: 500 V opto-isolated input-to-power/output with isolated input enabled.
<b>Data Logging</b>	Up to 1024 records, recorded 4/day at specific times or at defined time intervals. Record contains date, time, rate, total, grand total, and log number.
<b>Relative Humidity</b>	0 to 90% non-condensing
<b>Connections</b>	Screw terminals accept 12 to 22 AWG wire
<b>Enclosure</b>	Explosion-proof die-cast aluminum with glass window, corrosion resistant epoxy coating, color: blue. NEMA 4X IP68. Copper-free (0.3%). Three $\frac{3}{4}$ " NPT threaded conduit openings. One $\frac{3}{4}$ " NPT metal plug with 0.03 ft hex key fitting installed.
<b>Connections</b>	Screw terminals accept 12 to 22 AWG wire
<b>Mounting</b>	May be mounted directly to conduit. Two slotted flanges for wall mounting or NPS $1\frac{1}{2}$ " to $2\frac{1}{2}$ " or DN 0.13 to 0.21 ft pipe mounting.
<b>Overall Dimensions</b>	5.67" x 5.24" x 4.88" (W x H x D)(0.47 ft x 0.43 ft x 0.40 ft)
<b>Weight</b>	5.00 lbs (80 oz, 2.27 kg)

## Serial Communications

<b>Protocol</b>	2-Wire RS-485 with Modbus RTU. Isolation optional.
<b>Meter Address/Slave ID</b>	1 - 247
<b>Baud Rate</b>	1,200; 2,400; 4,800; 9,600; 19,200; 38,400; 57,600; or 115,200 bps
<b>Transmit Time Delay</b>	Programmable between 0 and 199 ms
<b>Parity/Stop Bit</b>	Even, odd, none with 1 stop bit, or none with 2 stop bits
<b>Byte-to-Byte Timeout</b>	Max of 1.5 character times or 750 $\mu\text{s}$

## Rate Input

<b>Pulse Input</b>	Field selectable; Sourcing or sinking pulse or square wave 0-5 V, 0-12 V, or 0-24 V; TTL; NPN or PNP transistor; Open collector 100 kΩ pull-up to 3 V; Switch contact 100 kΩ pull-up to 3 V; PNP transistor 100 kΩ pull-down to ground (COM); Active input 100 kΩ to battery level, 10kΩ to power. Maximum Frequency: 64 kHz. Minimum Pulse Width: 5 μs.
<b>Opto-Isolated Input</b>	Sourcing or sinking pulse or square wave 0-5 V, 0-12V, or 0-24 V; Logic High: 2-24 V, Logic Low: < 1 V
<b>Maximum Frequency</b>	20 kHz
<b>Minimum Pulse Width</b>	20 μs.
<b>Input Current</b>	1 mA @ 5 V, 2.5 mA @ 12 V, 5 mA @ 24 V
<b>Minimum Input Frequency</b>	0.0001 Hz. Minimum frequency is dependent on high gate setting (rate display).
<b>Input Impedance</b>	Pulse input: Greater than 75 kΩ @ 1 kHz
<b>Open collector/switch input</b>	100 kΩ pull-up to 3 V
<b>Total Reset Delay</b>	Programmable from 0 to 99,999 seconds
<b>Input K-Factor Units</b>	Gallons, liters, imperial gallons, cubic meters, barrels, bushels, cubic yards, cubic feet, cubic inches, liquid barrels, beer barrels, hectoliters, or custom.
<b>K-Factor</b>	Field programmable K-Factor used to define custom input units. May be programmed from 0.000001 to 9,999,999 pulses/unit.
<b>Accuracy</b>	±0.03% of calibrated span ±1 count
<b>Temperature Drift</b>	Rate display is not affected by changes in temperature.
<b>Low-Flow Cutoff</b>	0-99,999 (0 disables cutoff function)
<b>Decimal Point</b>	Up to four decimal places or none: 4.4444, 33.333, 222.22, 1111.1, or 00000
<b>Calibration</b>	May be calibrated using K-Factor, scale without signal source, or by applying an external calibration signal.
<b>Calibration Range</b>	Input 1 signal must be ≥: 1 Hz; input 2 signal may be set anywhere above input 1 setting. Minimum input span is 1 Hz. An Error message will appear if the input 1 and input 2 signals are too close together.
<b>Input Contact Debounce Filter</b>	Programmable. Input signal frequency speed selections of Hi (no filter), Med (250 Hz max input, 2 ms pulse width), and Low. (100 Hz max input, 5 ms minimum pulse width).
<b>Time Base</b>	Second, minute, hour, or day
<b>Gate</b>	Low gate: 1-99 seconds; High gate: 2-9,999 seconds

