Seametrics
Flow Meters & Controls

Protective Cover Closed

FT400-SERIES

Rate/Total Indicator Instructions

ISO 9001:2008 CERTIFIED COMPANY

PROUDLY MADE IN THE USA

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TABLES AND DIAGRAMS

GENERAL INFORMATION

The FT400 series flow computers are microcontroller-based indicator/transmitters that interface with pulse output flow sensors to compute and display flow rate, flow total, and also generate output signals representing flow. The FT430 and FT450 have one scaled pulse output and one pulse pass through. The FT440 has two scaled pulse outputs. Galvanic isolation is provided for most pulse outputs (see table).

The FT450 is battery powered. The FT430 may be powered by an external DC power source or an optional internal AC power supply.* The FT440 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 FT440 with dual 24 and 12VDC outputs to power both the loop and sensors requiring more power than the loop can supply.

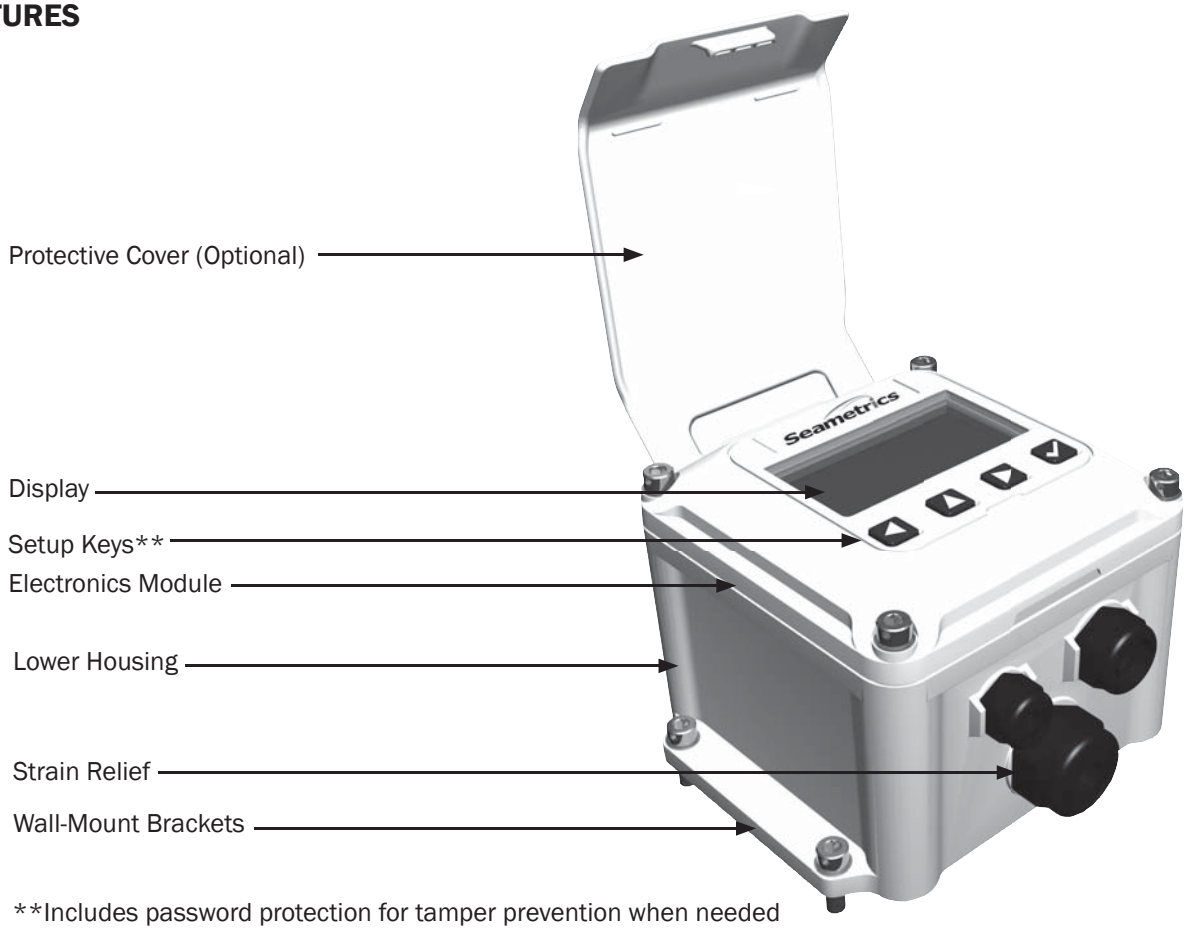
*Internal power supply is available for the wall mount option only.

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. FT400 Series flow computers can be password protected to prevent resetting the total or changing configuration settings.

All FT400 meters are available in wall and meter mount configurations. The FT430/440 models can also be panel mounted. Some configurations of the FT400 series can be converted from wall to meter or meter to wall after installation if needed. Consult factory for details.

Order the FT440 only if a 4-20mA output signal is required. Order the FT450 if internal battery power is needed. Otherwise, the FT430 offers the most flexibility.

