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XE-FTC2PM-R0A

FRC

A Safe Fleet Brand

DATATRON

FLOW • PRESSURE • MONITOR • RECORDER

PORTABLE SAMPLING
FLOW & PRESSURE METER
MODEL FTC200

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INTRODUCTION

Overview

The DataTron FTC200 Portable Flow Meter is an easy-to-use 4-channel portable sampling flow and pressure meter. It can record these values over time internally to automate the process of testing flow and pressure. This enables the operator to press a button and use the same portable tester with different size flow tubes. It provides connections for up to four flow tubes, displays pressure and flow readings for any or all four of the tubes simultaneously. Up to four tubes of different pipe sizes can be used at the same time. This device can be operated in either a Manual mode or Automatic mode. Using the Automatic mode will automate the process of testing flow and pressure.

The FTC200 Portable Flow Meter uses paddlewheel type flow sensors, and pressure sensors that are mounted in each of the four flow tubes. The paddlewheels contain a unique ID chip with memory storage to hold the calibration data for each of the four flow tubes. Flow rate information is provided from the paddlewheel flow sensors mounted in the flow tubes. This information is processed and shown on the digital display as flow rate. The user can retrieve sampled data with either a USB flash drive or from a computer with a USB cable.

The FTC200 has a 4-digit Red LED display with daylight bright digits 0.39 inch (10 mm) high for PRESSURE readings, a 5-digit Blue LED display for FLOW, and a 2-digit LED display for both TIME and COUNTS. The flowmeter electronics are self contained; program features are accessed via push buttons on the front of the module. Input connections and cables are also accessible on the front panel.

The FTC200 can be powered by an external power supply (provided), or an external 10-30V DC source (with supplied battery jumper cable or cigarette lighter plug). To charge the internal battery, plug the cable into the POWER input on the front panel , connect the POWER SUPPLY to a 120/240 VAC electrical outlet and place the power switch in the ON/CHARGE position. If the batteries are depleted, the unit can be used while the batteries are being charged.

Features

Measures Flow in GPM/LPM using paddlewheel sensors

Measures Pressure in PSI/kPa/BAR using calibrated sensors

Monitors up to 4 channels individually for flow and pressure

Manual snap-shot recording of data for all 4 channels

Automatic Mode records a maximum of 99 events

Multiple Flow Rate Calibration Points

Uses Multiple Diameter Flow Tubes (Please see Specifications on page 24.)

Summing Flow Function

Paddlewheels connected to each of the four flow tubes store the calibration memory data

Data Captured can be retrieved through a USB flash drive (via USB port "A") or via USB Cable connected to a computer (mini "B" port)

SYSTEM COMPONENTS

Panel Diagram (Display Module)

Figure 1. Controls and Indicators

Panel Controls and Ports Summary:

- CHANNEL CONNECTORS 1 THROUGH 4
- BUTTONS 1 THROUGH 4 – CHANNEL SELECT
- LED 1 THROUGH 4, GREEN – CHANNEL SELECTED INDICATORS
  ◦ Press a button to read the channel's Flow & Pressure.

- DISPLAY- 4-DIGIT RED–PRESSURE
  ◦ The selected channel's pressure reading.

- DISPLAY 5-DIGIT BLUE–FLOW
- BUTTON–SUM
- LED, RED–SUM INDICATOR
  ◦ The selected channel's flow reading.
  ◦ Press to sum the flow of all 4 channels together.

- BUTTON–MENU
- BUTTON–SELECT
- BUTTON - [▲] UP
- BUTTON - [▼] DOWN
  ◦ Use these to edit various setups and modes.

- DISPLAY 2-DIGIT–TIME
- DISPLAY 2-DIGIT–COUNTS
  ◦ Set recording parameters quickly & easily

- BUTTON–AUTO
  ◦ Press to automatically sample all parameters on a regular basis.
- BUTTON–MANUAL
  ◦ Press to take a single snap-shot.
- LED RED–RECORDING
  ◦ Unit is in a recording session.

- CONNECTOR – MEMORY (USB-A, HOST)
- LED RED – "BUSY" (MEMORY)
  ◦ Insert a USB flash drive compliant with USB 2.0 and formatted to the standard FAT32 file system to obtain your recorded data.

- CONNECTOR - TO COMPUTER
- LED RED – "BUSY" (COMPUTER MINI_AB DEVICE)
  ◦ Connect a USB cable to your computer to easily transfer data, just like a memory stick would work.

- LEDs – % STATE OF CHARGE (SOC)
- BUTTON PWR (POWER ON/CHARGE/OFF)
- CONNECTOR – PWR IN (POWER INPUT)
  ◦ Monitor and control the unit's power easily – everything is automatic.

Case

The DataTron FTC200 4-channel portable sampling flow and pressure meter is mounted inside of a resilient, high impact, structural copolymer case. The case is watertight, airtight, dustproof, chemical resistant and corrosion-proof , and has an automatic purge valve for quick equalization after changes in atmospheric pressure. All controls and indicators are located on the front panel. (Refer to Controls and Indicators.)

Internal Battery

The DataTron is powered by a rechargeable battery and must be charged regularly. A fully charged battery will provide approximately 8 hours of operating time. When the tester is not in use, the ON/OFF switch should be left in the OFF position. The 0% RED LED indicator will illuminate when the battery needs to be charged.

External Power Supply

A 120/240 VAC power supply is provided to power the DataTron. To charge the internal battery, switch the power off, then plug the cable into the POWER input on the front panel and connect the other end to a standard AC electrical outlet. The power supply can be used internationally and the wall adapter can be changed as necessary.

The battery must be charged with the ON/OFF switch in the ON position.

Accessory Adapter

A 12/24 VDC power source (car or truck battery) can also be used to power and charge the DataTron. Plug the provided DC Power Cable into the POWER input on the front panel and connect the other end to a DC source.

