EASTERN INSTRUMENTS

CentriFlow® Meter

CENTRIFLOW® DIGITAL ELECTRONICS INSTALLATION & OPERATION MANUAL

REV 8/24

VERSION cM3.1.0 A SOFTWARE

[cM3.1.0 Software for use with cMT3072XH HMI]

ORIGINAL LANGUAGE

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SAFETY

Safe Operation

PLEASE READ BEFORE OPERATING THE CENTRIFLOW METER

- Only authorized personnel should operate the CentriFlow Meter. Untrained personnel present a hazard to themselves and the meter and improper operation will void the warranty.
- Check for damaged parts before operating the meter. Any damaged part should be properly repaired or replaced by trained personnel. Do not operate the meter if any component does not appear to be functioning correctly. Contact Eastern Instruments for assistance or for repair components.
- Use the appropriate Personal Protection Equipment as required for operating the meter within its installation location.
- The various surfaces of the CentriFlow Meter module may have sharp edges and have the potential to cause injury. Use the proper protection for your hands when servicing or maintaining your CentriFlow Meter.
- The electrical panel (digital electronics) should be closed and the safety latch engaged at all times except during installation or service. At those times, only authorized personnel should have access to the electronics panel. When power is activated, AC voltage may be present throughout the panel. Therefore extreme caution is required.

♦ **DO NOT modify or alter this equipment in any way. If modifications are necessary, all such requests must be handled by Eastern Instruments. Any modification or alteration of any Eastern Instruments equipment could lead to personal injury and/or mechanical damage and will void the warranty.**

Warnings and Cautions

- Once power has been supplied to the CentriFlow Meter, it is always on and product may run through it at any time.
- Avoid entering or placing body parts within the meter's enclosure.
- Do not operate without proper training.
- Always wear proper PPE.
- NEVER service the meter while power is connected.

Safety Placards

SOME OR ALL OF THESE WARNINGS MAY BE ON YOUR METER. BE AWARE OF THE POSSIBLE DANGERS PRESENT.

ELECTRICAL SERVICE

Electrical shock or electrocution is possible when servicing the electronics of any Eastern Instruments equipment. Be sure to disconnect power before conducting any repairs on the electronics.

PRODUCT FLOW

The Control Valve for the CentriFeeder is used only as a control valve and does not act as an isolation valve. A secondary isolation valve is recommended to be installed before the CentriFeeder's control valve to isolate the CentriFeeder from flow during maintenance or repairs.

PINCH POINTS

The control valve of the CentriFeeder can cause serious injury or amputation. Keep hands clear of the control valve at all times.

LIVE ELECTRICITY

Live electrical wires may be present. Please note that coming into contact with the live wires (AC Power) could cause electrical shock or electrocution.

INSTALLATION

Installation Requirements

- The meter is to be used in a location where the product can be dropped from a fixed height such as a conveyer, or any type of feed system, which will give a reasonably constant initial vertical velocity. The design of the meter requires the product to contact the Tangential Plate and have some vertical drop.
- The meter should be installed so that it is level in two planes. Use the Bubble Level on top of the Seal Top to help (this is not applicable for meters that are installed at a 10° or 20° angle) .
- The meter should be mounted using the meter's mount only. The mounting method should minimize vibration and any movement. With a Type II Configuration, mounting should not be done using the meter's inlet or discharge flange.
- Guides to reduce product stream to the meter Pan width are required if the conveyer/feed system is wider than the meter Pan. Conversely, if the conveyer/feed system is considerably less than the width of the meter Pan, a spreader is required to widen the product stream to the width of the meter Pan.
- The discharge chute that the product stream empties into after traveling through the meter must be free flowing, meaning that it does not allow product to build up and consequently contact the Pan of the meter.
- The Electronics Enclosure should be wired using only the factory cable. There is a standard 25' Remote Electronics Cable supplied with the CentriFlow® Meter. The Electronics Cable should be cut to the exact length required. Do not coil the cable inside the meter casing or within the electronics cabinet.
- It is required that the Remote Electronics Cable be run through grounded metallic conduit connected on the side of the module and the bottom of the Electronics Enclosure. This Cable MUST be in a separate conduit than that of the AC Power or 24 Vdc Power supplied to the Electronics Enclosure. This is noted both in this manual and on the Enclosure itself.
- When installing multiple meters, be sure to take notice of the Serial Number of the meter and the electronics. When installed, the meter's serial number and the electronics' serial number should match, since the individual meters could have different flow rates or settings.

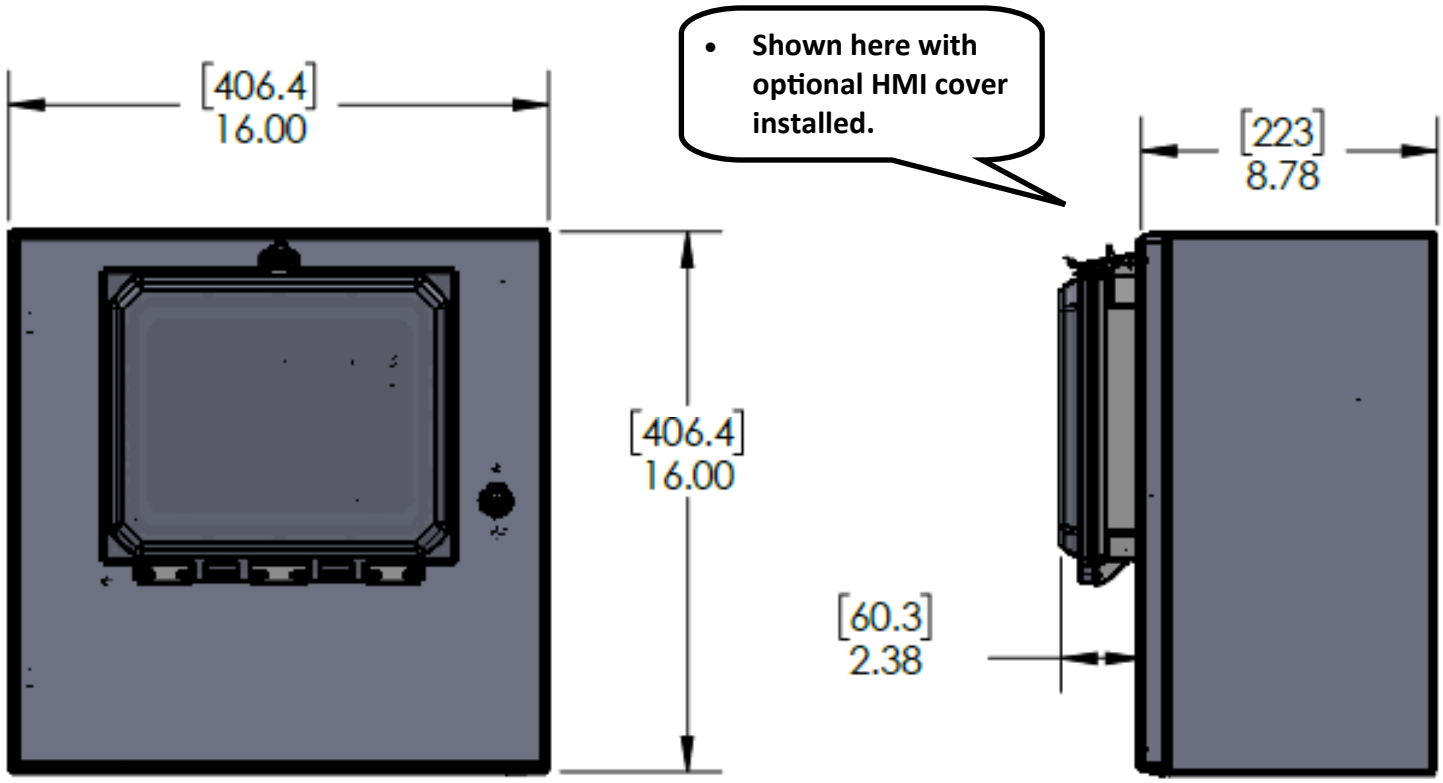
INSTALLATION

Installation Trouble Areas

- The CentriFlow® Meter's 4-20mA signal (sourced) is self-powered and does not require any additional voltage.
- DO NOT RUN 480V, 240V, 120V, AND SIGNAL LINES IN THE SAME CONDUIT. The power and signal lines should be separate from each other and from all other devices. Running any other power or signal lines in the same conduit could affect the performance of your meter. Isolate both power and signal lines from each other at all times.
- The CentriFlow® Meter is balanced at a specific angle and should not be subject to vibration or movement. The mass of the mount should be at least 2 times the mass of the meter .
- The Seal Top should be on the meter at all times that you are not working inside the meter. This is to keep all foreign materials out of the meter that could obstruct its movement or impair its functionality.

Electronics Enclosure Drawing

Dimensional Drawing



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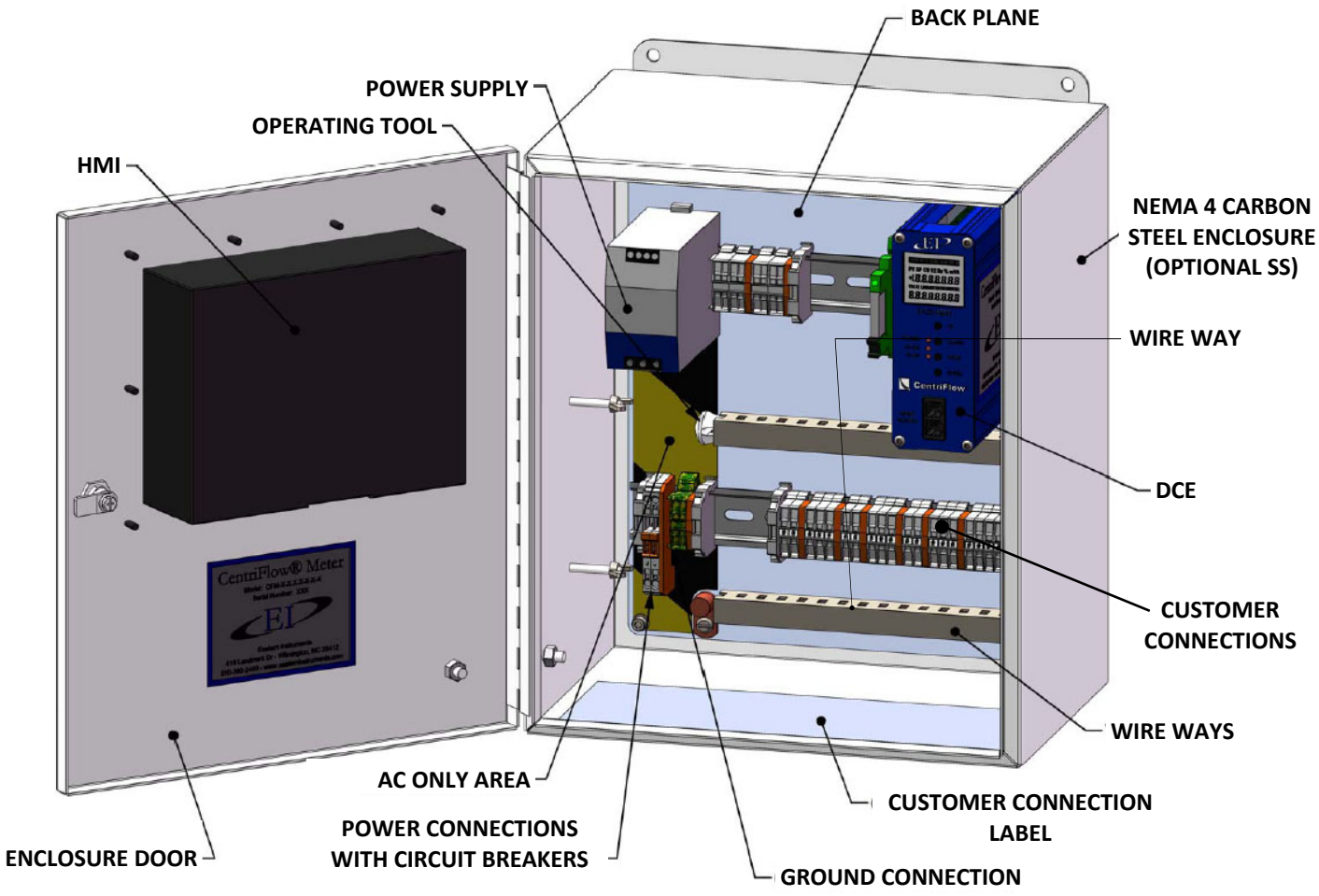
OPERATION

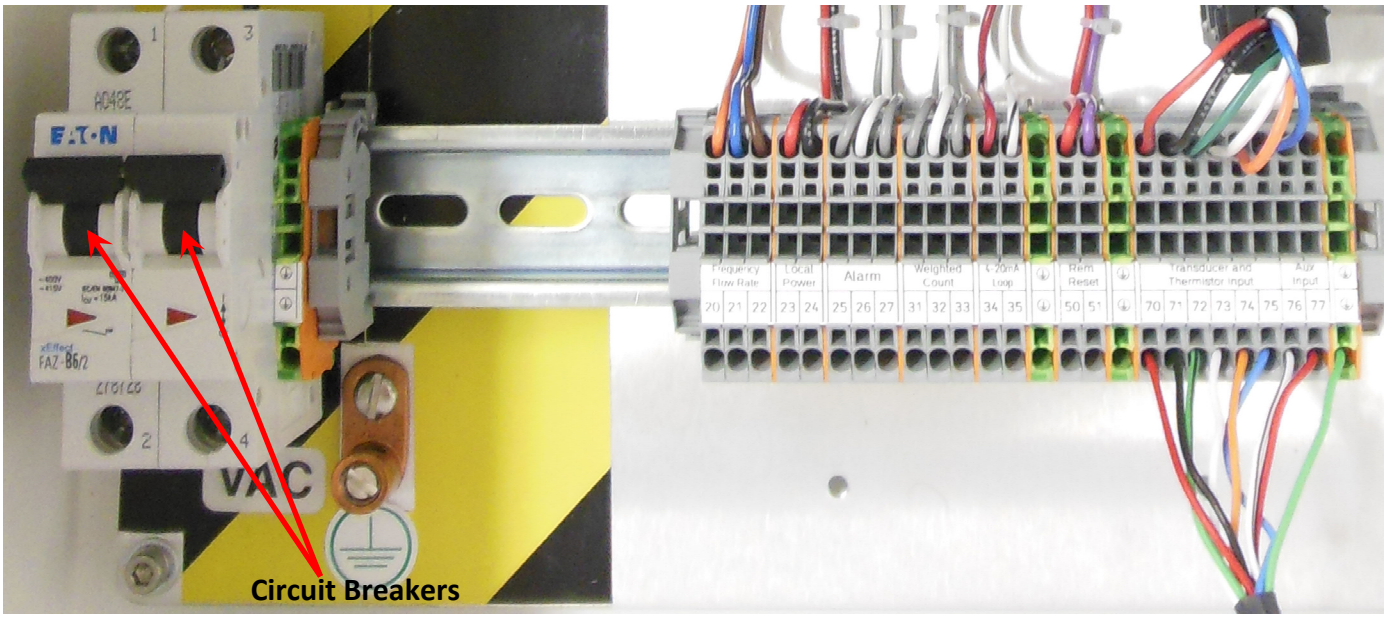
Identifying Your Components



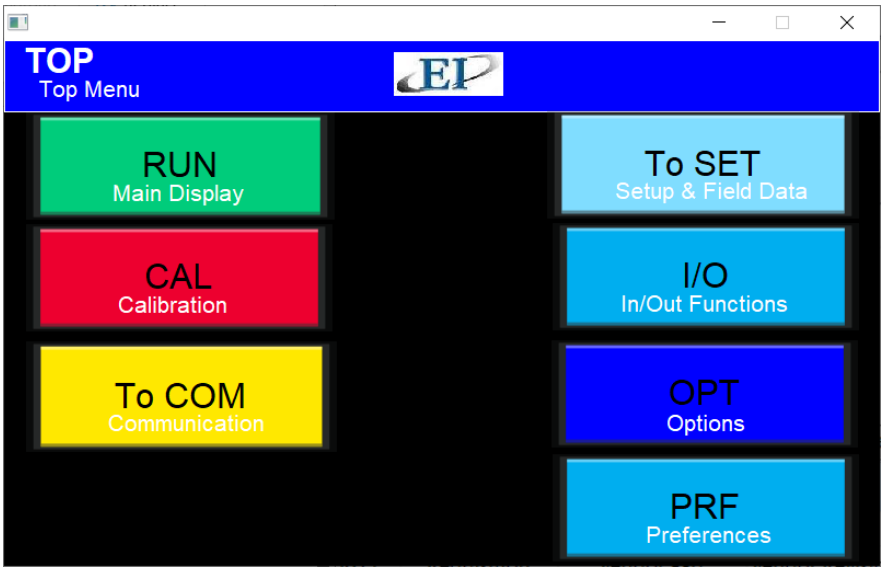
The Digital Electronics Enclosure contains the HMI, the Digital CentriFlow® Electronics (DCE), Power Supply, Alarm Relay, Power Connections with Circuit Breakers, and the Customer Connections.

Powering On

To power on your digital electronics, open the Digital Electronics Enclosure and close the Circuit Breakers on the VAC Power wiring connections as shown below.



Close the Digital Electronics Enclosure. The HMI should now be coming on. Upon startup, the HMI will display the Main Menu Screen, also called TOP, as shown below.



Screen Saver

Please note that the ScreenSaver option will be enabled upon shipment. If any page is left undisturbed for 120 minutes, the ScreenSaver will be enabled. The ScreenSaver will look like the image below. To stop the ScreenSaver, press anywhere on the screen.

To disable the ScreenSaver option, from the TOP MENU, press the PRF Button and then, the SCREEN SAVER Button. Entering a “0” in the Screen Saver Time, will turn off the Screen Saver.

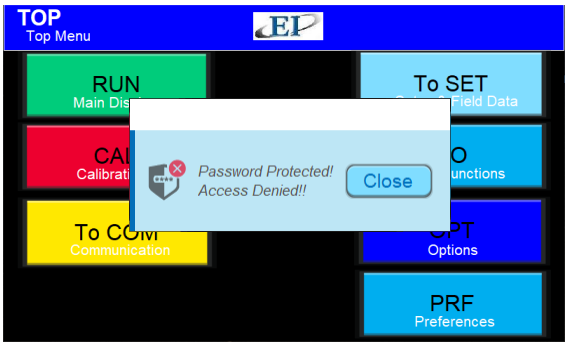
Security Features

Your CentriFlow® HMI is equipped with a security system that allows sensitive information and settings for your process to be protected via a password-based security layer. The password-based security system is designed to protect your information and settings from unauthorized access and tampering.

Please note that four pages require no security authorization to view. These pages are the TOP Menu, the TOP.RUN (or Main Display) page, the COM.INFO page and the RUN.TREND (Plotting) page. You will also be given access to the TOP.PRF page or the Preferences Page where you will be given the ability to Log In. All other pages require the entry of both a username and a password to access.

LOGGING ON

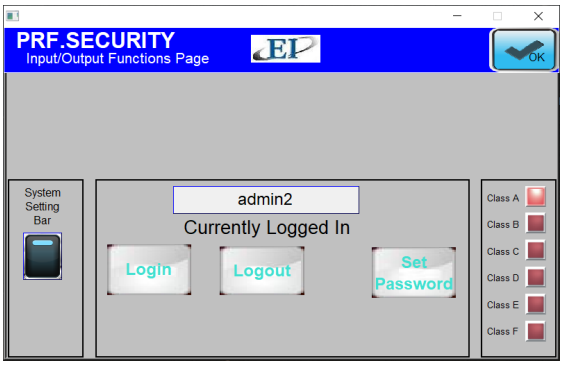
When accessing any page other than those mentioned above, a blue "ACCESS DENIED" dialog box will appear. Press the CLOSE Button and make your way to the TOP.PRF page by pressing the PRF Button from the TOP Menu.



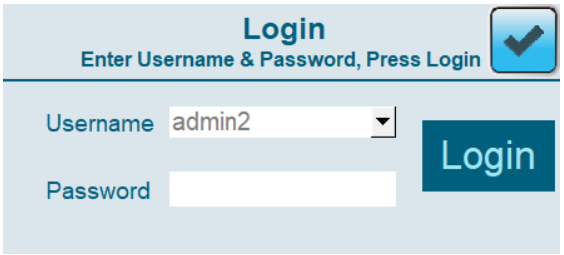
Next, press SECURITY SETTINGS.

Then, press LOGIN.

A dialog box will appear (bottom image). Select your Username from the from drop down menu and then enter your password. Now press the LOGIN Button. When successfully logged in, your username will appear in the "Currently Logged In" dialog box (see center image to the right). The default username and password are listed below:



Username: **admin2**
Password: **345**

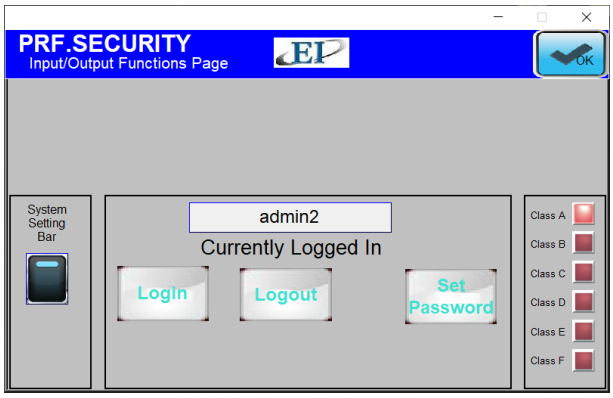


After correctly entering your username and password, you will be logged on to the system. Please note that you will be required to log in any time the HMI unit is powered up.

CHANGING YOUR PASSWORD

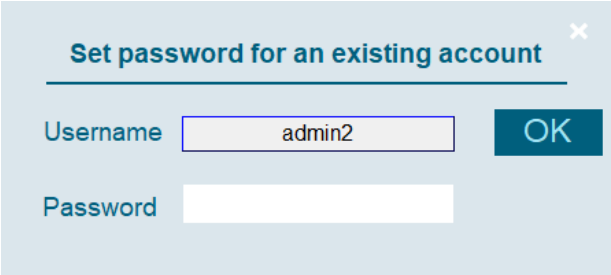
The password-based security system of your HMI was designed to have a similar look and feel to computer-based security systems commonly encountered on a PC. It is recommended to change your password for security purposes upon entering your system, however it is important to remember your password and to write it down and store it in a secure place, as once the password has been changed, the new password is required to operate the CentriFlow® HMI.

From the Top Menu Page, click the "Preferences" Button. You will now be on the TOP.PRF (Preferences) page. Click on the "Security Settings" Button. You should now be on the PRF.SECURITY page. Press the "Set Password" Button.



Please be aware that you can only change the password once you have already logged in with one of the USERNAMES.