FEATURES



**Includes password protection for tamper prevention when needed

SPECIFICATIONS*

		FT430	FT440	FT450
Power		7-30Vdc, 4mA	7-30Vdc, 4mA (4-20 mA when loop-powered)	Lithium "C", 3.6Vdc, replaceable. Life is ~5 years depending on usage.
Display	**Rate**	5-digit autorange	5-digit autorange	5-digit autorange
	Total	8-digit	8-digit	8-digit
Units	**Rate Units**	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		
	Total Units	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		
Outputs	**Pulse Output 1**	Scaled pulse output, high alarm output or low alarm output. Optoisolated on FT430 and FT440.**		
	Pulse Output 2	Pulse pass through	Scaled pulse output, high alarm output or low alarm output.**	Pulse pass through
	Loop Power Output	N/A	4-20mA Loop	N/A
Set P Range		0.1 - 99999.9 units/pulse	0.1 - 99999.9 units/pulse	0.1 - 99999.9 units/pulse
Input		5V pulse or contact closure	5V pulse or contact closure	Micropower GMR Sensor (square wave)
Input Range		2000 Hz Max	2000 Hz Max	550 Hz
K-Factor Range		.001 - 999999.999	.001 - 999999.999	.001 - 999999.999
Flow Alarm Output Range		0.1 - 99999.9	0.1 - 99999.9	0.1 - 99999.9
Operating Temperature		0˚ to 55˚ C (-32˚ to 131˚ F)	0˚ to 55˚ C (-32˚ to 131˚ F)	0˚ to 55˚ C (-32˚ to 131˚ F)
Non-Operating Temperature		-40˚ to 75˚ C (-40˚ to 158˚ F)	-40˚ to 75˚ C (-40˚ to 158˚ F)	-40˚ to 75˚ C (-40˚ to 158˚ F)
Environmental		NEMA 4X, IP67	NEMA 4X, IP67	NEMA 4X, IP67
Regulatory		CE Mark	CE Mark	CE Mark Pending

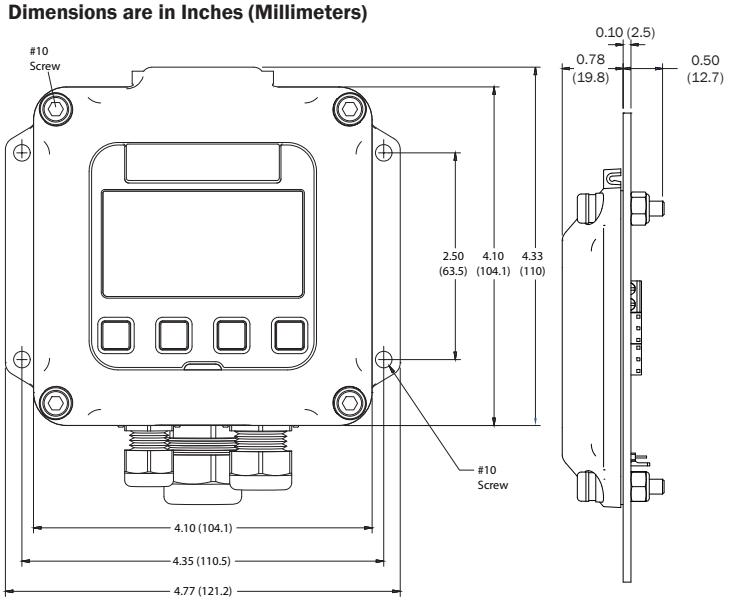
**Specifications subject to change • Please consult our website for current data (www.seametrics.com).*
***Scaled output pulses have a fixed width of 100ms. Maximum pulses per second is 6.5Hz*

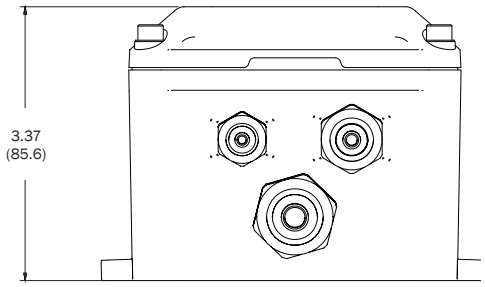
FT400 SERIES PULSE OUTPUT FUNCTION TABLE

