ABB MEASUREMENT & ANALYTICS | USER GUIDE | IM/SDR2/REV. A-EN

ScrewDriver2

Diagnostic and flow-profiling software for insertion flowmeters

Installation and operation

Measurement made easy

—

ScrewDriver2 software

Introduction

ScrewDriver2 is a powerful Device Type Manager (DTM) for use with ABB AquaMaster flowmeters. In addition to transmitter configuration, the software provides multi-parameter data logging and graphing, asset optimization through remote or local maintenance, historical functions and specialized functional tools – for example, flow-profiling.

The software uses NFC communication for transmitter access.

For more information

Further publications are available for free download from

www.abb.com/flow

or by scanning this code:

	Search for or click on:
Data Sheet AquaMaster4	DS/FET400-EN
Operating Instruction AquaMaster4	OI/FET400-EN

1

Contents

2 Health & Safety

Precautionary statements that appear in this document are explained below:

NOTICE

The signal word '**NOTICE**' indicates potential material damage.

Note

'Note' indicates useful or important information about the product.

3 Install ScrewDriver2

System requirements

- Laptop or PC with 32- or 64-bit Windows™ 10 operating system
- USB port
- 2 GB of RAM (minimum)
- 200 MB of free storage space (minimum).

Antivirus
It is recommended that you install a suitable antivirus application. It is also recommended to ensure that Windows updates are turned on to ensure Microsoft-identified vulnerabilities are patched.

Installing ScrewDriver2

1 Copy the ScrewDriver2 Installer file to the PC.

2 Right-click the ScrewDriver2 Installer file and select **Run as Administrator**.

3 When the **Welcome** window is displayed, click **Next**.

4 Enter your User Name and Organization, and click **Next**.

5 When the **Ready to Install the Program** window is displayed, click **Install**.

Note
ScrewDriver2 Installer detects whether .NET framework 4.7.2 is installed. If necessary, follow the instructions on the screen to install .NET framework 4.7.2.

Note
When .NET framework 4.7.2 is installed, ScrewDriver2 Installer detects whether NFC driver is installed. If NFC driver is not installed, do the steps that follow.

6 When the **Welcome** window is displayed, click **Next**.

...3 Install ScrewDriver2

7 In the **Choose Install Location** window, enter the path for the **Destination Folder** and click **Install**.

8 When the **Installation Complete** window is displayed, click **Next**.

9 In the **Completing**... window, click **Finish** and then click **Yes**.

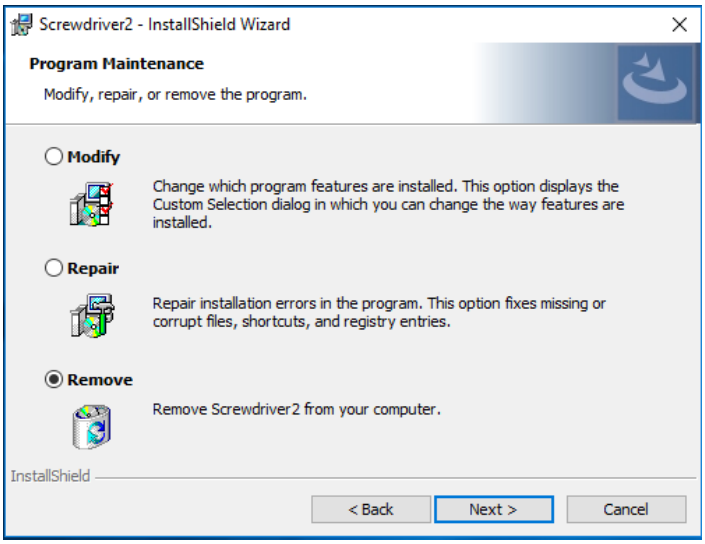
Uninstall ScrewDriver2

1 Go to **Windows** > **Control Panel** > **Programs** > **Programs and Features** > **Uninstall a program**.

2 Click **Screwdriver2**.

3 When the **InstallShield Wizard** window is displayed, click **Next**.

4 When the **Program Maintenance** window is displayed, select **Remove** and click **Next**.



5 When the **Remove the Program** window is displayed, click **Remove.**

6 Wait for ScrewDriver2 to uninstall and then click **Next**.

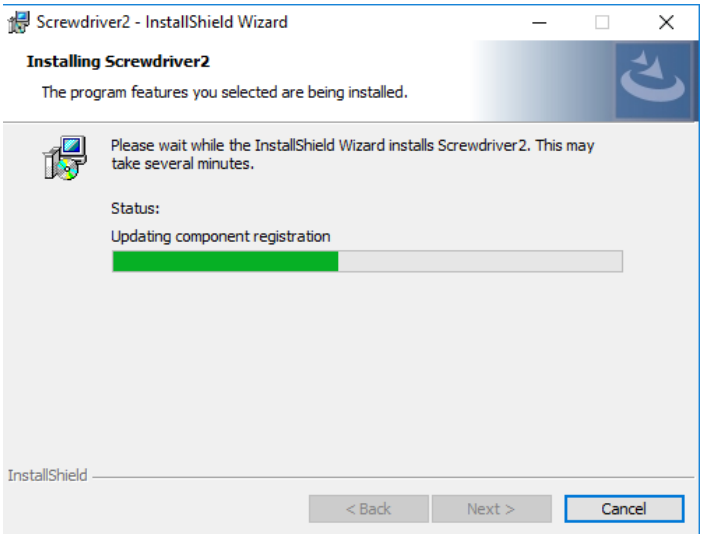
7 When the **InstallShield Wizard Completed** window is displayed, click **Finish**.

