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FSDATA Desktop Instrument Manager

User Manual

07/2017, Edition 2

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Section 1 Product overview

FSDATA Desktop is a software application for use with flow loggers and AS950 samplers. Use FSDATA Desktop to:

- Configure FL900 Series flow loggers
- Configure FL1500 flow loggers
- Download data from flow loggers and AS950 samplers
- Import data from FL1500 flow loggers and AS950 sampler controllers
- Export FL900 flow logger data to the FSDATA internet application
- Use saved settings to set up additional instruments
- Make and print reports
- View diagnostic information for attached sensors
- Update the instrument firmware



Instructional videos are available on www.hachflow.com.

1.1 PC requirements

The computer must have the following minimum requirements:

- Windows 7 or higher
- Microsoft .NET 4.0 Framework
- 25 MB hard disk space
- 1024 x 768 screen resolution

1.2 Install FSDATA Desktop on a computer

Before the flow logger or sampler is connected to a computer, make sure that FSDATA Desktop is installed on the computer. FSDATA Desktop is available at www.hachflow.com.

Section 2 User interface and navigation

2.1 Open FSDATA Desktop



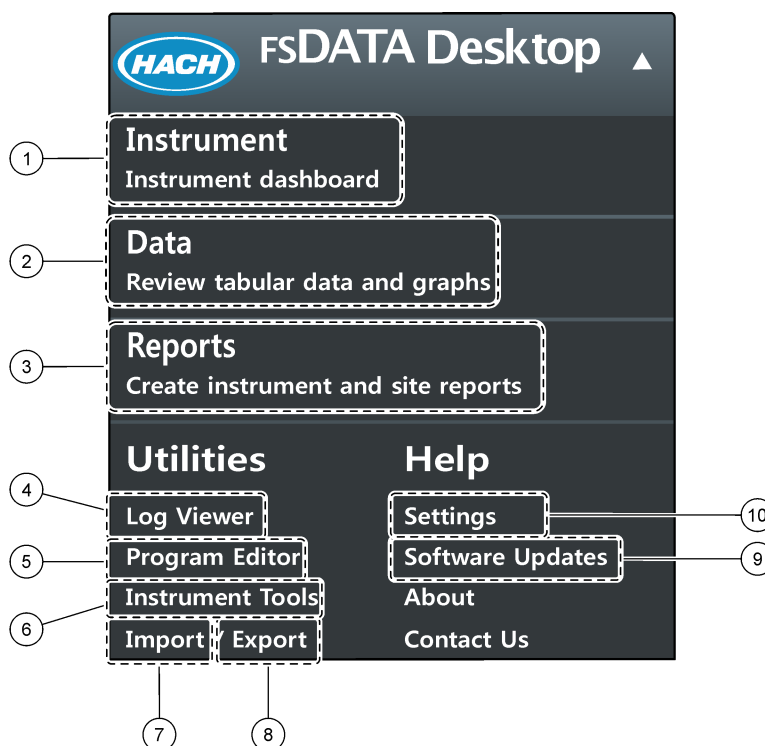
1. Click the FSDATA icon to open FSDATA Desktop Instrument Manager. When opened for the first time, the Settings>Language/Units screen is shown.
2. Select the user preferences for language and units.
3. Click Startup Options and select the display preferences.
4. Click **SAVE**. The main screen opens.

Note: To change user preferences at a later time, go to Settings from the main menu. Refer to [Change the user preferences](#) on page 6.

2.2 Main menu

Click the pull-down arrow adjacent to FSDATA Desktop to see the main menu (Figure 1). The Instrument and Instrument Tools menus are only available when an instrument is connected to FSDATA Desktop. The Program Editor, Import/Export and Software Update menus are only available when an instrument is not connected to FSDATA Desktop.

Figure 1 Main menu



1 Instrument—Set up and program a connected logger.	6 Instrument Tools—Clear data, restore default settings or update firmware.
2 Data—View downloaded data.	7 Import—Import data files from a USB flash drive.
3 Reports—Make and print reports.	8 Export—Export data from an FL1500 logger to a USB flash drive or from an FL900 logger to the FSDATA server.
4 Log Viewer—View event logs, alarm logs and sensor diagnostics.	9 Software Updates—Find and install newer versions of FSDATA Desktop.
5 Program Editor—Set up or edit a program for an offline logger and view program settings from downloaded data files.	10 Settings—Change the user preferences.

2.3 Change the user preferences

Use the Settings screen to change the language, units and screen that shows when FSDATA Desktop opens.

1. Go to Settings from the main menu. The Settings window opens and the Language/Units screen is shown.
2. Select from the available options in the Language section:

Option	Description
Language	Changes the displayed language (default: English)
Decimal	Selects "." or "," for numbers with a decimal (default: ".")
Time	12 or 24 hour, MM/DD/YYYY, YYYY/MM/DD or DD/MM/YYYY

3. Select from the available options in the Preferred Units section:

Option	Description
Level	Inches, feet, millimeters, centimeters or meters
Rain	Inches, millimeters or centimeters
Velocity	Feet/second or meters/second
Flow	Acre feet, cubic feet, cubic meters, million gallons, gallons or liters per second, minute, hour or day
Volume	Acre feet, cubic feet, cubic meters, gallons or liters
Temperature	Celsius (°C) or Fahrenheit (°F)

The preferred units are shown in data files, reports and logger programs. The preferred units are also shown in sensor diagnostics and after the factory default settings are restored to an instrument.

4. Select from the available options in the Default Log Channel Unit Options section:

Option	Description
Site program setting units	Uses the units that are set in the instrument when downloaded data files are opened.
Preferred units	Uses the preferred units when downloaded data files are opened.

5. Click **Startup Options** in the left task pane. Select from the available options:

Option	Description
Display open menu	Shows the main menu when FSDATA Desktop opens.
Automatically go to section	Shows a specific screen when FSDATA Desktop opens: Instrument, Data, Reports, Log Viewer or Program Editor.
Display tooltip messages	Shows detailed information when the cursor is held over a button.

6. Click **SAVE** to save the user preferences.
The updated preferences are shown after FSDATA Desktop is closed and opened again.

Section 3 FL900 flow logger setup

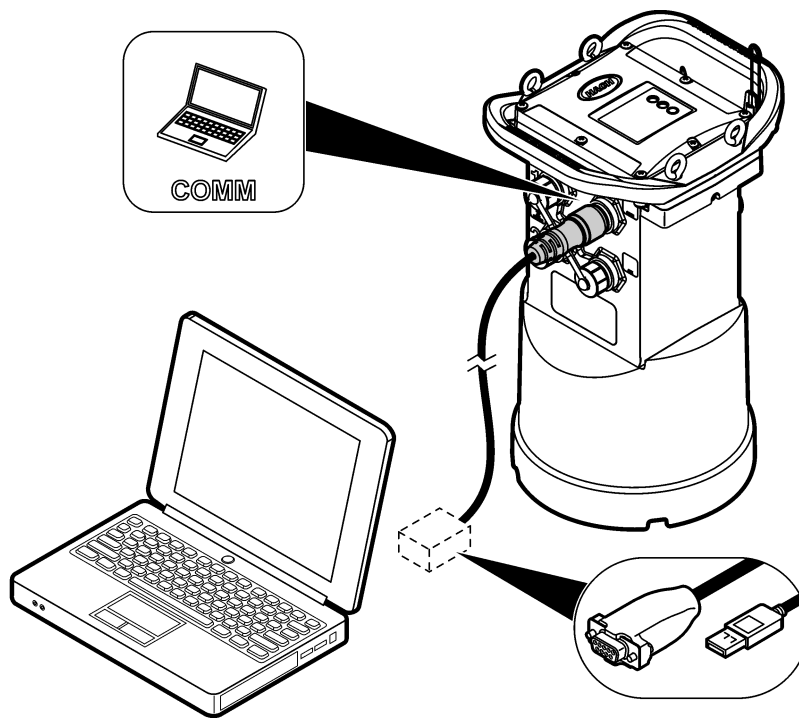
Use FSDATA Desktop to specify the settings that are used when the FL900 Flow Logger is deployed in the field.

3.1 Attach the logger to the computer

Pre-requisites: Make sure that FSDATA Desktop is installed on the computer. Connect only one logger to the computer.

1. Attach the logger to the computer ([Figure 2](#)).
2. When a USB cable is attached for the first time, the Found New Hardware wizard opens. Run the new hardware wizard to install the USB driver for the logger. When finished, the message “Your new hardware is installed and ready to use” is shown. In the event the wizard does not run or the install fails, contact technical support to assist with trouble shooting your specific operating system.

Figure 2 Attach the logger to a computer



3.2 Connect the logger to FSDATA Desktop

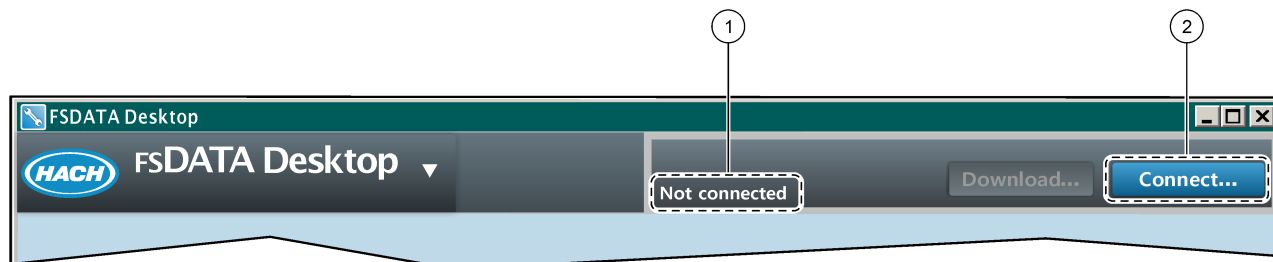
Connect the logger to FSDATA Desktop before deployment to set up the logger for data collection. Connect the logger to FSDATA Desktop after deployment to download data. Connection status:

- **Connected**—An instrument is attached to the PC and connected to FSDATA Desktop. The attached sensors are shown in the Instrument menu. The user can download and view data from the logger and write a program to the logger. The Program Editor, Import/Export and Software Updates menus are not available.
 - **Not connected**—An instrument is not connected to FSDATA Desktop. The Instrument and Instrument Tools menus are not available.
1. Attach the logger to the PC. Refer to [Attach the logger to the computer](#) on page 7.
 2. Click **CONNECT** ([Figure 3](#)). The Connect to Instrument window opens.
 3. Click **FL900**.

4. Select the port on the computer where the logger is attached (serial or USB), then click **CONNECT**. The connection status changes to Connected.

Note: If the sensor mismatch message is shown, select "Use existing program" if the sensors will be attached to the logger again during installation. If not, select "Create new program based on detected sensors."

Figure 3 Connect to FSDATA Desktop



1 Instrument connection status (connected or not connected)

2 Connect/Disconnect button

3.3 Make a basic FL900 logger program

A basic program must be written to the logger to specify the channels to be logged. The logger program starts when the program is written to the logger.

1. Open a communication session with the logger:
 - a. Open FSDATA Desktop.
 - b. Click **CONNECT**. The Connect to Instrument window opens.
 - c. Click **FL900**.
 - d. Select the port on the computer where the logger is attached (serial or USB), then click **CONNECT**.

Note: If the sensor mismatch message is shown, select "Use existing program" if the sensors will be attached to the logger again during installation. If not, select "Create new program based on detected sensors."
 - e. Make sure that the connection status shows "connected".
2. Go to the Instrument menu (Figure 1 on page 5). The FL900 Programming screen opens to the General Settings tab (Figure 4). The Port Assignments section shows the sensors that are attached to the logger. After measurements start, the logged channels show in the status pane. New values show at each log interval.
3. Enter the Site ID and Location with letters and numbers only. Do not use special characters.

Option	Description
Site ID	Enter a unique name for the site (required).
Location	Enter the physical location of the instrument (optional).

4. If there are sensors to include that are not currently attached, select the sensors in the Port Assignments section. Make sure that the specified port is used when the sensors are attached.

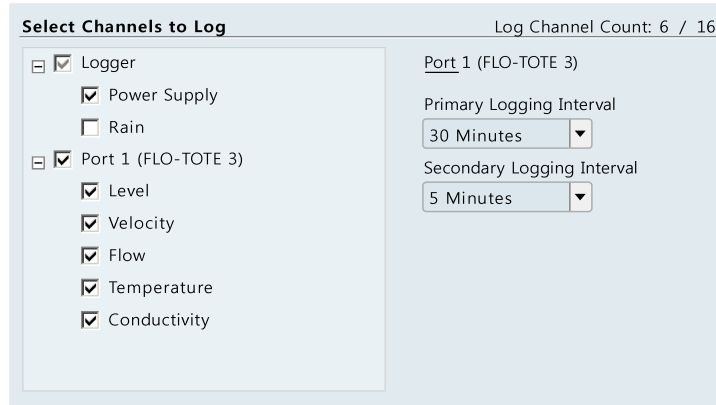
Note: Sensors do not have to be attached to the logger to write a program to the logger. The sensors must be attached for calibration.

5. Select the channels to be logged in the Select channels to log section:
 - a. Expand the tree for the Logger channel group. The Power Supply channel is always shown in this group. Logging the power supply will provide values for the battery level. An alarm could be set at a specific level to alert the account manager of a low level, thus prompting a field visit to change the batteries and

prevent lost data. If the logger contains a port for a rain gauge, the Rain channel is also shown. To include a Logger channel in the datalog, select the check box next to the channel name.

- b. Expand the tree for each Port[1](Sensor Name) channel group to view the available channels for the sensor. If the check box next to Logger or Port[1] is selected, all of the channels in the group are automatically selected.
- c. To include a Sensor channel in the datalog, select the check box next to the channel name. The Log channel count increases each time a channel is selected.

