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INSIGHT

DIGITAL FLOWMETER MODEL DFA400

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INTRODUCTION

Overview

The digital flowmeter has a 4-digit LED display with daylight bright digits 0.56 inch high. The meter electronics are self-contained and all program features are accessed via pushbutton switches on the front of the display module.

The flowmeter communicates with other display modules over a datalink. This technology allows for remote displays, the display of flow rate through multiple discharges (summing), and the totalization of flow for multiple discharges (accumulation). Flow rate information is provided by a paddlewheel type flow sensor mounted in the discharge. This information is processed and shown on the digital display.

There are two operator-selectable modes; display module identification and program access. In the display module identification mode, the digital display shows the module serial number, manufactured date, software revision, module function, and ID number. In the program access mode the display shows program options and operator input selections. Operator-selected modes are accessed and selections are made using two pushbutton switches on the front of the display module.

All controls and indicators are located on the front of the display module. Controls are simple pushbuttons.

Features

High and Low Flow Warnings

LED Display Brightness Automatically Adjusts for Day/Night Viewing

Datalink Interface for Primary/Remote Operation

Multiple Flow Rate Calibration Points

Specifications

Display Module

Supply Voltage:	9 to 30 VDC
Current:	1.5 Amps Maximum
Dimensions:	
Height	3 1/4"
Width	3 1/4"
Depth	2"

Flow Sensor

Model Number:	XE-MF15P
Type:	Paddlewheel
Sensor Material:	Acetal (Delrin) with Stainless Steel (316) Shaft
Excitation Voltage:	5 VDC

GENERAL DESCRIPTION

Components

The flowmeter kit consists of the following components:

Display Module

Paddlewheel Flow Sensor and Mounting Assembly

Cables

Display Module

The display module is waterproof and has dimensions less than 3 1/4 inches high by 3 1/4 inches wide by 2 inches deep. All controls and indicators are located on the front of the display module. (Refer to Controls and Indicators.)

Paddlewheel Flow Sensor

The flow sensor provides an input signal to the display module proportional to discharge flow rate. It is mounted in the discharge piping. Placement of the sensor in the piping is critical to obtain accurate flow rate information. Refer to Installation Section for detailed information on mounting locations. The electrical connector is waterproof and molded into the flow sensor housing.

Cables

A standard cable is provided. (Refer to Wiring Section.)

Controls and Indicators

All controls and indicators are located on the front of the display module. (Refer to Figure 1.)

Display

During normal operation the 4-digit LED display indicates flow rate. When the display module identification or program access modes are selected, module specific information, program codes, and settings are displayed. (Refer to Programming Section for more information.)

MODE Button

The MODE button accesses the display module identification mode. It is used with the TOTAL button to input data when in the program access mode. (Refer to Programming Section for more information.)

TOTAL x 100 LED

This red LED is on to indicate that the display indicates total accumulated flow and the value shown in the display is times 100.

TOTAL Button

The TOTAL button allows the operator to display total flow for a discharge. When the button is pressed, the value shown in the digital display, times 100, is the total flow. It is used with the MODE button to input data when in the program access mode. (Refer to Programming Section for more information.)

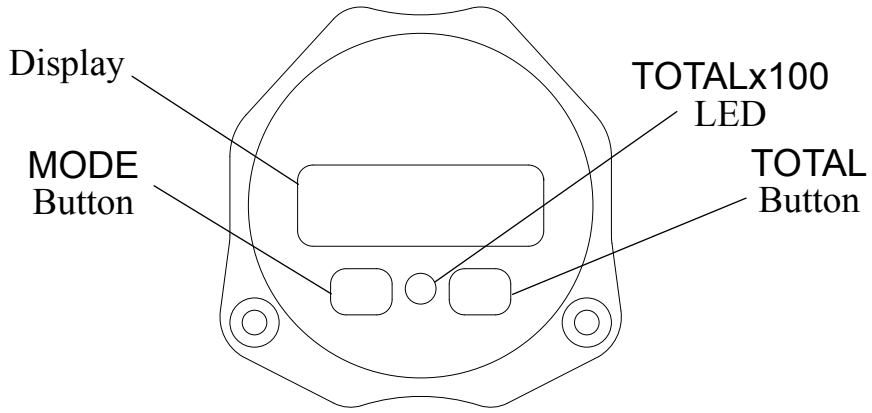

Figure 1. Controls and Indicators

INSTALLATION

Note: Plumbing systems are always unique and may cause small deviations in the factory calibration. It is recommended that the flowmeter is checked after installation for accuracy and calibrated when necessary.

Install Display Module

Display modules are interchangeable. It is recommended to check display accuracy if modules are swapped and calibrated when necessary.

1. Measure and mark mounting location for display module panel cutout and mounting screw holes. Make sure there is clearance behind the panel for the display and cables before cutting holes. Refer to Figure 2 for layout and dimensions.
2. Cut out a 2 3/4 inch diameter hole and drill two holes (clearance or tapped) for 10-32 mounting screws.
3. Place display module in position and secure with two screws.
4. Connect the cables and wires. (Refer to Wiring Section.)