Update ScrewDriver2

1 Right-click the new version of the ScrewDriver2 Installer file and select **Run as Administrator**.

2 When the **InstallShield Wizard** window is displayed, click **Yes**.

3 Wait for the **Preparing to Install...** process to finish.



4 When **Resuming the InstallShield Wizard for ScrewDriver2** is displayed, click **Next**.

5 Wait for the upgrade to install and then click **Next**.

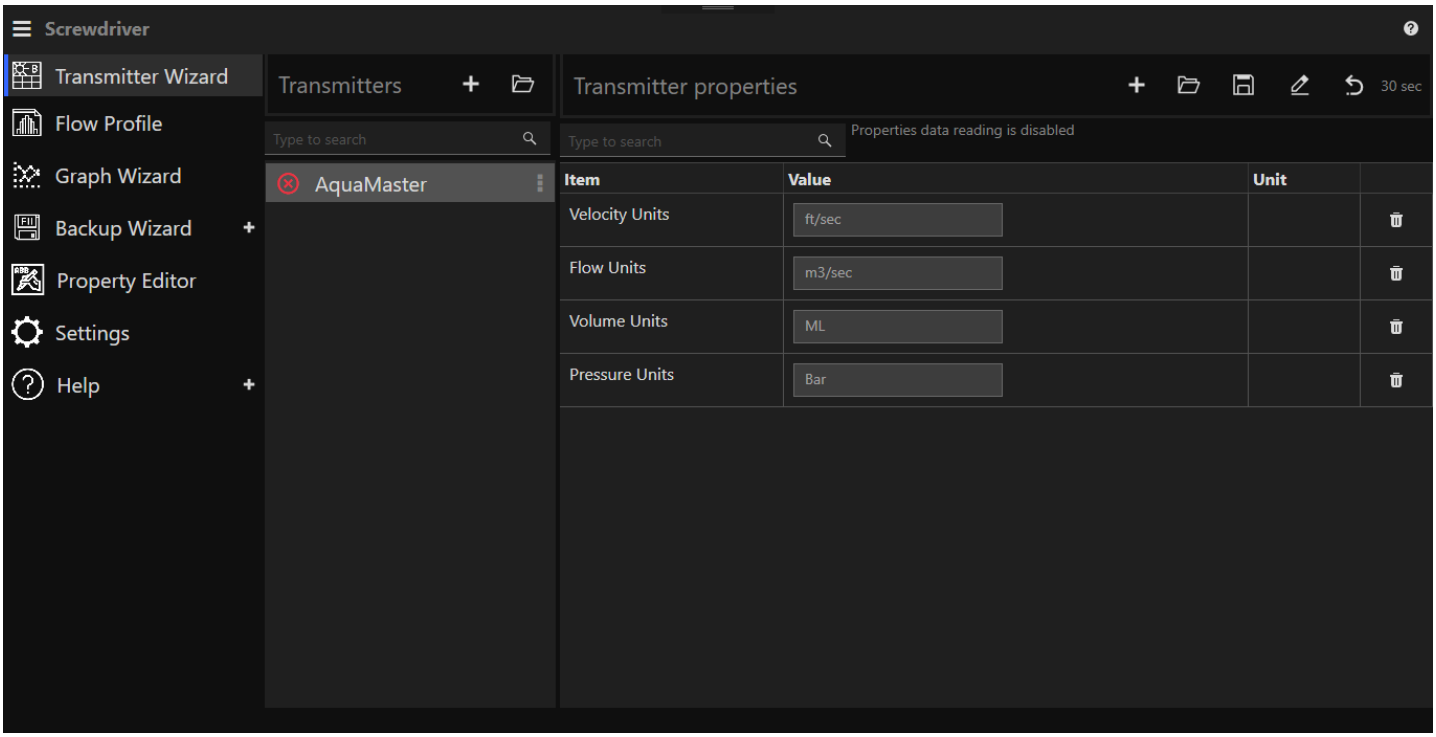
6 When the **InstallShield Wizard Completed** window is displayed, click **Finish**.

4 Connect a transmitter

Start the application

1 To start the application, click the desktop shortcut .

2 Wait for the application window to be displayed.



Add a new transmitter

1 Make sure that the transmitter cable is connected to the PC.

1 To add a new transmitter, click Transmitters + .

2 Enter the transmitter name and password in the **New transmitter configuration** window.

3 Make sure that **Connect transmitter** is selected, and then click **Create**.

4 Wait for ScrewDriver2 to find the transmitter and add it to the list.

- A green tick AquaMaster shows that the transmitter is connected.
- A red cross AquaMaster shows that the transmitter is not connected.

Disconnect a transmitter

1 Right-click a connected transmitter AquaMaster.

2 Use the menu that appears to do the steps that follow:

a Click **Disconnect** to disconnect the transmitter.

b Click **Edit** to edit the transmitter configuration.

c Click **Delete** to delete the transmitter.

Note
If you right-click on a disconnected transmitter, you can click **Connect** from the menu to connect the transmitter.

If a different transmitter is already connected, **Connect transmitter?** is displayed. Click **Yes** to disconnect the other transmitter and connect the new one instead.