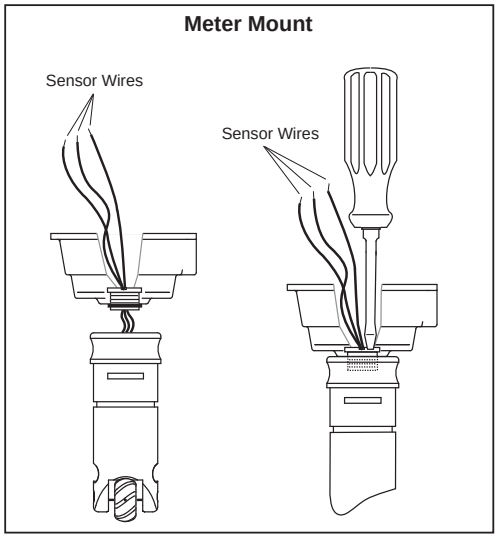
PULSE OUTPUT 1 (SCALED)	FT430	FT440	FT450
TYPE	Current sinking	Current sinking	Current sinking
MAX. VOLTAGE	30 Vdc	30 Vdc	3.6 V
MAX. CURRENT	100 mA	100 mA	100 mA
MAX. FREQUENCY	6.5 Hz	6.5 Hz	6.5 Hz
PULSE WIDTH	100 ms	100 ms	100 ms
ISOLATION	300 V	300 V	NOTE 1
CONFIGURABLE AS ALARM	YES (High or Low)	YES (High or Low)	YES (High or Low)
PULSE OUTPUT 2 (SCALED)	**FT430**	**FT440 (Note 2)**	**FT450**
TYPE	Not Available	Current sinking	Not Available
MAX. VOLTAGE		30 Vdc	
MAX. CURRENT		10 mA	
MAX. FREQUENCY		6.1 Hz	
PULSE WIDTH		100 ms	
ISOLATION		300 V	
CONFIGURABLE AS ALARM		YES (High or Low)	
PULSE OUTPUT 2 (PASS-THROUGH)	**FT430**	**FT440**	**FT450**
TYPE	Current sinking	Not Available	Current sinking
MAX. VOLTAGE	30 Vdc		3.6 V
MAX. CURRENT	100 mA		100 mA
MAX. FREQUENCY	2000 Hz NOTE 2		550 Hz
PULSE WIDTH	SAME AS SENSOR INPUT		SAME AS SENSOR INPUT
ISOLATION	300 V		NOTE 1
CONFIGURABLE AS ALARM	NO		NO

NOTE 1: *150V effective isolation when using Seametrics micropower sensors.* • ***NOTE 2:*** *With 2000 ohm or lower pull-up resistance.*

Dimensions are in Inches (Millimeters)







Wall Mount. To mount an FT400-Series 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 FT400-Series can be converted to a wall mount using an adapter mounting kit. Contact distributor for information.

Meter Mount. If the FT400-Series indicator was ordered as a meter mount model, the housing is already mounted directly to the flow sensor and needs no further installation.

An FT430/440-Series 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.

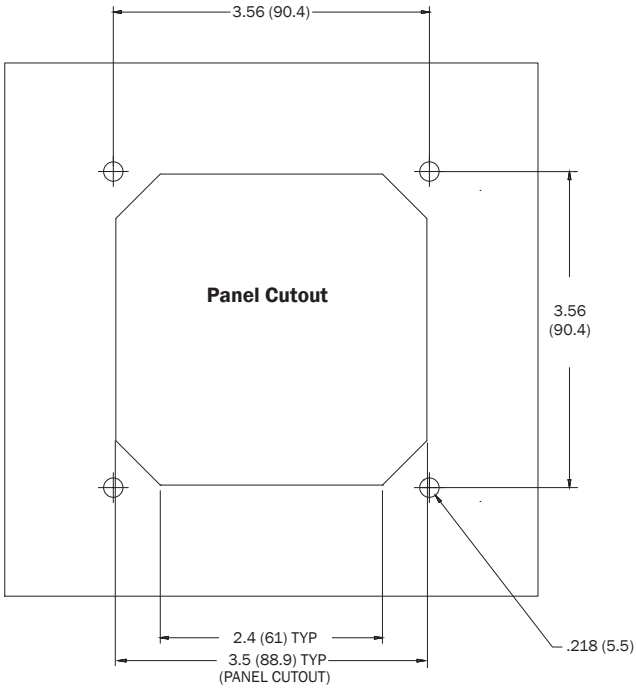
3) Route the wires through the threaded connector pre-installed in the bottom of the housing.

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 FT400-Series indicator as shown in Connections Diagrams, and then use the cover screws to attach the indicator to the top of the housing.

