



Q9 COMPUTER ELECTRONICS

Operation Manual for Firmware Versions 22-28



Please save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described.

Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage.

Please refer to back cover for information regarding this product's warranty and other important information.

DO NOT RETURN THIS PRODUCT TO THE STORE!

Please contact Great Plains Industries, Inc.® before returning any product. If you are missing parts, or experience problems with your installation, contact our Customer Support Department. We will be happy to assist you.

Call: 888-996-3837 or 316-686-7361

Email: meters@gplains.com

SAVE FOR YOUR RECORDS

Model #: _____

Serial #: _____

Purchase Date: _____

Q9 OPERATION TABLE OF CONTENTS

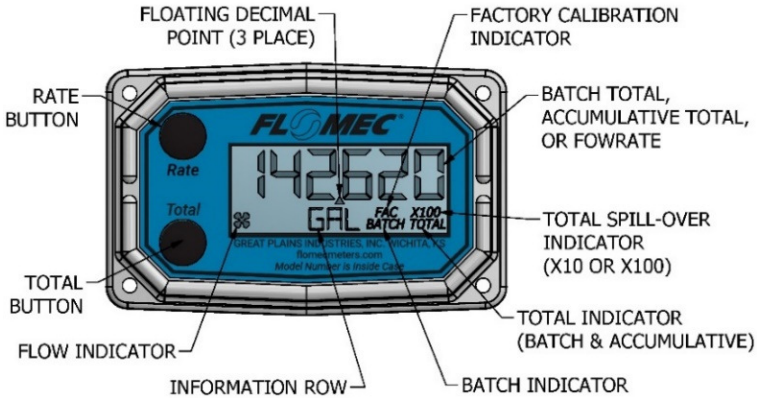
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OPERATION

COMPUTER DISPLAY

All operations are revealed on the LCD using the large 6-characters in the top row and smaller characters and symbols in the information row. These characters and symbols indicate information regarding totals, flow, calibration, units of measure and operational messages.

Push button operation varies dependent upon the various modes of operation, i.e. Normal Operation mode, Diagnostics Mode, and User Configuration mode. Their operation will be described in their respective sections.



Scan the QR code below to view videos for operating and calibrating the Q9 display.



OPERATION

COMPUTER DISPLAY

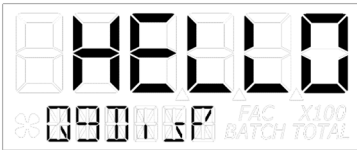
If operation instructions do not align with your meter, scan the QR code to view firmware version specific operation and calibration instructions.



ACTIVATE THE COMPUTER

When batteries are installed, the computer is on continuously and always ready to perform.

The computer is powered by field replaceable commercially available batteries. Reference the Maintenance Section for battery replacement details.

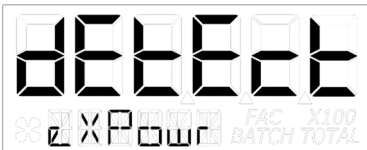


When batteries are initially installed or replaced, the initialization routine will start the LCD display blank, and then display “**HELLO**” on the top row and “**Q9Disp**” on the information row for one second.



The LCD will then display “**HELLO**” on the top row and “**FW Vxx**” on the information row for one second. The Vxx will be the version of the firmware installed on the display. Example: “**FW V27**” indicates firmware version 27 installed on the display.

External power and daughter board detection information will then be displayed. The following screens will only be displayed if the Q9 detects the relevant feature.



This screen will only display if an external power source is detected. The top row will display “**dEtEct**” and the information row will display “**eXPowr**”.

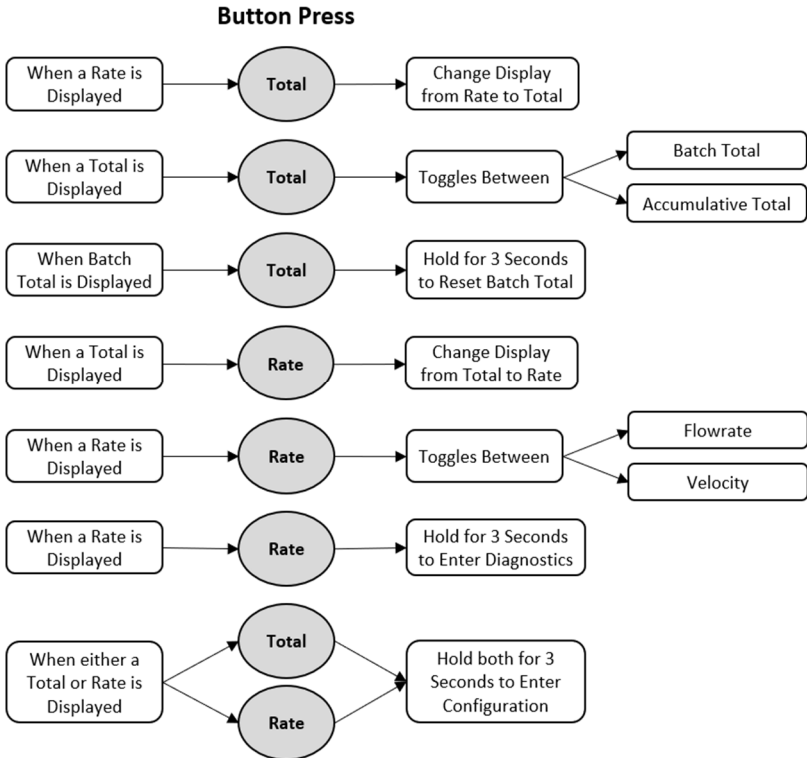


This screen will only display if a 4-20mA daughterboard module is detected. The top row will display “**dEtEct**” and the information row will display “**4-20mA**”.

OPERATION

NORMAL OPERATION

Normal Operation Map



Batch and Accumulative Total

When a rate is displayed, pressing **Total** changes the top row of large display digits to display a total. The information row will change to the proper volume units and the corresponding icons will also be shown, i.e. Gallons, Liters, etc.

When a total is displayed, pressing **Total** changes the top row of large display digits between batch total and accumulative total. The information row will change to the proper units and the corresponding icons will be shown, i.e. **TOTAL** or **BATCH TOTAL**.

(Batch Total-Gallons)



(Accumulative Total-Gallons)



OPERATION

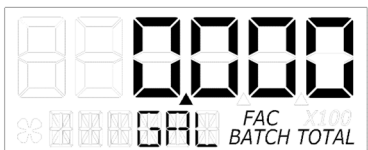
NORMAL OPERATION

Reset Batch Total

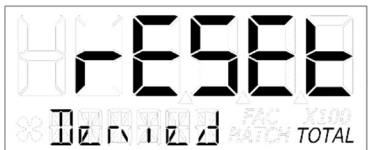
When a batch total is displayed, press and hold **Total** for 3 seconds; a three-second count down will start, and then reset the batch total to zero.



After the countdown completes, the display will show 0.000 in the top row and reset in the information row until the user releases **Total**.



