

ScrewDriver 7

Diagnostic and flow-profiling software for ABB flowmeters



Measurement made easy

ScrewDriver 7 software

Introduction

ScrewDriver 7 is a powerful Device Type Manager (DTM) for use with ABB AquaMaster, MagMaster and WaterMaster 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 several different communications methods for transmitter access, for example, native protocol and RS232 for physical connections.

For more information

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1 Overview

Software Features

■ Access:

- In-line access via device Wizard (available in the 2nd row of the icon bar)
- Access communications history (displays the last 16 operations)
- Item value display by meaning (displays 'Enabled' text instead of '1')
- Enhanced item explorer and item editor ('Print Item List' and 'Display by Meaning' editor)

■ Graph / Data Logger:

- Enhanced 'Stacked' graph (two items at a time, full statistic lines and error limit support for both graphs)
- Larger graph area on screen
- Monitor or graph view of same logged data.
- Monitor view spreadsheet with all statistical detail (Std, Range, Value etc.)
- Enhanced print graph and/or monitor data sheet
- Graph setup panel with 3 tabs (Scale, Names and Statistics)
- Immediate start of data logger – all parameters measured stored in spreadsheet
- Graph preview picture to edit scale, limits and statistics lines in graph setup

■ ABB Backup:

- A facility with 4 functions (Create, Restore, Compare and Print) that enable a user to create a backup from a device's memory, restore a previously saved backup file or generate a print report from a memory picture. A report is generated automatically after a completed Create or Restore operation.

2 Installing ScrewDriver 7

2.1 System Requirements

ScrewDriver 7 requires the following:

- Pentium class CPU
- Microsoft Windows NT/2000/XP/7 Professional/7 Ultimate (32-bit versions)
- Minimum of 10 Mb free hard disc space
- 1024 x 768 display resolution, 16-bit color
- Minimum of 1 free serial port (COM port) for device connection

2.2 Installation

To install ScrewDriver 7:

1. Place the CD in the computer's CD drive.
2. If Autorun is enabled, the installation process starts automatically. If Autorun is not enabled, click 'Start', select 'Run...!' and type 'x:\setup' in the dialog (where 'x' is the identification letter of the computer's CD drive) and press Enter.
3. Accept or modify the destination path of ScrewDriver 7; the software installs itself into the chosen drive and directory. ABB highly recommend to accept the default installation (C:\Program Files\ABB\ScrewDriver 7). After installation, a message box confirming successful installation appears. A new program group called 'ABB' is created, containing the icon for ScrewDriver 7.
4. To create a desktop shortcut (, click 'Start' and select 'Programs' followed by 'ABB'. Right click the 'ScrewDriver 7' icon and select 'Send To' followed by 'Desktop (create shortcut)'.

3 Registering ScrewDriver 7

ScrewDriver 7 can be used without being registered but the following advanced functions are not available:

All transmitters:

- Graphing and data logging
- Flow profiling

The software must be registered in order to use these functions. Registration is achieved in one of three ways:

- e-mail The software generates an e-mail utilizing the user's default e-mail application.
- Fax The software generates a text file that can be faxed to ABB on +44 (0)1453 829671.
- Telephone Dial +44 (0)1453 826661 and ask for the ScrewDriver 7 Program Administrator.

To register ScrewDriver 7, either telephone ABB or start the software and select 'Help', followed by 'Register ScrewDriver 7'. The following screen is displayed:



Select the registration method required and click **Next >**. The following screen is displayed:



Note. The *Name:* and *Company:* fields are completed automatically and cannot be changed. The remaining fields must all be completed for registration to be successful.

Enter the user information and click **Next >**. The following screen is displayed:



'Standard Advanced Functions' is selected automatically; select 'ABB Flow Profiling' (if required) and click **Finish**.

If the e-mail registration method is selected, the software generates an e-mail addressed to ABB. If the fax method was selected, a form is generated and the computer's default printer dialog launched to enable the form to be printed and faxed to ABB.

On receipt of the registration request, ABB generates the required Authorization Code(s) and returns it/them by e-mail or fax. Enter the code(s) into the software to activate the advanced functions. Start the software and select 'Help', followed by 'Register ScrewDriver 7'. The following screen is displayed:



Select the last option and click **Next >**. The following screen is displayed:



Enter the supplied Authorization Code(s) into the respective field(s) and click **Finish**. A message is displayed confirming that the advanced functions are now activated.

4 ScrewDriver 7 File Types

The software creates and uses five file types for holding data, parameter lists or scripts. These files are shared among the many functions. Extended Windows filenames are supported. The various file types are described in Table 4.1.

Type	Extension	Description
Template files	*.ilt	Template files can be opened in all functions except data logging/graphing. They enable the user to predefine a list of parameters for use in future access operations using <i>Item Explorer</i> , <i>Backup/Restore</i> , etc. They may also be saved as '<another name>.ils' or '<another name>.ilt'. The user is given the option to use the 'save as' command to create an '*.ils' file associated with a particular transmitter or event.
List files	*.ils	List files are customizable files containing user-defined parameters and their current or saved values. Each file is specific to a device communication address. List files may be used in all the same functions as template '*.ilt' files. The user is given the option to use the 'save as' command to create an '*.ils' file with a name associated with a particular transmitter or event.
Data logging/graphing files	*.dlg	Data logging/graphing files are comma-delimited (CSV) files containing data from a data logging/graphing session. They may be opened either in ScrewDriver 7 or a spreadsheet application, for example, Excel®.
Comma-delimited files	*.csv	Comma-delimited files are created by various functions and are contained in either the 'ScrewDriver7/History' subdirectory or a specific directory.
Txm files	*.txm	These files are unique to ScrewDriver 7 and are used for configuration control.

Table 4.1 File Types

5 ScrewDriver 7 Connectivity

ScrewDriver 7 supports as many connections as can be physically made to a PC. ABB AquaMaster and MagMaster support RS232 connections only, therefore use one serial communications port each. ABB WaterMaster supports an Infrared (IR) USB connection only. AquaMaster 3 is also supplied with a USB connection.

Older 'Notebook' type computers are equipped (typically), with only one serial communications port, and many newer 'Notebooks' have no serial communications ports. For situations where one or more serial communications ports are needed, USB-to-RS232 adapters can be used.

ScrewDriver 7 is extremely powerful and flexible. Data from **all** connected devices can be logged simultaneously and graphed. Up to 4 graphs can be opened per device or all the data from all connected devices can be logged and recorded on one graph. Any of the parameters within any of the connected devices can be accessed at any time using the 'Access' toolbar, even during graphing and data logging.

