



# RTI2-Series

## RATE/TOTAL INDICATOR INSTRUCTIONS

RTI2-SERIES RATE/TOTAL INDICATOR INSTRUCTIONS



Optional Protective Cover Closed



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The RTI2 flow computer is a microcontroller-based indicator/transmitter that interfaces with pulse output flow sensors to compute and display flow rate, flow total, and also generate output signals representing flow. The RTI2 has two scaled pulse outputs. Galvanic isolation is provided for most pulse outputs (see table.)

The RTI2 is a “two-wire” or “loop powered” device, meaning that it is powered by the 4-20 mA loop circuit itself. An optional internal AC power supply\* is available for the RTI2 with dual 24 and 12VDC outputs to power both the loop and sensors requiring more power than the loop can supply.

Pulse and 4-20mA analog outputs can be used to signal external devices, e.g. certain metering pumps and water treatment controls. Alternatively, one or more pulse outputs

can be configured as alarm outputs. These flow computers can be password protected to prevent resetting the total or changing configuration settings.

The RTI2 meter is available in wall and meter mount configurations. The RTI2 can also be panel mounted. Some configurations can be converted from wall to meter or meter to wall after installation if needed. Consult factory for details.

\*Internal power supply is available for the wall mount option only.

**Features**



\*\* Includes password protection for tamper prevention when needed

Specifications\*

<b>Power</b>		7-30Vdc, 4mA (4-20 mA when loop-powered)
<b>Display</b>	<b>Rate</b>	5-digit autorange
	<b>Total</b>	8-digit
<b>Units</b>	<b>Rate Units</b>	Gallons/Second/Minute/Hour/Day, Liter/Second/Minute/Hour/Day, Cubic Feet/Second/Minute/Hour/Day, Cubic Meters/Second/Minute/Hour/Day, Miner's Inch, Mega Liters/Day, Million Gallons/Day, Fluid Oz/Second/Minute/Hour/Day, Barrels (42 gallon)/Second/Minute/Hour/Day
	<b>Total Units</b>	Gallon, Gallon x 1000, Liters, Mega Liter, Cubic Meter, Acre Feet, Cubic Feet, Cubic Feet x 1000, Million Gallon, Miner's Inch Day, Acre Inch, Fluid Ounce, Barrels (42 gallon)
<b>Outputs</b>	<b>Pulse Output 1</b>	Scaled pulse output, high alarm output or low alarm output. Optoisolated. <sup>1</sup>
	<b>Pulse Output 2</b>	Scaled pulse output, high alarm output or low alarm output. <sup>1</sup>
	<b>Loop Power Output</b>	4-20mA Loop
<b>Set P Range</b>		0.1 - 99999.9 units/pulse
<b>Input</b>		5V pulse or contact closure
<b>Input Range</b>		0.75 <sup>2</sup> - 2000Hz
<b>K-Factor Range</b>		.001 - 999999.999
<b>Flow Alarm Output Range</b>		0.1 - 99999.9
<b>Operating Temperature</b>		0° to 55° C (-32° to 131° F)
<b>Non-Operating Temperature</b>		-40° to 75° C (-40° to 158° F)
<b>Environmental</b>		NEMA 4X, IP67
<b>Regulatory</b>		CE Mark

\* Specifications subject to change • Please consult our website for current data ([www.dwyer-inst.com](http://www.dwyer-inst.com)).

<sup>1</sup> Scaled output pulses have a fixed width of 100ms. Maximum pulses per second is 6.5Hz