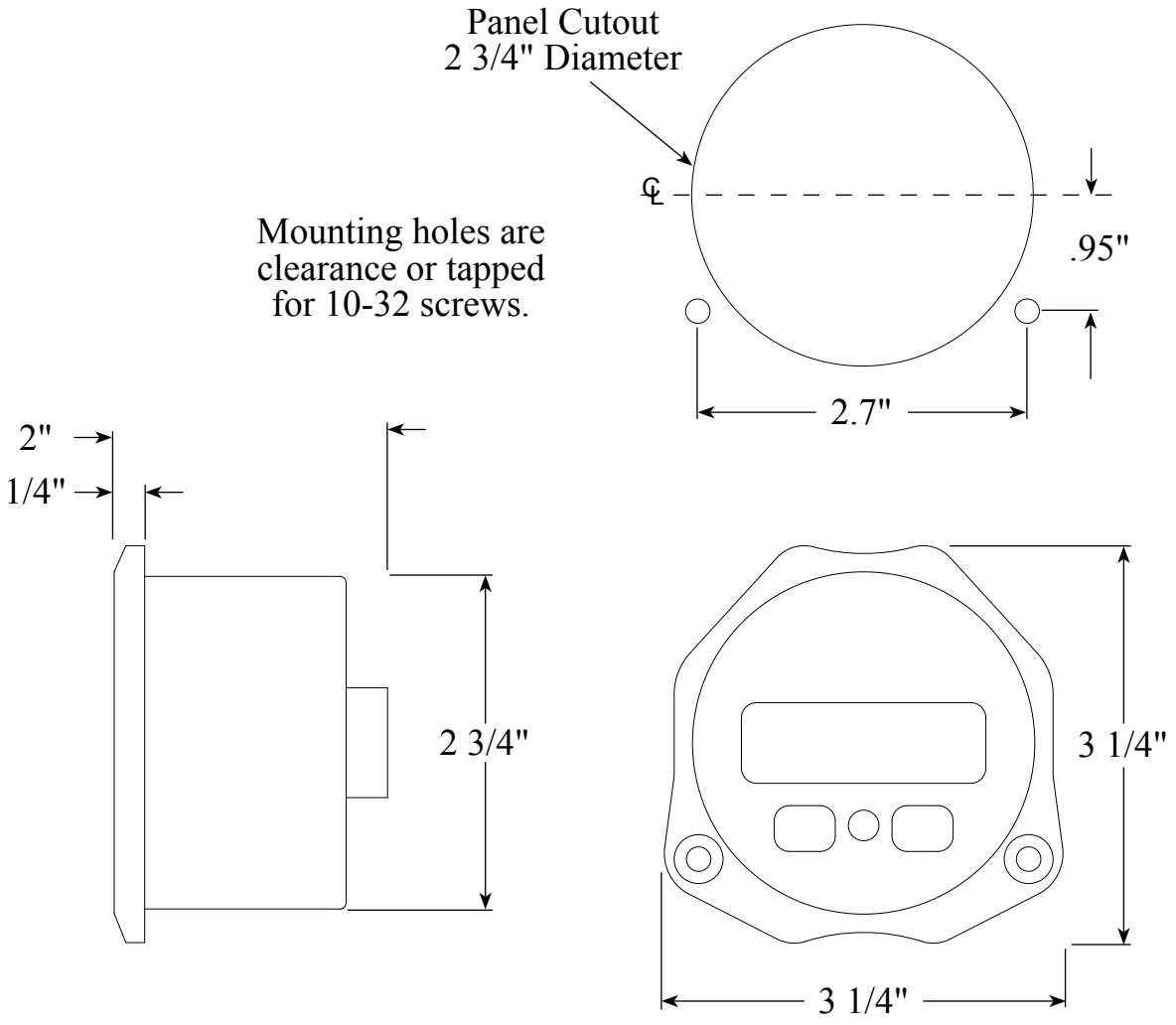

Figure 2. Display Module Mounting Dimensions

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Install Flow Sensor

There are several ways to install paddlewheel type flow sensors. Mounting options include saddle clamps, weldments, pipe tees, and special adapters. Each mount meets a particular plumbing requirement.

Flow sensors are interchangeable. It is recommended to check display accuracy if sensors are swapped and calibrated when necessary.

The maximum flow sensor pressure is 600 PSI.

Flow Sensor Location

Locating the flow sensor in the plumbing system is critical. The flow of water at and around the sensor must be laminar, or smooth, to ensure accurate flow rate measurement. There must be enough straight pipe before the flow sensor for the water stream to stabilize into a uniform flow. Guidelines for selecting flow sensor locations are outlined in Figure 3.

Turbulent Water

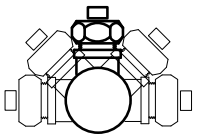
When the flow sensor is mounted after an area in the plumbing with increased water stream turbulence (e.g. a valve, increase in pipe diameter, etc.), stabilizing the flow is critical. Steps should be taken to stabilize the flow. When a pipe is reduced in diameter, the water stream tends to be squeezed into a more uniform flow. This can help stabilize flow when there is not sufficient straight pipe up stream.

Linearizer Feature

This meter features a Linearizer function in the calibration programming. This function should be used when the flow sensor is installed in a plumbing location where flow is not linear. It corrects for nonlinear flow by calibrating the display at multiple flow rates (up to 9). This provides more accurate flow rate readings. (Refer to Calibration Section.)

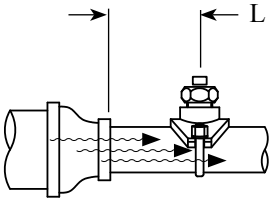
Flow Sensor Location Guide

The preferred location for mounting a flow sensor is on the top half of the pipe. The best orientation is vertical. If the sensor is mounted on the bottom of the pipe, it may be susceptible to dirt accumulation impacting operation.



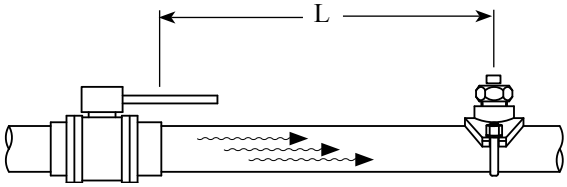
Best Orientation
is Vertical

When mounting a sensor after the pipe diameter is reduced, length L must be at least 2 times the pipe diameter.