5.1 MagMaster and AquaMaster Cables

MagMaster uses a standard Laplink cable. Laplink cables are available from computer stores.

A Laplink cable can be manufactured using a length of suitable cable and 2 x DB9 female plugs, connected as shown in Table 5.1.

	PC End DB9 Connector	MagMaster End DB9 Connector
Pin Number	2	3
	3	2
	5	5
	6	4 to 6
	7	7 to 8

Table 5.1 Laplink Cable DB9 Plug Connections

AquaMaster requires a specific cable, available from ABB (see relevant manual).

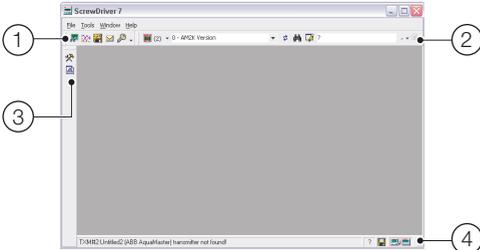
5.2 WaterMaster Cable and Connection

WaterMaster communicates with the PC hosting ScrewDriver 7 using the HART protocol over an IR/USB connection. This is achieved in combination with the ABB Service Port Splitter (part number WAJC2510). For this reason, installation of the ABB Service Port Splitter application is required prior to connection with a WaterMaster transmitter – refer to instruction manual IM/WMP for relevant details.

6 Using ScrewDriver 7 – Basic Functions

6.1 ScrewDriver 7 Start-up Screen

To run the application, either click the desktop shortcut  (if created – see Section 2.2, page 3) or click 'Start' and select 'Programs', 'ABB', 'ScrewDriver7', 'ScrewDriver 7'. The 'ScrewDriver 7.0' start-up screen is displayed:



- ① **'Tools' toolbar** – displays ScrewDriver 7's main tool buttons. This toolbar may be customized to display any of the available Tool buttons. Standard tools are:



New Item Explorer

– see Section 6.5, page 21.



New Graph

– (advanced functions only) see Section 7.1, page 35.



ABB Backup Wizard

– see Section 6.7, page 25.



Send e-mail

– see Section 6.8, page 34.

- ② **'Access' toolbar** – enables access to any device from a list of installed devices and access to any single parameter from that device. Access toolbar buttons include:



Active Device – provides indication of the connection status of the device that ScrewDriver 7 last communicated with. An active connection is indicated by the  icon; an inactive connection is indicated by the  icon. If the connection is inactive, click the button to initiate the AutoConnect function. The number in brackets to the right of the icon indicate the number of installed devices. To connect to a different device (if more than one is installed), click the down-arrow to the right of the button and select the device required from the drop-down list of installed transmitters to initiate the AutoConnect function.

Note. If no devices have been connected previously, the Transmitter Wizard button (see Section 6.3, page 12) is displayed in place of the active device button.



Refresh

– click to refresh the data displayed in the parameter data field.



Find Item

– click to enable a keyword search for parameter items within the instrument selected.



Modify

– click to change a writable parameter or type directly in the data field to the right of the button. Select engineering units and decimal place resolution from the drop-down menu at the right-hand end of the data field.

- ③ **Instrument toolbar** – displays tool buttons specific to MagMaster, AquaMaster and WaterMaster:



Synchronize Units – see Section 6.3, page 12.



ABB Flow Profile – see Section 7.2, page 39.

- ④ **Status bar** – displays a connection status message, together with the communication address and software version of the connected device.

6.2 ScrewDriver 7 File Browser

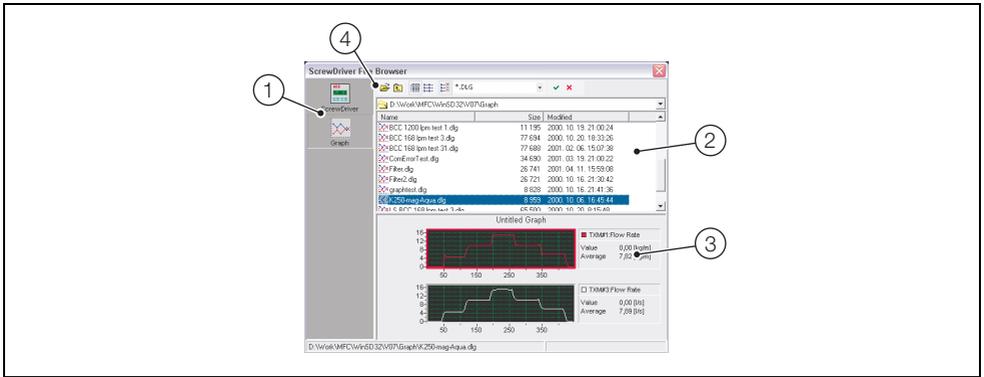


Fig. 6.1 ScrewDriver 7 File Browser

The ScrewDriver 7 File Browser is common to all software functions and is used to explore directories and open files for use in the active function.

Referring to Fig. 6.1, the window comprises the following:

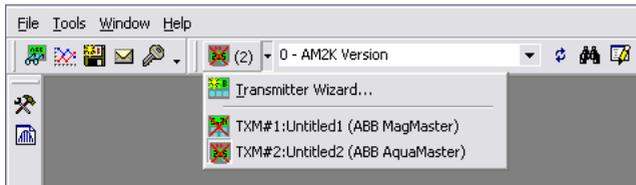
- ① displays ScrewDriver 7 directories
- ② Windows®-style file list and panel
- ③ displays a preview of the selected file
- ④ toolbar

To open a file from list ②, either double-click it or select it and click . Other directories are explored in the usual Windows manner.

Buttons on toolbar ④ enable the user to navigate the directory structure, change the way files are listed and disable or enable the preview panel. Files can be sorted within each column by clicking on the column header in list ②.

6.3 Transmitter Wizard

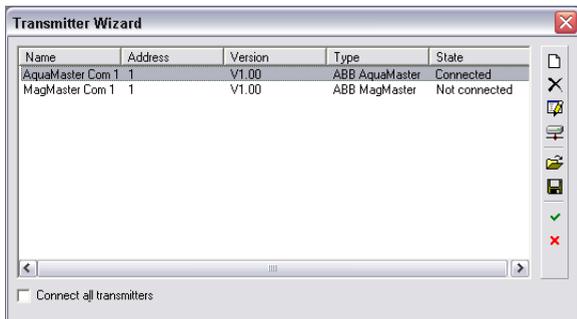
Select 'Transmitter Wizard...' from the 'Tools' menu or click the drop-down arrow to the right of the active device button () to reveal the 'Transmitter Wizard' button ():



Note.

- If no devices have been connected previously, the transmitter wizard button is displayed in place of the active device button.
- If the active device is not connected, the active device button contains a red cross ().