Jumper Cable

The jumper cable is provided to connect with any external 12/24 VDC power source. This cable allows for charging with a standard vehicle battery and ends with red and black alligator clips, which are attached to the vehicle battery.

NOTE: When external power sources are not in use, protect the 2-pin POWER port with seal plug.

Sensor Cable

Cables for each of the Four Flow Tubes with 6-pin Deutsch Connectors are available for the four flow pressure channels on the DataTron. Use the 3-pin connector on the cable marked for the flow sensor to plug into the flow sensor, and use the other 3-pin connector on the cable marked for the pressure sensor to plug into the pressure sensor. When not in use, the connectors should be covered with the seal plugs, which are provided as a standard part.

Flow Sensor

The flow sensor is provided as a paddlewheel type of device, which should be properly mounted inside of the flow tube. (See specifications section for more details for installation.) This sensor converts the rotations from the paddlewheel into electrical pulses of a proportional frequency. This data is processed and shown on the FLOW display.

Pressure Sensor

The pressure sensor is provided and converts pressure for each channel into DC voltage, which is then processed and shown on the PRESSURE display.

Flow Tubes

Each flow tube will have a mount for a paddlewheel flow sensor and pressure sensor. ***They must meet all specifications required to ensure proper operation with the flow channels.*** *Refer to the Specifications section for details*. **Caution:** Care should be taken not to drop the flow tubes. Dropping the flow tubes could result in damage the exterior of the tubes or the flow and pressure sensors.

USB Flash Drive

Use a USB flash drive compliant with USB 2.0 and formatted to the standard FAT32 file system for data retrieval by inserting into the MEMORY input on the right side of the front panel of the DataTron. Press the MEMORY button to transfer the data. (See the Data Management section for further information.)

USB Cable

A USB cable is provided and connects into the TO COMPUTER input on the front of the right side of the DataTron, which then connects also into the USB port on your computer. Once the USB cable is plugged into the port on the DataTron and connected to the computer, and the COMPUTER 💻 button is pressed, the DataTron will appear as an external drive.

Battery Management System

Note: The DataTron may be used while it is charging, and the length of time for the battery to fully charge will not be affected. The charge time is the same when it is in stand-by, or not being used.

Note: Please be certain to turn the power to the off position before changing power sources.

Note: If the device is left on and not being used for certain period of time, it will go into s̲h̲i̲p̲ ̲a̲n̲d̲ ̲s̲t̲o̲r̲e̲ mode (powers down to preserve battery life).

ON/CHARGE

Turning on the unit:

1. Move the toggle ON/OFF switch to the ON/CHARGE position.

2. The PRESSURE display shows the time and date briefly, while FLOW displays the current firmware revision.

3. Switch to the ON/CHARGE position to charge the DataTron.

4. Keep the switch in the OFF position to fully disconnect the DataTron for shipment.

5. Always keep the switch in the OFF position when not in use to prevent the internal battery from draining, or to help preserve the life of the battery. When switched to the OFF position, the battery is disconnected.

Internal Battery

The battery used in the DataTron is a maintenance free, LiFe PO4 (non-toxic, recyclable, lead-free). When the battery is almost depleted, use either the external power supply (for a wall outlet), accessory adapter or jumper cable to charge the DataTron. **The unit must be in the ON/CHARGE position to charge.**

State of Charge Indicator

Battery charge level is displayed as either 0%, 25%, 50%, 75% or 100%, and the corresponding LED next to the battery level percentage will light up.

External Power Supply

The universal external power supply with input voltage range of 100-240 VAC 50/60 Hz is provided with a removable plug, and can be replaced with the type needed for the country where the product will be used. Press the button on the back to release the clip and slide the connector on for your country. The power supply can be plugged into the wall and plug the other end into the POWER input on the DataTron. **The power switch must be in the ON/CHARGE position to charge.**

Accessory Adapter

Plug the provided DC Power Cable into the POWER input on the front panel and connect the other end to a DC source.

Jumper Cable

Plug the jumper cable into the POWER input on the front panel of the DataTron. The jumper cable is provided to connect to any external 12/24 VDC power source (such as a vehicle battery).

Making Connections

Before taking measurements, make sure the 6-pin Deutsch connector is connected to the flow and pressure channel that will be measured.

1. Plug the pressure sensor cable ending in a 6-pin Deutsch connector (part no. XE- FTIPFPM-C20A) into the flow and pressure channel until the tab firmly locks into position in the port on the DataTron for the selected channel (1 through 4). (An audible "click" will be heard once it is plugged in completely.)

2. Plug the other end of the IPF-PM pressure sensor cable (shaped like the letter "Y") into the pressure transducer and flow sensor.

3. One part of the cable will be labeled as "Flow Sensor" (with a blue heat shrink); plug this 3-pin connector into the flow sensor. This will lock into position with the tab on the connector.

4. The other half of the cable with the other 3-pin connector (with a red heat shrink) is labeled as "Discharge Sensor"; this 3-pin connector plugs into the pressure sensor. This also locks into position with the tab on the connector.

Channels

Reading Flow (Flow Tube Control)

1. To verify pipe size, press and hold any flow channel button (1,2, 3 or 4), and before the button is released the FLOW display shows the pipe size for that channel in either millimeters or inches. After letting go of the button, the pressure and flow value readings for that channel are shown in the corresponding PRESSURE and FLOW displays.

2. This action can be repeated for channels 1 through 4 to confirm the pipe size for each of the pipes connected to their respective channel.

Flow Sum Mode

1. SUM button—Use to display the sum of all 4 flow channels. Press and release the SUM button (labeled as " FLOW/SUM" ![FLOW SUM]); the sum LED light turns on. In the FLOW display, the sum of the flow for all 4 channels will be shown.