## Rate/Totalizer

<b>Display Assignment</b>	The Top display is assigned to rate or total. The Bottom display is programmable to display total; total and units; total and tag; total, total units, and rate units; grand total; grand total and grand total units; grand total and tag; grand total, grand total units, and rate units; rate units; rate; rate and total units; rate and rate units; rate and tag; rate units; total units; a custom tag; or be off (blank).
<b>Rate Display Units</b>	Gallons, liters, imperial gallons, cubic meters, barrels, bushels, cubic yards, cubic feet, cubic inches, liquid barrels, beer barrels, hectoliters, or custom.
<b>Rate Display Time Base</b>	Display rate may be calculated in terms of units per second, minute, hour, or day
<b>Total/Grand Total Display Unit Multiplier</b>	x1, x100 (h), x1000 (k), or x1,000,000 (M) multiplier (and prefix) applied to total or grand total display units. Setting is independent for each.
<b>Total/Grand Total Decimal Points</b>	Up to six decimal places or none: 6.666666, 55.55555, 444.4444, 3333.333, 22222.22, 111111.1 or 0000000. Total and grand total decimal points are independently programmed, and are independent of rate decimal point.
<b>Totalizers</b>	Calculates total and grand total based on rate and field programmable multiplier to display total in engineering units. Time base must be selected according to the time units in which the rate is displayed. The total and grand total utilize the same time base, with different conversion factors and resets.
<b>Totalizer Reset</b>	Via SafeTouch RESET button, mechanical button (cover off), external contact closure (total only), automatically via user selectable preset value and time delay (1 – 99,999 sec). Manual reset may be disabled or protected by password for the total and grand total. Total and grand total reset independently.
<b>Total Overflow &amp; Rollover</b>	The total can display up to 9,999,999,999,999. Up to 9,999,999 can be displayed on the lower display normally. An overflow display will toggle between the first six digits and last seven digits (999999 <> 9999999) for a 13-digit total. The total will rollover beyond thirteen digits. The T indicator on the display will flash to indicate total overflow, and the six most significant digits (first six numbers of the total) are indicated with the flashing overflow symbol.
<b>Grand Total Overflow &amp; Rollover</b>	The grand total can display up to 9,999,999,999,999. Up to 9,999,999 can be displayed on the lower display normally. An overflow display will toggle between the first six digits and last seven digits (999999 <> 9999999) for a 13-digit total. The grand total will rollover beyond thirteen digits. The GT indicator on the display will flash to indicate grand total overflow, and the six most significant digits (first six numbers of the grand total) are indicated with the flashing overflow symbol.
<b>External Reset Contact</b>	External total reset connections are made between RST and COM. Logic High: 1.4 V, 3.3V max; Logic Low: < 0.8 V. 32 ms debounce.

## 4-20 mA Transmitter Output

<b>Output Source</b>	Rate/process, total, grand total, or disabled.
<b>Scaling Range</b>	4.000 to 20.000 mA for any display range.
<b>Calibration</b>	Factory calibrated: 0.0 to 1000.0 = 4-20 mA output
<b>Under Range</b>	3.8 mA
<b>Over Range</b>	Display Overrange: 20.5 mA, Output Overrange: 20.5 mA
<b>Accuracy</b>	± 0.05% span ± 0.004 mA
<b>Temperature Drift</b>	33.4 µA/°F max from -40°F to 158°F (-40 °C to 75 °C) ambient
<b>External Loop Power Supply</b>	30 VDC maximum
<b>Output Loop Resistance</b>	24 VDC, 10-750 Ω; 30 VDC 100-1100 Ω Note: Loop-powered backlight subtracts 150 Ω from maximum resistance figures above.