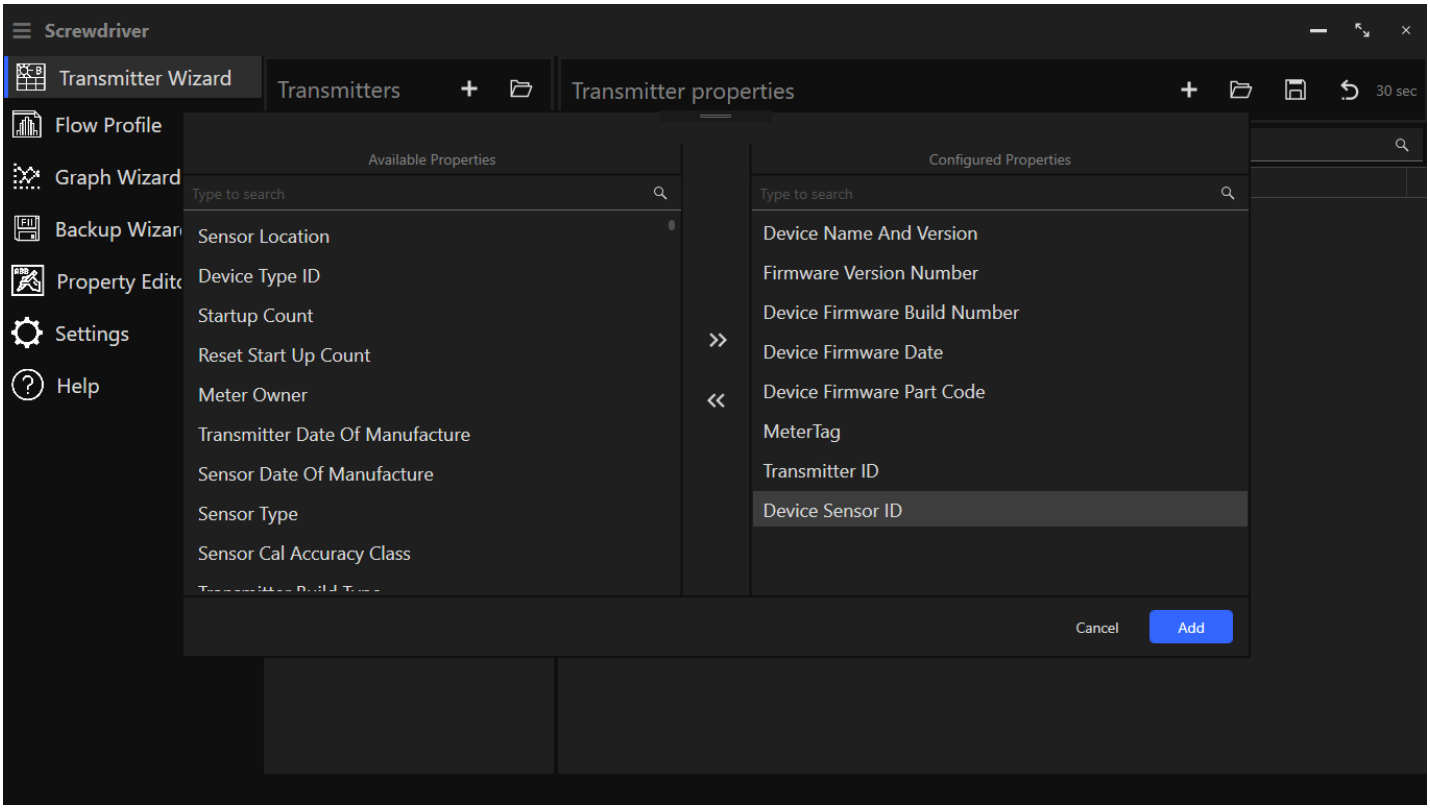
5 Configure a transmitter

Edit the properties of a transmitter configuration

1 Click Transmitter properties to view the properties of the transmitter configuration.

Note
If the transmitter is new, the default configuration is displayed.

2 To change the properties of the configuration, click + on the right-hand side of Transmitter properties.



3 To add a property to the configuration, select a value in **Available Properties** and then click ».

4 To remove a property from the configuration, select a value in **Configured Properties** and then click «.

5 To confirm the configuration, click **Add**.

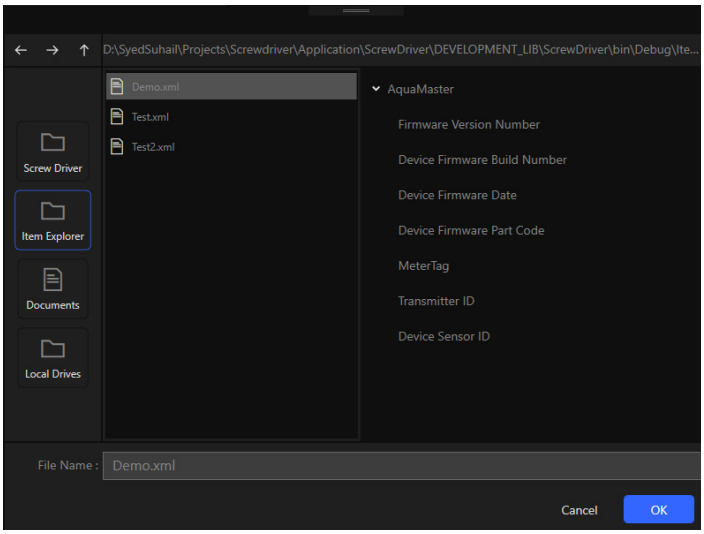
6 To save the configuration, click .