The Username should already have been filled in. You may now ENTER the new password. Press the OK Button once it has been entered. A successful change should display the word "Succeeds" below the PASSWORD Dialog box. You can now EXIT out of this screen by pressing the "X" in the upper right corner. The password should now be changed.



PROCEDURES

Static Calibration (Static Cal.)

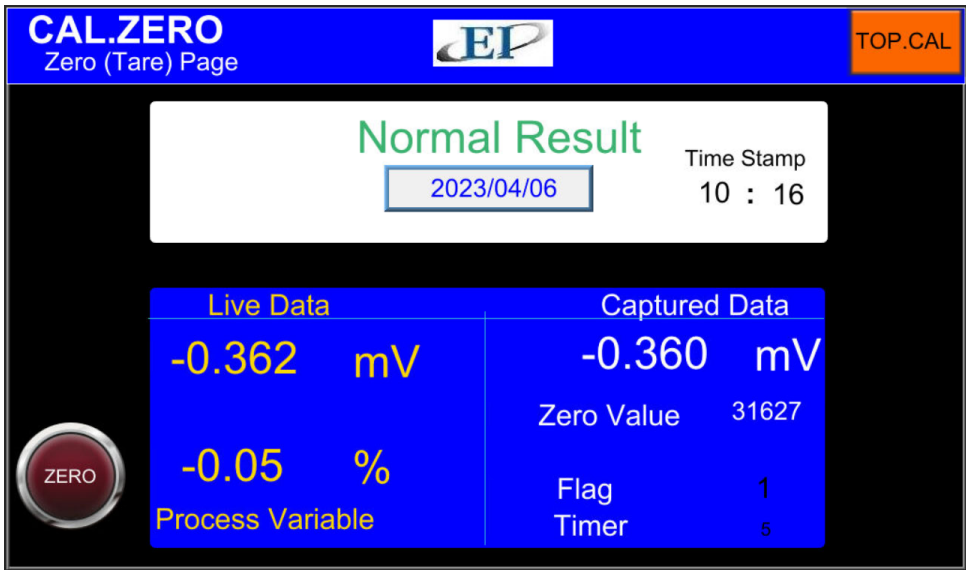
Static Calibration sets the Range of the Transducer in the CentriFlow Meter. This allows the meter to be versatile in a way such that it can be ranged up, known as Extended Static Calibration, or it can be ranged down, known as Reduced Static Calibration. The Static Calibration is a Factory Setting and should not need to be changed while the meter is in service, unless the Transducer has been replaced. Setting or checking the Static Calibration consists of two steps – Zero and Static Calibration. Note that readings are measured using two different units - %PV and % Volts. The difference between the two scales is the Dynamic CAL multiplier. The nominal value is five (5); this value equates to multiplying by one.

Before beginning the calibrations, make sure that there is no product on the Pan or around the Pan Arms.

The procedure for setting or checking the Static Calibration is as follows:

Step 1: Click the CAL Button on the TOP Menu, then click the ZERO Button.

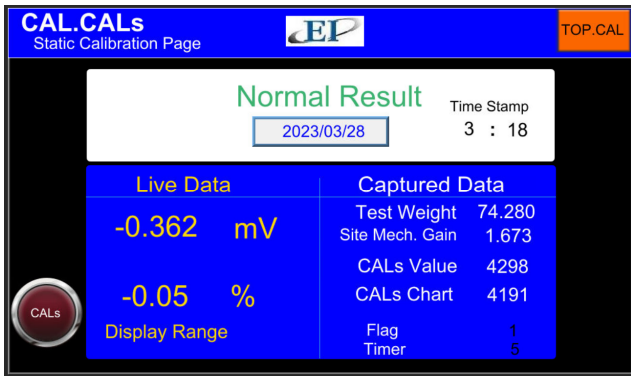
Step 2: You should now be on the CAL.ZERO page as seen below.



Step 3: Press the Zero Button. Verify that the number displayed in the Diagnostic Window is 0.0 % Process Variable.

Step 4: The Zero portion of Static Calibration is complete. Press the TOP.CAL Button on the upper right of the screen to return to the TOP.CAL page.

Step 5: Press the CALs Button. You should now be on the CAL.CALs page as seen to the right.

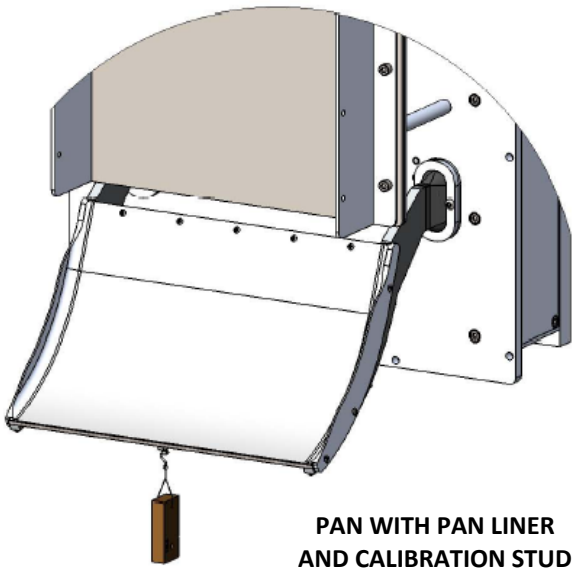


Step 6: Hang the Test Weight provided with the Electronics Enclosure from the Calibration Stud located under the bottom edge of the Pan as seen below. For Pans that have more than one Calibration Stud, there should be a Test Weight for each. Some optional pans may not have a Stud. In these cases the wire will be long enough to hook onto the top edge of the pan and be draped over the front end of the pan as shown below. Be sure that the Test Weight hangs freely from the Calibration Stud. It is also good practice to allow the Test Weight to become stable and movement free before proceeding.

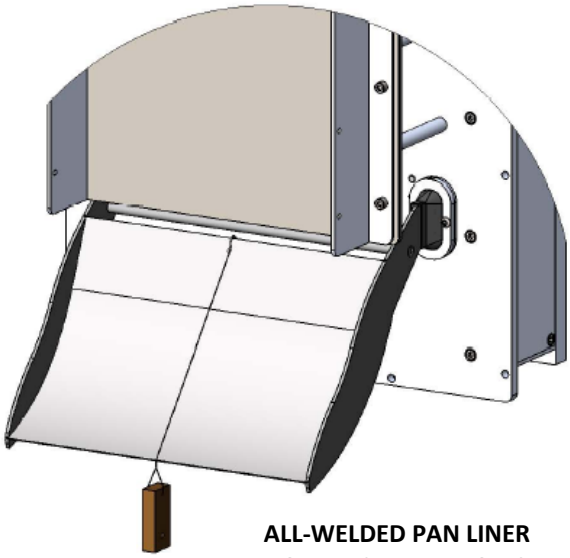
Step 7: Press the CALs Button located on the lower left side of the screen. Note the % Volts reading displayed in the Diagnostic Window. Verify the reading is correct for the selected range. For example, 25% is the correct value for the Standard Range setting. Please see the table below for the correct % Volts reading for each range.

Range	Extended	Standard	Reduced	Minimum
% Volts	12.5%	25.0%	50.0%	100.0%

Step 8: Remove the Test Weight from the Calibration Stud. The voltage should return to 0.00% Volts.



PAN WITH PAN LINER AND CALIBRATION STUD



ALL-WELDED PAN LINER WITHOUT A CALIBRATION STUD

Site Calibration

When the CentriFlow® Meter is shipped from the factory, it is programmed with Default values for the Static Calibration and the Calibration Voltage, which were chosen for the particular material being measured with the meter. As described in the previous Section, the Static Calibration is an adjustment that ranges the Transducer, the Measurement Element of the meter. Typically, this Setting will not change unless the Electronic Full Scale is changed.

The Calibration Voltage, however, is the adjustment that is made to Calibrate or Site Calibrate the Electronics to a particular application. Although the Factory setting may be quite accurate, it is likely due to differences in installation, feed systems, and material being measured that an adjustment be made after the CentriFlow® Meter is installed. This procedure is very simple and will require a means of capturing material that is run through the meter and weighing that material. Depending on the Configuration of the CentriFlow® Meter, either Type I or Type II, the method of capturing the material to be weighed will be different. For a Type I Configuration, the material can be captured after it leaves the Pan Section of the meter, if the installation allows, or at some other point in the flow path after it has been measured by the CentriFlow® Meter. The closer the capture point is to the end of the Pan Section of the meter the less likely that there will be loss in the measurement sample and therefore less likely that there will be an error in the Calibration of the Electronics. It is important not to come in contact with the Pan Section when capturing the measurement sample so that the Electronics does not give incorrect results from measuring the contact. Always remember to fully secure the door back to the enclosure before resuming normal flow through the meter.

When performing the Site Calibration, it is recommended that a minimum of five samples be taken before making any Adjustments to the Electronics. Also, it is recommended that the sample run be a minimum of 10 seconds long. This will allow a reasonable amount of material to be run through the CentriFlow® Meter ensuring an accurate adjustment to the Calibration. The procedure is explained as follows:

Step 1: Make sure that the TOP.RUN page is accessed to begin the procedure. Press the Reset Button on the Lower Left to reset your count to zero before running product through the meter.

Step 2: Run product through the meter for a designated period of time, collecting the material in some manner after it has passed through the meter.

Site Calibration Continued

Step 3: After product has stopped flowing through the meter, go to the SET.FIELD page located under the TO SET option on the MAIN MENU.

HINT: Access the MAIN MENU and then press TO SET, and finally, FIELD DATA.

Step 4: Click on the "ENTER RUN" Button and you should see the (CF Meter) value change from "0.000" to a number signifying the weight that the electronics calculates passed through the meter.

Step 5: Weigh the collected material on a static scale and record the weight in the YELLOW block (Actual) next to the value automatically entered in STEP 4. Press the YELLOW box to bring up a numeric keypad. Enter the value.

Step 6: After entering the Actual Weight in Step 5, press the NEXT RUN Button to prepare for the next run.

Please note: It is important that the container holding the material not be included in the weight. The only weight that is important is the material that actually went through the meter.

Site Calibration Continued

Step 7: Return to the TOP.RUN page and press the RESET Button on the bottom left. To reset your total to 0.

Step 8: Repeat Steps 2-7 four more times to complete the five Field Data runs.

Please note: Check your data to ensure your runs are repeatable. The % Standard Deviation will correspond to the typical accuracy that you can expect from the calibration you make using this data. Please see the below correlation table between % Standard Deviation and Accuracy.

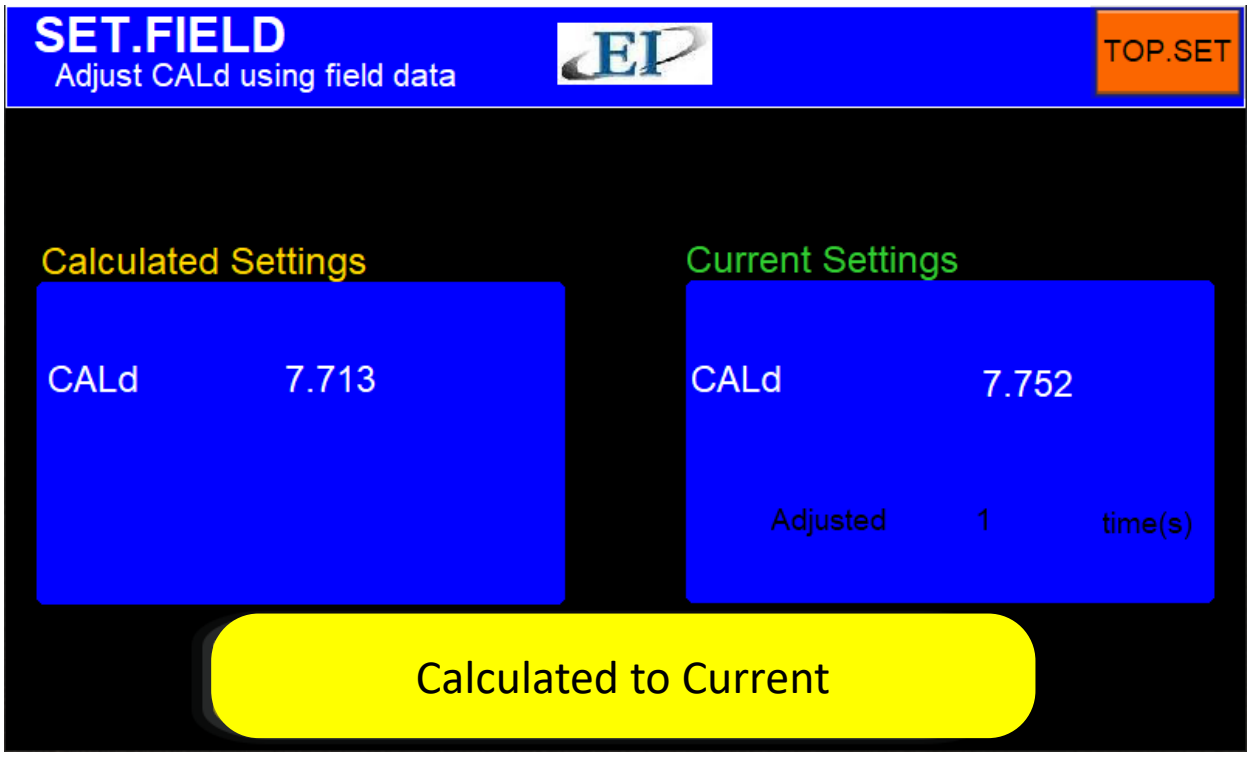
(#Vwdqgdug#Ghylwlrq#	Dffxudf|#
0.1%	+/-0.25%
0.2%	+/-0.50%
0.35%	+/-1.0%

Step 9: Once all five runs are completed, return to the SET.FIELD page and click on the RUN Number next to each set of data to select each data RUN (Numbered 1-5). When selected the grey boxes will turn green.

Step 10: Now return to the TOP.SET page by returning to the MAIN MENU and pressing the TO SET Button.

Step 11: Now press the FIELD CALd Button.

Step 12: You should now be on the SET.FIELD page. The newly calculated Dynamic Calibration can be seen on the left side of the page, while the current Dynamic calibration can be seen on the right side of the screen. If you would like to change your current settings to the settings that you calculated, please move on to Step 12. If you would like to keep your current settings, please press the TOP.SET Button to leave this page.

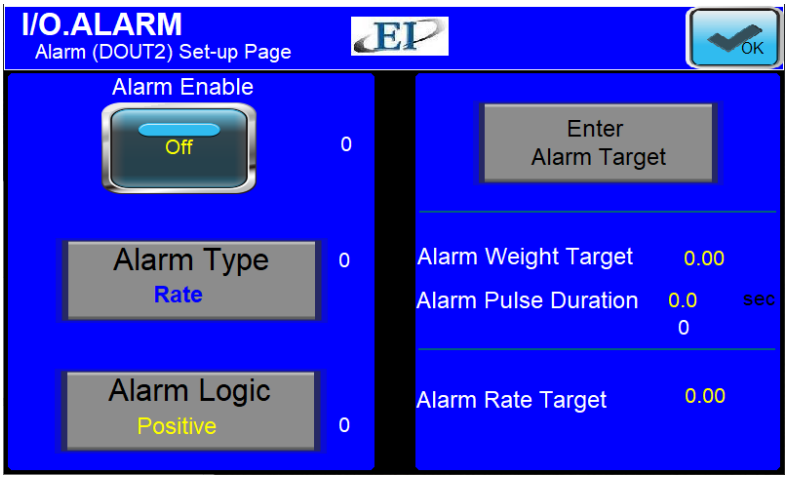


Step 13: To accept the new Dynamic Calibration, press the Yellow CALCULATED TO CURRENT Button. A pop-up screen will appear, asking if you want to "Write DCE Flash Memory". Press OK to continue. You have now successfully changed the Dynamic Calibration (CALd).

Alarm Rate

The alarm relay can be used to trigger alarms which warn the operator that a batch is complete or that the rate has exceeded a set speed. To use the alarm function of your Digital Electronics Package, please make sure that the alarm relay is wired according to the diagram in the Wiring Customer Connections-Alarm Outputs section of the Wiring Manual. The outputs are programmable to be assigned for rate or count. Below is a step by step procedure for setting a Totalization Alarm.

Step 1: From the TOP Menu, press the I/O Button. Then press the ALARM Button. This should take you to the I/O.ALARM page. The page is pictured below. Details of this page can be found in the HMI Screen Guide in this manual.



Step 2: Press the ALARM TYPE Button. Pressing the Green RATE/WEIGHT Button on the pop up menu will toggle between the Rate and the Weight Target. When “Rate” is displayed, press the DONE Button.

Step 3: Based on your selection of “Alarm Type” the Target Value will either be in units of weight or units of rate. You have chosen to set the alarm based on Rate. Now you must select a target value that will trigger the alarm. Select a Target Value by first pressing the ENTER ALARM TARGET Button.

Step 4: You should now be on the I/O.RATE.SP page. Details of this page can be found in the HMI Screen Guide in this manual.

Step 5: Press the RATE TARGET Button. A Numeric Keypad will appear. Please enter your rate target into the keypad and press ENTER. The minimum and maximum values that you can enter are shown above the entered value as a quick reference. You should now be returned to the I/O.RATE.SP page. Your newly entered Rate Target value should be displayed in the RATE TARGET Button. To accept the value, press the OK Button located in the upper right hand corner.

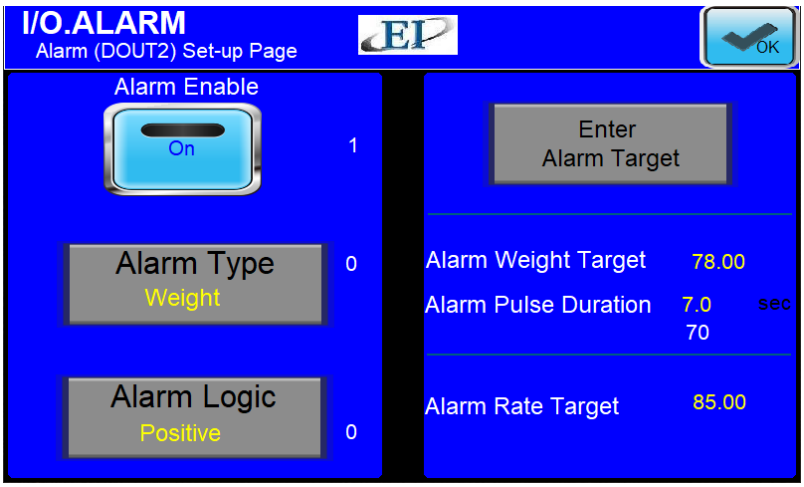
Step 7: Now return to the I/O.ALARM page. Make sure that the ALARM LOGIC Button has POSITIVE displayed in yellow lettering. If it does not, press the ALARM LOGIC Button and then click the GREEN Button on the Popup until POSITIVE is displayed. Then click DONE. Details on the LOGIC Button can be found in the HMI Screen Guide for the I/O.ALARM Page.

Step 8: Return to the I/O.ALARM page once more. To turn the alarm on, press the ALARM ENABLE Button until "ON" is displayed. Press the OK Button in the top right corner to complete the process.

Alarm Totalization

The alarm relay can be used to trigger alarms which will either hold for a period of time after a set Total has been reached, or will latch indefinitely until the Total is reset. To use the alarm function of your Digital Electronics Package, please make sure that the alarm relay is wired according to the diagram in the Wiring Customer Connections-Alarm Outputs section of the wiring manual. Below is a step by step procedure for setting a Totalization Alarm.

Step 1: From the TOP Menu, press the I/O Button. Then press the ALARM Button. This should take you to the I/O.ALARM page. The page is pictured below. Details of this page can be found in the HMI Screen Guide in this manual.



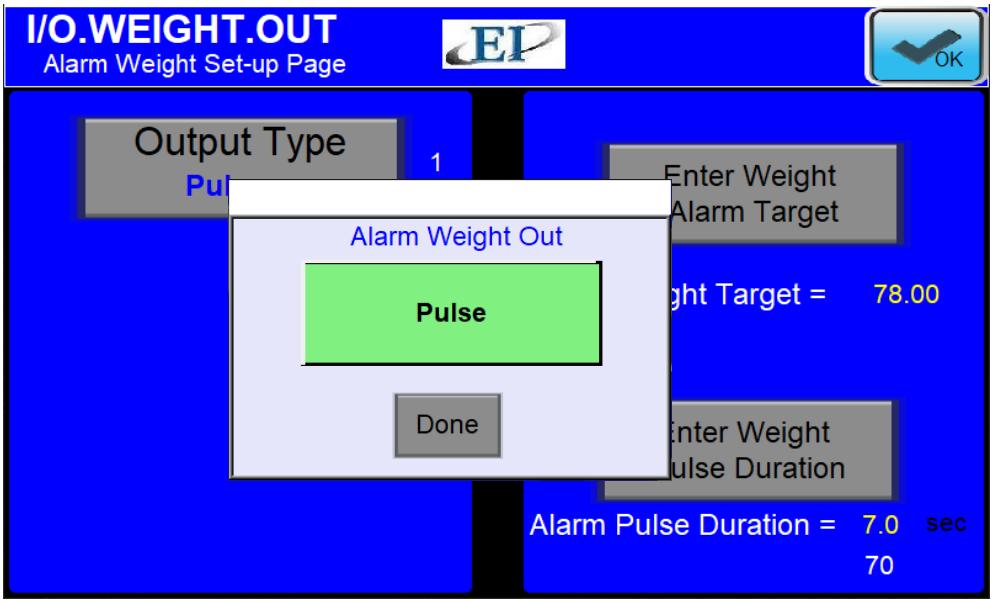
Step 2: Press the ALARM TYPE Button. A Popup will appear. Press the Green RATE/WEIGHT Button on the pop up menu to toggle between the Rate and the Weight Target. Select 'WEIGHT' from the pop-up menu. You have chosen to set the alarm based on Weight, or Totalization. When "Weight" is displayed, press the DONE Button.

Step 3: Based on your selection of "Alarm Type" the Target Value will either be in units of weight or units of rate. You have chosen to set the alarm based on Weight. Now you must select a target value that will trigger the alarm. Select a Target Value by first pressing the ENTER ALARM TARGET Button.

Step 4: You should now be on the I/O.WEIGHT.OUT page. Press the ENTER WEIGHT ALARM TARGET Button.

Step 5: You should now be on the I/O.WEIGHT.SP page. Click on the WEIGHT TARGET Button to enter a Weight Target. A popup keypad will appear. Enter your value and press the ENTER Button. Details of this page can be found in the HMI Screen Guide in this manual.

Step 6: Press the OK Button. You should now be back on the I/O.WEIGHT.OUT page.



Step 7: You should now choose which type of Weight Output you would like to use. Press the OUTPUT TYPE Button for your options. A popup should appear. More information on the two types of Weight Output (Pulse and Latch), can be found on the I/O.WEIGHT.OUT page in the Screen Guide section of the manual. With your Output Type selected, press the DONE Button.