## Open Collector Outputs

<b>Output Assignment</b>	Two open collector pulse outputs Out 1 and Out 2. Individually programmable for rate, total, or grand total alarms; rate, total, or grand total pulse outputs; or retransmitting of pulse inputs; constant timed pulse output; quadrature outputs (requires Out 1 and Out 2); or off.
<b>Rating</b>	Isolated open collector, off: 24 VDC max; on: <1V @ 150 mA max.
<b>Alarm Outputs</b>	Assign to rate for high or low alarm trip point. Assign to total or grand total for total or grand total summation alarms.
<b>Alarm Deadband</b>	0-100% FS, user selectable
<b>Alarm Acknowledge</b>	Enter button resets output and LCD indication.
<b>Pulse Output K-Factor (Count)</b>	K-factor (COUNT) programmable from 0.000001 to 9999999. Rate pulses are generated as a scaled output of the rate input with one output pulse per K-factor (count) number of input pulses. Total and grand total pulses are generated for every total or grand total increment selected. (e.g. K factor value of 100 will generate one pulse every time the total is incremented by 100 units) Rate retransmission pulses one to one for input pulses, up to maximum output speed. K-factor is not used for retransmitting outputs.
<b>Pulse Output Maximum Frequency</b>	5 kHz; 50% duty cycle. If the maximum would be exceeded, the meter will display "PULSE OVERRNG"
<b>Pulse Rate Retransmit Output</b>	The output will generate 100 to 130 us pulses at the falling edge of every input pulse.
<b>Maximum retransmit frequency</b>	5 kHz
<b>Quadrature Output</b>	Output set to quadrature will lag the other pulse output by 90° (1/4 duty cycle) at output frequency. Minimum 1 Hz
<b>Timer Output</b>	Programmable on and off time, repeating cycle. Minimum period 0.1 second, maximum 100,000 seconds. Minimum pulse time 0.01 second, maximum 10,000 seconds.

## Product Ratings and Approvals

<b>FM</b>	Explosion-proof for use in Class I, Division 1, Groups B, C, D. Class II, Division 1, Groups E, F, G. Class III, Division 1; T6. Class I, Zone 1, AEx d IIC T6 Gb. Zone 21, AEx tb IICT 185°F. Ta = -40°F to 158°F (-40 °C to 75 °C). Enclosure: Type 4X & IP66. Certificate number: 3040391
<b>ATEX</b>	II 2 G D. Ex d IIC T6 Gb. Ex tb IICT 185°F Db IP68. Ta = -40°F to 158°F (-40 °C to 75 °C). Certificate number: Sira 10ATEX1116X
<b>CSA</b>	Class I, Division 1, Groups B, C, D. Class II, Division 1, Groups E, F, G. Class III, Division 1; T6. Class I, Zone 1, Ex d IIC T6. Ta = -40°F to 158°F (-40 °C to 75 °C). Enclosure: Type 4X & IP66. Certificate number: 11 2325749

## Installation

### Direct Mounting

The Tek-LCD 7803B is designed to easily mount directly to a flowmeter. The example below shows it mounted to a turbine flowmeter. This particular Tek-LCD 7803B model (BM0) is battery-powered. Even though battery-powered, it does have a backlight; but to conserve battery power, it only turns on while SafeTouch® buttons are in use.



### Installation Flexibility

The Tek-LCD 7803B rotatable display, along with three available conduit connections, provide for numerous installation options. The display can be rotated in 90° increments. Rotate it 90° for horizontal mounting. Wiring can be routed to the most convenient conduit connection(s). One metal conduit plug is supplied per unit. Additional plugs are available if needed.

### Popular Models

Model Number	Description
7803B-AP0	Explosion-Proof Pulse Input Flow Rate/Totalizer

### Accessories

Model Number	Description
7800A-6846	Steel Pipe Mounting Kit
7800A-6846SS	Stainless Steel Pipe Mounting Kit
7800B-002	¾" M-NPT to ½" F-NPT Approved Reducer

# Customer Service and Support



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