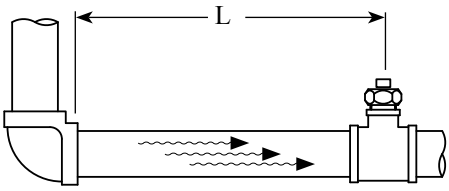
After Reduction
L > 2 X PIPE DIA.

When mounting a sensor after a valve, length L must be at least 14 times the pipe diameter.



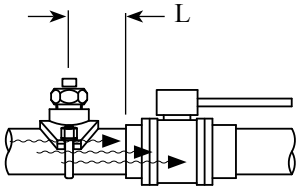
After Valve
L > 14 X PIPE DIA.

When mounting a sensor after an elbow, length L must be at least 6 times the pipe diameter.



After Elbow
L > 6 X PIPE DIA.

When mounting a sensor before a valve or an elbow, length L must be at least equal to the pipe diameter.



Before Valve or Elbow
L > 1 X PIPE DIA.

Figure 3. Flow Sensor Location Guide

Saddle Clamp Installation

Note: Ensure that the mounting location meets the requirements for uniform water flow. (Refer to Flow Sensor Location Guide.)

Note: Ensure that there is enough room for the saddle clamp, sensor, and connector to fit. (Refer to Figure 4.)

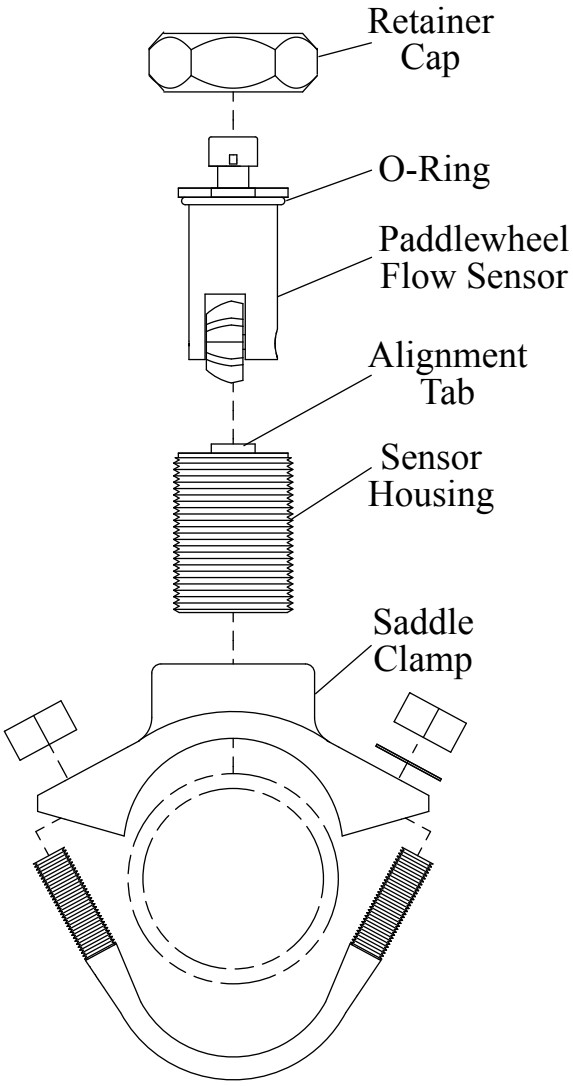
1. Drill and deburr a 1 11/16" to 1 3/4" diameter hole at mounting location.
2. Clean pipe surface in area where saddle clamp gasket seals.

Note: The sensor housing is epoxied in the saddle clamp with the alignment tab in the correct position. It is not meant to be removed.

3. Place saddle clamp over hole with sensor housing centered.
4. Tighten saddle clamp nuts until gasket makes a tight seal.
5. Insert flow sensor into sensor housing. Align flat spot on sensor rim with alignment tab and make sure O-ring is in groove.

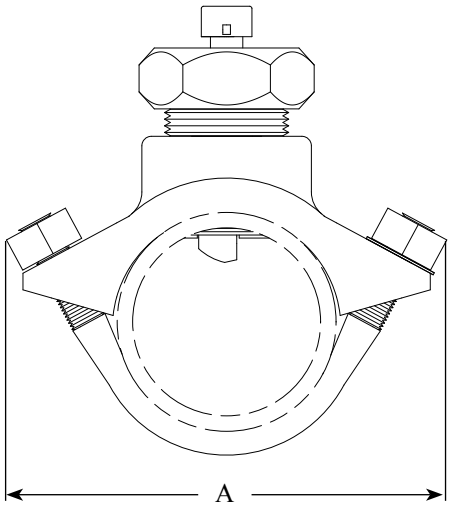
Note: The retainer cap is hand-tightened. There is an inside lip that stops the cap from turning when it makes contact with the alignment tab. This provides the correct pressure to make the seal at the O-ring. Make sure the flow sensor engages the alignment tab and does not rotate.

6. Install retainer cap and hand-tighten.
7. Connect cable from display module to flow sensor (cable is color coded blue). (Refer to Wiring Section.)



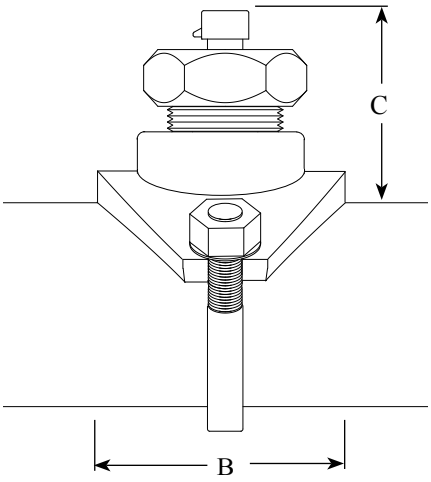
Note: When the retainer cap is tightened make sure the flow sensor engages the alignment tab and does not rotate.