2. To exit sum mode, press the SUM button again, or press one of the flow channel buttons. The LED shuts off , the device goes back to the selected channel or the one that was previously in use prior to activating SUM mode. FLOW and PRESSURE values are displayed for that channel.

NOTE: The PRESSURE display will be blank during the sum mode.

Reading Pressure

To read pressure, press and release any of the four channel buttons. Pressure for the selected channel will show in the PRESSURE display (as stated above in "Reading Flow").

Recording

The **DataTron** can be programmed to automatically record the desired count of measurements (from 01-99) separated by the time interval for each count in minutes.

Manual Mode

1. Manual Sample - press "MANUAL" to record pressure and flow as a snap-shot of the data recorded into the internal memory. The snap-shot recording in Manual mode will record the set up, date, time and sum for that specific event.

2. At the start of the manual recording session, the LED light goes on momentarily, and then shuts off when the session is finished.

Set Up for Automatic Mode

1. Before the recording session begins, first press the SELECT button.

2. The TIME display will start blinking, which indicates this is the active option. (Each menu option will flash when you are on the active option.) Then adjust the value for time by pressing the UP ▲ and DOWN ▼ arrow buttons to the right of the TIME and COUNTS displays. Adjust the time in minutes.

3. When the value for the time has been set to the desired number, press the SELECT button again. The COUNTS display will start blinking. The number of preset counts are adjusted with the ▲ and DOWN ▼ arrow buttons, as the time value was just adjusted. When the desired number has been reached for COUNTS, press the SELECT button. When you are ready to begin recording, press the AUTO button to begin recording in Automatic Mode. (*The first sample is taken immediately upon pressing the AUTO button, and the number of COUNTS will decrease by 1.)*

NOTE: Once the values have been set, they will be saved in memory until the next time it is turned back on. The back up memory retains the values that were preset last (even when the unit is powered off).

NOTE: **TIME** - This displays the length of the interval (in minutes) between each recorded sample.

          COUNTS - This displays the number of samples to be recorded.

For example: if the number of counts is set at 10, and the time interval is set for five (5), this equals a 45 minute recording session. The first sample is taken as the AUTO button is pressed, and the COUNTS value decreases by one (1). In this case, the remaining number of COUNTS will drop down to nine (9), after the first sample is taken.

(TIME or COUNTS can be any value from 01-99.)

Automatic Mode—Starting the Recording Session

1. Be sure to first go through the Set Up process as described above.

2. After pressing AUTO button, the recording session starts and the LED lights up under RECORDING.

3. Immediately after the AUTO button has been pressed, the first snap-shot sample is taken. The number of counts will decrease by one from the first snap-shot recording of data.

4. After each time interval has passed, the number of preset counts will continue to decrease by one count until the count value reaches zero. Once the number of counts reaches zero, the automatic recording session has ended, and the RECORDING light will shut off.

5. To disable/cancel Automatic mode, press and hold the AUTO button for approximately 2 seconds. (The LED light under the RECORDING light will shut off and the COUNTS will be at 0 when the session has been cancelled.)   Before exiting, one final data sample is taken and then the sample file is closed.

Data Management

USB Data Retrieval

The MEMORY port is compatible with a USB flash drive compliant with USB 2.0 and formatted to the standard FAT32 file system. The USB flash drive allows for transferring recorded internal data to a computer. This data is saved as a CSV file type, which can be viewed with Microsoft® Excel® or Open Office type programs.

1. First plug in the USB flash drive into the data port on the right side of the device labeled MEMORY. (Confirm that the DataTron is not in the middle of a recording session before plugging the USB flash drive into the port.)

2. Press the MEMORY 🔲 button and the LED will illuminate immediately afterwards. ***While the LED is illuminated, do not remove the USB flash drive.*** While the LED is on, the DataTron will transfer all the recorded session files to a folder named "DataTron" on the USB flash drive.

NOTE: A rapidly flashing red LED light indicates that an action is being attempted by the user while the DataTron is currently performing another action. The current action must either be completed or disabled before a new action can be initiated. (For example, if the user is attempting to transfer data to a USB flash drive while the unit is recording, both actions cannot be done simultaneously.)

3. Wait for the LED light to go out before removing the USB flash drive.

File Name Details:

A typical file name will appear as similar to the following:

FTC200_2014-11-26_10-54-01.csv

The above can be broken down as follows:

Model Number—FTC200

Year Recorded —2014

Month —11

Day —26

Hour —10

Minutes —54

Seconds —01

FTC-100 PORTABLE SAMPLING FLOW & PRESSURE METER REPORT	
File Name	FTC200_2014-11-26_10-54-01.csv
Software Version	0.31
Serial Number	1023
Test Date	2014/11/26
Test Time	10:54:02
No of Samples	1
Sample Rate (Minutes)	1
Unit of Measure	KPA/LPM
Chan 1 Pipe Size	0.0 mm
Chan 2 Pipe Size	0.0 mm
Chan 3 Pipe Size	114.3mm
Chan 4 Pipe Size	0.0 mm

Sample No.	Date	Time	Flow_1	Pres_1	Flow_2	Pres_2	Flow_3	Pres_3	Flow_4	Pres_4	Flow_Sum
1	11/26/2014	10:54:01	---*	---*	---*	---*	1510	613	---*	---*	1510

*Inactive Channel—when three dashes are shown, no data was recorded for that channel

Figure 2. Sample File Format

FTC200 Rev151207

Computer Interface:

1. There is a computer connector port on the right side of the DataTron named "TO COMPUTER" 💻 . This port allows for a direct data transfer to your computer (instead of with the USB flash drive). The USB cable is provided as part no. XE-XXUSBEXT-C10A.

2. <u>TO CONNECT</u>: Connect the USB cable to the connector ports on the DataTron and to your computer. Then press the button to the left of the computer port to connect the DataTron to your computer. The DataTron will now appear as an external drive on your computer. The LED light will remain solidly on once the connection is established.