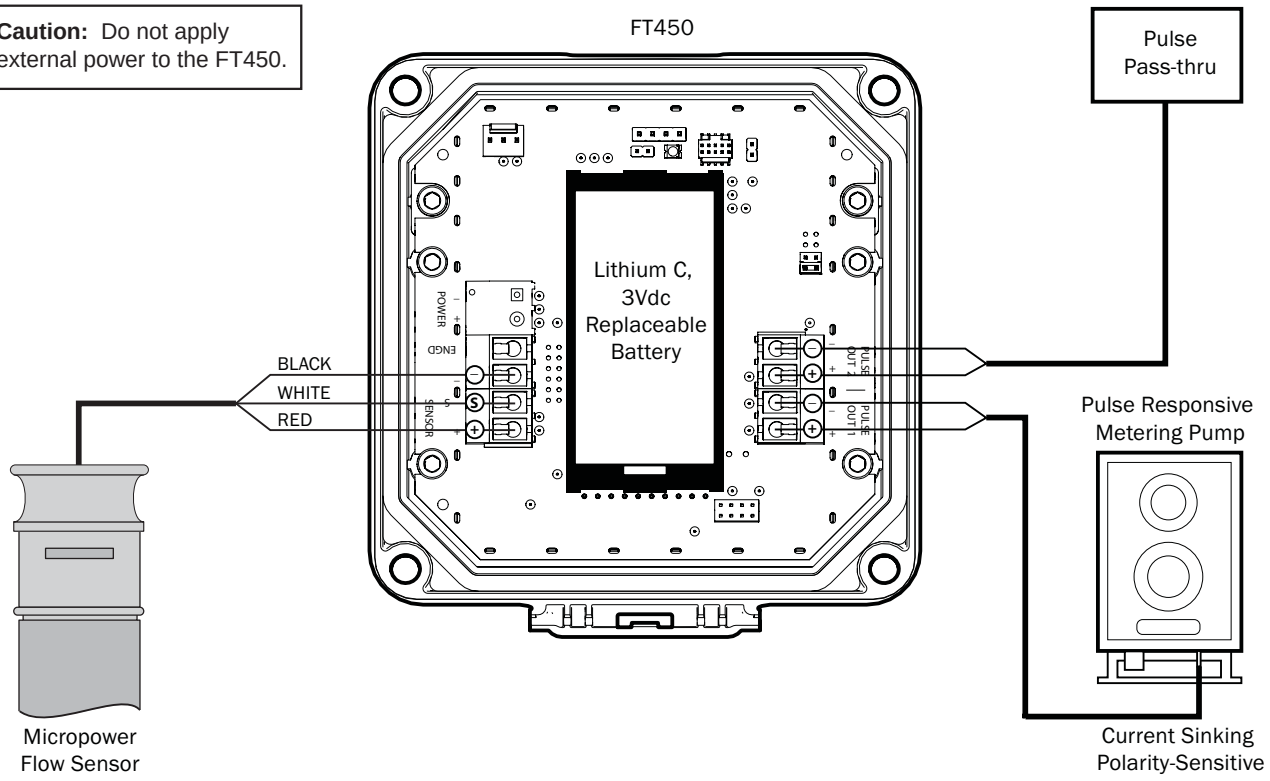
Panel Mount. Using the “Panel Cutout” drawing as a guide, cut a hole in the panel. Place the FT430/440 indicator on the panel and mark the holes, drill, and mount with the supplied screws and washers.



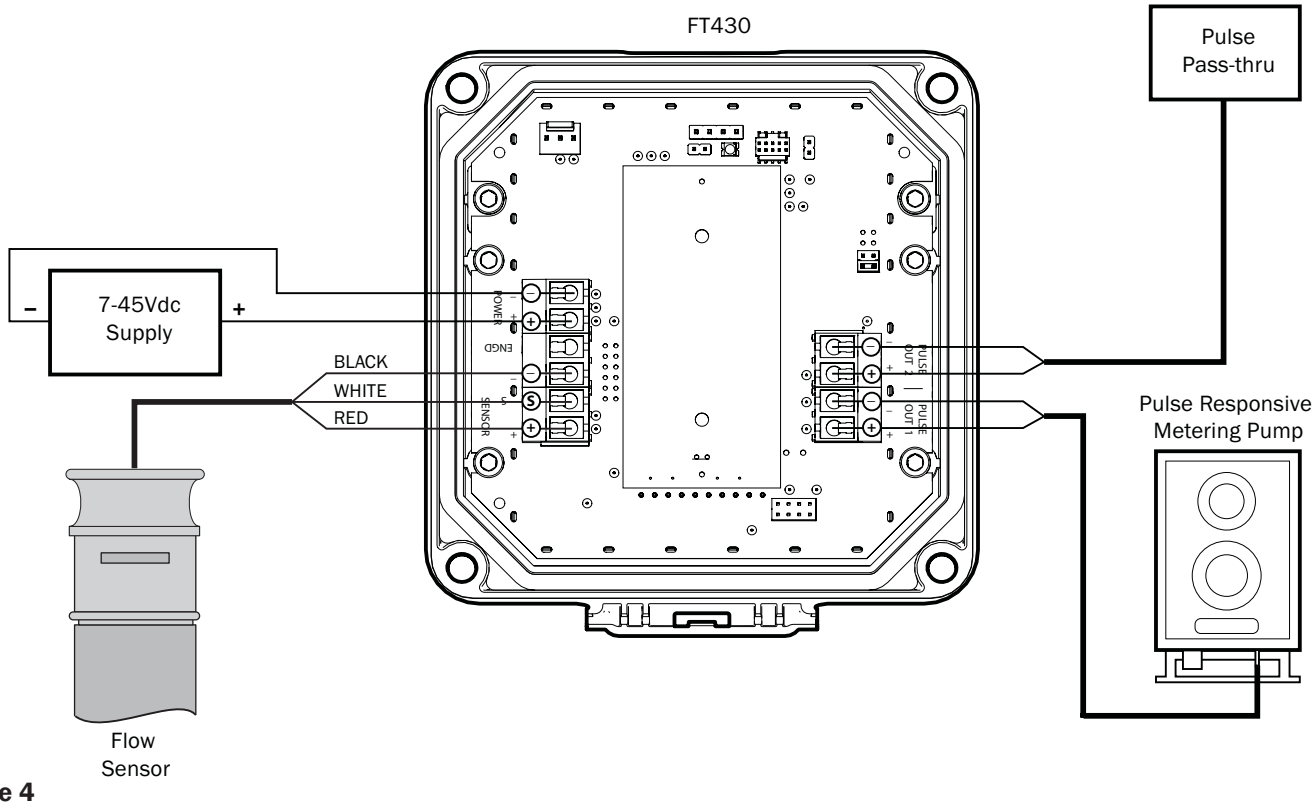
Connections. To connect the FT400-Series flow computer to a flow sensor or an external device such as a chemical metering pump, follow the Standard Connections diagrams on the following pages.