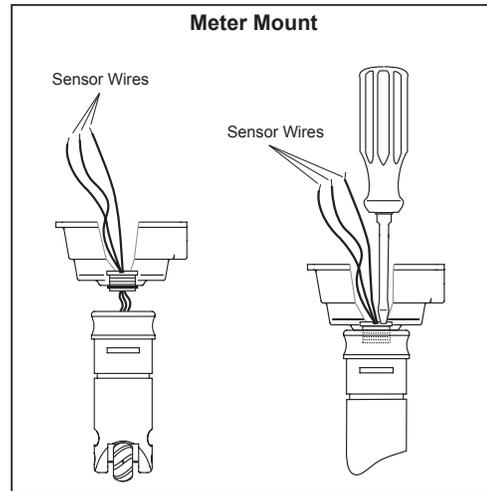
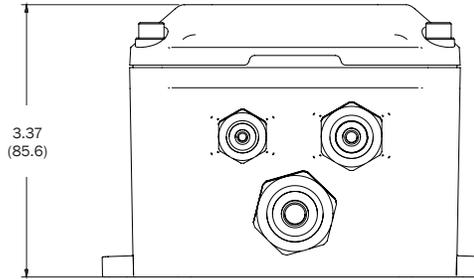
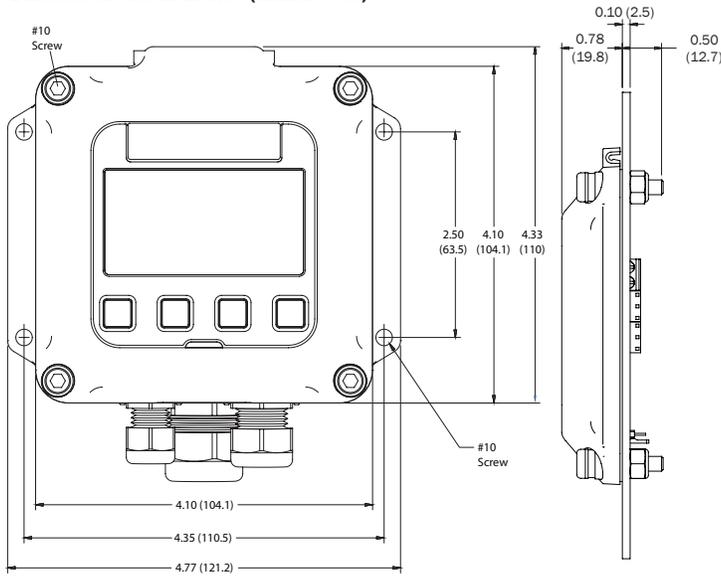
<sup>2</sup> For pulse frequencies <1 Hz, increase setting in SET F menu to 3 or higher.

Pulse Output Function Table

<b>PULSE OUTPUT 1 (SCALED)</b>	
<b>TYPE</b>	Current sinking
<b>MAX. VOLTAGE</b>	30 Vdc
<b>MAX. CURRENT</b>	100 mA
<b>MAX. FREQUENCY</b>	6.5 Hz
<b>PULSE WIDTH</b>	100 ms
<b>ISOLATION</b>	300 V
<b>CONFIGURABLE AS ALARM</b>	YES (High or Low)
<b>PULSE OUTPUT 2 (SCALED)</b>	
<b>(See Note 1)</b>	
<b>TYPE</b>	Current sinking
<b>MAX. VOLTAGE</b>	30 Vdc
<b>MAX. CURRENT</b>	10 mA
<b>MAX. FREQUENCY</b>	6.5 Hz
<b>PULSE WIDTH</b>	100 ms
<b>ISOLATION</b>	300 V
<b>CONFIGURABLE AS ALARM</b>	YES (High or Low)

**NOTE 1:** With 2000 ohm or lower pull-up resistance.

Dimensions are in Inches (Millimeters)



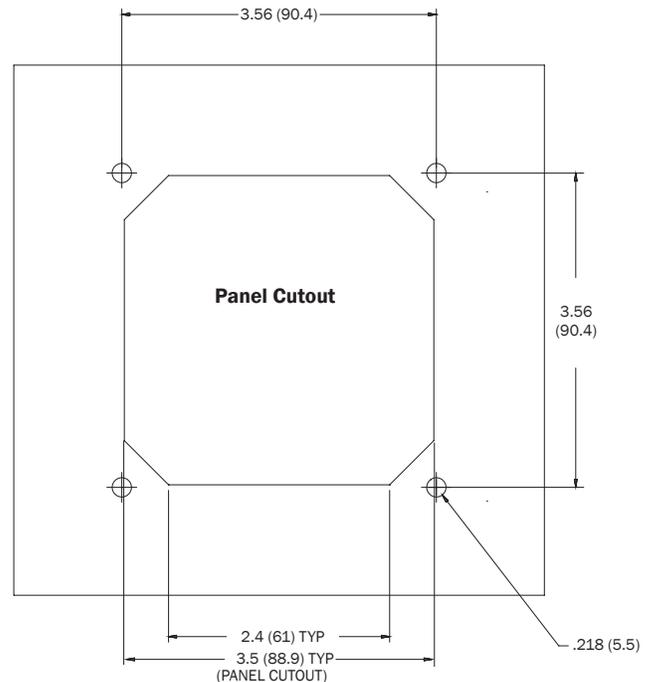
**Wall Mount.** To mount an RTI2 indicator to the wall, hold the unit in the desired position, mark the holes in the mounting feet, drill and mount with screws. A meter-mounted indicator can be converted to a wall mount using an adapter mounting kit. Contact distributor for information.