After **Total** is released, the display will return to Batch Total screen and will increment the total if flow is detected.



When the accumulative total is displayed in Normal Operation Mode, it cannot be reset using **Total**.

Rate of Flow and Velocity

When a total is displayed, pressing **Rate** changes the top row of large display digits from a total to a rate display. The information row will change to the proper units and the corresponding icons will also be shown, i.e. Gallons per minute, Liters per second, etc.

When a rate is displayed, pressing **Rate** changes the display between flow rate and velocity. The information row will change to the proper rate units and the corresponding icons will also be shown.

(Flowrate)



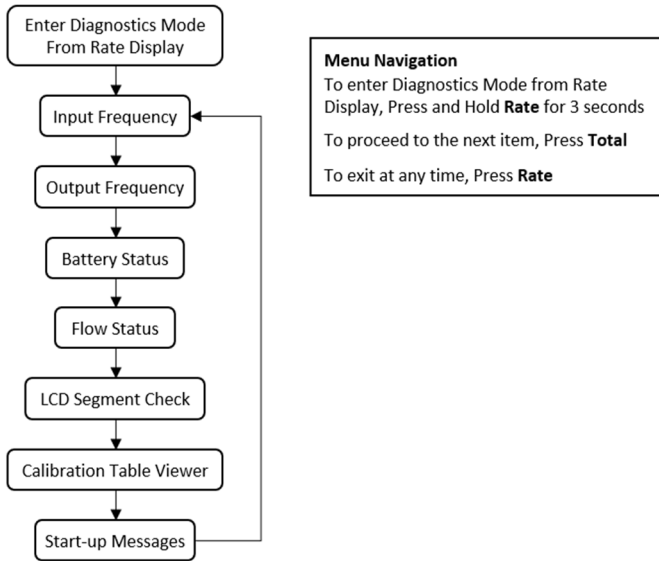
(Velocity)



OPERATION

DIAGNOSTICS

Diagnostics Mode Map

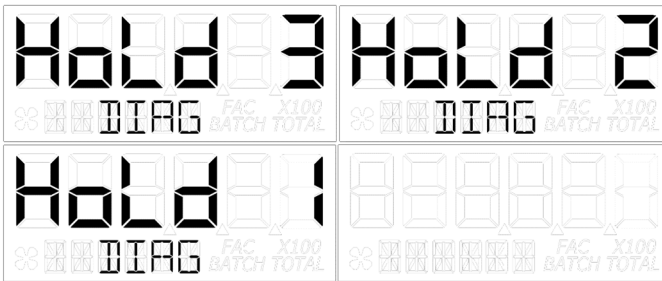


Enter Diagnostics Mode

While either Rate of Flow or Velocity is displayed, Press and Hold **Rate** for 3 seconds.

Diagnostics Mode can be exited at any time by Pressing and Releasing **Rate**.

Diagnostics Mode will automatically exit after 90 seconds of inactivity.



The diagnostic screens are reference information screens only. They cannot be edited.

Within the diagnostic menu: Pressing **Total** will advance to the next screen; pressing **Rate** at any time will exit the diagnostic menu. Upon exit, the display will return to the rate display.

There is a **90 second "no action" clock** running when in diagnostic mode. After 90 seconds with no button push to reset the clock, the computer will automatically exit and return to the rate display.

OPERATION

DIAGNOSTICS

Input Frequency

The first screen in diagnostics mode will display the input frequency.



The top row is used to indicate the frequency value. The information row will display "IN Hz" indicating the input frequency in Hz.

Press **Total** to continue to the next screen.

Output Frequency

Advancing to next screen will display the output frequency in Hz.

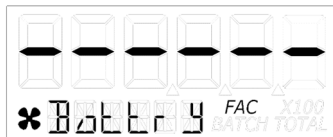


The top row is used to indicate the frequency value. The information row will display "OUT Hz" indicating the output frequency in Hz.

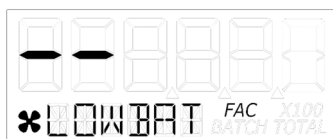
Press **Total** to continue to the next screen.

Battery Status

Advancing to the next screen will display the battery status.



The top row is used to indicate battery life with each dash indicating a percentage of battery life remaining. The information row will display "Battery".



If the battery life is sufficiently low, "LOWBAT" will be displayed in the information row. This low battery message will be displayed automatically without running a diagnostic battery check.

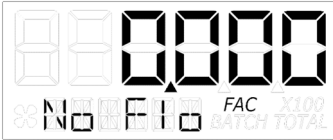
Press **Total** to continue to the next screen.

OPERATION

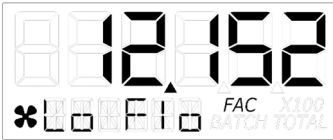
DIAGNOSTICS

Flow Status

Advancing to the next screen will display the flow status. The top row is used to indicate flow rate in the volume units programmed into the computer.



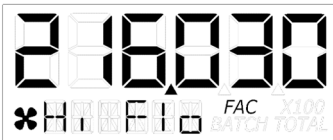
If there is no flow, the information row will display “No Flo”.



If there is flow rate below the normal range of operation, the information row will display “Lo Flo”.



If there is normal flow, the information row will indicate flow rate in the volume units programmed into the computer.

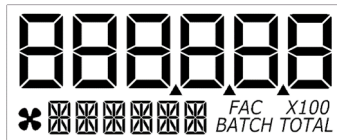
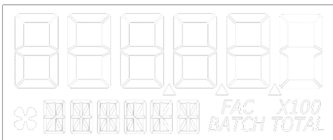


If there is a flow rate above the normal range of operation, the information row will display “Hi Flo”.

Press **Total** to continue to the next screen.

LCD Segment Check

All LCD segments are flashed on and off at a rate of 1 second to ensure proper LCD functionality.



Press **Total** to continue to the next screen.

OPERATION

DIAGNOSTICS

Calibration Table Viewer

Advancing to the next screen will display the calibration table. There may be **up to 5** Frequency – K-Factor pairs in the calibration table depending upon how many pairs have been programmed into the display through a calibration method.

Press **Total** to toggle through each screen.



The information row will display “**F1 Hz**”, indicating the value in the top row is the frequency value of the first Frequency – K-Factor pair.



The information row will display “**K1**” followed by the selected volume unit, indicating the value in the top row is the K-Factor of the first Frequency – K-Factor pair.



The information row will display “**F2 Hz**”, indicating the value in the top row is the frequency value of the second Frequency – K-Factor pair.



The information row will display “**K2**” followed by the selected volume unit, indicating the value in the top row is the K factor of the second Frequency – K-Factor pair.



The information row will display “**F3 Hz**”, indicating the value in the top row is the frequency value of the third Frequency – K-Factor pair.



The information row will display “**K3**” followed by the selected volume unit, indicating the value in the top row is the K factor of the third Frequency – K-Factor pair.

