

Eldridge Products, Inc.

Interface User Manual – vAEr00

Meter Firmware - vAE

EPICom LIVE - vAE

For use with EPI Flow Meters

80202001 (vAEr00)



www.epiflow.com

Eldridge Products, Inc.

475 Reservation Road

Marina, CA 93933

Tel: 800/321-3569

or 831/648-7777

Fax: 831/648-7780

Email: sales@epiflow.com

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Section A Revision History

The vXX Series is the latest approach to matching Meter's Firmware revisions with EPICom LIVE Software revisions. Whenever there is a revision that impacts the Meter Firmware AND the EPICom LIVE Software, the vXX revision shall be incremented and an updated manual will be released. Below are the details of the Revision History

vAEr00 Revision – June 25, 2020

1. EPICom LIVE vAE00
 - a. Added a check box to MTR Dialog that turns on/off EPICom "LIVE". Default is off
 - b. Added a check box to MTR Dialog that select Big Endian or Little Endian for Modbus Data only.
 - c. Added a check box to the Modbus Dialog that allows the user to view Modbus data in either Big Endian or Little Endian format. This selection is for viewing data only and does NOT change settings in the Meter configuration.
2. BASE vAE7.1r00
 - a. Added 220-Set Modbus Endian.
3. Manual vAEr00
 - a. Added CMD 220 Details in Menu 200 Section

220-Set MB Endian	This menu can be used to select the Modbus data format to be either Big or Little Endian. 0 = Little Endian 1 = Big Endian. Big Endian Byte order: 01 02 03 04 Little Endian Byte order: 03 04 01 02
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vADr00 Revision – June 5, 2020

4. EPICom LIVE vAD00 and BASE vADr00
 - a. Fixed the Clear Total button in the LIVE area on the MTR Dialog.
 - b. Stream lined calculations, interrupts priorities, and data transfer methods for improved communications between the Meter (BASE) and EPICom LIVE
5. BASE vAD7.1r00
 - a. Added 212-Track Hold and 222-Track Hold Duration to Meter (BASE) Modbus command support list. See Modbus Manual.
6. Manual vADr00
 - a. No manual details were changed. Only revision history to capture recent changes to the software and firmware.

vACr00 Revision – April 11, 2020

1. EPICom LIVE vAC00
 - a. Added NLPM and NLPH Engineering Units to EPICom LIVE MTR and MTR LiTe ComboBox List
2. BASE vAC7.1r00
 - a. Added 138-NLPM and 139-NLPH to Meter (BASE) 100 Menu
3. Manual vACr00
 - a. Updated 100 *Meter* Menu Section.

vABr02 Revision – March 9, 2020

1. BASE vAB7.1r02 and Manual
 - a. Added a second method to reset the Totalizer using the LCD Keypad. See Menu CMD 211 in the EPITerm Dialog Section

vABr01 Revision – March 3, 2020

1. EPICom LIVE vAB02 and Manual

- a. Added MTR LiTe Dialog Section
 - b. Added Ability to Read and Write .CMTR files when no meter is attached when using the MTR Dialog. See MTR Dialog Section.
 - c. Removed the Bacnet Dialog Button from the main toolbar.
 - d. Added mW, Volts, and mW to the EPI LIVE group in the MTR dialog. See MTR Dialog Section.
2. EPICom LIVE vAB02
 - a. Changed Password Scheme. No password to use MTR LiTe and Modbus Dialogs
 - b. Improved the “Send Data” to meter data transfer performance.
3. Manual
 - a. Added the EPICom LIVE Password Section to the User Manual

vABr00 Revision – February 22, 2020

1. Added SCMH to EPICom Unit Combobox list
2. Added 137-SCMH to Meter (BASE) 100 Menu

vAAr00 Revision – February 22, 2020

Initial Release Matching Firmware and Software vXX Series

1. vAA Initial Manual Release
2. vAA Initial Meter (BASE) Firmware
3. vAA Initial EPICom LIVE Software

Section B Introduction

EPICommunicator™ (EPICom LIVE) is proprietary software for use with any Eldridge Products, Inc. (EPI) flow meter. See our website for meter version compatibility. It consists of four modules — MTR LiTe, EPIMeter (MTR), SIM, and Modbus — which work together to put complete control of the EPI flow meter in the hands of the user. EPICom LIVE uses the RS232 communication protocol to connect an EPI flow meter to a PC running Windows 7®, Windows 10®, operating system. The software is available to download in .zip format at no charge from our web site, www.epiflow.com.

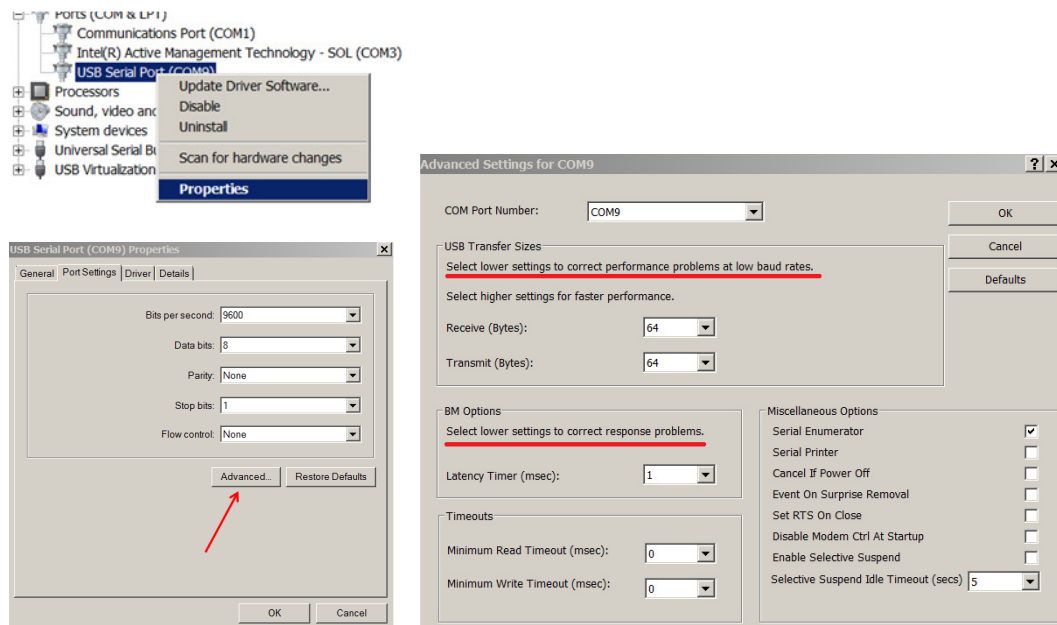
Please note that the menu system shown in this manual covers the latest version of EPICom and that older versions of the meter firmware may not support all EPICom functions. Also, some functions are available only as options selected at the time of purchase.

Connecting Your PC to Your EPI Flow meter (RS232 port)

Use the RS232 connection terminals on the EPI flow meter to connect the flow meter to the correct COM port on your PC. A wiring diagram for the 9-pin serial connector is included in this manual (see *Page E-1*). EPICom is pre-configured for RS232 communication so that no configuration adjustments should be necessary, however the factory settings are 115200 Baud, 1 start, 8 data, 1 stop, no parity.

Our meters can also use the RS485 connection terminals to carry the communications over longer distances than the RS232 protocols support. However, a RS485 to RS232 converter must be connected to the PC to communicate properly with the flow meter. Most third-party converters are suitable for this purpose.

It is recommended to use safe settings on the PC USB port configuration to prevent any potential port communication issues. For an example, see below images from Microsoft Windows PC Device Manager.



Installing and Starting EPICom

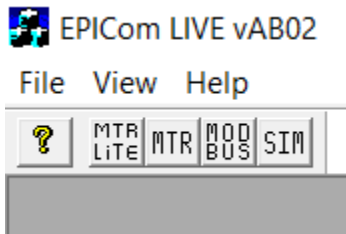
The EPICommunicator .zip file contains the basic files required for the proper operation of the software. To install EPICom, first create a folder into which the .zip file will be extracted. The name of this folder is not critical to the installation process. Extract all of the files to the folder. No other installation steps are required.

These files are all essential to the proper operation of EPICom software. They must all be stored in the same folder. Do not modify them in any way.

NOTE: If Graphical interfaces show some cutoff words, it may have to do with your computer display settings. You can adjust your Microsoft PC control panel display settings for text size. On some windows versions simply changing from Smaller to Medium (125%) display then restarting your computer will adjust the graphical interface appropriately. The graphical interface is usable even without making this change.


To start EPICom, open the EPICom folder and double-click on EPICom executable file or its icon. EPICom will open to a blank screen with the menu bar similar to shown below:


NOTE: Only one of the buttons below are allowed to be opened at any time. If one of them has an open window, then the other buttons will not work until you close the window.




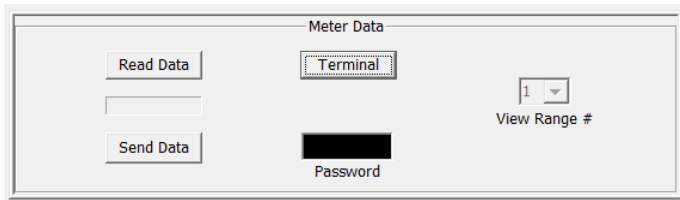
Prior to selection of a Dialog, please select “View” followed by “Settings” to make sure that the RS232 comport and its settings are identical to the PC settings for the RS232 port or the USB Virtual comport settings when using a RS232 to USB adapter.

MTR LiTE and Modbus Dialog buttons on the above menu tool bar are not password protected. MTR and SIM require a password. See the Password Section for more details.

The SIM button  allows the user to read all the sensor interface parameters from the meter and store them to a .CSIM file. These parameters are not modifiable by the user. They may be sent to the factory for viewing and modifications as needed. The SIM dialog also allows the user to read a .CSIM file and send it to the meter.


The Modbus button  opens the Modbus Dialog. **The Modbus communications module is discussed in a separate manual.**

The MTR LiTE button  is a reduced feature set of MTR parameters. These are parameters most likely to be utilized in the field and simplifies the visualization of these parameters for ease of use. Once the dialog button is pressed, the MTR LiTE dialog is opened, you will see a “Terminal”

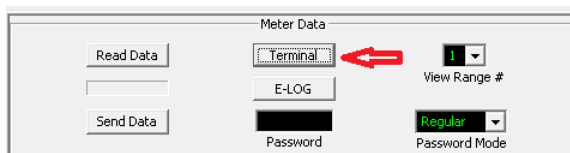


button which will open a **EPITerm Dialog** session to our EPI meter. See EPITerm Dialog Section for details on parameter access via the Terminal.



To open the MTR Dialog, click on . Once the dialog button is pressed, you will be prompted for a password. After the password is satisfied, the MTR module is opened, you will see a “Terminal”

button which will open a **EPITerm module** session to our EPI meter. See EPITerm Dialog Section for details on parameter access via the Terminal.



While attempting to utilize meter key buttons, do not open the MTR module or other modules within EPICommunicator since it may cause the key buttons to stop responding. It may require the meter to be reset via the MTR/EPITerm window, or a power reset on the meter. Sometimes this may also lock up the RS232 / USB driver port on the computer where it may need to be disconnected and reconnected or the port on your computer to be disabled/re-enabled in order to reset it.

To communicate with your EPI flow meter, begin by opening the MTR Dialog, then clicking on the “Terminal” button for EPITerm Dialog. Successfully connecting to the flow meter with EPITerm should assure that any subsequent connection to the meter will also be successful. If you experience any problems in establishing the connection with EPITerm, first check the RS232 connection (Or USB-to-Serial Comm Port if using a driver converter) and the COM port selection. EPI technicians use EPICommunicator as part of the setup process for all EPI flow meters, and they verify that the communications are working correctly as part of the final quality testing process at our facility. If any problems occur onsite that cannot be resolved, please contact the factory.

If you are using an USB to RS232 adapter dongle, you will need to plug the adapter into the PC USB port first prior to the RS232 at the meter if the meter is powered up. On occasion, the PC will see the meter's ASCII characters and may configure it as a mouse. The above method ensures this will not happen.

If USB is disconnected while the EPI Communicator is opened, you may need to re-open the "View" dropdown then click on "Settings" then click the 'OK" button to reconnect the com port.

If the display for some reason seems it is not showing all the data but is showing information from the meter and is communicating with the meter, typing "RRR" will refresh the screen to the proper expected display.

RS485 caution. If there is any attempt to turn off RS485 protocol communication, it is highly recommended to power off the meter and remove the wires prior to any attempt to read / write using the MTR module, otherwise corruption of the meter parameters may occur. If this occurs, you will be required to contact the factory for further action.

Section C EPICom MTR LiTE Dialog

MTR LiTE Overview



MTR LiTE allows access to key flow meter's settings through one PC screen. **The functions and parameters on this screen are fully described in the EPITerm section.** It is also used to save .cmtr meter backup files ("Save To File" button) after making meter configuration changes or to open a prior saved file to restore settings.

The screenshot displays the MTR LiTE software interface with the following sections:

- File Data:** Includes "Save To File" and "Read File" buttons, a text area for notes, and a dropdown menu showing a saved file: "vAB02 vAB7.1r01 SN19112602 v1.94 SN12345678 03-02-2020 09.15.01.cmtr".
- Meter Details:** Displays meter information: BASE vAB7.1r01, SN19112602; SIM v1.89, SN12345678; and Active Range 1.
- Meter Data:** Contains "Read Data", "Send Data", and "Terminal" buttons, a "View Range #" dropdown, and a "Password" field.
- Signal Output:** Features "mW Filter" (set to 2), "DAC Filter" (set to 2), and "DAC Refresh" (set to 2). It also shows "Flow V-Out 0-10V" (checked), "Temp V-Out 0-10V" (unchecked), "4-20 Out 1" (checked), "4-20 Out 2" (checked), "Flow" (checked), "TEMP" (checked), "Gas Temp Range" (0 to 210 °C), and "Zero Temp Offset" (0.0).
- Flow/Total Parameters:** Shows "Units" (Nm³/s), "Full Scale" (15.00), "C Factor" (1.000000), "Flow Cutoff" (1.00), "Area(m²)" (12.566355), "Pipe" (4000.067), "Diameter(mm)" (1 - 12.566355 m² 4000.067001 mm), and a "Pipe Size List" dropdown.
- Alarm/Relay Settings:** A table for configuring events and relays.

Event	Function	Value	Trip Delay	
Relay #1 OFF	MAX KEY	50	0	
Relay #1 ON	MIN KEY	0	0	<input type="checkbox"/> Hold Flow
Relay #2 OFF	MAX KEY	50	0	
Relay #2 ON	MIN KEY	0	0	<input type="checkbox"/> Hold Flow

Be sure the Meter's RS232 serial communications is attached to the PC as detailed in this manual. The User has two options to start interacting with the meter. The first is to press the Terminal button in the Meter Data group and proceed as described in the EPITerm Section in the manual. The second is to press the Read Data button in the Meter Data group in the image above. On a successful read, the Meter Details group will be populated with the details of the meter serial numbers and firmware revisions including the Active Range is the meter is a multi-range device. See EPITerm Section for details on ranges.

Once the Read Data has been read any .CMTR files with the associated revision and serial number will appear in the drop-down box in the File Data group. The User can save the meter's parameters using the Save to File button in the File Data group. The filename will automatically be generated by the EPICom software and will appear in the drop-down box in the File Data group. Prior to saving the parameters to the file, the User can enter notes into the large black rectangle to the right of the Safe to File Button. These notes will be stored in the .CMTR file along with the parameters.

If the Read File button is pressed, the data fields will be overwritten with the file data and this data can be sent to the meter using the Send Data button in the Meter Data group.

All .CMTR files are stored and retrieved from the same directory that the EPICom .exe is located.

Section D The EPITerm Dialog (Terminal)

Overview

EPITerm is a terminal emulation program which uses the RS232 communications protocols to present the EPI meters for real-time monitoring and control. It can be accessed via a button found within the MTR Dialog. The system features eight operational modes and their corresponding menus:

The **500 *Run* Menu** displays the real-time flow rate and total flow as well as information about the relay alarms status, time-stamping of high and low flows, etc. This is the basic operating mode for flow measurement.

The **100 *Meter* Menu** provides easy access to change the engineering units for the flow rate and total.

The **200 *Utility* Menu** supports such functions as changing the signal filtering (to smooth out pulsation or unwanted flow noise), monitoring the digital and analog voltage signals, and selecting the meter calibration range.

The **400 *Alarm* Menu** is utilized to set the flow alarm relays to respond to a wide variety of process conditions and situations. (View meter documentation to determine if your meter has one or two alarm relays. Typically, the ValuMass™ product has one while the Master-Touch™ has two)

The **450 *E-Logger* Menu** supports real-time data logging

The **750 *PW-Curve Fit* Menu** is used to apply specific adjustments to the factory calibration in increments of 5% of the Full Scale.

The **800 *P-Curve* Menu** is reserved for factory calibration configuration and variables, although some menu items, such as the Full Scale, C-Factor, SetXSect, and Auto Zero, may be used for field adjustments.

The linearizing coefficients (Menus 801-810) derived from the NIST calibration should never be changed without specific instructions from a factory technician. Changing any of these values will corrupt the calibration and negate the factory warranty.