**Meter Mount.** If the RTI2 indicator was ordered as a meter mount model, the housing is already mounted directly to the flow sensor and needs no further installation.

An RTI2 module can be converted from a wall-mount to a meter-mount using the mounting kit (contact distributor) that includes a lower housing and associated hardware and installs as follows:

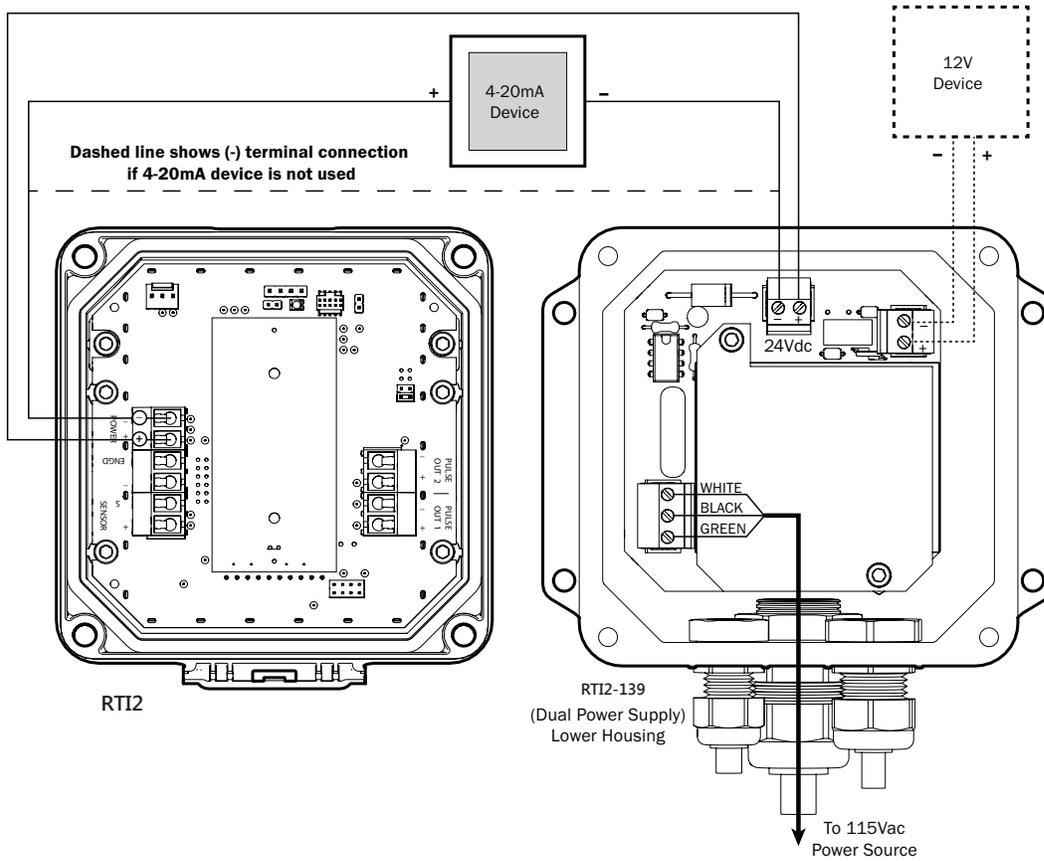
- 1) Remove the strain relief through which the flow sensor cable runs.
- 2) Cut the cable to about 6" in length. Carefully strip the cable jacket to expose the three colored wires (red, white, and black) inside.
- 3) Route the wires through the threaded connector pre-installed in the bottom of the housing.
- 4) Start the threaded connector into the female thread on the top of the flow sensor. Be sure to match the oblong shape on the bottom of the housing to the depression on the top of the flow sensor.
- 5) Using an ordinary screwdriver inserted in one side of the slot (see drawing), tighten the screw as much as possible.
- 6) Strip the wire ends, make the connections to the indicator as shown in Connections Diagrams, and then use the cover screws to attach the indicator to the top of the housing.

