SA77RTC
Dual-Line 5-Digit Explosion-Proof Pulse Input Rate/Totalizers

Through-Glass Button Programming

FM APPROVED

FLOW RATE/TOTAL

- Pulse, Open Collector, NPN, PNP, TTL, Switch Contact, Sine Wave (Coil), Square Wave, Opto-Isolated Inputs
- Explosion-Proof, IP68, NEMA 4X Enclosure
- 5-Digit 0.7" (17.8 mm) Top Display for Rate or Total
- 7 Alphanumeric Character 0.4" (10.2 mm) Lower Display for Rate, Total, Grand Total, Units, and Tag
- 13-Digit Totalizer with Total Overflow Feature
- Through-Glass Button Programming
- Isolated 4-20 mA Output for Rate, Total, or Grand Total
- Two Isolated Open Collector Pulse Outputs, Up to 5 kHz
- Battery, DC, or Output Loop-Powered Models
- Gate Function for Rate Display of Slow Pulse Rates
- K-Factor, Scaling, or Live Input Calibration with 32-Point Linearization
- Automatic Rate, Total, and Grand Total Unit Conversions
- Password Protection
- Backlight Standard on All Models
- On-Board Data Logging
- Modbus® Communications RS-485 Option
- Flanges for Wall or Pipe Mounting
- Operates from -40 to 75°C

SA-77

1-800-667-7993 | www.sa-77.com

SA77RTC Explosion-Proof Pulse Input Rate/Totalizers

SA77-RTC Pulse Input Rate/Totalizer

Mounts directly to flowmeter

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Explosion-Proof
Die-Cast Aluminum
NEMA 4X Enclosure

Three ¾" NPT
Conduit Holes

Through-Glass
Menu Button

0.7" (17.8 mm)
5-Digit

0.4" (10.2 mm)
7-Character
(Alphanumeric)

Engineering Units,
Total, Rate, & More

Through-Glass
Reset or Right Arrow

Mounting Flanges
(Up to 2½" Pipe)

Through-Glass Button Programming

Through-Glass
Enter or
Acknowledge Button

Rate/Total/Process
Variable
Backlight Standard

Total/Grand Total,
Battery, and Sleep
Mode Icons

Alarm Indicator

Password Protection

Through-Glass
Max/Min or Up Arrow

Mechanical Buttons
(4 Places)

¾" NPT Flowmeter
Connection

Rate/Totalizer Displays

Flow Rate Indicator

Total Indicator

Rate & Total

Easy to Setup

Input Programming Example

OVERVIEW

The new SA77RTC Explosion-Proof Rate/Totalizer brings modern design, easy readability, and enhanced functionality to hazardous areas around the world in a way never seen before. Other meter designs have lost sight of the fact that the primary thing operators do with meters such as these is look at them. Operators want a meter with a display that provides the important information about their process, can be seen under various lighting conditions, from wide angles, and from a distance. The SA77RTC delivers all these and more, with high performance and a sleek, modern look that managers can be proud to install in their facility. Spend a few minutes reviewing the features described in the graphic above and you will see how!

KEY FEATURES

Informative & Easy to Read Display

The high contrast, backlit LCD is easy to read from far away and under various lighting conditions. The upper display is 0.7" high and shows 5 digits of flow rate or total. The lower display is 0.4" high and shows either flow rate, total, grand total or a tag with 7 alphanumeric characters. Best of all, the display is mounted right up against the glass so it can be seen from a wide viewing angle.

Through-Glass Buttons

The SA77RTC is equipped with four sensors that operate as through-glass buttons so that it can be programmed and operated without removing the cover (and exposing the electronics) in a hazardous area. These buttons can be disabled for security by selecting the OFF setting on the THRU-GLASS BUTTONS switch located on the back of the electronics module, inside the enclosure.

To actuate a button, press one finger to the glass directly over the marked button area. When the cover is removed, four mechanical buttons located next to the sensors are used.