Step 8: If a Pulsed Weight Output is chosen, you should enter a duration for the Pulsed Alarm. This is accomplished by pressing the ENTER WEIGHT PULSE DURATION Button. You should see the I/O.WEIGHT.TIME Page. Click on the TIME (SECONDS) Button and enter your pulse duration in the popup keypad.

Step 9: You should now be on the I/O.WEIGHT.TIME Page. From here, press the OK Button in the upper right hand corner. This will take you to the I/O.WEIGHT.OUT Page.

Step 10: You should now be on the I/O.WEIGHT.OUT Page. From here, press the OK Button in the upper right hand corner. This will take you to the I/O.ALARM Page.

Step 11: You can now select your logic. Press the ALARM LOGIC Button and select your logic by pressing the GREEN Button until your desired selection is displayed. Press the DONE Button to return to the I/O ALARM Page. Details on the LOGIC Button can be found in the HMI Screen Guide for the I/O ALARM PAGE.

Step 12: Return to the I/O.ALARM page once more. To turn the alarm on, press the ENABLE Button until "YES" is displayed. Press the OK Button in the top right corner to complete the process.

Remote Reset & Zero Capability

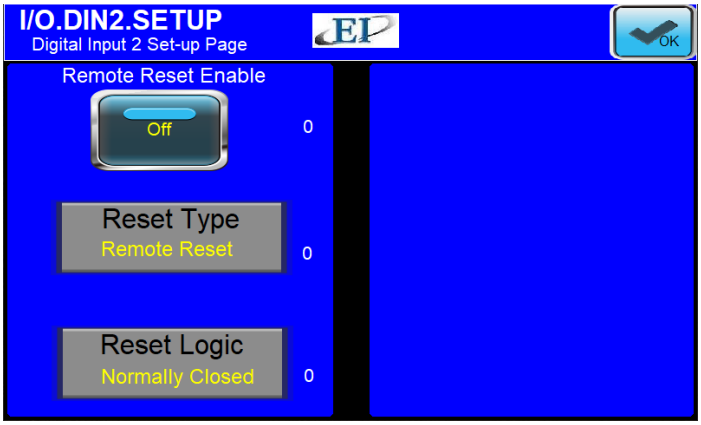
What is Remote Reset?

Remote Reset allows you to remotely trigger a reset of the Totalization on your Digital Electronics. This feature is similar to pressing the RESET Button from the TOP.RUN page. The Remote Reset can be used by installing a remote push button on/off switch (customer supplied). To properly wire the push button on/off switch for Remote Reset Capabilities, please see the Wiring Manual.

When to Perform Zero

Zeroing should be performed after initial installation and after any mechanical procedures or replacement of parts, such as Loadcells or Measurement Pans. Once properly calibrated, the meter may be zeroed periodically if deemed necessary. Recommendations of whether to zero the meter or not and how often to zero the meter are application specific. Typically, zeroing is recommended in the case that zero drift contributes sufficient error to prevent the desired accuracy. Zero drift may occur due to product buildup on the pan, temperature changes, and other factors. Generally, this is not a problem since the user may zero the meter to remove the offset before the reintroduction of product flow through the meter.

Enabling the Remote Reset Capability



Once the switch is wired properly, you must enable the Remote Reset. To enable the Remote Reset Capability, go to the I/O.DIN2.SETUP Page. This is accessed from the TOP Menu by pressing the I/O Button and then selecting REMOTE RESET & ZERO. You should now see the page below. To enable Remote Reset, simply press the REMOTE RESET ENABLE Button. If enabled, the word “ON” will be displayed on the button.

Selecting Remote Reset, Zero or Both

Pressing the RESET TYPE Button will allow you to toggle between the different functions by pressing the GREEN Button on your popup. It will either function as a Remote Reset of Total, to Zero the meter, or it can function as both simultaneously.

Logic

The logic of the Remote Reset Capability can also be manipulated. If the LOGIC Button is pressed, a popup will allow you to toggle between Normally Closed and Normally Open via the GREEN Button. Press the DONE Button to complete.

Weighted Count Output (Optional)

What is Weighted Count?

Weighted Count is an output option that will allow you to generate a count much slower than the 500 Hz Frequency, flow rate proportional signal. It is derived mathematically by dividing the totalization output by a scale factor. Once a target weight is selected, a pulsed output signal is generated by the electronics each time the target weight is reached. This signal can be used by a PLC or counter to digitally record the total weight based on the number of pulses. This option may eliminate the need for a costly High-Speed Counter Card for your PLC.

Please note that Weighted Count needs to be wired properly in order to function. Please see the appropriate section of the Wiring Manual for instructions.

Setting Up the Weighted Count

Step 1: Make your way to the Weighted Count Setup Page. This is accessed from the TOP Menu by pressing the I/O Button and selecting the Weighted Count Option. The page seen should be the I/O.WCOUNT Page as shown below.

Step 2: Press the WEIGHTED COUNT TARGET Button. Clicking the YELLOW Weighted Count Button will enable you to enter a Weighted Count value via the popup keypad. Press ENTER when completed to exit the popup and then press the OK Button located in the upper right hand corner in order to return to the I/O.WCOUNT Page.

Step 3: You can also select the duration of the pulse sent after each time the target weight passes through the meter. To do so, press the PULSE WIDTH Button and select your desired value. Press the OK Button in the Upper Right corner of your screen when finished.

Step 4: For more information on the Weighted Count Option, please see the I/O.WCOUNT page in the Screen Guide of this manual.

Pulsed Air System (Optional)

If the CentriFlow® Meter was shipped with the Pulsed Air option please continue with the following directions.

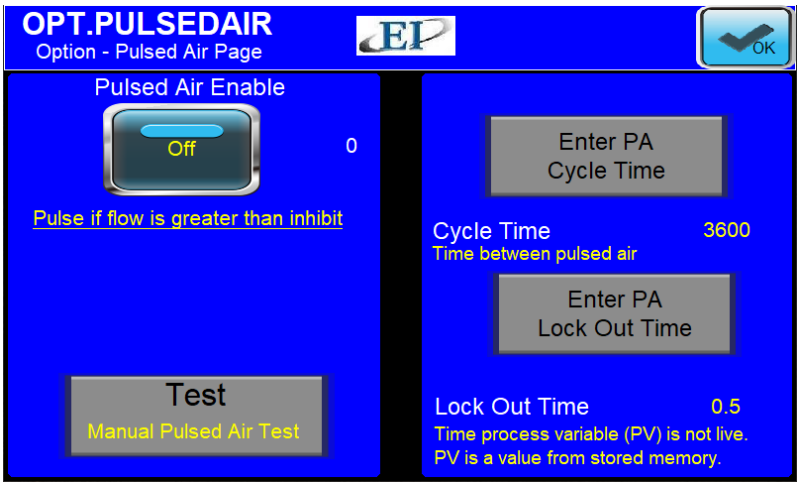
PURPOSE:

The Pulsed Air System was designed to deliver a pulsed blast of air to the area in front of the Backplate and behind the Tangential Cover, as well as across the Measurement Pan. The use of this air is intended to aid in reducing product buildup on the Pan, Pan Arms, and behind the Tangential Plate. The blast of dry air should reduce buildup and greatly reduce miscalculations caused by buildup on and around the Pan. Because the output is locked during the pulsed blast of air, the output is not adversely affected by the air pulse across the measurement pan.

Please note the mechanical set up is discussed in the Mechanical Manual. See it for further details on the mechanical setup of the Pulsed Air Option.

ELECTRONICS SETUP:

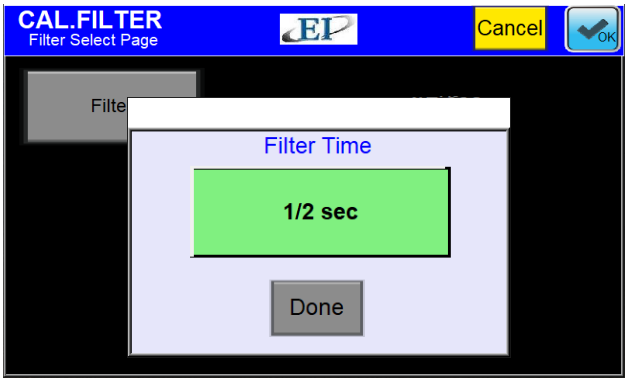
The Pulsed Air Setup Page (OPT.PULSEDAIR) can be accessed from the TOP Menu by pressing the OPT Button and selecting the PULSED AIR Option. You should now be on the OPT.PULSEDAIR Page shown below.



The setup includes options for the cycle time (time between pulses of air) as well as the length of the lockout time for the electronics. You can also Manually test the Pulsed Air system to ensure that it is working properly. Turning the option on and off is accomplished by pressing the PULSED AIR ENABLE Button. Additional information on the options seen on this screen can be viewed on the OPT.PULSEDAIR Page in the Screen Guide at the end of this manual.

4-20 mA Filtering

Filtering of the 4-20 mA signal allows smoothing of the otherwise instantaneous output delivered by the CentriFlow Meter's electronics. The 4-20 mA signal can be filtered from 1/4s up to 10s increments, however the mathematical method of filtering differs depending on the desired increment. A simple moving average filter is used for under 3s and for more than 3s, an exponential moving average is used.



Simple Moving Average:

The formula for a simple moving average filter is shown below. Press one of the Filter Buttons to select the desired time increment for the filter. For example, a time increment of 1 second will filter (or average) 200 samples of the input signal to create the 4-20mA filtered output signal. This is because the transducer input sample rate is 200 samples per second. The 4-20mA output signal is updated at the same sample rate as the input signal. However, the output signal will be delayed by the selected time.

$$y[i] = 1/M \sum_{j=0}^{M-1} x[i+j]$$

X[ ] = input signal
Y[ ] = output signal
M = number of points
Filter = 1/4, 1/2, 1, 2, 3 s

Exponential Moving Average:

The formula for an exponential moving average filter is shown below. The time increment selected determines the value of the smoothing coefficient constant as seen in the following formula.

$$S_t = \alpha \times Y_t + (1 - \alpha) \times S_{t-1}$$

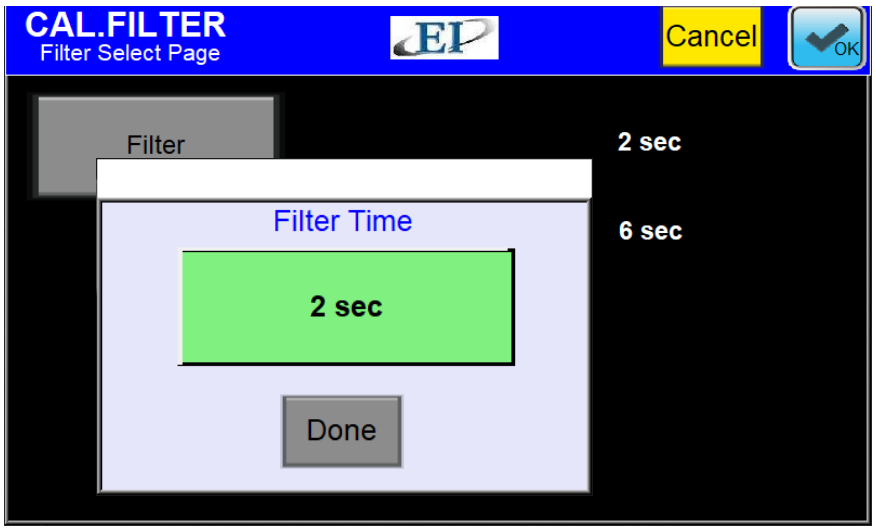
S_t = Exponential Moving Average at time (t)
α = Constant Smoothing Coefficient
Y_t = Sample at time (t)
Filter = 3, 4, 5, 6, 7, 8, 9, 10s

*** Please note that the 4-20 mA filtering option will not be visible via the HMI plot screen. Any 4-20 mA filtering will also not function if transmitting data via Ethernet or another internet protocol.**

Software Setup of the 4-20 mA Filter

The 4-20 mA filter allows local filtering of the 4-20 mA flow rate signal and can be filtered using 1/4s increments up to 10s increments. Please note that the 4-20 mA Filter cannot be transmitted via Remote Communications Protocol. The settings for enabling your 4-20 mA filter are found on the CAL.FILTER page, accessed by first pressing the CAL Button from the Main Menu, and then pressing the FILTER Button from the TOP.CAL page. The procedure below describes how to set the 4-20 mA filter of the flow rate signal locally.

1. The 4-20 mA filter is automatically set to 1/4 second. To enable the filter, push the FILTER Button which will bring up a popup selection for the Filter Time.
2. Toggle through the time units until you have the selection of your choice on the screen. Press the DONE Button once selected.
3. Press the OK Button in the top right hand corner to accept this value.

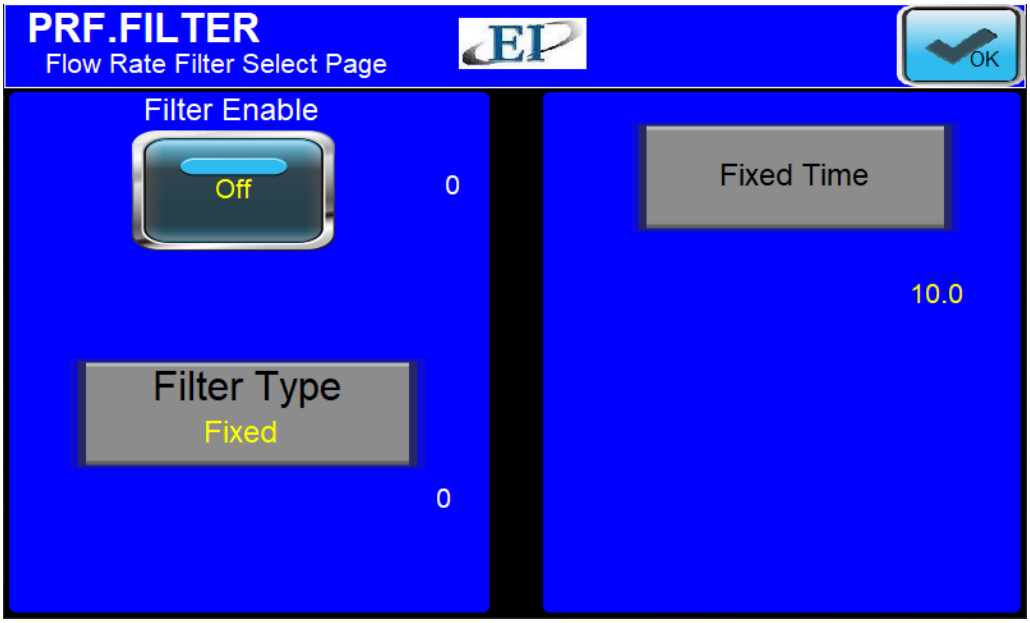


Filter Options

Simple Moving Average	Exponential Moving Average
1/4s	3s
1/2s	4s
1s	5s
2s	6s
3s	7s
	8s
	9s
	10s

Rate Filtering

Filtering of the rate as seen on the TOP.RUN allows smoothing of the otherwise instantaneous output delivered by the CentriFlow Meter's electronics. The filtering method is similar to the 4 -20 mA Simple Moving Average filter with some specific differences. Whereas the 4-20 mA filter is a local filter only, the Rate Filter allows filtering of the output that is transmitted via Ethernet or any other Internet Protocol. This filter also filters the RATE display on the RUN Screen. The Rate Filter is fixed, filtering at anywhere from 0s to 10s at 0.1 second intervals.



Configuration of Fixed (Rate) Filter

The Fixed Rate Filter must be enabled and must also be configured by entering a time interval in the appropriate location. To enable the Fixed Rate Filter, please follow the below instructions from the PRF.FILTER page. This page is accessed from the TOP Menu by pressing the PRF Button and then, selecting RATE FILTER.

Step 1: Turn on the RATE FILTER by pressing the FILTER ENABLE Button so that "ON" is displayed.

Step 2: The FILTER TYPE is set at FIXED and can not be changed.

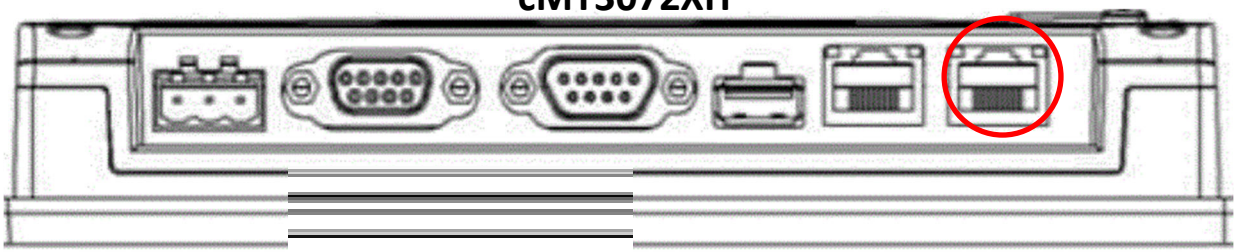
Step 3: To change the filter time, press the FIXED TIME Button. This will take you to the PRF.RATEFILTER.TIME Page. Pressing the YELLOW Button here, will bring up a popup keypad that allows you to enter the filtering time. You can enter any value from 0s to 10s in .1s intervals. Once the time interval has been selected, press the ENTER Button and then, once exited from the popup menu, press the OK Button in the top right hand corner.

Changing the Ethernet/IP Address (Optional)
Example of Establishing Communication : ContrlLogx Unit

If you have purchased the Ethernet/IP Option, read on for the procedure to set up your IP Address to communicate with your existing PLC. The Ethernet/IP option allows you to output both the flow rate and the totalization signals via an Ethernet connection, directly to your PLC. The main tasks involved in enabling this option are to physically connect your HMI to your PLC, to assign an appropriate IP Address to your HMI, and to instruct your PLC to accept the signal through your Ethernet connection.

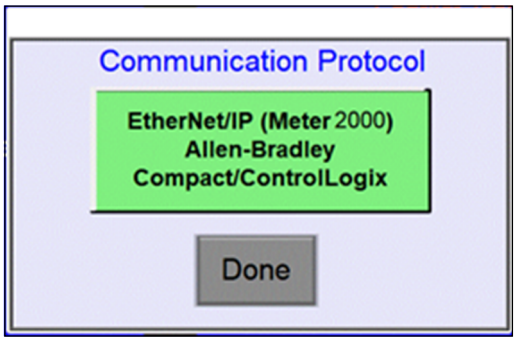
Step 1: Install your Ethernet Cable into the RJ45 connection on the back of your HMI. To access the back of your HMI, simply open the door of your Digital Electronics Unit. The HMI is attached to the door itself. Please see the drawing below for the location of the RJ45 Connection.

cMT3072XH



Step 2 (PLC): Create tags in the RSLogix 5000 project.

The HMI EtherNet/IP is a client/master protocol. This requires unique tag names for each meter if multiple meters are connected to a single PLC. If the Meter S/N protocol is selected, then the tag names have a _NNNN suffix, where NNNN is the four-digit serial number of the meter. In this example the meter serial number is 2000.



DATA/COMMANDS RECIEVED BY PLC FROM HMI

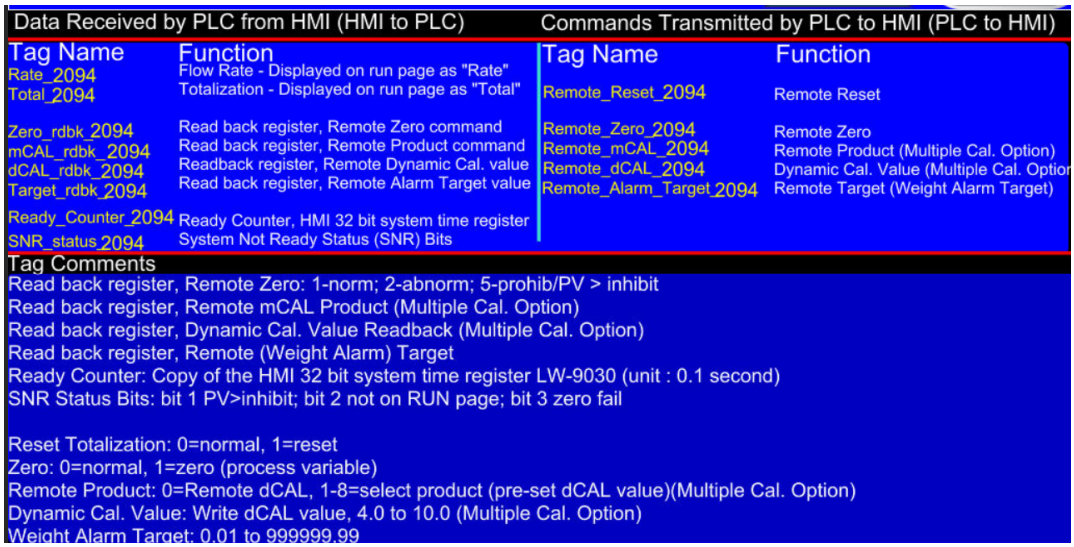
TAG NAME	DIRECTION	FUNCTION
Ready_Counter_2000	HMI to PLC	Heartbeat Accumulator
Rate_2000	HMI to PLC	Flow Rate
Total_2000	HMI to PLC	Totalization
Zero_rdbk_2000	HMI to PLC	Read back register for the Remote Zero command
mCAL_rdbk_2000	HMI to PLC	Read back for Remote Product (Number of Product: Multiple Cal. Option)
Target_rdbk_2000	HMI to PLC	Read back register for Remote (Weight Alarm) Target
dCAL_rdbk_2000	HMI to PLC	Dynamic Cal. Value Readback (Value of dCal for the Multiple Cal. Option)
SNR_status_2000	HMI to PLC	System Not Ready Status Bits

DATA/COMMANDS TRANSMITTED BY PLC TO HMI

TAG NAME	DIRECTION	FUNCTION
Remote_Reset_2000	PLC to HMI	Remote Reset
Remote_Zero_2000	PLC to HMI	Remote Zero
Remote_mCAL_2000	PLC to HMI	Remote Product (Number of Product: Multiple Cal. Option)
Remote_dCAL_2000	PLC to HMI	Dynamic Cal. Value (Value of dCal: Multiple Cal. Option)
Remote_Alarm_Target_2000	PLC to HMI	Remote Target (Remote Alarm)

•Press the HELP button on the OPT.PLC to go to the OPT.PLC.HELP page.

This page will show the tag names.



Protocol Selection (EI01)

If the Meter EI01 protocol is selected, then the tag names have a _EI01 suffix, where EI01 is a generic four-digit number. This may be useful in a single or dual meter installation to help simplify the PLC programming.

Press the HELP button on the OPT.PLC to go to the OPT.PLC.HELP page. This page will show the tag names.