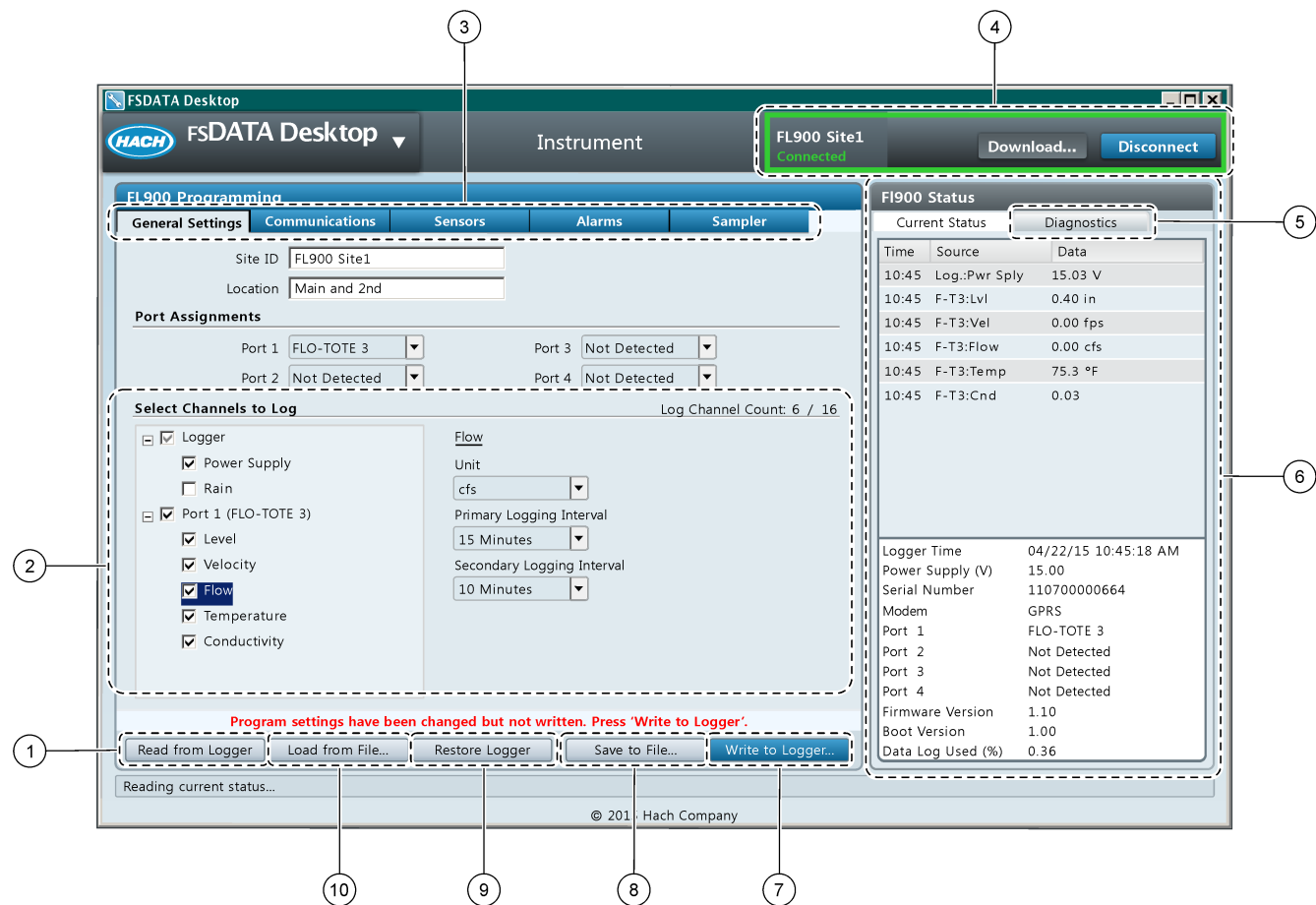
Note: For loggers with multiple sensor ports, the port number is added to the channel name. For example, Velocity 3 is the velocity channel name for sensor port 3.



- 6. To set the logging interval for a channel group:
 - a. Click on the channel group name, for example **Port1 (Flo-Dar)**. The logging intervals are shown.
 - b. Select the interval from the drop-down list. The primary logging interval is used for normal operation. The secondary logging interval is used during alarm conditions.
- 7. Click **WRITE TO LOGGER** to save the settings. A message window is shown:

Option	Description
Warning: all data will be lost. Continue?	All data that is stored in the logger is erased when a program is written to the logger. To save the data, select No and download the data to a safe location. Select Yes to erase all data and update the logger with the new program.
Set Logger Clock	Synchronize to Computer Clock—the logger uses the date and time settings of the computer. Set Logger Clock—the logger uses the date and time settings that are set by the user. Note: If the unit has a modem, the logger automatically uses the date time settings of the server for the selected time zone. There is no adjustment on the server for daylight savings time. The logger time is synchronized to the selected (standard) time zone on the server each evening.

Figure 4 Instrument dashboard



1 Load the settings from the logger	6 Connected logger status pane
2 Specify the channels that will be logged	7 Send the settings to the logger
3 Setup tabs	8 Save the settings to a file
4 Connect/disconnect, download buttons and connection status	9 Set the logger to the default settings
5 Diagnostics tab	10 Load the settings from a file (modem settings are not loaded)

3.3.1 Configure the logger for remote communication

Pre-requisites: The logger must be attached to the computer. An account with a network provider must be set up, and the server must be configured.

The settings for remote communication must be entered into FSDATA Desktop and then written to the logger.

1. Start a communication session with the logger:
 - a. Open FSDATA Desktop.
 - b. Click **CONNECT**. The Connect to Instrument window opens.
 - c. Click the FL900 button.
 - d. Select the port on the computer where the logger is attached (serial or USB), then click **Connect**.

Note: If the sensor mismatch message is shown, select "Use existing program" if the sensors will be attached to the logger again during installation. If not, select "Create new program based on detected sensors."

- e. Make sure that the connection status shows "connected".
2. Go to the Communications tab. Enter the information for the desired site. Select Time Zone.
3. Complete the Remote Settings information:

Option	Description
CDMA	No additional configuration is necessary.
GPRS	Select the network provider and the modem frequency. (For US locations, 850/1900 MHz. For outside the US, contact the provider for the modem frequency.) Enter the user name and password, if applicable.
Primary Call Interval	The frequency that the logger calls the server.
Secondary call interval	The frequency that the logger calls the server during an alarm condition.
Server Verification Code	The code that specifies which account on the FSDATA server the logger belongs to. The server cannot store data without this code.

4. Click **WRITE TO LOGGER** to save the settings. A message window is shown:

Option	Description
Warning: all data will be lost. Continue?	All data that is stored in the logger is erased when a program is written to the logger. To save the data, select No and download the data to a safe location. Select Yes to erase all data and update the logger with the new program.
Set Logger Clock	Synchronize to Computer Clock—the logger uses the date and time settings of the computer. Set Logger Clock—the logger uses the date and time settings that are set by the user. <i>Note: If the unit has a modem, the logger automatically uses the date time settings of the server for the selected time zone. There is no adjustment on the server for daylight savings time. The logger time is synchronized to the selected (standard) time zone on the server each evening.</i>

3.3.1.1 Modbus communication

The Modbus protocol is a communication option for this instrument. The Modbus registers change with the sensor settings. To find the Modbus registers, go to the Communications tab in the Instrument dashboard or the Program editor. Click **MODBUS MAP**. The register information opens in a PDF format.

3.3.2 Set up the sensors—Setup Wizard

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

Note: As an alternative, complete a zero level calibration before the AV9000 sensor is installed.

The Setup Wizard is the easiest method to configure and calibrate the sensor. The Setup Wizard includes illustrated instructions for each input parameter and includes a site velocity profile. To skip the site velocity profile, select none for the profile method. The Setup Wizard must be used for the US9000 sensors.

1. Click the Sensors tab in the Instrument dashboard.
2. Click Sensor Port[1] (sensor name).
3. Click **SETUP WIZARD**. The Setup Wizard window opens.
4. Select the options on each screen. When the Setup Results screen is shown, click **FINISH**.

5. Click **WRITE TO LOGGER** to save the settings. A message window is shown:

Option	Description
Warning: all data will be lost. Continue?	All data that is stored in the logger is erased when a program is written to the logger. To save the data, select No and download the data to a safe location. Select Yes to erase all data and update the logger with the new program.
Set Logger Clock	Synchronize to Computer Clock—the logger uses the date and time settings of the computer. Set Logger Clock—the logger uses the date and time settings that are set by the user. <i>Note: If the unit has a modem, the logger automatically uses the date time settings of the server for the selected time zone. There is no adjustment on the server for daylight savings time. The logger time is synchronized to the selected (standard) time zone on the server each evening.</i>

The sensor setup is complete. The status light on the logger will flash green if the program matches the connected sensors.

3.3.3 Set up the sensors manually

The Setup Wizard is the easiest method for sensor setup and calibration. The Setup Wizard includes illustrated instructions for each input parameter and includes a site velocity profile. To set up or adjust the sensors manually, use the instructions that follow for the applicable sensor.

3.3.3.1 Flo-Tote setup

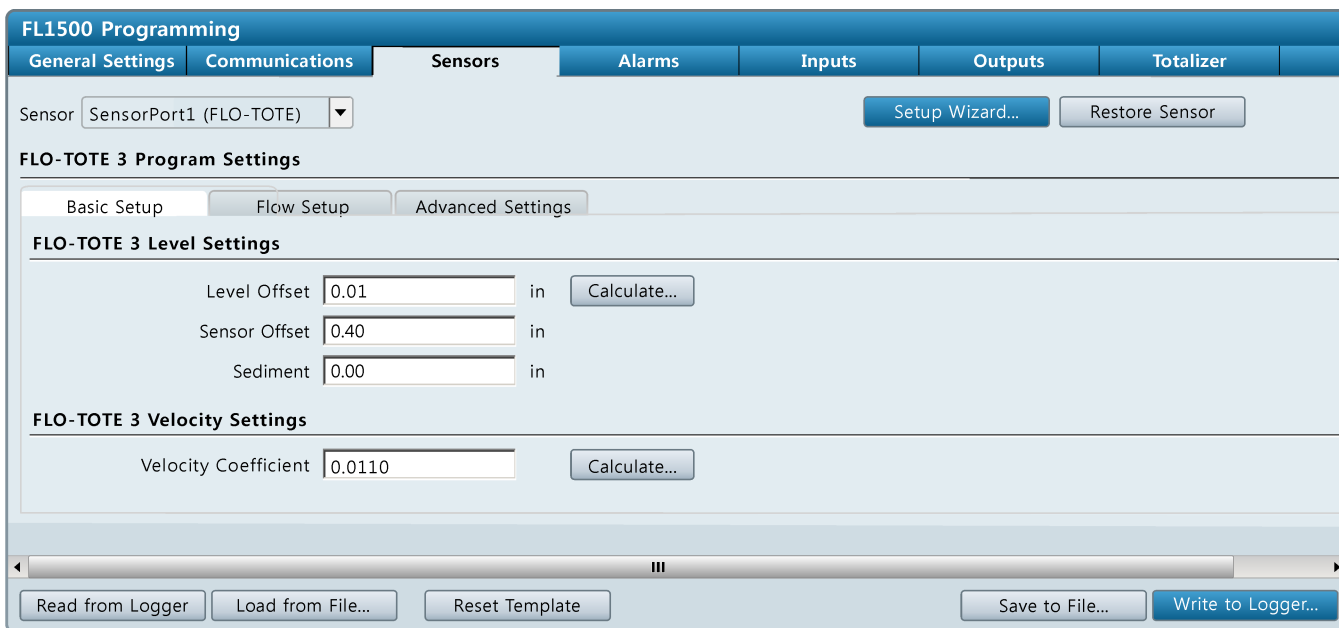
Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached Flo-Tote sensor ([Figure 5](#)).
3. FL900 only: To change the units, click **UNITS**.
Note: The selected units in the Sensors tab override the selected units in the Settings menu.
4. Click the Basic Setup tab.
5. Complete the information in the Level Settings section.
 - a. Click **CALCULATE** for the Level Calibration field. The Calculate Level Calibration window opens.
 - b. Click **TAKE MEASUREMENT**. The sensor measures the liquid level in the flow channel. When the measurement is complete, the measured level is shown.
 - c. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.
 - d. Enter the measured value in the Actual Level field. Click **OK**. The software calculates a calibration value to adjust the measured value to the actual value.
 - e. If the sensor is not installed at the bottom of the channel, measure the vertical distance from the bottom of the flow channel to the installed sensor location. Enter the value in the Sensor Offset field.
 - f. If there is sediment in the channel, measure the vertical distance from the bottom of the flow channel to the top of the sediment. Enter the value in the Sediment field.
6. Complete the information in the Velocity Settings section.
 - a. Click **CALCULATE**. The Site Coefficient window opens.
 - b. Click **TAKE MEASUREMENT**. The sensor measures the velocity in the flow channel. When the measurement is complete, the measured velocity is shown.
 - c. Measure the velocity in the flow channel with a portable instrument. A velocity profile is recommended to determine the average velocity.

- d. Enter the measured value in the Actual Velocity field. Click **OK**. The software calculates a site coefficient value to adjust the measured velocity to the average velocity.
7. Configure the flow channel as follows:
 - a. Click the Flow Setup tab.
 - b. Select the shape of the flow channel.
 - c. Enter the dimensions of the flow channel.
 - d. If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
8. For complex site conditions, contact technical support to complete the information in the Advanced Settings tab.

Note: It is not necessary to adjust the advanced settings for typical applications. Make changes only with the guidance of technical support.
9. To start again from the default settings, click **RESTORE SENSOR**. The default settings are shown.
10. Click **WRITE TO LOGGER** to save the settings.

Figure 5 Flo-Tote sensor setup



3.3.3.2 Flo-Dar setup

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached Flo-Dar sensor (Figure 6).
3. FL900 only: To change the units, click **UNITS**.

Note: The selected units in the Sensors tab override the selected units in the Settings menu.
4. Click the Basic Setup tab.
5. Complete the information in the Level Settings section.
 - a. Select the Transducer Type for the connected sensor—Standard: 0–1.5 m (0–5 ft) or Long Range: 0–6.1 m (0–20 ft).
 - b. If the sensor height is known, enter the value in the sensor height field. The sensor height is the distance from the bottom of the flow channel to the top of the sensor frame.