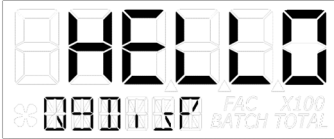
OPERATION

DIAGNOSTICS

Start-up Messages

Advancing to the next screen will display start up messages. Firmware version information, power detection, and daughter board detection information will be displayed.

These screens will auto-rotate on 1 second intervals. Not all of the following screens will display. If they do appear, they will appear in the following order:



The first screen to display will show **"HELLO"** on the top row and **"Q9Disp"** on the information row for one second. This screen will always display.



The screen will then display **"HELLO"** on the top row and **"FW Vxx"** on the information row for one second. The Vxx will be the version of the firmware installed on the display. Example: **"FW V27"** indicates firmware version 27 installed on the display. This screen will always display.



This screen will only display if an external power source is detected. The top row will display **"dEtEct"** and the information row will display **"eXPowr"**.



This screen will only display if a 4-20mA daughterboard module is detected. The top row will display **"dEtEct"** and the information row will display **"4-20mA"**.

After all start-up messages have been displayed, the display will cycle back to the begging of diagnostics mode and display the input frequency screen. Press **Rate** at any time to exit diagnostics mode.

OPERATION CONFIGURATION

Configuration Mode Map

Menu Navigation

To enter Configuration Mode, press and hold both **Rate** & **Total** for 3 seconds

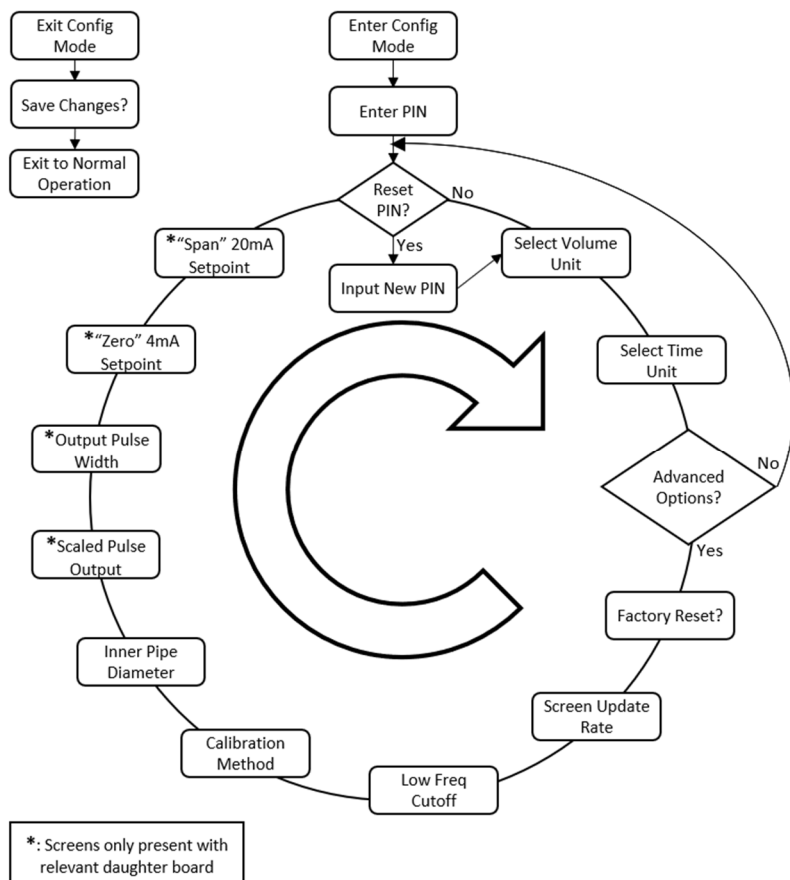
To change a value in a menu:

1. If changing a value in the information row, press **Rate** to change the selection.
2. If changing digits in the top row, press **Rate** to change the value of a digit.
Press **Total** to change the focused digit.

To proceed to the next menu:

1. If the information row is in focus, press **Total**
2. If a digit in the top row is in focus, hold **Total**, then press **Rate**

To exit at any time, press and hold both **Rate** & **Total** for 3 seconds



OPERATION

CONFIGURATION

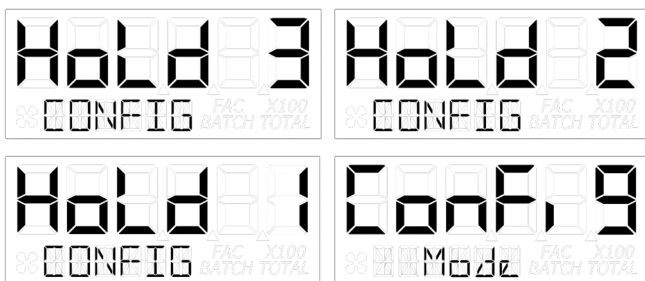
General Notes for Configuration Menus

1. The term “**focus**” as used in this manual indicates an active editable item. Focused items will constantly flash ON/OFF.
2. **Advance the focused digit in a menu: This only applies to menus with editable digits in the top row.** Press **Total**. Advancing focus will move focus to the next editable item to the right. If already on right most item, the focus will go back to the start position in a round robin fashion.
3. **Increment the value of editable item:** Press **Rate**. If editing a number, the number will increment in a round robin fashion. If editing a text option, focus will advance through a predefined list of text depending on the active menu and item.
4. **Advance to next menu:** If the information row is in focus, pressing **Total** will confirm the selection and proceed to the next menu. If a digit in the top row is in focus, hold **Total** and then press and release **Rate** to proceed to the next menu.
5. **Retrogress focus back to previous editable item or previous menu:** Press and hold **Rate** and then press **Total**.
6. **Exit any user configuration mode menu:** Press and hold **Total** first and immediately press and hold **Rate**, holding both buttons down for 3 seconds.

NOTE: Unless an exception is noted, there is a **90 second “no action” clock** running when in user configuration mode. After 90 seconds with no button push to reset the clock, the computer will automatically exit and return to normal operating mode. There is **no automatic “save”**, all entries made up to that point would be lost.

Entering Configuration

While in normal operation mode, the user can enter configuration mode by pressing and holding **Total** and **Rate** simultaneously for 3 seconds from any screen; a three second count down sequence will commence, then the display will enter configuration mode.



After three seconds, the LCD will display “**ConFig**” on the top row and “**Mode**” on the information row until the user releases both of the buttons; the display will then immediately show the first menu (PIN) of the configuration mode menus.

If the user releases both or either button before the countdown completes, the display will return to normal operation mode.

Once in configuration mode, the user can then proceed through the configuration menus as shown on the configuration map above.

OPERATION

CONFIGURATION

Save on Exiting Configuration

Entries as you progress through the configuration menus will be retained. However, there is **no automatic “save”** when exiting. Instead, you will be shown a “save” screen to enter “**yes**” or “**no**” to save your entries.

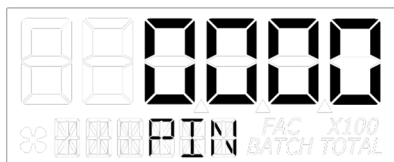


Press **Rate** to change between “**yes**” or “**no**”. Press **Total** to confirm the selection. Confirming the selection will perform the “save” selection you made and return the display to normal operation mode. The last shown screen in that mode will be displayed. **Total** must be pressed twice (to verify the end user is “certain” of selection).