FT450 Standard Connections

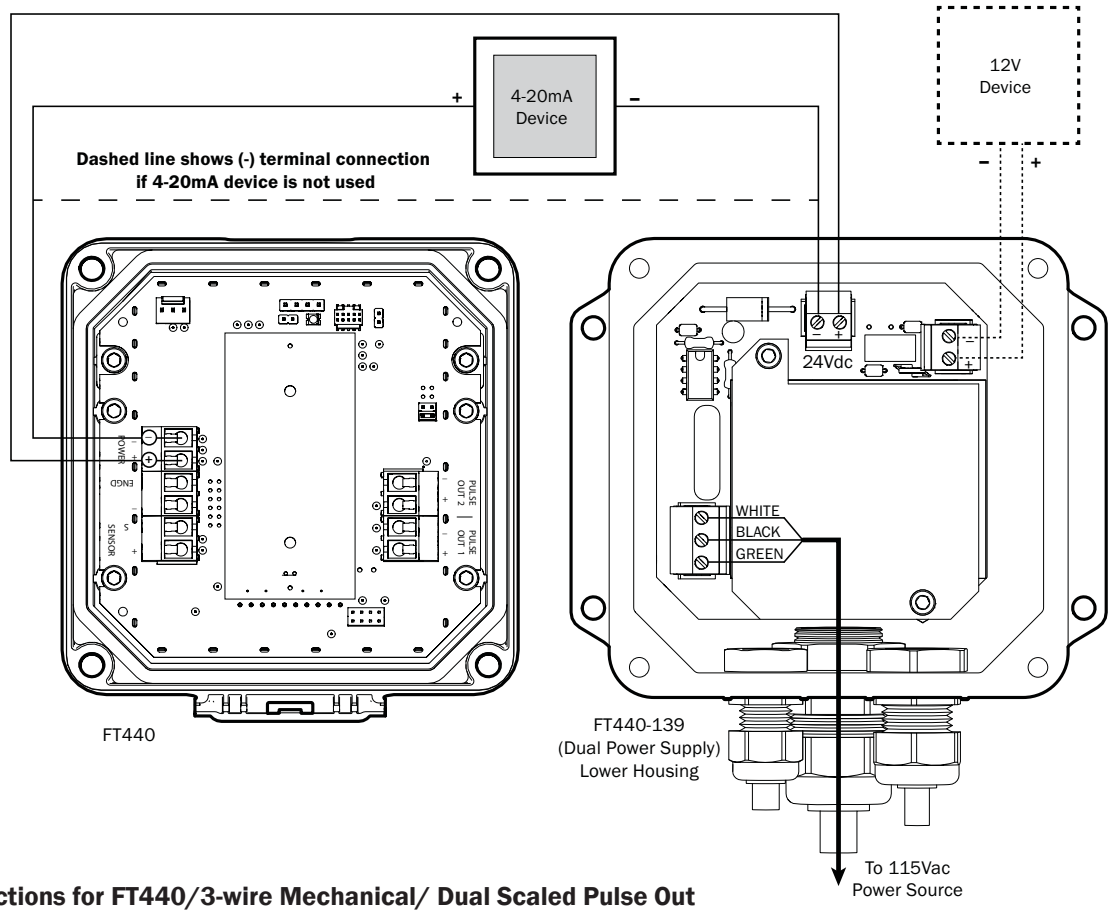
Caution: Do not apply external power to the FT450.