- c. If the sensor height is not known, click **CALCULATE** for the Sensor Height field. The Calculate Sensor Height window opens.
 - d. Click **TAKE MEASUREMENT**. The sensor measures the distance to the liquid surface (sensor distance).
 - e. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.
 - f. Enter the measured value in the Actual Level field. Click **OK**. The software calculates the sensor height from the bottom of the channel to the sensor.
 - g. If there is sediment in the channel, measure the vertical distance from the bottom of the flow channel to the top of the sediment. Enter the value in the Sediment field.
 - h. If more adjustment is necessary for the level calibration, click **CALCULATE** for the Level Calibration field. The Calculate Level Calibration window opens.
 - i. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.
 - j. Enter the measured value in the Actual Level field. Click **OK**. The software calculates a calibration value to adjust the measured value to the actual value.
6. Complete the information in the Velocity Settings section.
- a. Select the Velocity Method (Direct Mean for circular flow channels or Velocity Multiplier for non-circular flow channels).
 - b. Click **CALCULATE** for the Site Multiplier field. The Calculate Site Multiplier window opens.
 - c. Click **TAKE MEASUREMENT**. The sensor measures the velocity in the flow channel. When the measurement is complete, the measured velocity is shown.
 - d. Measure the velocity in the flow channel with a portable instrument. A velocity profile is recommended to determine the average velocity.
 - e. Enter the measured value in the Actual Velocity field. Click **OK**. The software calculates a site multiplier value to adjust the measured surface velocity to the average velocity.
 - f. If an SVS sensor is used, select the sensor port on the logger where the SVS is attached.
 - g. If an SVS sensor is used and the Flo-Dar sensor is installed in the opposite direction from the flow, select the Reversed SVS Sensor checkbox.
7. Configure the flow channel as follows:
- a. Click the Flow Setup tab.
 - b. Select the shape of the flow channel.
 - c. Enter the dimensions of the flow channel.
 - d. If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
8. For complex site conditions, contact technical support to complete the information in the Advanced Settings tab.
- Note: It is not necessary to adjust the advanced or tech support settings for typical applications. Make changes only with the guidance of technical support.*
9. To start again from the default settings, click **RESTORE SENSOR**. The default settings are shown.
10. Click **WRITE TO LOGGER** to save the settings.

Figure 6 Flo-Dar sensor setup

The screenshot displays the 'FL1500 Programming' software interface. The 'Sensors' tab is selected, showing the configuration for 'SensorPort1 (FLO-DAR)'. The 'FLO-DAR Program Settings' section is active, with the 'Basic Setup' sub-tab selected. Under 'FLO-DAR U-Sonic Level Settings', the 'Transducer Type' is set to 'Standard', 'Sensor Height' is 12.00 in, 'Sediment' is 0.75 in, and 'Level Offset' is 0.00 in. Under 'FLO-DAR Velocity Settings', the 'Velocity Method' is 'Direct Mean', 'Site Multiplier' is 1.00, and 'SVS Port' is 'None'. The 'Reversed SVS Sensor' checkbox is unchecked. At the bottom, there are buttons for 'Read from Logger', 'Load from File...', 'Reset Template', 'Save to File...', and 'Write to Logger...'.

3.3.3.3 US9000 setup

Make sure to use the Setup Wizard to set up US9000 sensors. If necessary, adjust the level offset and sediment values after the initial setup.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached US9000 sensor (Figure 7).
3. FL900 only: To change the units, click **UNITS**.
Note: The selected units in the Sensors tab override the selected units in the Settings menu.
4. Click the Basic Setup tab.
5. Complete the information in the Level Settings section.
 - a. Select the sensor type—Down-Looking or In-Pipe.
 - b. If there is sediment in the channel, measure the vertical distance from the bottom of the flow channel to the top of the sediment. Enter the value in the Sediment field.
 - c. Click **CALCULATE** for the Level Calibration field. The Calculate Level Calibration window opens.
 - d. Select the sensor type—Down-Looking or In-Pipe.
 - e. Click **TAKE MEASUREMENT**. The sensor measures the liquid level in the flow channel. When the measurement is complete, the measured level is shown.
 - f. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.
 - g. Enter the measured value in the Actual Level field. Click **OK**. The software calculates a calibration value to adjust the measured value to the actual value.
 - h. The zero level is the distance from the face of the sensor or sensor tube to the bottom of the channel.
6. Configure the flow channel as follows:
 - a. Click the Flow Setup tab.

FL900 flow logger setup

- b. Select the shape of the flow channel.
 - c. Enter the dimensions of the flow channel.
 - d. If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
7. If area velocity is selected as the flow device, select the sensor port with the area velocity sensor.
 8. For complex site conditions, contact technical support to complete the information in the Advanced Settings tab.
Note: It is not necessary to adjust the advanced settings for typical applications. Make changes only with the guidance of technical support.
 9. To start again from the default settings, click **RESTORE SENSOR**. The default settings are shown.
 10. Click **WRITE TO LOGGER** to save the settings.

Figure 7 US9000 sensor setup

The screenshot shows the 'FL1500 Programming' software interface. The 'Sensors' tab is selected, and the 'US9000 Program Settings' section is expanded to show 'Level Settings'. The 'Sensor Type' is set to 'Down-Looking', 'Sediment' is 0.50 in, and 'Level Offset' is 0.10 in. A 'Calculate...' button is next to the Level Offset field. At the bottom, there are buttons for 'Read from Logger', 'Load from File...', 'Reset Template', 'Save to File...', and 'Write to Logger...'.

3.3.3.4 AV9000 setup

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

Note: As an alternative, complete a zero level calibration before the AV9000 sensor is installed.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached AV9000 sensor ([Figure 8](#)).
3. FL900 only: To change the units, click **UNITS**.
Note: The selected units in the Sensors tab override the selected units in the Settings menu.
4. Click the Basic Setup tab.
5. Complete the information in the Level section.
 - a. If the sensor is not installed at the bottom of the channel, measure the vertical distance from the bottom of the flow channel to the installed sensor location. Enter the value in the Sensor Offset field.
 - b. Click **CALCULATE** for the Level Offset field. The Calculate Level Offset window opens.
 - c. Click **TAKE MEASUREMENT**. The sensor measures the liquid level in the flow channel. When the measurement is complete, the measured level is shown.
 - d. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.

- e. Enter the measured value in the Actual Level field. Click **OK**. The software calculates a calibration value to adjust the measured value to the actual value.
 - f. If there is sediment in the channel, measure the vertical distance from the bottom of the flow channel to the top of the sediment. Enter the value in the Sediment field.
6. If the sensor is installed in the opposite direction from the flow, select the Reversed Sensor checkbox in the Velocity section. Flow measurements will be recorded with a positive value.
 7. Configure the flow channel as follows:
 - a. Click the Flow Setup tab.
 - b. Select the shape of the flow channel.
 - c. Enter the dimensions of the flow channel.
 - d. If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
 8. For complex site conditions, contact technical support to complete the information in the Advanced Settings tab.
- Note:** It is not necessary to adjust the advanced or tech support settings for typical applications. Make changes only with the guidance of technical support.
9. To start again from the default settings, click **RESTORE SENSOR**. The default settings are shown.
 10. Click **WRITE TO LOGGER** to save the settings.

Figure 8 AV9000 sensor setup

The screenshot displays the 'FL1500 Programming' software interface. At the top, there are tabs for 'General Settings', 'Communications', 'Sensors', 'Alarms', 'Inputs', 'Outputs', and 'Totalizers'. The 'Sensors' tab is selected. Below the tabs, a dropdown menu shows 'SensorPort1 (AV9000)' and a 'Setup Wizard...' button. A 'Restore Sensor' button is also present. The main area is titled 'AV9000 Program Settings' and contains sub-tabs for 'Basic Setup', 'Flow Setup', 'Advanced Settings', and 'Tech Support Settings'. The 'Flow Setup' tab is active. Under the 'Level' section, there are three input fields: 'Sensor Offset' (0.40 in), 'Level Offset' (0.01 in), and 'Sediment' (1.00 in). A 'Calculate...' button is located next to the Level Offset field. Under the 'Velocity' section, there is a 'Reversed Sensor' checkbox which is currently unchecked.

3.3.4 Verify the sensor calibration

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

After the sensor setup is complete and the program has been written to the logger, verify that the sensor measurements are accurate.

1. Click on the Diagnostics tab in the Instrument dashboard.
2. Select the sensor from the pull-down list.
3. Click **TAKE MEASUREMENT**. The sensor measurement starts. When the measurement is complete, the sensor data is shown in the Status panel.
4. Examine the results. Make sure that the sensor data is reasonable. If the data is questionable, use the Setup Wizard or go through the steps for manual sensor setup again.

- To log diagnostic data for the sensor, select a time interval and click **LOG DIAGNOSTICS**. All FFT, quality parameters and sub-measurements will be recorded as part of the datalog for the specified interval.

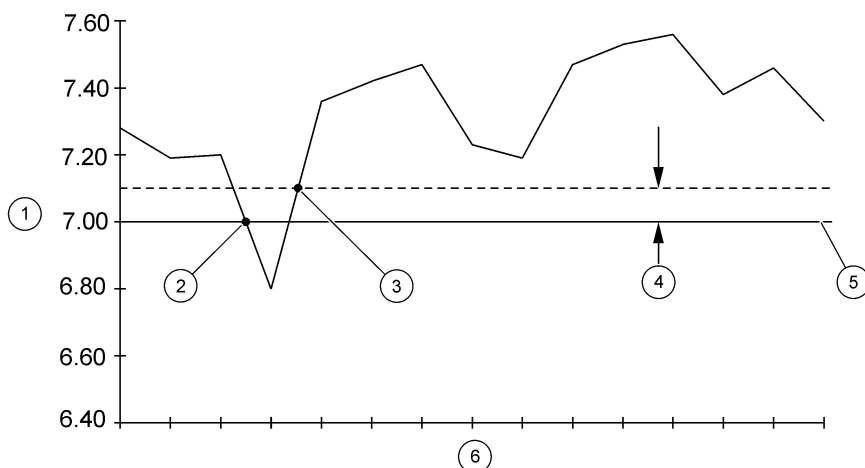
Note: The diagnostic data is available in the downloaded data file in FSDATA Desktop. For FL900 wireless loggers, the diagnostic data is also available on the FSDATA server.

3.3.5 Set up alarms

Use the Alarms menu to set up channel alarms, system alarms and notifications. Channels must first be selected in the General Settings tab before channel alarms can be set. A maximum of 16 channel alarms can be set.

- Go to the Alarms tab in the Instrument Dashboard (connected) or Program Editor (not connected).
- To set a channel alarm, click the **Channel Alarms** tab:
 - Click **ADD....** The Add Channel Alarm window opens.
 - Select the channel from the drop-down list.
 - Select the type of alarm (low/low, low, high, high/high) and click **OK**. The channel alarm is shown in the main section.
 - Select the channel alarm.
 - Enter the setpoint value and deadband. An alarm starts when the channel value is equal to the setpoint value. An alarm stops when the channel value goes above (low alarm) or below (high alarm) the setpoint value by the deadband value.

Figure 9 Low alarm example



1 Channel value	3 Low alarm stops	5 Setpoint
2 Low alarm starts	4 Deadband	6 Time

- Select the actions that will start during an alarm condition:

Option	Description
Send SMS from logger	Sends an SMS (text) message from a wireless logger—useful when there is no server connection.
Send Email from logger	Sends an email message from a wireless logger—useful when there is no server connection.
Trigger sampler	Starts a sampling program when a sampler is attached.
Switch to secondary log interval	Switches to secondary log interval—the secondary log interval is used.

Option	Description
Switch to secondary call interval	Switches to secondary call interval—the secondary call interval is used.
Send SMS from server	Sends an SMS (text) message from the server—uses less battery power in the logger.
Send Email from server	Sends an email message from the server—uses less battery power in the logger.

3. To set a system alarm, click the **System Alarms** tab:

a. Select the system alarm type:

Option	Description
Low Main Power	Less than 8 V is available from the logger batteries or the external power supply.
Low RTC Battery	The battery for the internal clock in the logger is weak.
Low Slate Memory	The datalog is 80% full.
Slate Memory Full	The datalog is full. The new data overwrites the oldest data.
Sensor Timeout	The sensor has not responded to a call by the server.
Sensor ID Error	The program cannot detect what type of sensor is connected.

b. Select the system alarm actions:

Option	Description
Send SMS from logger	Sends a text message from the logger via the network provider.
Send Email from logger	Sends an email from the logger via the network provider.
Send SMS from server	Sends a text message from the FSDATA server.
Send Email from server	Sends an email from the FSDATA server.

4. To enter recipient information for alarm notifications, click the **Recipients** tab:

- a. Enter the email address for each email recipient (maximum of 5).
- b. Enter the number for each SMS (text message) recipient (maximum of 5). Enter the phone number as a 10-digit number with no space or dash between the numbers (e.g., 9705551234).

3.3.6 Set up flow pacing for samplers

Use flow pacing to set up an attached automatic sampler to collect samples at specified flow intervals. The sampler must be attached to the auxiliary port on the logger. Use the Sampler menu to specify when samples are collected.

- 1. Go to the Sampler tab in the Instrument Dashboard (connected) or Program Editor (not connected).
- 2. In the Pacing Source field, select the sensor port that will measure flow for the sampler.
- 3. Enter the volume interval that generates a flow pulse to the sampler. For example, a sampler can collect a sample every 100 gallons of flow.

Note: The sampler can also collect a sample during alarm conditions if the Trigger sampler action is set for a channel alarm.

3.3.7 IM9001 setup for FL900 loggers

The IM9001 interface module can be installed on the FL900 flow loggers. When the IM9001 interface module is installed, the FL900 logger can collect data from a Sigma Flow Meter and transmit the data via a wireless or local connection. The data can be used to trigger alarms or pace a sampler.

Use the Instrument dashboard to set the log intervals and to select the channels that are logged. The logging intervals that are programmed into the 950 Flow Meter must be more than or equal to the logging intervals of the logger to be sure that all data is logged.

Note: Configure the Sigma Flow Meter before connection to the IM9001 module. The flow meter program cannot be configured through the IM9001 module. Refer to the flow meter user manual for programming details. The logger program and Sigma Flow Meter programs run independently of each other.

Configure the IM9001 module to communicate with a Sigma Flow Meter.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the IM9001 module.
3. Change any of the options:

Option	Description
Modbus Address	Use the same Modbus address that is programmed in the Sigma Flow Meter.
Baud Rate	Use the same Baud rate that is programmed in the Sigma Flow Meter.