Data Received by PLC from HMI (HMI to PLC)		Commands Transmitted by PLC to HMI (PLC to HMI)	
Tag Name	Function	Tag Name	Function
Rate_2094	Flow Rate - Displayed on run page as "Rate"		
Total_2094	Totalization - Displayed on run page as "Total"	Remote_Reset_2094	Remote Reset
Zero_rdbk_2094	Read back register, Remote Zero command	Remote_Zero_2094	Remote Zero
mCAL_rdbk_2094	Read back register, Remote Product command	Remote_mCAL_2094	Remote Product (Multiple Cal. Option)
dCAL_rdbk_2094	Readback register, Remote Dynamic Cal. value	Remote_dCAL_2094	Dynamic Cal. Value (Multiple Cal. Optio
Target_rdbk_2094	Read back register, Remote Alarm Target value	Remote_Alarm_Target_2094	Remote Target (Weight Alarm Target)
Ready_Counter_2094	Ready Counter, HMI 32 bit system time register		
SNR_status_2094	System Not Ready Status (SNR) Bits		

Tag Comments

Read back register, Remote Zero: 1-norm; 2-abnorm; 5-prohib/PV > inhibit
Read back register, Remote mCAL Product (Multiple Cal. Option)
Read back register, Dynamic Cal. Value Readback (Multiple Cal. Option)
Read back register, Remote (Weight Alarm) Target
Ready Counter: Copy of the HMI 32 bit system time register LW-9030 (unit : 0.1 second)
SNR Status Bits: bit 1 PV>inhibit; bit 2 not on RUN page; bit 3 zero fail

Reset Totalization: 0=normal, 1=reset
Zero: 0=normal, 1=zero (process variable)
Remote Product: 0=Remote dCAL, 1-8=select product (pre-set dCAL value)(Multiple Cal. Option)
Dynamic Cal. Value: Write dCAL value, 4.0 to 10.0 (Multiple Cal. Option)
Weight Alarm Target: 0.01 to 999999.99

Protocol Selection (EI02)

If the Meter EI02 protocol is selected, then the tag names have a _EI02 suffix, where EI02 is a generic four-digit number. This may be useful in a single or dual meter installation to help simplify the PLC programming.

Press the HELP button on the OPT.PLC to go to the OPT.PLC.HELP page. This page will show the tag names.

Data Received by PLC from HMI (HMI to PLC)		Commands Transmitted by PLC to HMI (PLC to HMI)	
Tag Name	Function	Tag Name	Function
Rate_2094	Flow Rate - Displayed on run page as "Rate"		
Total_2094	Totalization - Displayed on run page as "Total"	Remote_Reset_2094	Remote Reset
Zero_rdbk_2094	Read back register, Remote Zero command	Remote_Zero_2094	Remote Zero
mCAL_rdbk_2094	Read back register, Remote Product command	Remote_mCAL_2094	Remote Product (Multiple Cal. Option)
dCAL_rdbk_2094	Readback register, Remote Dynamic Cal. value	Remote_dCAL_2094	Dynamic Cal. Value (Multiple Cal. Optio
Target_rdbk_2094	Read back register, Remote Alarm Target value	Remote_Alarm_Target_2094	Remote Target (Weight Alarm Target)
Ready_Counter_2094	Ready Counter, HMI 32 bit system time register		
SNR_status_2094	System Not Ready Status (SNR) Bits		

Tag Comments

Read back register, Remote Zero: 1-norm; 2-abnorm; 5-prohib/PV > inhibit
Read back register, Remote mCAL Product (Multiple Cal. Option)
Read back register, Dynamic Cal. Value Readback (Multiple Cal. Option)
Read back register, Remote (Weight Alarm) Target
Ready Counter: Copy of the HMI 32 bit system time register LW-9030 (unit : 0.1 second)
SNR Status Bits: bit 1 PV>inhibit; bit 2 not on RUN page; bit 3 zero fail

Reset Totalization: 0=normal, 1=reset
Zero: 0=normal, 1=zero (process variable)
Remote Product: 0=Remote dCAL, 1-8=select product (pre-set dCAL value)(Multiple Cal. Option)
Dynamic Cal. Value: Write dCAL value, 4.0 to 10.0 (Multiple Cal. Option)
Weight Alarm Target: 0.01 to 999999.99

Choosing the Correct Protocols

The meter S/N protocol selection is required in applications where more than two meters are connected to the PLC. The meter S/N protocol or the generic protocols (EI01 or EI02) may be selected in applications with only one or two meters connected to a PLC. The difference between the protocols is that the generic protocols do not require the PLC program to be changed if the meter electronics is changed.

NOTE: Reset output functions similarly to pressing the Reset Button on the TOP.RUN page, while the Multiple Cal output functions similarly to using the multiple calibration option detailed in the Setup of Multiple Calibration section of this manual.

PLC Programming Note:

Remote RESET: (Valid values)
0 for normal operation
1 to reset the total

Any change to 1 from 0 should have a minimum duration of 1 second.

READY COUNTER: (32 Bit): System time register (unit: 0.1s)

REMOTE ZERO: (Valid values)
0 for None
1 Success-Normal Result
2 Failure-Abnormal Result
4 Abnormal Prohibited-Local Zero
5 Prohibited-PV% greater than inhibit

REMOTE PRODUCT: (Valid Values)
0 = Remote dCal
1 through 8; to select products 1 thru 8 respectively

SYSTEM NOT READY: (Valid Values)
Bit 1: 0 when current PV is less than the current inhibit threshold
Bit 2: 0 while HMI is on RUN page
Bit 3: 0 when Zero Cal. successfully performed
Bit 4: 0 when Static Cal. successfully performed

NOTE: A non-zero value for any of the System Not Ready Bits indicates that something may not be ready for operation.

NOTE: Please enter all tags into the PLC configuration. Missing tags may affect system performance.

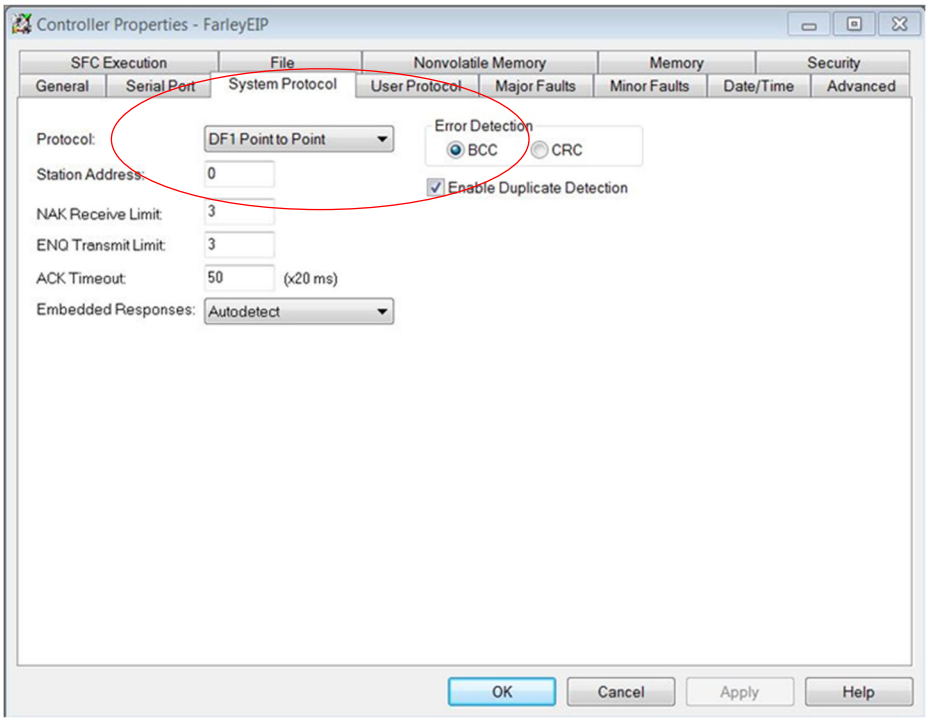
Controller Tags - FarleyEIP(controller)

Scope: FarleyEIP Show: All Tags Enter Name Filter...

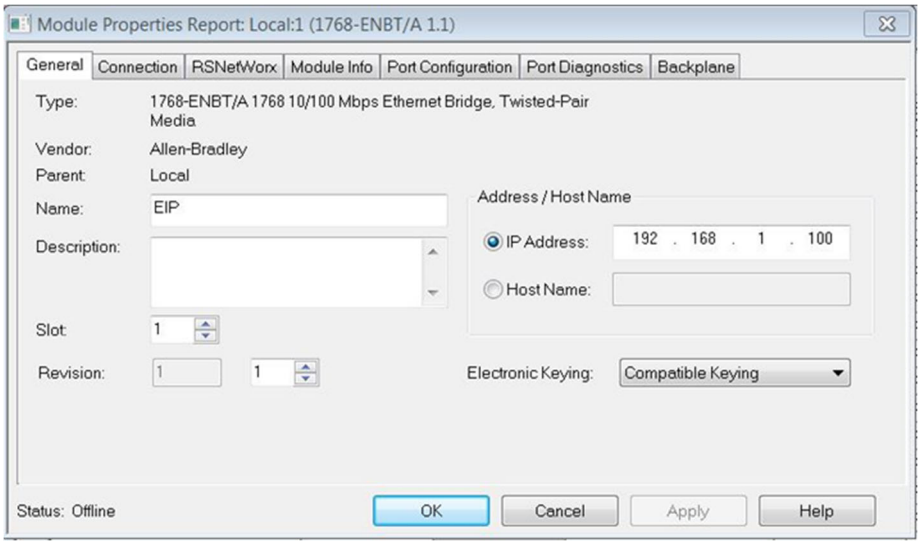
Name	Value	Force Mask	Style	Data Type	Description
Local:3:C	{...}	{...}		AB:1769_DO8:C:0	
Local:3:I	{...}	{...}		AB:1769_DO8:I:0	
Local:3:O	{...}	{...}		AB:1769_DO8:O:0	
Ready_Counter_2064	8004.0		Float	REAL	
Rate_2064	0.0		Float	REAL	1993 C02:00 Rate
Total_2064	0.0		Float	REAL	1993 C02:01Total
mCAL_rdbk_2064	0.0		Float	REAL	1993 C02:03
Target_rdbk_2064	0.0		Float	REAL	1993 C02:04
dCAL_rdbk_2064	4.601		Float	REAL	1993 C02:11
SNR_status_2064	0.0		Float	REAL	1993 C02:12
Remote_Reset_2064	0.0		Float	REAL	1993 C03:00 Remote Reset
Remote_Zero_2064	0.0		Float	REAL	1993 C03:01 Remote Zero
Remote_mCAL_2064	0.0		Float	REAL	1993 C03:02 Remote mCAL
Remote_dCAL_2064	4.87		Float	REAL	1993 C03:03 Remote dCAL
Remote_Alarm_Target_2064	0.0		Float	REAL	1993 C03:04 Remote Alarm Weight Target
Zero_rdbk_2064	1.0		Float	REAL	2016 C02:02 Zero Readback

Step 3 (PLC): From the Controller Properties window for your PLC, click on the System Protocol tab. Verify that the following settings have been applied:

- Protocol: DF1 Point to Point
- Station Address: Default is 0
- Error Detection: BCC



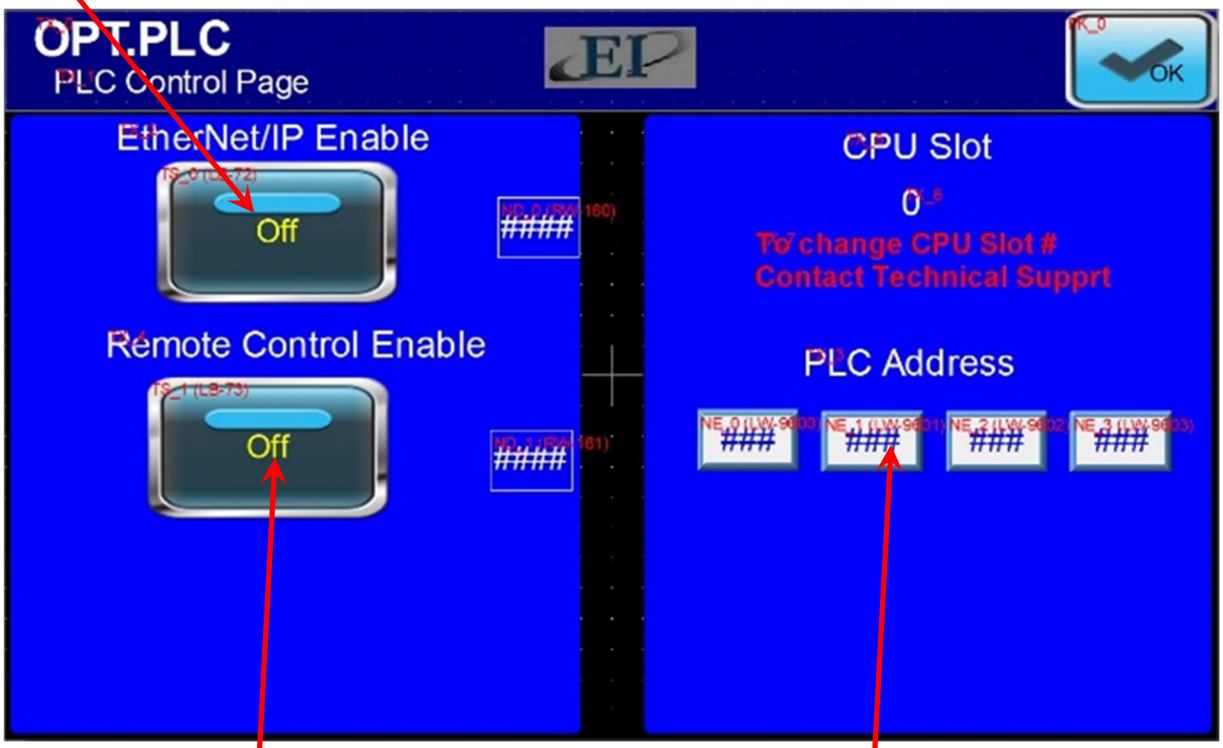
Step 4 (PLC): Double-click on the Ethernet module folder and note the IP address that is assigned to the module.



Step 5 (HMI): Enter the IP Address of the PLC EtherNet module into the HMI OPT.PLC page. Please note that the CPU Slot is hard coded to the value of 0. If another value is required, EI will change the software to accept your CPU Slot value. Contact EI for assistance.

This screen is accessed when the PLC Button is pushed from the TOP.OPT page. The TOP.OPT page is accessed by pushing the OPTIONS Button from the Main Menu. Pushing the buttons on this menu allows you to Enable or Disable local control of the electronics and allows you to both set up and view the data that is both transmitted to the HMI by a PLC and to a PLC from the HMI.

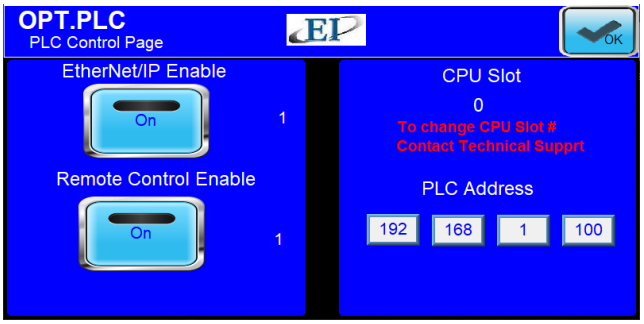
ENABLE HMI to PLC COMMUNICATION



ENABLE PLC to HMI COMMUNICATION **IP ADDRESS of PLC Ethernet Module**

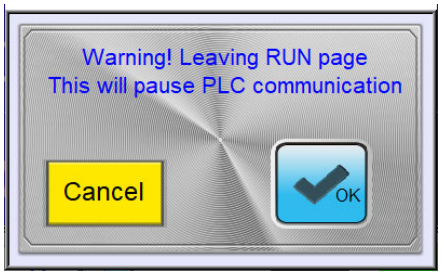
Communication can be toggled from the PLC control page OPT.PLC. To reach that page, please see the below page progression.

TOP	OPT	ETHERNET/IP



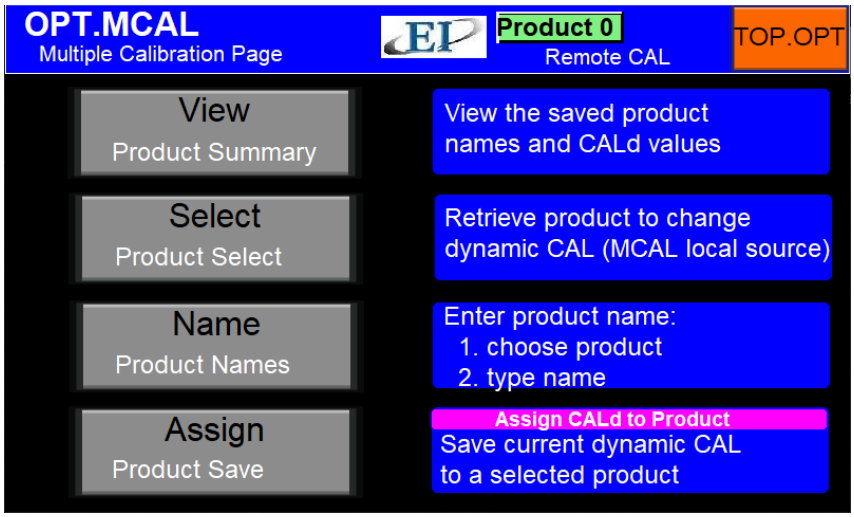
Please note that if PLC Communication is enabled, data is only transmitted via Ethernet while on the Main Run screen or TOP.RUN page. The TOP.RUN Screen is accessed by travelling to the page only.

Please note that while the Ethernet Communication is on, you cannot leave the TOP.RUN page or a popup will appear, informing that you will pause PLC communication. If you would like to continue communicating with your PLC, press CANCEL and you will remain on the TOP.RUN page.



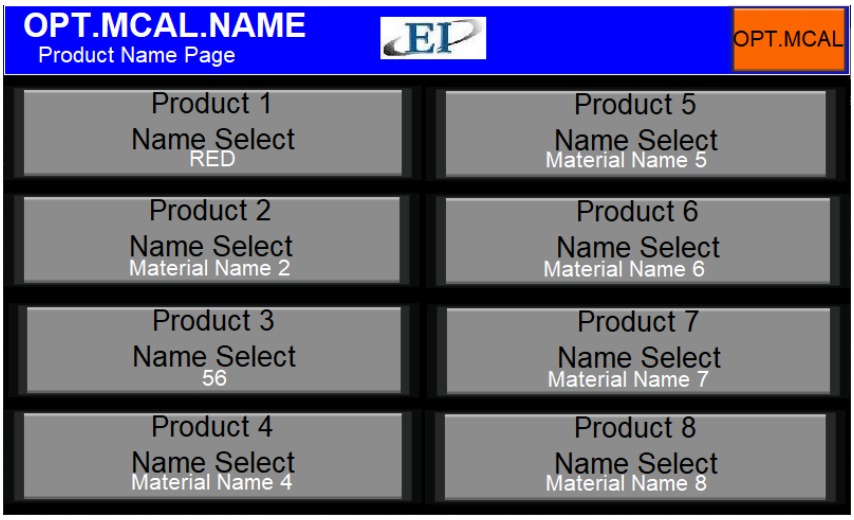
Setup of Multiple Calibration Screens

The Multiple Calibration Screens option allows you to run more than one product through your meter without having to recalibrate each time the product is switched. This option allows you to store up to eight product calibrations at one time. To access the option, press the MULTIPLE CAL Button from the TOP.OPT page, accessed by pressing the OPTIONS Button from the TOP Menu. You will now see the screen shown below.



From this screen, you are able to differentiate your different products by assigning them names and Dynamic Calibrations that are specific to each product. You can also choose the Calibration you will be using from this menu.

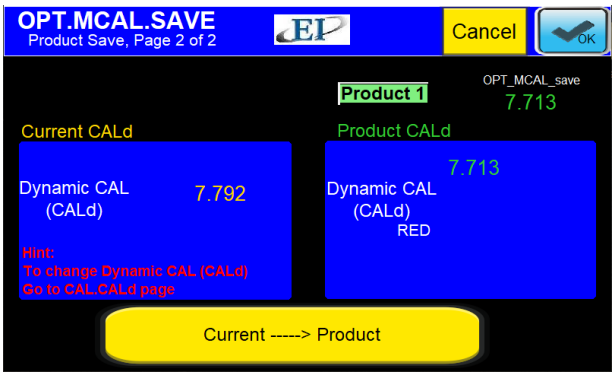
Step 1: The first step is to enter names for each of your products. To do so, press the NAME Button. You should now see this screen (below). Select the product you would like to name. If none have been previously selected, select Product 1.



Step 1: (Continued) Selecting the product above will allow you to rename the selected product. Although this step is not necessary to continue it will help you differentiate your products and their calibration voltages in the future.

Step 2: To assign a new calibration name, the name of the product itself is typically used, however any name can be used. Click the presently entered value for NAME and you will be prompted to enter your product's new name. When finished, press the ENTER Button and then press the DONE Button on the popup to accept the name change.

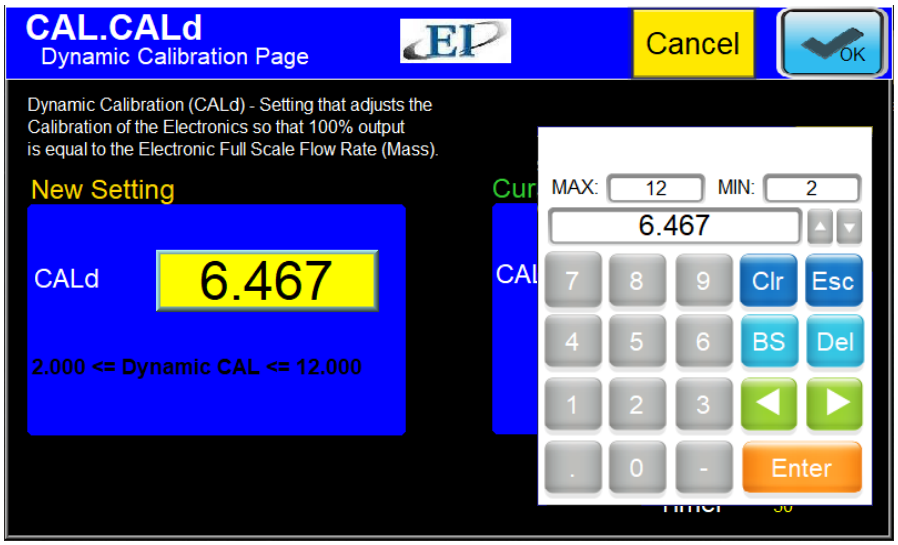
Step 3: Now you should be able to enter your calibrations for each of the products that you have assigned with names. You should have been returned to the OPT.MCAL Menu. If not, return there now and press the ASSIGN Button. You should now see this screen (left). Pressing on one of the Product Number Buttons will take you to the MCAL Change page (right).