To save power, and prevent unintended triggers, through-glass buttons enter a power saving mode after three minutes of inactivity. This mode is indicated by a pause symbol (⏻). To enable the through-glass buttons, press the MENU button for up to five seconds. The display will read AWAKE, and the through-glass buttons will be fully enabled.

Modern, Sleek and Practical Enclosure

The first thing customers notice about a product is its enclosure and the SA77RTC really shines here. The copper-free (0.30%), smooth, die-cast aluminum NEMA 4X (IP68) enclosure is finished with a corrosion resistant epoxy coating that literally does make the SA77RTC shine. The built-in mounting flanges make for convenient wall or pipe mounting and there is even a slot on the back of the enclosure for centering on the pipe. There are two ¾" NPT conduit holes for wiring and one ¾" NPT hole for a flowmeter connection.

Perfect & Secure Fit Every Time

The internal cast rails ensure the SA77RTC assembles together perfectly, quickly and securely; and everything lines up for optimal viewing every time. There are no standoffs to worry about breaking or getting out of alignment. Two spring-loaded, self-retaining thumbscrews make the assembly a snap, while pressing the LCD as close to the glass as possible to improve wide angle viewing.

SA77RTC Explosion-Proof Pulse Input Rate/Totalizers

Wide Viewing Angle

Customers can't always look at the display from straight on, so the window and display module have been optimized to provide a wide viewing angle of approximately +/- 40°; nearly twice that of the competition! Remember, the SA77RTC is designed to be looked at.

TOTALIZER CAPABILITIES

Display Total or Grand Total

The upper display shows the flow rate or 5-digit total. The bottom display can display 5-digit rate, 13-digit total or grand total, or a 7-character alphanumeric unit or tag. It is easy to switch between displaying the rate, total, or grand total. Press DISPLAY to change the lower display. The LCD will display a T when showing total, and a GT when showing the grand total.

13-Digit Total/Grand Total Overflow

The total and grand total may each display up to 13 digits on the lower, 7-digit display. To do this, the display enters overflow mode. The total and grand total will toggle between two displays as shown below.

| 6 Most Significant Digits | 7 Least Significant Digits |

Displaying Grand Total of 2,015,497,892,002

The T or GT indicator on the display will flash to indicate overflow, and the 6 most significant digits (first 6 numbers of the total) are indicated with the overflow symbol as shown above.

Total & Grand Total Reset

The total and grand total may be reset via the through-glass RESET button, mechanical button (cover off), an external contact closure (total only), or automatically via user-selectable preset value and time delay (1–99,999 sec). Manual reset may be disabled or protected by a password. Total and grand total are reset independently.

Non-Resettable Grand Total Mode

The grand total may be configured to be a non-resettable grand total. *This is a permanent setting*. Configuring the grand total as a non-resettable grand total locks out all setup parameters that could be used to reset or change the setup of the grand total; including input selection, rate scaling, and conversion factors.

Alternating Rate, Total, Unit, & Tag Displays

The meter can be configured so that the lower display automatically toggles between several displays, such as the total or grand total value, total or grand total units, and a custom assigned tag name. Rate and rate units, total units, or a custom tag may also be selected to toggle. The toggled values will display every 10 seconds for 1-5 seconds; as programmed.

Total on Bottom — Total Units on Bottom

Bottom Display Alternating Total and Total Units

Total On Top Line Display

A 5-digit total may be displayed on the top display, with various bottom displays including rate, grand total, units and tags.

Total on Top Display, Total Units on Bottom

For example, the top 5-digit display may display total, and the bottom display used for the full 7-digit or 13-digit grand total.

METER CONFIGURATION

Automatic K-Factor Unit Conversions

Most flowmeter manufacturers provide k-factor and k-factor units for the device. Enter the defined k-factor and units (i.e. pulses/gal), and the meter can automatically convert the rate, total, and grand total displays to any of 12 predefined units with four different rate time base selections and four different total multipliers. This allows you to display the units you want without the need to do math or enter additional conversion factors! Custom units can be entered which require a user defined conversion factor. The available predefined units are shown below.