4. Click **WRITE TO LOGGER** to save the settings.

3.3.8 Set up a program offline

Use the Program Editor to set up a logger program for later use or to view program settings from downloaded data files. Save the program as a file, edit as necessary, then write the program to the logger when the logger is connected to FSDATA Desktop.

1. Go to Program Editor from the main menu.
2. Select **NEW** to make a new program or **LOAD** to edit an existing program.
Note: If a downloaded site file is open, the program settings for the site file are shown.
3. Enter the program information in each of the tabs. Refer to [Make a basic FL900 logger program](#) on page 8.

Note: The Program Editor shows most of the information that is in the Instrument dashboard. Some buttons such as the Setup Wizard and Calculate show only when a logger with an installed sensor is connected to FSDATA Desktop.

4. Click **SAVE TO FILE**. Save the file on the PC for later use. When the logger is connected, click **LOAD FROM FILE**, navigate to the saved file and click **OPEN**.

3.4 Export FL900 files to FSDATA server

FL900 logger files can be sent to the FSDATA server where other site users have access to the data. The server software can complete additional operations such as merge multiple data files into one data file.

1. Open FSDATA Desktop.
2. Go to Import/Export from the main menu. The Import/Export screen opens.
3. Select the Export to FSDATA option. The Export to FSDATA screen opens.
4. Click **SELECT FILES**. The file directory window opens.
5. Go to the directory that has the logger files (.fl9) and select one or more files. Click **OPEN**.
6. Click **EXPORT**. The FSDATA Log In window opens.

7. Enter the user name and password and click **OK**.
Note: Contact technical support if a user name and password have not been set up.
8. Click **OK**. The Status in the file list changes from pending to successful.

Section 4 FL1500 flow logger setup

Use FSDATA Desktop to configure the settings for the FL1500 Flow Logger. Send the configuration directly to the logger from the PC or save the configuration to a USB flash drive for import into the logger. Refer to [Export settings to a USB drive](#) on page 46.

4.1 Attach the FL1500 to the computer

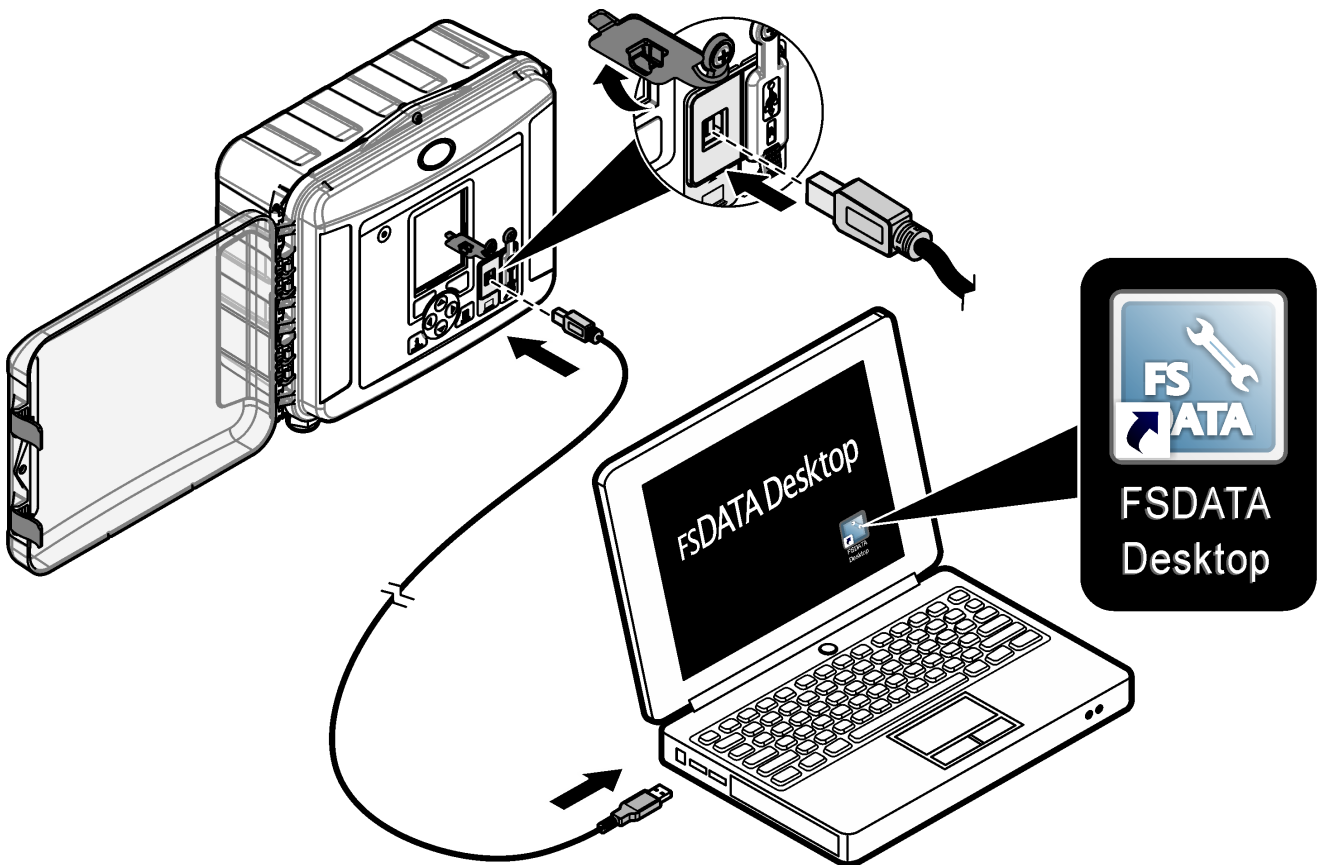
NOTICE

Damage to the logger and PC can occur if the PC is connected to the incorrect port on the logger. Connect the PC only to the USB B port on the logger.

Pre-requisites: Make sure that FSDATA Desktop is installed on the computer.

Use a USB A to B cable (maximum length: 2.7 meters (9 feet)) to attach the computer to the logger. Refer to [Figure 10](#). Connect only one logger to the computer.

Figure 10 Attach the logger to a computer



4.2 Connect the logger to FSDATA Desktop

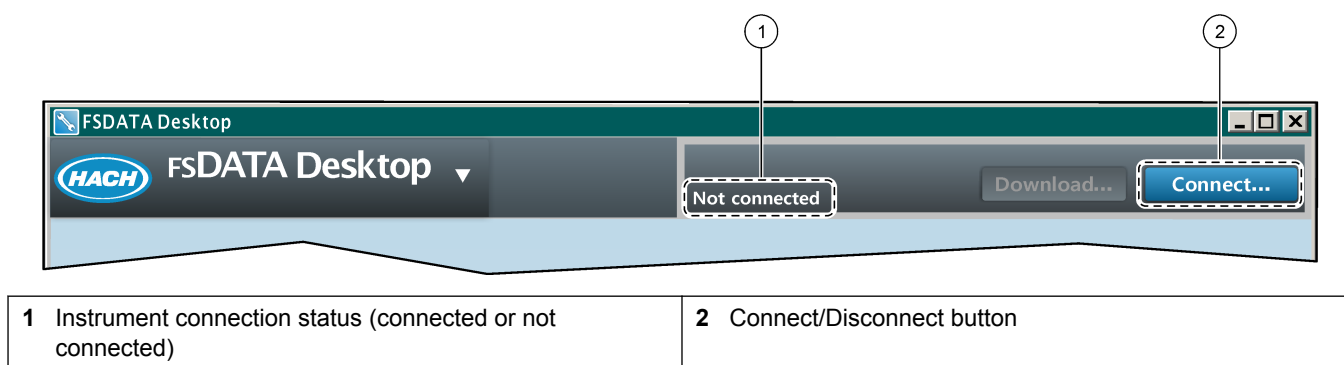
Connect the logger to FSDATA Desktop to configure the logger or to download data.

Connection status:

- Connected—An instrument is attached to the PC and connected to FSDATA Desktop. The attached sensors are shown in the Instrument menu. The user can download and view data from the logger and write a program to the logger. The Program Editor, Import/Export and Software Updates menus are not available.
 - Not connected—An instrument is not connected to FSDATA Desktop. The Instrument and Instrument Tools menus are not available.
1. Attach the logger to the PC. Refer to [Attach the FL1500 to the computer](#) on page 23.
 2. Click **CONNECT** (Figure 11). The Connect to Instrument window opens.
 3. Click **FL1500**. Select USB from the COM Port options.
 4. Click **CONNECT**. The connection status changes to Connected.

*Note: If the Program Mismatch message shows, the FL1500 program has port assignments that are different from installed sensor ports. To change the program, click **YES**.*

Figure 11 Connect to FSDATA Desktop



4.3 Make a basic FL1500 logger program

A basic program must be written to the logger to specify the channels to be logged. The logger program starts when the program is written to the logger.

1. Make sure that the connection status shows "Connected".
2. Go to the Instrument menu (Figure 1 on page 5). The FL1500 Programming screen opens to the General Settings tab. Refer to Figure 12.
3. Enter the Site ID and Location with letters and numbers only. Do not use special characters.

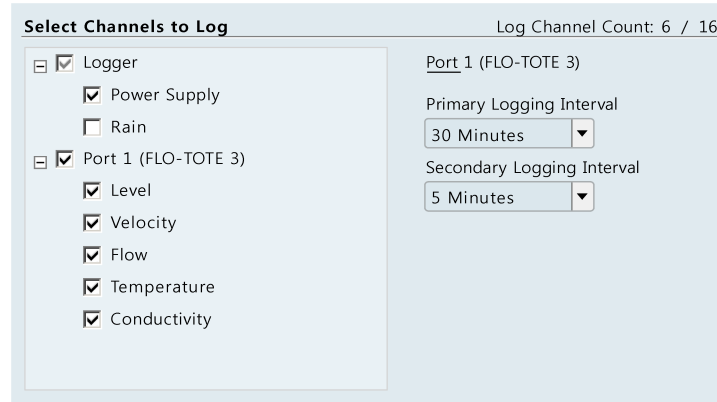
Option	Description
Site ID	Enter a unique name for the site (required).
Location	Enter the physical location of the instrument (optional).

4. Select the sensors in the Port Assignments section. Make sure to select the same port connection where the sensor is physically installed in the instrument.

Note: Sensors do not have to be attached to the logger to write a program to the logger. The sensors must be attached for calibration.
5. Select the channels to be logged in the Select channels to log section:
 - a. Expand the tree for the Logger channel group. The Power Supply channel and Rain Gauge Channel are always shown in this group. An alarm could be set to alert the user of a low level for the optional backup battery. To include a Logger channel in the datalog, select the check box next to the channel name.

- b. Expand the tree for each Port[1](Sensor Name) channel group to view the available channels for the sensor. If the check box next to Logger or Port[1] is selected, all of the channels in the group are automatically selected.
- c. To include a Sensor channel in the datalog, select the check box next to the channel name. The Log channel count increases each time a channel is selected.

Note: The port number where the sensor connects to the instrument shows in the sensor channel name. For example, Velocity 2 is the velocity channel name for the sensor that connects to sensor port 2. An IO number that follows a channel name identifies the analog inputs of the optional I/O module.

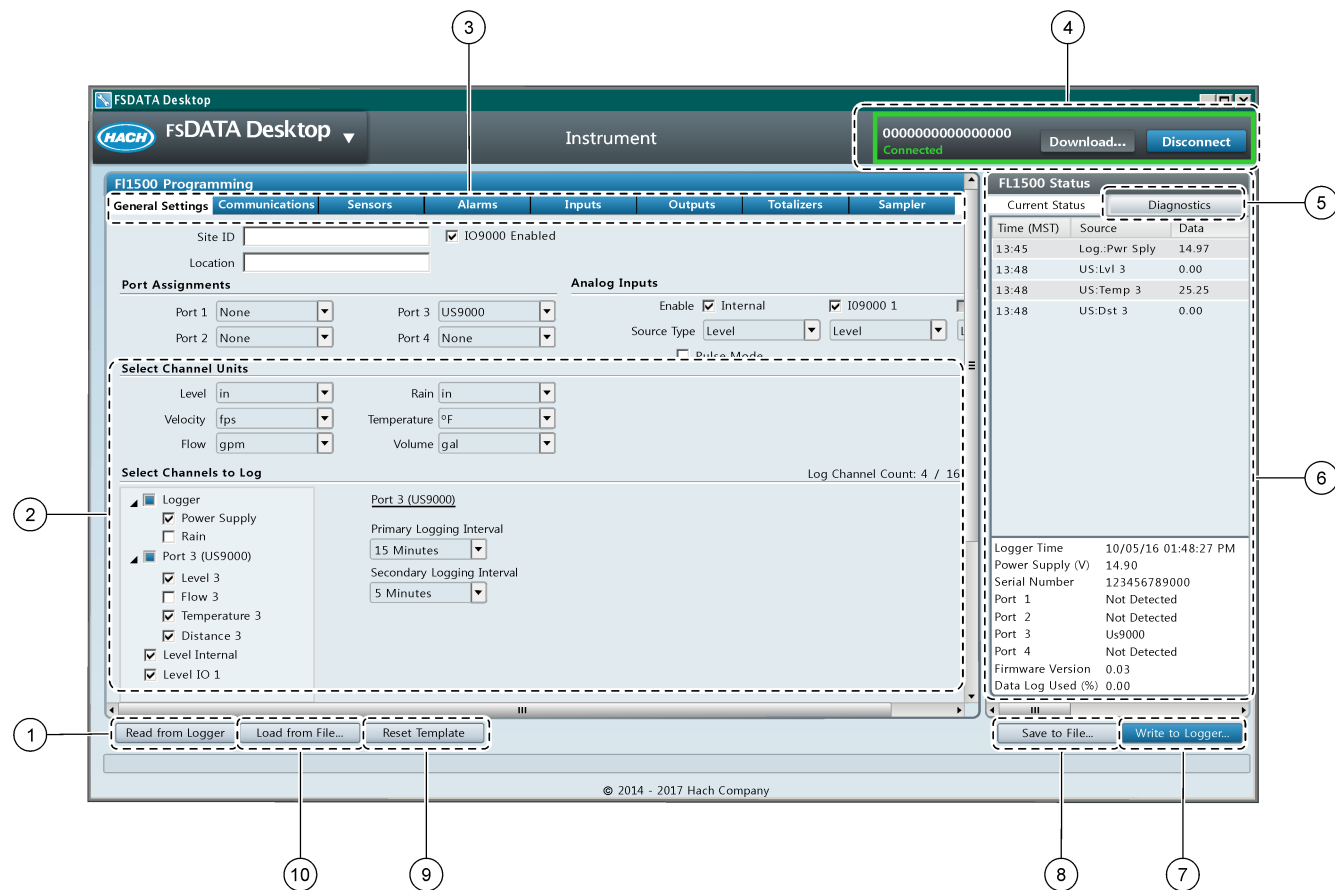


- 6. To set the logging interval for a channel group:
 - a. Click on the channel group name, for example **Port1 (Flo-Dar)**. The logging intervals are shown.
 - b. Select the interval from the drop-down list. The primary logging interval is used for normal operation. The secondary logging interval is used during alarm conditions.
- 7. Click **WRITE TO LOGGER** to save the settings. The Write Program to FL1500 window opens.
- 8. Select the options, then click **WRITE PROGRAM**.