PIN Menu

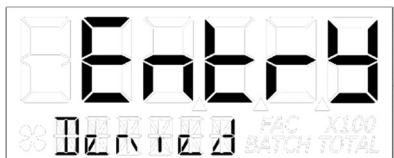
The first menu in the configuration mode is for the user to enter a Personal Identification Number (PIN) to secure the configuration of the computer and continue with making changes.

The default user PIN is 0000. Using this default PIN will unlock the meter unless the PIN has been reset by the user.



The initial user PIN entry screen will show 0000. The left most digit will be flashing ON/OFF to indicate focus if the user wants to change the PIN.

Press **Rate** to increment the focused digit. Press **Total** to advance focus to the next digit. Once a PIN has been entered, hold **Total** and then press and release **Rate** to confirm entry of PIN. If the PIN is correct, the display will advance to the Reset PIN Menu.



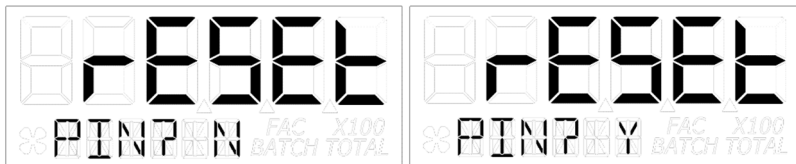
If the entered PIN was incorrect, the screen momentarily displays “**Entry Denied**” and returns automatically to normal operation display.

OPERATION

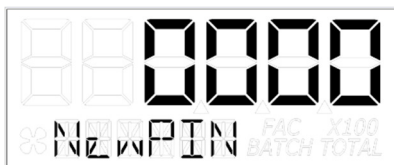
CONFIGURATION

Reset PIN Menu

If the PIN was entered correctly, the next menu will be displayed and allow reset of the PIN if desired.



The “N” will be in focus (flashing). To decline resetting the PIN, press **Total** to advance to the volume unit menu. To reset the PIN, increment the “N” to “Y” and press **Total** to advance to the new PIN screen.



If “Y” was selected, the previous PIN will be shown. The left most digit of PIN is in focus. Increment the value of each digit as desired as you advance focus through the digits.

After reset of the PIN and entry of new PIN, hold **Total** and then press and release **Rate** to confirm the new PIN.

Volume Unit Menu

The volume unit can be changed from the list of options below with this menu.

Volume Unit	Abbreviation	Volume Unit	Abbreviation
Gallon	GAL	Litre	L
Imperial Gallon	IGAL	Millilitre	mL
Custom	Set by user	Cubic Metre	m3
Acre-Foot	Ac--Ft	Cubic Centimetre	cm3
Quart	Qt	Cubic Foot	FT3
Ounce	OZ	Barrel	bbl



The information row of characters will be in focus. Press **Rate** to select a different volume unit from the list above.

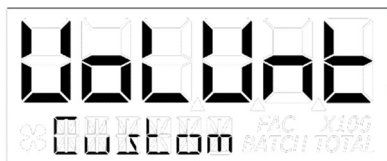
Press **Total** with a volume unit in focus to select that unit of measure and advance to the next menu.

Changing between different volume units will not corrupt the Total's contents. For example, in GAL (gallon) mode, the computer totalizes 10.000 gallons, if the user changes to L (litre) mode, the display will read 37.854 litres (the same volume, different unit).

OPERATION

CONFIGURATION

Custom Volume Unit Label Menu



A “Custom” volume unit can be created by the user. Advancing to the next menu with the “Custom” volume unit in focus will advance the display to a new menu (see below) that will allow the user to create a new label, or reuse one already stored in computer memory.

If the computer is new or has no previous custom volume unit label stored in memory, the screen will appear with three dashes.



The left most of the dashes will be in focus and the user can select a letter from the list of upper-case letters. Press **Rate** to change the character. Press **Total** to advance focus to the next character. An empty space will be shown on the menu screen as an underscore “_” during creation, but the underscore will not show when displaying the unit label in operation.



If the user has previously entered a custom volume unit label, it will be read from computer memory and the unit label will be displayed with the left most character in focus. The label can then be changed if desired.

Hold **Total** and then press and release **Rate** to confirm the custom volume unit label. The display will advance to the calibration method menu and a calibration method will need to be selected for the custom volume unit. See page 20 for a description of the calibration method menu. Once a calibration method has been selected, the display will advance to the Select Time Unit menu. See the **Custom Volume Unit Map** on the next page to see how this process deviates from the **Configuration Mode Map** flow.

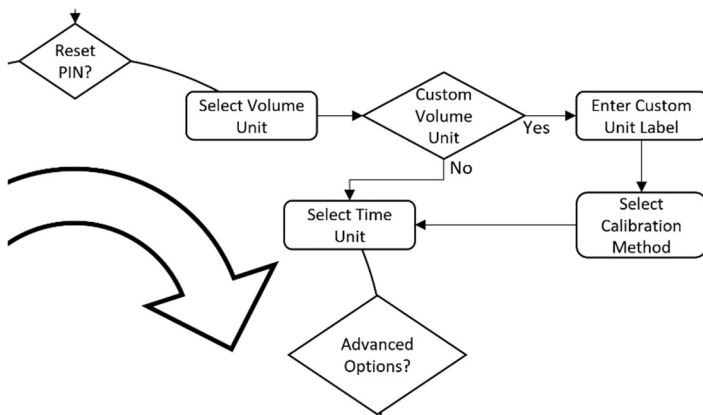
The computer will remember your calibration method selection. If your selected field calibration method is dispense display, percent adjust, or K-factor method, you will be given the opportunity to configure that method upon exiting configuration mode. The field calibration procedure of the selected method can be found in the Configuration (Field Calibration Mode) section of this manual on page 25.

The factory calibration stored in the unit will never be lost.

OPERATION

CONFIGURATION

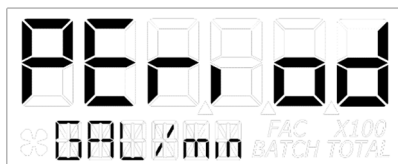
Custom Volume Unit Map



Flow Rate/Time Period Menu

This menu is used to choose the period of time over which the flow rate is calculated. The options for this menu are: per day, hour, minute, or second.

Time Base	Abbreviation
Day	d
Hour	h
Minute	min
Second	s



The current selected volume unit and time period will display in the information row. Press **Rate** to cycle through the available time periods. Press **Total** to confirm the selection.

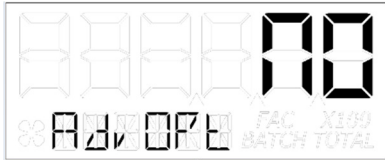
After advancing to the next configuration menu, the time period will be temporarily stored to computer memory. Saving after exiting configuration will permanently store the time period.