Unit	Description	Unit	Description
GAL	Gallons	cuYD	Cubic yards
L	Liters	cuFt	Cubic feet
IGAL	Imperial gallons	cuIn	Cubic Inches
M3	Meters cubed	L BBL	Liquid Barrels
BBL	Barrels	BBBL	Beer barrels
BUSH	Bushels	HECtL	Hectoliter

The rate time base is selectable in seconds, minutes, hours, or days.

The total and grand total may have a x1, x100 (h), x1000 (K), or x1,000,000 (m) multiplier to prevent rollover. For example, a total unit of gallons, and a multiple of x1,000,000 (1x10^6) will display total in mega-gallons (MGAL). Totals are automatically recalculated when changing between predefined units.

Custom Display Conversion Factors

Displaying rate and total in desired units is fast, requiring no math or conversion factors, regardless of the k-factor defined by the flow-meter manufacturer. The SA77RTC automatically performs all unit conversions.

Configuration Steps	Example 1	Example 2
1. Enter flowmeter k-factor and k-factor units. This is defined by the flowmeter manufacturer	*45 Pulses/Gal*	*12 Pulses/Liter*
2. Select display rate unit and time base from available preset options.	*Liters/Sec*	*Barrels/Min*
3. Select total units and optional multiplier.	*Megaliters*	*Barrels*

Programming the meter in *Example 1* above accepts a flowmeter signal defined in pulses/gallon and displays rate in Liters/second and total in Megaliters. No calculations were required, just a few settings with clearly labeled menu selections!

Example 1 Meter Displays:

| Rate & Total | Flow Rate Units | Total Units |

Custom Scaling and Live Input Calibration

In lieu of K-Factor setup, the meter can be scaled to any span relative to the input pulse rate span (i.e. if you knew the pulse input span for gallons but wanted to display the rate and total in liters). No external signal is required. Live input calibration can also be performed. This is done at any two points along the scale. Using this method, an operator can set a "best fit straight line" for non-linear input spans.

Multi-Point Linearization

Up to 32 linearization points can be selected under the Scale function. The multi-point linearization can be used to linearize the display for non-linear signals such as non-linear flows, and for end-point correction on flow meters. These points are established via direct entry (SCALE) or with an external calibration signal (CAL).

Customizable Menu Structure

The top-level programming menus are fully customizable. The menus available by default when pressing the MENU button are Setup and Advanced. These menus may be removed, or additional parameters added, to customize the programming menu for easier operation and enhanced programming security.

ADDITIONAL FEATURES

Pulse to 4-20 mA Retransmission

Use the analog output to retransmit the pulse input signal in the commonly used 4-20 mA form. This feature is available on the SA77RTC's -APA, -BMA, -BTA, -CTB, and -DTB models. The 4-20 mA output can be scaled to represent all, or part, of the actual input span.

Open Collector Outputs

The SA77RTC has two open collector outputs standard. Open collector pulse outputs Out 1 and Out 2 are individually programmable for rate, total, or grand total alarms; rate, total, or grand total pulse outputs; retransmitting of pulse inputs; quadrature paired output; or constant timed pulse output.

Wide Input Signal Selection

The SA77RTC is designed to handle a wide variety of inputs, including: pulse, open collector, NPN, PNP, TTL, or switch contact up to a 64 kHz rate. It can readily discern inputs with pulse widths as small as 5 μs. Inputs are conveniently set up on the display module by simply moving a switch to the desired option. The voltage input offers up to 500 V of isolation.

Gate Function for Slow or Unsteady Pulses

The gate function allows for a rate display of slow or unsteady pulse rates. Using the programmable gate, the meter is able to display pulse rates as slow as 1 pulse every 9,999 seconds (0.0001 Hz). The gate function can also be used to obtain a steady display reading with a fluctuating input signal. There are two settings for the Gate, low gate and high gate.