Option	Description
Erase logged data stored in FL1500	All data, which includes the resettable and non-resettable software totalizers, is erased when the new program is written to the logger.
Set FL1500 time	Sets the logger time to be the same as the computer.

After measurements start, the logged channels show in the status pane. New values show at each log interval.

Figure 12 Instrument dashboard



1 Load the settings from the logger	6 Connected logger status pane
2 Specify the channels and units	7 Send the settings to the logger
3 Setup tabs	8 Save the settings to a file
4 Connect/disconnect, download buttons and connection status	9 Set the logger to the default settings
5 Diagnostics tab	10 Load the settings from a file

4.3.1 Set up the sensors—Setup Wizard

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

The Setup Wizard is the easiest method to configure and calibrate the sensor. The Setup Wizard includes illustrated instructions for each input parameter and includes a site velocity profile. To skip the site velocity profile, select none in the profile method.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor from the pull-down list.
3. Click **SETUP WIZARD**. The Setup Wizard window opens.
4. Select the options on each screen. When the Setup Results screen is shown, click **FINISH**.

5. Click **WRITE TO LOGGER** to save the settings. The Write Program to FL1500 window opens.
6. Select the options, then click **WRITE PROGRAM**.

Option	Description
Erase logged data stored in FL1500	All data, which includes the resettable and non-resettable software totalizers, is erased when the new program is written to the logger.
Set FL1500 time	Sets the logger time to be the same as the computer.

4.3.2 Set up the sensors manually

The Setup Wizard is the easiest method for sensor setup and calibration. The Setup Wizard includes illustrated instructions for each input parameter and includes a site velocity profile. To set up or adjust the sensors manually, use the instructions that follow for the applicable sensor.

4.3.2.1 Flo-Tote setup

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached Flo-Tote sensor (Figure 13).
3. FL900 only: To change the units, click **UNITS**.
Note: The selected units in the Sensors tab override the selected units in the Settings menu.
4. Click the Basic Setup tab.
5. Complete the information in the Level Settings section.
 - a. Click **CALCULATE** for the Level Calibration field. The Calculate Level Calibration window opens.
 - b. Click **TAKE MEASUREMENT**. The sensor measures the liquid level in the flow channel. When the measurement is complete, the measured level is shown.
 - c. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.
 - d. Enter the measured value in the Actual Level field. Click **OK**. The software calculates a calibration value to adjust the measured value to the actual value.
 - e. If the sensor is not installed at the bottom of the channel, measure the vertical distance from the bottom of the flow channel to the installed sensor location. Enter the value in the Sensor Offset field.
 - f. If there is sediment in the channel, measure the vertical distance from the bottom of the flow channel to the top of the sediment. Enter the value in the Sediment field.
6. Complete the information in the Velocity Settings section.
 - a. Click **CALCULATE**. The Site Coefficient window opens.
 - b. Click **TAKE MEASUREMENT**. The sensor measures the velocity in the flow channel. When the measurement is complete, the measured velocity is shown.
 - c. Measure the velocity in the flow channel with a portable instrument. A velocity profile is recommended to determine the average velocity.
 - d. Enter the measured value in the Actual Velocity field. Click **OK**. The software calculates a site coefficient value to adjust the measured velocity to the average velocity.
7. Configure the flow channel as follows:
 - a. Click the Flow Setup tab.
 - b. Select the shape of the flow channel.

FL1500 flow logger setup

- c. Enter the dimensions of the flow channel.
- d. If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
8. For complex site conditions, contact technical support to complete the information in the Advanced Settings tab.
Note: It is not necessary to adjust the advanced settings for typical applications. Make changes only with the guidance of technical support.
9. To start again from the default settings, click **RESTORE SENSOR**. The default settings are shown.
10. Click **WRITE TO LOGGER** to save the settings.

Figure 13 Flo-Tote sensor setup

The screenshot displays the 'FL1500 Programming' software interface. The 'Sensors' tab is selected, showing the configuration for 'SensorPort1 (FLO-TOTE)'. The interface includes a 'Setup Wizard...' button and a 'Restore Sensor' button. The 'FLO-TOTE 3 Program Settings' section is expanded to show 'Level Settings' and 'Velocity Settings'. The 'Level Settings' section includes input fields for 'Level Offset' (0.01 in), 'Sensor Offset' (0.40 in), and 'Sediment' (0.00 in), each with a 'Calculate...' button. The 'Velocity Settings' section includes a 'Velocity Coefficient' input field (0.0110) and a 'Calculate...' button. At the bottom of the interface, there are buttons for 'Read from Logger', 'Load from File...', 'Reset Template', 'Save to File...', and 'Write to Logger...'.

4.3.2.2 Flo-Dar setup

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached Flo-Dar sensor (Figure 14).
3. FL900 only: To change the units, click **UNITS**.
Note: The selected units in the Sensors tab override the selected units in the Settings menu.
4. Click the Basic Setup tab.
5. Complete the information in the Level Settings section.
 - a. Select the Transducer Type for the connected sensor—Standard: 0–1.5 m (0–5 ft) or Long Range: 0–6.1 m (0–20 ft).
 - b. If the sensor height is known, enter the value in the sensor height field. The sensor height is the distance from the bottom of the flow channel to the top of the sensor frame.
 - c. If the sensor height is not known, click **CALCULATE** for the Sensor Height field. The Calculate Sensor Height window opens.
 - d. Click **TAKE MEASUREMENT**. The sensor measures the distance to the liquid surface (sensor distance).
 - e. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.

- f. Enter the measured value in the Actual Level field. Click **OK**. The software calculates the sensor height from the bottom of the channel to the sensor.
 - g. If there is sediment in the channel, measure the vertical distance from the bottom of the flow channel to the top of the sediment. Enter the value in the Sediment field.
 - h. If more adjustment is necessary for the level calibration, click **CALCULATE** for the Level Calibration field. The Calculate Level Calibration window opens.
 - i. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.
 - j. Enter the measured value in the Actual Level field. Click **OK**. The software calculates a calibration value to adjust the measured value to the actual value.
6. Complete the information in the Velocity Settings section.
 - a. Select the Velocity Method (Direct Mean for circular flow channels or Velocity Multiplier for non-circular flow channels).
 - b. Click **CALCULATE** for the Site Multiplier field. The Calculate Site Multiplier window opens.
 - c. Click **TAKE MEASUREMENT**. The sensor measures the velocity in the flow channel. When the measurement is complete, the measured velocity is shown.
 - d. Measure the velocity in the flow channel with a portable instrument. A velocity profile is recommended to determine the average velocity.
 - e. Enter the measured value in the Actual Velocity field. Click **OK**. The software calculates a site multiplier value to adjust the measured surface velocity to the average velocity.
 - f. If an SVS sensor is used, select the sensor port on the logger where the SVS is attached.
 - g. If an SVS sensor is used and the Flo-Dar sensor is installed in the opposite direction from the flow, select the Reversed SVS Sensor checkbox.
7. Configure the flow channel as follows:
 - a. Click the Flow Setup tab.
 - b. Select the shape of the flow channel.
 - c. Enter the dimensions of the flow channel.
 - d. If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
8. For complex site conditions, contact technical support to complete the information in the Advanced Settings tab.

***Note:** It is not necessary to adjust the advanced or tech support settings for typical applications. Make changes only with the guidance of technical support.*
9. To start again from the default settings, click **RESTORE SENSOR**. The default settings are shown.
10. Click **WRITE TO LOGGER** to save the settings.

Figure 14 Flo-Dar sensor setup

The screenshot shows the 'FL1500 Programming' software interface. The 'Sensors' tab is selected, displaying 'SensorPort1 (FLO-DAR)'. Below this are two main sections: 'FLO-DAR U-Sonic Level Settings' and 'FLO-DAR Velocity Settings'. The level settings include fields for Transducer Type (Standard), Sensor Height (12.00 in), Sediment (0.75 in), and Level Offset (0.00 in), each with a 'Calculate...' button. The velocity settings include Velocity Method (Direct Mean), Site Multiplier (1.00), SVS Port (None), and a checkbox for Reversed SVS Sensor. At the bottom, there are buttons for 'Read from Logger', 'Load from File...', 'Reset Template', 'Save to File...', and 'Write to Logger...'.

4.3.2.3 US9000 setup

Make sure to use the Setup Wizard to set up US9000 sensors. If necessary, adjust the level offset and sediment values after the initial setup.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached US9000 sensor (Figure 15).
3. FL900 only: To change the units, click **UNITS**.
Note: The selected units in the Sensors tab override the selected units in the Settings menu.
4. Click the Basic Setup tab.
5. Complete the information in the Level Settings section.
 - a. Select the sensor type—Down-Looking or In-Pipe.
 - b. If there is sediment in the channel, measure the vertical distance from the bottom of the flow channel to the top of the sediment. Enter the value in the Sediment field.
 - c. Click **CALCULATE** for the Level Calibration field. The Calculate Level Calibration window opens.
 - d. Select the sensor type—Down-Looking or In-Pipe.
 - e. Click **TAKE MEASUREMENT**. The sensor measures the liquid level in the flow channel. When the measurement is complete, the measured level is shown.
 - f. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.
 - g. Enter the measured value in the Actual Level field. Click **OK**. The software calculates a calibration value to adjust the measured value to the actual value.
 - h. The zero level is the distance from the face of the sensor or sensor tube to the bottom of the channel.
6. Configure the flow channel as follows:
 - a. Click the Flow Setup tab.

- b. Select the shape of the flow channel.
 - c. Enter the dimensions of the flow channel.
 - d. If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
7. If area velocity is selected as the flow device, select the sensor port with the area velocity sensor.
 8. For complex site conditions, contact technical support to complete the information in the Advanced Settings tab.

Note: It is not necessary to adjust the advanced settings for typical applications. Make changes only with the guidance of technical support.
 9. To start again from the default settings, click **RESTORE SENSOR**. The default settings are shown.
 10. Click **WRITE TO LOGGER** to save the settings.

Figure 15 US9000 sensor setup

The screenshot displays the 'FL1500 Programming' software interface. The 'Sensors' tab is selected, showing the 'Sensor' dropdown set to 'SensorPort1 (US9000)'. Below this, the 'US9000 Program Settings' section is visible, with the 'Basic Setup' tab active. Under 'Level Settings', the 'Sensor Type' is set to 'Down-Looking'. The 'Sediment' field is set to '0.50 in' and the 'Level Offset' field is set to '0.10 in'. A 'Calculate...' button is located next to the Level Offset field. At the bottom of the interface, there are buttons for 'Read from Logger', 'Load from File...', 'Reset Template', 'Save to File...', and 'Write to Logger...'.

4.3.2.4 AV9000 setup

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

Note: As an alternative, complete a zero level calibration before the AV9000 sensor is installed.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached AV9000 sensor ([Figure 16](#)).
3. FL900 only: To change the units, click **UNITS**.

Note: The selected units in the Sensors tab override the selected units in the Settings menu.
4. Click the Basic Setup tab.
5. Complete the information in the Level section.
 - a. If the sensor is not installed at the bottom of the channel, measure the vertical distance from the bottom of the flow channel to the installed sensor location. Enter the value in the Sensor Offset field.
 - b. Click **CALCULATE** for the Level Offset field. The Calculate Level Offset window opens.
 - c. Click **TAKE MEASUREMENT**. The sensor measures the liquid level in the flow channel. When the measurement is complete, the measured level is shown.
 - d. Measure the vertical distance from the bottom of the flow channel to the top of the liquid.

FL1500 flow logger setup

- e. Enter the measured value in the Actual Level field. Click **OK**. The software calculates a calibration value to adjust the measured value to the actual value.
 - f. If there is sediment in the channel, measure the vertical distance from the bottom of the flow channel to the top of the sediment. Enter the value in the Sediment field.
6. If the sensor is installed in the opposite direction from the flow, select the Reversed Sensor checkbox in the Velocity section. Flow measurements will be recorded with a positive value.
7. Configure the flow channel as follows:
 - a. Click the Flow Setup tab.
 - b. Select the shape of the flow channel.
 - c. Enter the dimensions of the flow channel.
 - d. If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
8. For complex site conditions, contact technical support to complete the information in the Advanced Settings tab.

Note: *It is not necessary to adjust the advanced or tech support settings for typical applications. Make changes only with the guidance of technical support.*
9. To start again from the default settings, click **RESTORE SENSOR**. The default settings are shown.
10. Click **WRITE TO LOGGER** to save the settings.

Figure 16 AV9000 sensor setup

The screenshot displays the 'FL1500 Programming' software interface. At the top, there are tabs for 'General Settings', 'Communications', 'Sensors', 'Alarms', 'Inputs', 'Outputs', and 'Totalizers'. The 'Sensors' tab is active. Below the tabs, a dropdown menu shows 'SensorPort1 (AV9000)' selected. To the right of the dropdown are two buttons: 'Setup Wizard...' and 'Restore Sensor'. Below this is the 'AV9000 Program Settings' section, which has four sub-tabs: 'Basic Setup', 'Flow Setup', 'Advanced Settings', and 'Tech Support Settings'. The 'Basic Setup' tab is selected. Under 'Level', there are three input fields: 'Sensor Offset' with a value of 0.40, 'Level Offset' with a value of 0.01, and 'Sediment' with a value of 1.00. Each field is followed by the unit 'in'. A 'Calculate...' button is located to the right of the 'Level Offset' field. Under 'Velocity', there is a 'Reversed Sensor' checkbox which is currently unchecked.