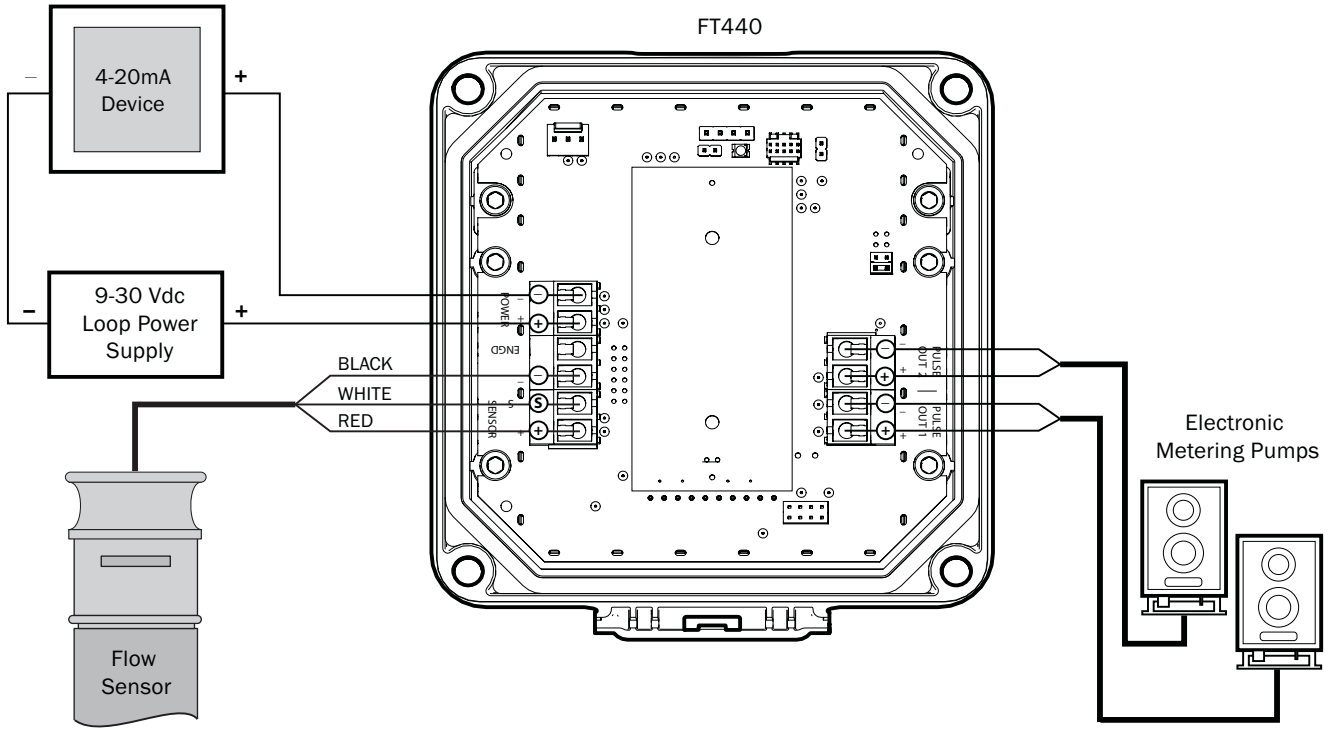
Connections for FT430/3-Wire Mechanical Meter



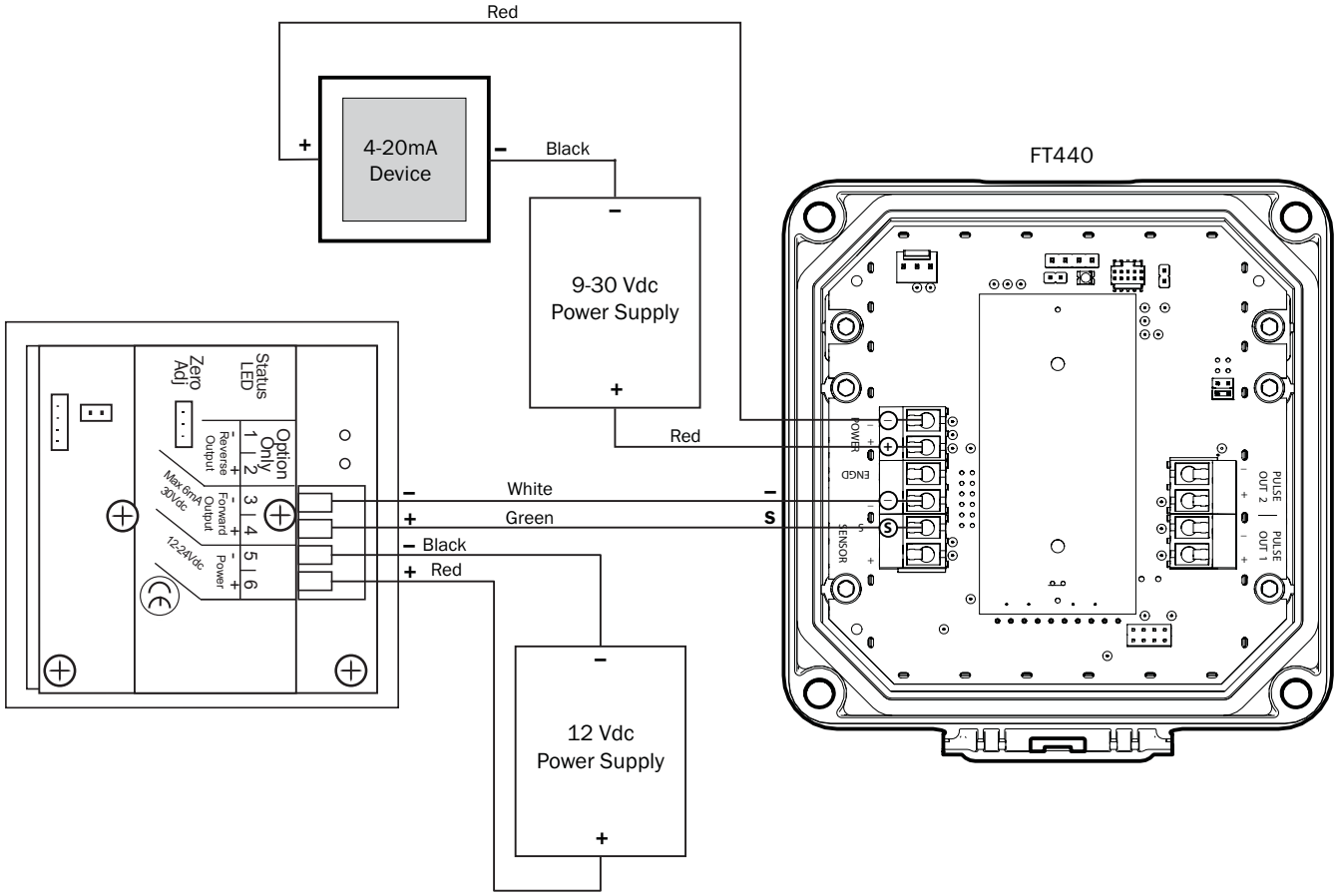
Connections for FT440-139 (115Vac Option)