If you have named your products, you should see them listed on the OPT.MCAL.SAVE1 page. Select the product that you would like to assign a calibration voltage and press the corresponding button. You should now see this page (right). Your Digital Electronics' current Dynamic Calibration value is displayed in the Current Cal(d) table on the left hand side of the page. If this is the correct dynamic calibration for your particular product, press the CURRENT/PRODUCT Button (Yellow) and then press OK. Please note that if more than one product will have the same Dynamic Calibration, they must be entered one at a time from the previous page.

Step 4: If the current Dynamic Calibration is not correct for your particular product and you would like to change it, or none has been specified, you can either enter one manually or you can calculate another value by running a Site Calibration. To run a Site Calibration, please see the Site Calibration section of the Procedures section of this manual.

Step 5: To manually enter a Dynamic Calibration, return to the main TOP Menu, press the CAL Button, and then press the CALd Button. You should now see this screen (right). Click the current value for Dynamic Calibration (yellow button) and enter your new value. Press the ENTER Button when finished, then press the OK Button in the upper right hand corner.



Step 6: Once the value is entered, return to the OPT.MCAL.SAVE page as described above and save the new current Dynamic Calibration to the selected product. Repeat this process for all of your products, up to eight.

Step 7: To access any of your saved Dynamic Calibrations for running your process, simply click the SELECT Button from the OPT.MCAL page and choose the product that is currently running. Press the OK Button located in the upper right hand corner.

Web Server

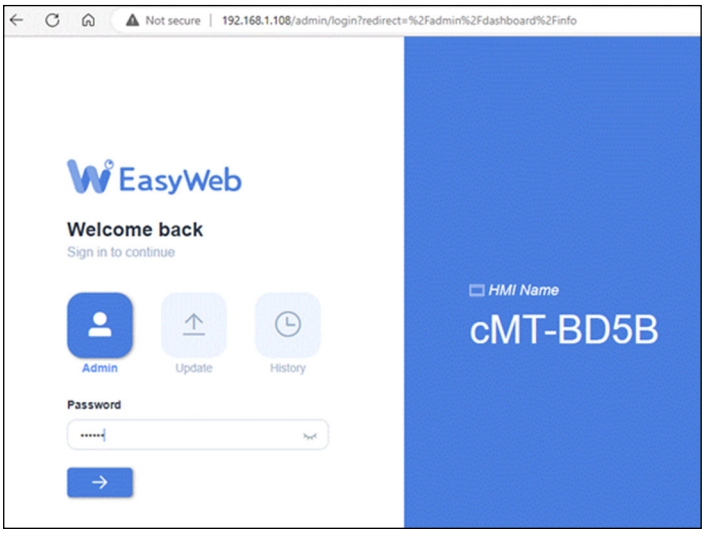
EasyWeb and WebView

The WebView feature enables viewing and interacting with your HMI screens in a web browser. This section describes how to set it up.

Connecting to WebView: To connect to WebView all you need is a device that has a web browser and has access to the HMI's IP address. To find the HMI's IP address go to the **COM.INFO page**. From the TOP page, Press TO COM, then from the TOP.COM page press Information.

- **To connect to WebView:**

1. Connect the HMI to the network.
2. Open your browser or open a new tab in your browser.
3. Enter the HMI's IP address in the browser's address bar.
4. The HMI's EasyWeb 2.0 system dashboard login page should appear in your browser screen. Enter the password and press the right arrow. The default password is 111111.



These Directions Continued on Next Page...

Web Server

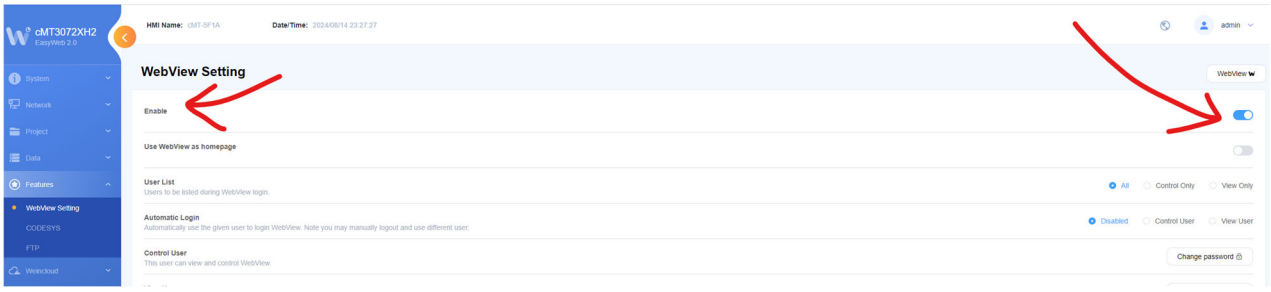
EasyWeb and WebView

- **To connect to WebView:**

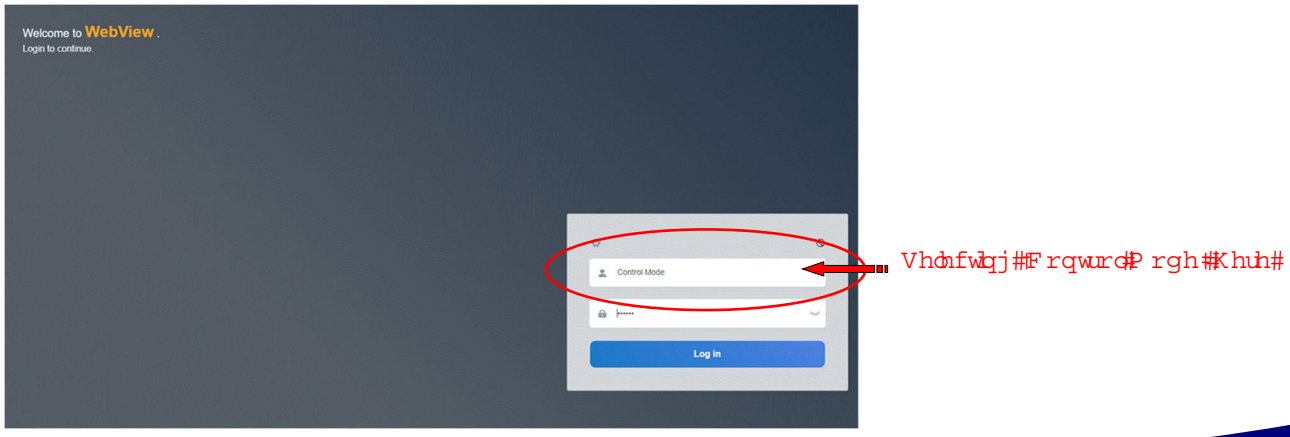
5. After logging in, you'll see the EasyWeb 2.0 system dashboard. Select WebView within 'admin.'

(NOTE: If WebView is not an option in the drop down menu, then you must enable it. If it is already enabled, move on to Step Number 7.

6. In the Menu on the Left Hand Side of the screen, Press FEATURES and then WEBVIEW SETTINGS. Ensure that WebView is ENABLED by clicking the toggle (shown below). Return to Step 5.



7. Select Control Mode under User. Enter the default password 111111. Click Log in. You should now be able to access the WebView feature of the HMI.

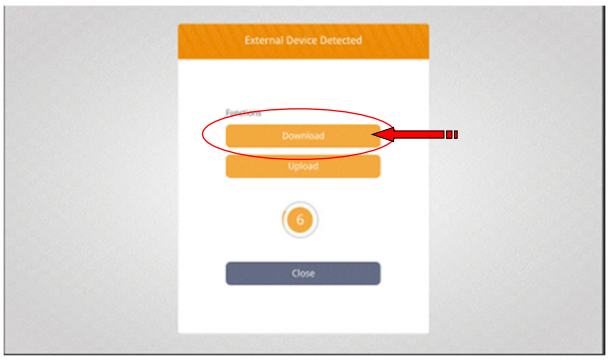


HMI Software Update

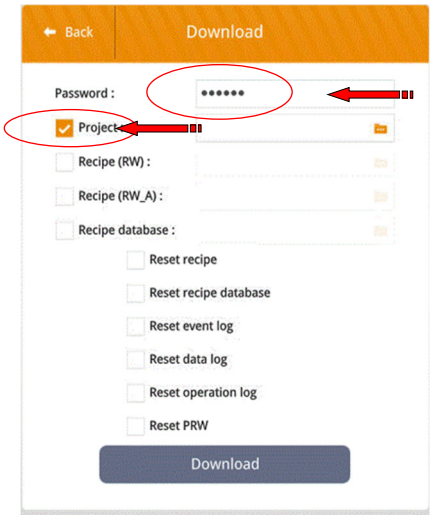
The following section explains how to download a project file by using USB drive. Downloading a new project is a way of updating your HMI program which allows for function/feature updates as well as Ethernet Tag name updates. This is especially useful for multiple meter installations where all meter's tags will have to have different Ethernet Tag names.

1. Insert the external USB device with the project into the HMI. The External Device Pop-Up message should appear.

2. Click Download.



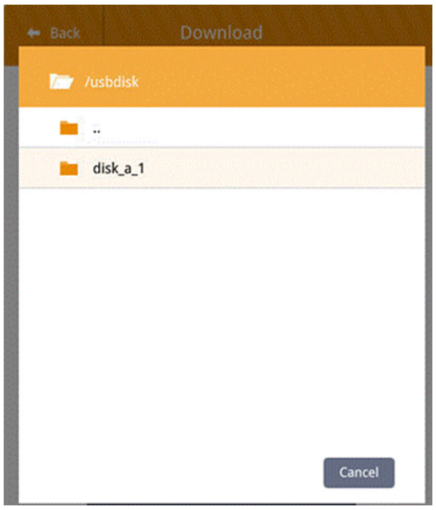
3. Enter the default password 111111 and check the Project box.



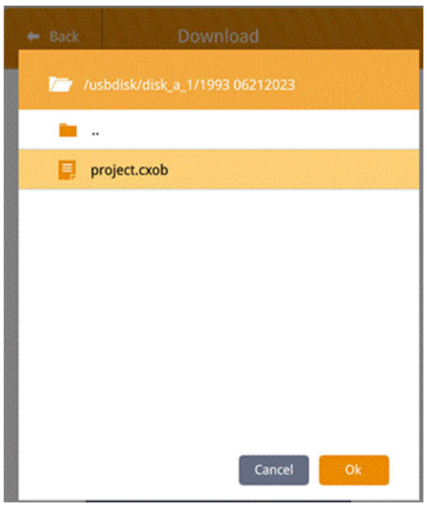
HMI Software Update Continued

4. Next, click the folder Icon in the Project field, it will show the directories in the external device. (usbdisk: USB Drive)

5. Select the directory that contains the project.



6. Select the project and press OK to start downloading the new project.



SCREEN GUIDE

Every HMI page has a unique name that includes the previous page name combined with a description of the current page. A period separates the names. When the DCE is first powered on, or when you press the TO TOP Button on another page, the TOP page is displayed.

TOP

TOP is the Main Menu screen. There are seven buttons on the TOP page.

RUN: Press the RUN Button to go to the TOP.RUN page. This is the normal display mode.

CAL: Press the CAL Button to go to the TOP.CAL page. This is where the DCE calibration is performed (comparable to analog electronics Static Calibration).

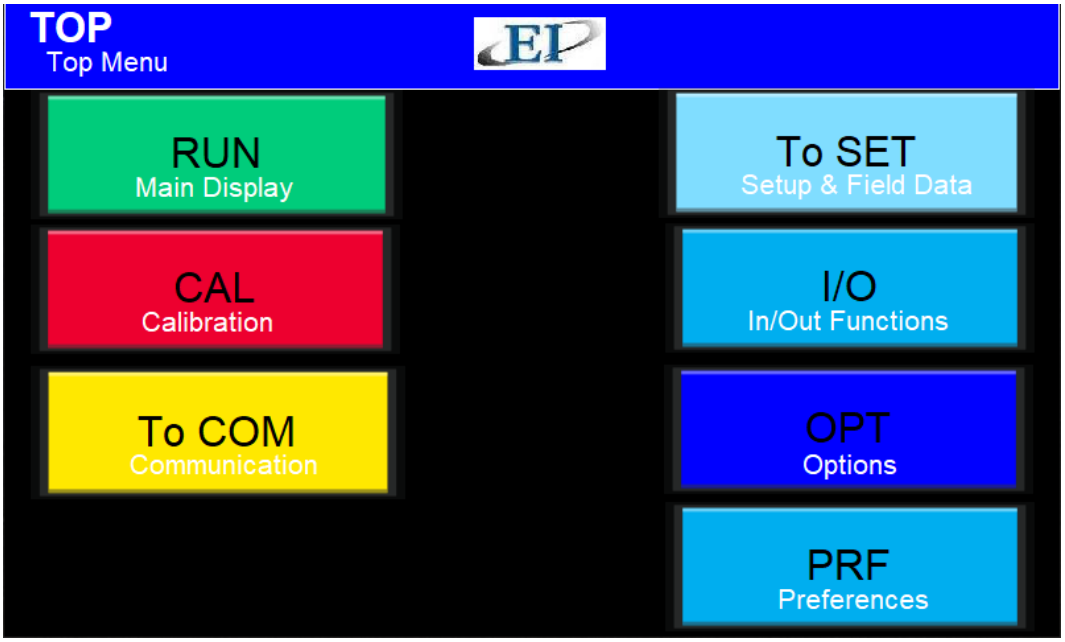
TO COM: Press the COM Button to view pertinent information about your meter's setup.

TO SET: Press the SET Button to go to the TOP.SETUP page. This is used to perform the DCE site calibration.

I/O: Press the I/O Button to access settings for the Alarm, Weighted Count and others.

OPT: Press the OPT Button to access various options.

PRF: Press the PRF Button to go to the TOP.PRF page. This page allows the security settings clock and other features to be set to your desired preferences.



TOP.RUN

TOP.RUN	TOP	RUN	

TOP.RUN is the main display mode. Access this screen by pressing the RUN Button from the TOP screen. A Horizontal Bar Graph is used for a graphical indication of flow rate. The length of the green horizontal bar is proportional to the flow rate. To determine the flow rate, use the scale just below the horizontal bar. The scale units are percent (%) and the scale resolution is 10.

At either end of the bar graph array there is a color coded indicator. The indicator labeled IN is the inhibit light. It will turn on when the flow rate is less than the inhibit setting. The display color for the IN light is yellow. The Inhibit Status Indicator will indicate the ON/OFF status of the inhibit logic for the flow rate display and 4-20 mA output. The indicator labeled OV is the over range light. It will turn red when the flow rate is greater than full scale. Note that the Horizontal Bar Graph is only used for an approximate visual representation of the flow rate.

Under the Horizontal Bar Graph is a digital display of both the Flow Rate and the Total weight of product flowing through the meter. Pressing the Reset Button will reset the Total displayed to 0.00.

The Input and Output Status indicators are tri-colored. The colors have the following meaning: gray equals not enabled, green equals enabled but not active (low), and red equals enabled and active (high). These indicators include the Remote Reset and Alarm/Preset functions.

Raw Count displays the number of counts that the Electronics is calibrated to display based on the Calibration Voltage. Its primary usage is during the Calibration of the Electronics so that the desired Electronic Full Scale Flow Rate is correct. The counter is set to display 500 counts per second. Thus, if the Electronic Full Scale Flow Rate is to be calibrated to 300 lb/min, then the counter should display 100 counts per lb of product.

TOP.CAL

TOP.CAL	TOP	CAL	

TOP.CAL is the Main Calibration Page. Access this screen by pressing the CAL Button from the TOP page. There are six buttons on the TOP.CAL page.

ZERO: Press the ZERO Button to go to the CAL.ZERO page. This is where you can perform a Zero Calibration.

CALS: Press the CALs Button to go to the CAL.CALs page. This is where you can perform Static Calibration.

CALD: Press the CALd Button to go to the CAL.CALd page. This is where you can perform Dynamic Calibration.

RANGE: Press the RANGE Button to go to the CAL.RANGE page. This is where you select the current range of your electronics.

INHIBIT: Press the INHIBIT Button to go to the CAL.INHIBIT page. This is where you can select a threshold below which the Electronics will not take a flow measurement.

FILTER: Press the FILTER Button to go to the CAL.FILTER page. This is where you can filter the output of your 4-20 mA signal from instantaneous to averaged.

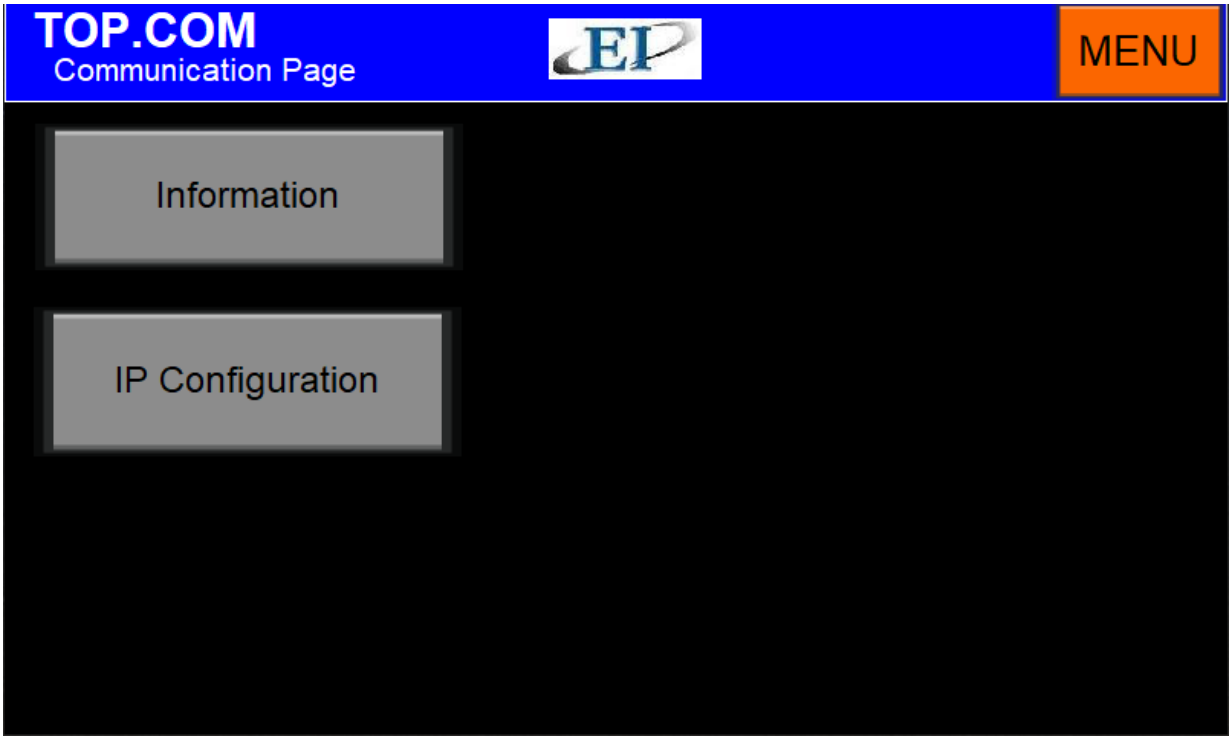
TOP.COM

TOP.COM	TOP	TO COM	

TOP.COM is the Main Communication Page. Access this page by pressing the COM Button from the TOP page. There are two buttons on the TOP.COM page.

INFORMATION: Press the INFORMATION Button to view information concerning your Software's version, your IP Address, and your main configuration settings.

IP CONFIGURATION: Press the IP CONFIG Button to edit your IP Address.



TOP.SET

TOP.SET	TOP	TO SET	

TOP.SET is the Main Data Entry menu. Access this page by pressing the SET Button from the TOP page. There are five buttons on the TOP.SET page.

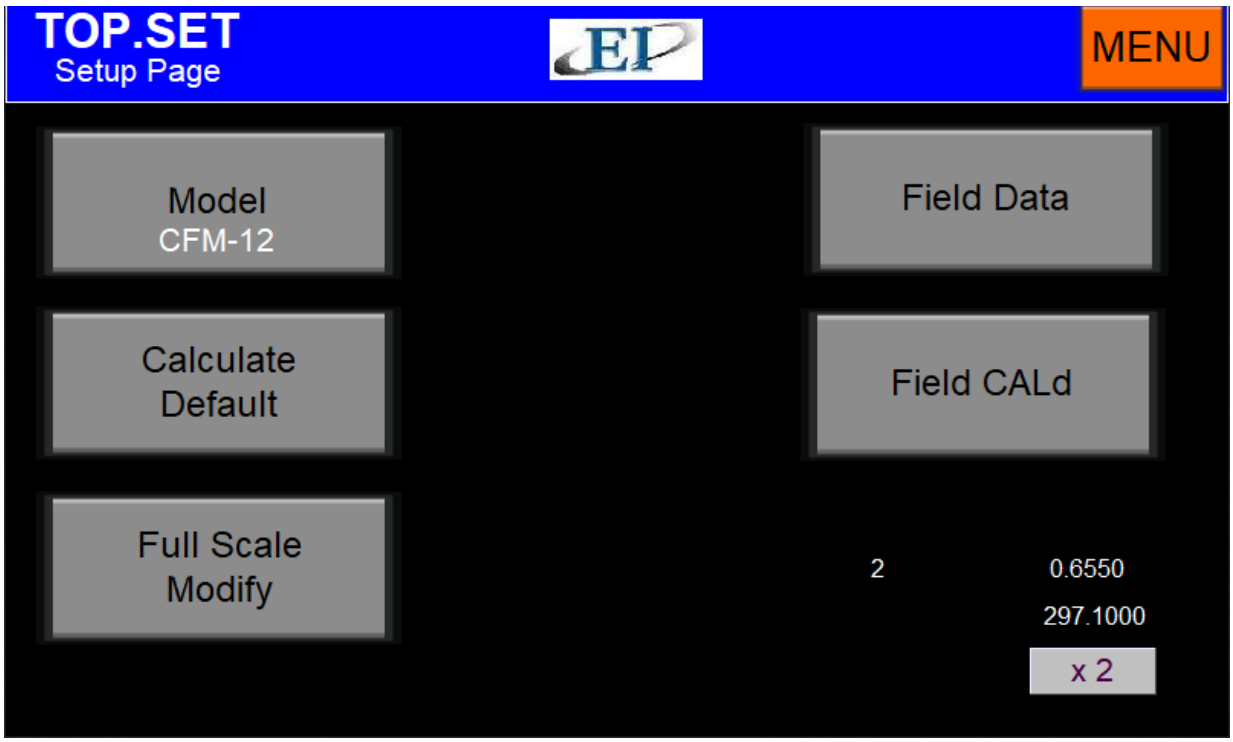
MODEL: Change the meter model. When the MODEL Button is pressed, a popup appears which allows you to scroll through the meter models that are available. Press the model number value (button) until your meter is displayed. Then, press the DONE Button.