4.3.2.5 BL9000 bubbler setup

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

For an explanation of the setup options, refer to the user manual for the bubbler.

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port that connects to the BL9000 bubbler. Refer to [Figure 17](#).
3. Click the Basic Setup tab.

4. Complete the options in the Level Settings section as follows:

Option	Description
Bubble Rate	Changes the rate that bubbles come out of the bubbler line. Options: 1 to 5. Increase or decrease the bubble rate number until the bubble rate is approximately one bubble per second.
Level Adjust	Sets the level value to the current head (the level that contributes to flow) in the channel. Use the level adjust option for weir installations when the bubbler line outlet is in the water. The level adjust value is the vertical distance from the zero reference point to the water level. Level adjust values are positive when the water level is above the zero reference point, or negative when the water level is below the zero reference point. In a circular pipe, the level that contributes to flow is the distance from the surface of the water to the invert (bottom) of the pipe. In a flume the level that contributes to flow is the distance from the surface of the water to the floor of the flume. Enter the vertical distance from the zero reference point to the water level above the zero reference point. <i>Note: When the user enters a value for level adjust, the control instrument erases the sensor offset value.</i>
Sensor Offset	Adjusts the level measurement for applications where the bubbler line outlet is above or below the zero reference point. Use the sensor offset option for weir installations where the bubbler line outlet is not currently in the water or in non-weir applications where the bubbler line outlet is above or below the zero reference point of the channel. The sensor offset value is the vertical distance from the bubbler line outlet to the zero reference point. Enter the vertical distance from the bubbler line outlet to the zero reference point. <i>Note: When the user enters a value for sensor offset, the control instrument erases the level adjust value.</i>
Sediment	Adjusts the cross-section (area) of the flow channel for sediment in the flow channel when area is used in the flow calculation. Enter the value of the vertical depth of the sediment in the flow channel.

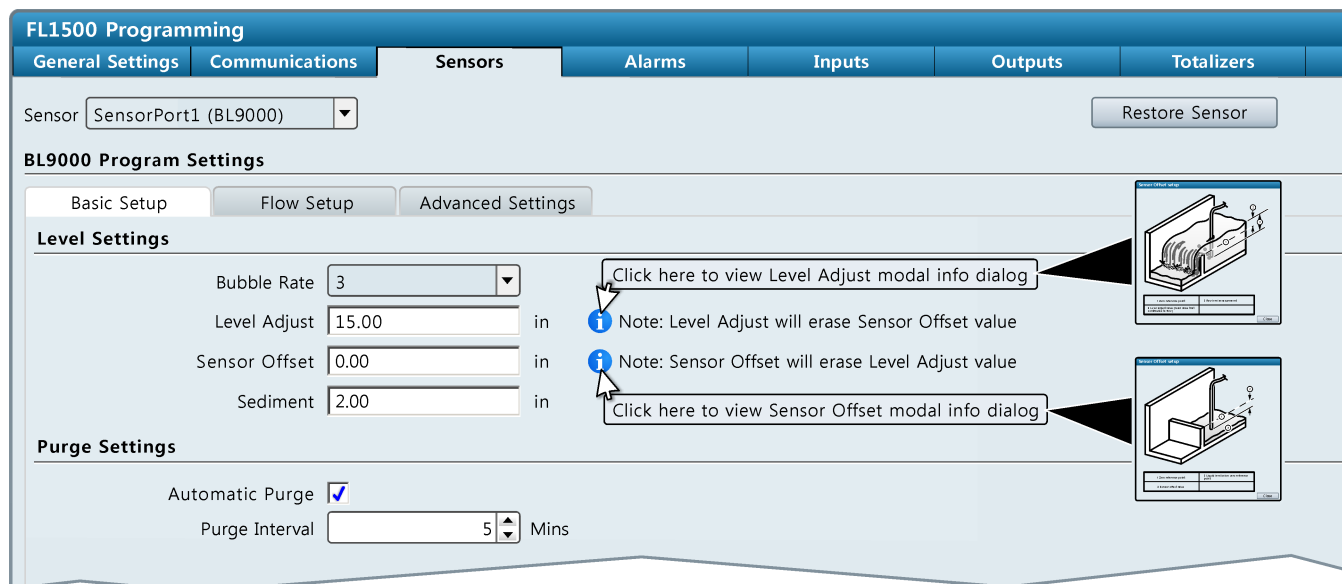
5. In the Purge Settings section, select the Automatic Purge option to purge the bubbler line at selected intervals (5 to 30 minutes).

Note: The auto purge option pushes air out the bubbler line at high pressure for 1-second to remove sediment from around the bubbler line outlet.

6. Configure the flow channel as follows:
- Click the Flow Setup tab.
 - Select the shape of the flow channel.
 - Enter the dimensions of the flow channel.
 - If the flow channel has a complex shape, a table is shown. Enter the area at the specified level intervals.
7. If area velocity is selected as the flow device, select the sensor port with the area velocity sensor.
8. Calibrate the BL9000 bubbler from the Advanced Settings tab.
9. Click **WRITE TO LOGGER** to save the settings. The Write Program to FL1500 window opens.
10. Select the options, then click **WRITE PROGRAM**.

Option	Description
Erase logged data stored in FL1500	All data, which includes the resettable and non-resettable software totalizers, is erased when the new program is written to the logger.
Set FL1500 time	Sets the logger time to be the same as the computer.

Figure 17 BL9000 bubbler setup



4.3.2.6 pH sensor setup

1. Click the Sensors tab in the Instrument dashboard.
2. Select the sensor port with the attached pH sensor.
3. Select the options:

Option	Description
AC Frequency	Selects the power line frequency to get the best noise rejection. Options: 50 or 60 Hz (default).

4. Click **WRITE TO LOGGER** to save the settings.

4.3.3 Verify the sensor calibration

Pre-requisites: Install the sensor in the process. Connect the logger to FSDATA Desktop.

After the sensor setup is complete and the program has been written to the logger, verify that the sensor measurements are accurate.

1. Click on the Diagnostics tab in the Instrument dashboard.
2. Select the sensor from the pull-down list.
3. Click **TAKE MEASUREMENT**. The sensor measurement starts. When the measurement is complete, the sensor data is shown in the Status panel.
4. Examine the results. Make sure that the sensor data is reasonable. If the data is questionable, use the Setup Wizard or go through the steps for manual sensor setup again.
5. To log diagnostic data for the sensor, select a time interval and click **LOG DIAGNOSTICS**. All FFT, quality parameters and sub-measurements will be recorded as part of the datalog for the specified interval.

Note: Diagnostic logging is available for the AV9000, Flo-Dar, BL9000 and US9001 sensors.

Note: The diagnostic data is available in the downloaded data file in FSDATA Desktop.

4.3.4 Set up flow pacing for samplers

Use flow pacing to set up an attached automatic sampler to collect samples at specified flow intervals. The sampler must be attached to the auxiliary port on the logger. Use the Sampler menu to specify when samples are collected.

1. Go to the Sampler tab in the Instrument Dashboard (connected) or Program Editor (not connected).
2. In the Pacing Source field, select the sensor port that will measure flow for the sampler.
3. Enter the volume interval that generates a flow pulse to the sampler. For example, a sampler can collect a sample every 100 gallons of flow.

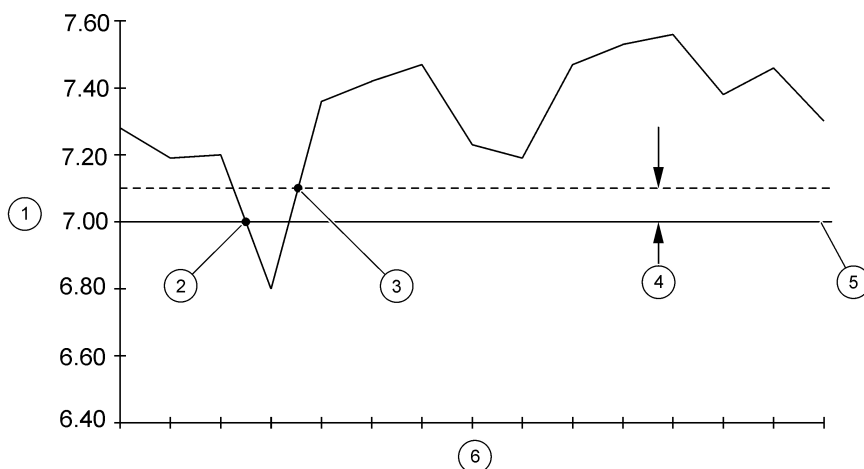
Note: The sampler can also collect a sample during alarm conditions if the Trigger sampler action is set for a channel alarm.

4.3.5 Set up alarms

Use the Alarms menu to set up channel alarms and system alarms. Channels must first be selected in the General Settings tab, Select Channels to Log section before channel alarms can be set. A maximum of 16 channel alarms can be set.

1. Go to the Alarms tab in the Instrument Dashboard (connected) or Program Editor (not connected).
2. To set a channel alarm, click the Channel Alarms tab:
 - a. Click ADD.... The Add Channel Alarm window opens.
 - b. Select the channel from the drop-down list.
 - c. Select the type of alarm (low/low, low, high, high/high) and click **OK**. The channel alarm is shown in the main section.
 - d. Select the channel alarm.
 - e. Enter the setpoint value and deadband. An alarm starts when the channel value is equal to the setpoint value. An alarm stops when the channel value goes above (low alarm) or below (high alarm) the setpoint value by the deadband value.

Figure 18 Low alarm example



1 Channel value	3 Low alarm stops	5 Setpoint
2 Low alarm starts	4 Deadband	6 Time

- f. Select the actions that will occur during an alarm condition:

Option	Description
Trigger sampler	Starts a sampling program when a sampler is attached.
Switch to secondary log interval	Switches to secondary log interval—the secondary log interval is used.
Log into alarm log	Saves the alarm data in the alarm log.
Activate internal relay #[1–2]	Opens or closes the internal relay. The internal relay must be enabled to see this option.
Activate internal digital output #[1–2]	Sends a digital signal from the flow logger. The internal digital output (available on advanced model only) must be enabled to see this option.
Activate IO9000 relay #[1–4]	Opens or closes the IO9000 relay if the IO9004 module is installed. The IO9000 relay must be enabled to see this option.
Activate IO9000 digital output #[1–4]	Sends a digital signal from the IO9004 module, if installed. The IO9000 digital output must be enabled to see this option.

3. To set a system alarm, click the **System Alarms** tab:

- a. Select the system alarm type:

Option	Description
Low Main Power	Less than 8 V is available from the external DC power supply.
Sensor Timeout	The sensor has not responded to the logger.
Internal Digital Input - [1–2]	An internal digital input (available on the advanced model only) must be enabled to see this option. The selected trigger is used for the alarm. Refer to Figure 19 on page 37.
IO9000 Digital Input - [1–4]	An IO9000 digital input must be enabled to see this option. The selected trigger is used for the alarm. Refer to Configure the IO9000 inputs on page 38.

- b. Select the system alarm.
c. Select the system alarm actions (refer to step 2f).

4.3.6 Configure the inputs and outputs

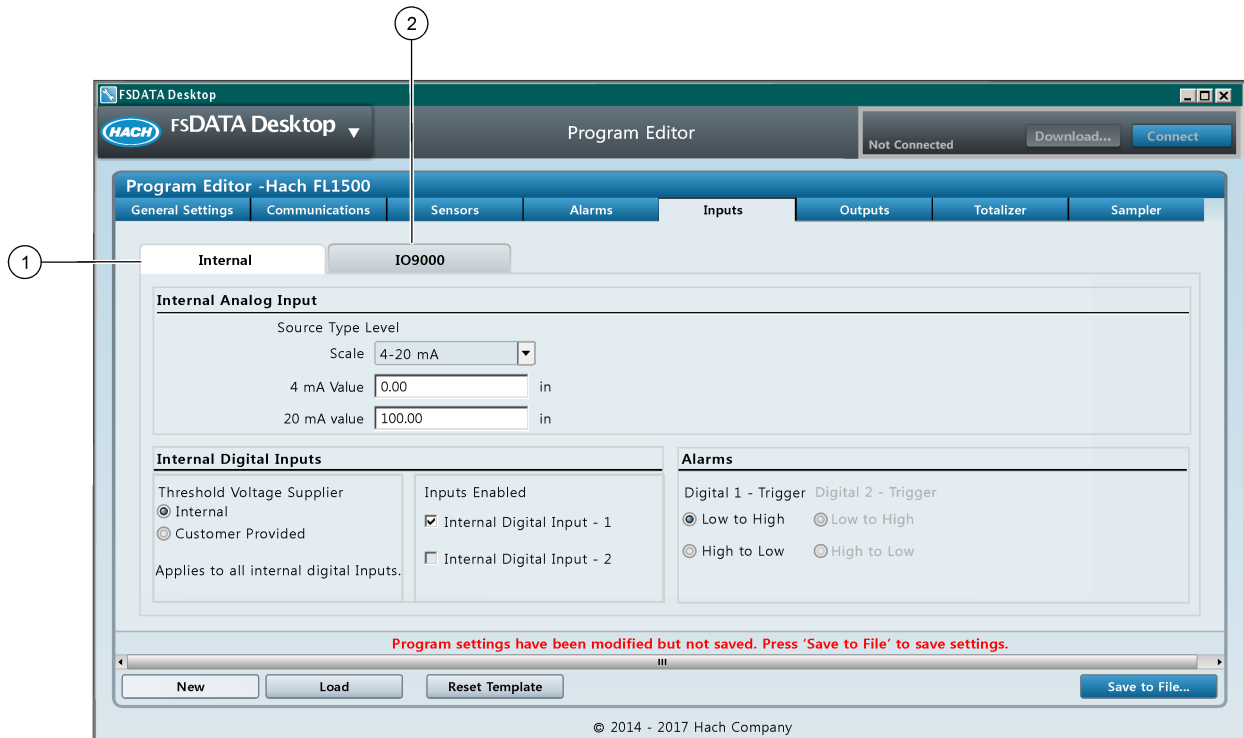
Configure the inputs and outputs for user-supplied devices. The user can connect an IO9004 module to add more inputs and outputs.