Connections for FT440/3-wire Mechanical/ Dual Scaled Pulse Out



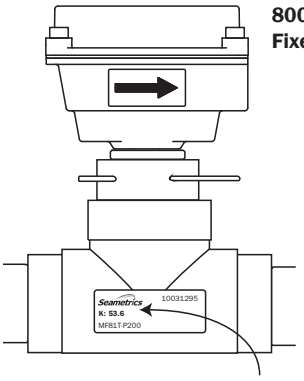
Connections for FT440-139 / EX Magmeter



K-FACTOR

At a minimum, every FT400-Series 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 the FT400 to read in units other than gallons, see below.

The K-factor on any Seametrics 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 sensors (110, 210, 150, 250 models), use the calculator on our website.

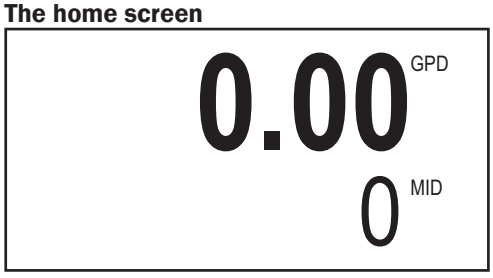


800-Series Fixed Depth Meter

Find Your K-Factor Here

CHANGING FLOW INDICATOR SETTINGS

The home screen

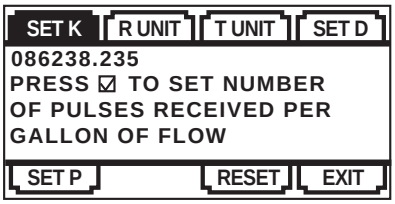


The HOME Screen, shown above, is the normal screen which displays TOTAL flow volume and flow RATE. The Four buttons below the LCD display are used to access menu screens for viewing and changing setup parameters.

MENU NAVIGATION

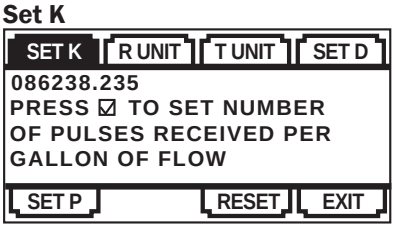
The left/right keys are used to move through the menus and position the cursor during data entry. The up arrow is used to scroll through the available values that are to be entered. (examples: numerical values for K factor entry or selection of units from the available options) The enter key (represented 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



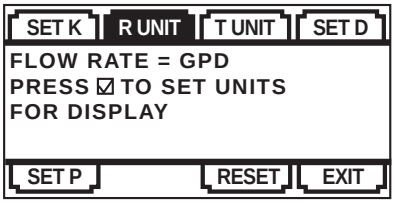
All menu screens consist of two rows of tabs surrounding a dialog box that lets you view and change setup parameters.

Set K



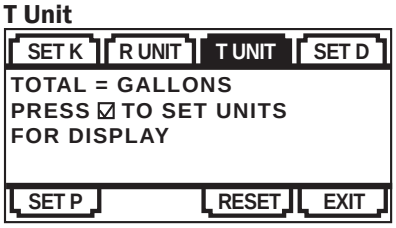
View or change the K factor. The K factor is the number of pulses the flow sensor provides for every gallon of flow. (Note that the decimal is fixed at three places. If you only have two decimal places for your K-factor, enter a zero for the third digit. If unable to set K-factor, the unit is "locked"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

R Unit



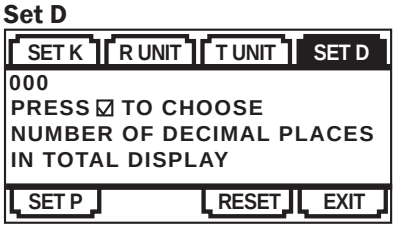
View or change the flow rate units

T Unit



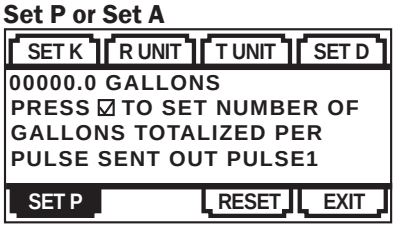
View or change the total volume units

Set D



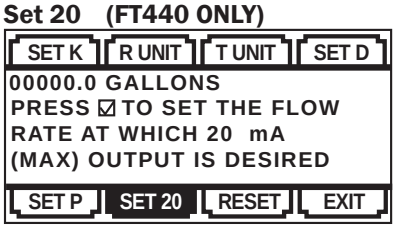
View or change the number of decimals displayed in the total volume display