Settings Password Protection

A 5-digit password prevents unauthorized changes to the programmed parameter settings. The lock symbol is displayed to show that settings are protected. If the meter is password protected, the meter will display the message PASS LOCKED when the MENU button is pressed.

Alarm Indication

The SA77RTC has LCD indicators to alert the operator when an alarm condition is in effect.

Save Backup & Backup Restore

The backup restore feature is used to save and restore programmed settings. This is useful to restore meters whose programming has been altered in unknown ways, or to quickly restore known good settings if mistakes are made during reprogramming. The load feature will not affect the current password settings, or allow the editing of permanently locked parameters due to the enabling of the non-resettable grand total feature.

FLEXI-POWERED

There are SA77RTC models that can be powered by battery, DC with battery backup, DC only, the output-loop, or the output loop with battery backup. Under nominal battery operating conditions, the battery life is approximately 5 years. As an unused backup, the life is the shelf-life of the battery (up to 20 years). When powering the SA77RTC-CTB or -DTB by the output loop, the output load impedance must not exceed 30 VDC excitation (See Specifications for details).

Battery Backup

Any SA77RTC model with a battery may use the battery as a battery backup. As a battery backup, the primary power source is supplied by either DC power or the output loop; depending on the model. The battery is installed during battery backup operation. If there is a power failure of the primary power source, the battery will instantly take over powering the meter. There will be no interruption in the display, and no information will be lost.

Battery Status Indication

A battery indicator on the LCD alerts the user to the power status of the SA77RTC. If powered on with a battery, the battery indicator appears and will flash when a battery replacement is necessary. When the battery is being used as a battery backup, the battery symbol will appear if the primary power source fails, and the meter is being powered by the battery.

Power Smart Backlight

The meter backlight saves power and extends battery life by automatically detecting the power source and entering a power-save mode when battery powered. When the backlight is enabled and powered by a DC source or the output loop, the backlight remains on. When battery power is detected, the backlight automatically adjusts to be on momentarily, activating whenever a button activation is detected, and turning off after a short time when no button activation is detected.

Designed for Long Battery Life

The SA77RTC is designed with power savings in mind to help extend battery life. Power saving features include a low power "sleep" mode for the through-glass buttons and momentary battery-powered backlight. These power saving features extend battery life to up to 7.5 years. Low power drain from the battery when being used as a battery backup extends the recommended replacement interval to 10 years. See Specifications for additional battery life details.
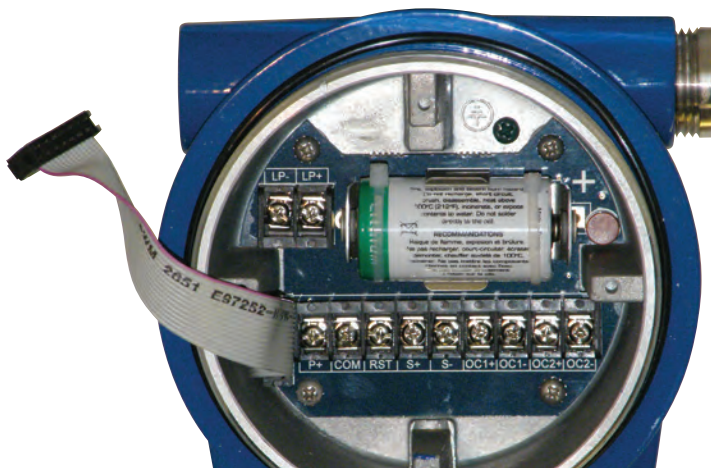
INSTALLATION

Direct Mounting

The SA77RTC is designed to easily mount directly to a flowmeter. The example below shows it mounted to a turbine flowmeter. This particular SA77RTC model (BM0) is battery-powered. Even though battery-powered, it does have a backlight; but to conserve battery power, it only turns on while through-glass buttons are in use.