Load a saved transmitter configuration

1 Make sure that the transmitter is disconnected.

2 To view the available configurations, click .

3 Select a configuration file to view the properties of the configuration.

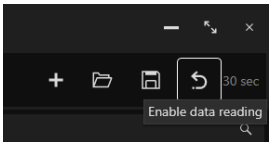


4 To load the configuration, select the configuration file and click **OK**.

5 When the **Confirmation** window is displayed, click **Yes**.

Change the data reading interval

1 To enable data reading, click the **Enable data reading** button.



Note
The default interval for refreshing the data is 30 s.

2 To change the interval, do the steps that follow:

a Click Settings.

b Enter a value for **Auto Refresh Time** and click **Save**.

Manage the data history storage

1 Use the history toggle switch to turn on or off the historical data storage.

Note
Historical data is stored in a .csv file in the **Historian** folder.

6 Flow profiles

The flow profiling functions are applicable to AquaMaster. They enable you to:

- Perform standalone velocity profiles
- Complete verifications of existing meters using automated input of velocity measurement
- Provide fully traceable records based on operator, site name and date/time
- Recall and review all profile statistics.

Configure a flow profile

1 Make sure that the **Data Reading** switch is off 30 sec.

2 Click Flow Profile.

NOTICE

Do not use the nominal pipe bore. Enter an accurate measurement of the pipe bore.

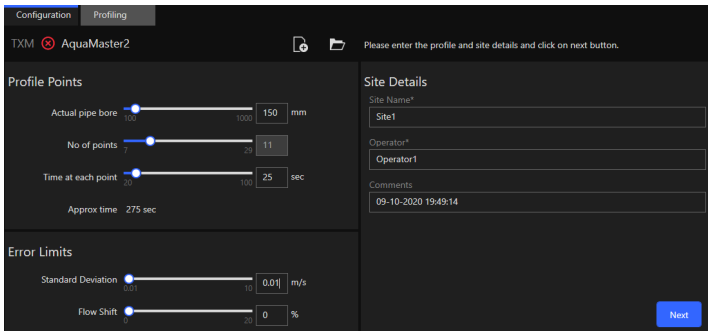
3 Move the slider to set the **Actual pipe bore**.

4 Move the slider to set the **No of points**. Use an odd number to make sure that the middle measurement in on the center-line of the pipe.

5 Move the slider to set the **Time at each point**.

6 Enter values for **Site Name**, **Operator**, and **Comments**.

7 Click **Next**.



8 When the **Profiling** window is displayed, click ▶ and follow the instructions.

Note

- The software will tell you to insert the probe until it touches the opposite side of the pipe. With the probe installed, mark the probe shaft at the insertion point. Use this mark as a reference point for the next steps.
- The software automatically allows for the velocity sensor position. This is typically 30 mm from the tip of the probe.
- ScrewDriver2 uses graphics to display the data recorded while you follow the profiling instructions.
- ScrewDriver2 compares the data recorded at each point with preconfigured limits. ScrewDriver2 will recommend whether or not to accept each result.

...6 Flow profiles

...Configure a flow profile

9 Accept or reject the data for each point:

a Click ✓ to accept the data.

b Click × to reject the data.

NOTICE

If the connection is lost while the software samples the data for a point, do the steps that follow.

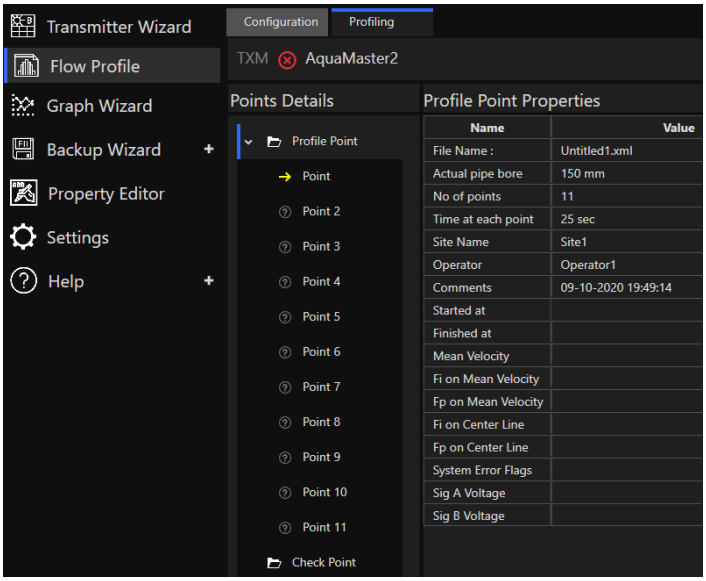
10 If necessary, manually reconnect the transmitter and resample the data for the last point:

a Click Transmitters + 🗁.

b Click Connect.

c When the transmitter is reconnected, click **Profiling**.

d From the Points **Details list**, click the last point that was sampled.



e Click ▶ and follow the instructions.

Flow profile calculations

When the sampling at all measurement points is complete, ScrewDriver2 calculates the check points and the flow profile of the pipe. The data is displayed as a graphic.