3. <u>TO DISCONNECT</u>:

    A) First close any open files.

    B) Then safely remove the external drive through your computer software. (For example, Windows users will see the safely remove hardware ✅ icon.)

    C) Press the "TO COMPUTER" 💻 button and the LED light will shut off. The USB cable may now be disconnected from both the DataTron and from your computer's USB port.

NOTE: The file format for use with a computer is the same as described with USB Data Retrieval on the previous page.

NOTE: A rapidly flashing red LED light indicates that an action is being attempted by the user while the DataTron is currently performing another action. The current action must either be completed or disabled before a new action can be initiated. (For example, if the user is attempting to transfer data via the USB cable while the unit is recording, both actions cannot be done simultaneously.)

PROGRAMMING

Programming functions are not allowed when the control module is in the recording mode. All program functions are password protected.

The P-code program functions are available to view and change after the password code has been entered (see below). Scroll through the P-codes. The value blinks and the UP [▲] and DOWN [▼] arrow buttons are used to change that value or initiate an action. (If the value on the display does not blink, the value is read-only.) Use the SELECT button to choose specific P-codes to change. The MENU button is used to save the changes; press and hold this button to save (until 5 dashes appear − − − − − in the FLOW display).

Note: To exit programming modes, press the MENU button and return to normal operation.

Note: When entering codes in the program access mode there is a time out feature that requires an operator input be made every three seconds. If an input is not detected at a button within three seconds, the program will return to normal operation.

Note: A rapidly flashing red LED light indicates that an action is being attempted by the user while the DataTron is currently performing another action. The current action must either be completed or disabled before a new action can be initiated. (For example, if the user is attempting to transfer data to a USB flash drive while the unit is recording, both actions cannot be done simultaneously.)

Enter Password for Program Access

1. Press and hold the MENU button for 3 seconds. The PRESSURE display shows four dashes − − − − . Then release the MENU button.

2. Press the UP [▲] and DOWN [▼] arrow buttons to change the value. Each time a button is pressed the first digit changes by 1. Press the SELECT button to move to the next digit. Set the first digit to the desired number.

3. Repeat step 2 and enter the password code.

    Result: When a correct password code is entered the PRESSURE display flashes the program (P) code and the message display shows the name of the program or a description of the program code.

4. Press the UP [▲] and DOWN [▼] arrow buttons to scroll through the P-codes.

Operator Password 1221

Provides access to system programming P-codes.

   1221 - Operator Programs

Refer to Operator P-100 Codes.

NOTE: Please see Program Code Descriptions for more detailed information on P-codes that refer to specific user passwords according to the user level being accessed. This information is noted after the P-codes table on pages 17-21.

OEM/Dealer Password Restricted (Contact FRC)

Provides access to system programming P200 and P300 codes.

Password Restricted - OEM/Dealer Programs

For more information, refer to the OEM/Dealer P200 and P300 Codes listed in the separate OEM programming manual.

Operator P-100 Codes

- Refer to Program Code Descriptions for detailed information.

- When a valid code has been entered and a programed value or option is shown in the display, the timeout feature is disabled.

Table 1. Program Functions P-Codes Quick Reference

CODE	DESCRIPTION Password Code: 1221 Enables Access to P100	MESSAGE DISPLAY (See examples below.)	Press SELECT button to select; change value with ▲ or ▼ buttons	Refer to details on pages
P101	Displays System Model Number	FTCXXX	(Read Only)	n/a
P102	Displays Software Revision	r1.00	(Read Only)	n/a
P103	Displays Manufacturing Date	2014-12-08	(Read Only)	n/a
P104	Displays Serial Number	985471	(Read Only)	n/a
P105	Displays Hardware Revision	001	(Read Only)	n/a
P106	Displays Mac Address UID #	00-00-00-EF-10-23	(Read Only)	n/a
P107	Displays/Edits Real-Time Date Value	2015-01-10	(Read/Write)	18
P108	Displays/Edits Real-Time Time Value	15:30	(Read/Write)	18
P109	Firmware Update	UPdAtE COdE	(Procedure)	19
P111	Flow Calibration	FLO CAL	(Procedure)	20-21
P112	Pressure Calibration	PRES CAL	(Procedure)	22

Set Date and Time (codes P107 and P108)

Set Date (Code P107*)

Enter password code 1221. (Refer to Enter Password for Program Access.)

1. Press the UP ▲ and DOWN ▼ arrow buttons and scroll to code P107 in the PRESSURE display.

2. Press the SELECT button.

   Result: The FLOW display shows the date with the year flashing.

3. Press the UP ▲ and DOWN ▼ arrow buttons to change the year.

4. Press the SELECT button.

   Result: The month flashes.

5. Press the UP ▲ and DOWN ▼ arrow buttons to change the month.

6. Press the SELECT button.

   Result: The day flashes.

7. Press the UP ▲ and DOWN ▼ arrow buttons to change the day.

8. Press and hold the MENU button for five (5) seconds to save.

   Result: The message display shows DONE.

*Note: When changing the date, please note that the year is represented with a "Y" on the left side of the FLOW display (e.g., Y-2014), month is symbolized with a lowercase "n", and "d" for the day. When adjusting the time, note the device runs on a 24 hour clock, and that minutes are represented by a lowercase "n". After the desired date, has been set, press MENU to hold and save the entry.

Set Time (Code P108)

Enter password code 1221. (Refer to Enter Password for Program Access.)

1. Press the UP ▲ and DOWN ▼ arrow buttons and scroll to code P108.

2. Press the SELECT button.

   Result: The FLOW display shows the time with the hours flashing.

3. Press the UP ▲ and DOWN ▼ arrow buttons to change hours.

4. Press the SELECT button.

   Result: The message display shows time with the minutes flashing.