Installation Flexibility

The SA77RTC's 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 (SA77RT-PLUG75) if needed.

Easy Wiring & Service

Field wiring is made to easily accessible screw terminal blocks at the base of the enclosure and there is plenty of room inside the enclosure to do the wiring. The terminal blocks are clearly marked to ensure proper wiring. The meter module connects to a detachable ribbon cable so that it can be easily removed for service, while keeping all the field wiring intact.

DATA LOGGING

The SA77RTC is capable of data logging up to 1024 records, each containing date, time, rate, total, grand total, and log number.

Real Time Logging

A real time clock records the date and time for each data log entry. The data may be recorded using the Log Time feature up to 4 times per day at a specific times entered by the user. When the log is full, it will roll over and continue to log, deleting the oldest data. The data may also be recorded using the Log Interval feature, recording the data every programmed time interval, from 1 minute to 24 hours. When the Interval log is full, recording will stop, keeping all data until logging is started again.

Easy On-Screen Access

The data log entries are easily viewable on the meter LCD. Data points may be navigated by viewing the log number, date and time, rate, total, or grand total amounts. A known log may be jumped to immediately, avoiding a lengthy search for data. With through-glass buttons and a customizable menu, the data log can be accessed quickly and without the need for external control stations or serial communications, for easy viewing in the field.

DIGITAL COMMUNICATIONS

The SA77RTC has two Modbus connectivity options; non-isolated RS-485 and isolated RS-485. Both include a three position header for 2-wire (and ground) RS-485 communication.

Modbus® RTU Serial Communications

With the purchase of an RS-485 serial communications option, SA77RTC meters can communicate with any Modbus master device using the ever-popular Modbus communications protocol. Below are just some of the actions you can perform using Modbus.
- Read rate, total, grand total, max, and min display values.
- Read the on-board 1024 record data log.
- Access all parameters remotely for programming or verification.

CONNECTIONS

To access the wiring connections, remove the enclosure cover and unscrew the two captive screws that fasten the display module. Disconnect the ribbon cable and remove the display module. Power and signal connections are made to terminal blocks at the base of the enclosure. Grounding connections are made to the two ground screws provided on the base – one internal and one external.

Code	Description
P+	DC power positive terminal
COM	DC power return/negative, reset contact closure common
RST	Contact closure reset pull-up to 1.8 VDC
S+	Signal input positive terminal
S-	Signal input negative terminal
OC1+	Open collector output 1 positive terminal
OC1-	Open collector output 1 negative terminal
OC2+	Open collector output 2 positive terminal
OC2-	Open collector output 2 negative terminal
LP+	4-20 mA transmitter DC power positive terminal
LP-	4-20 mA transmitter regulated current output terminal

DIMENSIONS

Units: Inch (mm)

3.35 (85.0)
4.15 (105.5)
3.22 (81.9)
4.86 (123.5)

5.25 (133.4)
5.65 (143.5)
0.32 (8.2)
2.25 (57.1)
3.35 (85.1)
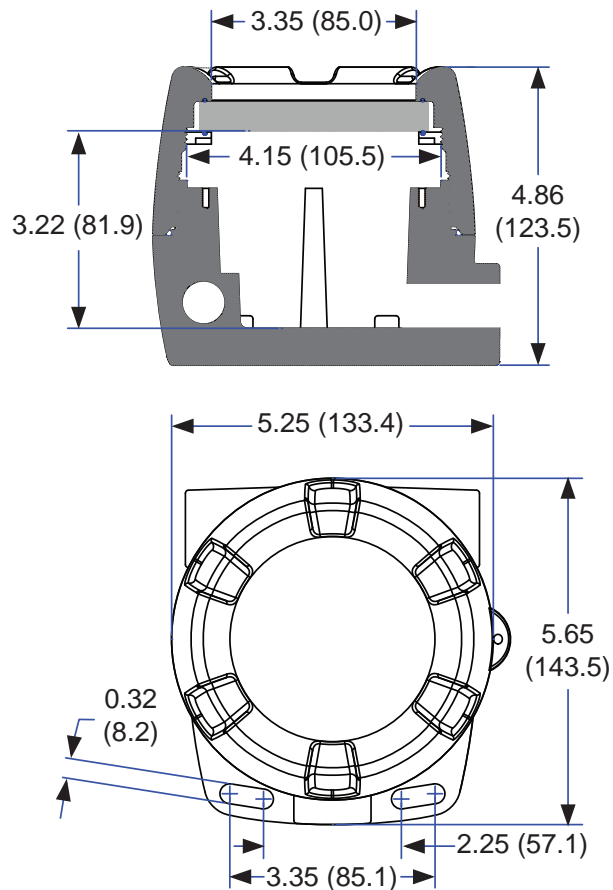
SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