Note: Allow a minimum of 2 inches clearance above the sensor for connector removal/ installation.



Pipe Size (Sch 40)	Dimensions A	B	C
2	5.5	3.9	2.9
2.5	5.5	3.9	2.8
3	5.9	3.9	2.8
3.5	6.8	4.3	2.8
4	6.8	4.3	2.8
5	8	4.3	2.8

Measurements are in inches.



Note: Dimensions are typical and are an aid to determine flow sensor mounting locations.

Figure 4. Saddle Clamp Installation

Weldment Installation

Note: Ensure that the mounting location meets the requirements for uniform water flow. (Refer to Flow Sensor Location Guide.)

Note: Ensure that there is enough room for the weldment, sensor, and connector to fit. (Refer to Figure 5.)

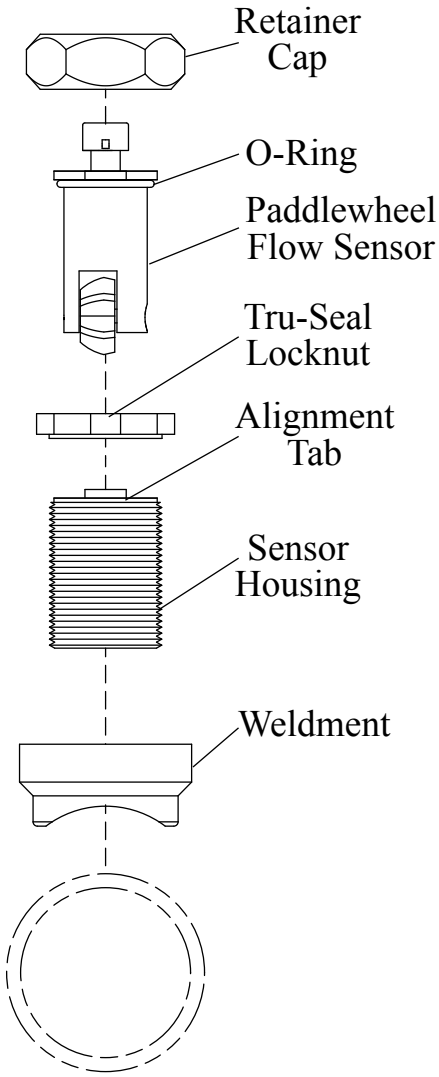
1. Drill and deburr a 1 11/16" to 1 3/4" diameter hole at mounting location.
2. Center weldment mount over hole and weld it to pipe. The weld must be continuous around the fitting with no gaps or voids.
3. Screw sensor housing into weldment far enough to make sure it goes through the pipe freely, then back it out.

Note: The paddlewheel sensor must be correctly aligned in the water stream. The alignment tab is used to set the sensor position. Make sure the alignment tab is centered on the pipe center line. (Refer to Figure 5.)

4. Set sensor housing to dimension A in Figure 5. Make sure alignment tab is centered on the pipe as shown (it can be on upstream or downstream side).
5. Install Tru-Seal locknut and tighten with 2" wrench using light to medium torque. Make sure the sensor housing alignment tab remains centered and the sensor housing does not rotate causing dimension A to change.
6. Insert flow sensor into sensor housing. Align flat spot on sensor rim with alignment tab and make sure O-ring is in groove.

Note: The retainer cap is hand-tightened. There is an inside lip that stops the cap from turning when it makes contact with the alignment tab. This provides the correct pressure to make the seal at the O-ring. Make sure the flow sensor engages the alignment tab and does not rotate.

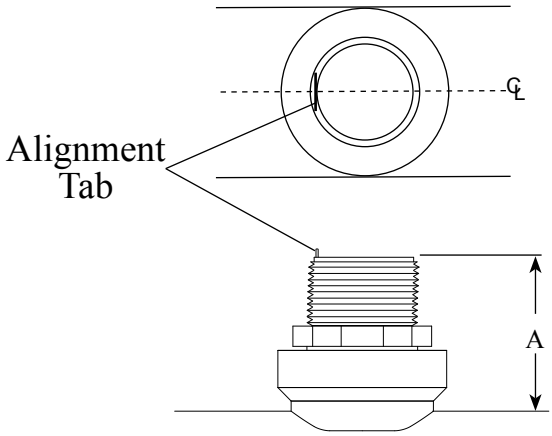
7. Install retainer cap and hand-tighten.
8. Connect cable from display module to flow sensor (cable is color coded blue). (Refer to Wiring Section.)



Pipe Size (Sch 40)	Dimension A
1.5	1.95 to 1.80
2	1.95 to 1.80
2.5	1.90 to 1.75
3	1.88 to 1.73
3.5	1.88 to 1.73
4	1.85 to 1.70
5	1.85 to 1.70

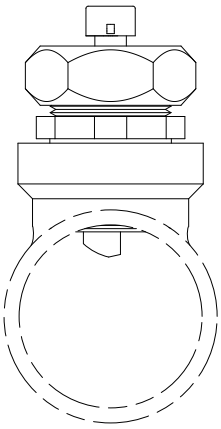
Measurements are in inches.

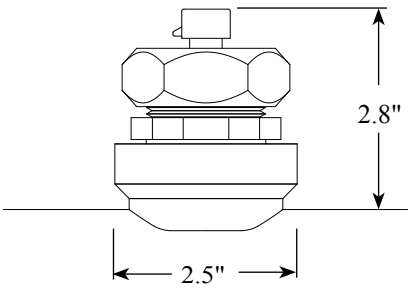
Make sure that the alignment tab is centered on the pipe center line.