4.3.6.1 Configure the internal inputs

The instrument has one analog input and two digital inputs (advanced model).

1. To set up the analog input:
 - a. Select Internal in the Analog Inputs section on the General Settings tab.
 - b. Select the Source Type.
 - c. Click the Inputs tab.
 - d. Click the Internal tab.
 - e. Select the scale, minimum and maximum values in the Internal Analog Input section. Refer to [Figure 19](#).
2. To set up the digital input:
 - a. Click the Inputs tab.
 - b. Click the Internal tab.
 - c. Select the options in the Internal Digital Inputs section. Refer to [Figure 19](#).

Figure 19 Inputs tab



1 Internal inputs tab

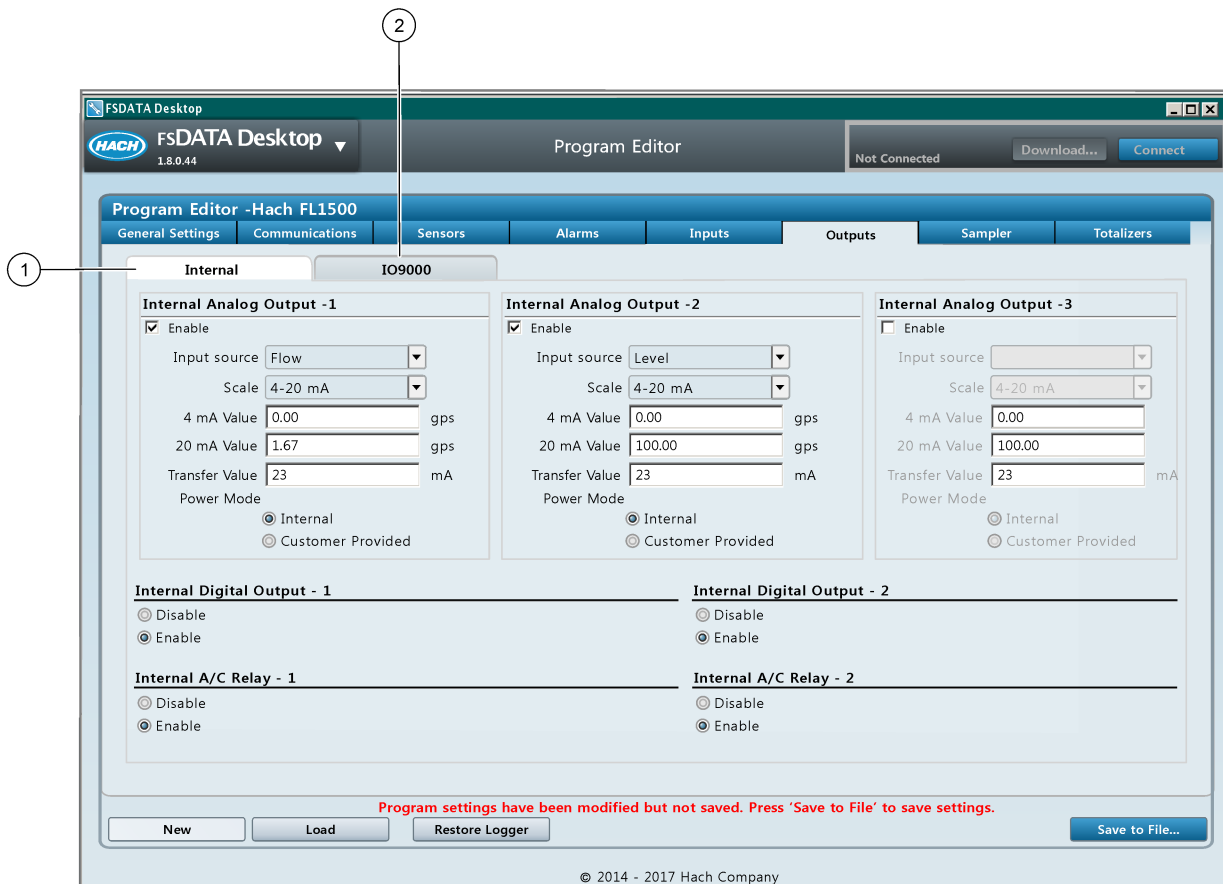
2 IO9000 inputs tab

4.3.6.2 Configure the internal outputs

The instrument has two (basic model) or three (advanced model) analog outputs, two AC relays and two digital outputs (advanced model).

1. To set up the analog outputs:
 - a. Click the Outputs tab.
 - b. Click the Internal tab.
 - c. Set the options in the Internal Analog Output section. Refer to [Figure 20](#).
2. To set up the digital outputs or relays:
 - a. Click the Outputs tab.
 - b. Click the Internal tab.
 - c. Select the options in the Internal Digital outputs or A/C Relay section. Refer to [Figure 20](#).

Figure 20 Outputs tab



1 Internal Outputs tab

2 IO9000 Outputs tab

4.3.6.3 Configure the IO9000 inputs

The IO9004 module increases the number of inputs and outputs that connect to the flow logger. Refer to the documentation for the IO9004 module for more information.

1. Select IO9000 Enabled in the General Settings tab.
2. To set up the analog input:
 - a. Select IO9000 [1–2] in the Analog Inputs section on the General Settings tab.
 - b. Select the Source Type.
 - c. Click the Inputs tab.
 - d. Click the IO9000 tab. Refer to [Figure 19](#) on page 37.
 - e. Select the scale, minimum and maximum values in the IO9000 Analog Input section.
3. To set up the digital input:
 - a. Click the Inputs tab.
 - b. Click the IO9000 tab. Refer to [Figure 19](#) on page 37.
 - c. Select the options in the IO9000 Digital Inputs section.

4.3.6.4 Configure the IO9000 outputs

The IO9004 module increases the number of inputs and outputs that connect to the flow logger. Refer to the documentation for the IO9004 module for more information.

1. Select IO9000 Enabled in the General Settings tab.
2. To set up the analog output:
 - a. Click the Outputs tab.
 - b. Click the IO9000 tab. Refer to [Figure 20](#) on page 38.
 - c. Select the scale, minimum and maximum values in the IO9000 Analog Output section.
3. To set up the digital outputs and relays:
 - a. Click the Outputs tab.
 - b. Click the IO9000 tab. Refer to [Figure 20](#) on page 38.
 - c. Select the options in the IO9000 Digital Output [1–4] or IO9000 A/C Relay [1–4] section.

4.3.7 Set up the software totalizer

Pre-requisite: Set up one or more flow channels in the General Settings tab. Refer to [Make a basic FL1500 logger program](#) on page 24.

The software totalizer counts the total flow volume for one or more flow channels. If necessary, the user can set the flow volume to zero from the flow logger interface.

1. For analog input connections, enable the input in the General Settings tab.
 - Analog input, internal—Select Internal in the Analog Inputs section. Set the Source Type to flow.
 - IO9004 analog input—Select IO9000 Enabled, then select IO9000 [1] in the Analog Inputs section. Set the Source Type to flow.
2. Click the Totalizers tab in the Instrument dashboard or Program Editor.

Note: Scroll to the right if the Totalizers tab does not show.
3. For connected sensors, select Port[1] Enabled for the sensor port that has the applicable flow channel.
4. For analog input connections, select the applicable input.
 - Analog input, internal—Select Analog Internal Enabled in the Analog Internal section.
 - IO9004 analog input—Select IO9000 - [1–2] Enabled in the IO9000 - [1] section.
5. Select the totalizer software options:

Option	Description
Display Unit	Sets the flow units. Options: gallons (gal), Liters (L), acre feet (af), cubic feet (ft ³), cubic meters (m ³)
Scaling Factor	Sets the factor that is used in the flow totalizer software. Options: x1, x10, x100, x1000, x10000, x100000, x1000000, x0.1

4.3.8 Set up the mechanical totalizer

Pre-requisite: Set up one or more flow channels in the General Settings tab. Refer to [Make a basic FL1500 logger program](#) on page 24.

The mechanical totalizer is an external device that counts the total flow volume for one flow channel. The user cannot set the mechanical totalizer to zero after operation starts.

1. Click the Totalizers tab in the Instrument dashboard or Program Editor.

Note: Scroll to the right if the Totalizers tab does not show.

2. Select Mechanical Totalizer Enabled in the Mechanical section.
3. Select the mechanical totalizer options.

Option	Description
Display Unit	Sets the flow units. Options: gallons (gal), Liters (L), acre feet (af), cubic feet (ft ³), cubic meters (m ³)
Volume Per Pulse	Sets the flow volume for each pulse signal from the flow channel, for example 100 gallons. Set the flow volume to a large number for high flow volumes and a small number for low flow volumes.
Flow Source	Selects the flow channel.
Pulse Width	Sets the time in milliseconds (ms) for each pulse. The source will send a pulse for the specified time.
Delay Between Pulses	Sets the wait time in milliseconds (ms) between each pulse.

4. Calculate the total flow for a time period.
 - a. Record the number on the mechanical totalizer at the start of the time period.
 - b. Record the number on the mechanical totalizer at the end of the time period.
 - c. Subtract the number at the start of the time period from the number at the end of the time period to get the flow volume in pulses.
 - d. Multiply the flow volume in pulses by the volume per pulse to get the flow volume in the selected flow units.

4.3.9 Modbus communication

Pre-requisite—Connect the PC to the flow logger. Select the channels to log in the General Settings tab.

The Modbus protocol is a communication option for this instrument. The Modbus registers change with the sensor settings. To find the Modbus registers, go to the Communications tab in the Instrument dashboard. The connection status must show connected. Click **MODBUS MAP**. The register information opens in a PDF format.

4.3.10 Set up a program offline

Use the Program Editor to set up a logger program for later use or to view program settings from downloaded data files. Save the program as a file on the PC. Import the program file from a USB flash drive or write the program to the logger when connected to FSDATA Desktop.

1. Go to Program Editor from the main menu.
2. Select **NEW** to make a new program or **LOAD** to edit an existing program.

Note: If a downloaded site file is open, the program settings for the site file are shown.
3. Enter the program information in each of the tabs. Refer to [Make a basic FL1500 logger program](#) on page 24.

Note: The Program Editor shows most of the information that is in the Instrument dashboard. Some buttons such as the Setup Wizard and Calculate show only when a logger with an installed sensor is connected to FSDATA Desktop.

4. Click **SAVE TO FILE**. Save the file on the PC.

Section 5 Data management

5.1 Download data from a logger

When data is downloaded from the logger, the data includes the channel data, the event log, the alarm log, the sample history and diagnostic data. The data is automatically saved as a site file (.fl1 or .fl9) in the specified directory.

1. Connect the logger to FSDATA Desktop. Make sure that the connection status shows Connected.
2. Click **DOWNLOAD**. The Download Data window opens.
Note: The window takes more time to open when the site file is large.
3. Select one of the download options:

Option	Description
Download all data	Download all of the data from the logger.
Download new data since last download	Download only the data that was logged since the last download. For wireless loggers, the last server maintenance call is the last download.

4. Change any of the download file settings:

Option	Description
Save data to	Change the directory where the data file is saved.
Open file after download has completed	Automatically open the data file in FSDATA Desktop after the download is complete.
Export data	Save the data as a TSV or CSV file for use with a spreadsheet application.

5. When all selections have been made, click **DOWNLOAD**. A status bar shows the progress. If the settings are set to automatically open the data file, the data shows in the screen.

5.2 Download data from a sampler

Data can be downloaded from an AS950 sampler when the sampler is connected to the computer. The data includes the event log, the alarm log and the sample history. The data is automatically saved as a site file (.as9) in the specified directory.

1. Connect the AS950 controller to FSDATA Desktop:
 - a. Use an A-to-A USB cable to attach the AS950 sampler controller to the computer. Refer to [Figure 21](#).
 - b. Open FSDATA Desktop and click **CONNECT**. The Connect to Instrument window opens.
 - c. Click **AS950**.
 - d. Click **CONNECT**. The connection status changes to Connected.
2. Go to the Data menu in FSDATA Desktop.
3. Click **DOWNLOAD**. The Download Data window opens.
Note: The window takes more time to open when the site file is large.
4. Select one of the download options:

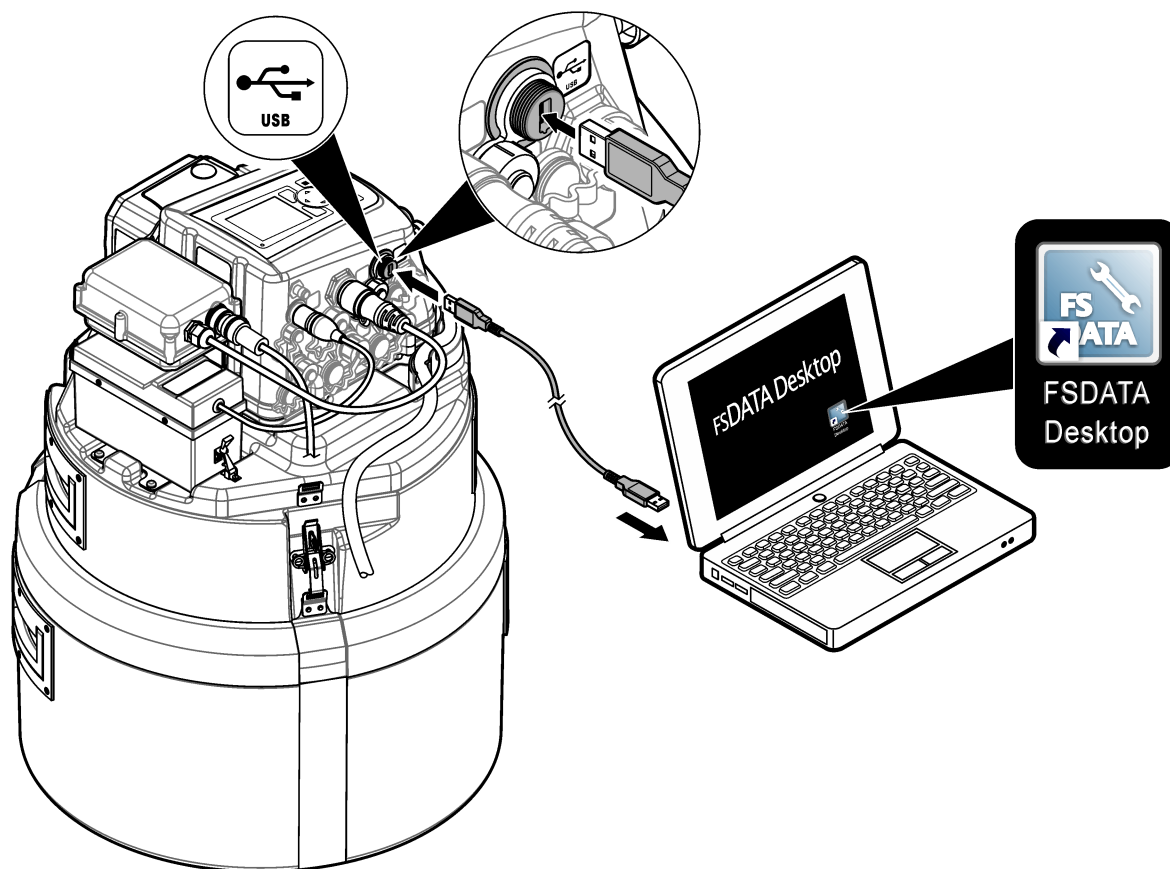
Option	Description
Download all data	Download all of the data from the logger.
Download new data since last download	Download only the data that was logged since the last download. For wireless loggers, the last server maintenance call is the last download.