ScrewDriver2 records and displays the data that follows for each profile point:

- Value
- Corrected for FP (profile factor)
- Minimum
- Maximum
- Range
- Average data
- Standard deviation
- Slope
- flow Shift.

ScrewDriver2 uses the data to make the calculations that follow:

- Average (mean) velocity (Vavg) in the pipe
- Profile Factor (Fp) and Insertion Factor (Fi,) for possible final probe fitted positions.

The probe affects the measured flow velocity. Fi corrects for this. Fi depends on the size of the probe, the size of the pipe and the insertion depth of the probe. The software calculates Fi for all points of Vavg and the centerline position.

Vavg is measured by the probe only when it is positioned at a point in the pipe where the actual velocity is equal to Vavg.

When the actual velocity is equal to Vavg, Fp = 1.000. There are at least 2 points on either side of the pipe's centerline where Fp = 1.000.

ScrewDriver2 calculates the flow rate as follows:

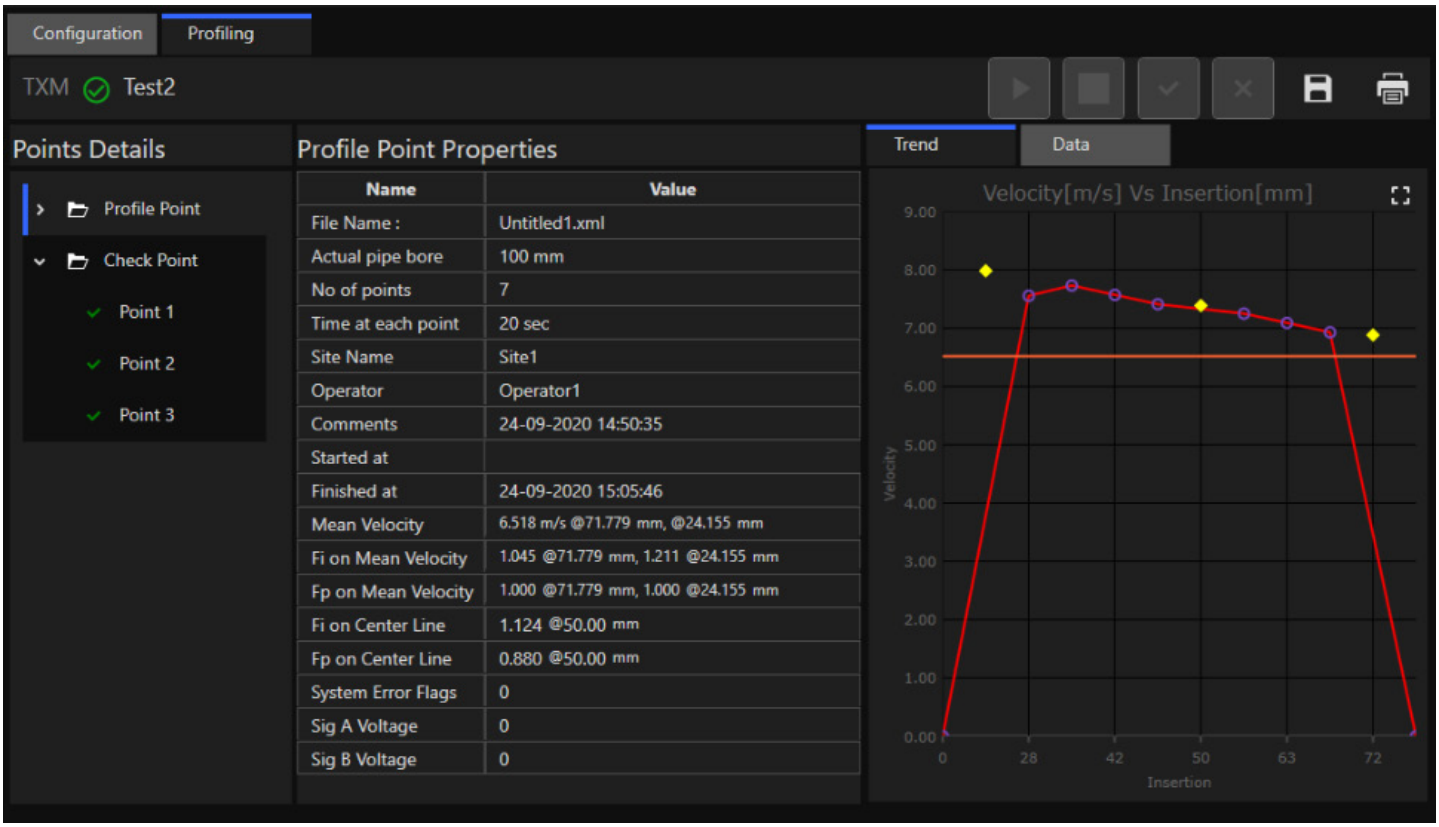
$$\text{Flow rate} = \text{Vavg[m/s]} \times 3.14159(\text{Pi}) \times \text{ID2[m]}/4$$

Check points

The calculated check points are shown on the graphic in yellow.

1 Click **Check Point** to see the list of check points.

2 Click **Point n** to see the data for each check point.



7 Graph Wizard

Use Graph Wizard to configure a list of items to be logged. Graph Wizard has two tabs: **Configuration** and **Graph**.