General

Display: Top: Five digits (0 to 99,999), 0.7" (17.8 mm) high, 7-segment, automatic lead zero blanking. Bottom: Seven characters, 0.4" (10.2 mm) high, 14-segment automatic lead zero blanking. Symbols: Total, grand total, battery power/low battery, high & low alarm, password lock, and through-glass button sleep mode/disable.

Display Assignment: Top Display: Rate or total; Bottom Display: Combinations of rate, total, grand total, units, and custom tag.

Backlight: White LED, 10 sec auto-off when battery powered.
Backlight deactivated below temperatures ≈ -20°C

Display Update Rate: Ambient > -20°C: 1 Update/Second.
Ambient < -20°C: 1 Update/10 Seconds.
Note: Update is dependent on gate settings.

Display Orientation: Display may be mounted at 90° increments up to 270° from default orientation

Overrange: Display flashes 99,999

Programming Method: Four through-glass buttons when cover is installed. Four internal pushbuttons when cover is removed.

Recalibration: Calibrated at the factory to read frequency in Hz. No recalibration required.

Max/Min Display: Max/Min readings reached by the process are stored until reset by the user or until power to the meter is cycled.

Password Menu Options: 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.

Alarm Indication: Flashing display plus HI/LO indicators for rate alarms, SET for total alarms

Non-Volatile Memory: All programmed settings and total are stored in non-volatile memory for a minimum of ten years if power is lost.

Power Options: 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.

Battery: 3.6 V Primary Lithium (Li-SOCl2), non-rechargeable Model SA77RT-BAT36C. Expected service life & recommended replacement interval is dependant on the operating conditions.

Operating Condition
No open collector outputs, through-glass buttons off, minimal backlight
Service Life: 7.5 years   Recommended Replacement: 5.5 years
<100 Hz open collector outputs, minimal through-glass button and backlight
Service Life: 5.5 years   Recommended Replacement: 4 years
<2 kHz open collector outputs, minimal through-glass button and backlight
Service Life: 2.5 years   Recommended Replacement: 2 years
5 kHz open collector outputs, minimal through-glass button and backlight
Service Life: 1.3 years   Recommended Replacement: 1 year
Backup power only
Service Life: N/A   Recommended Replacement: 10 years

Isolation: All models: 500 V opto-isolated input-to-power/output with isolated input enabled.
SA77RTC-APA: 500 V input/power-to-output
SA77RTC-BMA: 500 V input/power-to-output
SA77RTC-BTA: 500 V input-to-output.
Note: Requires separate output supply

Data Logging: 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.

Operating Temperature Range: -40 to 75°C

Storage Temperature Range: -40 to 75°C.

Relative Humidity: 0 to 90% non-condensing

Connections: Screw terminals accept 12 to 22 AWG wire

Enclosure: Explosion-proof die-cast aluminum with glass window, corrosion resistant epoxy coating, color: blue. NEMA 4X, 7, & 9, IP68. Copper-free (0.3%). Three ¾" NPT threaded conduit openings. One ¾" NPT metal plug with 12 mm hex key fitting installed.