CALCULATE DEFAULT: Enter values for your Count to Weight Ratio.

FULL SCALE MODIFY: Modify your Full Scale value.

FIELD DATA: Enter Field Data that is taken during Site Calibration.

FIELD CALD: Change your Dynamic Calibration Settings based on your Dynamic Calibration/Field Data.



TOP.I/O

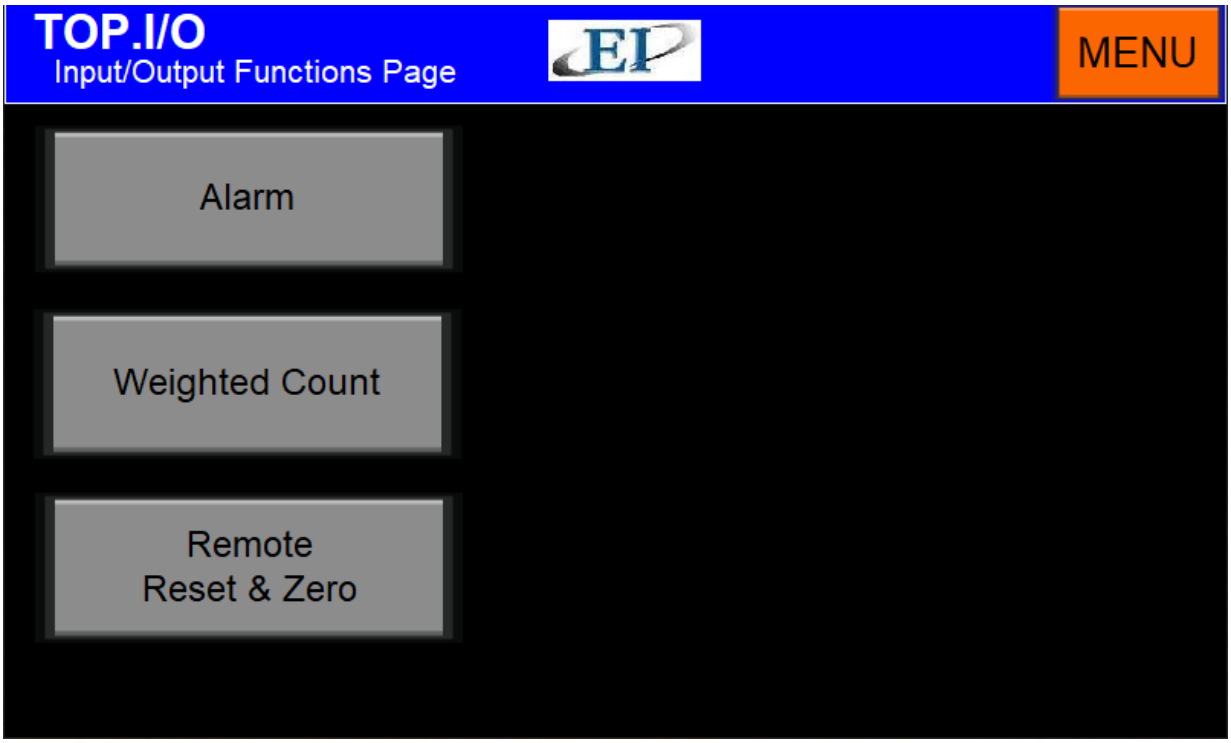
TOP.I/O	TOP	I/O	

TOP.I/O is the Main Input/Output Menu page. Access this screen by pressing the I/O Button from the TOP page. There are three buttons on the TOP.I/O page. This page is for accessing all options associated with setting all inputs and outputs in your process.

ALARM: Set up and configure the alarms.

WEIGHTED COUNT: Set up and configure the Weighted Count Option.

REMOTE RESET & ZERO: Set up and configure how the Remote Reset and Remote Zero will work.



TOP.OPT

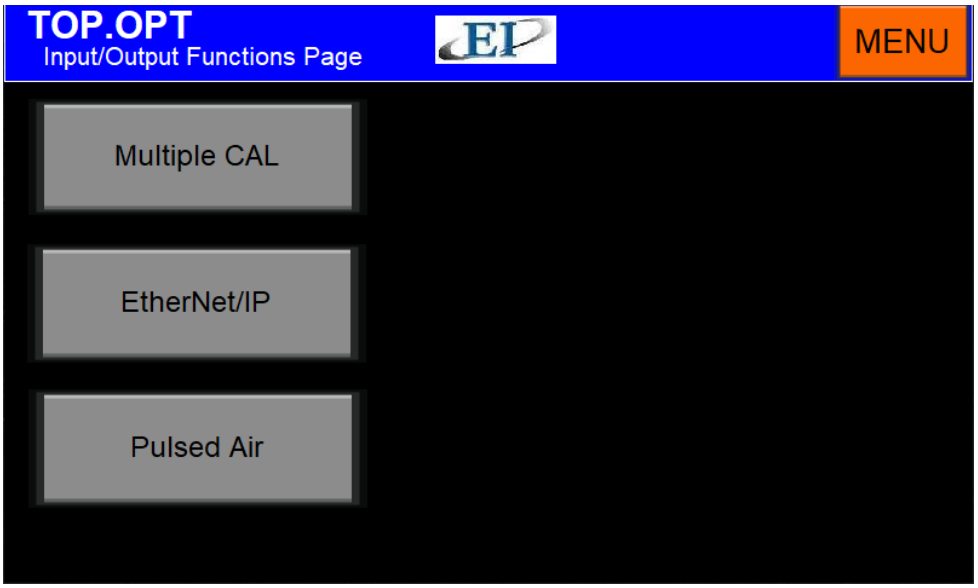
TOP.OPT	TOP	OPT	

TOP.OPT is the Main Options page. Access this screen by pressing the OPT Button from the TOP page. There are 3 options that can be adjusted here. The options accessed from this page are listed below.

MULTIPLE CAL: Set up and configure the Multiple Calibration option after pushing this button. Please see the Multiple Calibration section of this manual for more information on the Multiple Cal option.

ETHERNET/IP: Set up and configure Ethernet/IP communication after pushing this button. Please see the Changing the IP Address section of this manual for more information on the Ethernet/IP setup.

PULSED AIR: Set up and configure the Pulsed Air option after pushing this button. Please see the Pulsed Air section of this manual for more information.



TOP.PRF

TOP.PRF	TOP	PRF	

TOP.PRF is the Main Preferences page. Access this screen by pressing the PRF Button from the TOP page. There are 6 preferences that can be adjusted here. The TOP.PRF page allows access to several features that offer greater flexibility during the operation of the CentriFlow Meter. The features accessed from this page are listed below.

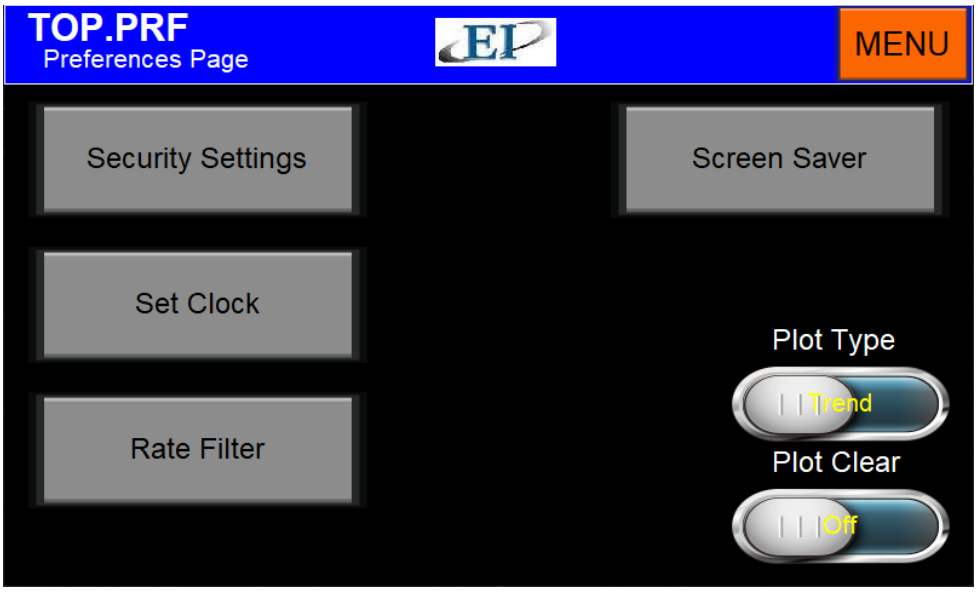
SECURITY SETTINGS: Press the Security Settings Button to access the security settings/login. Please see the Security Features section of this manual for more information on the Security Settings.

SET CLOCK: Press the SET CLOCK Button to modify the current time and date displayed by your HMI. You can modify the current values for HOUR, MINUTE, DAY, MONTH or YEAR by clicking the values and entering a new value via the popup keypad. Press ENTER once the new value is entered.

RATE FILTER: Press the RATE FILTER Button to access the selections and configurations for the Filter. Please see the Filter section of this manual for more information on the Setting up the Filter.

SCREEN SAVER: Please see the Screen Saver section of this manual for more information on the Setting up the Screen Saver.

PLOT TYPE: Choose between a Trending Plot or a Scope style plot.
PLOT CLEAR: Toggle Plot Clear on and off.



CAL.ZERO

CAL.ZERO

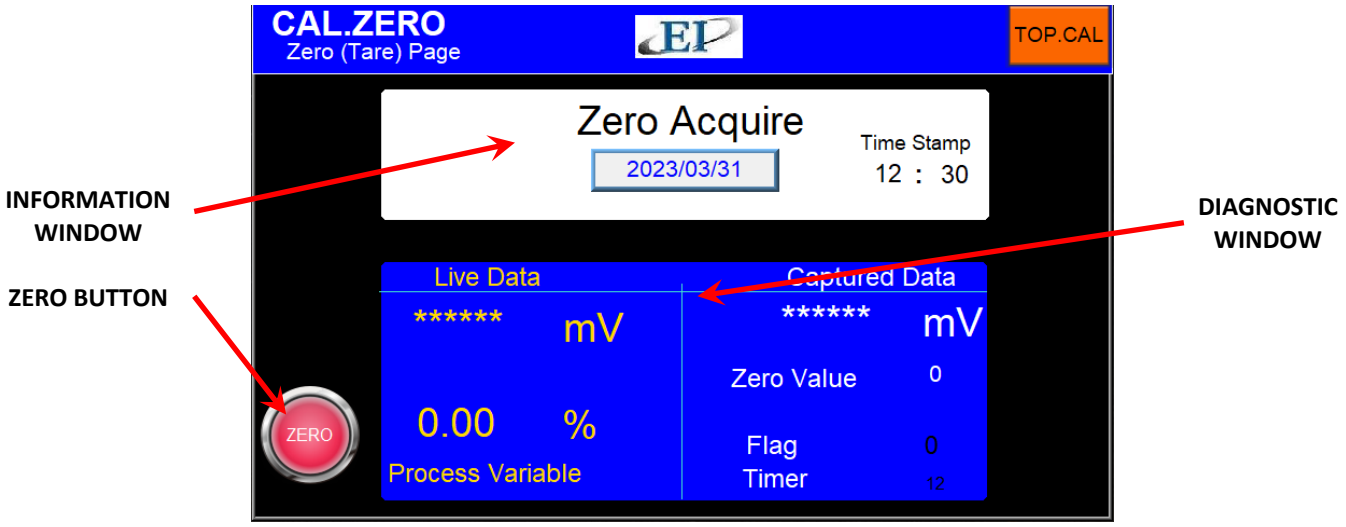
TOP	CAL	ZERO

CAL.ZERO is the Zero Calibration page. Access this screen by pressing the ZERO Button on the TOP.CAL screen after pressing the CAL Button from the TOP page. This page is for conducting Zero Calibrations. The procedure for a Zero Calibration can be found under the Static Calibration Section.

The Diagnostic Window displays the Process Variable. The Red Zero Button is pushed to run a Zero Calibration. Information on whether the calibration was successful and whether there may be excess product on your Meter Pan may be found in your Information Window.

The meter should normally be re-zeroed when the Process Variable % is greater than +/- 0.25% with no flow. If highest accuracy is required, zero when greater than +/- 0.1%. Conversely, if lower accuracy is required this value can be raised. One can view the Process Variable % on the bottom right of the TOP.RUN page to determine if a zero is needed.

Ensure there is no flow prior to performing a zero!



CAL.CALs

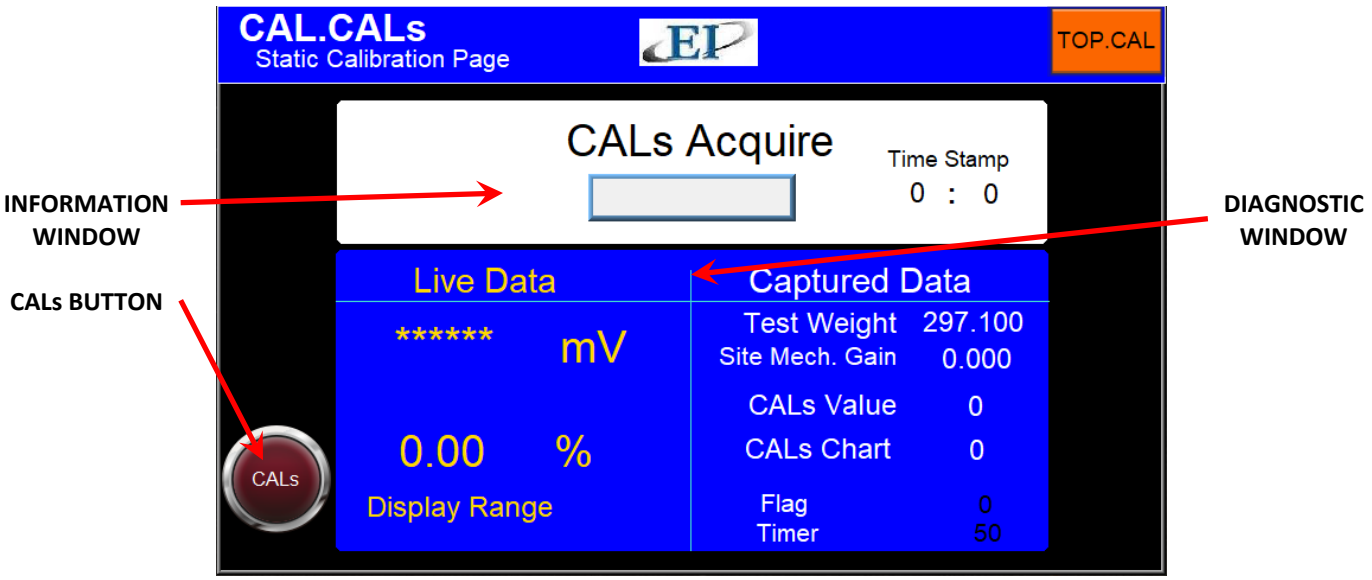
CAL.CALs

TOP	CAL	CALS

CAL.CALs is the Static Calibration page. Access this screen by pressing the CALs Button on the TOP.CAL page after pressing the CAL Button from the TOP page. This page is for conducting Static Calibrations. The procedure for a Static Calibration can be found under the Static Calibration Section.

The Diagnostic Window displays Voltage. The Red CALs Button is pushed to run a Static Calibration. Information on whether the calibration was successful may be found in your Information Window. A Red background in the Information Window signifies a Static Calibration failure, while a Green background indicates a successful Static Calibration.

Tilt is the meter tilt angle and is typically set at the factory using the SET.SIZE page.



CAL.CALd

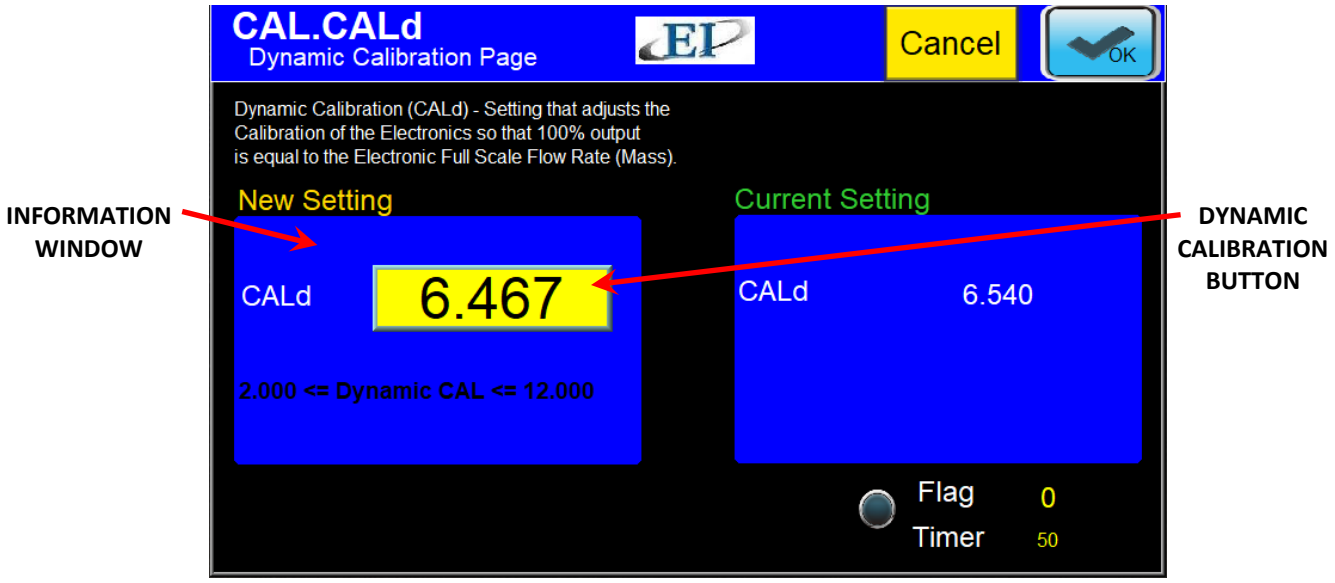
CAL.CALd

TOP	CAL	CALD

CAL.CALd is the Dynamic Calibration page. Access this screen by pressing the CALd Button on the CAL Screen after pressing the CAL Button from the TOP page. This page is for conducting Dynamic Calibration. Please see the Dynamic Calibration (or Site Calibration) procedure in this manual.

The Information Window displays helpful information regarding the options on this screen. Pressing the Yellow Dynamic Calibration (Cald) value Button brings up a numeric keypad that allows you to manually enter your Dynamic Calibration Number.

Dynamic Calibration: Displays the setting used to adjust the Electronic Full Scale Flow Rate to the appropriate value. This Voltage can range from a minimum of 2 to a maximum of 12.



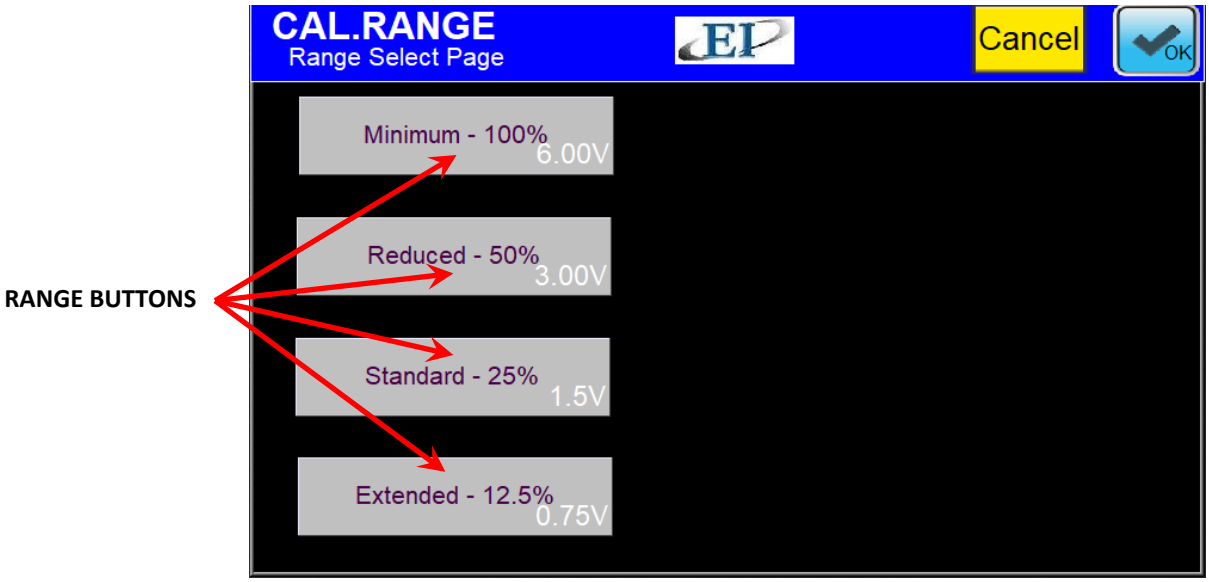
CAL.RANGE

CAL.RANGE	TOP	CAL	RANGE

CAL.RANGE is the Calibration Range page. Access this screen by pressing the RANGE Button on the TOP.CAL page after pressing the CAL Button from the TOP page. This page is for changing the Range of your electronics.

The Range can be changed to the desired value by clicking on the appropriate button.

The Range setting is already selected by the factory and typically adjustment is not required.