5. Press the UP ▲ and DOWN ▼ arrow buttons to change the minutes.

6. Press the SELECT button.

   Result: The message display shows time with the AM/PM flashing.

7. Press the UP ▲ and DOWN ▼ arrow buttons to change the AM/PM.

8. Press and hold the MENU button for five (5) seconds to save.

   Result: The message display shows DONE.

Firmware Update (code P109)

Please read the following for instructions to confirm the software is updated to the current revision.

Firmware Update Steps

1. First make sure to have a USB flash drive compliant with USB 2.0 and formatted to the standard FAT32 file system available.

2. Copy the FTC200.hex file that you received from FRC onto your USB flash drive.

3. Enter the programming mode and scroll through the P-codes and select P109.

4. Insert your USB flash drive into the MEMORY 🔲 port on the DataTron.

5. The COUNTS display will read as "no".

6. Use the UP ▲ and DOWN ▼ arrow buttons to change the setting to "y" (YES).

7. Press and hold the MENU button for approximately 3 seconds, and then let go. The LED light above the MEMORY 🔲 button will illuminate, and 5 dashes will appear on the FLOW display.

8. While the DataTron is updating, the dashes will scroll across the FLOW display.

9. The DataTron will power off and then restart automatically. Once the unit powers on again, the firmware will be updated to the new revision. The current revision number will show on the PRESSURE display.

10. Power down and remove the USB flash drive.

Flow Calibration (code P111)

It is recommended that the flowmeter/pressure indicator is checked after installation for accuracy and calibrated when necessary

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

NOTES:

1. Flow calibration must be done according to the designated preset. (Refer to P301 in the OEM Programming Codes Manual.) For example, if P301 is set for PSI, the flow will be calibrated in GPM. Or, if P301 is set for kilopascal (PCAL) or BAR, then flow will be calibrated in LPM instead.

2. It is recommended that the calibration of the meter be checked once annually or if the operator feels that the reading might be erroneous.

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

4. If any error codes appear, refer to the error codes chart.

5. 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 E203 or E204 error code shows on the display.

6. The calibration data is stored inside of the paddlewheel sensor of the flow tube. This allows the flow tube to be used in any flow/pressure channel of the currently used device or another DataTron.

Single Point Calibration

1. First be certain to connect the flow tube into the desired flow and pressure channel.

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. Enter the programming mode and scroll through the P-codes and select P111.

4. Press the SELECT button, and the display reads "SELECT CHAN"; the LEDs will start blinking the displays for all four flow channels.

5. Press the button next to the desired flow channel to be calibrated. *(Only one channel at a time can be calibrated for flow.* The LED next to the selected channel will illuminate, and the last known flow value will appear on the FLOW display.

6. Using your calibration standard, enter the new or corrected flow value. (*See note #1 above*.)

7. Edit the value and once the calibration point has been entered in the FLOW display, **press and hold the MENU button** until 5 dashes appear. Once the 5 dashes appear, the calibration point has been saved.

8. To exit, press the MENU button. The calibration point will be saved and appear in the FLOW display.

NOTE: See the beginning of the Programming section (on page 15) for detailed instructions to edit the flow values on the DataTron with the UP ▲ and DOWN ▼ arrow buttons.

Multiple Point Calibration

1. First be certain to connect the flow tube into the desired flow and pressure channel.

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. Enter the programming mode and scroll through the P-codes and select P111.

4. Press the SELECT button, and the display reads "SELECt CHAn"; the LEDs will start blinking the displays for all four flow channels.

5. Press the button next to the desired flow channel to be calibrated. *(Only one channel at a time can be calibrated for flow.* The LED next to the selected channel will illuminate, and the last known flow value will appear on the FLOW display.

6. Using your calibration standard, enter the new or corrected flow value. (*See note #1 on page 19.*)

7. Edit the value and once the calibration point has been entered in the flow display, ***press and immediately release the MENU button.*** The COUNTS display will advance to the next point number (e.g. P2, P3 or P4).

8. To continue entering the next calibration point, adjust the flow rate to the desired number and then enter into the FLOW display.

9. If you wish to enter another calibration point, adjust your flow rate, press the MENU button quickly and release it to repeat the process described in number 7 (above).

10. Or to exit, then press and hold the MENU button to save the entered calibration points. (Five dashes will appear, and the process is completed.) The calibration point will be saved and appear in the FLOW display.

NOTE: A maximum of four calibration points may be entered.

NOTE: See the beginning of the Programming section (on page 15) for detailed instructions to edit the flow values on the DataTron with the UP ▲ and DOWN ▼ arrow buttons.

Pressure Calibration (code P112)

NOTES:

1. Pressure calibration is done according to how the Unit of Measure was set in P301—either PSI, BAR or kPa. (Refer to P301 in the OEM Programming Codes Manual.)

2. It is recommended that the calibration of the meter be checked once annually or if the operator feels that the reading might be erroneous.

3. To calibrate the pressure indicator, use a precalibrated pressure indicator or gauge as a reference.

4. If any error codes appear, refer to the error codes chart.

5. 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 E203 or E204 error code shows on the display.

6. The calibration data is stored inside of the paddlewheel sensor of the flow tube. This allows the flow tube to be used in any flow/pressure channel of the currently used device or another DataTron.

7. There are always two calibration points for Pressure Calibration (one lower and one upper value).

Pressure Calibration Steps

1. First be certain to connect the flow tube into the desired flow and pressure channel.

2. Enter the programming mode and scroll through the P-codes and select P112.

3. Press the SELECT button, and the display reads "PrES CAL"; the LEDs will start blinking the displays for all four flow channels.

4. Press the button next to the desired flow channel to be calibrated. *(Only one channel at a time can be calibrated for pressure.)* The LED next to the selected channel will illuminate, and the last known pressure value will appear on the PRESSURE display. The COUNTS display will read as P1.

5. Choose one lower point value (<u>usually zero</u>) and one higher point value. This first value will show as 0 in the FLOW display.