Mounting: May be mounted directly to conduit. Two slotted flanges for wall mounting or NPS 1½" to 2½" or DN 40 to 65 mm pipe mounting.

Overall Dimensions: 5.67" x 5.24" x 4.88" (W x H x D)
(144 mm x 133 mm x 124 mm)

Weight: 5.00 lbs (80 oz, 2.27 kg)

Warranty: 3 years parts and labor

Rate Input

Pulse Input: 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, 10 kΩ to power. Maximum Frequency: 64 kHz. Minimum Pulse Width: 5 μs. Thresholds selectable as normal or hi.

Threshold Setting	Low (V)	High (V)
Normal	1.2	2.0
Low	0.2	1.2

Opto-Isolated Input: Sourcing or sinking pulse or square wave 0-5 V, 0-12 V, or 0-24 V; Logic High: 2-24 V, Logic Low: < 1 V.
Maximum Frequency: 20 kHz
Minimum Pulse Width: 20 μs.
Input Current: 1 mA @ 5 V, 2.5 mA @ 12 V, 5 mA @ 24 V

Low Voltage Mag Pickup Input: Sensitivity: 20 mVp-p to 24 Vp-p.
Maximum Frequency: 6 kHz

Minimum Input Frequency: 0.0001 Hz. Minimum frequency is dependent on high gate setting (rate display).

Input Impedance: Pulse input: Greater than 75 kΩ @ 1 kHz.
Open collector/switch input: 100 kΩ pull-up to 3 V.

Input K-Factor Units: Gallons, liters, imperial gallons, cubic meters, barrels, bushels, cubic yards, cubic feet, cubic inches, liquid barrels, beer barrels, hectoliters, or custom.

K-Factor: Field programmable K-Factor used to define custom input units. May be programmed from 0.000001 to 9,999,999 pulses/unit.

Accuracy: ±0.03% of calibrated span ±1 count

Temperature Drift: Rate display is not affected by changes in temperature.

Low-Flow Cutoff: 0-99,999 (0 disables cutoff function)

Decimal Point: Up to four decimal places or none: 4.4444, 33.333, 222.22, 1111.1, or 00000

Calibration: May be calibrated using K-Factor, scale without signal source, or by applying an external calibration signal.

Calibration Range: 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.

Input Contact Debounce Filter: Programmable. Input signal frequency speed selections of Hi (no filter), Med (250 Hz max input, 31 ms pulse width), and Low. (100 Hz max input, 12 ms minimum pulse width).

Time Base: Second, minute, hour, or day

Gate: Low gate: 1-99 seconds; High gate: 2-9,999 seconds

Rate/Totalizer

Display Assignment: 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).

Rate Display Units: Gallons, liters, imperial gallons, cubic meters, barrels, bushels, cubic yards, cubic feet, cubic inches, liquid barrels, beer barrels, hectoliters, or custom.

Rate Display Time Base: Display rate may be calculated in terms of units per second, minute, hour, or day

Total/Grand Total Display Units: Gallons, liters, imperial gallons, cubic meters, barrels, bushels, cubic yards, cubic feet, cubic inches, liquid barrels, beer barrels, hectoliters, or custom. Setting is independent for each.

SA77RTC Explosion-Proof Pulse Input Rate/Totalizers

Total/Grand Total Display Unit Multiplier: 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.

Total/Grand Total Decimal Points: 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.

Totalizers: 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.

Totalizer Reset: Via through-glass 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.

Total Overflow & Rollover: 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.

Grand Total Overflow & Rollover: 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.