Navigation and Data Entry

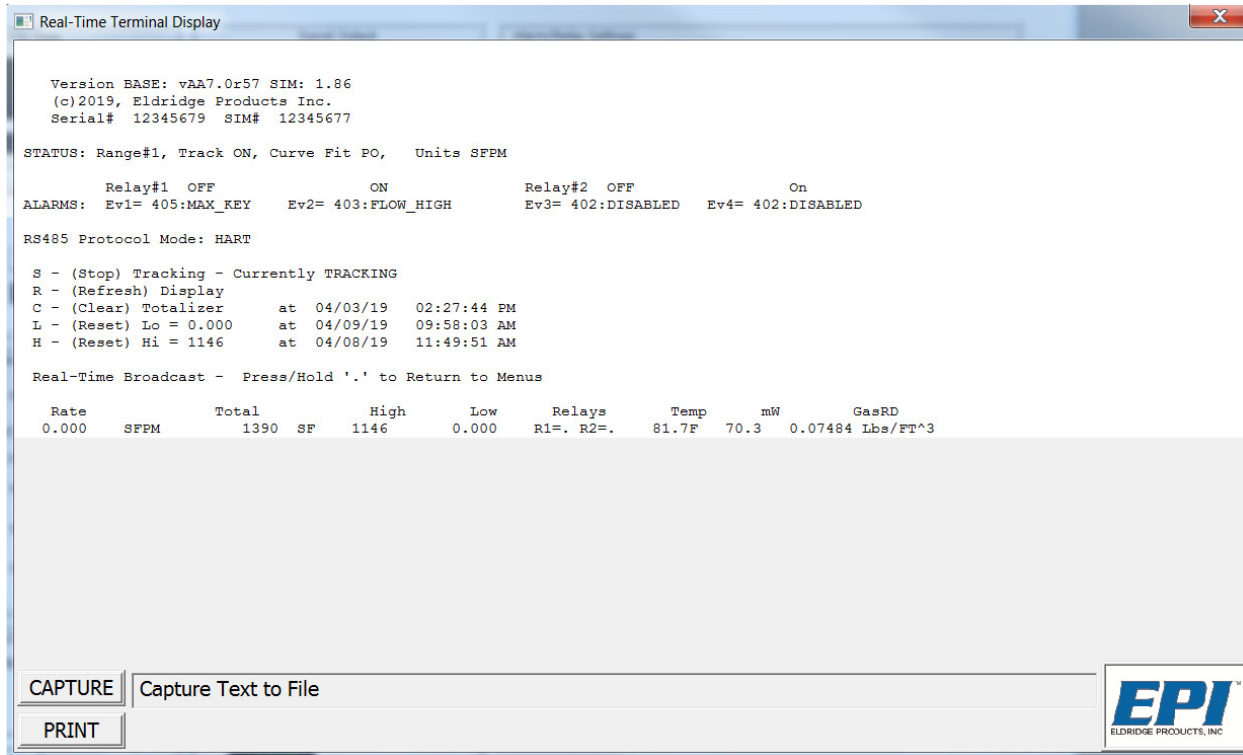
Each of the menu screens includes general status information as well as submenu items. Menu navigation and data entry are done via the PC keyboard. All data is entered at the bottom of each screen at the ">_" data entry prompt. If the meter is in the 'Run Mode', simply push and hold the period '.' Or type three periods '...' in order to display the menus. To go to a menu, simply key in the menu or submenu item number and press **Enter**. If you are in the unlocked mode, it will display ">>", if you then go into a menu for a change, it will show current value and ">" prompt, to exit from this prompt without entering any new values while in unlocked mode, press period (.), then **Enter** (or Return). This will retain the current value of the menu item. To return the flow meter to **Run Mode**, enter "500" at the menu prompt (not at a submenu data entry prompt) and press **Enter**.

EPI flow meters support a numeric passkey system to guard against unintentional meter adjustments or unauthorized data entry. The current stored values may be viewed anytime, however the settings must be unlocked before the flow meter will accept any changes to the values (*see menu items 218–Reset Lock and 219–UnLock*). A second, factory-only password is required for settings which should not be changed under ordinary circumstances.

The following pages describe each menu screen with their specific submenu items and functions.

500 *Run* Menu

The 500 *Run* Menu of the EPI Flow meter shows the basic operations of the flow meter when in use.



500 *Run* Screen (ValuMass Meter, typically 1 relay)

The **STATUS** line indicates the following:

- current active meter range (see *200 *Utility* section submenu 213-Set Meter*);
- tracking status (see *200 *Utility* section*);
- curve fit mode (see *200 *Utility* section*);
- currently selected engineering units (see *100 *Meter* section*).

The **ALARMS** line displays the current status of the alarms events (see *400 *Alarms* section*).

- Current Active Event — (Ev1–Ev4) displays the current active relay Event
- Relay#1 Off/Ev1 — indicates selected response condition for Ev1 (**Typically Not on ValuMass**)
- Relay#1 On/Ev2 — indicates selected response condition for Ev2 (**Typically Not on ValuMass**)
- Relay#2 Off/Ev3 — indicates selected response condition for Ev3
- Relay#2 On/Ev4 — indicates selected response condition for Ev4

See the MTR Module section for further alarm relay settings using the Graphical User Interface (GUI).

The **Real-Time Readout** commands are available while the flow meter is in the basic Run Mode:

(Ensure **UPPER** case for commands below. The dates and time will only reveal time of below clearing when the screen is refreshed using “RRR” or unlocking and restarting the meter)

- **R** Press “**R**” three times to refresh the information displayed in the 500 *Run* screen;
- **C** Press “**C**” three times to clear the accumulated total flow value and record the time stamp for the most recent reset of this value, and then press “**R**” three times to refresh the displayed information; Pushing “**CCC**” will also create a new line to show the old values and the new values after the clear was done.
- **L** Press “**L**” three times to clear the low flow value and the time stamp for the most recent reset of this value, and then press “**R**” three times to refresh the displayed information;
- **H** Press “**H**” three times to clear the high flow value and the time stamp for the most recent reset of this value, and then press “**R**” three times to refresh the displayed information;
- **.** Press “**.** (period)” three times to go to the **100 *Meter* Menu** and the data entry prompt.
- **9** Press “**9**” three times will cause the flow meter to restart.

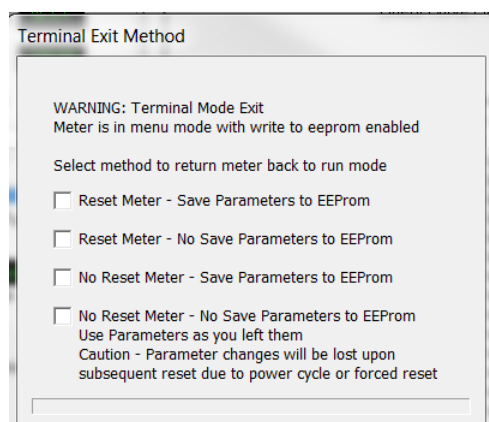
The **Real-Time Data** line is updated as the values change without any need to refresh the screen:

- **Rate** The current flow rate in current engineering units;
- **Total** The accumulated flow total since the last Total reset;
- **High** The highest flow rate since the last High reset;
- **Low** The lowest flow rate since the last Low reset;
- **R1** The current status of Relay #1 (. = *de-energized*, * = *energized*);
- **R2** The current status of Relay #2 (. = *de-energized*, * = *energized*).
- **Temp** The process gas temperature.
- **mW** Milliwatt representation linear to current flow rate.
- **GasRD** Gas reference density.

The “**CAPTURE**” button will start capture of your screen and allow you to select the location to save and filename to save to. The button will change to “**STOP**”, meaning it is capturing. Push the button to stop capture and open the captured file.

The “**Print**” button will print what is seen on the screen and what has scrolled off the screen. If you open the terminal window above and it is open for a period of time, there would be many lines that were displayed but scrolled off screen, but will still print if you use the print button. If you do not want many lines of displayed data, you can close the window and re-open it, then print and it should only show a few lines of display data. Note that printing to a file is not supported.

Also note, upon exiting the EPITerm dialog, if the meter was taken out of run mode, you will be prompted for saving any potential changes you have made to the meter. See option choices below. It is recommended that you return the meter to run mode by entering 500 prior to closing the dialog.



100 *Meter* Menu

The 100 *Meter* Menu of the EPI Flow meter includes a series of submenu items which allow you to easily change the engineering units for the flow rate and elapsed total, change the scaling of the 0–5VDC and 4–20mA output signals, and reset the stored values for elapsed total, high and low flow rates, timestamps, etc.

The flow meter settings must be unlocked to change the engineering units, 4-20mA scaling or to reset the stored values (see menu item 219–UnLock).

100 *Meter* Screen

100 *Meter*

101-SCFS	102-SCFM	103-SCFH	104-SCFD	105-LB/S
106-LB/M	107-LB/H	108-LB/D	109-STPM	110-SCIM
111-SCIH	112-SFPS	113-SFPM	114-BTUM	115-BTUH
116-MCFD	117-MMCFD	118-NCMS	119-NCMM	120-NCMH
121-NCMD	122-SLPS	123-SLPM	124-SLPH	125-SCCM
126-KG/S	127-KG/M	128-KG/H	129-KG/D	130-MTPM
131-NMPS	132-NMPM	133-NMPH	134-Nm/s	135-Nm/m
136-Nm/h	137-SCMH	138-NLPM	139-NLPH	

100 *Meter* Submenus

Menu items 101 through 139 are used to change the operational engineering units (some menu items are currently unused). With the meter settings unlocked, select the desired engineering units by entering the menu item number, i.e., “102” (SCFM), at the prompt, then press Enter. The flow meter will restart using new operational engineering units. The Full Scale will be recalculated as part of this process (see menu items 840–FScale).

The conversion of engineering units is “1:1” — the flow meter does not make adjustments for differences in Reference Conditions between Imperial and metric units, nor does it adjust for volume to weight conversions for gases other than Air or Nitrogen. Changing units between Imperial and Metric will require command 231 to be changes as appropriate. Consult the factory for help with the additional adjustments required for these situations.

101-SCFS	Standard Cubic Feet / Second
102-SCFM	Standard Cubic Feet / Minute
103-SCFH	Standard Cubic Feet / Hour
104-SCFD	Standard Cubic Feet / Day
105-LB/S	Pounds / Second
106-LB/M	Pounds / Minute
107-LB/H	Pounds / Hour

108-LB/D	Pounds / Day
109-STPM	Short Tons / Minute
110-SCIM	Standard Cubic Inches / Minute
111-SCIH	Standard Cubic Inches / Hour
112-SFPS	Standard Feet / Second
113-SFPM	Standard Feet / Minute
114-BTUH	British Thermal Units / Minute
115-BTUH	British Thermal Units / Hour
116-MCFD	Thousands of Cubic Feet / Day
117-MMCFD	Millions of Cubic Feet / Day
118-NCMS	Normal Cubic Meters / Second
119-NCMM	Normal Cubic Meters / Minute
120-NCMH	Normal Cubic Meters / Hour
121-NCMD	Normal Cubic Meters / Day
122-SLPS	Standard Liters / Second
123-SLPM	Standard Liters / Minute
124-SLPH	Standard Liters / Hour
125-SCCM	Standard Cubic Centimeters / Minute
126-KG/S	Kilograms / Second
127-KG/M	Kilograms / Minute
128-KG/H	Kilograms / Hour
129-KG/D	Kilograms / Day
130-MTPM	Metric Tons / Minute
131-NMPS	Normal Meters / Second
132-NMPM	Normal Meters / Minute
133-NMPH	Normal Meters / Hour
134-Nm/s	Normal Meters / Second
135-Nm/m	Normal Meters / Minute
136-Nm/h	Normal Meters / Hour
137-SCMH	Standard Cubic Meters / Hour
138-NLPM	Normal Liters / Minute
139-NLPH	Normal Liters / Hour

200 *Utility* Menu

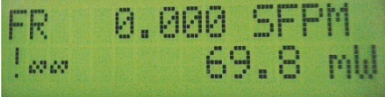
The 200 *Utility* Menu of the EPI Flow meter 200 includes a series of submenu items which allow you to easily change a wide variety of microprocessor parameters, such as the display update rate, the internal date and time, the analog-to-digital (ADC) and digital-to-analog (DAC) signal conversion filters, etc.


Although most settings are accessible by using the default user password of “9001”, some of the parameters require a special password available only by contacting the factory. This has been instituted to prevent the accidental change of critical settings.

200 *Utility* Screen

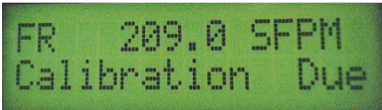
200 *Utility*			
201-Set DAC Out	202-DAC Refresh	203-DAC Filter	204-DAC Readout
205-mW Filter	206-BV Readout	207-LCD Refresh	208-LCD Contrast
209-mW Readout	210-MB BN Address	211-Reset L,H,C,A	212-Track Hold
213-Set Range	214-Set Date	215-Set Time	216-Gas Temp Offset
217-PW Enable	218-Reset Lock#	219-UnLock Meter	220-Set MB Endian
221-SetCalDate	222-Hold Duration	223-Set WD Timer	224-Protocol Mode
225-SetRS232Baud	226-SetRS485Baud	227-Flow 0-5,10	228-Temp 0-5,10
229-LCD Options	230-Temp Zero	231-Temp Span	232-Terminal Options
233-RS485Parity	234-LCD Toggle Rate	235-Reserved	236-Reserved
237-SetPSWDMODE	238-Reserved	239-Reserved	240-BiDir Mode
241-Reserved	242-Reserved	243-Reserved	244-EpiVal Sensor
245-EpiVal Log	246-Config 4-20mA	247-Accuracy Mode	248-Reserved
249-Reserved	250-Multi Point	251-CustRefCondition	252-Frequency Polarity
253-Frequency PW	254-NAMUR Enable	255-Clear Totalizer	256-Bacnet Setup

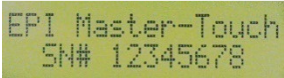
201-Set DAC Out	This menu item is used to manually set the Digital-to-Analog Converter (DAC) output voltage to specific value, i.e., 0 = 0VDC and 4mA outputs, 2.5 = 2.5VDC and 12mA outputs, etc. When in use, the system tracking is placed on hold, the totalizer stops accumulating, and the DC output pin will reflect the DAC voltage. This function may be used to aid in troubleshooting a complex system, or to verify that external devices, such as valves or recorders, are properly responding to the flow meters output signals.
202-DAC Refresh	<p>This menu item is used to adjust the Digital-to-Analog converter (DAC) response time interval. The value entered here is multiplied by 50ms to establish the rate at which the DAC generates new output voltages to the DC output pin, system totalizer, and current flow rate conversions. For example, a value of 20 adjusts the DAC to generate new voltages at one second intervals (20 x 50ms = 1 second).</p> <p>Acceptable values are 1 – 63.</p>
203-DAC Filter	<p>This menu item provides a smoothed DAC response to compensate for erratic input signals caused by flow fluctuations. Higher values result in greater dampening or smoothing; lower values result in a rapid response to changing signals from the internal curve linearizer. Acceptable values are 1 – 127.</p> <p>To view output results of changing this filter, menu 204 is used.</p>
204-DAC Readout	<p>This menu item functions like an onboard voltmeter by generating a real-time readout of both the DAC filtered output voltage (Direct) and its input signal before filtering (Filtered) which corresponds to the linear 0-5 VDC output of the flowmeter. This menu item is used to verify a complex system's operation or in troubleshooting. To exit this mode from the PC terminal, press period Enter.</p> <p>This menu shows the filtered output value based on menu 203 setting.</p>
205-mW Filter	<p>This menu item provides a smoothed Analog-to-Digital Converter (ADC) response to compensate for erratic input sensor signals caused by flow fluctuations. Higher values result in greater dampening or smoothing; lower values result in a rapid response to changing signals. Acceptable values are 1 – 255.</p> <p>To view output results of changing this filter, menu 209 is used.</p>
206-BV Readout	Displays output bridge voltage
207-LCD Refresh	<i>This menu option will set the time frame between refreshing the LCD screen to reflect the new displayed values. Increments in 500ms units. Valid values are 1 through 10.</i>
208-LCD Contrast	This menu item sets the LCD panel contrast value. Minimum value = 80 for Darkest display. Maximum 128 value for lightest display.
209-mW Readout	<div>Flow Sensor mWatts</div> <div>Direct Filtered</div> <div>218.4mW 217.5mW (Press Enter to exit)</div> <p><i>This menu shows the filtered output value based on menu 205 setting.</i></p>

210-MB BN Address	<p>This menu item sets the Modbus or BACnet Slave Address for this flow meter.</p> <p>A value of 1-127 is the flow meter's address. See Modbus or BACnet manual for more details.</p> <p>See Menu 233 for RS485 Parity and Menu 226 for RS485 Baud rate and Menu 256 for BACnet. See menu 224 for protocol setting.</p>
211- Reset L,H,C,A	<p>Reset readings. Low flow, high flow, total, All.</p> <pre> Reset L,H,C,A 1 - Reset Low Flow Reading 2 - Reset High Flow Reading 3 - Reset Total 4 - Reset All the Above </pre> <p>The numeric values above are required when utilizing the button keypad.</p> <p>An alternate way to reset total if the Total Mode is = 0 and not in EXT Range mode, is to Press and Hold SHIFT and then press MAX+MIN while Holding SHIFT such that all three LCD buttons are pressed at the same time.</p>
212-Track Hold	<p><i>Tracking means that flow, total, 0-5V, and 4-20mA are held at the value they are at when requested to Track Hold.</i></p> <p>Enable / Disable.</p> <p>Upon enabling tracking hold, the flow rate is held. This may be desired if a purge cycle is to be run and you do not want the purge to affect the totalizer or affect the flow rate going to the PLC.</p> <p>Temporary track hold can be done by typing "SSSRRR" and is not stored and defaults back to tracking upon reset (typing ..., <password>, 500). (see section under 500 Run Menu for explanation)</p> <p>See menu 222 for tracking duration.</p>  <p>When tracking is on, the meter display should show "!" in the range position on the LCD display.</p>