OPERATION

CONFIGURATION (Advanced Options)

Advanced Options Menu

This menu is used to access the Advanced Options. Press **[Rate]** to change between “NO” and “YES” selections. Press **[Total]** to confirm selection.



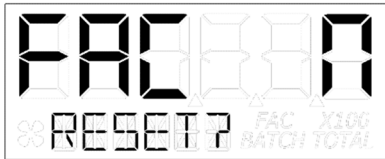
Select “NO” to return to the beginning of Configuration menu



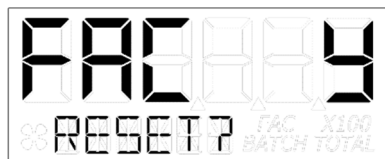
Select “YES” to enter into Advanced Options

Factory Reset Menu

This is the first menu inside of the advanced options menu. The factory reset menu can be used to restore all configuration settings such as but not limited to volume unit, time period, pipe diameter, etc. to their factory defaults. Press **[Rate]** to change between “N” for no and “Y” for yes. Press **[Total]** to confirm the selected option.



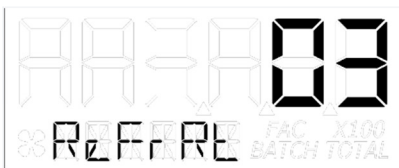
Select “N” to not perform a factory reset



Select “Y” to perform a factory reset

Display Update Rate Menu

This menu allows the update rate of the display for flow rate, velocity, batch total, and accumulative total to be adjusted.



The range of this menu is from 1 to 60 seconds. Although the computer is maintaining constant calculations, the rate that the new information is displayed is controlled by this menu.

“00” may be selected, but that value will represent “01” (1 second).

Press **[Rate]** to increment the focused digit. Press **[Total]** to advance focus to the next digit. Hold **[Total]** and then press and release **[Rate]** to proceed to the next menu.

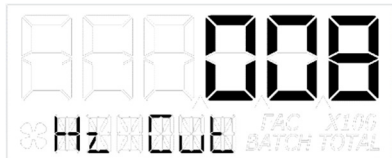
OPERATION

CONFIGURATION (Advanced Options)

Low Frequency Cutoff Menu

This menu allows setting a minimum pulse input frequency to filter out any low frequency input pulses which can be generated when the meter is subject to mechanical vibrations. These vibrations could cause the totalizer to add “phantom” volume to the display totalization values.

The current minimum input frequency will be read from the computer’s memory and displayed on the top row with the left most digit in focus. Increment range is from 0 Hz to 255 Hz.



If 0 is set, the input frequency filtering algorithm will be disabled.

Press **Rate** to increment the focused digit. Press **Total** to advance focus to the next digit.

Hold **Total** and then press and release **Rate** to proceed to the next menu.

Calibration Method Selection Menu

This menu is used to define which calibration method will be used in normal operation. If a calibration method has been previously selected, it will be shown on the display first. The information row of characters will be in focus indicating that the calibration method can be changed. Press **Rate** to move through the various calibration method options, and press **Total** to select the “Calibration Method” that is currently in focus and advance to the next menu.

Factory Calibration: All units are configured with a “factory” calibration. This factory calibration (FAC icon displayed below 6-digit display) is permanently programmed into the computer and is not user adjustable.

NOTE: The factory calibration stored in the unit will never be lost



Factory calibration is the typical use method. Prior to shipping from the factory, the display will be configured and calibrated to the meter body on which it is installed (or going to be installed).

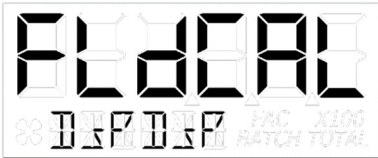
When the user selects this option the “FAC” icon will be “ON” to indicate that the display is using its factory calibration table. This method does not support field calibration.

OPERATION

CONFIGURATION (Advanced Options)

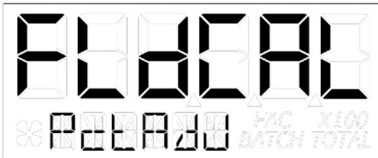
Field Calibration: If one of the following calibration methods is selected (K-Factor Entry, Percent Adjust, or Dispense Display), a calibration process will need to be performed upon exiting configuration mode. See page 25 for more details on using each calibration method.

Dispense/Display is a field calibration method by which the user will dispense a known volume of fluid and the software will keep track of the pulse count during the dispense operation. The user will then enter the known volume into the display and the software will calculate a K-factor for the volume dispensed.



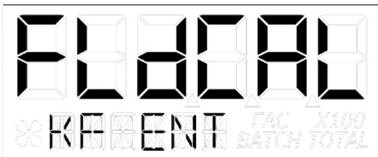
The top row will display “**FldCAL**”.
The information row will display “**DspDsp**”.

Percent Adjust is a field calibration method by which the user will enter a percentage amount to adjust K-factor values in the factory programmed K-factor table. Once the percentage is input by the user, this percentage adjustment to all calculated and displayed values. This method is good for users who simply want to adjust their meter by a percentage amount.



The top row will display “**FldCAL**”.
The information row will display “**PctAdj**”.

K-Factor Entry method is a field calibration method by which the user can input either a single point or multipoint calibration table. 1 to 5 unique K-factor and frequency values can be entered and will be stored in the custom K-factor table in the computer.



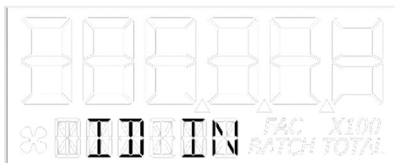
The top row will display “**FldCAL**”.
The information row will display “**KF ENT**”.

OPERATION

CONFIGURATION (Advanced Options)

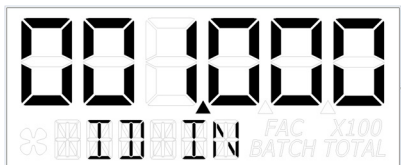
Inner Pipe Diameter Menu

This menu allows a pipe inner diameter (ID) to be entered. This will allow the display to calculate and display the volumetric flow through the meter. The pipe dimension unit can be selected as either inches (IN) or millimeters (mm).



The currently programmed ID measurement unit label will be displayed on the information row as either English (IN) or metric (mm) units. The unit label (IN or mm) will have the focus to indicate that it can be changed.

Press **Rate** to change between inches (IN) and millimeters (mm). Press **Total** to store the selection and allow the user to edit the pipe inner diameter value.



The currently programmed pipe ID numeric value will be displayed. The left most decimal point is in focus to indicate it can be changed.

Press **Rate** to move the decimal point one digit to the right. When the decimal point disappears, indicating an integer value, an additional button press will cycle the focus back to the left most decimal point in a round robin fashion. When the decimal point is in the desired position, press **Total** to lock its location.

The screen then advances focus to the left most numeric value digit to allow the user to edit the pipe ID value. Pipe ID values can be from 0.001 to 999999. The inner pipe diameter entries will be used in the volumetric flow rate calculation during normal operation.