**Panel Mount.** Using the "Panel Cutout" drawing as a guide, cut a hole in the panel. Place the RTI2 indicator on the panel and mark the holes, drill, and mount with the supplied screws and washers.

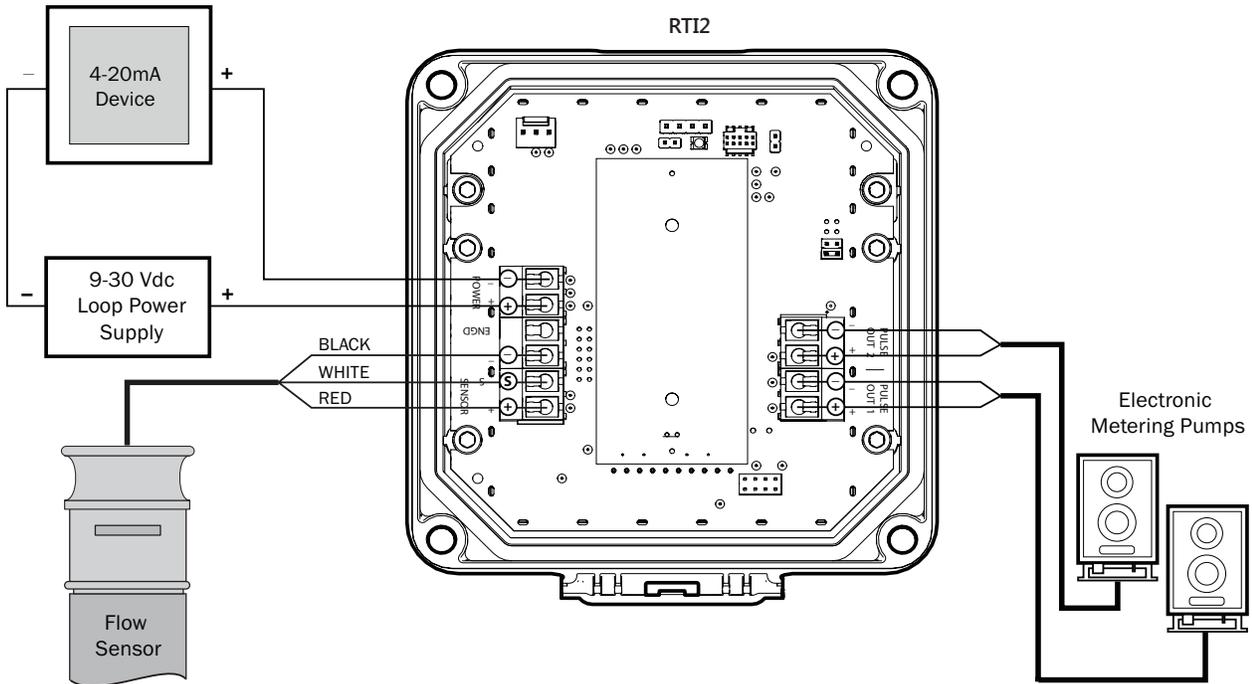


**Connections.** To connect the flow computer to a flow sensor or an external device such as a chemical metering pump, follow the Standard Connections diagrams on the following pages.