<p>213–Set Range</p>	<p>This menu item is used to select the active meter range.</p> <p>All EPI flow meters are capable of storing configuration and parameter data for five separate meter ranges.</p> <p>A specific meter range is selected by entering 1–5 in this menu item. If a flow meter has only one calibrated meter range, the factory will program it as meter range #1 and meter ranges #2–5 will not be valid.</p> <p>The flow meter can also be set up to allow external switching between stored ranges by entering “0” at the prompt. However, this disables the keypad functions.: Careful, putting the meter in this state will allow anyone to push the MIN / MAX buttons which will temporarily change the meter range if they are pushed during run mode.</p> <p>Upon setting this menu to a specific range, the meter will be restarted.</p> <p>Note: Terminal mode will show “EXTERNAL RANGE MODE” on the screen to reflect when option ‘0’ is selected. Only 4 ranges are allowed with external control. See below.</p> <p><i>External terminal Mode 1 and Mode 2 will be used for external control of ranges. It is a bit format where:</i></p> <p><i>Mode 1 open, Mode 2 open = range 1 (binary 00)</i> <i>Mode 1 open, Mode 2 grounded = range 2 (binary 01)</i> <i>Mode 1 grounded, Mode 2 open = range 3 (binary 10)</i> <i>Mode 1 grounded, Mode 2 grounded = range 4 (binary 11)</i></p> <p>LCD display will show the range number on the left side of the bottom line in front of the relay energized indicators. See LCD section of this document.</p>
<p>214–Set Date</p>	<p> The meter Date can be changed 6 times. Attempting to change it 7 times will not work. This was done to help prevent hackers to attempt Epi-Val fraudulent field validations. If your meter no longer allows date changes, contact the factory.</p> <p>This menu item sets the time stamp functions to the current date for accurate reporting. The menu supports both MM/DD/YY and DD.MM.YY time formats where:</p> <ul style="list-style-type: none"> • MM = month (01–12) • DD = day (01–31) • YY = year (00–99) <p>Include a slash (/) as the delimiter between values for MM/DD/YY format, or a period (.) as the delimiter between values for DD.MM.YY format. The date will not be set if these formats are not followed exactly.</p>

215-Set Time	<p>This menu item sets the time stamp functions to the current time for accurate reporting. The time prompt indicates HH:MM:SS where:</p> <ul style="list-style-type: none"> • HH = hour (00–23) • MM = minutes (00–59) • SS = seconds (00–59) <pre>Enter Selection >> 215</pre> <pre>Enter HH:MM:SS = 09:00:02 => 11:00:00a</pre> <pre>Enter Selection >> 215</pre> <pre>Enter HH:MM:SS = 11:00:24 AM =></pre> <p>By default, 24-hour format will be used. To switch to AM/PM, enter “p” or “a” after the date. Example:</p> <p>Include a colon (:) as the delimiter between values. The time will not be set if this format is not followed exactly.</p>
216-Gas Temp Offset	<p>This menu allows the user to change the display temperature of gas to a more positive or more negative number. This is to adjust the display only and will not affect flow calibration in any way.</p>
217-PW Enable	<p>Enable / Disable pointwise correction</p> <p>0 = Disable, 1 = Enable</p> <p>See 750 menus for pointwise correction details.</p>
218-Reset Lock#	<p>This menu allows the four-digit numeric password to be changed. The flow meter must be unlocked prior to accessing this menu item.</p> <p>To unlock, see 219 menu.</p> <p>All flow meters are shipped with an initial password of 9001 unless otherwise specified at the time of purchase. The range of valid passwords is 1000–9999.</p> <p>After changing this menu with the new password, type “500” in order to save the password, which the meter will restart and enter back into run mode.</p> <p><i>If you set your own password, save it in a secure place to prevent loss and lockout from user variables.</i></p>
219-UnLock (For meter keypad functionality only)	<p>This menu can be used to unlock the meter. It takes more key strokes vs simply typing the menu 218 password from being typed in at the > prompt (triggered by typing ... (three dots).</p> <p>You can access any number of menu items while the settings are unlocked.</p> <p>If you enter a menu that you do not intend to make changes, then simply enter one period “.” And push <Enter> key to back out of the menu.</p> <p>See section of this document that discusses meter button functionality for how to use this menu to unlock the meter using the meter keypad.</p> <p>Menu 237 will override this menu password.</p>
220-Set MB Endian	<p>This menu can be used to select the Modbus data format to be either Big or Little Endian. 0 = Little Endian 1 = Big Endian.</p> <p>Big Endian Byte order: 01 02 03 04 Little Endian Byte order: 03 04 01 02</p>

221-SetCalDate	<p>This menu item can be set to act as a reminder for periodic recalibrations. Enter the date of the next calibration reminder using the date format, or enter a zero-zero (00) for either the month or day to disable the reminder.</p> <p>When calibration is due, it will flash on the meter display.</p> <div></div>												
222-Hold Duration	Used with menu 212 for Tracking Hold. This menu is the hold duration in minutes. See menu 212 for further explanation.												
223-Set WD Timer	This timer is used for no-activity timeout and to exit all menus after the time-out period. This menu item allows the user to change the Watchdog (WD) timer “time-out” period. Value is entered as minutes.												
224- Protocol Mode	<p>Select the protocol that is used for the meter. HART and Profibus may only be selected at the Factory and is not changeable by the User.</p> <div><p>Protocol Mode</p><ul style="list-style-type: none">0 - ASCII Terminal Mode1 - Modbus RTU2 - Hart3 - Profibus4 - Bacnet</div>												
225-SetRS232Baud	<p>This menu item adjusts the baud rate of the RS232 port.</p> <table><tbody><tr><td>1 = 9600</td><td>2 = 14400</td><td>3 = 19200</td><td>4 = 28800</td></tr><tr><td>5 = 33400</td><td>6 = 38400</td><td>7 = 56000</td><td>8 = 57600</td></tr><tr><td>9 = 76800</td><td>10 = 115200</td><td></td><td></td></tr></tbody></table>	1 = 9600	2 = 14400	3 = 19200	4 = 28800	5 = 33400	6 = 38400	7 = 56000	8 = 57600	9 = 76800	10 = 115200		
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226-SetRS485Baud	<p>This menu item adjusts the baud rate of the RS485 port.</p> <table><tbody><tr><td>1 = 9600</td><td>2 = 14400</td><td>3 = 19200</td><td>4 = 28800</td></tr><tr><td>5 = 33400</td><td>6 = 38400</td><td>7 = 56000</td><td>8 = 57600</td></tr><tr><td>9 = 76800</td><td>10 = 115200</td><td></td><td></td></tr></tbody></table> <p>RS485 communications require an RS485-to-RS232 or RS485-to-USB protocol converter for connecting the flow meter to a PC running EPICommunicator or similar software.</p> <p>See menu 233 for RS485 Parity</p> <p>This menu is not used for Profibus DP. The Profibus DP PCA will autodetect the network baud rate. See supplied .gsd file for supported baud rates.</p> <p>This menu is also not used for Hart. The baud rate will be fixed. It uses Frequency Shift Keying (FSK).</p>	1 = 9600	2 = 14400	3 = 19200	4 = 28800	5 = 33400	6 = 38400	7 = 56000	8 = 57600	9 = 76800	10 = 115200		
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5 = 33400	6 = 38400	7 = 56000	8 = 57600										
9 = 76800	10 = 115200												
227-Flow 0-5,10	This menu item adjusts the Flow Output Voltage from either 0 to 5 or 0 to 10 Volts out: 0 = 0-5V Output;1 = 0-10V Output.												

228-Temp 0-5, 10	This menu item switches the Temperature Output Voltage from either 0 to 5 or 0 to 10 Volts out: 0 = 0-5V Output; 1 = 0-10V Output.
229-LCD Options	<p>This menu item controls the microprocessor signal to the LCD to display various outputs as mentioned below. Each option can be disabled or enabled.</p> <pre> 1: NO LCD - DISABLED 2: SPLASH ONLY - DISABLED 3: PERCENT - ENABLED 4: TOTAL - ENABLED 5: RELAY/RANGE - ENABLED 6: TEMPERATURE - ENABLED 7: mW - ENABLED Enter Option Number to Change = LCD Options => </pre> <p>If 1 is enabled, there will be no LCD display (Blank)</p> <p>If 2 is enabled, it will show the splash screen like below.</p>  <p>Options 3 through 7 have options to be enabled or disabled. If one is enabled, it should be shown on the bottom line of the display while the flow rate is shown on the top line. If multiple options are enabled, the options should be toggled (rotated through) in the bottom line of the display.</p> <p>(Note, option 5 for relays. The first number in the display is the active meter range, 1 out of 5. The infinity sign will change to an asterisk * to represent that relay being activated)</p> <p>See menu 207 for LCD refresh rate for all displays.</p> <p>See menu 234 for time between toggling the LCD displays for different display values.</p> <p>See menu 232 for terminal output control for these same values.</p>
230-Temp Zero	<p>This menu item sets the gas temperature value (°F or °C) for the 0 VDC output.</p> <p>The factory default is 0. Typically, this value should not be changed.</p> <p>Works in conjunction with menu 231.</p>
231-Temp Span	<p>This menu item sets the gas temperature maximum value (°F or °C) for the 5 VDC output.</p> <p>If Units are currently set for metric (such as NCMH) then the value entered for this command should be entered as °C value, otherwise if imperial units, the value should be entered as °F. If flow units are changed between Imperial and Metric, then this value should be converted to °C or °F as required.</p> <p><i>This menu does not affect the temperature compensation range for the process gas.</i></p> <p>Works in conjunction with menu 230</p>

232-Terminal Option	<p>This menu controls the terminal display output for removing or adding various outputs on the screen.</p> <p>Terminal Options</p> <p>0 - Both mW and Temperature are Displayed 1 - mW not Displayed 2 - Temperature not Displayed 3 - mW and Temperature not Displayed 4 - No Terminal Updates Current Setting = 0 =></p> <p>Value 0</p> <table><tr><td>Rate</td><td>Total</td><td>High</td><td>Low</td><td>Relays</td><td>Temp</td><td>mW</td><td>GasRD</td></tr><tr><td>185.4 SCFM</td><td>14136 SCF</td><td>1000</td><td>0.000</td><td>R1=, R2=.</td><td>71.4F</td><td>185.3</td><td>0.07484 Lbs/FT^3</td></tr></table> <p>Value 1</p> <table><tr><td>Rate</td><td>Total</td><td>High</td><td>Low</td><td>Relays</td><td>Temp</td><td>GasRD</td></tr><tr><td>184.8 SCFM</td><td>14320 SCF</td><td>1000</td><td>0.000</td><td>R1=, R2=.</td><td>71.5F</td><td>0.07484 Lbs/FT^3</td></tr></table> <p>Value 2</p> <table><tr><td>Rate</td><td>Total</td><td>High</td><td>Low</td><td>Relays</td><td>mW</td><td>GasRD</td></tr><tr><td>185.3 SCFM</td><td>14441 SCF</td><td>1000</td><td>0.000</td><td>R1=, R2=.</td><td>185.3</td><td>0.07484 Lbs/FT^3</td></tr></table> <p>Value 3</p> <table><tr><td>Rate</td><td>Total</td><td>High</td><td>Low</td><td>Relays</td><td>GasRD</td></tr><tr><td>185.1 SCFM</td><td>14548 SCF</td><td>1000</td><td>0.000</td><td>R1=, R2=.</td><td>0.07484 Lbs/FT^3</td></tr></table> <p>Value 4</p> <p><u>NO TERMINAL MODE</u></p> <p>See menu 229 for LCD display options for these same values.</p>	Rate	Total	High	Low	Relays	Temp	mW	GasRD	185.4 SCFM	14136 SCF	1000	0.000	R1=, R2=.	71.4F	185.3	0.07484 Lbs/FT^3	Rate	Total	High	Low	Relays	Temp	GasRD	184.8 SCFM	14320 SCF	1000	0.000	R1=, R2=.	71.5F	0.07484 Lbs/FT^3	Rate	Total	High	Low	Relays	mW	GasRD	185.3 SCFM	14441 SCF	1000	0.000	R1=, R2=.	185.3	0.07484 Lbs/FT^3	Rate	Total	High	Low	Relays	GasRD	185.1 SCFM	14548 SCF	1000	0.000	R1=, R2=.	0.07484 Lbs/FT^3
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233-RS485Parity	<p>This menu sets the baud rate on the RS 485 communications port;</p> <p>RS485Parity</p> <p>0 = 1-Stop 8-Bits No-Parity 1-Stop 1 = 1-Stop 8-Bits Even-Parity 1-Stop 2 = 1-Stop 8-Bits Odd-Parity 1-Stop 3 = 1-Stop 8-Bits No-Parity 2-Stop Current Setting = 1 => _</p> <p>See Menu 226 for RS485 Baud rate.</p>																																																								
234-LCD Toggle Rate	<p>This menu is used to set the time delay between displaying different LCD display values which were enabled in menu 229. Valid entries are 1 through 10. Time increments of 500ms.</p>																																																								
235- Reserved	<p>Not used</p>																																																								
236- Reserved	<p>Not used.</p>																																																								

237-SetPSWDMode	<p>Password Mode will allow different password control.</p> <p>Mode 0 will utilize the password that was established in menu 218.</p> <p>Mode 1 will prompt for a new password that can be up to 8 digits and will then be required to unlock the meter and the password in menu 218 will not be used.</p> <p>Mode 2 will leave the meter open with no password required. (This mode is not recommended since it allows for unauthorized access to make meter changes)</p> <p>Note: When using the EPICom MTR user menu to change to an alternate password, you will get a popup to re-select the alternate password pulldown a few times until you enter your 8-digit password.</p>
238-Reserved	Not used
239-Reserved	Not used
240-BiDir Mode	<p>This menu sets the meter into Bi-Directional mode. This requires a special probe designed specifically for this feature. Contact factory for details. This should be set to 0 for standard meters.</p> <p>This either activates or deactivates bi-directional mode. Set at factory.</p> <p>This menu is only used with EPI's Bi-Directional flow meter design.</p>
241- Reserved	Not Used
242- Reserved	Not Used
243- Reserved	Not Used
244- EpiVal Sensor	<p>Epi-Val™ (In-Situ field validation)</p> <p>See the Epi-Val™ manual for explanation of this menu</p>
245- EpiVal Log	<p>Epi-Val™ (In-Situ field validation)</p> <p>See the Epi-Val™ manual for explanation of this menu</p>
246-Config 4-20mA	<p>This menu will setup output 1 and output 2 for either Flow or Temperature.</p> <pre> Enter Selection > 246 Config4-20mA Output1 4-20mA Output2 4-20mA 0 = Flow Temperature 1 = Flow Flow 2 = Temperature Flow 3 = Temperature Temperature </pre> <p>(Special wiring considerations done at the factory based on customer choice)</p> <p>Default is 0</p>

247–Accuracy Mode	<p>This menu can be used to compare the initial calibration accuracy check list that was shipped with the meter against how the meter is doing at the time of this accuracy test. The meter output for 0-5VDC or 4-20mA should reflect entered value based on calibration.</p> <p>Flow Rate – 1, Enter flow rate from the accuracy sheet and the output of the meter should align closely with the accuracy sheet 0-5vdc or 4-20mA.</p> <p>mW – 2, (used when communicating with the factory)</p> <p>Temperature – 3, This test will be used in conjunction with how menus 230 (Temp Zero) and 231 (Temp Span). Entering a temperature value should cause the meter output for temperature (either voltage or mA) to have the same proportional output of menu 230 / 231.</p> <p>Once the meter is reset (Typing “500” or power cycled), it will be taken out of accuracy mode.</p>
248– Reserved	Not Used
249– Reserved	Not Used
250–Multi Point	<p>This menu sets the meter into Multi-Point mode. This requires a special probe designed specifically for this feature. Contact factory for details. This should be set to 0 for standard meters.</p> <p>This menu is only used with EPI’s Multipoint flow meter design.</p>
251–CustRefCondition	This read-only menu displays the gas reference conditions for this meter.

**252-Frequency
Polarity**

Frequency Polarity. Only available on 1 relay board set.

This menu item is used to set the Frequency Output polarity

0 = LOW @ No Flow with Low to High pulse at flow;

1 = HIGH @ No Flow with High to Low pulse at flow.

Provides 0 – 1 kHz frequency output proportional to the calibrated flow rate. The signal is both Sink and Source capable. The following specifications apply when this option is ordered:

Sinking (User provides power input)	40 VDC max. 200mA max.
Sourcing (ValuMass™ provides power input)	15 VDC 50mA max. 300 ohm min.

Frequency Output Formula:

Frequency Span x (Actual Flow Rate / Full Scale) = Frequency Output

Examples:

1. Full Scale = 1000 SCFM
Flow Rate = 150 SCFM
Frequency Span = 1 kHz
 $1 \text{ kHz} \times (150 / 1000) = 0.15 \text{ kHz}$
2. Full Scale = 500 NCMH
Flow Rate = 425 NCMH
Frequency Span = 1 kHz
 $1 \text{ kHz} \times (425 / 500) = 0.85 \text{ kHz}$

Works in conjunction with menu 253.