Press **Rate** to increment the digit in focus. Press **Total** to advance focus to the next digit. To advance to the next menu, press and hold **Total** and then press the **Rate** button.

NOTE: Upon entering the next menu, the pipe ID entries will be temporarily stored in the computer. Failure to save your entries on the "save" screen will cause the entries to be discarded.

OPERATION

CONFIGURATION (Advanced Options)

DAUGHTER BOARD MODULES

Scaled Pulse Output K-Factor

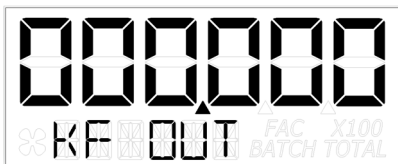
(Requires a Module That Supports Pulse Output)

This screen will only appear if a module that supports pulse output is connected to the Q9 display.

The scaled pulse output K-Factor menu allows the user to enter a K-Factor for the pulse output of the meter.

The currently programmed pulse output K-Factor will be displayed on the top row. The **Total** and **Rate** button presses for this menu for editing the value function the same as the button presses for the Inner Pipe Diameter Menu shown on the previous page.

NOTE: The pulse output K-Factor cannot exceed the input K-Factor. Pulse output can only be scaled down.



When advancing focus to the next menu the software will temporarily store the Scaled Pulse K-factor to the computer.

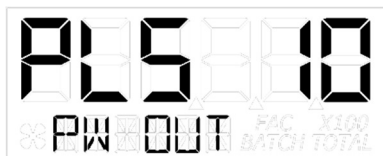
Output Pulse Width

(Requires a Module That Supports Pulse Output)

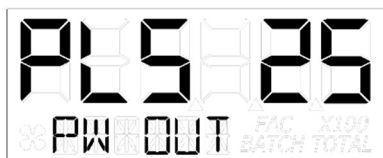
This screen will only appear if a module that supports pulse output is connected to the Q9 display.

If scaled pulse output k-factor is set to 0 on the previous menu, this menu will not be present and the output K-Factor and pulse width will be the same as the input K-Factor and pulse width.

The output pulse width menu allows the user to select the desired width of the output pulse. There are **up to 4** options on this menu. The display will limit the available options based on a combination of the maximum input frequency, input K-Factor, and output K-Factor to not exceed a 50% duty cycle. The **default** option will always be available. Press **Rate** to cycle through the options. Press **Total** to confirm the selection.



Select **“PLS 10”** for an output pulse width of 10 milliseconds.

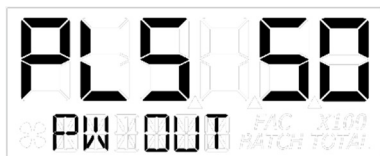


Select **“PLS 25”** for an output pulse width of 25 milliseconds.

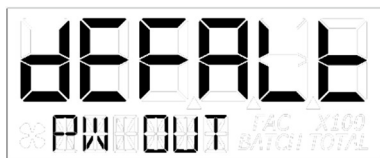
OPERATION

CONFIGURATION (Advanced Options)

DAUGHTER BOARD MODULES



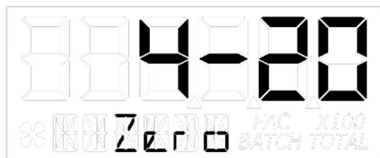
Select “**PLS 50**” for an output pulse width of 50 milliseconds.



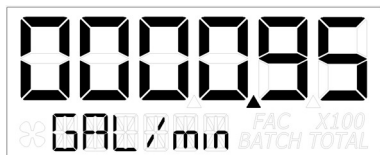
Select “**dEFAULT**” for an output pulse width with a 50% duty cycle.

4-20mA Menu (Requires 4-20mA Daughter Board Module)

This screen will only appear if a 4-20mA daughter board is connected to the Q9 display.

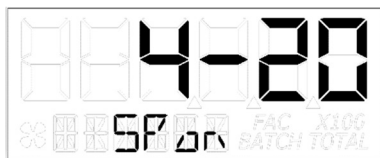


“**Zero**” 4mA Setpoint : This figure will flash for 1 second before allowing the user to change the 4mA or “zero” setting. This setting will already be configured for the minimum flowrate of the meter, when shipped from the factory.

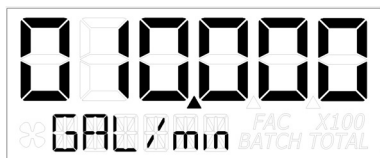


Press **Rate** to cycle the decimal point position.
Press **Total** to lock its location.

The screen then advances focus to the left most numeric digit. Values entered can be from 0.001 to 999999. Press **Rate** to increment the digit in focus. Press **Total** to advance focus to the next digit. To advance to the next menu, press and hold **Total** and then press **Rate**.



“**Span**” 20mA Setpoint: This figure will flash for 1 second before allowing the user to change the 20mA or “span” setting. This setting will already be configured for the maximum flowrate of the meter, when shipped from the factory.



Total and **Rate** presses for this menu function the same as the button presses for the “Zero” 4mA Setpoint description above.

OPERATION

CONFIGURATION (Field Calibration Mode)

Field Calibration Method

General

The field calibration method may be set by the user, and can be changed or modified at any time using a field calibration method described in this section. Totals or flowrate derived from the field calibration are being invoked when the (FAC) icon is no longer visible below the 6-digit display.

Factory calibration settings are programmed into each computer during manufacturing, using Stoddard test solvent or water at 70° F (21° C) depending upon meter body material and pipe diameter.

Settings are correct for light liquids such as water, gasoline or diesel. Readings using the factory calibration (FAC) may not be accurate in some situations, for example, "heavy" liquids such as motor oil, under extreme temperature conditions, non-standard plumbing configurations or with fluids other than mentioned above.

For improved accuracy under such conditions, the computer allows for field calibration, that is, user entry of custom calibration parameters. A "single point" field calibration curve may yield acceptable accuracy when used in a non-standard application; however, the computer is capable of programming a "five point" field calibration curve.

NOTE: If the calibration method is changed when in user configuration mode, i.e., not using the default factory calibration (FAC), the programming will allow the user to adjust the user programmable calibration table for the calibration method selected. This is done by shunting the user to the field calibration method entry menu specific to that calibration method upon exit from the user configuration mode.

Verify Accuracy before Beginning Field Calibration

For the most accurate results, dispense at a flowrate which best simulates your actual operating conditions. Avoid "dribbling" more fluid or repeatedly starting and stopping the flow. This can result in less accurate calibrations. Make sure you meet the meter's minimum flowrate requirements.

The use of a uniformly dependable, accurate calibration container is recommended for the most accurate results. For best results, the meter should be installed and purged of air before field calibration.

Due to high flowrates on meters 2 inch and larger, it is strongly recommended that field calibration be completed with a combination of volume and weight determined with fine resolution scales.

For additional information regarding field calibration methods, scan the QR code on page 4 to view videos showing operation and calibration details for the Q9 display.