Click  to open the 'Transmitter Wizard' installed list. Previously connected devices, together with their communication settings and status, are listed:



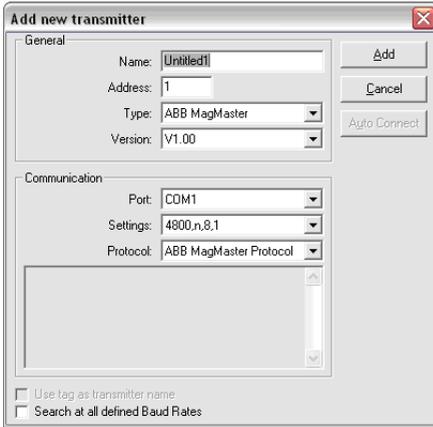
The 'Transmitter Wizard' is used to add the following device types:

- ABB MagMaster – see Section 6.3.1
- ABB AquaMaster – see Section 6.3.1
- ABB WaterMaster – see Section 6.3.2, page 15

6.3.1 Adding an ABB MagMaster or ABB AquaMaster Device

To add a new device to the list:

1. Ensure the device is connected to the computer's serial communications port.
2. Click  to display the 'Add new transmitter' dialog:



3. Complete the following parameters:

Name:

Enter a name for the device.

Address:

Enter a unique address number.

Type:

Select the type of device to be connected (ABB MagMaster or ABB AquaMaster).

Port:

Select the required port number.

Search at all defined Baud Rates

Click to enable searching at all available Baud rates).

4. Click . The software searches for the device on the selected serial communications (Com) port and, if found, connects automatically and adds it to the transmitter wizard list. The connection status is displayed in the dialog and in the status bar at the bottom of the main screen (see Section 6.1, page 9).

If the device is not found, it is added to the transmitter wizard list but a 'Not connected' status message is displayed and a 'transmitter not found' status message is displayed in the status bar at the bottom of main screen.

5. Click  to close the transmitter wizard screen.

6. Synchronize engineering units:

- a. Click . The 'Synchronize Units' screen is displayed:

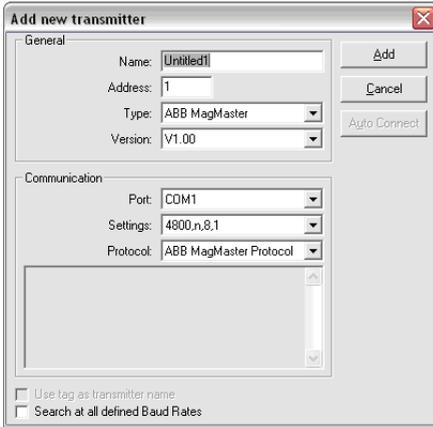


- b. Click  to synchronize the engineering units in ScrewDriver 7 with those programmed into the connected MagMaster or AquaMaster.
7. Refer to Section 6.3.3, page 18 for details of how to delete / edit / connect devices and how to restore / save device configurations.

6.3.2 Adding an ABB WaterMaster Device

To add a new ABB WaterMaster device to the list:

1. Ensure the device is connected to the computer's serial communications port.
2. Click  to display the 'Add new transmitter' dialog:



3. Complete the following parameters:

Name:

Enter a name for the device.

Address:

Enter a unique address number.

Type:

Select the type of device to be connected (ABB WaterMaster).

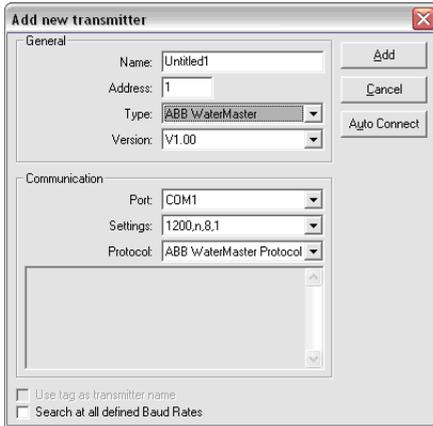
Port:

Take no action at the 'Port:' drop-down option.

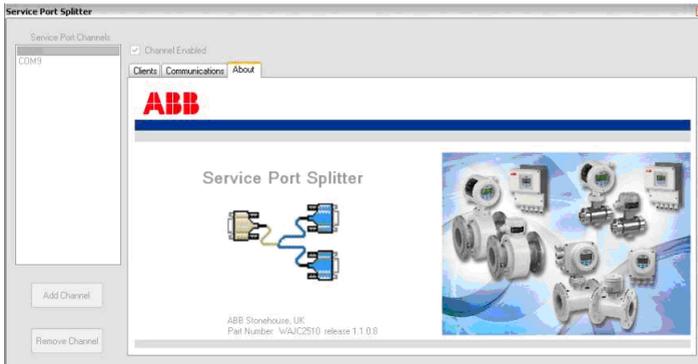
Search at all defined Baud Rates

Take no action at the 'Search at all defined Baud Rates' checkbox.

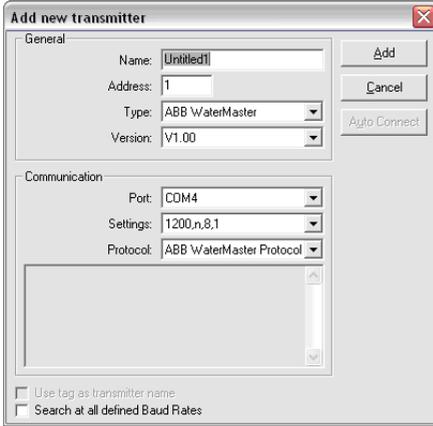
4. Ensure the ABB Service Port Splitter application is installed (see IM/WMP Manual), then at the 'Type' dropdown, select 'ABB WaterMaster' to enable the **Auto Connect** button:



5. Ensure an active WaterMaster transmitter is connected to an appropriate communication port on the PC, then click the **Auto Connect** button and allow the ScrewDriver 7 Application to connect to the ABB Service Port Splitter (SPS) application. SPS is launched automatically (if not already launched) and briefly displays a splash-screen while it opens:



- If the auto-connection completes successfully, the  button is disabled and the 'Port:' numeric displays the virtual client port selected by the SPS:



Note. If a prompt is displayed, refer to 6.3.4, page 19 to troubleshoot the connection.

- Click . The software, having connected to a device automatically adds that device to the transmitter wizard list.

The connection status is displayed in the dialog and in the status bar at the bottom of the main screen (see Section 6.1, page 9).

If the device is not found, it is added to the transmitter wizard list but a 'Not connected' status message is displayed and a 'transmitter not found' status message is displayed in the status bar at the bottom of main screen.