External Reset Contact: 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

Output Source: Rate/process, total, grand total, or disabled.
Scaling Range: 4.000 to 20.000 mA for any display range.
Calibration: Factory calibrated: 0.0 to 1000.0 = 4-20 mA output
Underrange: 3.8 mA
Overrange: Display Overrange: 20.5 mA, Output Overrange: 20.5 mA
Accuracy: ± 0.05% span ± 0.004 mA
Temperature Drift: 0.8 µA/°C max from -40 to 75°C ambient
External Loop Power Supply: 30 VDC maximum
Output Loop Resistance: 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

Output Assignment: 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.
Rating: Isolated open collector, off: 24 VDC max; on: <1V @ 150 mA max.
Alarm Outputs: Assign to rate for high or low alarm trip point. Assign to total or grand total for total and grand total summation alarms.
Alarm Deadband: 0-100% FS, user selectable
Alarm Acknowledge: ENTER button resets output and LCD indication.
Pulse Output K-Factor (Count): K-factor (ᴄᴏᴜɴᴛ) 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 incriminated 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.

Pulse Output Maximum Frequency: 5 kHz; 50% duty cycle. If the maximum would be exceeded, the meter will display ᴘᵁʟˢᴇ ᴏᵛᴇʀʀɴɢ.
Pulse Rate Retransmit Output: The output will generate 100 to 130 us pulses at the falling edge of every input pulse.
Maximum retransmit frequency: 5 kHz.
Quadrature Output: Output set to quadrature will lag the other pulse output by 90° (1/4 duty cycle) at output frequency. Minimum 1 Hz
Timer Output: 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.

Serial Communications

Protocol: 2-Wire RS-485 with Modbus® RTU. Isolation optional.
Meter Address/Slave ID: 1 - 247
Baud Rate: 1,200; 2,400; 4,800; 9,600; 19,200; 38,400; 57,600; or 115,200 bps
Transmit Time Delay: Programmable between 0 and 199 ms
Parity/Stop Bit: Even, odd, none with 1 stop bit, or none with 2 stop bits
Byte-to-Byte Timeout: Max of 1.5 character times or 750 µs
Note: Refer to Modbus Register Tables at www.sa-77.com for details.

Product Ratings & Approvals

Product Manufactured By Precision Digital Corporation

FM: 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 IIIC T85°C. Ta = -40 to 75°C.
Enclosure: Type 4X & IP66.
Certificate Number: 3040391
ATEX: II 2 G D. Ex d IIC T6 Gb. Ex tb IIIC T85°C Db IP68.
Ta = -40 to 75°C.
Certificate Number: Sira 10ATEX1116X
IECEx: Ex d IIC T6 Gb. Ex tb IIIC T85°C Db IP68.
Ta = -40 to 75°C
Certificate Number: IECEx SIR 10.0056X
CSA: 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 to 75°C. Enclosure: Type 4X & IP66.
Certificate Number: 2325749

ORDERING INFORMATION

SA77RTC • Pulse Input Rate/Totalizer	
Reorder Number	**Description**
SA77RTC-AP0-0	DC powered
SA77RTC-APA-0	DC powered with isolated loop output
SA77RTC-BM0-0	Battery powered (or DC with battery backup*)
SA77RTC-BMA-0	Battery powered (or DC with battery backup*) with isolated loop output
SA77RTC-BTA-0	Battery powered (or DC with battery backup*) with output loop-powered backlight and isolated loop output
SA77RTC-CTB-0	Output loop powered with loop output
SA77RTC-DTB-0	Output loop with battery backup* (or battery powered) with loop output
-M Option	2-wire RS-485 connection with Modbus protocol.** Replace ending -0 in part number with -M. Not available on -CTB or -DTB model. (Example: SA77RTC-APA-M)
-I Option	Isolated signal 2-wire RS-485 with Modbus protocol.** Replace ending -0 in part number with -I. Not available on -CTB or -DTB model. (Example: SA77RTC-APA-I)
* Battery will provide backup power when other power supply is lost. **RS-485 communication functions only when powered by DC.	

Your Local Distributor is:

Peterson Instruments

#123, 5655-10 Street NE, Calgary, AB, Canada, T2E 8W7

LDS6830-PI_A   04/15

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