253-Frequency PW	<p>Frequency Pulse width. Only available on 1 relay board set.</p> <p>This menu item is used to set the pulse width of the Frequency Output in 50µs (50 microseconds) increments between 50µs and 950µs. Entry is rounded to the nearest 50µs increment.</p> <p>-----</p> <p>Frequency Span x (Actual Flow Rate / Full Scale) = Frequency Output</p> <p>Examples:</p> <ol style="list-style-type: none"> 1. Full Scale = 1000 SCFM Flow Rate = 150 SCFM Frequency Span = 1 kHz $1 \text{ kHz} \times (150 / 1000) = 0.15 \text{ kHz}$ 2. Full Scale = 500 NCMH Flow Rate = 425 NCMH Frequency Span = 1 kHz $1 \text{ kHz} \times (425 / 500) = 0.85 \text{ kHz}$ <p>Works in conjunction with menu 252.</p>
254-NAMUR Enable	<p>This menu item 1 – Enable or 0 – Disables NAMUR</p> <p>If the mW reading goes below 10% of the calibrated mW value for no flow, the 4-20mA output will drop to 0mA</p> <p>If the flow rate value goes above 10% of the full scale, the 4-20mA output will jump to 24mA</p>

255–Clear Totalizer	<p>This menu item allows the user to manage how the total is cleared or not</p> <pre> Enter Selection >> 255 0 is UNLOCKED Mode 1 is LOCKED Mode 2 is PASSWORD Mode Clear Totalizer Mode = 0 Enter 0 = Change Modes or Enter 1 = Clear Totalizer => 0 Enter 0 for UNLOCKED Mode Enter 1 for LOCKED Mode Enter 2 for PASSWORD Mode Enter Any Other Key to Exit </pre> <p>Option 0 allows the user to clear the totalizer through the terminal window by typing “CCC” while the meter is in run mode.</p> <p>Option 1 This mode will prevent the totalizer from being reset. It requires a password to be set so changing the mode to either 0 or 2 later on will require this password for changing out of mode 1.</p> <p>Option 2 will allow the user to set a password (if password already established, it must be re-entered to change modes) that will then be required upon attempting to clear (user typing CCC in run mode) the flow totalizer back to a value of 0.</p> <p>If the password is ever lost or forgotten you will need to contact the factory to reset the password. There may be a fee associated with this activity, so it is highly recommended to record all your passwords in a safe place.</p>
256–Bacnet Setup	<p>Example settings below for BACnet. Ensure meter power is turned off while connecting any communication wires to the meter.</p> <pre> 1 - Device Name = MT8000 2 - Device Description = EPI Master-Touch 3 - Device Location = 4 - Device ID = 4194302 5 - MS/TP Mac (Meter) Address = 1 6 - MS/TP MAX_Master = 127 7 - Set to Default Values 8 - Save and Exit 9 - No Save and Exit = Bacnet Setup => </pre>

400 *Alarms* Menu

Alarm Relay Overview

EPI flow meters have two 1-amp SPDT relays that provide four relay Events (Ev1–Ev4):
(One relay for ValuMass™ meters)

- Relay 1 OFF (**Ev1**) — the relay coil is de-energized with the Common and Normally Closed connected
- Relay 1 ON (**Ev2**) — the relay coil is energized with the Common and Normally Open connected
- Relay 2 OFF (**Ev3**) — the relay coil is de-energized with the Common and Normally Closed connected
- Relay 2 ON (**Ev4**) — the relay coil is energized with the Common and Normally Open connected

These events can be used to activate other devices in response to user-defined flow conditions, or to provide pulsed outputs based on flow rate or flow total. There are user-selectable conditions which will trigger an alarm relay response from an EPI flow meter. Some of the most commonly used response conditions are:

- **Trip High** — an alarm relay is triggered by a flow rate that is higher than the preset value;
- **Trip Low** — an alarm relay is triggered by a flow rate that is lower than the preset value;
- **Total** — an alarm relay is triggered by an accumulated flow total that is higher than the preset value;
- **Timer** — an alarm relay is triggered after a preset time delay value;
- **Trip Delay** — the relay trigger is delayed to ensure the programmed condition continues for this period of time.
- **Proportional Pulse Output** — an alarm relay is triggered by a flow rate that is equal to a preset proportion of the value in menu item **840–FScale**;
- **Pulse Output** — an alarm relay is triggered after an preset value of accumulated flow total;
- **MAX Button** — an alarm relay is triggered by momentarily pressing the **MAX** button on the LCD panel;
- **MIN Button** — an alarm relay is triggered by momentarily pressing the **MIN** button on the LCD panel;
- **Flow Hold 1 & 2** — the ADC input voltage is maintained at constant value, typically during gas purge cycle
- **Temp High** - This menu item sets the gas temperature value for the high temperature trip point.
- **Temp Low** - This menu item sets the gas temperature value for the low temperature trip point.
- **BiDir Relay** - This menu item is used to indicate which direction the flow is traveling and when it changes direction

In addition, the alarm relays can be **Disabled** so they do not trigger on any Event. The Disabled function is also used to latch or hold the relay at its current condition. If no Event programming has been requested at the time of purchase, Disabled is the default condition for the alarm relays.

Note: ValuMass™ will use Alarm Relay #2.

Alarm Programming

The flow meter settings must be unlocked to change the alarm relay parameters (see menu item 219–UnLock).

The alarm relays only operate while the flow meter is the Run Mode. To select and program alarm relay Events, use the 400 *Alarms* menu items. First, select the specific Event (Ev1–Ev4) in menu

item **401–Set Event**. After selecting an Event, a condition is assigned (Timer, Max, Frequency Out, etc.). With the exception of setting the **MAX** or **MIN** buttons for manual operation or to **Disable** an Event, each condition requires a numeric value to control the response. Depending upon the selected condition, these values refer to 50 millisecond (ms) increments or to the currently selected engineering units.

The flow meter accepts settings for the Event until it returns to Run Mode, or until another Event is selected by returning to menu item 401. Therefore, if a mistake is made while setting the parameters for an Event, such as selecting Trip High instead of Trip Low, there is no need to undo the previous settings — simply select the correct menu item and continue entering the settings.

The following are examples of the steps required for two typical uses of the alarm relays:

Example 1 — Meter is programmed to show SCFM Units

Set Alarm Relay 2 to activate for each accumulated flow total of 100 SCF with a 4000ms pulse width:

- Unlock the flow meter settings and go to the **400 *Alarms*** menu;
- Select menu item **401–Set Event**, then enter **3** at the prompt (3 = Ev 3, Relay 2 OFF);
- Select menu item **407–Timer**, then enter **80** at prompt (80 x 50ms = 4000ms = 4 seconds);
- Select menu item **401–Set Event**, then enter **4** at the prompt (4 = Ev 4, Relay 2 ON);
- Select menu item **409–PulseOut**, then enter **100** (SCF) at menu prompt;
- Select menu item **500 *Run Mode*** to lock the flow meter and return to Run Mode.

```
Rate           Total           High           Low           Relays           Temp           mW           GasRD
214.5   SCFM           7223   SCF   1000           0.000   R1=. R2=*   65.9F   214.4   0.07484 Lbs/FT^3
```

Notice above that the terminal broadcast string shows R2 relay with an Asterix “*” indicating the relay is active. The Asterix will show active for 4 seconds upon reaching each 100 SCF of flow.

Relay	Event	Function	Relay Energized	Relay Position	Value	EPIComm Terminal Function Name	“MTR” EPIMeter Menu Function Name
Off	3	407	No	COM-NC	80	Timer	Timer
On	4	409	Yes (Until Timer expires)	NO-COM	100	PulseOut	PulseOut

Example 2 — Meter is programmed to show SCFM Units

Set Alarm Relay 1 to activate if the flow rate falls below 10 SCFM for a period of four seconds:

- Unlock the flow meter settings and go to the **400 *Alarms*** menu;
- Select menu item **401–Set Event**, then enter **1** at the prompt (1 = Ev 1, Relay 1 OFF);
- Select menu item **407–Timer**, then enter **20** at prompt (20 x 50ms = 1s);
- Select menu item **401–Set Event**, then enter **2** at the prompt (2 = Ev 2, Relay 1 ON);
- Select menu item **404–Trip Low**, then enter **10** (SCFM) at menu prompt;
- Select menu item **410–Trip Delay**, then enter **80** at prompt (80 x 50ms = 4s);
- Select menu item **500 *Run Mode*** to lock the flow meter and return to Run Mode.

As an example of the results of this programming, assume that during Run Mode, the flow reads approximately 18 SCFM. Therefore Relay 1 is inactive. Then the flow decreases to 8 SCFM for 1.25

seconds but returns to 18 SCFM 1 second later. No alarm is generated because the total duration of the increased flow was less than the Trip Delay value (4 seconds). If the duration of the low flow (i.e., < 10 SCFM) exceeded 4 seconds, Relay 1 would activate for 1 second (the value for menu item 407–Timer) and then reset. The alarm relay will not be activated again until the flow increases above 10 SCFM and then falls below 10 SCFM.

MTR supports Alarm programming through a series of pull-down menus which provide the simplest means of setting up complex Alarm parameters.

400 *Alarm* Screen

400 *Alarm*		
401-Set Event	402-Disabled	403-Flow High
404-Flow Low	405-MAX Key	406-MIN Key
407-Timer	408-Total	409-PulseOut
410-Trip Delay	411-Temp High	412-Temp Low
413-System Fault	414-Fail Safe	415-Flow Hold1
416-Flow Hold2	417-BiDir Relay	

400 *Alarms* Submenus

401-Set Event	This menu item selects the specific relay Event (Ev1–Ev4) to which a response condition is assigned.
402-Disabled	This menu item causes the current active Event to ignore all response conditions.
403-Flow High	This menu item sets the current active Event to respond to a flow rate that is higher than this preset value.
404-Flow Low	This menu item sets the current active Event to respond to a flow rate that is lower than this preset value.
405-Max Key	This menu item sets the current active Event to respond when the MAX key on the LCD panel is pressed or when Mode 1 is grounded.
406-Min Key	This menu item sets the current active Event to respond when the MIN key on the LCD panel is pressed or when Mode 2 is grounded.
407-Timer	This menu item sets current active Event to release the relay after the time expires for this 407-Timer setting. Enter the desired preset duration value in units of 50ms.
408-Total	This menu item sets the current active Event to respond to an elapsed total. Enter the desired preset value in the current engineering units (whole numbers only – no decimals).

409–PulseOut	<p>This menu item sets the current active Event to respond to an elapsed flow total. This function is used with remote data collection systems which count the pulses to generate an elapsed flow total.</p> <p>Enter a value to activate a relay for every X number of units on the totalized flow.</p> <p>Example: If Menu 100 has submenu 102 (SCFH) selected then if 1000 is entered for this submenu 409-PulseOut then this event will trip the relay for each 1000 SCFH of flow.</p> <p>Any whole number between 1 and 65535 may be entered at the prompt (>), but we recommend decimal values (1, 10, 100, . . .).</p> <p>A timer function must be associated with this menu item to release the relay from the active state (<i>see menu item 407–Timer</i>). The timer must be set fast enough to release the relay before the next preset total value is reached.</p>
410–Trip Delay	<p>This menu item sets the response delay for triggering the relay for the current active Event. Enter the desired value in increments of 50ms (20 = 1 second). The acceptable values are 1– 255.</p>
411–Temp High	<p>This menu item sets the gas temperature value for the high temperature trip point.</p>
412–Temp Low	<p>This menu item sets the gas temperature value for the low temperature trip point.</p>
413 - System fault	<p>Multipoint system related menu. If internal cable disconnects then a system fault shows on meter LCD display and terminal screen. This fault is also a Relay/Alarm function event that can be set for relay contact notification. When using this fault, it will utilize both events for the relay. When using this alarm feature, one relay will have its events set for SYSTEM_FAULT and the other DISABLED. Setting this alarm through EPICom Terminal mode will set the events up properly.</p>
414 Fail Safe	<p>This is used for energizing a relay if power fails, it de-energizes the relay for contact control for remote monitoring. When using this alarm feature, the relay events will have its events set for FAIL_SAFE and the other DISABLED.</p>
415–Flow Hold1	<p>This menu item holds the flow rate while Relay 1 Event 2 is active. When the value is set to one (1), it will hold the flow at its current value. A value of zero (0) will disable this feature.</p> <p>Example: Can be used with events “PulseOut” or “Max Button” event.</p> <p>Example: This option may be desired to hold the flow rate during a purge gas cycle to prevent flow rate spike during the purge.</p>
416–Flow Hold2	<p>This menu item holds the flow rate while Relay 2 Event 2 is active. When the value is set to one (1), it will hold the flow at its current value. A value of zero (0) will disable this feature.</p> <p>Example: Can be used with events “PulseOut” or “Max Button” event.</p> <p>Example: This option may be desired to hold the flow rate during a purge gas cycle to prevent flow rate spike during the purge.</p>

417-BiDir Relay	<p>This menu item is used to indicate via the relay, which direction the flow is traveling and when it changes direction.</p> <p>This menu is only used with EPI's Bi-Directional flow meter design.</p>
------------------------	---

450 *E-Log* Menu

This module supports the logging of various flow and flow meter status data. The 450 E-Log submenu items control the functions related to data logging by the flow meter. The EPICom v2.00 E-Logger™ module controls these same functions as well as providing additional functions, a real-time readout of the data, and data file storage on the PC (*see Section D*).

The storage of flow data within the flow meter itself is limited by the onboard microprocessor's memory capacity. The use of the EPICom v2.00 E-Logger module provides virtually limited capacity by storing the data on the PC.

(See E-Logger™ Module section for more details)

450 *E-Log* Terminal Screen

```
450 *E-Log*
451-Set StartDate      452-Start Time(24Hr)  453-Set Stop Date
454-Stop Time(24Hr)    455-Interval Time     456-Option Date
457-Reserved           458-Reserved       459-Option Total
460-Option High        461-Option Low        462-Option Relay1
463-Option Relay2      464-Start Elog Now    465-Stop Elog Now
466-Start Timer        467-Display Setup    468-
```

450 *E-Log* Submenus

The following list shows the 450 *E-Log* submenus and their functions. Some titles may be truncated on the display due to the limitations of the 16 characters per line.

451-Set StartDate	This menu item is used to set the date to start collecting the data snapshots. It uses the MM/DD/YY format.
452-Start Time(24Hr)	This menu item is used to set the time to start collecting the data snapshots. It uses the HH:MM:SS format.
453-Set Stop Date	This menu item is used to set the date to stop collecting the data snapshots. It uses the MM/DD/YY format.
454-Stop Time(24Hr)	This menu item is used to set the time to stop collecting the data snapshots. It uses the HH:MM:SS format.
455-Interval Time	This menu item is used to set the time interval for each data snapshot. It uses the HH:MM:SS format.
456-Option Date	This menu item is used to include the current date in the data snapshot. (0 = No; 1 = Yes)
457-Reserved	Not used
458-Reserved	Not used
459-Option Total	This menu item is used to include the current elapsed total in the data snapshot. (0 = No; 1 = Yes)

460—Option High	This menu item is used to include the highest flow rate in the data snapshot. (0 = No; 1 = Yes)
461—Option Low	This menu item is used to include the lowest flow rate in the data snapshot. (0 = No; 1 = Yes)
462—Option Relay1	This menu item is used to include the status of Relay #1 in the data snapshot. (0 = No; 1 = Yes)
463—Option Relay2	This menu item is used to include the status of Relay #2 in the data snapshot. (0 = No; 1 = Yes)
464—Start Elog Now	This menu item is used to manually start collecting the data snapshots.
465—Stop Elog Now	This menu item is used to manually stop collecting the data snapshots.
466—Start Timer	This menu item is used to start the internal timer for the programmed Start and Stop options (Menus 451 — 454). It will start capturing data at the specified time without restarting the meter.
467—Display Setup	This menu item presents a screen which presents a summary of the currently selected data logger parameters (see below).
468—	(unused)

Menu 467 Screen

The following screen shows the selected data logging parameters, including a calculation of the number of snapshots that can be stored in the flow meter's memory. This calculation is based on the selected data options, and will increase by selecting fewer data options or decrease by selecting more data options.

UNIVERSAL FLOW DATA_METER

(c)2018, Eldridge Products Inc.

Datalog Parameter Configuration

451-Set Start Date 9/26/18 452-Set Start Time 14:21:2

453-Set Stop Date: 9/26/18 454-Set Stop Time 14:21:2

455-Interval Time: Snapshot Every 0 hr 0 min 5 sec

456-Option Date Yes 457-Option Time Yes 458-Option Flow Yes

459-Option Total Yes 460-Option High Yes 461-Option Low Yes

462-Option Relay1 No 463-Option Relay2 No

Total Memory Available: 40000 Bytes

Options Byte Requirements (Option Command-Bytes Used)

456-11b 457-13b 458-12b 459-23b 460-12b 461-12b 462-7b 463-7b

Based on the Options Selected Above

Bytes Used per Snapshot: 95b Number of Snapshots Available: 421

Press Any Key to Exit

750 *PW-Curve Fit* Menu

The EPI meter software supports Pointwise Curve (PW-Curve) adjustments to the linear output to correct for flow profile anomalies which may occur at different flow rates/velocities. The twenty PW-Curve menu items, 751 through 770, are used to assign multipliers to a segment of the linear output. Each segment is 5% of the linear range. Menu **751** adjusts the lowest segment, 0 to 5%; menu **752** adjusts the next segment, 5% to 10%, and so on. Menu **770** represents the highest segment, 95 to 100%. These multipliers are applied as necessary after the global C-Factor (see *menu 811-C-Factor*) has been applied. The following is an example of the steps required for setting a multiplier for a flow profile anomaly causing a reading which is 6% too low at 20 to 25% of the linear flow range:

- Unlock the flow meter settings and go to the **750 *PW-Curve Fit*** menu;
- Select menu item **755**, then enter **6** at the prompt;
- Select menu item **500 *Run Mode*** to return to normal operation.