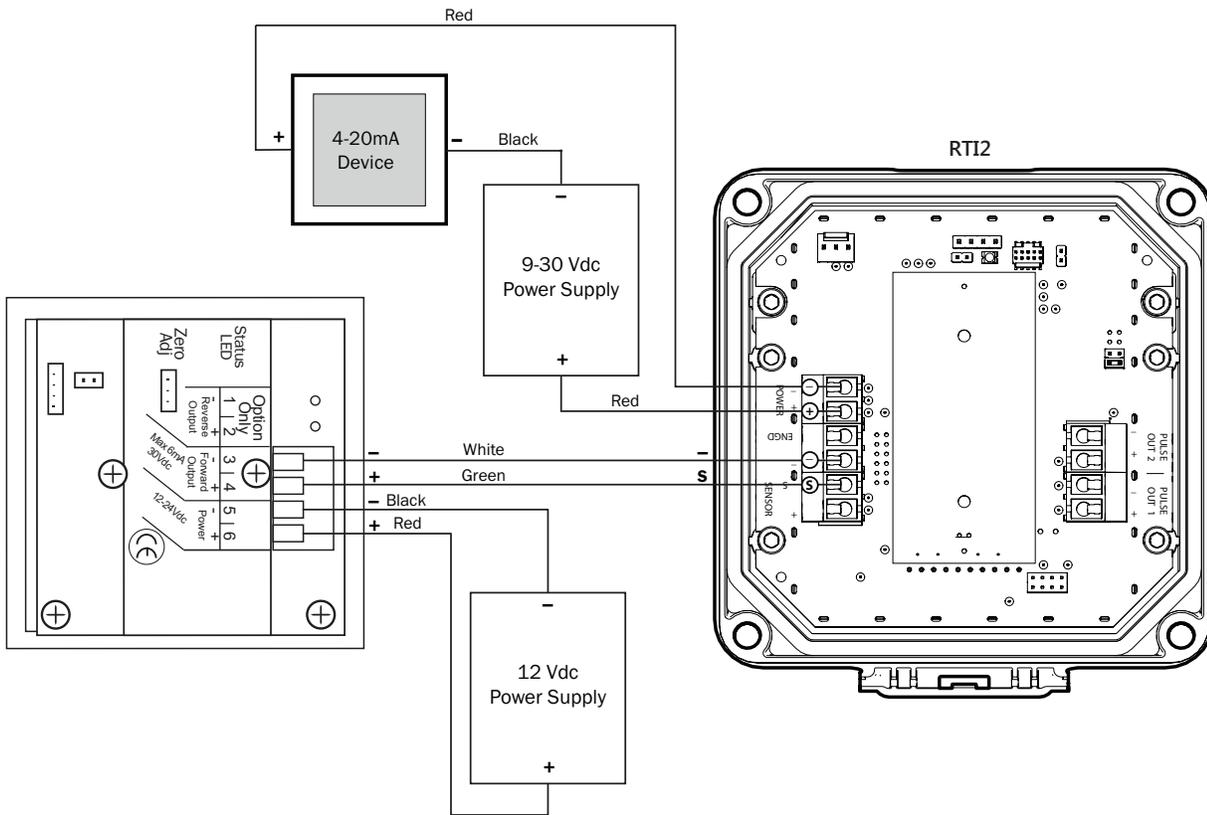
Connections for RTI2-139/115Vac Option



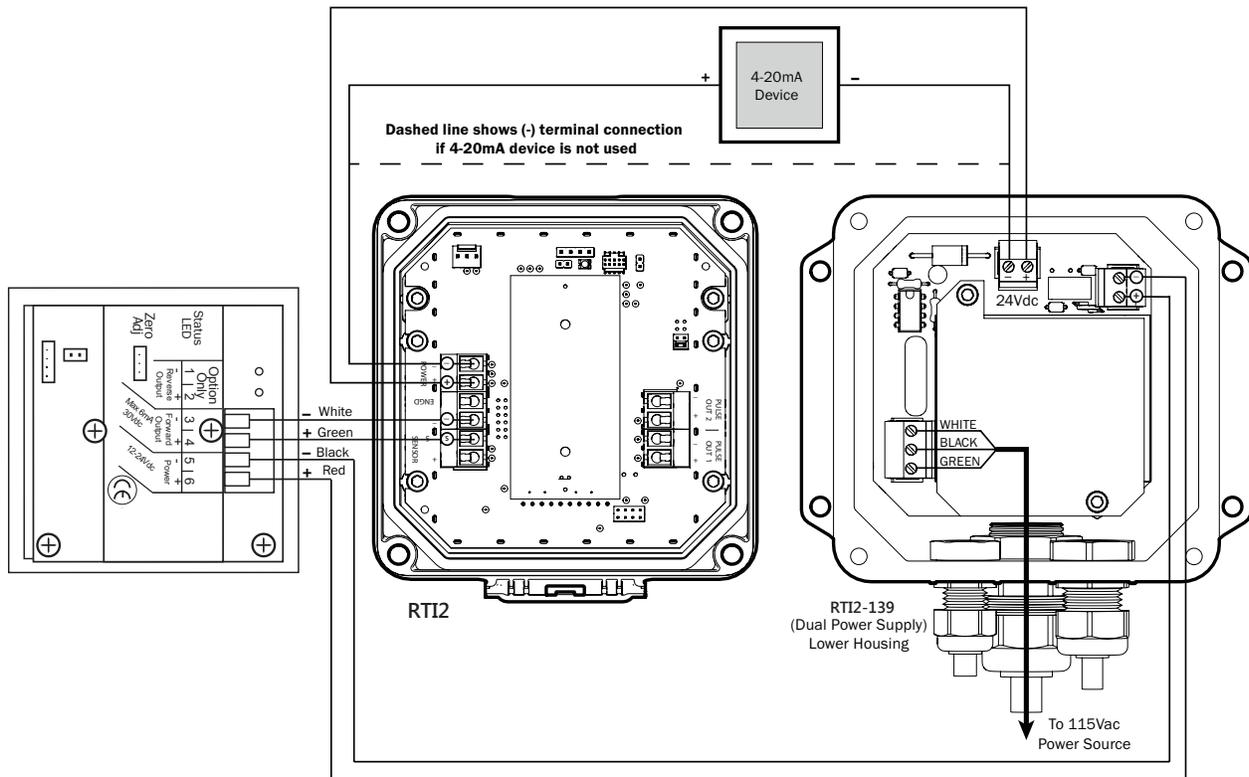
Connections for RTI2 3-wire Mechanical/ Dual Scaled Pulse Out



Connections for RTI2/EX Magmeter



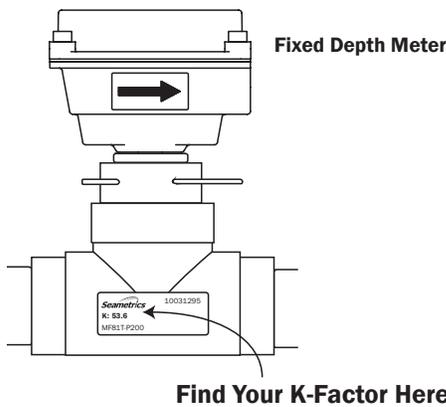
Connections for RTI2-139/EX Magmeter



**K-Factor**

At a minimum, every RTI2 flow computer must be programmed with the "K-factor". (This is the number of pulses that the meter produces per gallon of flow.) If you wish to read in units other than gallons, see below.

The K-factor on any Dwyer flow sensor fitting or in-line meter can be found on the model-serial label. The line reading K = xxxx gives the desired number. For depth-adjustable sensor, look in the instruction manual under your pipe size.

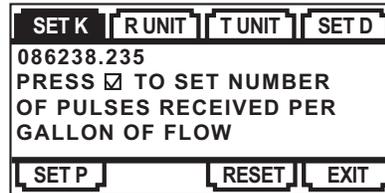


**Menu Navigation**



The left/right keys are used to move through the menus and position the cursor during data entry. The up arrow is used to scroll through the available values that are to be entered. (examples: numerical values for K factor entry or selection of units from the available options) The enter key (represented on the keypad by the check mark) is used to save selected entries and in conjunction with the exit tab to move between menu screens. As one navigates the menus the current parameter setting is shown and instructions are displayed for how to change the selected parameter.

**Main Menu**



All menu screens consist of two rows of tabs surrounding a dialog box that lets you view and change setup parameters.

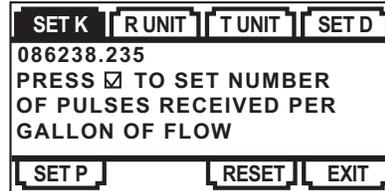
**Changing Flow Indicator Settings**

**The home screen**



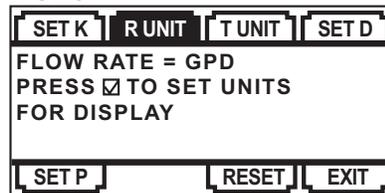
The HOME Screen, shown above, is the normal screen which displays TOTAL flow volume and flow RATE. The Four buttons below the LCD display are used to access menu screens for viewing and changing setup parameters.