6. Press and release the MENU button. The COUNTS display will read as P2.

7. Increase the pressure and enter the higher value into the FLOW display in kPa.

8. **Press and hold the MENU button** to save both calibration points. The process is complete.

Error Codes and Fault Warnings Troubleshooting Table

The table is provided to assist in tracking down system problems, it is not meant to take the place of good troubleshooting practices.

Table 2. Error Codes and Fault Warnings Troubleshooting

Code	Description	Probable Cause
E101	Failed to read unique identifier from calibrated pipe	Check electrical connections between flow tube and channel input.
E102	Failed to read data from calibrated pipe	Check electrical connections between flow tube and channel input.
E103	Failed to verify data written to a calibrated pipe	Check electrical connections between flow tube and channel input.
E104	Calibration data read from a pipe is not verifiable	Check electrical connections between flow tube and channel input.
E201	User entered a (0) zero calibration value	User entry error (confirm with detailed information for either codes P111 or P112).
E202	The paddlewheel or the pressure sensor data is reading a zero value	No water flow or pressure detected - check the electrical connections between the Flow Sensor and the Flow Tester Cable.
E203	The entered calibration point is to close to the previous point.	See detailed information for multiple point flow calibration.
E204	The paddlewheel or the pressure sensor data is reading a value too close to another calibration point	See detailed information for multiple point flow calibration.
E205	The minimum number of calibration points has not been reached.	Pressure requires a least 2 points. The user pressed and held MENU before the second point was entered.
E301	Power Supply Failure, Main 5 Volt	Check connections between flow tube and channel input for a possible short.
E311	Power Supply Failure, Pressure Channel 1	Check connections between flow tube and channel input for a possible short.
E312	Power Supply Failure, Pressure Channel 2	Check connections between flow tube and channel input for a possible short.
E313	Power Supply Failure, Pressure Channel 3	Check connections between flow tube and channel input for a possible short.
E314	Power Supply Failure, Pressure Channel 4	Check connections between flow tube and channel input for a possible short.
E321	Power Supply Failure, Flow Channel 1	Check connections between flow tube and channel input for a possible short.
E322	Power Supply Failure, Flow Channel 2	Check connections between flow tube and channel input for a possible short.
E323	Power Supply Failure, Flow Channel 3	Check connections between flow tube and channel input for a possible short.
E324	Power Supply Failure, Flow Channel 4	Check connections between flow tube and channel input for a possible short.
E331	Power Supply Failure, User USB Memory	Check connections between flow tube and channel input for a possible short.
E332	Power Supply Failure, Internal USB Memory	Check connections between flow tube and channel input for a possible short.
E341	Power Supply Failure, J1939	Check connections between flow tube and channel input for a possible short.
E342	Power Supply Failure, FRC CAN	Check connections between flow tube and channel input for a possible short.
E401	Internal Error	Contact FRC and advise the code number.
E402	Internal Error	Contact FRC and advise the code number.
E403	Internal Error	Contact FRC and advise the code number.
E404	Internal Error	Contact FRC and advise the code number.

Steps to Obtain an Error Log:

1. Insert a USB flash drive (compliant with USB 2.0 and formatted to the standard FAT32 file system) into the data port on the right side of the DataTron labeled MEMORY.

2. Press both the UP ▲ and DOWN ▼ arrow buttons at the same time until the LED light comes on above the MEMORY 🖴 button.

3. When the LED light goes out, remove the USB flash drive.

4. Insert the USB flash drive into the your computer's USB port. The Error Log will appear with the file name "error.txt". This file can be read with any standard text editor such as Windows® Note Pad.

PARTS LIST

PART NO.	DESCRIPTION
XE-FTC200-D0A	DM Flow & Pressure 4-Channel Recorder
XE-FTIPFPM-C20A	Cable, Flow Tester IPF-PM 20-ft
XE-XXPSAA30R-150	Battery Charger/Power Supply
XE-FTC12V-A1A	Charger Cable, DC, Alligator Clips
XE-PRO31PT3-S0B	Pressure Sensor
XE-MF40P-S0A	Flow Sensor (Paddlewheel)
XE-XXUSBEXT-C10A	Cable, Ext. USB Mini-B 10-ft (laptop to FTC200)
XE-XXBC-ZA5074-B	Charger Cable, DC, Accessory Plug 12V BA
XE-XX552-RPA-R	Adapter, AC 12V 2.5A 30W Wall Adapter
XE-XXPLUGDEU2P-A0A	Seal Plug, 2-Pin (for POWER port)
XE-XX6PDP-A0A	Seal Plug, 6-Pin (for Flow Tube channels)

NOTE: Per your testing requirements, 1-4 flow tubes can be ordered with the corresponding number of flow/pressure sensors and harnesses. The size of each flow tube can be specific to your requirements.

Flow Sensor (Paddlewheel)
Part No. XE-MF40P-S0A

Cable, Flow Tester IPF-PM 20-ft
Part No. XE-FTIPFPM-C20A

Pressure Sensor
Part No. XE-PRO31PT3-S0B

Cable, Ext. USB Mini-B 10-ft
Part No. XE-XXUSBEXT-C10A

Accessory Plug
Part No. XE-XXBC-ZA5074-B

Charger Cable, DC, Alligator Clips
Part No. XE-FTC12V-A1A

Table 3. Parts List

Specifications

Display Module (mounted inside Pelican Case 1400)

Supply Voltage:	10 - 30 VDC
Supply Power:	15 Watts
Case Exterior Dimensions:	13.37 x 11.62 x 6 inches (L x W x D)
	34 x 29.5 x 15.24 cm (L x W x D)
Operating Temperature (non-condensing):	-30°C to 55°C (-22°F to 131°F)
Storage Temperature (non-condensing):	-40°C to 60°C (-40°F to 140°F)

NOTE: Do not store the DataTron in either extreme hot or cold temperature environments.