- Click  to close the transmitter wizard screen.

9. Synchronize engineering units:

- a. Click . The 'Synchronize Units' screen is displayed:



- b. Click to synchronize the engineering units in ScrewDriver 7 with those programmed into the connected WaterMaster.

10. Refer to Section 6.3.3, page 18 for details of how to delete, edit, connect devices and how to restore and save device configurations.

6.3.3 Device Administration

The device highlighted in the transmitter wizard list is the active device and its icon is displayed in the icon bar.

To delete a device from the transmitter wizard list, click on the device to select it and click .

To edit a device in the transmitter wizard list, click on the device to select it and click  to open the 'Transmitter properties' dialog. This dialog is identical to the 'Add new transmitter' dialog. Edit the parameters as described in step 3 (above) and click .

To connect to a device, click on the device to select it and click  or . To connect to all devices in the list, click the Connect all transmitters checkbox and click  or .

To restore a device's configuration, select the device in the transmitter wizard list, click  and select a configuration (*.txm) file from the 'ScrewDriver 7 File Browser'.

To save a device's configuration, select the device in the transmitter wizard list, click  and save the file in the required location.

6.3.4 Troubleshooting a WaterMaster Device Connection

If an error or unexpected scenario is encountered during WaterMaster auto-connection, prompts appear on the screen advising what ScrewDriver 7 has detected and the remedial action required.

1. If the auto-connection completes but the communications port cannot be assigned, the following prompt is displayed:



In this instance, select a port that is known to be connected to the transmitter and click  to complete the operation.

2. If the auto-connection fails to complete, 1 of 2 pop-ups is displayed:
 - this prompt is displayed if the SPS application launches, but there is no communication between it and the ScrewDriver 7 application:



- this prompt is displayed if the SPS application cannot be found:



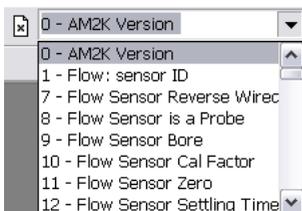
6.4 Changing Device Parameter Values

ScrewDriver 7 uses the parameters defined within the connected device's '.ini' file. The 'Item Editor' is used to change the values of parameters that are not set to 'read-only'.

Numbered device parameters, unique to the device type, are contained in the Item Editor's drop-down list.

To modify a parameter value:

1. Open the Item Editor's drop-down list and scroll to the parameter required:

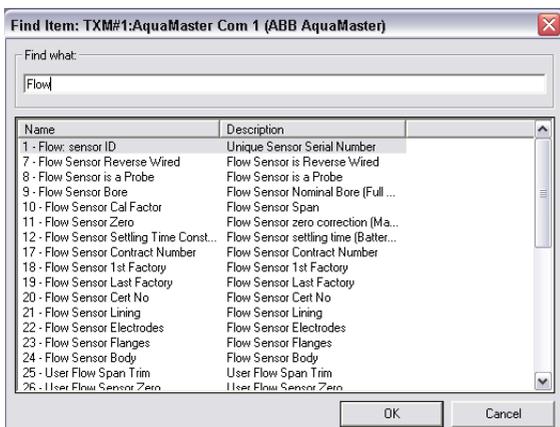


OR

Type the parameter's identification number into the Item ID box and press 'Enter'.

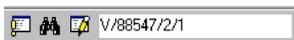
OR

Click () to open the 'Find Item' dialog:



Type a search term into the 'Find what:' field. As the term is entered, all parameters containing that term are listed. Select the required parameter from the list and click 'OK' or press the 'Enter' key.

2. The current parameter value is displayed in the 'Item Editor' field:



Enter the new value and click () or press 'Enter' to write the change to the device '.ini' file. If the button is greyed-out ():

the parameter is read-only and cannot be changed **or**

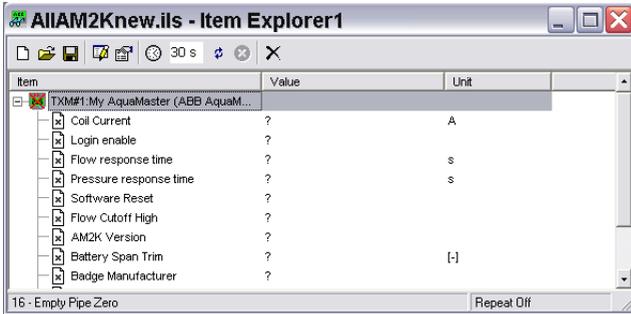
the parameter is read-only for the present password level **or**

communication with the device has been lost – exit and restart ScrewDriver 7.

6.5 New Item Explorer

The New Item Explorer is used to display and modify any user-defined parameter value contained within the '.ils' list file (see Table 4.1, page 7) associated with any of the devices listed in the Transmitter Wizard screen – see Section 6.3, page 12.

To launch the New Item Explorer, select 'New Item Explorer...' from the 'Tools' menu or click . If New Item Explorer is being used for the first time, an empty List file 'Untitled1.ils' is displayed, otherwise the last List file accessed is displayed:



To open a previously saved file:

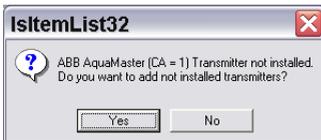
1. Click  – the 'ScrewDriver 7 File Browser' window (see Section 6.2, page 11) is displayed.
2. Click the 'Item Explorer' or 'ABB Backup' buttons in the left-hand panel to navigate to the folders where *.ils files are typically saved (see Section 4, page 7) or select a file's location using the browser bar ().

Note. Click the 'ScrewDriver 7' button in the left-hand panel to return to the location last selected in the browser bar.

3. Select the type of file to open from the 'File type:' drop-down list (*.ils).

Note. If an '*.ilt' file type (template file – see Section 4, page 7) is selected and opened, the file extension is changed automatically to '*.ils'.

4. Select the file to open from the displayed list and double-click it or click either  or  to open it. Click  to close the file browser screen without opening a file.
5. If the device associated with the selected List file is not listed in the Transmitter Wizard screen (see Section 6.3, page 12), a warning is displayed:

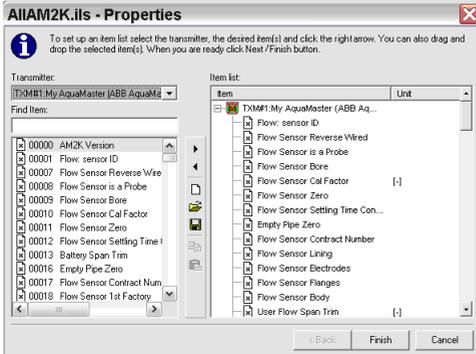


Click to add the device to the Transmitter Wizard list or to exit.