**Set K**



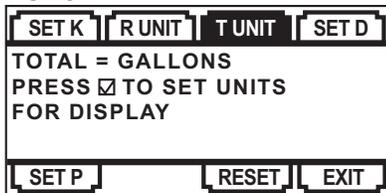
View or change the K factor. The K factor is the number of pulses the flow sensor provides for every gallon of flow. (Note that the decimal is fixed at three places. If you only have two decimal places for your K-factor, enter a zero for the third digit. If unable to set K-factor, the unit is "locked" to prevent tampering. Please contact your distributor for assistance.)

**R Unit**



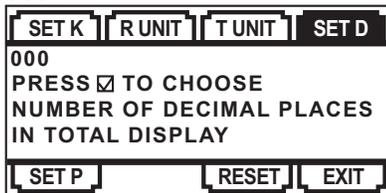
View or change the flow rate units

**T Unit**



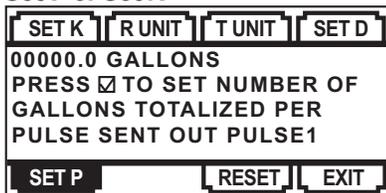
View or change the total volume units

**Set D**



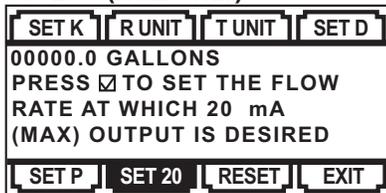
View or change the number of decimals displayed in the total volume display

**Set P or Set A**



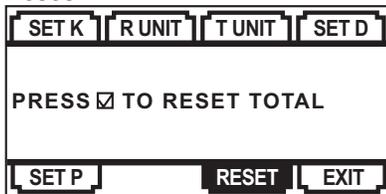
The factory setting will show Set P which allows one to view or change the volume of flow totalized per pulse sent to pulse out 1. The units for Set P follow the units selected for the rate display. Secondary menu selection will change the display to Set A. The alarm can be set to trigger on either a high or low flow condition as determined by the user.

**Set 20 (RTI2 ONLY)**



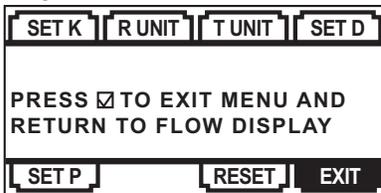
Input the flow rate at which 20 mA (max) output is desired

**Reset**



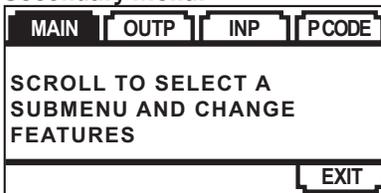
Reset the total flow volume to zero. This tab is not available when the -64 non resettable total option is ordered

**Exit**



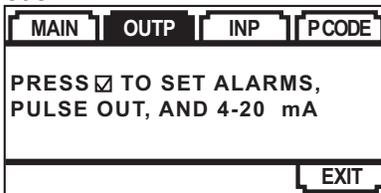
Return to the home screen, enter a submenu, or accept a parameter change

**Secondary Menu.**



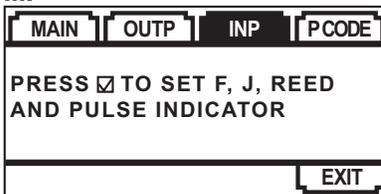
To enter the secondary menu use the left/right arrow keys to navigate to the exit tab. While the exit tab is highlighted press the up arrow 4 times. The secondary menu, shown above, will now be displayed.

**OutP**



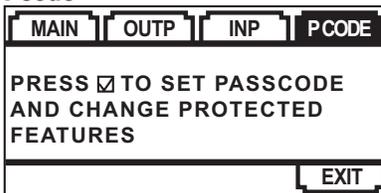
View or change the function of Set P tab on the main menu. Options are pulse out 1, alarm low, alarm high. If the alarm high/low option is selected a Set H (hysteresis) tab is available. The hysteresis entry is a % value. The value defines the % change required for a change in alarm state to occur.