Note: Allow a minimum of 2 inches clearance above the sensor for connector removal/installation.

Note: When the retainer cap is tightened make sure the flow sensor engages the alignment tab and does not rotate.





Note: Dimensions are typical and are an aid to determine flow sensor mounting locations.

Figure 5. Weldment Installation

OPERATION

On power-up the flowmeter is in normal operating mode. Information from a paddlewheel type flow sensor or from the datalink interface is processed and displayed. When a display is set as a remote, it receives all pressure and flow information via the datalink.

Datalink Interface

The datalink interface is standard on all flowmeters and provides a way of connecting multiple display modules on a shared data bus. The DFA400 (digital flowmeter), FPA400 (pressure/flow indicator), and FPA500 (pressure/flow indicator) series display modules can operate as independent displays or interconnected to provide remote displays, the display of flow rate through multiple discharges (summing), and the totalization of flow for multiple discharges (accumulation).

Primary Display Module

Primary displays are programmed with the module function Pri. A primary display receives inputs from the pressure sensor and flow sensor. When programmed with Id 0, no information is output to the datalink. When programmed with Id 1 to Id 99, it provides information (via the datalink) to remote, summing, and accumulator displays.

Remote Display Module

Remote displays are programmed with the module function SLA (slaved to a primary). A remote display must be programmed with the same ID number as the primary display. It receives flow rate from the primary display over the datalink. All remote display features are programmed independently of the primary display. No calibration is necessary on a remote display.

Summing Display Module

Summing displays are programmed with the module function SU. A summing display shows the actual flow rate for all primary displays on the datalink except for those with Id 0.

Accumulator Display Module

Accumulator displays are programmed with the module function ACC. An accumulator display shows the total accumulated flow for all primary displays on the datalink except for those with Id 0. The value shown is times 100.

Note: A single display module can be used for both summing and accumulation functions. When program it as a summing display, pressing the TOTAL button shows total accumulated flow for all primary displays on the datalink.

Program Features

See Programming Section for more detailed information.

High and Low Flow Warning (Codes 315 and 316)

When the flow rate is above the programmed high flow value, a flashing -HI- is shown in the digital display. When the flow rate is below the programmed low flow value, a flashing -LO- is shown in the digital display.

Flow Cutoff (Codes 318 or 319)

The digital display indicates 0 when the flow rate is below the programmed flow cutoff value.

TOTAL Button

The TOTAL button performs two functions, display total flow for a discharge or reset the totalized flow value to 0 (if totalizer reset function is set to YES).

Display Total Flow

When the TOTAL button is pressed and released the digital display shows the total accumulated flow and the TOTALx100 LED is on. (The value shown is times 100.)

Press and release the TOTAL button again to show normal flow rate.

Reset Total Flow to 0

The totalizer reset (code 317) has two program settings, YES or no. (Refer to Programming Section). To enable the reset function the program totalizer reset is set to YES.

Total flow resets and starts from 0 when power is applied to the control module. Flow total is reset to 0 during operations by displaying the total flow and then pressing and holding the TOTAL button until the display shows 0.

PROGRAMMING

The program access mode is selected and inputs are made using the two pushbutton switches on the front of the display module. The digital display shows stored data and operator inputs. (Refer to Figure 1.)

Note: When entering codes in the program access mode there is a time-out feature that requires an operator input every three seconds. If an input is not detected within five seconds the program returns to normal operation.

Inputs

The two pushbutton switches on the front of the display module allows the operator access to stored data and program functions.

Both the MODE and TOTAL buttons are used to enter program codes.

Once a program code is entered, the MODE button selects the digit to change and the TOTAL button changes the digit or option choice.

Display Module Identification Mode

When in the module identification mode, the digital display shows the module serial number, manufactured date, software revision, function code, and ID number. The module identification mode is a display-only mode and no changes can be made to program information.

Note: There is a time-out feature that returns the program to normal operation in five seconds if input is not detected.

Select Display Module Identification Mode

Turn on power. Press and hold the MODE button, then press the TOTAL button and release both. The program enters the display module identification mode and the display shows the module serial number. Press the MODE button a second time and the display shows the manufacturing date. Each time the MODE button is pressed the display shows the next block of stored identification data.

If the button is not pressed for five seconds the program reverts to normal operation.

Program Access Mode

To gain access to the program features a three-digit program code must be entered. Review the Program Code Descriptions or refer to Table 1. Program Code Quick Reference for the proper three-digit code.

Note: There is a time-out feature that returns the program to normal operation in five seconds if input is not detected.

Select Program Access Mode

Turn on power. Press the MODE button and hold it until the display shows four dashes. The program is ready for a three-digit program code to be entered.

Enter Program Code

Note: There is a time-out feature that returns the program to normal operation in five seconds if input is not detected.

1. Select the Program Access Mode (four dashes are shown in the display).
2. Press the MODE button. The number 100 shows in the display with the first digit (1) flashing. Each time the MODE button is pressed the number increments by 1. Set the first digit to the desired number.
3. Press the TOTAL button. The second digit flashes. Each time the TOTAL button is pressed the number increments by 1. Set the second digit to the desired number.
4. Press the MODE button. The third digit flashes. Each time the MODE button is pressed the number increments by 1. Set the third digit to the desired number.

When a valid three-digit program code is entered, a program value or an option shows in the display. If an invalid code is entered an error code shows in the display.

Note: When a valid code has been entered and a program value or an option shows in the display, the time-out feature is disabled.

Change Values or Options

Press the MODE button to select the digit to be change. The digit flashes. Press the TOTAL button to change the digit or the option choice.

Exit Program Access Mode

Press and hold the MODE button and then press the TOTAL button and hold them until the display shows four dashes. Release the buttons and enter a new code, or after five seconds the program times out and returns to normal operation.