Configuration

1 Make sure that the **Data Reading** switch is off 30 sec.

2 Click Graph Wizard.

3 To open a saved configuration, click .

4 To create a new configuration, click .

5 To add items to the configuration, click .

6 To add a property to the configuration, select a value in **Available Properties** and then click .

7 To remove a property from the configuration, select a value in **Configured Properties** and then click .

8 To confirm the configuration, click **Add**.

9 Enter values for **Sampling period time**.

Note
If you enter a value for **Sampling period time** that is too high, ScrewDriver2 calculates a maximum value based on how many items are set to be logged.

10 Enter a value for **Mode**:

- **a** Select **Free run data logging** to start when the window is closed, and end when you stop it.
- **b** Select **From start time to finish time** to enter the date and time when logging starts and stops.
- **c** Select **From start time for an interval** to enter a start date and time, and the length of time that logging continues.

11 Enter a value for **File Name**.

12 Select the **Append new samples** check box to add new samples to the file.

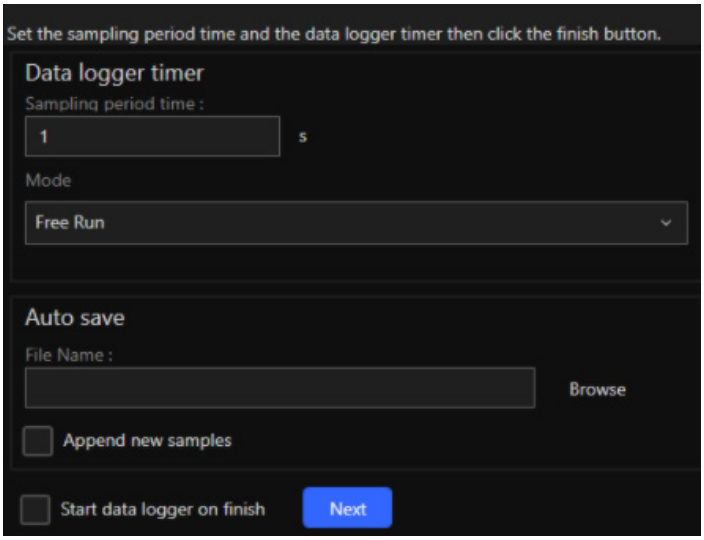
Note
If this check box is cleared, the file is overwritten with new data after every finished sample.

...7 Graph Wizard

...Configuration

13 To start data logging, check the **Start data logging on exit** check box.

14 Click **Next**.



Graph

Use the **Graph** tab to create graphs from the data-logging of multiple parameters from different devices (or from the same device). Use the item list to customize the list of items to be logged. You can save and load the item list.

1 To start or continue data logging, click ▶.

2 To pause and resume data logging, click ⏸.

3 To stop data logging, click ■.

4 To save a graph, select the graph and click 💾.

5 To see a spreadsheet of data for the logged items, click ▦.

6 To see the report for the active graph, click 📄.

Note
The report shows the graph on a white background, with the parameter statistics below.

Graph views

1 To view one graph for one logged item, click ▣.

2 To two graphs for two logged items, click ▦.

Note
If you change how many graphs are displayed, it does not interrupt the logging of other items.

8 Backup Wizard

Backup Wizard has three functions: **Backup**, **Restore**, and **Compare**.

Backup

1 Click Backup Wizard.

2 Click **Backup**.

3 To add items to the backup configuration, click +.

4 To add a property to the backup configuration, select a value in **Available Properties** and then click ».

5 To remove a property from the backup configuration, select a value in **Configured Properties** and then click «.

6 To confirm the configuration, click **Add**.

7 To backup all of the steps in sequence, click ▶.

8 To backup one step at a time, click ▶|.

Note
The Backup Wizard displays a report as the backup progresses.

9 To print the report, click 🖶.

Restore

1 Click **Restore**.

2 Click on the filename to open a saved backup file.

3 To add items to the backup configuration, click +.

4 To add a property to the backup configuration, select a value in **Available Properties** and then click ».

5 To remove a property from the backup configuration, select a value in **Configured Properties** and then click «.

6 To confirm the configuration, click **Add**.

7 To back up all of the steps in sequence, click ▶.

8 To back up one step at a time, click ▶|.

Note
The Backup Wizard displays a report as the backup progresses.

9 To print the report, click 🖶.

Compare

Compare the current data with a saved file.

1 Click **Compare**.

2 To open the comparison file, click 📂.

3 To add items to compare, click +.

4 To add a property to the comparison, select a value in **Available Properties** and then click ».

5 To remove a property from the comparison, select a value in **Configured Properties** and then click .

6 To confirm the configuration, click **Add**.

7 To compare all of the properties in sequence, click .

8 To compare one property at a time, click .

Note
The Backup Wizard displays a report as the comparison progresses.

9 To print the report, click .

9 Property Editor

Use the property editor to display or modify user-defined parameters that are stored in the probe XML file.