If is clicked, the 'Add new transmitter' dialog is displayed. Add the device as described in Section 6.3, page 12.

To edit a List file:

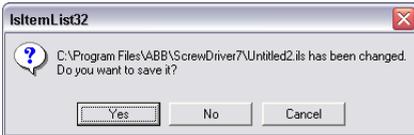
1. Click  to open the '<filename.ils> – Properties' screen:



2. To add parameters to a List file, highlight the parameters in the left-hand panel (shift-click to select several contiguous parameters or ctrl-click to add several non-contiguous parameters) and either click  or drag-and-drop the parameters into the right-hand (Item list) panel.

To remove a parameter from a List file, highlight it in the right-hand panel and click .

3. Click . If the file has been changed, a prompt is displayed:



Click  to save (entering a new filename if required) or click  to exit, discarding the changes.

Referring to Fig. 6.2, when the List file is saved, ScrewDriver 7 connects automatically to device (A) and the current value of each parameter in the list below the icon is displayed in value list (B). To refresh the current values, select device (A) and click  or press the keyboard function key F2.

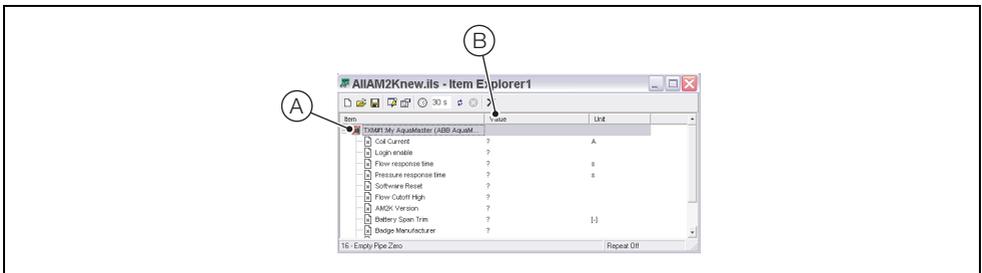


Fig. 6.2 List File

6.6 Terminal Emulator

The terminal emulator enables the user to read and/or modify settings using the AquaMaster or MagMaster transmitter's menu system.

To launch the terminal emulator, select 'Terminal...' from the 'Tools' menu.

6.6.1 AquaMaster

Log on to the AquaMaster at Security Level 4 to enable read/write access to any variable within the menu system.

AquaMaster Menu Commands

- press [TAB] to go to the top of each menu
- press [M] to list the menu contents
- press [ENTER] to step through each item within the menu
- press [SPACE] to edit an item
- press [ESC] to exit

For further information on programming using the AquaMaster transmitter's menu system, refer to the AquaMaster Quick Reference Programming Guide (IM/AM/QRG).

6.6.2 MagMaster

Log on to the MagMaster at Security Level 2 to enable read/write access to any variable within the menu system.

MagMaster Menu Commands

- press [ESC] to return to the top level of the main menu or abort editing an item value
- press [Enter] to display the next menu header, sub menu header or item value within a menu
- press [Q] followed by [Enter] to exit the current menu or sub menu (to go up one level)
- press [1]–[9], [A], [B] or [C] followed by [Enter] to access a menu, sub menu or edit the value of an item within a menu

For further information on programming using MagMaster transmitter's menu system, refer to the MagMaster Quick Reference Programming Guide (IM/MM/QRG2).

6.6.3 WaterMaster

Terminal emulation is not supported for WaterMaster transmitter types. The following prompt is displayed by ScrewDriver 7 if terminal emulation is attempted:



Fig. 6.3 Transmitter Type Not Supported Prompt

For further information on programming using WaterMaster transmitter's menu system, refer to the WaterMaster Programming Guide (IM/WMP).

6.7 ABB Backup

ABB Backup is a utility that comprises the following functions:

- **Backup** either the complete memory content of a transmitter or a selection of items into a disk file
- **Restore** transmitter memory from a backup file
- **Compare** previous with loaded memory data
- **Print** a report from a backup file.

ABB Backup Wizard – Fig. 6.4

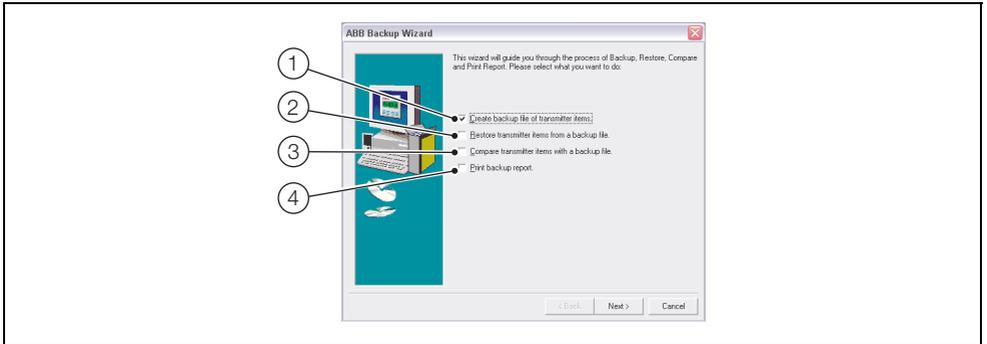


Fig. 6.4 ABB Backup Wizard

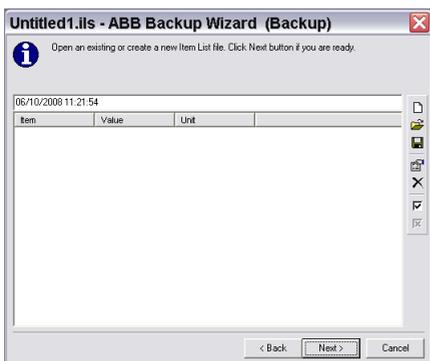
Select the checkbox for the required function:

- ① Create backup of transmitter items – see Section 6.7.1, page 26.
- ② Restore transmitter items from a backup file – see Section 6.7.2, page 28.
- ③ Compare transmitter items from a backup file – see Section 6.7.3, page 30.
- ④ Print backup report – see Section 6.7.4, page 32.