OPERATION

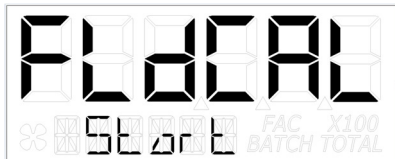
CONFIGURATION (Field Calibration Mode)

Field Calibration Entry Menu

At the beginning of the calibration method entry menu, the software will allow the user to start the calibration process or to exit back to normal operation.

The information row of characters will be in focus to indicate that the user can select between either "Start" or "Exit" by advancing focus. Press **Rate** to change between "Start" & "Exit". Press **Total** to confirm the selection.

NOTE: **Total** must be pressed twice (to verify the end user is "certain" of selection).



If "Start" is selected, the display will advance to the calibration menu for the calibration method that was previously selected.

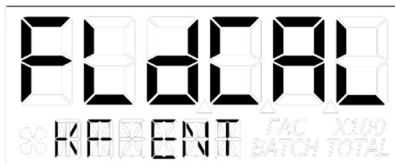


If "Exit" is selected, the "save" screen for the configuration mode will be displayed. Select "yes" to save your entries.

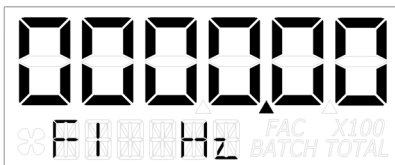
K-Factor Entry

K-Factor entry method is a field calibration method by which the user can input either a single point or multipoint calibration table.

Frequency Input:



1 to 5 unique K-Factor and frequency values can be entered and will be stored in the custom K-factor table in the computer. This will not over write the existing factory calibration table.



The software will read the existing K-Factor table from the computer and will display the first frequency on the top row with the left most character in focus to indicate the user can change the value. Minimum frequency value allowed is 0.25 Hz and the maximum allowable frequency value is 3000.00 Hz. The decimal point for the frequency value is fixed.

Press **Rate** to increment the digit in focus. Press **Total** to advance focus to the next digit.

Once the desired frequency is entered, press and hold **Total**, then press **Rate** to advance to the next screen.

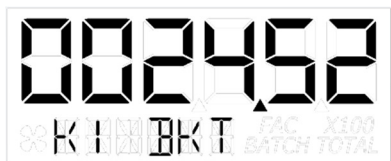
NOTE: Entering all zeros will store the value as the minimum frequency (0.25 Hz).

OPERATION

CONFIGURATION (Field Calibration Mode)

K-Factor Input:

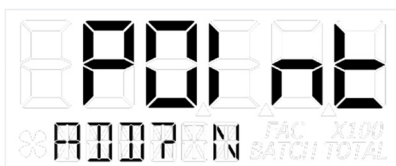
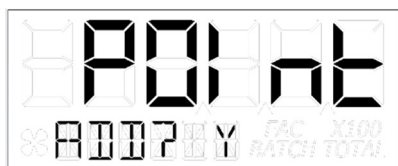
The software will read the existing K-Factor table from the computer and will display the first K-Factor on the top row. The information row displays the K-Factor table entry position (1 through 5) for the volume unit shown.



Press **Rate** to cycle the decimal point position.
Press **Total** to lock its location.

The screen then advances focus to the left most numeric digit. Values entered can be from 0.001 to 999999. Press **Rate** to increment the digit in focus. Press **Total** to advance focus to the next digit. To advance to the next menu, press and hold **Total** and then press **Rate**.

After completing the first table entry of frequency and K-Factor, the display will ask the user if there are additional points to enter. Press **Rate** to change between "Y" (Yes) & "N" (No). Press **Total** to confirm the selection.



If the user chooses YES, the previous screens will repeat for Frequencies 2 – 5 and K-Factors 2 – 5.

NOTE: If the table stops short of 5 points, then only the points entered will be used to define the calibration curve.

If the user chooses NO (or after the fifth table entry of frequency and K-Factor) the software will show the "FLdCAL" Exit screen for one second, and will then exit field calibration mode. The software will temporarily store the K-Factor table values in the computer, and then display the "Save" screen.

NOTE: Failure to save your entries on the "save" screen will cause the entries to be discarded.

NOTE: User input K-Factor entry values will disable the (FAC) icon.

OPERATION

CONFIGURATION (Field Calibration Mode)

Percent Adjust (Correction Factor)

Percent adjust method is a field calibration method by which the user will enter a percentage amount to adjust K-Factor values in the factory programmed K-Factor table. Once the percentage is input by the user, the software will apply this percentage adjustment to all calculated and displayed values.



This will not over write the existing factory calibration table, instead, it applies a calculation to the existing values for use by the computer.

This method is good for users who simply want to adjust their meter by a percentage amount.



The top row left most character will be in focus to indicate the user can change the value. The left most character is the sign of the value. The decimal point is not adjustable. The range for the values are: -99.999% to +99.999%. The software will display the user applied percent adjustment on the top row.

Press **[Rate]** to change between (dash "-") and (underscore "_"). A dash indicates a negative value. An underscore indicates a positive value. Press **[Total]** to select dash "-" (*negative value*) or underscore "_" (*positive value*). The focus will then advance to the left most digit.

NOTE: A selected positive value will show no sign while a negative value will show a solid dash.

Once the left most digit is in focus, press **[Rate]** to increment the digit in focus. Press **[Total]** to advance the focus to the next digit.

When all digits are entered, exit by pressing and holding **[Total]** and then press **[Rate]**.

NOTE: "FLdCAL" will then be displayed on the top row and "Exit" on the information row. The software will temporarily store the adjusted percentage correction, then display the "Save" screen.

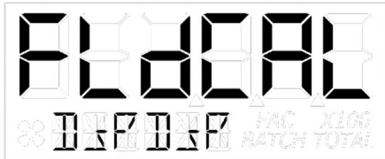
NOTE: Failure to save your entries on the "save" screen will cause the entries to be discarded.

OPERATION

CONFIGURATION (Field Calibration Mode)

Dispense Display

Dispense/Display is a field calibration method by which a known volume of fluid is dispensed and the software will keep track of the pulse count during the dispense operation. The user will then enter the known volume into the display and the software will calculate a K-Factor for the volume dispensed.



The software will allow the user to dispense a known volume in order to create a custom K-Factor. This will not over write the existing factory calibration table.



The first screen in this calibration method will show "run" indicating that the computer is waiting for flow to start. Pressing any single button while on this screen will not have any effect. Press and hold **Total** first and immediately press and hold **Rate**, holding both buttons down for 3 seconds, to exit the calibration mode.



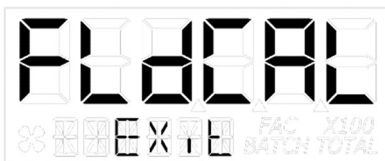
Begin dispensing into a container of known accurate volume. As soon as pulses are detected by the software, the screen will change to display the volume being dispensed on the top row and the volume unit on the information row.