IP Rating:	67—with seal plugs in place and case closed
Typical Battery Run Time:	8 hours (from full charge)
Typical Battery Charge Time:	4-5 hours

Flow Tubes

Material:	Aluminum
Sizes Available:	1.5" Tube w/2.5" Couplings (13 - 320 GPM)
	2.0" Tube w/2.5" Couplings (21 - 520 GPM)
	2.5" Tube w/2.5" Couplings (30 - 850 GPM)
	3.0" Tube w/NPT Threads (40- 1380 GPM)
	4.0" Tube w/NPT Threads (80 - 2300 GPM)

Note: GPM rating is at 0 PSI back pressure (no obstruction at end of tube).

Flow Sensor

Model Number:	XE-MF40P-S0A
Type:	Paddlewheel
Sensor Material:	Acetal (Delrin) with Stainless Steel (316) Shaft
Excitation Voltage:	5 VDC
Calibration:	4 kb Internal Memory Storage

Pressure Sensor

Model Number:	XE-PRO31PT3-S0B
Pressure Range:	0 - 300 PSI
Proof Pressure:	800 PSI
Type:	Stainless Steel
Excitation Voltage:	5 VDC
Output Voltage:	0-5 VDC- 4.75 VDC (See Table 4.)

Flow Sensor

Flow Sensor
(Top View)

Supply
Voltage

Signal
Output

Ground

Sensor Cable from
8-Pin Connector

Sensor Cable
3-Pin Connector

Pin/Wire	Description
A/Black	Ground
B/Red	Supply Voltage
C/White	Signal
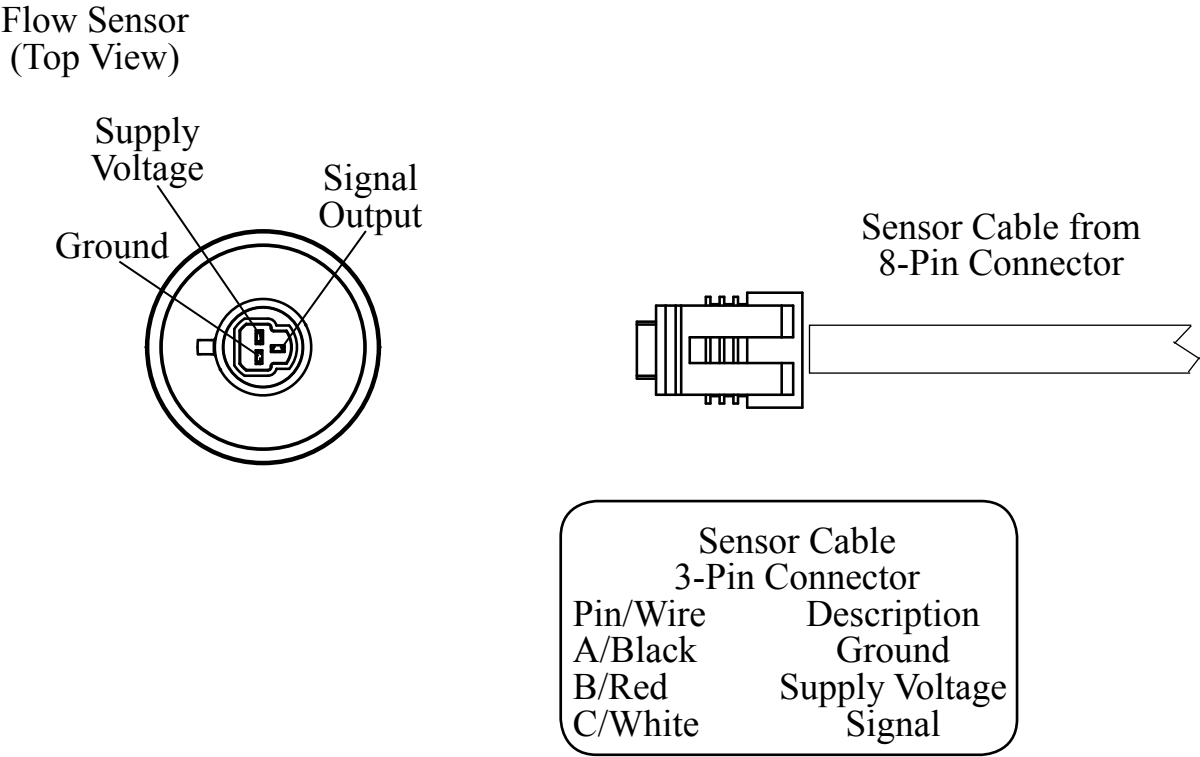
Figure 3. Flow Sensor Wiring

Pressure Sensor

Model Number:	XE-FTC200-D0A
Pressure Range:	0 - 300 PSI
Proof Pressure:	800 PSI
Type:	Stainless Steel
Excitation Voltage:	5 VDC
Output Voltage:	0-5 VDC- 4.75 VDC (See Table 1)

Table 4. Pressure Sensor Output Voltage

	0 psi	100 psi	150 psi	200 psi	250 psi	300 psi	600 psi
FTC200 XE-FTC200-D0A	0.5 vdc	1.917 vdc	2.625 vdc	3.33 vdc	4.04 vdc	4.75 vdc	N/A