Table 1. Program Code Quick Reference

CODE	FEATURE	OPTION
311	Flow Rate Increment Set Point	0000 to 9999
312	ID Number	0 to 99
313	Module Function	Pri, SLA, ACC, SU (Refer to Note for ACC and SU)
315	High Flow Warning	0001 to 9999 0 = Disabled
316	Low Flow Warning	0001 to 9999 0 = Disabled
317	Totalizer Reset	Yes = Resets to 0 at Power On No = Stores Total Flow at Power Off
318*	Flow Cutoff (Frequency)	0 to 99.9 Hz
319*	Flow Cutoff (Flow Rate)	0 to 999
321	Flow Calibration (Single Point)	1 Calibration Point
322	Flow Calibration (Multiple Point)	9 Calibration Points
340	CAN Terminator	On, Off
E202	Invalid Program Code Entered	Re-Enter Code
E204	No Flow Sensor Signal	Check Water Flow and Wiring
E206	Invalid Calibration Point	Select Different Calibration Point
E208	Memory Failure	Contact Factory
E210	Exceeded Maximum Calibration Points	Exit Calibration Procedure

Notes:

- Refer to Program Code Descriptions for detailed information.
- The time-out feature returns the program to normal operation in five seconds if input is not detected.
- When a valid code has been entered and a programed value or option is shown in the display, the time-out feature is disabled.

* Code 318 is valid when the code 319 is set to 0. When a value is set for code 319, code 318 is ignored.

Summing and Accumulator Mode Note

Using Code 319 Cut-off for Summing and Accumulator Modes:

When the flowmeter is used in summing or accumulator mode, a flow cutoff may be set for each summed valve controller or flowmeter (up to 20 devices). This permits compensation for differences in turbulence in different pipe sizes. The values entered with Code 319 in the summing module should match the cutoff value set in each valve controller or flowmeter with the corresponding ID number.

Note: The default value from the factory for flow cutoff is 10 GPM for all IDs.

1. Enter program code 319.

   Result: The display toggles between the ID number and the cutoff value for that ID.

2. Press and release the MODE button to increase the ID to the next higher value. Press and hold the MODE button to automatically step though subsequent ID numbers.

   The display alternates between the ID number and the cutoff value.

3. Press the TOTAL button and adjust the displayed flow cutoff rate:

   The MODE button selects the digit to change. The digit will flash.

   The TOTAL button changes the value of the flashing digit.

4. Press and hold the MODE button then press the TOTAL button, the next ID is displayed.

5. When all cutoff values have been entered, press and hold the MODE button and then press the TOTAL button to exit programming mode and return to normal operation.

Program Code Descriptions

When a valid three-digit program code has been entered, a program value or option shows in the display. The MODE and TOTAL buttons are used change the data.

Press the MODE button to select the digit to be change. The digit flashes. Press the TOTAL button to change the digit or the option choice.

Code 311 Flow Rate Increment Set Point

Factory programmed value: 400

Options: 0000 to 9999

This code sets where the digital display changes from increments of 1 to increments of 10. The display values increment by 1 at flow rates below the set point and by 10 at flow rates above the set point. This code does not impact flow warnings, flow cutoff settings, or flow rate display when in the calibration program.

Code 312 ID Number

Factory programmed value: Id 0

Options: 0 to 99

This code sets the datalink identification (ID) number for the display module. The display is programmed with an ID number between 0 and 99. When a display module is programmed with Id 0 no data is output to the datalink. The ID number assigned to a remote display must match the ID number of the primary display. The ID number for a summing or accumulator display is not used.

Code 313 Module Function

Factory programmed value: Pri

Options: Pri, SLA, SU, ACC

This code sets the datalink function of the display module. Four program choices are available. Pri (primary) sets the module as a primary display. The display module must be programmed as primary to interpret flow sensor information. SLA (slaved) sets the module as a remote display. SU (summing) shows the actual flow rate and ACC (accumulator) shows the total accumulated flow for all primary displays on the datalink except for those with Id 0.

Code 315 High Flow Warning

Factory programmed value: 0 (High flow warning is disabled.)

Options: 0001 to 9999

This code sets the high flow warning. When the flow rate is above the high flow warning programmed value, the flow display alternately flashes the flow rate and -HI-.

Code 316 Low Flow Warning

Factory programmed value: 0 (Low flow warning is disabled.)

Options: 0001 to 9999

This code sets the low flow warning. When the flow rate is below the low flow warning programmed value, the flow display alternately flashes between the flow rate and -LO- .

Code 317 Totalizer Reset

Factory programmed value: YES

Options: YES, no

This code toggles the flow totalizer reset function on and off. The totalizer reset function has two program settings; YES and no. For the reset function to work the totalizer reset is set to YES. Flow total is reset and starts from 0 when power is applied. Flow total is reset to 0 when the TOTAL button is pressed and held. When the totalizer reset is set to no, the flow total continues to accumulate and does not reset to 0 even when power is removed.

Code 318 Flow Cutoff (Frequency)

Factory programmed value: C 3.0

Options: 0 to 99.9 Hz

This code sets a cutoff frequency for the flow sensor. There is always some turbulence in the pipe that could cause the flow sensor to turn when the discharge is closed. This can cause the display to show a flow rate when there is no flow. The frequency cutoff is set so that the display shows 0 flow when the flow sensor signal is below the programmed value.

Note: Code 318 is valid when the code 319 is set to 0. When a value is set for code 319, code 318 is ignored.

Code 319 Flow Cutoff (Flow Rate)

Factory programmed value: F 0

Options: 0 to 999

This code sets a cutoff flow rate for the flow sensor. There is always some turbulence in the pipe that could cause the flow sensor to turn when the discharge is closed. This can cause the display to show a flow rate when there is no flow. The flow rate cutoff is set so that the flow display shows 0 flow when the flow sensor signal is below the programmed value.