NOTE: The user is permitted approximately 10 minutes to dispense fluid into the container. Dispensing fluid longer than 10 minutes will prompt a configuration mode exit, and any configuration mode edits/changes the user made will **NOT BE SAVED**.

When the user is finished with the run, the known volume of liquid must be entered. Press and hold **Total** until the left most digit begins to flash indicating it is in focus, then release **Total**. Press **Rate** to increment the digit in focus. Press **Total** to advance focus to the next digit. Once the known volume has been entered, press and hold **Total** and then press **Rate** to advance focus to the next menu.

NOTE: Advancing focus to the next menu will lock in the entered volume.

The software will then calculate the K-Factor for the volume entered based on the pulse count for the run and the volume entered. The average frequency and the K-Factor will be entered into the custom user K-Factor table for "run".



"FldCAL" will then be displayed on the top row and "Exit" on the information row. The software will temporarily store the sorted table of frequencies and K-Factors, then display the "Save" screen.

NOTE: Failure to save your entries on the "save" screen will cause the entries to be discarded.

TROUBLESHOOTING

Symptom	Probable Cause	Corrective Action
A. INACCURATE TOTALS / FLOWRATE.	1. Field Calibration not performed properly. 2. Factory Calibration not suitable for liquid being measured. 3. Meter operated below minimum flowrate. 4. Meter partially clogged with dried liquid. 5. Turbine bearings partially clogged with dried liquid. 6. Sealant material wrapped around meter rotor. 7. Meter installed too close to fittings. 8. Meter installed too close to motors or electrically "noisy" environment.	Field calibrate again or select Factory Calibration. Perform a Field Calibration according to Field Calibration Section. Increase flowrate. Remove meter. Clean carefully. Make sure rotor spins freely. Remove meter. Clean carefully. Make sure rotor spins freely. If applicable, remove rotor. Make sure rotor spins freely. Install correctly. Install correctly.
B. BUTTON NOT WORKING.	1. Button plunger not fully pressed. 2. Button only operates upon release. 3. Assembly issue. 4. Configuration issue.	Ensure finger covers entire button. Release button to see display change. Contact the factory. Contact the factory.
C. "BA0.000" IS DISPLAYED.	1. Configuration issue.	a. Reset Batch and Accumulative Totals. b. Performing a Field Calibration may allow desired performance. c. Contact the factory.
D. WEIRD CHARACTERS ON SCREEN.	1. Assembly issue. 2. Bad LCD.	Contact the factory. Contact the factory.
E. DISPLAY IS FADED OR BLANK.	1. Batteries weak, dead, or not connected. 2. Ambient temperature is too cold. 3. Computer defective.	Remove display. Check and replace batteries. Place bare hand or warmer on display for temporary readability. Contact the factory.

TROUBLESHOOTING (continued)

Symptom	Probable Cause	Corrective Action
F. ENTIRE SCREEN "BLUISH".	1. Ambient / fluid temperature is reaching upper heat limits.	If readable, display is fine. If a nuisance, consider Remote Display kit options.
G. NO FLOW ON SCREEN WHEN FLUID IS MOVING IN PIPE.	1. Field Calibration not performed correctly. 2. Rotor stuck or damaged. 3. Sealant material wrapped around rotor. 4. Computer defective.	Field calibrate again or select Factory Calibration. Remove meter. Make sure rotor spins freely. Remove meter. Make sure rotor spins freely. Contact the factory.
H. EXCESSIVE FLOW ON SCREEN WHEN FLUID IS NOT MOVING IN PIPE.	1. Electro-Magnetic Interference (EMI) – Too close to motor or other electrically "noisy" equipment.	Move installation point of meter away from EMI sources.
I. PROBLEMS GETTING INTO FIELD CALIBRATION MODE.	1. Wrong button sequence.	Proceed with calibration using Field Calibration Section instructions that are included in this manual.
J. PROBLEMS NAVIGATING "DIAGNOSTIC MODE", "CONFIGURATION MODE", OR "NORMAL OPERATION MODE".	1. See this owner's manual Table of Contents for page number information for each specific "Mode" Section.	See specific "Mode" Section that is included in this owner's manual.

Declaration of Conformity

We declare, that the product:

Product Name:	Electronic Digital Meter
Model Numbers:	03*****
	A1*****
	A2*****
	G2*****9***
	G2*****Q1***

Model numbers include all combinations of an alpha-numeric series as illustrated above.

Conforms with the requirements of the Directives/Regulations below by compliance with the Standards subsequently listed:

1. Council Directive 2014/30/EU and UK Regulation 2016 relating to Electro-Magnetic Compatibility.
EN 61000-6-2:2005 S.I. 2016:1091
EN 61000-6-3:2007/A1:2011
2. Council Directive 2014/34/EU and UK Regulation 2016 relating to equipment or protective systems intended for use in potentially explosive atmospheres.
EN 60079-0:2018 S.I. 2016:1107
EN 60079-11:2012
EN 60529+A1:2000
3. Council Directive 2011/65/EU and 2015/863 as amended (RoHS Directive), EN IEC 63000:2018 and UK Regulation 2012 relating to the restriction of certain hazardous substances in electrical and electronic equipment.

Supplementary Information:

- This product meets an (Ingress Protection) IP65 rating.
- This product has insufficient internal volume size or pressure ratings to meet a pressure directive.
- This product is not recommended for custody transfer or application where levying by consumption takes place.

I the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Signature:



Full Name:

Victor Lukic

Position:

President

Place:

Great Plains Industries, Inc.
Wichita, KS USA
September 2022

Notified Body: FM Approvals Europe Ltd.
One Georges Quay Plaza
Dublin, Ireland D02 E440

Identification No: 2809

EC-Type Examination Certificate No: FM13ATEX0016X

UK-Type Examination Certificate No: FM22UKEX0117X



Wichita · Sydney



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FLOMEC® TWO-YEAR LIMITED WARRANTY

Great Plains Industries, Inc. 5252 E. 36th Street North, Wichita, KS USA 67220-3205, hereby provides a limited warranty against defects in material and workmanship on all products manufactured by Great Plains Industries, Inc. This product includes a 2-year warranty. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. The warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of manufacture or on the date of purchase with an original sales receipt. This warranty shall not apply if:

- A. the product has been altered or modified outside the warrantor's duly appointed representative;
- B. the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, or for technical assistance or repair, contact your FLOMEC distributor or contact FLOMEC at one of the locations below.

In North or South America contact

Great Plains Industries, Inc.
5252 East 36th St. North
Wichita, KS 67220-3205
USA

888-996-3837

www.flomecmeters.com
(North America)

Outside North or South America contact

GPI Australia
(Trimec Industries Pty. Ltd.)
12/7-11 Parraweena Road
Caringbah NSW 2229
Australia

+61 02 9540 4433

www.flomec.com.au

The company will step you through a product troubleshooting process to determine appropriate corrective actions.

GREAT PLAINS INDUSTRIES, INC., EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.

NOTE: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT – Part 702 (governs the resale availability of the warranty terms).

Wichita / Sydney

GREAT PLAINS INDUSTRIES



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