1 Click Property Editor.

2 To edit a property, click on the property name.

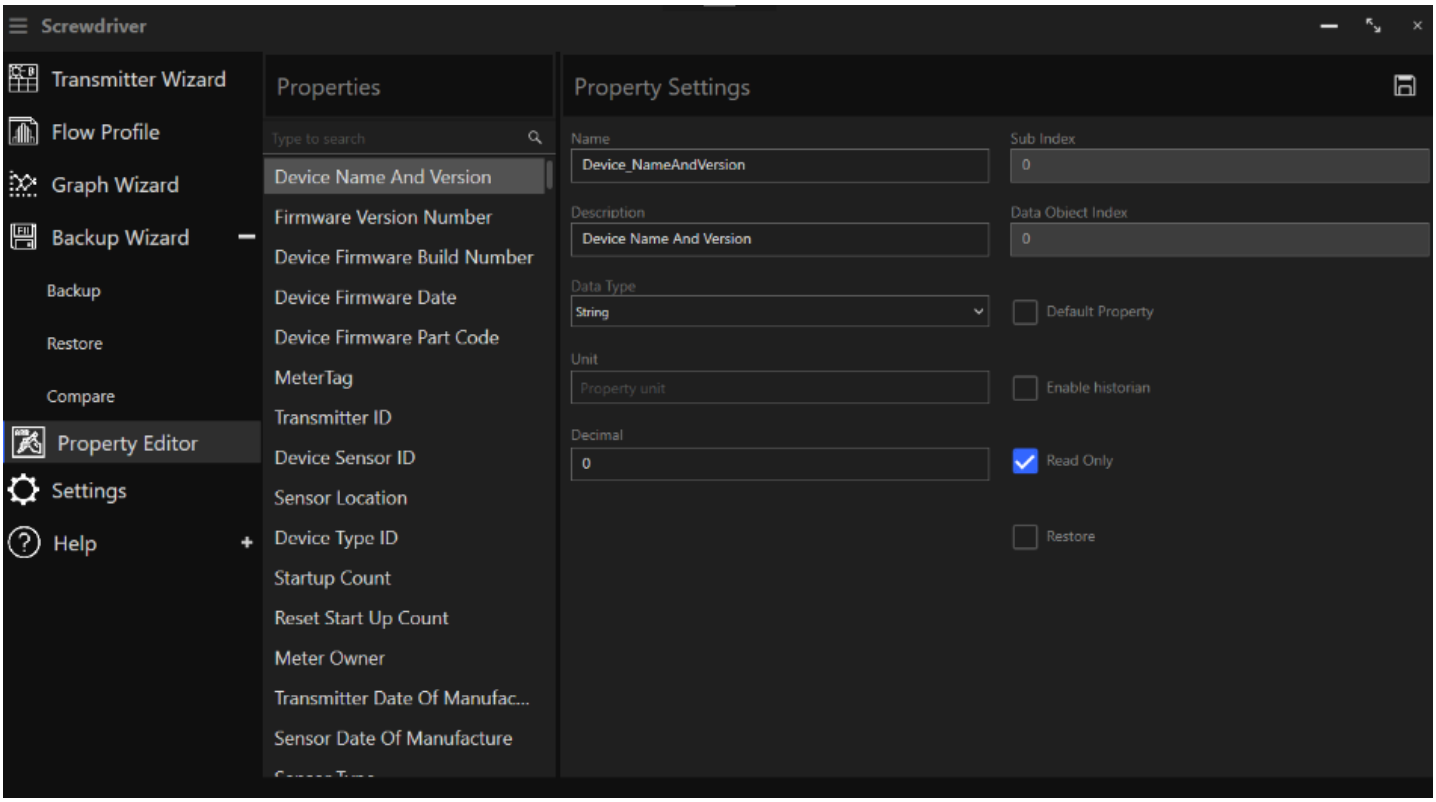
3 Enter the **Property Settings**.

4 If necessary, use the check boxes to set the property to **Default Property**, **Enable historian**, **Read Only**, or **Restore**.

5 To save the properties, click .

6 When the **Confirmation** window is displayed, click **Yes**.

7 Enter the file name and click **OK**.



10 Settings

Use the **Settings** menu to change **General Settings** or **Feature Settings**.