The flow meter readings will be increased by 5% when the flow signal is between 20% and 25% of the Full Scale value.

It is expected that more than one segment will require an adjustment for profile anomalies if any are required at all, that each adjustment will have a similar value, and that the values will tend to all be greater than 1.0 or all be lower than 1.0, though other scenarios are possible.

750 *PW-Curve Fit* Screen

```
750 *PW-CurveFit*
751-Pointwise 5%  752-Pointwise 10% 753-Pointwise 15% 754-Pointwise 20%
755-Pointwise 25% 756-Pointwise 30% 757-Pointwise 35% 758-Pointwise 40%
759-Pointwise 45% 760-Pointwise 50% 761-Pointwise 55% 762-Pointwise 60%
763-Pointwise 65% 764-Pointwise 70% 765-Pointwise 75% 766-Pointwise 80%
767-Pointwise 85% 768-Pointwise 90% 769-Pointwise 95% 770-Pointwise 100%
780-SetAll PW=0% 781-ShowAll PWs
```

750 *PW-Curve Fit* Submenus

751-Pointwise 5%	This menu item is used to adjust the 0 – 5% segment of the flow range.
752-Pointwise 10	This menu item is used to adjust the 5 – 10% segment of the flow range.
753-Pointwise 15	This menu item is used to adjust the 10 – 15% segment of the flow range.
754-Pointwise 20	This menu item is used to adjust the 15 – 20% segment of the flow range.
755-Pointwise 25	This menu item is used to adjust the 20 – 25% segment of the flow range.
756-Pointwise 30	This menu item is used to adjust the 25 – 30% segment of the flow range.
757-Pointwise 35	This menu item is used to adjust the 30 – 35% segment of the flow range.
758-Pointwise 40	This menu item is used to adjust the 35 – 40% segment of the flow range.
759-Pointwise 45	This menu item is used to adjust the 40 – 45% segment of the flow range.
760-Pointwise 50	This menu item is used to adjust the 45 – 50% segment of the flow range.

761-Pointwise 55	This menu item is used to adjust the 50 – 55% segment of the flow range.
762-Pointwise 60	This menu item is used to adjust the 55 – 60% segment of the flow range.
763-Pointwise 65	This menu item is used to adjust the 60 – 65% segment of the flow range.
764-Pointwise 70	This menu item is used to adjust the 65 – 70% segment of the flow range.
765-Pointwise 75	This menu item is used to adjust the 70 – 75% segment of the flow range.
766-Pointwise 80	This menu item is used to adjust the 75 – 80% segment of the flow range.
767-Pointwise 85	This menu item is used to adjust the 80 – 85% segment of the flow range.
768-Pointwise 90	This menu item is used to adjust the 85 – 90% segment of the flow range.
769-Pointwise 95	This menu item is used to adjust the 90 – 95% segment of the flow range.
770-Pointwise 100	This menu item is used to adjust the 95 – 100% segment of the flow range.
780-All PW = 0%	This menu item is used to reset all segments to the factory default of zero (0).
781-ShowAll PWs	This menu item is used to show all current Pointwise settings

800 *P-Curve Fit* Menu

The EPI meter software stores the Primary Curve (P-Curve) coefficients which are generated by the factory NIST calibration, as well as the global C-Factor, process line cross-sectional area, etc.

Although most settings are accessible by using the default user password of “9001”, some of the parameters require a special password available only by contacting the factory. This has been instituted to prevent the accidental change of critical settings. The P-Curve coefficients values should never be changed without direct factory instructions.

800 *P-Curve Fit* Screen

```
Version BASE: vAA7.0r48 SIM: 1.86
(c)2018, Eldridge Products Inc.
Serial# 655363 SIM# 12345678

STATUS: Range#1, Track ON, Curve Fit PO, Units SFPM

      Current,      Relay#1 Off      On,      Relay#2 Off      On
ALARMS: Act Evt=Ev1,      Ev1=402 Ev2=402,      Ev3=402 Ev4=402

800 *P-Curve Fit*
801-CoeffTermA      802-CoeffTermB      803-CoeffTermC
804-CoeffTermD      805-CoeffTermE      806-CoeffTermF
807-CoeffTermG      808-CoeffTermH      809-CoeffTermI
810-CoeffTermJ      811-C Factor      812-Reserved
813-Pipe Area      814-Pipe ID      815-Pipe List
816-FlowCutoff%      840-Full Scale

100 *Meter*      200 *Utility*      300 *Status*      400 *Alarms*
500 *Exit-Reboot* 750 *PW-CurveFit*
800 *P-Curve Fit*
```

800 *P-Curve Fit* Submenus

801-CoeffTermA	Factory Calibration Coefficient. Factory Only. This menu item requires the Diagnostic Password for access.
through	
810-CoeffTermJ	Factory Calibration Coefficient. Factory Only. This menu item requires the Diagnostic Password for access.
811-C Factor	This value is a multiplier used to adjust the P-Curve linearization. It is normally set to 1.0, but may be adjusted based the <i>Installation Guidelines</i> , or to correct for aberrations in sensor readings. The C Factor can also be used to change standard conditions (STP) or to apply a density factor (vapor density) when changing the engineering units from volumetric units (SCFM, NCMH, etc.) to gravimetric units (Lbs/Hr, Kg/Hr, etc.) in flow meters calibrated for gases other than air.
812- Reserved	Not Used

813–Pipe Area	<p>This value is the cross-sectional area of the flow section or process line. The units of measure are determined by the engineering units selected (<i>see menu items 101–136</i>). For example, if the current engineering units are SCFM, then the menu item 813 value must represent square feet (F²). A value of one (1) may be used if the current engineering units represent velocity (SFPM, NMPS, etc.) or if the flow meter is an “inline” style with its own flow section.</p> <p>Changing this menu will recalculate menu 814.</p> <p>Menu 815 will select the indexed pipe size in the list that menu 813 will change.</p>
814–Pipe ID	<p>Use this menu to change the pipe ID of the selected pipe entry from menu 815.</p> <p>Changing this menu will recalculate menu 813.</p> <p>Menu 815 will select the indexed pipe size in the list that menu 814 will change.</p>
815–Pipe List	<p>This menu allows the user to select the pipe of interest up to 10 pipe selections. The area is calculated from the I.D. placed in the flow meter (by user or factory when requested by user). The area multiplied by velocity is flow rate in whatever engineering units are selected</p> <p>Use CMD 813 Change Area or CMD 814 to Change the Diameter</p>
816–FlowCutoff	<p>This menu item is used to set a percentage of the Full-Scale value (<i>menu item 840–FScale</i>) as the minimum readable flow rate. Actual flow rates below this minimum value will be treated as No Flow. The display will show “Low” instead of the real-time flow rate, no additional elapsed flow will be recorded, the 0–5VDC signal will drop to 0VDC, and the 4–20mA signal will drop to 4mA. For example, if the full scale is 1000 SCFM, a value of 10 (10%) will cause the flow meter to ignore flow rates below 100 SCFM or less. When the actual flow rate increases above this value, all of the flow meter’s functions will resume.</p>
840–FScale	<p>This menu item is used to adjust the scaling of the 0 – 5VDC and 4 – 20mA output signals. To change this value, enter the desired value at the prompt, and then press Enter. (The meter settings must be unlocked to make this change.) The meter will accept the new value and return to the data entry prompt. To verify the change, return to this menu. EPI does not recommend going above the factory established FS by more than +20% and does not specify the accuracy above +10% of FS. It is also ok to adjust this value below FS as needed for external equipment requirements.</p>

Section E EPICom Password Section

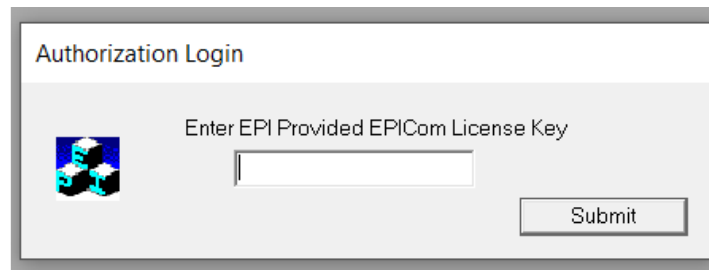
Password Mechanism Overview

When EPICom is first installed, opened, and either the MTR or SIM Dialog buttons are pressed, EPICom will prompt for Authorization Login. You must contact the factory for this initial password. Once the authorization password is entered successfully, EPICom will prompt the User to enter a unique password for future sessions with EPICom's MTR and SIM dialogs. All subsequent openings of EPICom, the MTR and SIM Dialogs will require the unique password to run. If the User forgets their password, they will need to contact the factory to reset it and provide a new authorization password. Each PC will require the authorization password. Keep in mind that EPICom allows the User to run the MTR LiTE and Modbus Dialogs without the Authorization password.

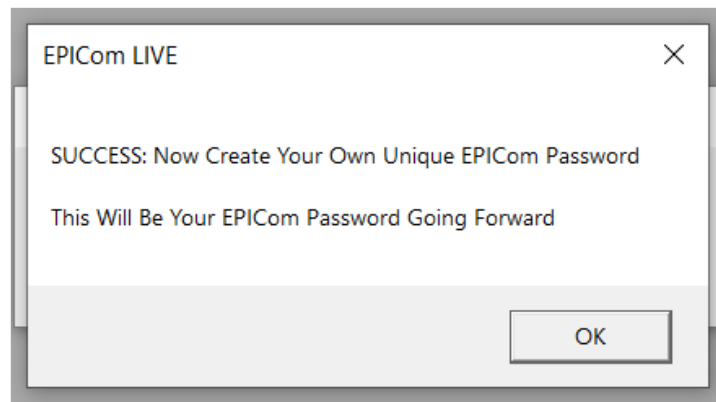
Authorization Login

Contact EPI Factory for Authorization Password. EPI will email you license key. An example License Key is c4b 310 059 0c6

Alpha characters are case sensitive. Enter the License Key with spaces into the Textbox shown below and press submit.

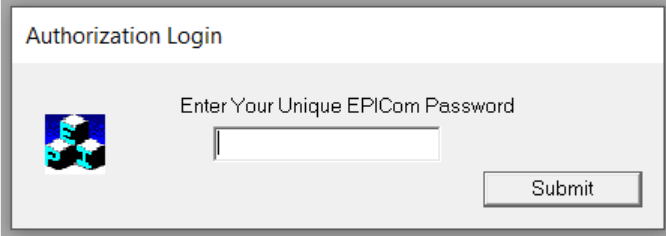
A screenshot of a software dialog box titled "Authorization Login". On the left side, there is a small icon of three interlocking cubes in blue, green, and red. To the right of the icon, the text "Enter EPI Provided EPICom License Key" is displayed above a single-line text input field. At the bottom right of the dialog, there is a button labeled "Submit".

If the License Key is correct, you will see the success message. Then press enter.

A screenshot of a software dialog box titled "EPICom LIVE" with a close button (X) in the top right corner. The main text area contains two lines: "SUCCESS: Now Create Your Own Unique EPICom Password" and "This Will Be Your EPICom Password Going Forward". At the bottom right, there is a button labeled "OK".

Unique EPICom Login

Now you will be prompted to enter a unique password. Enter any ASCII string of your choice and then press Submit. Be sure to write down the password for future sessions with EPICom MTR and or SIM Dialogs.

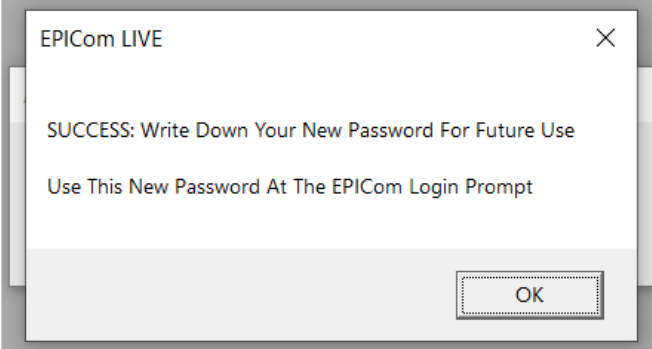
A dialog box titled "Authorization Login" with a light gray background. On the left is a small icon of three interlocking cubes in blue, green, and red. To the right of the icon is the text "Enter Your Unique EPICom Password" above a white text input field. At the bottom right is a button labeled "Submit".

Authorization Login

Enter Your Unique EPICom Password

Submit

If the unique password is entered properly, you will see the success message. Then press enter.

A dialog box titled "EPICom LIVE" with a close button (X) in the top right corner. The background is light gray. The text inside reads: "SUCCESS: Write Down Your New Password For Future Use" followed by "Use This New Password At The EPICom Login Prompt". At the bottom right is a button labeled "OK".

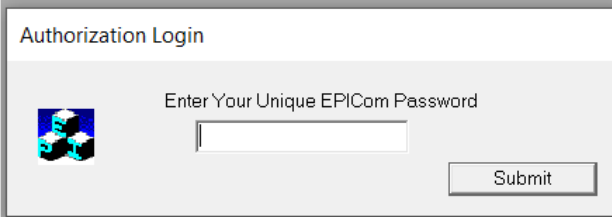
EPICom LIVE

SUCCESS: Write Down Your New Password For Future Use

Use This New Password At The EPICom Login Prompt

OK

You have now completed the password mechanism. In future sessions with EPICom MTR and SIM Dialogs, you will only be prompted for your unique password. It's shown below.

A dialog box titled "Authorization Login" with a light gray background. On the left is a small icon of three interlocking cubes in blue, green, and red. To the right of the icon is the text "Enter Your Unique EPICom Password" above a white text input field. At the bottom right is a button labeled "Submit".

Authorization Login

Enter Your Unique EPICom Password

Submit

Section F EPICom MTR Dialog

Revision vAB01 Changes

Modified the BASE Serial Number parameter to a textbox. If no meter is attached, the User will be allowed to enter a serial number so that .CMTR files will be displayed related to the serial number entered. This gives the User the ability to read modify write .CMTR files when no meters are attached. This will be useful to modify a .CMTR file away from the meter and then in the field use MTR LiTE to load it onto the meter in the field. This text box will become read only once a successful Read Data occurs. The read data will over write the parameters in the Meter Details group.

Added mW, Volts, and mAmps textbox to the EPICom LIVE group in the image below. This is real time LIVE data that comes from the meter while attached and after a successful read from meter. The Volts and Amps are calculated and are the expected values at the hardware outputs.

End of Revision vAB01 Changes

MTR Overview



MTR allows access to key flow meter's settings through one PC screen. **The functions and parameters on this screen are fully described in the EPITerm section.** It is also used to save .cmtr meter backup files ("Save To File" button) after making meter configuration changes or to open a prior saved file to restore settings.

The screenshot displays the EPICom MTR dialog box, which is organized into several functional panels:

- File Data:** Includes 'Save To File' and 'Read File' buttons, a text field for the file name, and a status indicator showing 'No Files Found'.
- Meter Details:** Contains fields for BASE, SIM, and other meter-specific parameters, along with a 'Change' button and a 'Watchdog Timer' section.
- Host Computer Date / Time:** Features a date and time selection interface with 'Format' and 'Factory' options.
- Gas Density Reference Conditions:** Includes fields for Gas, Density, SG, and Reference Conditions, with a 'Density Multiplier' field.
- LCD Display:** Allows configuration of display settings such as 'No LCD', 'Splash Only', 'Percent FS', 'mW', 'Temperature', 'Relay/Range', 'Contrast', 'Refresh Rate', and 'Toggle Rate'.
- Signal Output:** Configures output settings including 'mW Filter', 'NAMUR', '4-20 Out 1', '4-20 Out 2', 'Flow V-Out 0-10V', 'Temp V-Out 0-10V', 'TEMP', and 'TEMP'.
- Alarm/Relay Settings:** Configures alarm and relay settings, including 'Event', 'Function', 'Value', 'Trip Delay', and 'Hold Flow'.
- Linear Curve Fit:** Provides a table for 'Primary Coefficients' and a 'Point-Wise' section for curve fitting.
- Flow/Total Parameters:** Displays real-time data for 'Rate', 'Total', 'mW', 'Volts', 'mAmps', and 'Relay 1/2'.
- Meter Communications:** Configures communication settings for 'RS232 Port', 'RS485 Port', 'COM3', 'COM5', 'Modbus Big Endian', 'Device Address', and 'Protocol Mode'.

Eldridge Products recommends that factory settings of a flow meter be read into MTR (Read Data button) and then backup (Save To File button, will save a .cmtr file) to a PC in case the settings are needed to be restored to the flow meter at a later date. Also, please note that the Primary Coefficients are unique to each flow meter. The settings from one flow meter cannot be used to restore the factory settings to any other flow meter, even if the other parameters for flow rate, engineering units, etc. are the same.