When the flowmeter is used in summing or accumulator mode, a flow cutoff may be set for each summed valve controller or flowmeter (up to 20 devices). Refer to Summing and Accumulator Mode Note.

Code 321 Flow Calibration (Single Point)

Factory programmed value: Precalibrated to Pipe Size

Options: 1 Calibration Point

This code starts the calibration program for a single flow rate.

Refer to Calibration Section.

Code 322 Flow Calibration (Multiple Point)

Factory programmed value: No Values Entered

Options: 9 Calibration Points

This code starts the calibration program for multiple flow rates. This function is used when the flow sensor is installed in a difficult plumbing location where flow is not linear. It corrects for nonlinear flow to provide an accurate flow rate display.

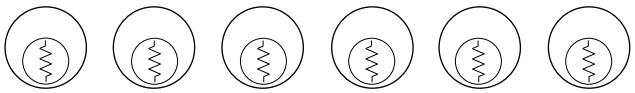
Refer to Calibration Section.

Code 340 CAN Terminator

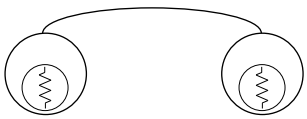
Factory programmed value: On

Options: On, Off

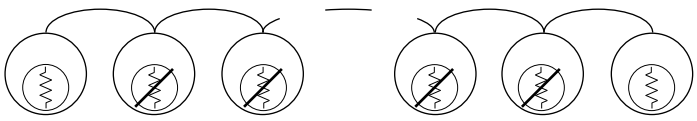
This code sets the datalink terminating resistor for the module. When the datalink is not used all module terminating resistors are set to On. When the datalink is daisy-chained between two modules, the terminating resistors are set to On. When the datalink is daisy-chained between multiple modules, only the two modules on the end of the chain have the terminating resistor set to On. All other modules need the terminating resistors set to Off.



No Datalink Daisy-Chain
Terminator Resistors On



With a Datalink Daisy-Chain
Primary-to-Remote Only
Terminator Resistors On
Each Module is at the End of the Chain



With a Datalink Daisy-Chain
More Than Two Modules
Terminator Resistors Off Except for the Two
Modules at Each End of the Chain

Error Code E202

An invalid program code has been entered. Re-enter the program code when the digital display resets.

Error Code E204

There is no signal from the sensor. This code is displayed only when in a calibration program. Troubleshoot the sensor and the associated wiring.

Error Code E206

A selected calibration point is to close to the previous point. (There is less than 5% difference between two calibration points.) Select a different point to continue with the calibration procedure.

Error Code E208

There is a failure with the internal memory of the module. Contact factory if this error code is displayed.

Error Code E210

The number of available calibration points have been exceeded. Exit the calibration program.

Exit Program Access Mode

Press and hold the MODE button and then press the TOTAL button and hold them until the display shows four dashes. Release the buttons and enter a new code, or after five seconds the program times out and returns to normal operation.

CALIBRATION

The flowmeter is precalibrated and tested at the factory. Plumbing systems are always unique and may cause small deviations in the factory calibration. It is recommended that the flowmeter is checked after installation for accuracy and calibrated when necessary.

Review the Programming Section procedures for using the Program Access Mode.

Error Code E204

If error code E204 is shown, there is no signal from the flow sensor. This code is displayed only when in a calibration program. Troubleshoot the sensor and the associated wiring.

Note: To calibrate the flowmeter, use a precalibrated water flow test kit (connected to the discharge according to the instructions provided) or a Pitot gauge as a reference.

Flow Calibration, Single Point (Code 321)

Select a flow rate for calibration that is within the most commonly used discharge flow range.

1. Enter code 321.

   Result: The digital display shows flow rate with the last digit flashing.

2. Flow water through the discharge at the flow rate selected for calibration. Ensure a constant pressure is maintained to obtain a steady flow rate.

3. Adjust the displayed flow rate to match the reference flow rate.

   The MODE button selects the digit to change. The digit will flash.

   The TOTAL button changes the value of the flashing digit.

4. To exit the calibration program:

   Press and hold the MODE button and then press the TOTAL button and hold them until the display shows four dashes. Release the buttons and enter a new code, or after five seconds the program times out and returns to normal operation.

5. Vary the water flow through the discharge and ensure the flow rate displayed matches the reference. If there are differences at other flow rates, the multiple point calibration may be necessary.

Flow Calibration, Multiple Point (Code 322)

This function is used when the flow sensor is installed in a difficult plumbing location where flow is not linear. It corrects for nonlinear flow to provide an accurate flow rate display.

Select calibration points (up to 9) that are within the most commonly used range.

Note: There must be at least a 5% difference between each calibration point. If a selected calibration point is too close to the previous point, an E206 error code shows on the display.

1. Enter code 322.

   Result: The digital display shows Pt1 (program is ready to set the first calibration point).

2. Flow water through the discharge at the flow rate selected for the calibration point. Ensure a constant pressure is maintained to obtain a steady flow rate.

3. Press the MODE button.

   Result: The display shows flow rate with the last digit flashing.

4. Adjust the displayed flow rate to match the reference flow rate.

   The MODE button selects the digit to change. The digit will flash.

   The TOTAL button changes the value of the flashing digit.

5. Press and hold the MODE button, momentarily press the TOTAL button, release the buttons. The next calibration point is displayed. (If the buttons are pressed too long, the program exits the calibration mode.)

   Result: The display shows Pt2 (or the next calibration point).