General Settings

1 Click Settings.

2 Click **General Settings**.

3 Select a language from the **Language** drop-down menu.

4 Select a theme from the **Theme** drop-down menu.

5 Use the **Decimal** slider to set the number of decimal places.

Feature Settings

1 Click **Feature Settings**.

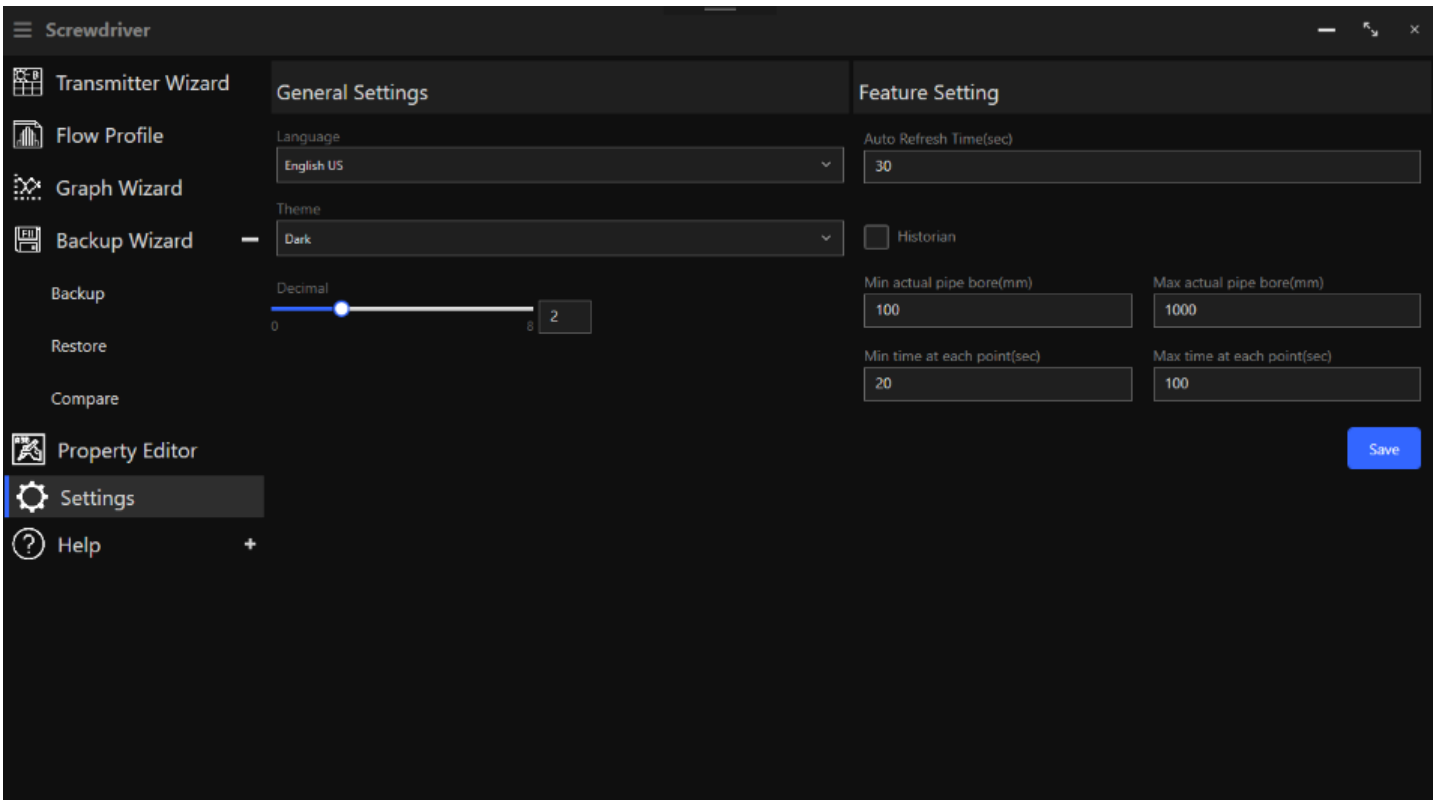
2 Enter a value for the **Auto Refresh Time**.

3 Enter values for the actual pipe bore.

4 Enter values for the minimum and maximum time at each point.

5 To enable Historian, select the **Historian** check box.

6 Click **Save**.



11 Cyber security

Disclaimer

This product is designed to be connected to a digital communication interface and to communicate information and data via that interface. It is your sole responsibility to provide and continuously ensure a secure connection between the product and your network or any other network (as the case may be).

You shall establish and maintain any appropriate measures (such as but not limited to the application of authentication measures etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

USB communication

Screwdriver2 works over a secure protocol NFC on top of USB. USB is only a carrying medium. The NFC protocol uses the USB that is connected to the system to communicate.

The USB communication protocol is inherently unsecured. It can be successfully exploited by spoofing techniques that would allow access to device data and configurations. To prevent the use of such techniques, always ensure that physical access to the device is properly secured. ABB Limited and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

Although ABB provides functionality testing on the products and updates that we release, you should institute your own testing program for any product updates or other major system updates (to include but not limited to code changes, configuration file changes, third party software updates or patches, hardware change out, etc.) to ensure that the security measures that you have implemented have not been compromised and system functionality in your environment is as expected.

Security and password access of Flowmeter device

Access to the transmitter via the NFC interface requires the use of an authentication password. The NFC interface supports two access accounts, each with a separate password: a user account for normal use and an account to reset the user account password.

Enter the account authentication password in the Velox phone/ tablet productivity app before bringing the configuration device into contact with the transmitter. Data exchange will not be successful if an incorrect password is used.

NOTICE

Password and PIN details are entered via the Setting option in the Instrument List pane – refer to XXXXX for navigation details (OI document of AM4device - OI_FET400-EN).

Default passwords

User account – standard level privileges, Factory default password: **am2k**

This is the main user account for general access to the transmitter. The user can change the password. Process values, user configuration settings, transmitter diagnostics conditions and logger data are accessible with the standard level privileges provided by the User account.

These are the only items that users are expected to need during normal flowmeter use. Advanced settings and factory-specific configuration (not needed to for normal flowmeter configuration and control) are accessible only with high levels of access privilege. Temporary elevated access privileges can be obtained only with a meter specific one-time use command generated by ABB technical support and service teams.

NOTICE

- It is strongly recommended that the account's factory default authentication password is changed from the factory default on commissioning the flowmeter.
- When changing a password, record it somewhere secure, especially if each flowmeter has a unique password. If a password is lost or unknown, the flowmeter must be reset to its factory default settings to regain access.

Contact your ABB technical support or service engineer for help if needing access to advanced settings or factory configuration.

Note

More data is exchanged via the NFC connection with higher levels of access, so it takes longer to read from the flowmeter when these privileges are being granted.

NOTICE

The command code is a meter-specific one-time user hash code generated by ABB technical support/ service teams only. Contact your regular ABB technical support or service engineer for help if needing to reset the user account password.

ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/measurement

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