5. Change any of the download file settings:

Option	Description
Save data to	Change the directory where the data file is saved.
Open file after download has completed	Automatically open the data file in FSDATA Desktop after the download is complete.
Export data	Save the data as a TSV or CSV file for use with a spreadsheet application.

6. When all selections have been made, click **DOWNLOAD**. A status bar shows the progress. If the settings are set to automatically open the data file, the data shows in the screen.

Figure 21 AS950 sampler connection to FSDATA Desktop



5.3 View data

5.3.1 View instrument data

Data files from a logger or an AS950 sampler can be viewed after download in tabular (spreadsheet) format, as a line graph, x, y scatter plot or mixed tabular and line graph. The data can be exported to a user-specified location or copied to the clipboard. Graphs can be opened in PDF format.

1. Go to Data from the main menu. The Data screen opens.
2. Click the **OPEN FILE** icon in the Sites panel. The file directory window opens.
3. Find the site file (.fl1, .fl9 or .as9) and click **OPEN**. The available channels are shown in the Sites panel.

4. Click on the check box next to a channel to show or remove channels in the Review pane. Each selected channel is shown as a column in the tabular view and as a line in the graph view. Refer to [Figure 22](#).
5. Use the drop-down lists in the time span section to show data for a specific time span.
6. Select the options in the tabular view to change the tabular display.

Option	Description
Sort by column	Click on a column header to sort the tabular data by that column.
Export	Save or copy data as a TSV or CSV file. Select the data rows, then click EXPORT . Select the file type and directory.
Show statistics	Click on the Statistics tab to show the minimum, maximum, average and total values for applicable channels.

7. Use the options in the graphical views to change the graph or scatter plot displays. A maximum number of 8 channels can be shown on a line graph. A maximum of 2 channels can be shown on a scatter plot.








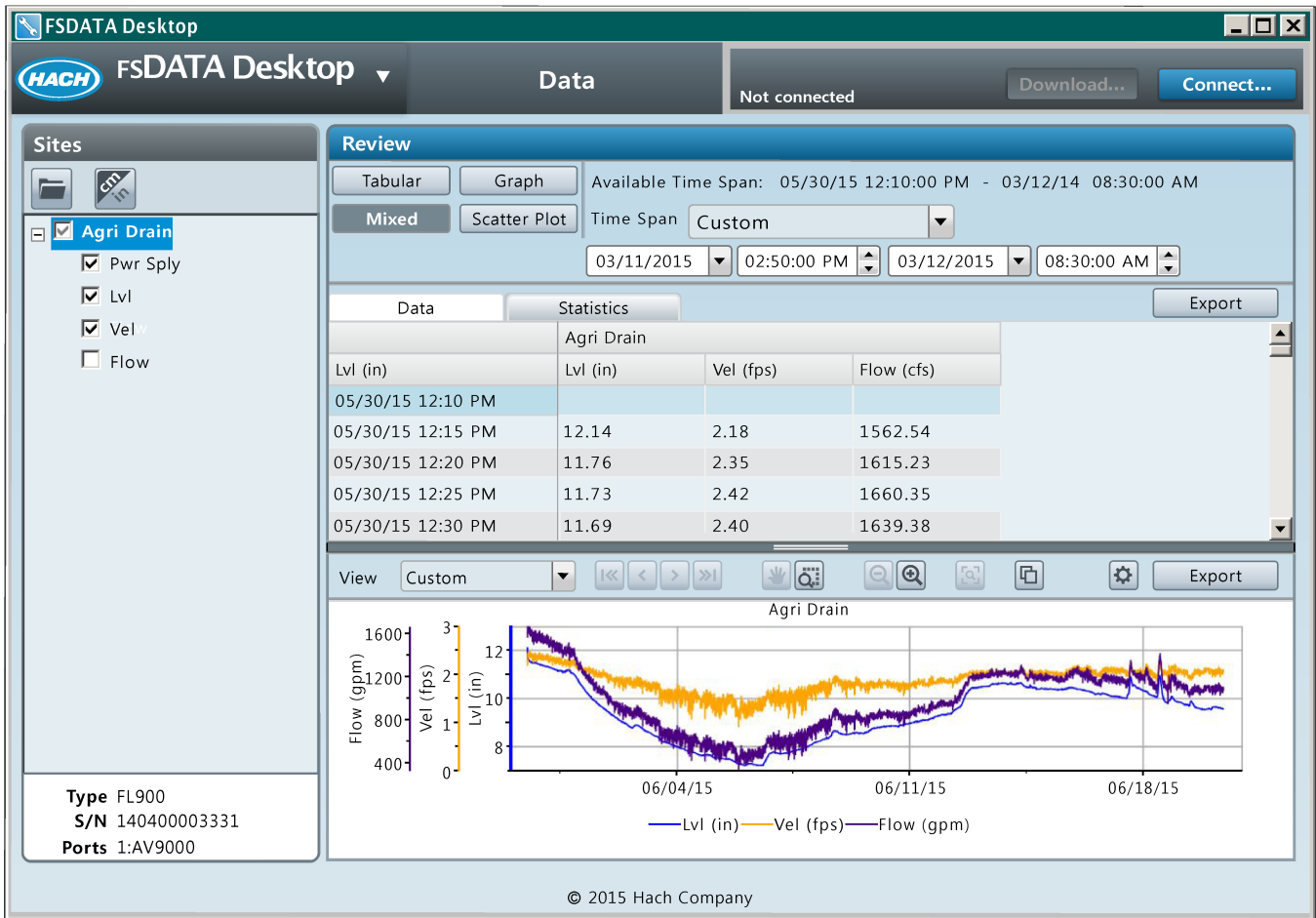
Option	Description
View <input style="border: 1px solid #ccc;" type="text" value="Custom"/> ▼	Select different time periods within the specified time span.
	Go to the beginning, back, forward or to the end of the time span.
	Drag the displayed time span to the right or to the left.
	Click and drag an area on the graph to zoom in on.
	Click on the graph to zoom in or out.
	Zoom out to the selected time span.
	Copy the current graph view to the clipboard for use in other applications.
	Open the graph settings window to change settings such as line color, y-axis range, grid lines and title bars.
<input type="button" value="Export"/>	Make a pdf that can be saved, printed or sent to an email recipient.

Figure 22 Mixed data view



5.3.2 View instrument logs

The user can view events, sensor diagnostic information, alarm logs and sample history in the Log Viewer menu.

1. Go to Log Viewer from the main menu. The Log Viewer screen opens.
2. Click the **OPEN FILE** icon in the Sites panel. The file directory window opens.
3. Find the site file (.fl1, .fl9 or .as9) and click **OPEN**.
4. Use the drop-down lists in the time span section to show data for a specific time span.
5. Click on the tabs to view the available information:

Option	Description
Events	Shows a list of events in a tabular format. Select or deselect events from the list in the left column. The date and time, event type and event data is shown in the data columns. Click on a column to sort the events by the column.
Sensor Diagnostics	Shows the sensor name, date and time and sensor data in a tabular and graphical format. The graph can be copied to the clipboard for use in other applications.

Option	Description
Alarms	Shows the date and time, alarm source, alarm type, state and data for all alarms in the tabular format.
Sample History	Shows the date and time, status (success or failed), sample number, bottle number, volume and program name in a tabular format when a sampler is attached to the logger.

- To save the data as a TSV or CSV file, click **EXPORT**. Select the file type and directory.

5.4 Make a report

Reports can show instrument data or site-specific information such as events and alarms. To make a report, data must first be downloaded from an instrument. All reports are made in pdf format for a selected time span.

- Download data from the instrument. Refer to [Download data from a logger](#) on page 41 or [Download data from a sampler](#) on page 41.
- Go to Reports from the main menu. The Reports screen opens.
- Click **Data Reports** or **Site Reports** to show the list of available reports.
- Select a report type:

Option	Description
Data Summary	A summary of instrument data. The maximum, minimum, average and total (if applicable) values are shown for each selected channel. The report includes an overall summary and a list of interval summary data for each channel. The intervals are hourly when the time span is less than or equal to 48 hours and daily when the time span is greater than 48 hours.
Summary Statistics	A summary of instrument data. The maximum, minimum, average and total (if applicable) values are shown for each selected channel. The report includes an overall summary for each channel. Interval summaries are not listed.
Tabular Data	A list of Individual data points for up to seven channels.
Event Log	The event log data. The report includes a summary of all events and a list of individual events.
Sample History	The sample history data. The report includes a summary of all events and a list of individual events.
Site Alarm	A list of alarm conditions for an instrument. The report includes the alarm type, alarm state and data for each alarm.

- Click the **OPEN FILE** icon in the Sites panel. The file directory window opens.
- Find the site file (.fl1, .fl9 or .as9) and click **OPEN**. The available channels are shown in the Sites panel.
- For data reports, select the channels to include in the report.
- To change the units that are shown in a data report, select the units icon. Select the units to show in the report and click **SAVE**.
- Use the drop-down lists in the time span section to show data for a specific time span.
- Click **CREATE REPORT**. The report opens in a PDF format in a new window.
- Use the toolbar to save or print the report.

5.5 Export settings to a USB drive

The instrument settings from the FL1500 flow logger can be saved to a computer, then exported to a USB flash drive.

1. Open FSDATA Desktop.
2. Use the Instrument dashboard or Program Editor to make a logger program.
3. Click **SAVE TO FILE**. Save the file on the PC.
4. Install the USB flash drive in the computer. Remove all other USB drives.
Note: No other USB flash drives can be attached to the computer.
5. Go to Import/Export from the main menu. The Import/Export screen opens.
6. Select Export to USB - Hach FL1500. A list of ten locations on the USB drive shows.
Note: If a program file is already saved on the USB drive, the file name shows in the Site Name column.
7. Click **Browse**.
8. Select the file on the computer, then click **Open**.
9. Select an available location from the list.
10. Click **Export** to send the file to the USB drive. The file name shows in the list.
11. Remove the USB drive from the computer.

5.6 Import data/settings from a USB drive

Data from an AS950 sampler controller or an FL1500 flow logger can be saved to a USB flash drive and then imported into FSDATA Desktop. The data files from AS950 samplers have a .as9 extension. The data files from FL1500 flow loggers have a .fl1 file extension. The imported data file includes log files, sample history and settings.

1. Use the export menu in the instrument to save the data to a USB flash drive.
2. Install the USB flash drive in the computer.
3. Open FSDATA Desktop.
4. Go to Import/Export from the main menu. The Import/Export screen opens.
5. Select the Import from USB option. The files that can be imported are shown in the Downloads section.
6. Select one or more files to import. Click **IMPORT**. A confirmation window is shown.
7. Click **OK**. The Status in the file list changes from pending to successful.

6.1 Update FSDATA Desktop

When connected to the internet, the application can find available updates.

1. Go to Software Updates from the main menu. The Software Updates screen opens.
2. Click **CHECK NOW**. The application finds the newest update and compares the newest version to the installed version.
3. If a newer version is available, click **OK** to install the newer version. If the installed version is the newest, click **OK**. The screen shows the installed version and the date and time of the last search for an update.

6.2 Update the instrument firmware

Install firmware updates regularly for best results. The firmware update process erases all data, program information and software totalizer data. Make sure data is saved to a file before the firmware update process starts.

1. Make sure that the device is connected to FSDATA Desktop.
2. Go to Instrument Tools from the main menu. The Instrument Tools screen opens.
3. Click **FIRMWARE UPDATE**. The Firmware Update window opens.
4. Select the connected device from the drop-down list.
5. If necessary, click **BROWSE** to select the correct directory of the update file.
6. Click **UPDATE**. A confirmation window opens.
7. Click **YES**. The update starts. The update completes in approximately 2 minutes.

***Note:** If the firmware update contains program changes that are not compatible with the current program settings, the update may fail. If the update fails, deselect the Restore program settings checkbox and start the update again.*

6.3 Restore the default settings

The instrument can be set to use the factory default settings. All measurement and log data is permanently erased.

1. Make sure that the device is connected to FSDATA Desktop.
2. Go to Instrument Tools from the main menu. The Instrument Tools screen opens.
3. Click **RESTORE**. A confirmation window opens.
4. Click **RESTORE**. Wait for the process to complete.

6.4 Erase instrument data

Data can be permanently erased from the instrument. Make sure to save data to a file before this task is started.

1. Make sure that the device is connected to FSDATA Desktop.
2. Go to Instrument Tools from the main menu. The Instrument Tools screen opens.
3. Click **CLEAR**. The Clear Data window opens.
4. Select the type of data to be erased (measurement, alarm, event and/or sample).
5. Click **CLEAR**. A confirmation window opens.
6. Click **YES**. Wait for the operation to complete.

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