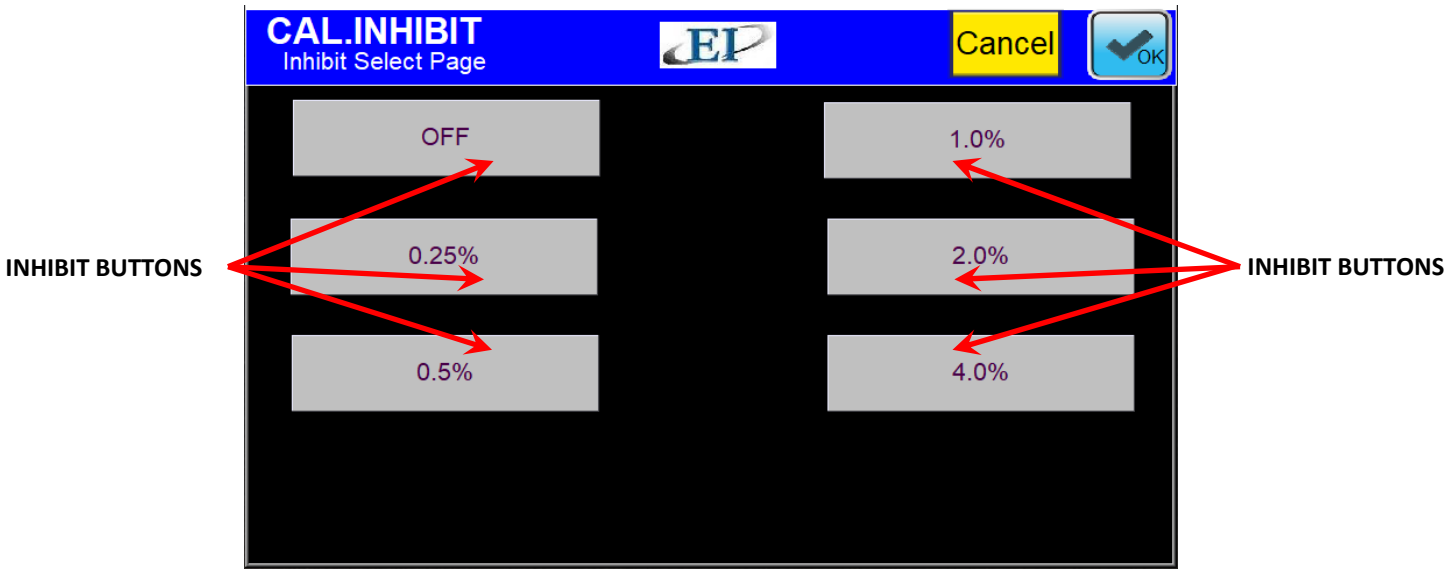
CAL.INHIBIT

CAL.INHIBIT	TOP	CAL	INHIBIT

CAL.INHIBIT is the Inhibit page. Access this screen by pressing the INHIBIT Button on the TOP.CAL page after pressing the CAL Button from the TOP page. This page is for changing the Inhibit that sets a threshold which the Flow Rate Output must rise above for the electronics to begin counting. The range for setting this threshold is from 0.5% of full scale to 4.0% of full scale.

The Inhibit can be changed by pressing the accompanying Inhibit Buttons.

Unless OFF is selected for Inhibit, the Total display on the page TOP.RUN and the output signal 'Frequency, Flow Rate Proportional' will be inhibited. The Inhibit for the Flow Rate display on the page TOP.RUN and the output signal '4-20mA' operate slightly different. The Inhibit is OFF for the Flow Rate and 4-20mA signal when the 4-20mA moving average filter is OFF. (See the page CAL.FILTER.) To Inhibit the Flow Rate and 4-20mA signal, both the 4-20mA moving average filter and the Inhibit must be on.



CAL.FILTER

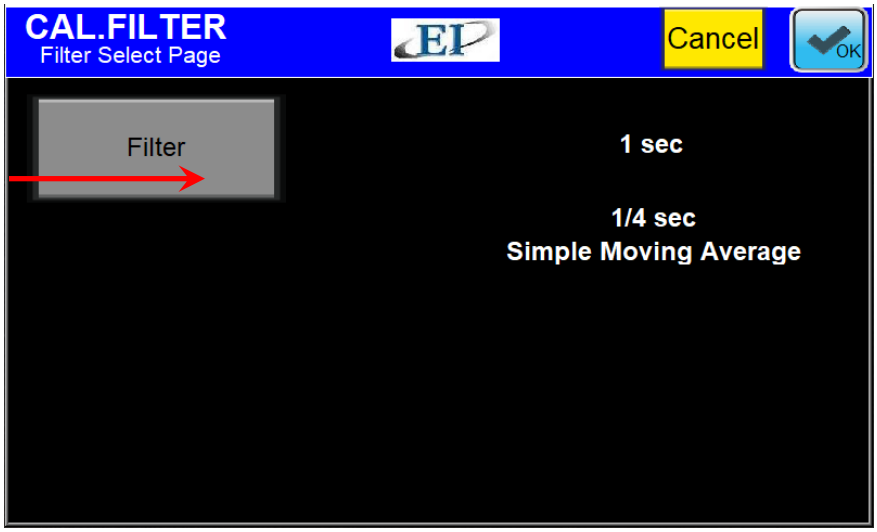
CAL.FILTER	TOP	CAL	FILTER

CAL.FILTER is the Filter page. Access this screen by pressing the FILTER Button on the TOP.CAL page after pressing the CAL Button from the TOP page. This page is for selecting the number of points used in the 4-20mA moving average filter. The filter will be a simple moving average filter for filtering up to three seconds and will be an exponential moving average for filtering three seconds or over.

The moving average is a very common filter in digital signal processing. Despite its simplicity, the filter is optimal at performing the common task of reducing random noise while retaining a sharp step response. The moving average filter can also be turned off from this page.

Please note that the inhibit is automatically turned OFF when the Filter is set to OFF.

FILTER BUTTON

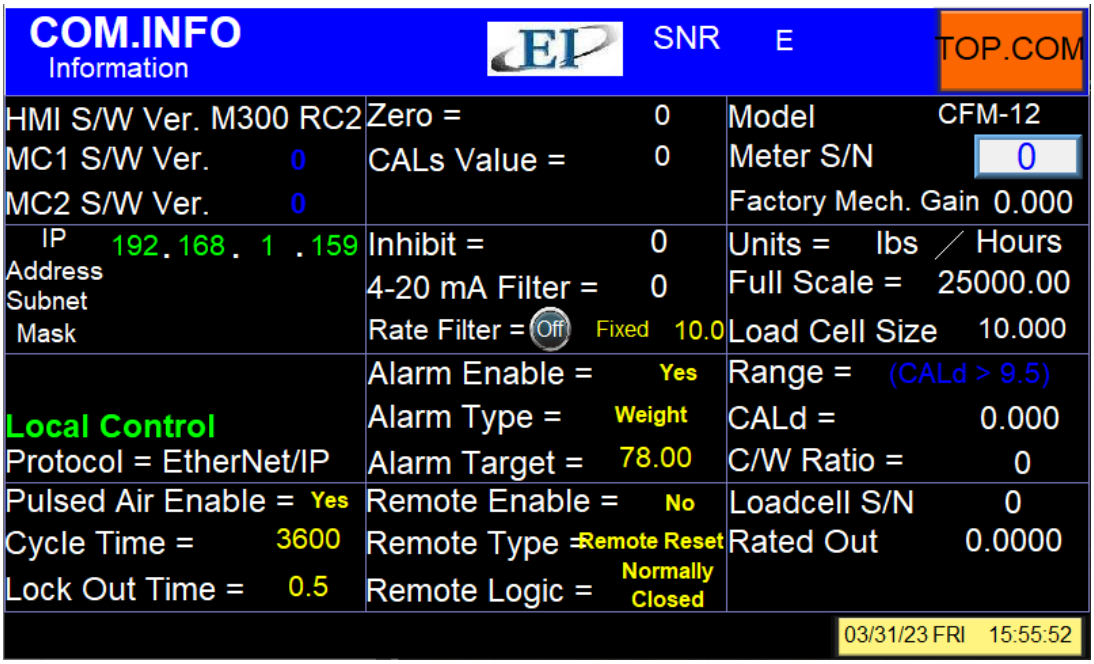


COM.INFO

COM.INFO

TOP	TO COM	INFORMATION

This screen is accessed when the INFORMATION Button is pushed from the TOP.COM page. This page can be accessed to view information regarding the software version for your particular unit as well as your current communication protocol information.



COM.IP

COM.IP

TOP	TO COM	IP CONFIGURATION

This screen is accessed when the IP CONFIGURATION Button is pushed from the TOP.COM page. This page can be accessed to enter or change your IP Address. Please note that each section of the IP address must be pressed and the new value entered via a popup keypad. All for sections are entered independently.

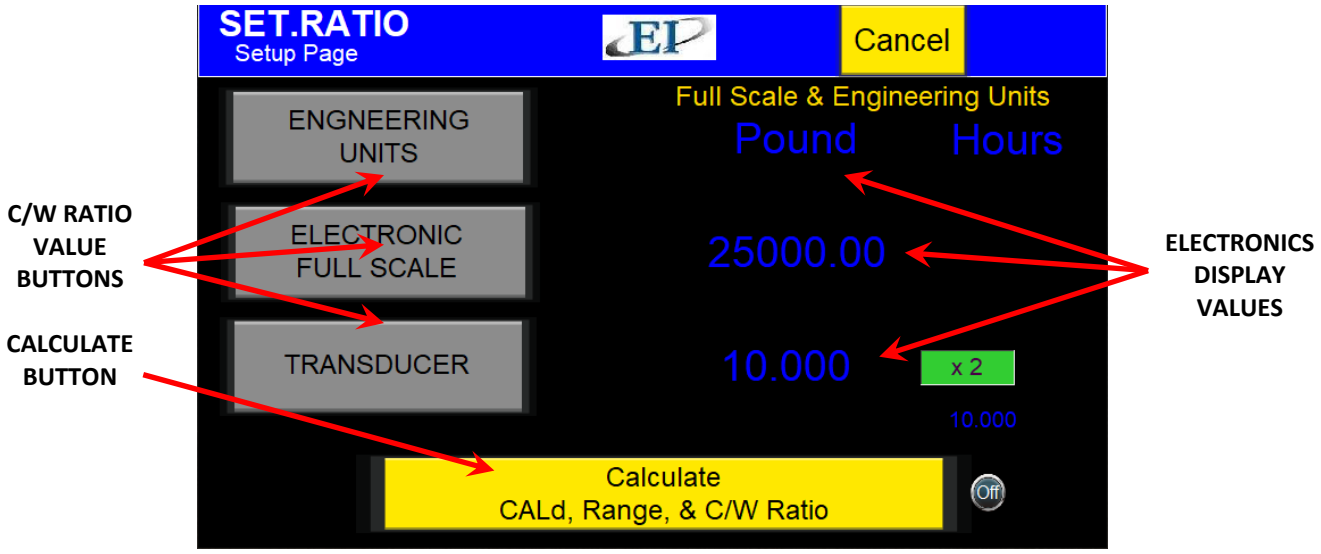
SET.RATIO

SET.RATIO	TOP	TO SET	CALCULATE DEFAULT

SET.RATIO is the page that allows you to calculate your count per weight ratio. The C/W Ratio, or Count per Weight Ratio, is determined by the factory. This value is the divisor used to calculate the engineering count (total) from the raw count. Your Full Scale value can be changed, the units of your Full Scale value can be modified, and the number and size of your Transducers can be modified from this page. The button near the bottom will use this data and recalculate your C/W ratio.

Engineering Count = Raw Count / Count per Weight Ratio

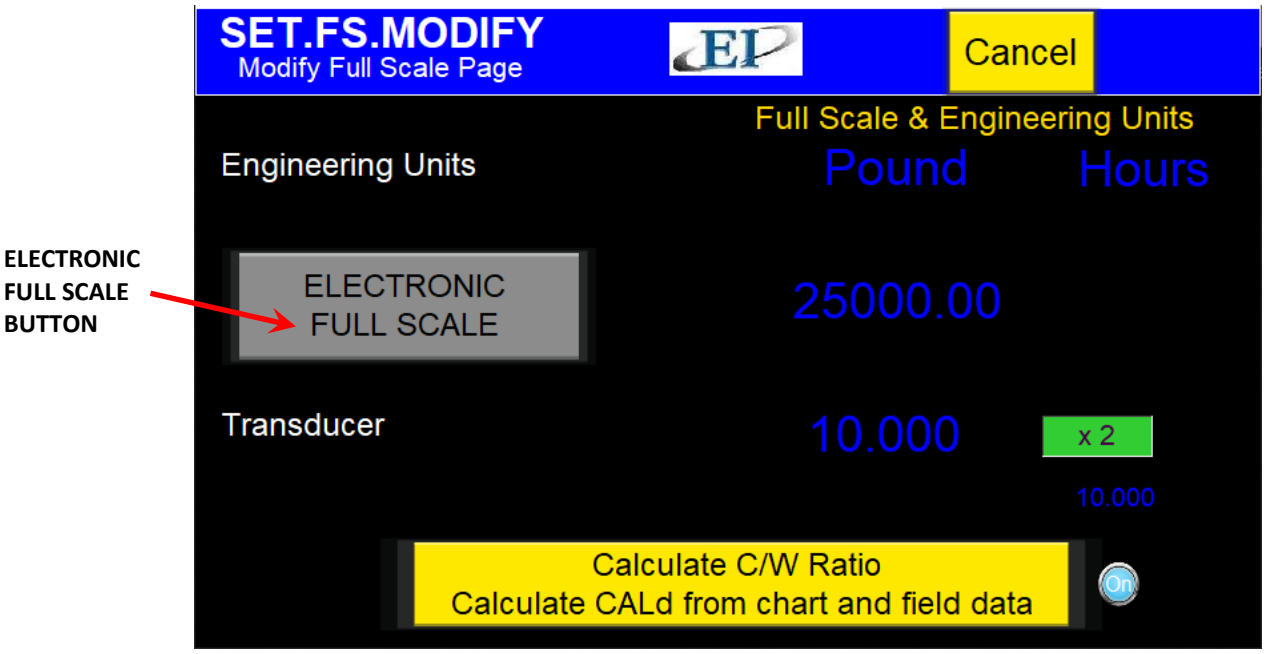
This data is set by the factory and should not be changed by the customer.



SET.FS.MODIFY

SET.FS.MODIFY	TOP	TO SET	FULL SCALE MODIFY

SET.FS.MODIFY is the page that allows you to modify your full scale. Pressing the ELECTRONICS FULL SCALE Button opens a list of possible Full Scales that you can choose from. Select your Full Scale value and press the SET RATIO Button in the upper right hand corner.

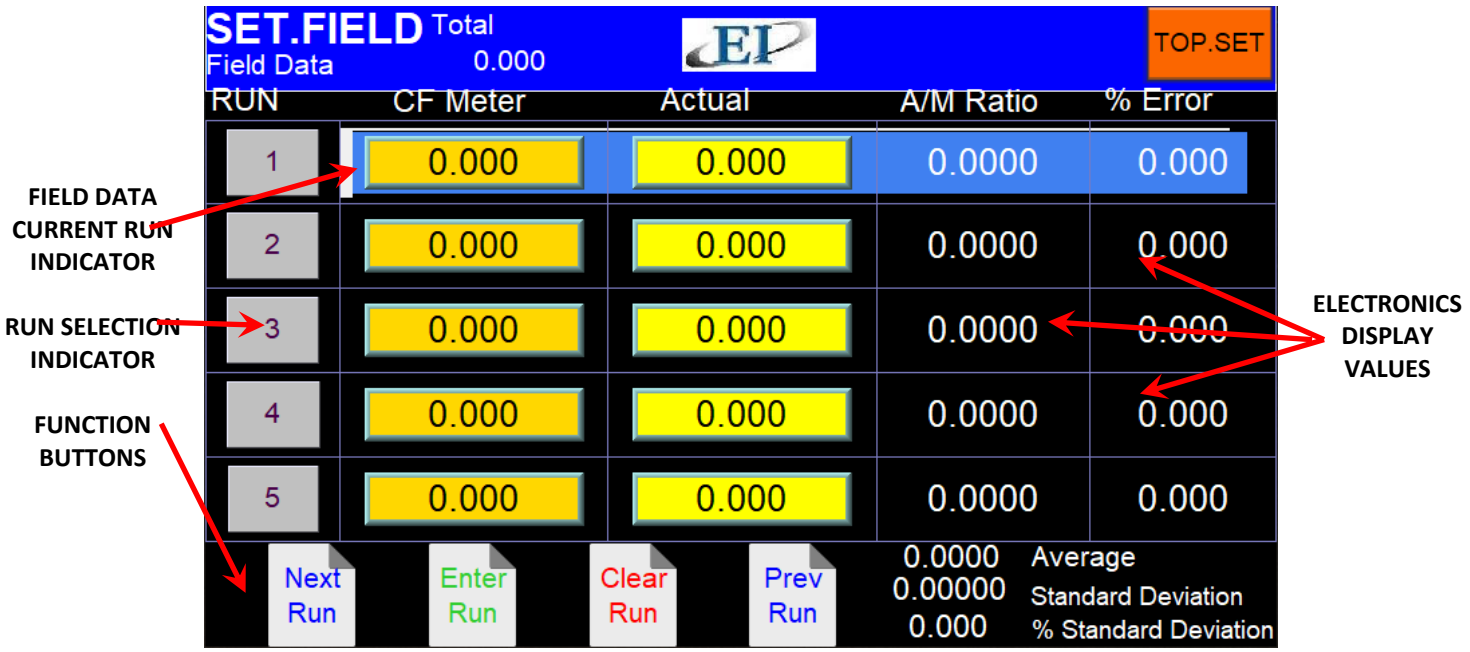


SET.FIELD

SET.FIELD

TOP	TO SET	FIELD DATA

SET.FIELD is the page that allows you to collect and verify your site calibration data. This page is used extensively in Site Calibration as shown in the Site Calibration section of this manual. This screen allows you to compare the metered weight of material run through the meter versus the actual weight of the material, often weighed by a static scale after being diverted. By pressing the FIELD DATA CURRENT RUN Buttons (1-5) you can select which runs will be used during your Site Calibration calculation. The green RUN SELECTOR INDICATOR lights will be lit green when selected. Selecting certain runs using your FIELD DATA CURRENT RUN Buttons will also be useful when used in conjunction with the FUNCTION Buttons at the bottom of the screen for clearing a certain run or entering the actual data for a specific run. Values for the actual weight of material run through the meter can be entered by touching the appropriate area in the "Actual" column. A numeric keypad will prompt you to enter your data.

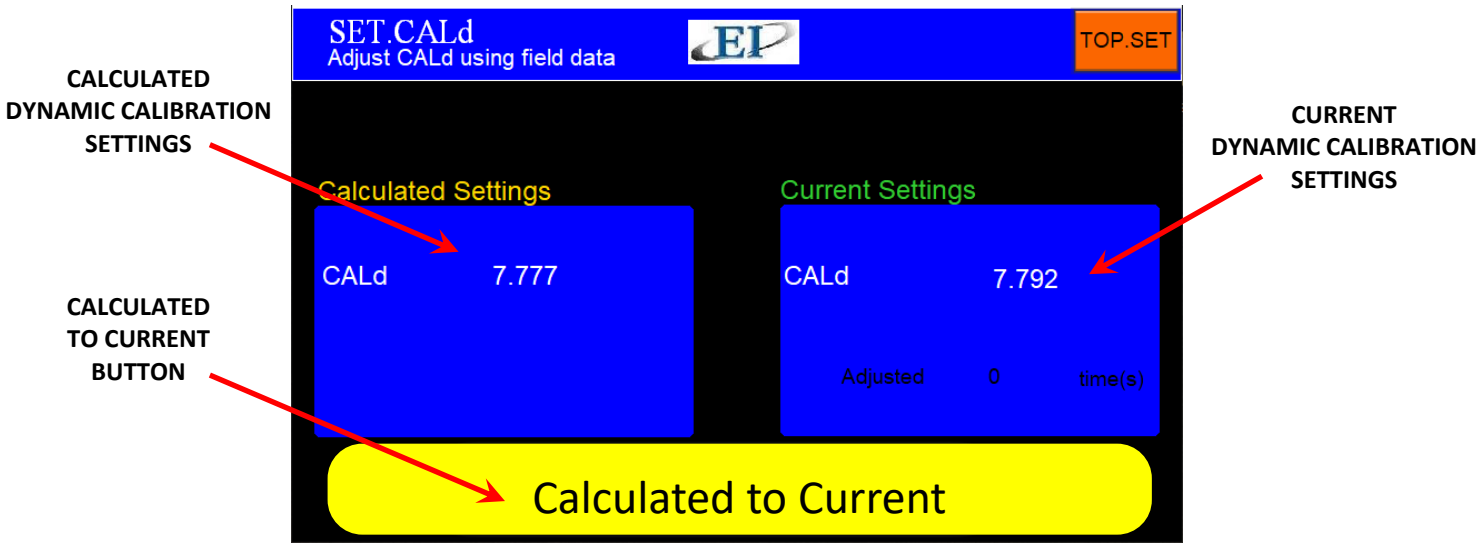


SET.CALd

SET.CALd

TOP	TO SET	FIELD CALD

SET.CALd is a page used in conjunction with SET.FIELD page to adjust your Dynamic Calibration using recently collected field data. Once the field data is entered, open this page and you should see the new calculated Dynamic Calibration value under the CALCULATED DYNAMIC CALIBRATION SETTINGS section. Your current calibration settings will be displayed under the CURRENT DYNAMIC CALIBRATION SETTINGS section. The CALCULATED TO CURRENT Button allows you to change your Dynamic Calibration using the new, calculated value. For detailed instructions on how to perform a Dynamic, or Site, Calibration, please see the Site Calibration section of this manual.



I/O.ALARM

I/O.ALARM

TOP	I/O	ALARM

I/O.ALARM is the Alarm page. Access this screen by pressing the ALARM Button from the TOP.I/O page. This page is for changing the options of the alarm. The alarm can be turned on and off using the ALARM ENABLE Button. Press the ALARM ENABLE Button until the desired result is displayed in the Button's display box.

The alarm can be used to monitor either flow rate or weight using the ALARM TYPE Button. Press the ALARM TYPE Button until the desired result is displayed in the popup's green display box.

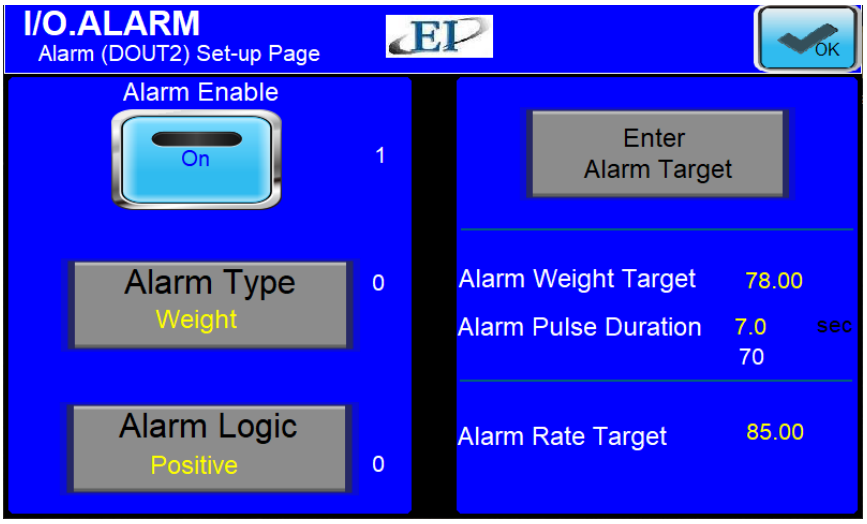
The Target Value for both rate and weight alarms can be set by pressing the ENTER ALARM TARGET Button and entering an appropriate value.

IF ALARM TYPE RATE IS SELECTED: Press the ENTER ALARM TARGET Button to take you to I/O.RATE.SP page to configure the alarm.

IF ALARM TYPE WEIGHT IS SELECTED: Press the ENTER ALARM TARGET Button to take you to I/O.WEIGHT.OUT page to configure the alarm.