6. Repeat steps 2 through 5 for each flow rate to be calibrated.

7. To exit the calibration program:

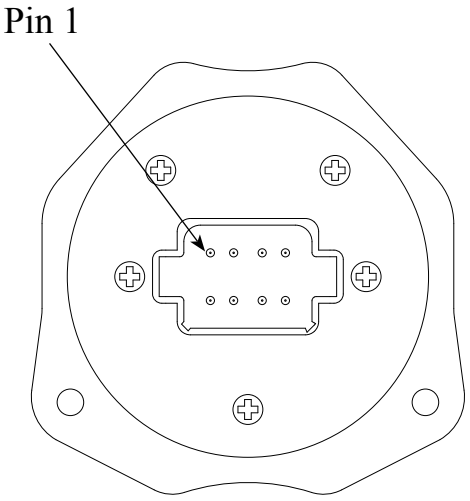
   Press and hold the MODE button and then press the TOTAL button and hold them until the display shows four dashes. Release the buttons and enter a new code, or after five seconds the program times out and returns to normal operation.

WIRING

The following figures include wiring and cable information.

Display Module

A remote display module requires four (4) wires, power (pins 1 and 2) and the datalink connection (pins 7 and 8) to the primary display. A remote display must be programmed with the same ID number as the primary display.



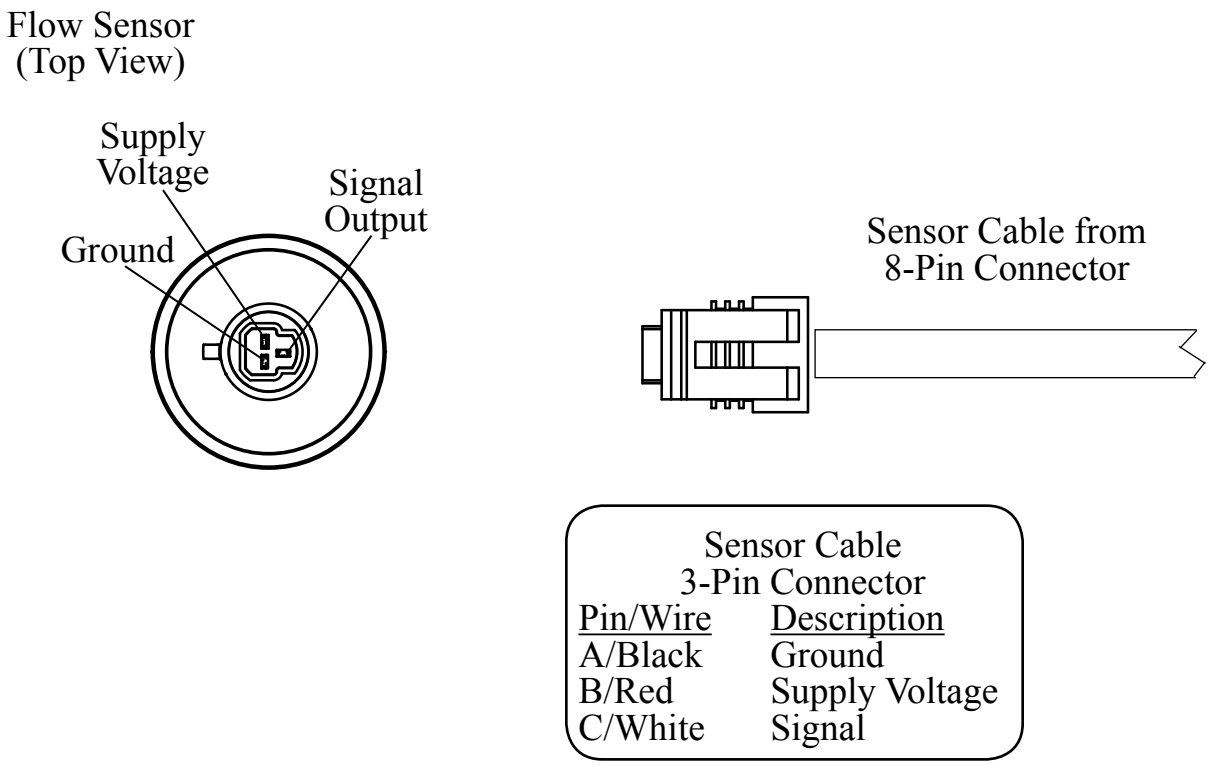
Rear View

8-Pin Connector/Cable

Pin	Description
1	Power
2	Ground
3	Flow Sensor +5 VDC
4	Flow Sensor Ground
5	Flow Sensor Signal
6	NC
7	Proprietary Datalink (–)
8	Proprietary Datalink (+)

Figure 6. Display Module Wiring

Flow Sensor



Sensor Cable
3-Pin Connector

Pin/Wire	Description
A/Black	Ground
B/Red	Supply Voltage
C/White	Signal

Figure 7. Flow Sensor Wiring

NOTES

NOTES

DANGER

PERSONAL RESPONSIBILITY CODE

The member companies of FEMSA that provide emergency response equipment and services want responders to know and understand the following:

1. Firefighting and Emergency Response are inherently dangerous activities requiring proper training in their hazards and the use of extreme caution at all times.
2. It is your responsibility to read and understand any user's instructions, including purpose and limitations, provided with any piece of equipment you may be called upon to use.
3. It is your responsibility to know that you have been properly trained in Firefighting and/or Emergency Response and in the use, precautions, and care of any equipment you may be called upon to use.
4. It is your responsibility to be in proper physical condition and to maintain the personal skill level required to operate any equipment you may be called upon to use.
5. It is your responsibility to know that your equipment is in operable condition and has been maintained in accordance with the manufacturer's instructions.
6. Failure to follow these guidelines may result in death, burns or other severe injury.

FEMSA

Fire and Emergency Manufacturers and Services Association, Inc.
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