**InP**



View or change the filter (set F), jitter (set J), enable reed mode. Use the filter setting if the display is jumping excessively due to flow conditions. Use the jitter setting to enter a time delay to handle start up conditions. Jitter units are seconds.

**Pcode**



Enter the passcode for access to protected features.

**The RTI2 Secondary Menu Functions**

<p><b>OutP</b></p> <p>Enters the menu where the default output functions are selected.</p> <p>The P/A tab changes the function of the outputs. Default is scaled pulse out for both outputs. Either output can be changed to alarm high or alarm low. If alarm options are selected menu tabs for setting the alarms will be displayed on the main menu (alarm 1) or the secondary menu (alarm 2) If the alarm options are selected a Set H (hysteresis) tab is available. The hysteresis entry is a % value. The value defines the % change required for a change in alarm state to occur.</p> <p>The factory setting will show Set P2 which allows one to view or change the volume of flow totalized per pulse sent to pulse out 2. The units for Set P2 follow the units selected for the rate display. If P2 is selected as an alarm the menus will change to Set A2 and a Set H (hysteresis) tab is available. The hysteresis entry is a % value. The value defines the % change required for a change in alarm state to occur.</p> <p>Set 4 input the flow rate at which 4 mA (min) output is desired.</p> <p>ADJ L allows the adjustment of the 4 mA and 20 mA values so that one can tune performance of the RTI2 to match the installed system values. The adjustment units range for 0-32? Positive values adjust the setting incrementally larger and negative values adjust the setting incrementally lower.</p>	<p><b>InP</b></p> <p>View or change the filter (set F), jitter (set J), enable reed mode. Use the filter setting if the display is jumping excessively due to flow conditions. Use the jitter setting to enter a time delay to handle start up conditions. Jitter units are seconds.</p> <p><b>Protected Features</b></p> <p>To enter the protected features use the left/right arrow keys to navigate to the Pcode tab, found in the secondary menu. Press the enter key and then enter the passcode. The protected menu, shown below, will now be displayed. The tabs have the following functions:</p> <p><b>Set CD</b> Enter a user created numerical passcode.</p> <p><b>Lock</b> Lock menu functions to prevent unauthorized changes.</p> <p><b>E/D R</b> Disable or enable the total volume reset function.</p> <p><b>PCNT</b> Keeps a running tally of the number of times the passcode has been used.</p>
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Problem	Probable Causes	Things to try...
Display blank	No power to the unit Short in sensor circuit Display is in sleep mode	Check for minimum 12 Vdc at power terminals Disconnect sensor, see if display returns (zero flow rate) Push any button to reactivate display. (Display goes to sleep after about 3 minutes of non-use.)
Display missing pixels	Damaged display module	Contact distributor for return/replacement
Display showing meaningless characters	Unit's microcontroller crashed	Disconnect and reconnect power. If problem repeats, contact distributor for return/replacement.
Display reads normally but flow rate incorrect	Wrong K-factor or time base entered	Enter correct K-factor from meter, fitting, or manual
Display reads normally but incorrect pulse output	Wrong pulse output setting Polarity reversed on pulse output terminals	Use "Set P" to correct pulse output setting Reverse leads
Display reads normally, but no (or incorrect) 4-20mA output (RTI2 only)	Wrong 4mA setting or wrong 20mA setting Inadequate loop power supply voltage Polarity incorrect in 4-20mA loop circuit	Use "Set 4" to correct target minimum flow rate. Use "Set 20" to correct target top flow rate. Check voltage (For 4-20mA applications, 24 Vdc is recommended) Compare to Connections diagram
Display reads zero when there is flow	Flow sensor failed Break in flow sensor circuit Flow sensor not battery-compatible	Consult flow sensor manual for how to test Check for continuity with multimeter Check flow sensor model number for "micropower option"
Display reads flow rate when there is none	Long flow sensor wire, running parallel to power wires Flow sensor malfunction Flow "jitter" (oscillating slosh) reads as flow	Reroute wire or change to shielded wire See flow sensor manual to check Consult factory for "anti-jitter" setting
Totalizer does not always appear to display the total flow	Break in power to meter	The totalizer's memory is only updated every 15 minutes. If power is lost, the totalizer will retain the value last written but will not be updated to reflect any flow between the last write and the time the power was lost.