The alarm can be set as either a High Alarm or a Low Alarm. Use the LOGIC Button to choose which type of alarm you would like to use. Press the LOGIC Button until the desired result is displayed in the Blue display box to the right of the LOGIC Button.

NOTE: POSITIVE LOGIC INDICATES THAT THE ALARM HAS BEEN SET AS A HIGH ALARM AND WILL TRIGGER WHEN FLOW (OR WEIGHT) GOES ABOVE THE TARGET VALUE. NEGATIVE LOGIC INDICATES THAT THE ALARM HAS BEEN SET AS A LOW ALARM AND WILL TRIGGER WHEN FLOW (OR WEIGHT) GOES BELOW THE TARGET VALUE.

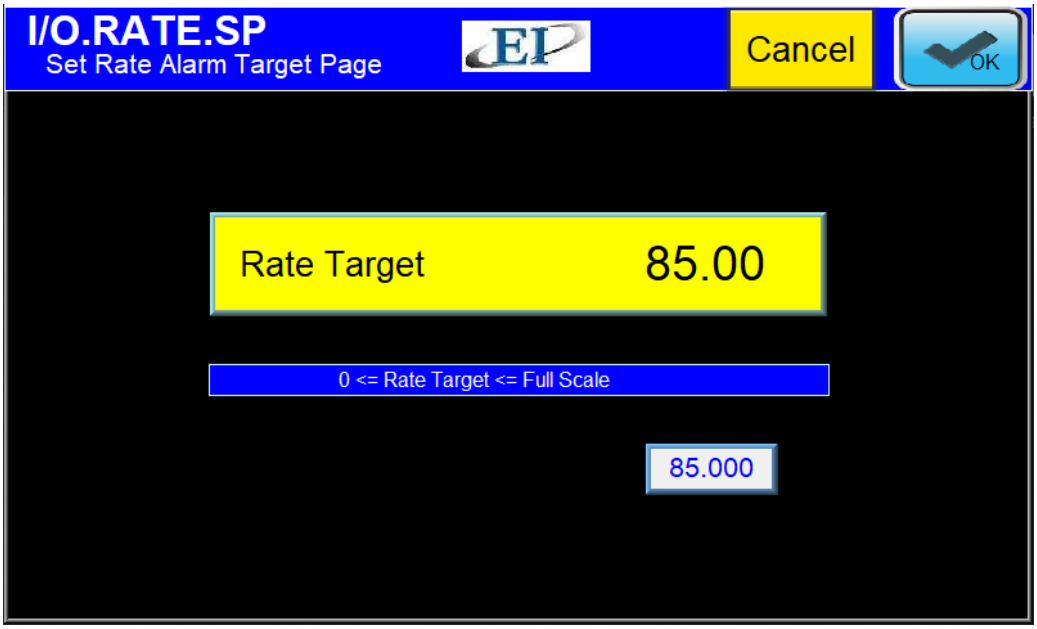


I/O.RATE.SP

I/O.RATE.SP

TOP	I/O	ALARM	ENTER ALARM TARGET

I/O.RATE.SP is the Alarm Target Entry page. Access this screen by pressing the TARGET Button from the I/O.ALARM page while ALARM TYPE Rate is selected. This page is for changing the values that will trip the alarm. You can enter a rate by pressing the RATE TARGET Button (yellow button) and entering a rate into the popup keypad. To change the value, you must press the OK Button located in the upper right hand corner of the screen.



I/O.WEIGHT.OUT

I/O.WEIGHT.OUT

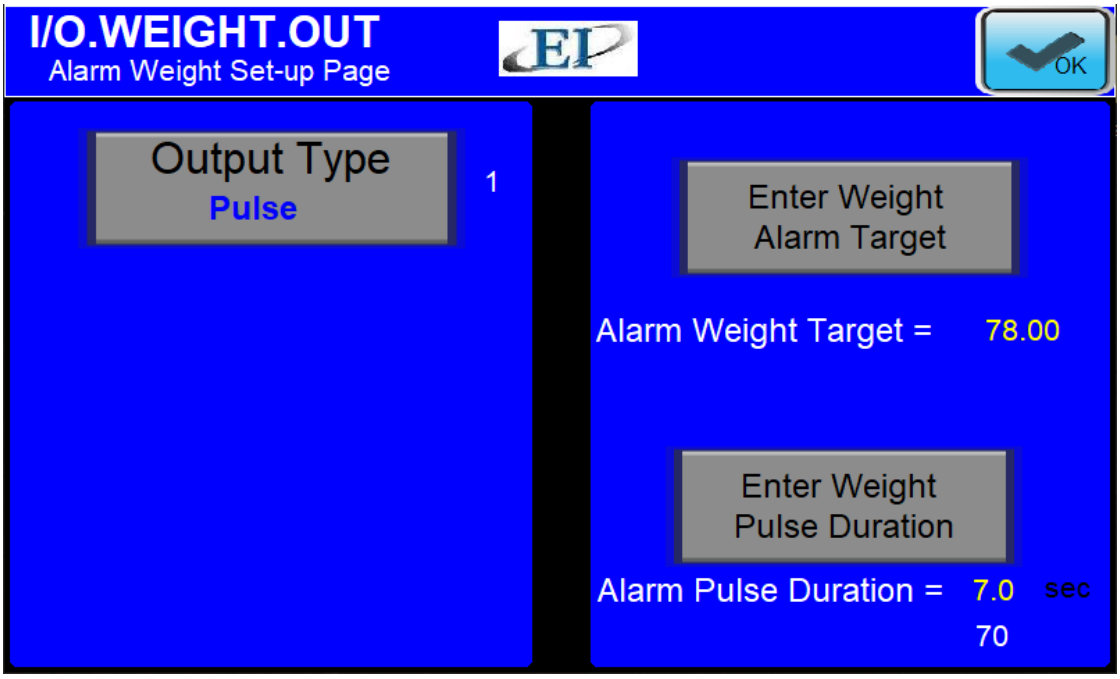
TOP	I/O	ALARM	ENTER ALARM TARGET

I/O.WEIGHT.OUT is the page that allows you to define the type of Weight/Totalization alarm that you will be using. Access this screen by first pressing the I/O Button from the TOP.MENU page. Then press the ALARM Button, followed by the ENTER ALARM TARGET Button (only available if WEIGHT has been selected as the ALARM TYPE).

OUTPUT TYPE: The two types of Weight Alarms to choose from are Pulsed Weight Alarms and Latch Weight Alarms. A Pulsed Weight Alarm will allow you to choose a Weight Target and when that amount of weight, or Total Weight, passes through the meter, the alarm will be tripped for a set duration of time. A Latch Weight Alarm will trip as soon as the Target Weight is reached and will remain tripped, or "latched", until the Totalization count is reset.

ENTER WEIGHT PULSE DURATION: If a Pulsed Weight Alarm is chosen, a duration for the Pulsed Alarm can be chosen as well. This is accomplished by pressing the DURATION Button and entering an alarm duration in seconds. The Totalization Count is reset once the Pulse Alarm time expires.

*Please note that while a duration can be entered even while a Latch Weight Alarm is selected, the duration entered will have no effect unless a Pulse Weight Alarm is chosen.



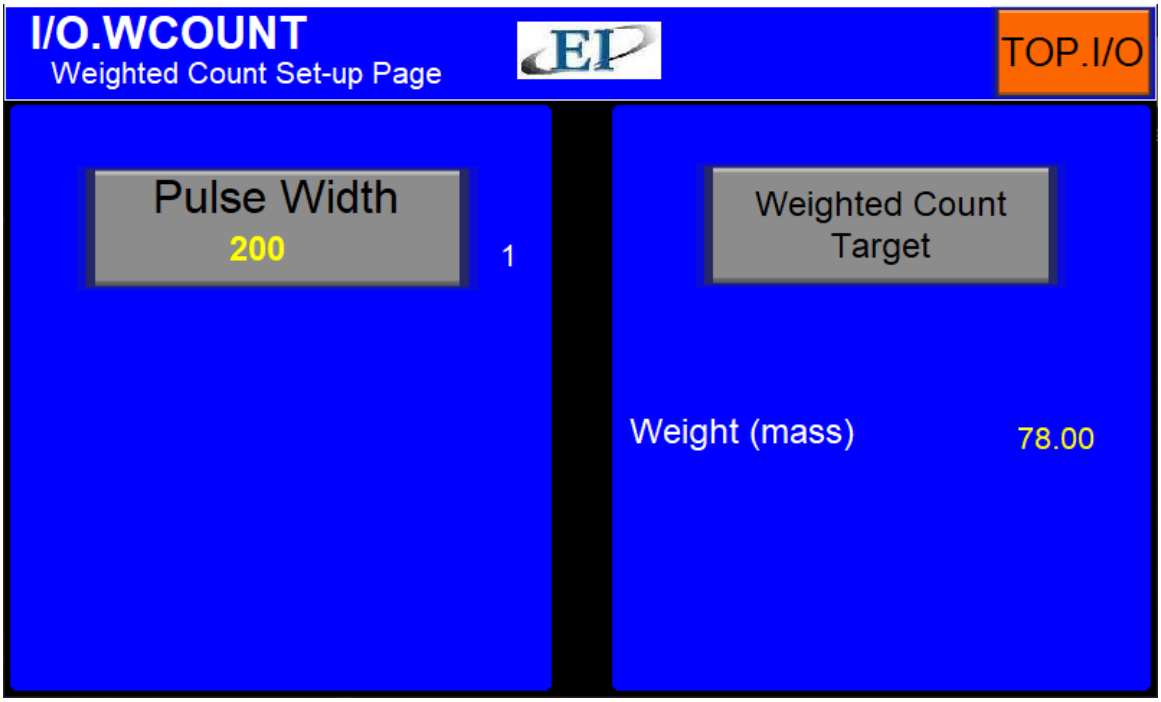
I/O.WCOUNT

I/O.WCOUNT	TOP	I/O	WEIGHTED COUNT

The I/O.WCOUNT page allows you to set up the weighted count option. This option allows you to set a target weight that will trigger a pulsed signal each time that target weight passes over the meter. The WEIGHTED COUNT TARGET Button allows you to determine when the pulse will trigger by selecting the target weight, while the PULSE WIDTH Button allows you to determine the length, or duration, of the pulse signal. The values become effective immediately upon entry.

As an example, if you are using your Weighted Count option to monitor product flowing at 60,000 lb/min to send a pulsed signal to an indicator light every time 1,000 lb passes through the meter and your pulse width is set to one second, the indicator light will never go off before it is signaled to come back on again.

If this is the case, a warning message will appear. Raising your target value, lowering your pulse width, or both will remedy this.

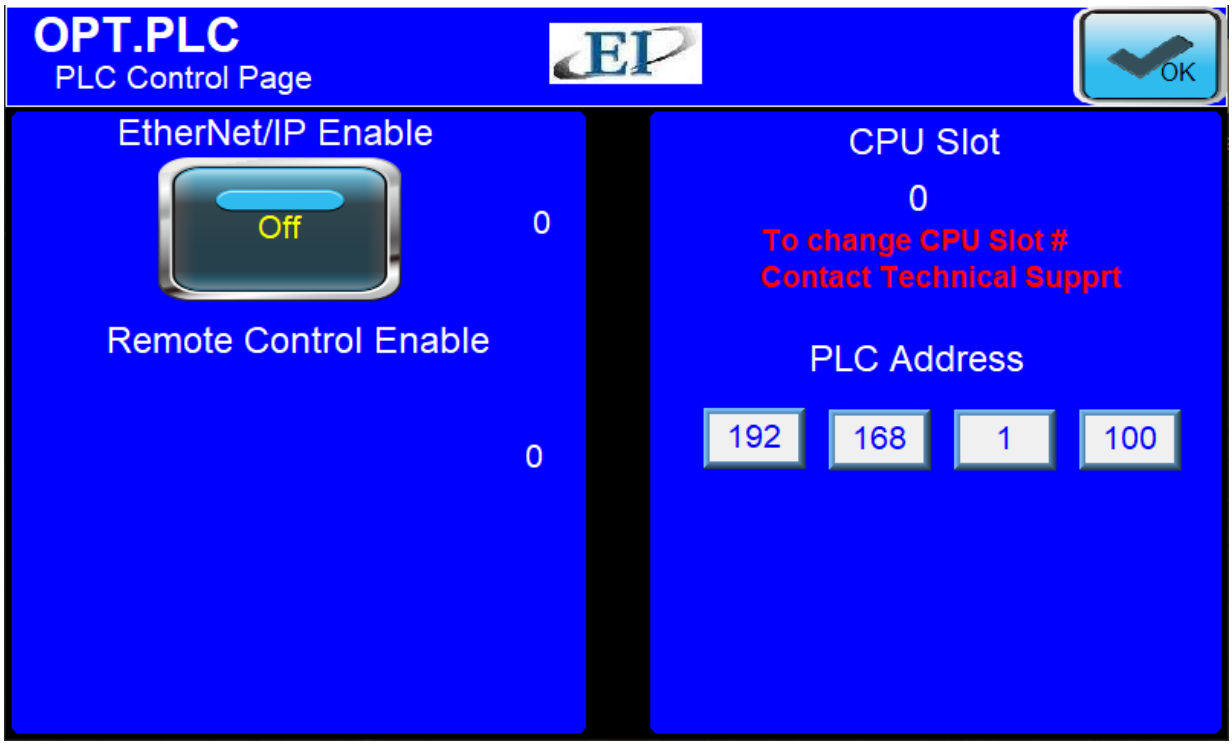


OPT.PLC

OPT.PLC (Optional)

TOP	OPT	ETHERNET/IP

This screen is accessed when the ETHERNET/IP Button is pushed from the TOP.OPT page. The TOP.OPT page is accessed by pushing the OPTIONS Button from the Main Menu. Pushing the buttons on this menu allows you to Enable or Disable local control of the electronics and allows you to change your IP address. Please note that CPU Slot value can only be changed at the factory. Please contact EI and we will assist in changing your CPU Slot designation.



OPT.PULSEDAIR

OPT.PULSEDAIR	TOP	OPT	PULSED AIR

This screen is accessed when the PULSED AIR Button is pushed from the TOP.OPT page. The TOP.OPT page is accessed by pushing the OPTIONS Button from the Main Menu. From this screen you can enable and disable the pulsed air option, change the frequency of the blasts of air, set Lock Out Time, and perform a manual test of the Pulsed Air System.

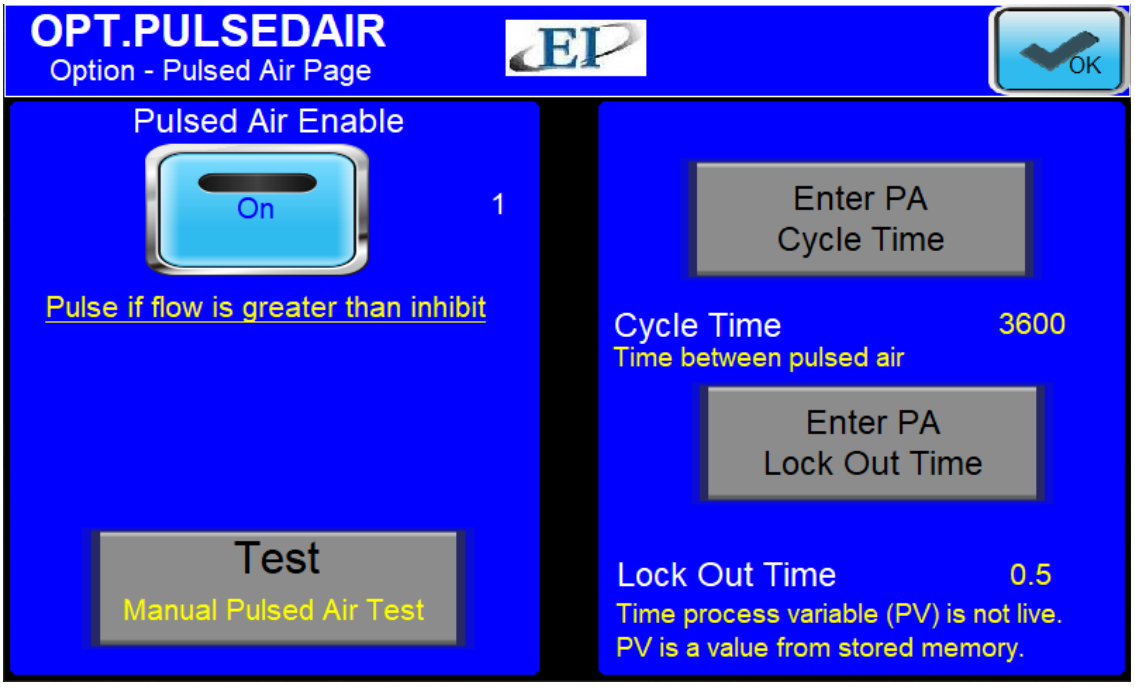
Please note that the Pulsed Air duration, or time that each blast of air lasts, is a constant that is factory set at 100 ms and cannot be changed. The Pulsed Air Cycle Time, or the duration of time between pulsed blasts of air, can be changed, however.

ENABLE: Turns on and off the Pulsed Air Option.

CYCLE TIME: The duration of time between blasts of air. This duration is input in seconds and can be changed as appropriate. The recommended Frequency is once per hour or once every 3600 seconds.

LOCK OUT TIME: The Digital Electronics averages the real time flow rate during normal operation and locks the mass flow signal at this value during an air blast. The amount of time that the Mass Flow Signal is locked during the blast can be changed here. Typically, this value does not need to be changed.

TEST: Allows manual operation of the Pulsed Blast System.



REFERENCE

Definition of Terms

Dynamic Calibration (CALd): Setting that adjusts the Calibration of the Electronics so that 100% Output is equal to the Electronic Full Scale Flow Rate (Mass). This number ranges from a minimum of 4 to a maximum of 10.

Electronic Full Scale Flow Rate (Mass): Flow Rate that Electronics is calibrated at such that the Electronics output is 100%.

Extended Static Calibration: This is a non-standard setting of the Static Calibration that will electronically range the Transducer up to 2 times the standard Transducer Value. The Range setting for this is 0.75 Volts.

Inhibit Threshold: Voltage level that is adjusted to allow Electronics not to measure product that might be present only at certain periods. An example of this would be at start up when there might be product dribbling onto the meter. This Voltage would represent a percent of the 100% output of the Electronics. That is, if the 100% output represented an Electronic Full Scale Flow Rate of 300 lb/min, then an Inhibit Threshold setting of 2% of the Electronic Full Scale Flow Rate would be 6 lb/min.

Minimum Static Calibration: This is a non-standard setting of the Static Calibration that will electronically range the Transducer down to ¼ times the standard Transducer Value. The Voltage setting for this is 6.0 Volts. (This is used only under special circumstances.)

NC: Normally Closed. This term refers to electronic signal outputs and means that the output is normally closed until a signal is received at which point the output will open.

NO: Normally Open. This term refers to electronic signal outputs and means that the output is normally open until a signal is received at which point the output will close.

Reduced Static Calibration: This is a non-standard setting of the Static Calibration that will electronically range the Transducer down to ½ times the standard Transducer Value. The Voltage setting for this is 3.0 Volts.

Static Calibration (CALs): Voltage setting that Ranges Transducer in a STATIC State. This setting is made while the Test weight is hung from the Calibration Stud on the Pan End and no product is on the Pan.

Weighted Count: The weighted count is the engineering unit count divided by a scale factor to generate a much slower count (i.e. 1 pulse/100 lb or 1 pulse/1,000 lb). Typically, the weighted count is used as an input to a PLC and is transmitted to the PLC via a solid state relay (SSR).

Barclay-Phelps

CE MARKING SPECIALISTS
Hoi Yuen Road, Kwun Tong, Kowloon, Hong Kong

CERTIFICATE & DECLARATION OF CONFORMITY FOR CE MARKING

Company contact details:
Eastern Instruments
416 Landmark Drive, Wilmington, NC 28412, USA

Eastern Instruments declares under their sole responsibility that their:
Digital CentriFlow Electronics
listed as the following model numbers
CV-UV-25-H1-CV-ET-MC-WC-IT-AZ-FL-EH-AF-5K-PA
CV-UV-25-H1-CV-DN-MC-WC-IT-AZ-FL-EH-AF-5K-PA
CV-UV-25-H1-CV-PB-MC-WC-IT-AZ-FL-EH-AF-5K-PA
CV-UV-25-H1-CV-CAN-MC-WC-IT-AZ-FL-EH-AF-5K-PA
SV-UV-25-H1-CV-ET-MC-WC-IT-AZ-FL-EH-AF-5K-PA
SV-UV-25-H1-CV-DN-MC-WC-IT-AZ-FL-EH-AF-5K-PA
SV-UV-25-H1-CV-PB-MC-WC-IT-AZ-FL-EH-AF-5K-PA
SV-UV-25-H1-CV-CAN-MC-WC-IT-AZ-FL-EH-AF-5K-PA

comply with the Essential Requirements of the following EU Directives:
Low Voltage Directive 2006/95/EC
Electromagnetic Compatibility Directive 2004/108/EC
RoHS 2 Directive 2011/65/EU

and further conform with the following EU Harmonized Standards:
EN 61010-1:2010
EN 61326-1:2013

Dated: 13 November 2015
Position of signatory: Technical Director
Name of Signatory: Robert Otto Brandt, Jr.
Signed below:
on behalf of Eastern Instruments

Panel Shop Certification Record

Listing# E212589
Original Certification: June 30, 2015
Revised Certification: N/A

MET Laboratories, Inc.
First in Certification

This Certification is issued to:

Eastern Instruments
416 Landmark Drive
Wilmington, NC 28412

For the product(s):

Open/Enclosed Industrial Control Panels

Have been certified to the following standard(s):
UL 508A: Standard for Safety, Industrial Control Panels, Revision Date: January 13, 2014
CSA C22.2 #14: Industrial Control Equipment, Revision Date: March 2013

Rick Cooper,
Director of Laboratory Operations
Safety Laboratory

All changes proposed in the previously identified product that affects the above information must be submitted to MET for evaluation prior to implementation to assure continued MET Certification status.

The covered product(s) shall be subject to follow-up inspections to ensure that the Certified product(s) are identical to the product sample evaluated by MET Laboratories, Inc. and that all manufacturer's responsibilities are being fulfilled as specified in the Manufacturer's Responsibility section of the Certification report. The applicant named above has been authorized by MET Laboratories, Inc. to represent the product(s) listed in this record as "MET Certified" and to mark this/these product(s) according to the terms and conditions of the MET Applicant Contract, MET Listing Reports, and the applicable marking agreements. Only the product(s) bearing the MET Mark and under a follow-up service are considered to be included in the MET Certification program. This certification has been granted under a System 3 program as defined in ISO Guide 67.

SCC Accredited CR-PTS
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MET Laboratories, Inc. is accredited by OSHA and the Standards Council of Canada.
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NRTL