Pressure Sensor

Pressure Sensor
Cable

Pressure Sensor Cable
3-Pin Connector

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

Pressure Sensor
Top View

Ground

Supply
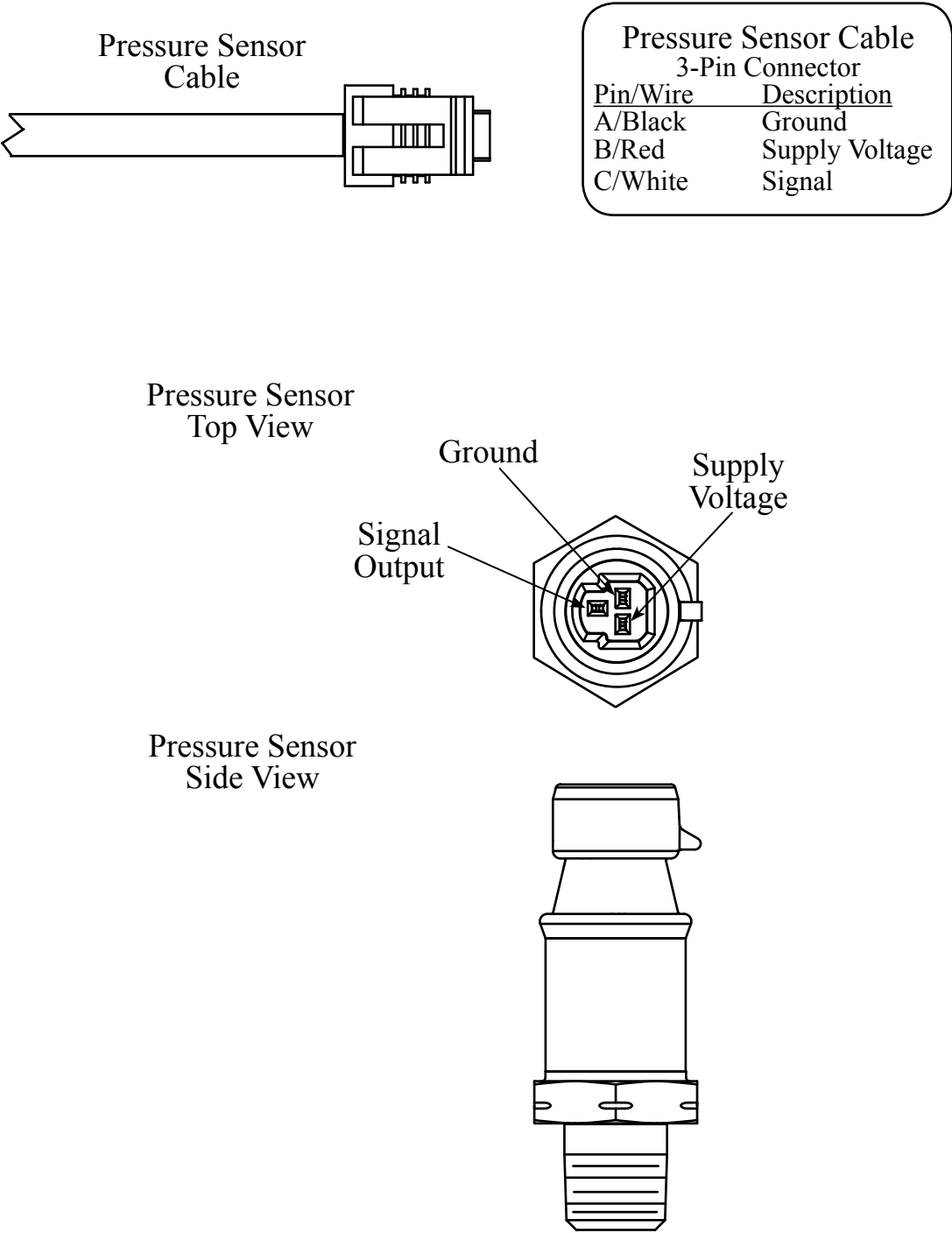Voltage

Signal
Output

Pressure Sensor
Side View

Figure 4. Pressure Sensor Wiring

FLOW SENSOR MAINTENANCE

It is recommended that the flow sensor be cleaned during the yearly calibration check.

Depending on the environment that the flow tube is used in, it is possible that mud, grass, algae, or other materials may collect on the paddlewheel of the flow sensor and require it to be cleaned from time to time.

Remove the flow sensor and clean the it with a mild soap and clean water. Make sure the paddlewheel spins freely.

Remove Flow Sensor

1. Remove retaining nut.

2. Slide flow sensor out of sensor housing.

Install Flow Sensor

1. 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 only needs to be hand tightened. There is an inside lip that will stop 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 does not disengage from the alignment tab and rotate.

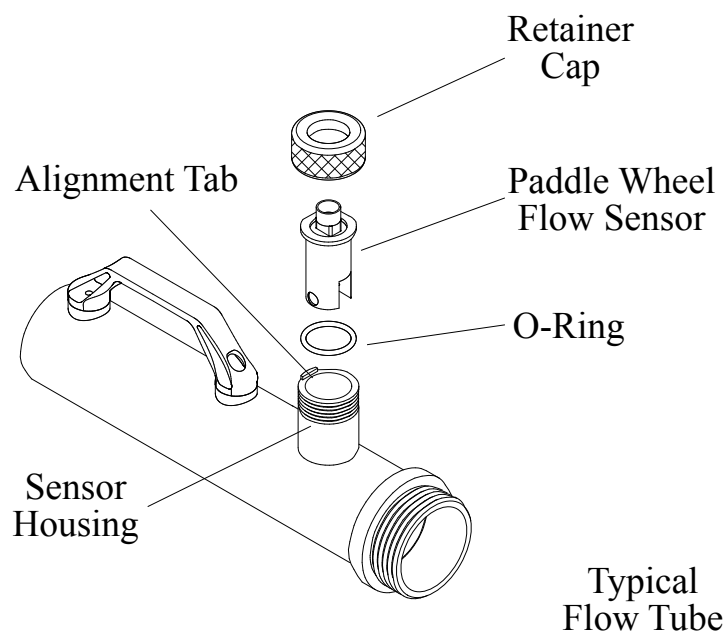2. Install retainer cap and hand tighten.

Figure 5. Flow Sensor Maintenance

NOTES

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

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