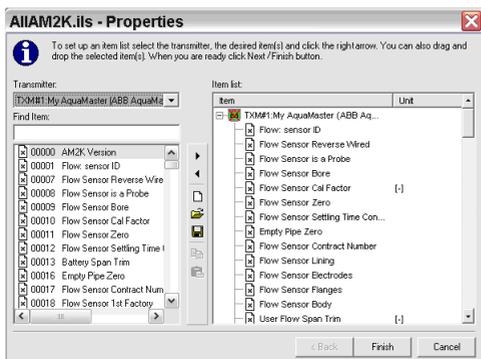
6.7.1 Backup

To create a backup file:

1. Referring to Fig. 6.4, select option ① and click  to continue. The 'ABB Backup Wizard (Backup)' screen is displayed:



2. A new backup file can be created or, if required, click  to open an existing backup file.
3. Click  to open the 'Properties' screen where items can be added to, or removed from, the backup file:



Select items to be added from the left-hand panel and click .

Select items to be removed from the right-hand (Item list) panel and click .

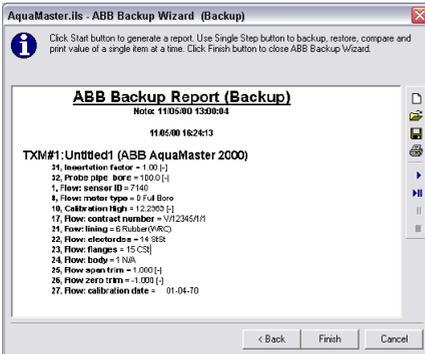
Click  to save the file and return to the 'ABB Backup Wizard (Backup)' screen.

Note. ABB recommend that the filename contains either the backup date (for example, **backup150500.ils**) or the serial number of the transmitter (for example, **backup_V_123456_1_2**).

- Click to continue. The next 'ABB Backup Wizard (Backup)' screen is displayed:



- Click to backup all items selected at step 3 sequentially, or click to backup each item one-by-one. Click to pause backup or click to stop.
- A report is generated in the wizard screen as the backup progresses:



Click to print the report.

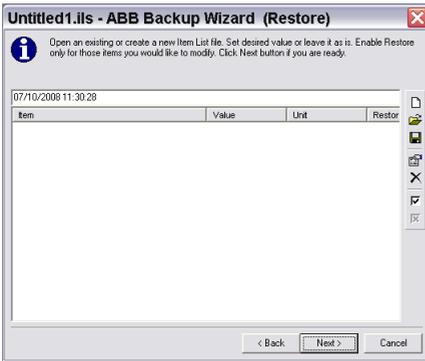
- When the backup is complete, click . A save dialog is displayed. Click to save or click to exit, discarding the changes.

Note. By default the file is saved in the ScrewDriver 7 application's root directory. For good data management, ABB recommend that a separate directory is created for storing all backup files, for example – C:\ABB_APPS\ScrewDriver\Backup.

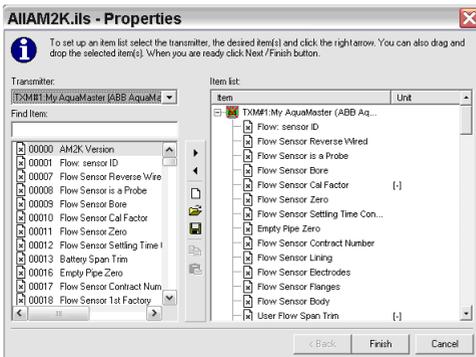
6.7.2 Restore

To restore a backup file:

1. Referring to Fig. 6.4, select option (2) and click  to continue. The 'ABB Backup Wizard (Restore)' screen is displayed:



2. Click  to open the backup file to restore.
3. If required, modify the backup file. Click  to open the 'Properties' screen where items can be added to, or removed from, the backup file:



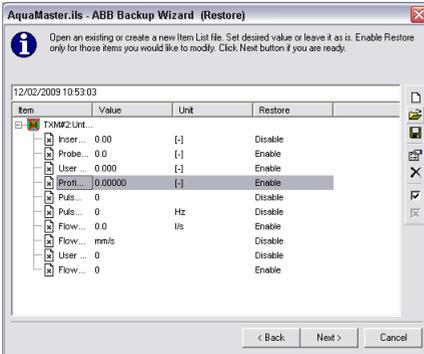
Select items to be added from the left-hand panel and click .

Select items to be removed from the right-hand (Item list) panel and click .

Click  to save the file and return to the 'ABB Backup Wizard (Restore)' screen.

Note. It is recommended that the filename contains either the backup date (for example, **backup150500.ils**) or the serial number of the transmitter (for example, **backup_V_123456_1_2**).

- Click to continue. The next 'ABB Backup Wizard (Restore)' screen is displayed:



- Click to restore all items selected at step 3 sequentially, or click to restore each item one-by-one. Click to pause restore or click to stop.
- A report is generated in the wizard screen as the restore process progresses:



Click to print the report.

- When the restore process is complete, click .

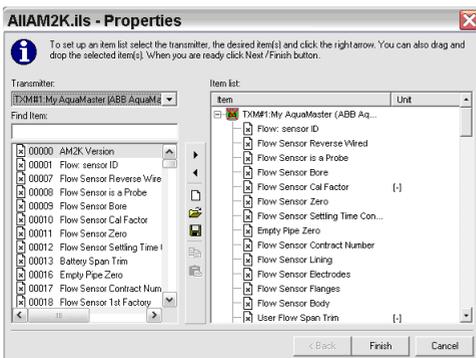
6.7.3 Compare

To compare a transmitter item to the contents of a backup file:

1. Referring to Fig. 6.4, select option (3) and click  to continue. The 'ABB Backup Wizard (Compare)' screen is displayed:



2. Click  to open the backup file the transmitter item is to be compared to.
3. If required, modify the backup file. Click  to open the 'Properties' screen where items can be added to, or removed from, the backup file:



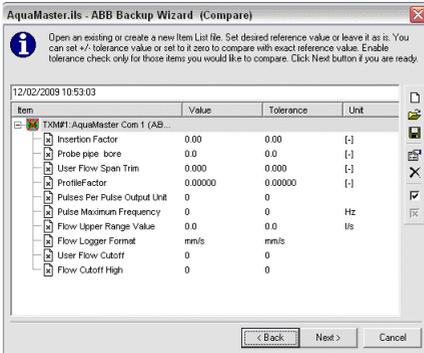
Select items to be added from the left-hand panel and click .

Select items to be removed from the right-hand (Item list) panel and click .

Click  to save the file and return to the 'ABB Backup Wizard (Compare)' screen.

Note. It is recommended that the filename contains either the backup date (for example, **backup150500.ils**) or the serial number of the transmitter (for example, **backup_V_123456_1_2**).