Backups are recommended upon receiving an EPI flow meter. If a backup was not done and something happens in the field that requires an MTR file, you may also receive the MTR data files for your specific EPI flow meters directly from EPI which is subject to a service fee. The file name

first few characters identifies the EPICommunicator version, the eight digits that follow are the flow meter's serial number, the last part is a date and time the file was saved.

The settings of a EPI flow meter can be read into the MTR screen by establishing a connection to the flow meter and clicking on the **“Read Data”** button. This is useful if you need to check the current settings during trouble-shooting or in preparation for making adjustments. If your flow meter has multiple ranges and you want to activate the settings of a range other than the currently active range, then enter the Password for the meter in the password field, then click on the **Desired** pull-down menu and choose the range (1 – 5) that you want to access then click the **Change** button. The flow meter will restart into the desired range. Then click on **Read Data** again to view the settings. New setting changes can be uploaded to the EPI flow meter by clicking on the **Send Data** button.

All of the settings for the selected meter range on the screen, are overwritten when the file is read. Be sure you have selected the correct meter range and that the settings are correct when sending data to the flow meter. Do not send data if ALL coefficients/parameters are zero (0).

MTR Screen Layout

MTR supports a variety of adjustments to the factory settings through a series of data entry windows and pull-down menus. See menu descriptions earlier in this document for any of the below sections that reference the menus.

Sections:

- Meter Details
 - Version
 - Base version
 - SIM version.
 - Range (Menu 213)
 - Active – Active gas range to set for the EPI meter
 - EXT – This checkbox will set the meter for external range control. See menu 213 explanation for cautions.
 - Desired (Select this range to be used with the change button)
 - Change button (Changing ranges may require a valid password to change ranges)
 - Date / Time (This shows the PC date, not the meter date or time. “Terminal” mode or button mode, is required to change the date or time on the meter)
 - The date button will change format from/to MM/DD/YY – DD.MM.YY
 - The time button will change format from/to AM/PM to 24Hour.
 - Calibration date (Menu 221)
 - Clear Date
 - 1 Year Date
 - Watchdog Timer
- File Data
 - Save To File – Allows meter settings to be saved to a .cmtr file. This should be done as soon as the meter is installed for a backup of factory settings. If any changes are done after installation, you should also save another configuration (with added notes).
 - These files are saved into the location of the EPICom executable file.
 - Read File – This should be done after using the “Read Data” from the meter if you are planning to “Send Data” from the file back to the meter.
 - Notes window – Right side of “Save to File” button. Click in box, Then Notes window will appear. Enter explanation of changes made for the .cmtr file you are saving, then click on “Exit” button. Continue to click on “Save To File” button to save your notes into a new configuration file.

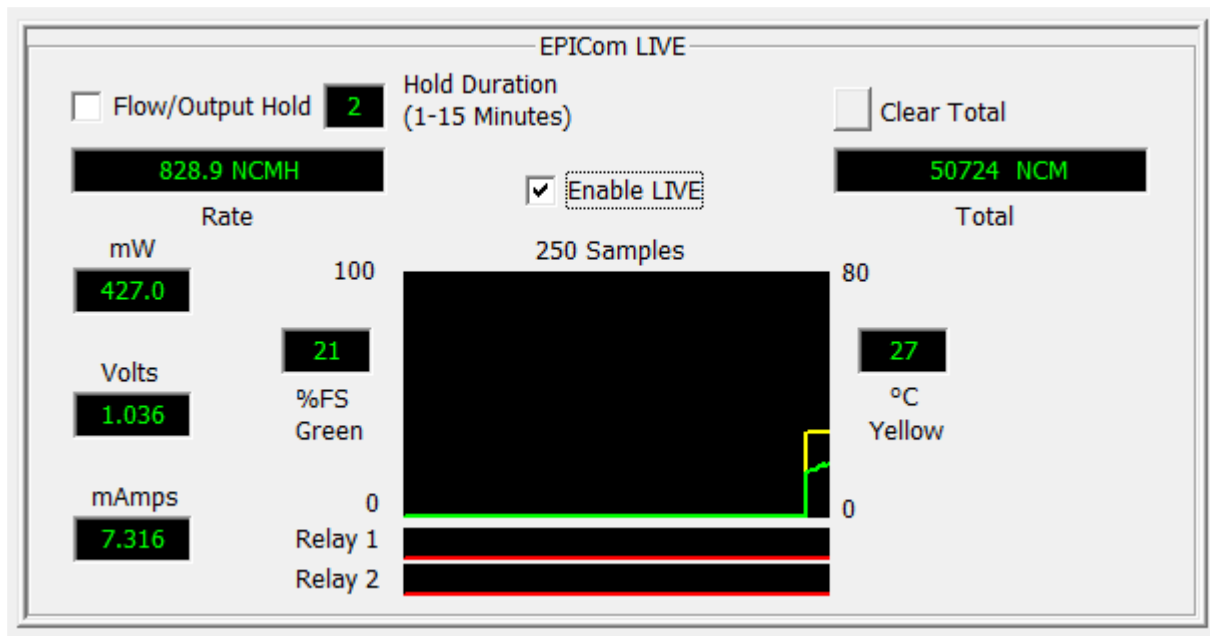
- File selection pulldown – Upon clicking the “MTR” button the first time to open, you will need to **Read Data** from the meter first to reveal available configuration files. The read will validate the serial number of the meter to then show the proper saved files. Click on the file you want to retrieve, then click “Read File” button to retrieve it and see saved notes for that configuration file.
- Meter Data
 - Read Data - Read & display values from the meter
 - Range selection pulldown – Select range to read from or write to. Ranges other than 1 would have needed to be purchased in order to utilize them.
 - Terminal button. This will bring up terminal mode where all menus can be accessed. See section of this document that discusses EPITerm terminal mode.
 - Send Data- Send values in this window to the meter (Requires Password. See menu 218 & 237)
 - Password – Password initially set up in menu 218. Need to enter prior to sending data. See menu 237 for explanation of modes 0, 1, 2.
 - Mode selection pulldown – See menu 237 for explanation of modes 0, 1, 2.
 - E-Log Button (See E-Logger section)
- Gas Density Reference Conditions (Menu 251)
 - Ref. Temperature
 - Celsius / Bar(A)
 - Fahrenheit / PSI(A)
 - Ref Pressure
 - Ref Density
 - Density Multiplier
- LCD Display
 - No LCD checkbox (Menu 229)
 - Splash Screen Only (Menu 229)
 - Percent of Full Scale (Menu 229)
 - Total Accumulated Flow (Menu 229)
 - Relay/Range (Menu 229)
 - Temperature (Menu 229)
 - Milliwatt - mW (Menu 229)
 - Contrast slide bar (Menu 208)
 - Refresh Rate slide bar (Menu 207)
 - Toggle Rate (Menu 234)
- Signal Output
 - mW (Menu 205)
 - Flow V-Out 0-10 checkbox (Menu 227)
 - Temp V-Out 0-10 checkbox (Menu 228)
 - DAC Filter (Menu 203)
 - DAC Refresh (Menu 202)
 - Gas Temp Range (°F) value
 - Zero (Menu 230)
 - Span (Menu 231)
 - NAMUR checkbox (Menu 254)
 - 4-20 Out Flow checkbox (Menu 246)
 - 4-20 Out Temperature checkbox (Menu 246)
 - Temperature Offset – (Menu 216)
- Flow/Total Parameters
 - Mode – (Menu 255)
 - Password – (Menu 255)
 - Units (Menu 100's)
 - Full Scale (Menu 840)
 - C Factor (Menu 811)

- Flow Cutoff % (Menu 816)
 - Pipe Area ft² (Menu 813)
 - Pipe Diameter ID (Inches) (Menu 814)
 - Pipe Size List (Menu 815)
- Terminal – (Menu 232)
 - No term checkbox
 - No temp checkbox
 - No mW checkbox
- Alarm/Relay Settings (Menu 400's)
 - Relay #1 Off
 - Function
 - Value
 - Trip Delay
 - Relay #1 On
 - Function
 - Value
 - Trip Delay
 - Hold Flow (Menu 413) – Hold input voltage while event 2 is active.
 - Relay #2 Off
 - Function
 - Value
 - Trip Delay
 - Relay #2 On
 - Function
 - Value
 - Trip Delay
 - Hold Flow (Menu 414) – Hold input voltage while event 4 is active.
- Linear Curve Fit
 - Point-Wise Enable (Menu 217)
 - Point-Wise Correction % - (Menu 751 – 770)
 - Display Linear curve Button
 - Display Curve Button
 - Primary Coefficients – (Menu 801 – 810)
- Meter Communications
 - RS232 Port Baud Rate – (Menu 225)
 - RS485 Port Baud Rate – (Menu 226)
 - RS485 Port Parity – (Menu 233)
 - Device Id/Address – (Menu 256 Meter ID)
 - Protocol Mode – (Menu 224)
- EPI Factory – Factory only
- MultiPoint – Factory only
- EPICom LIVE
 - Flow/Output Hold (Menu 212) (Selecting checkbox will hold flow for Hold Duration. Uncheck to clear)
 - Hold Duration (Reveals Menu 222 setting. Temporary change here will not change Menu 222)
 - Rate (Flow rate for selected units. 100's Menus)
 - Total (Totalizer for accumulated flowed units)
 - Clear (Clear totalizer. See menu 255 for explanation)
 - %FS GRN (% of Full Scale)
 - ° F (Gas Temperature)
 - Relay 1 (Shows active upon energization of the relay)
 - Relay 2 (Shows active upon energization of the relay)

Flow/Total Parameters: Changing Flow Units. To change the engineering units used by a flow meter, push the Read Data button first (to read all meter values) then simply select the new units from the pull-down menu. The dependent settings, such as Full Scale and Maximum Range, are automatically recalculated. Changing between Imperial and metric units will also change the cross-sectional area to ft² or m² as appropriate (changing the cross-sectional area, however, does NOT automatically make similar changes). Pushing the Send Data button will then write all displayed settings plus the new units to the meter.

Extra Information - EPICOM LIVE

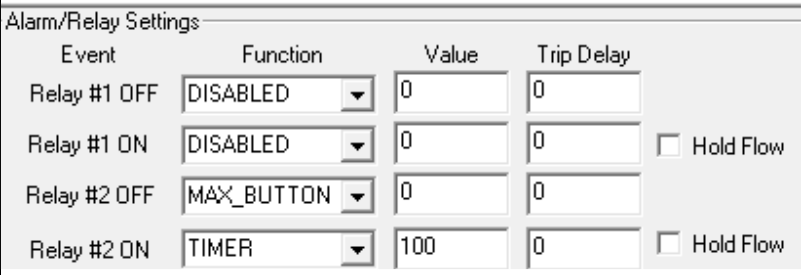
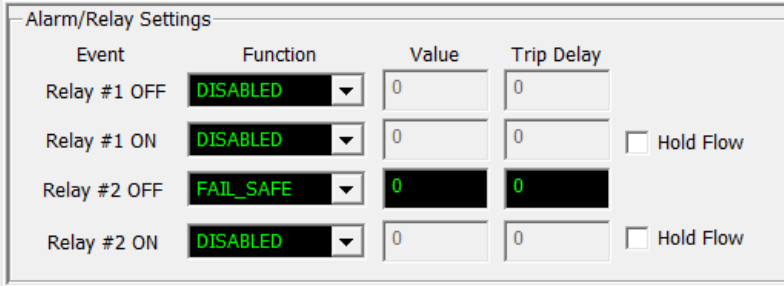

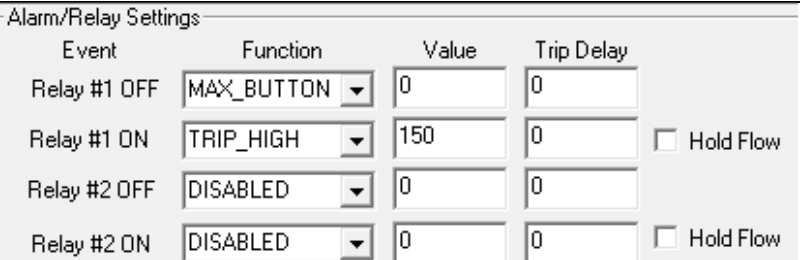
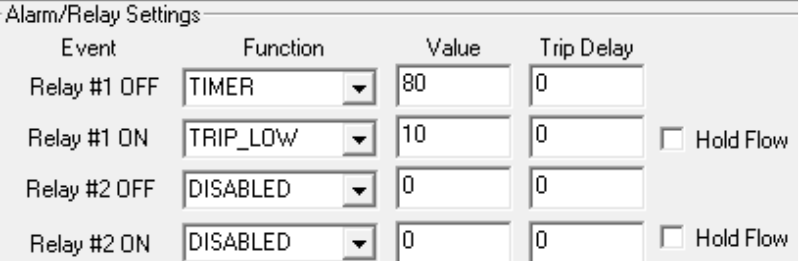
EPICom LIVE section reveals the current meter flow status and relay status. You must first push the “Read Data” button to pull the meter values. The Green line represents the current % of Full Scale. The Yellow line represents the gas temperature. The Red lines represent the relay status if they are de-energized (low) or energized (high). The Enable LIVE check box allows the user to enable/disable this feature. When enabled, EPICom LIVE communicates with the meter to query for the real-time data. The Volts and mAmps are the Meter’s calculated values and may not represent the exact electrical values as read using a DVM on the SIB board.



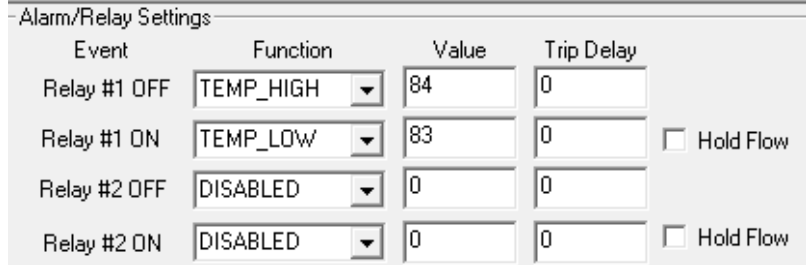
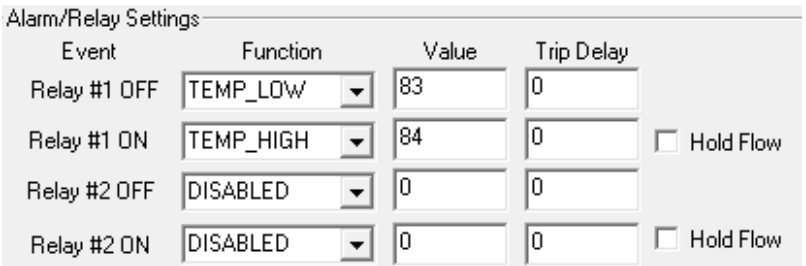
Extra Information - Alarm/Relay Settings Section

Setting the Alarm values is much easier to accomplish by using MTR other than the other methods such as through the meter keypad or using EPITerm. The various functions for each Relay Event are listed in a windows screen. See below.

Some examples of Alarm cases shown with MTR screen

1	<p>Set relay #2 to de-energize (Connect COM-NC) during a power failure.</p> <p>Test failure by pushing MAX button during run mode to trigger the relay.</p>	 <p>Power failure detection (Option 1)</p>
2	<p>Set relay #2 to de-energize (Connect COM-NC) during a power failure.</p>	 <p>Power failure detection (Option 2)</p>
3	<p>Set relay #2 to energize (Connect NO-COM) upon push of MAX button. Stays energized until release of button and timer timeout (1s)</p>	 <p>Possible usage: Manual push button requirement to trigger a contact closure for an application specific need. Timer = 100 = 100 x 50ms = 5 seconds</p>
4	<p>Set relay #1 to energize (Connect NO-COM) upon tripping at high flow of 150 SCFM and keep relay energized until the MAX button on the meter is pushed.</p>	 <p>FLOW UNITS SCFM (Menu 102 selected)</p>
5	<p>Set relay #1 to energize (Connect NO-COM) upon low flow of 10 SCFM for 4 seconds.</p>	 <p>FLOW UNITS SCFM</p> <p>Timer = 80 = 80 x 50ms = 4 seconds</p> <p>Trip Low = 10 SCFM (Menu 102)</p>