Set P or Set A



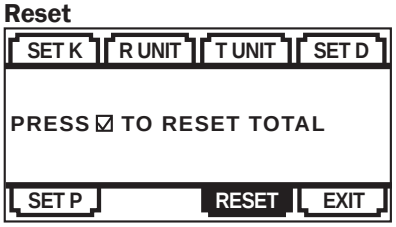
The factory setting will show Set P which allows one to view or change the volume of flow totalized per pulse sent to pulse out 1. The units for Set P follow the units selected for the rate display. Secondary menu selection will change the display to Set A. The alarm can be set to trigger on either a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

Set 20 (FT440 ONLY)



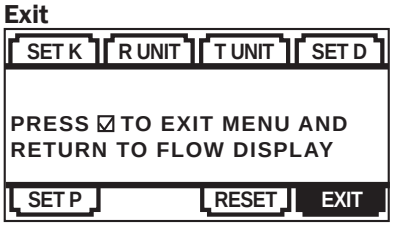
Input the flow rate at which 20 mA (max) output is desired

Reset



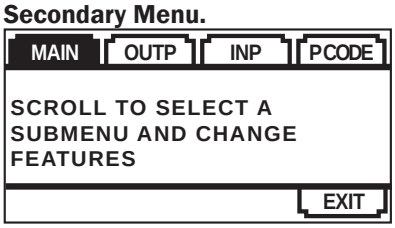
Reset the total flow volume to zero. This tab is not available when the -64 non resettable total option is ordered

Exit



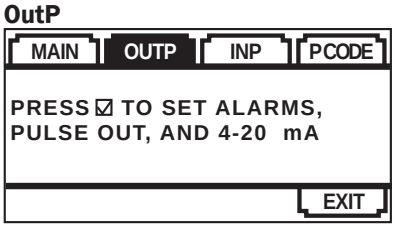
Return to the home screen, enter a submenu, or accept a parameter change

Secondary Menu.



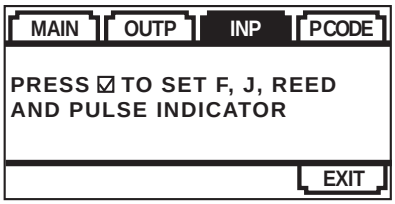
To enter the secondary menu use the left/right arrow keys to navigate to the exit tab. While the exit tab is highlighted press the up arrow 4 times. The secondary menu, shown above, will now be displayed.

OutP



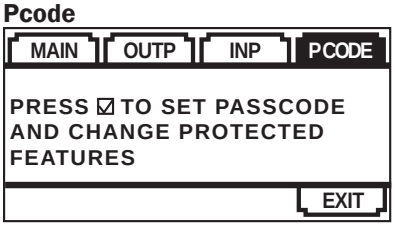
View or change the function of Set P tab on the main menu. Options are pulse out 1, alarm low, alarm high. If the alarm high/low option is selected a Set H (hysteresis) tab is available. The hysteresis entry is a % value. The value defines the % change required for a change in alarm state to occur.

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 FT440 SECONDARY MENU tabs have the following functions:

OutP

Enters the menu where the default output functions are selected.

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.

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.

Set 4 input the flow rate at which 4 mA (min) output is desired.

ADJ L allows the adjustment of the 4 mA and 20 mA values so that one can tune performance of the FT440 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.

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

Protected Features

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:

Set CD Enter a user created numerical passcode.
Lock Lock menu functions to prevent unauthorized changes.
E/D R Disable or enable the total volume reset function.
PCNT Keeps a running tally of the number of times the passcode has been used.

TROUBLESHOOTING

Problem	Probable Cause	Try...
Display blank	No power to the unit	Check for minimum 12 Vdc at power terminals
	Short in sensor circuit	Disconnect sensor, see if display returns (zero flow rate)
	Battery dead or loose (FT450 only)	Wiggle battery, replace if over three years old
Display missing pixels	Damaged display module	Contact distributor for return/replacement
Display reading meaningless characters	Unit's microcontroller crashed	Disconnect and reconnect power, if problem repeats, contact distributor for return/replacement
	Battery nearly dead	Replace battery
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	Use "Set P" to correct pulse output setting
	Polarity reversed on pulse output terminals	Reverse leads
Display reads normally, but no (or incorrect) 4-20 mA output (FT440 only)	Wrong 4mA setting or wrong 20mA	Use "Set 4" to correct target minimum flow rate Use "Set 20" to correct target top flow rate
	Inadequate loop power supply voltage	Check voltage (For 4-20 mA applications, 24 Vdc recommended)
	Polarity incorrect in 4-20 mA loop circuit	Compare to Connections diagram
Display reads zero when there is flow	Flow sensor failed	Consult flow sensor manual for how to test
	Break in flow sensor circuit	Check for continuity with multimeter
	Flow sensor not battery-compatible	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	Reroute wire or change to shielded wire
	Flow sensor malfunction	See flow sensor manual to check
	Flow "jitter" (oscillating slosh) reads as flow	Consult factory for "anti-jitter" setting

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LT-14235-20150902
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