- 4. Click to continue. The next 'ABB Backup Wizard (Compare)' screen is displayed:



- 5. Click to compare all items selected at step 3 sequentially, or click to compare each item one-by-one. Click to pause compare or click to stop.
- 6. A report is generated in the wizard screen as the comparison process progresses:



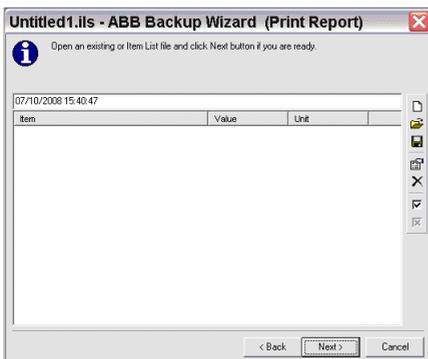
Click to print the report.

- 7. When the comparison process is complete, click .

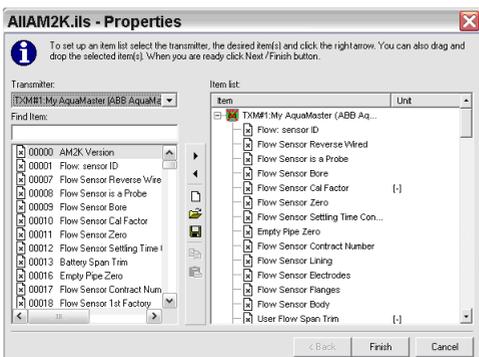
6.7.4 Print Report

To print a report:

1. Referring to Fig. 6.4, select option (4) and click  to continue. The 'ABB Backup Wizard (Print Report)' screen is displayed:



2. Click  to open the backup file the report is to be generated from.
3. If required, modify the backup file. Click  to open the 'Properties' screen where items can be added to, or removed from, the backup file:



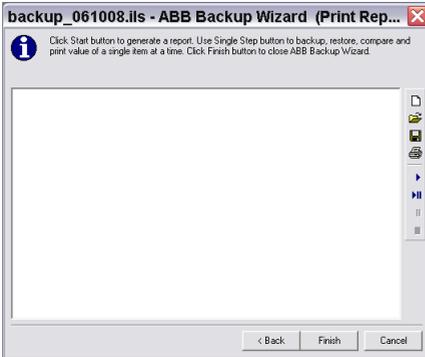
Select items to be added from the left-hand panel and click .

Select items to be removed from the right-hand (Item list) panel and click .

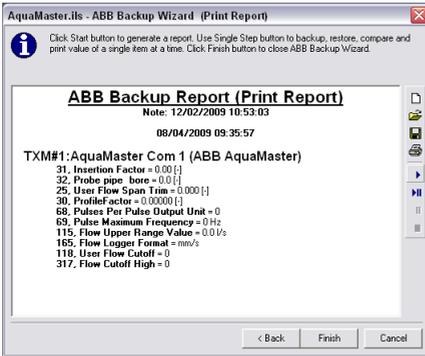
Click  to save the file and return to the 'ABB Backup Wizard (Print Report)' screen.

Note. ABB recommend that the filename contains either the backup date (for example, **backup150500.ils**) or the serial number of the transmitter (for example, **backup_V_123456_1_2**).

- 4. Click  to continue. The next 'ABB Backup Wizard (Print Report)' screen is displayed:



- 5. Click  to generate the report from all items selected at step 3 sequentially, or click  to process each item one-by-one. Click  to pause or click  to stop.
- 6. The report is generated in the wizard screen:



- 7. Click  to print the report.

Note. To print a partial report, select the part to be printed in the wizard screen and click . If nothing is selected, the complete report is printed.

- 8. When the print process is complete, click .

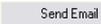
6.8 e-mail

The e-mail facility enables the user to send data files to ABB for interpretation and analysis. The software compresses (zips) all '*.ils', '*.dlg', and '*.csv' files automatically in ScrewDriver 7's Backup, Graph, History and Item Explorer directories, enables the user to write a short cover message and creates an e-mail with the zipped files attached in the user's default e-mail application. The e-mail is addressed, by default, to Instrumentation@gb.abb.com but this can be changed. The user can also modify the number and type of files that are sent.

To send an e-mail:

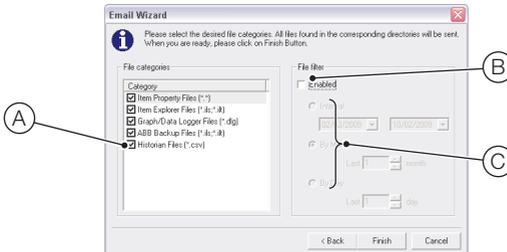
1. Click the  button on the ScrewDriver 7 start-up screen or select 'Send Email...' from the 'Tools' menu. The 'Email Wizard' dialog is displayed:



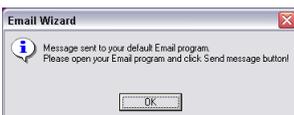
- a. To send default files to the default address, complete the 'User Name', 'Company Name' and 'Note' fields as required and click .

or

- b. To select files to send click . The following dialog is displayed:



- c. Select the file types to add to the e-mail from list (A).
 - d. If required, select box (B) to enable filtering the transmission of files to those falling within a range of calendar dates, selected using options (C).
 - e. Click .
2. A prompt is displayed:



Follow the instructions on the prompt to send the e-mail.

7 Using ScrewDriver 7 – Advanced Functions

Note. This Section is applicable only if ScrewDriver 7 is registered and Advanced Functions activated – see Section 3, page 4.

7.1 Graphing and Data Logging

This facility enables graphing and data logging of multiple parameters from different devices (or from the same device). The item list, containing a list of items to be logged, is fully user-customizable and can be saved and reloaded. If more than one device is connected to ScrewDriver 7, items from different devices can be added to the same list.

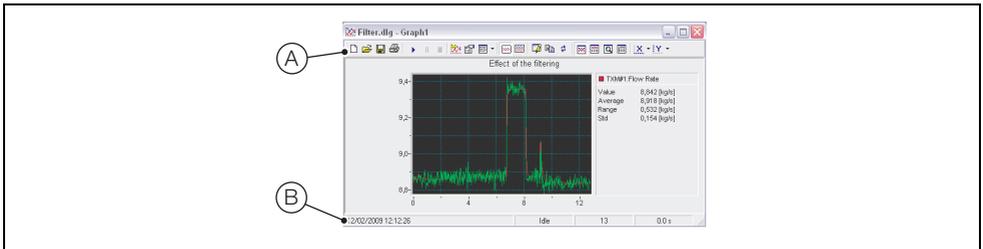


Fig. 7.1 Graph View

Referring to Fig. 7.1, toolbar **A** controls all the Graph functions. Hold the mouse cursor over any button to display help text explaining the button's function.