6	<p>Set relay #2 to energize (Connect NO-COM) upon each accumulated flow total of 100 SCF with 100ms pulse width.</p> <p>The accumulation of flow starts at the point of clearing the total by either typing “CCC” on the terminal or from the point of initially setting up the relay.</p>	<p>FLOW UNITS SCFM</p> <p>Timer = 2 = 2 x 50ms = 100ms</p> <p>Pulse Out = 100 SCFM (Menu 102)</p>																									
7	<p>Set relay #1 to energize (Connect NO-COM) upon each accumulated flow total of 100,000 SCF with 4 second pulse width.</p> <p>Hold flow rate during this time so relay can trigger purge cycle and purge gas does not affect flow rate since flow rate is being held</p>	<div>Alarm/Relay Settings</div> <table><thead><tr><th>Event</th><th>Function</th><th>Value</th><th>Trip Delay</th><th></th></tr></thead><tbody><tr><td>Relay #1 OFF</td><td>TIMER</td><td>80</td><td>0</td><td></td></tr><tr><td>Relay #1 ON</td><td>PULSE_OUT</td><td>100000</td><td>0</td><td><input checked="" type="checkbox"/> Hold Flow</td></tr><tr><td>Relay #2 OFF</td><td>DISABLED</td><td>0</td><td>0</td><td></td></tr><tr><td>Relay #2 ON</td><td>DISABLED</td><td>0</td><td>0</td><td><input type="checkbox"/> Hold Flow</td></tr></tbody></table> <p>FLOW UNITS SCFM</p> <p>Timer = 80 = 80 x 50ms = 4000ms = 4 seconds</p> <p>Pulse Out = 100000 = 100000 SCFM (Menu 102)</p> <p>Hold flow rate during timer duration.</p>	Event	Function	Value	Trip Delay		Relay #1 OFF	TIMER	80	0		Relay #1 ON	PULSE_OUT	100000	0	<input checked="" type="checkbox"/> Hold Flow	Relay #2 OFF	DISABLED	0	0		Relay #2 ON	DISABLED	0	0	<input type="checkbox"/> Hold Flow
Event	Function	Value	Trip Delay																								
Relay #1 OFF	TIMER	80	0																								
Relay #1 ON	PULSE_OUT	100000	0	<input checked="" type="checkbox"/> Hold Flow																							
Relay #2 OFF	DISABLED	0	0																								
Relay #2 ON	DISABLED	0	0	<input type="checkbox"/> Hold Flow																							
8	<p>Set relay #1 to energize (Connect NO-COM) upon the total flow reaching 100 SCFM.</p> <p>The accumulation of flow starts at the point of clearing the total by typing “CCC” on the terminal or if the current accumulation of the total flow has not reached the total value set for the relay, then once it is reached, the relay will be triggered.</p>	<div>Alarm/Relay Settings</div> <table><thead><tr><th>Event</th><th>Function</th><th>Value</th><th>Trip Delay</th><th></th></tr></thead><tbody><tr><td>Relay #1 OFF</td><td>TIMER</td><td>0</td><td>0</td><td></td></tr><tr><td>Relay #1 ON</td><td>TOTAL</td><td>100</td><td>0</td><td><input type="checkbox"/> Hold Flow</td></tr><tr><td>Relay #2 OFF</td><td>DISABLED</td><td>0</td><td>0</td><td></td></tr><tr><td>Relay #2 ON</td><td>DISABLED</td><td>0</td><td>0</td><td><input type="checkbox"/> Hold Flow</td></tr></tbody></table> <p>FLOW UNITS SCFM (Menu 102 selected)</p> <p>Trigger relay upon 100 SCF of total flow</p> <p>Note: If the current accumulation of total flow is above the value set here for “TOTAL”, then the total must be cleared otherwise the relay will stay energized.</p>	Event	Function	Value	Trip Delay		Relay #1 OFF	TIMER	0	0		Relay #1 ON	TOTAL	100	0	<input type="checkbox"/> Hold Flow	Relay #2 OFF	DISABLED	0	0		Relay #2 ON	DISABLED	0	0	<input type="checkbox"/> Hold Flow
Event	Function	Value	Trip Delay																								
Relay #1 OFF	TIMER	0	0																								
Relay #1 ON	TOTAL	100	0	<input type="checkbox"/> Hold Flow																							
Relay #2 OFF	DISABLED	0	0																								
Relay #2 ON	DISABLED	0	0	<input type="checkbox"/> Hold Flow																							
9	<p>Set relay #2 to energize (Connect NO-COM) upon manual push of MAX button.</p> <p>Hold flow rate during this time so relay can trigger purge cycle and purge gas does not affect flow rate since flow rate is being held. stays energized until</p>	<p>Timer = 100 = 100 x 50ms = 5 seconds</p>																									

	release of button and timer timeout (1s)	Hold flow rate during timer duration.
10	<p>Set relay #1 to energize (Connect NO-COM) when gas temperature drops below 83 and de-energize (Connect NC-COM) when it raises again to 84.</p> <p>You can delay the relay trip for either event using “Trip Delay” entry. These are 50ms units.</p>	 <p>Used for trip low or trip high</p>
11	<p>Set relay #1 to energize (Connect NO-COM) when gas temperature rises to 84 and de-energize (Connect NC-COM) when it drops again to 83.</p> <p>You can delay the relay trip for either event using “Trip Delay” entry. These are 50ms units.</p>	 <p>Used for trip low or trip high.</p>
12	<p>Set relay #1 to energize (Connect NO-COM) when gas temperature rises to 84 and de-energize (Connect NC-COM) when it drops below 60.</p> <p>Trip delay can be used and hold flow can also be used. See explanation in above table for menus 413 and 414.</p>	<p>When gas temperature is between these values, the relay will maintain the last state until the gas temperature either rises above 100 or falls below 60. If the last state was an energized relay due to rising above 100, if it falls below 100, no change occurs, it must fall below 60.</p>

MTR will also generate graphs showing the non-linear curve output of the sensor and the linear 0–5VDC output for each flow meter. These graphs (shown below) are useful in understanding the affects of changes to the Full Scale, Zero Offset, C Factor, etc.

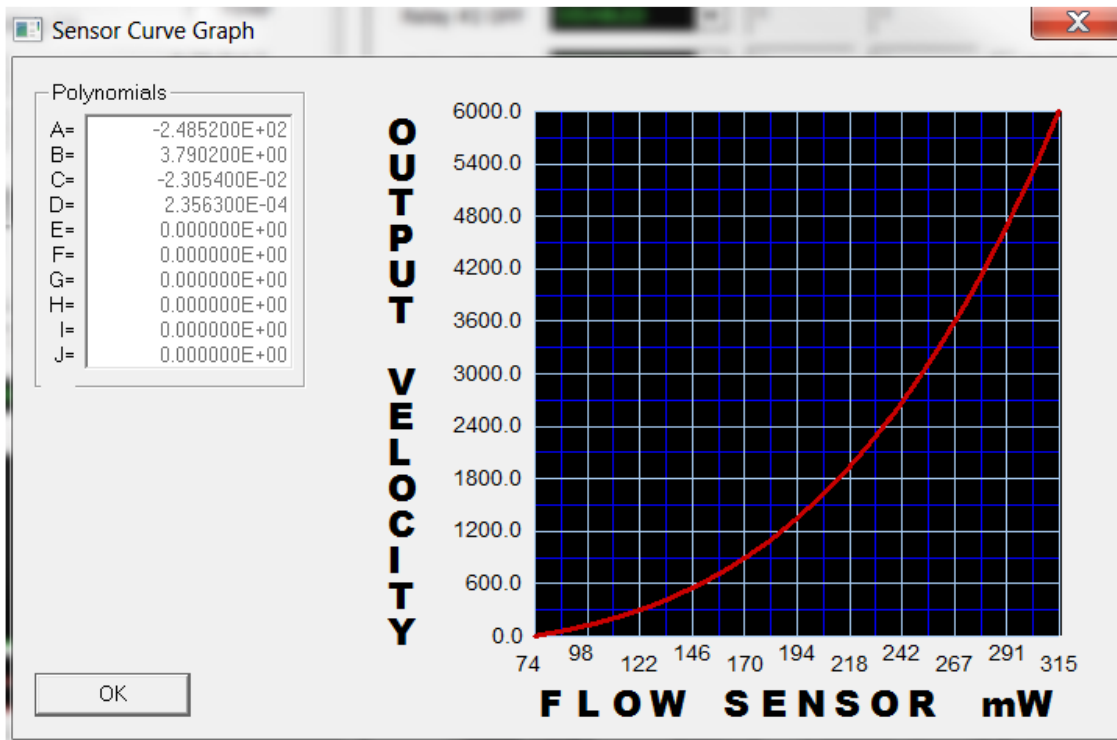
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Extra Information - Linear Curve Fit Section

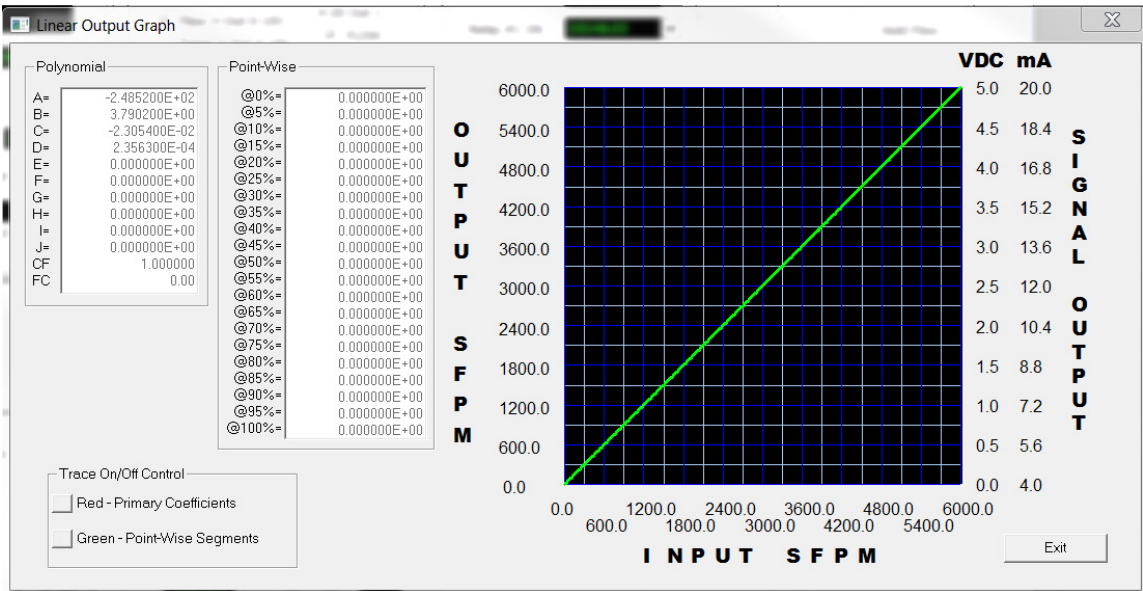
Changes to the factory linearization can be made by using the C-Factor, Secondary Coefficients or Point-Wise adjustments. The results of these changes to the linear output signal can be viewed by selecting the appropriate curve fit options and clicking on the **Display Linear** button (see Display Linear below).

The Primary coefficients must never be changed unless done so at the specific direction of factory technicians. Changing these values without factory direction will negate the signal linearization and cancel the factory warranty.

“Display Curve” button - The X-axis of the Sensor Curve Graph is the sensor input; the Y-axis is the full-scale output. Each sensor and sim board assembly have a unique curve, as does each gas or gas mixture.



“Display Linear” button - The X-axis of the Linear Output Graph is the Full-Scale value of the flow meter; the left Y-axis is the Full Scale value of the flow meter; the right Y-axis is the linear 0-5VDC (& mA) output scaled to the Full Scale value. The output can be modified by the C-Factor, or the Point-Wise factors.



Saved CMTR Files

To open an archived *.cmtr file, you would first use the **Read Data** button to read from the meter where it will identify the meter serial number. Once the read occurs, any prior saved .cmtr files that were saved using the MTR module, they will show up in the dropdown under the **Read File** button. You can select any file and then push the **Read File** button which will update the MTR screen and then you can write these prior stored settings back to the meter using the **Send Data** button. The .cmtr files are stored in the same directory of the EPICom executable file.

Some of the data fields will be “grayed out” or blank. These fields are either accessible only by factory technicians or only for viewing.

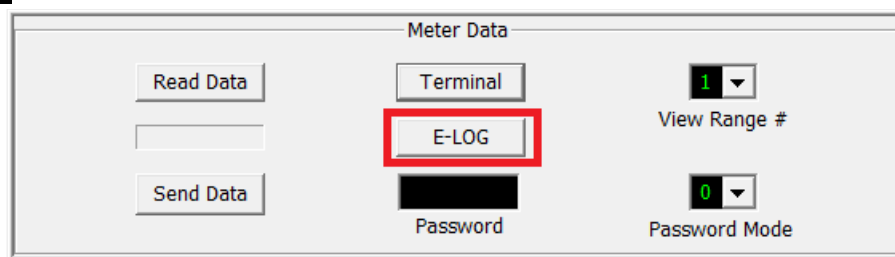
Section G The E-Logger Dialog

E-Logger Overview

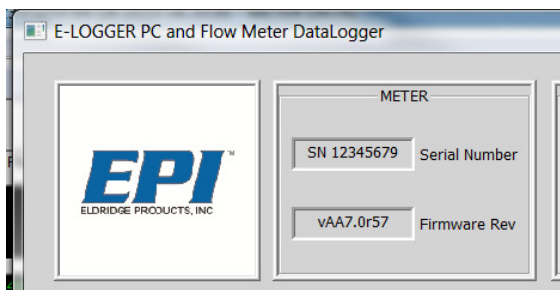
E-Logger includes a fully functional, PC-based data logger that works in conjunction with EPI flow meter software. To use the E-Log function, you must first open the MTR module and then “Read Data” from the meter successfully.

The amount of data that can be collected and store is only limited by the file size parameters of the PC. The E-Logger dialog is also used to configure and control the internal data logger included in EPI meter. The flow meter’s data logger is independent of the PC-based data logger. The PC can be disconnected from the flow meter without any impact to the internal meter data logger. However, its data storage capacity is constrained by the limited memory available in the flow meter.

To start the E-Logger, first push the “E-Log” button, this will read data from the meter and update the E-Logger screen, which will reveal the meter Serial Number and Firmware Revision. If a non-compatible meter version is attempted to be read, a message “Failed: Meter Not Compatible with EPICom vAA” will be displayed.

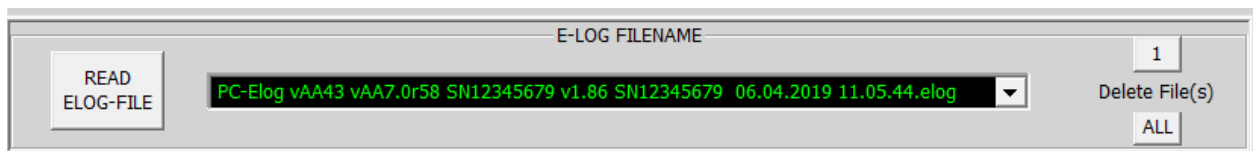


When the E-Logger is ready, you will see the meter Serial Number and Firmware Rev in the “METER” section seen in the below image.



To display real time data to the computer screen, push the Start button inside of the Computer E-Logger – Controls section.

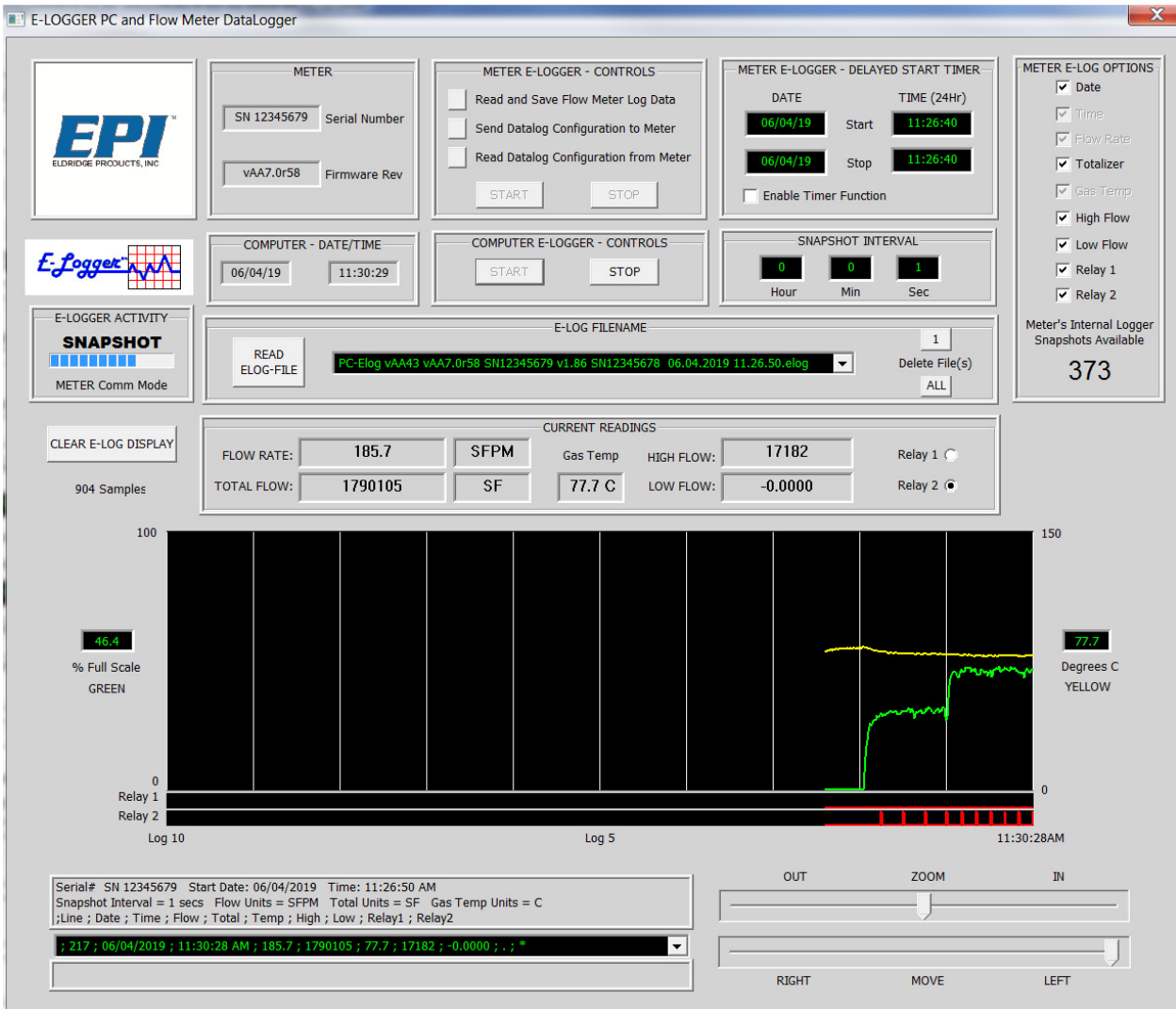
The filename will be created starting with “PC-Elog...”. Once the Stop button is pushed, the data will be saved to this file. The file will be stored at the same location as the EPICom application



executable file.

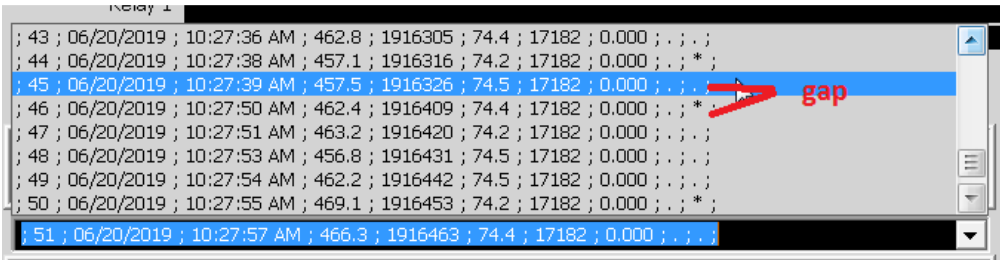
Below is a sample display output after the user pushed “Start” button inside of the “Computer E-logger – Controls” section.

Below image shows data just started to scroll from the right side of the screen. The snapshot interval was set at 1 second and all meter E-log options were turned on. The yellow line represents temperature, the green line represents flow % of full scale, the relay red lines show de-energized when the red line is low, and energized when the redline is high. Note on relays, that in order for them to be detected as energized, the snapshot must occur during the energized phase, otherwise it will not show in the snapshot display.



At the bottom of the screen, the selection dropdown will allow the user to select specific data entry which will align the graph to the far right of the screen at that timestamp.

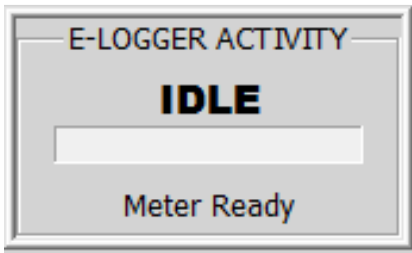
Note that if the application is running from the network and saving to a PC if a network outage



occurs, then there may be a gap in the data during that time period of the network outage. See below.

The E-Logger screen has its fields and functions arranged in operational groups. These functions are described below.

E-LOGGER ACTIVITY



This group monitors and displays the activity of E-Logger. There are three general categories that are monitored:

- 1) Communications with the flow meter as data is transferred;
- 2) Any exception conditions that might occur during operation;
- 3) Indication of the data logger modes; i.e. running, snapshots, meter ready, or idle.

COMPUTER – DATE/TIME

This is the current date and time found on the PC that is running the E-Logger module. It is used with the timer functions of the PC data logger.

METER E-LOGGER – CONTROLS

The **Start** button will start the flow meter’s data logging functions. If the “Enable Timer function” inside of the ‘METER E-LOGGER – DELAYED START TIMER’ is checked, then this delayed start timer section will control the actual start and stop of data collection, otherwise data collection starts immediately.

While the E-Logger is being logged to the meter, the LCD display will indicate with “LOG”. See below.



The Terminal should show “D” (stands for “Datalog”) at the far left of the screen while the meter is in run mode.

```
D 163.6 SFPM 1798920 SF 17182 0.000 R1=. R2=. 77.3F 104.4 0.07484 Lbs/FT^3
```

The **Stop** button immediately stops data collection regardless of the Timer parameters.

There are five buttons in this group that control the activity with the flow meter’s internal data logging functions:

The “**Read and Save Flow meter Log Data**” button will request the logged data from the flow meter and send it directly to the data log file on the PC. This action will clear the log display on the screen and send this data to the log display for review. The file is indicated in the E-LOG

FILENAME group. If there is no data to read from the meter, an exception condition is indicated in the E-LOGGER ACTIVITY group.

The **“Send Datalog Configuration to Meter”** button will send the TIMER group, LOG OPTIONS group, and SNAPSHOT INTERVAL group information to the flow meter. This information is stored in the flow meter’s EEPROM and will be used if the flow meter data logging function is selected.

The **“Read Datalog Configuration from Meter”** button will request from the flow meter the same information used in the send function. Once the data is received, it will be displayed in the appropriate groups. This allows the user to see how the flow meter logger is programmed.

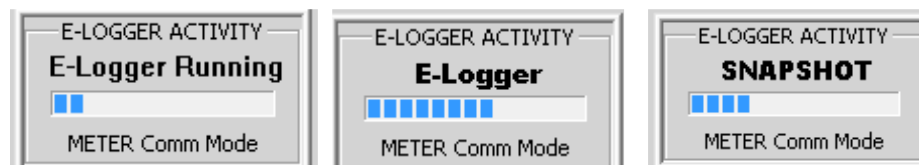
COMPUTER E-LOGGER – CONTROLS

There are two buttons in this group that control the activity with the PC-based data logging functions:

The **Start** button will start the PC-based data logging functions. The data collection starts immediately.

Upon pushing the Start button, an Elog file will be created in the folder where EPICom executable file resides. The file name will be “Elog SN<meter serial number> <date & time>.elog”.

One of three messages below may show at any time. The Snapshot view is done at the interval set by the use.



The **Stop** button immediately stops data collection regardless of the Timer parameters. The file that was created at the time of pushing the “Start” button is then closed.

METER E-LOG OPTIONS

This group is used to select the information that will be stored with each snapshot. A check mark indicates which information will be stored. It is important to consider the selections carefully, especially when using the METER E-LOGGER - CONTROLS due to its memory limitations. Each selection requires a number of bytes of storage space. Just below the METER E-LOG OPTIONS group you will see the number of Snapshots available for the flow meter’s data logger. As you make the log option selection, you will see the effect on the number of snapshots which can be stored in the flow meter’s memory. If your application requires more storage space than supported in the flow meter’s memory, please use the PC-based data logger. The PC-based logger usually has ample storage space available, so the data log selection decision is not critical.

E-LOG FILENAME

The file names in the pulldown are created upon the use pushing the Start button in the COMPUTER E-LOGGER – CONTROLS section for which the meter data starts being captured into this file. The file is closed upon pushing the Stop button. A stored .log file can be opened and loaded into the Snapshot Log Display by selecting its name in the file window and clicking on the READ LOG FILE FROM FOLDER button.

There is a Delete File button which deletes the selected file in the pulldown.

There is a Delete All Files button which clears all stored files. Caution using this button. You will have to use the PC file restore options if you accidentally delete all the files unintentionally.

METER E-LOGGER – DELAYED START TIMER

This group is used to control the timer functions. The **Start Date/Time** and **Stop Date/Time** fields determine when to start and stop the data collection if the Timer function is selected. The Timer is selected by the checking the **Enable Timer Function** box in this group.

SNAPSHOT INTERVAL

There are three fields in this group, **Hour**, **Min**, and **Sec**. The snapshot interval is the time between data snapshots that are stored in the log. The minimum interval between snapshots is 1 second. The maximum interval is 24 hours.

CURRENT READINGS

When the “COMPUTER E-LOGGER” start button is pushed, this group shows the current readings from the flow meter. The graph will reveal the snap shots for every snapshot interval that was set. Example, set for 1 second, then the graph will indicate the values for every second.

Graphing Window Display

This field displays the active snapshot data for gas flow rate, gas temperature and relay activity as it is collected during the COMPUTER E-LOGGER logging mode or static data when the ‘Read Log File From Folder’ button is used.

Clear E-Log Display

This button clears the data in the snapshot graph. It does not affect the storage of data in the log file.

Time axes’ values may be adjusted for analysis purposes by using the slide buttons for zooming and/or using the right & left slide bar. The bottom right time indicator will reveal the right-most side of the graph data. The bottom left data set will scroll and reveal the data set that the right side of the graph time stamp has indicated.

The Relay 1 or 2 radio views will show active upon the relay being energized.

Section H LCD and Keypad

LCD Overview

Master-Touch™ flowmeters typically include a 2-line, 16-character LCD display and keypad to view and control the functions of the full menuing system. Each of the Menus and submenu items are accessible via the key pad, though many functions are more easily used with *EPICommunicator* software.

Menu 229 setting will determine which lines are displayed and menu 234 will determine how fast the displays change from one to the other.



FR 229.3 SFPM
114.0 mW

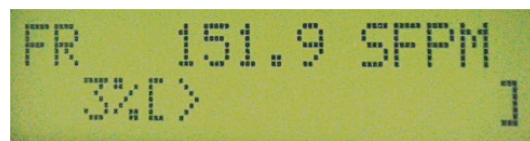
Relay 1 left, Relay 2 right

FR = Flow Rate, Then flow Units

1 = Range (1-5, more than 1 must be purchased)

The Infinity symbols represent Relay1 and Relay2 status. (∞ = de-energized, * = energized);

114 = mW representation of flow



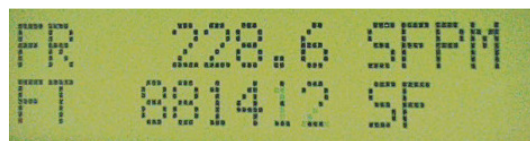
FR 151.9 SFPM
3%L

3% = Three percent of full scale is currently flowing



FR 288.6 SFPM
GT 83F ET 103F

GT = Gas Temperature, ET = Environment
Temperature inside of PCB enclosure



FR 228.6 SFPM
FT 881412 SF

FT = Flow Total

Master-Touch™ flowmeters typically include a 2-line, 16-character LCD display and keypad to view and control the functions of the full menu system. Many of the Menus and submenu items are accessible via the key pad, though many functions are more easily used with *EPICommunicator* software.

When the meter is in “Run Mode”, pressing the “**Mode**” button will cause the meter to show the first 100’s menu option. As you continue to press the “**Mode**” button, it will continue to show the next set of menus that can be displayed or modified.

Menus that can be displayed are:

100’s “Meter” (Selectable flow units) menus, 200’s “Utility” menus, 300’s “Status” menus, 400’s “Alarms” menus, 450’s “E-Log” menus, 750’s “PW-Curve Fit” menus, 800’s P-Curve Fit menus.

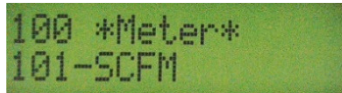
Note: Some menus can only be changed using the terminal window. In this case, the LCD will show “**Use Terminal**” on the display.

Once you reach the end of the menus, pushing “**Mode**” one last time should put the meter back into “Run Mode”. If you desire to put the meter back into run mode at any time, simply push the “**Shift**” + “**Mode**” button at the same time.

For an explanation of any of these menus and possible values for selection, please view the description of these menus which are found earlier in this document.

Note: Whenever you see “Use Terminal” on the LCD display, it means that you must use the EPICom software tool to access terminal mode in order to change these menu features.

Notice on the example LCD displays below, the top line shows the category type of menus that can be displayed or modified. Modification can only be done once the meter is unlocked (See section on how to unlock the meter using the keypad for menu 219).

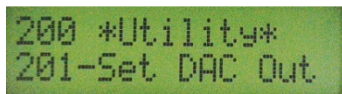


100 *Meter*
101-SCFM

While meter is in “Run Mode” Push “**Mode**” button once. (100’s) menus show up.

Push “**Mode**” button twice. (200’s menus), push again to go to next set of menus...

For any of the menus, the “**Max**” (Forward/Up) or “**Min**” (Backwards/Down) buttons will scroll through (2nd LCD display line) the menus that are available within that category group (1st LCD display line).



200 *Utility*
201-Set DAC Out

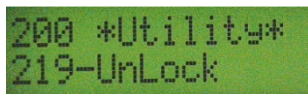
Unlock Meter Using Keypad

The keypad has 4 keys below the LCD display. Shift, Mode, Max, Min.

Shift is used to select (or used to move to the left while changing a value in a menu),

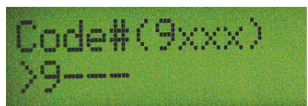
Mode is used to move through main menus (or used to move to the right while changing a value in a menu),

Max & Min used to move through sub menus (within main menu groups) and also used to change values for a specific menu.



200 *Utility*
219-UnLock

While the meter is in “Run Mode”, pushing the “**Mode**” button twice until it shows the top line of the LCD display as seen below. Next, push the “**Max**” button until the bottom line for menu 219-UnLock is revealed.



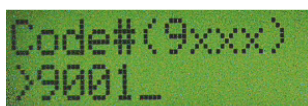
Code#(9xxx)
>9---

Then push the “Shift” button to select menu 219. For the example shown, once the LCD shows the display “>9---”, you can use the “**Max**” button to increment the digits, or “**Min**” button to decrement the digits. Once you select the proper first digit, push the “**Mode**” button to move to the next digit.



Code#(9xxx)
>9_--

The digit that is being changed will flash. Once you select it using “**Max**” or “**Min**” button, then again push “**Mode**” button until all the digits are entered. Once the last digit is entered and you push “**Mode**” button the



Code#(9xxx)
>9001_

last time, it will show the position seen below “9001_”. Now, push “**Mode**” button once more time and it will revert back to showing menu 219.



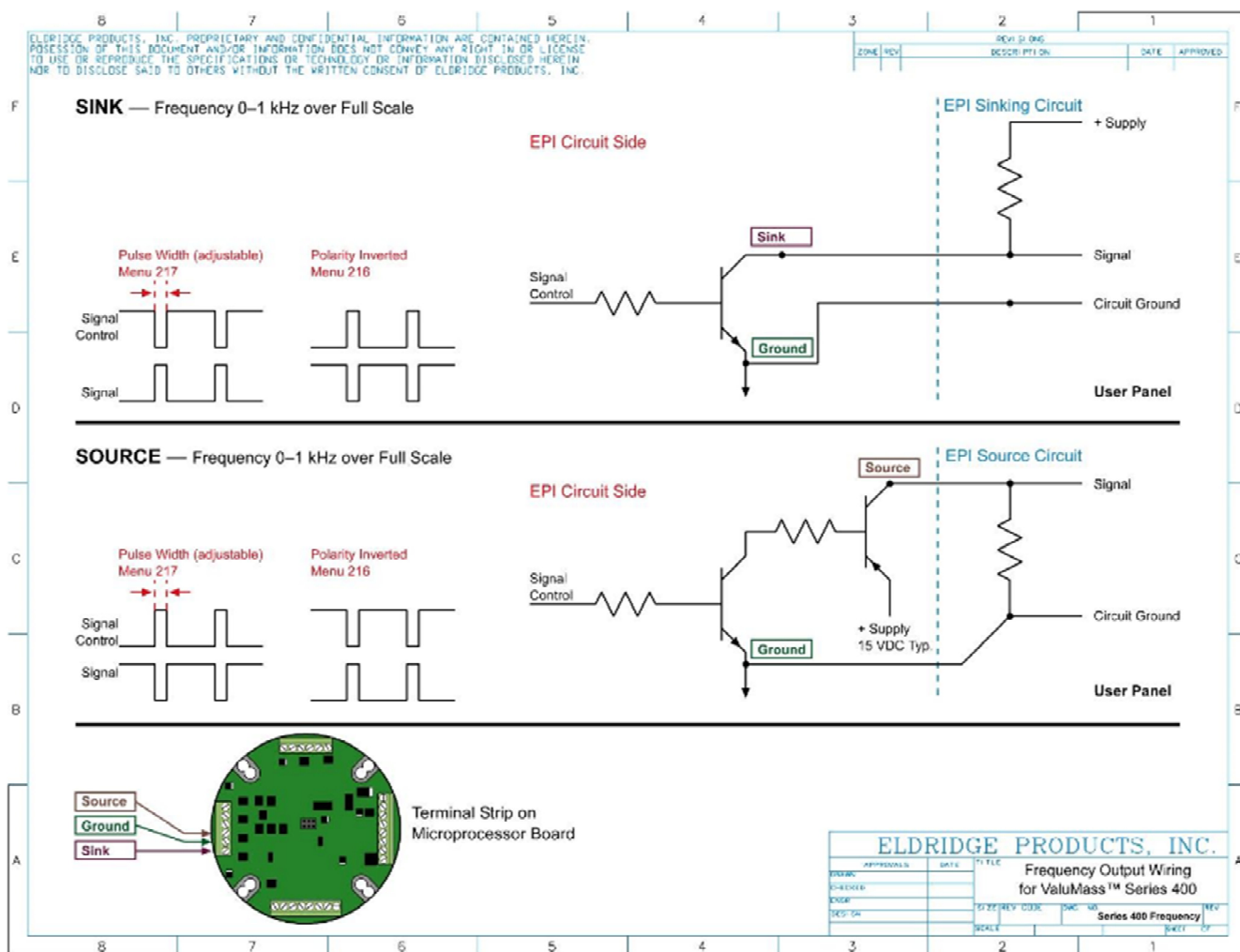
200 *Utility* >
219-UnLock

Notice the “>” character in the top right corner of the display, this identifies that the meter is now unlocked.

Once you are done with any changes, push the **Mode** button to put the meter back into run mode. If you forget to do so, it will eventually timeout and go into run mode.

Section I Guidelines and Product Drawings

Frequency Output Wiring Diagram



Guidelines and Product Drawings

RS232 Wiring Diagram