Graph Toolbar Buttons

- | | | |
|--|-----------------------|---|
|  | New | Creates a new, untitled graph using the data from a single, default item from the first device in the 'Transmitter Wizard' installed list – see Section 6.3, page 12. Click  to start graphing/logging or click  to change the graphing/logging data source – see Section 7.1.1, page 37. |
|  | Open | Enables the user to select and open an existing graph. |
|  | Save As | Enables the user to save a graph with a different filename. |
|  | Print | Prints the 'Report' view of the active graph. |
|  | Start/Continue | Starts/continues data logging of the currently selected items. |
|  | Suspend | Suspends data logging – click again to continue. |
|  | Stop | Stops data logging. |
|  | Graph Wizard | Enables the user to select devices and add or delete items to log and graph – see Section 7.1.1, page 37. |

Continued...

	Properties	Enables the user to change chart properties (for example, zoom level, chart name, axis titles etc.).
	Options	Enables the user to select the type of statistics to be displayed, select grid on/off, connect trace points or show as dots, mark the data points with boxes, and enable/disable editing of recorded data in the 'Spreadsheet' view.
	Single Chart	Enables the user to display the graph trace for any 1 logged item. If more than 1 item is logged, recording of those items continues uninterrupted.
	Dual Chart	Enables the user to display the graph trace for any two logged items. If more than two items are logged, recording of those items continues uninterrupted. Click on either of the graphs to select that graph. The selected graph is indicated by a red frame.
	Edit Graph Note	Enables the user to enter a note as a reminder or explanation of the data. The note is displayed in the status bar – see (B) in Fig. 7.1.
	Copy	Copies the active graph window to the clipboard for pasting into other applications.
	Refresh	Redraws the active graph.
	Chart	Displays the last selected view (Single or Dual Chart) of the active graph.
	Report	Displays the report view of the active graph. The report comprises the graph on a white background with parameter statistics below.
	Preview	Displays the report, resized to fit the current window.
	Spreadsheet	Displays each logged item with its record number and a time reference. Select 'Allow Data Editing' from the 'Options' menu to enable editing of the data.
	X axis	} Changes the source of the data for the graph axes
	Y axis	

Zoom

The cursor changes to a cross (+) when positioned over the graph. Click-and-drag over the graph to draw a box over an area to be enhanced and release the mouse button to magnify the area. Repeat to zoom-in further. Double-click to return to normal view.

7.1.1 Graph Wizard

Graph Wizard is used to set up a list of items to be logged. To load an existing item list file (*.ils) into Graph Wizard, refer to Fig. 7.2 and:

1. Click (A) (📁) to select the list file required from the 'ScrewDriver 7 File Browser' window.
2. Select the required items to log and graph in panel (B) and click ▶ to add them to the list in panel (C). To remove an item from the list, select the item from panel C and click ◀.
3. When the list is complete click . The Data Logger Setup dialog (Fig. 7.3) is displayed.

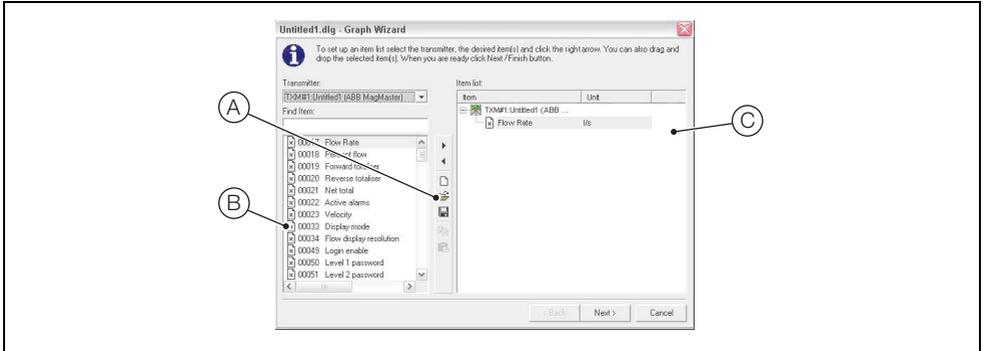


Fig. 7.2 Graph Wizard

Referring to Fig. 7.3:

- ① Enter a sampling period time in seconds. ScrewDriver 7 calculates a maximum suggested sampling period time according to how many items are to be logged. If the sampling period time entered exceeds the suggested time, ScrewDriver 7 displays a dialog suggesting a new value when data logging is started.
- ② Select a mode:
 - Free rundata logging starts when the dialog is closed and continues until stopped by the user
 - From start time to finish timedata logging runs between the start and finish dates/times selected
 - From start time for an intervaldata logging starts at the date/time selected and ends when the selected interval elapses
- ③ Select the start and finish date and times and enter an Interval (in seconds), depending on the mode selected at step ②.
- ④ Enter the filename required or click to search for an existing data logging file.
- ⑤ Tick the 'Append new samples' checkbox to add new samples to the file. If this box is unchecked, the file is overwritten with new data after every finished sample.
- ⑥ Tick the 'Start data logging on exit' checkbox to start data logging when is clicked. If this checkbox is not ticked, data logging is started by clicking in the Graph window.
- ⑦ Click to exit the wizard. Click to return to the 'Graph Wizard' window or click to exit the wizard without saving any changes.

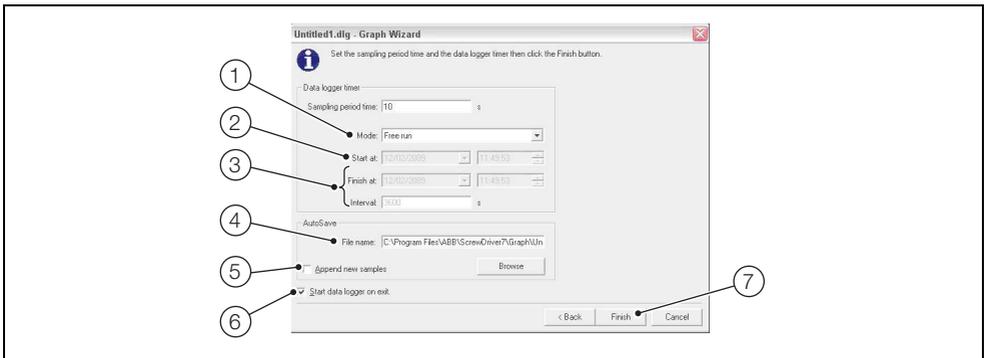


Fig. 7.3 Data Logger Setup Dialog

7.2 ABB Flow Profiling

The flow profiling functions are applicable to AquaMaster, MagMaster and WaterMaster and enable the user 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.

To launch flow profiling, click . The 'ABB Flow Profile' screen (Fig. 7.4) is displayed.

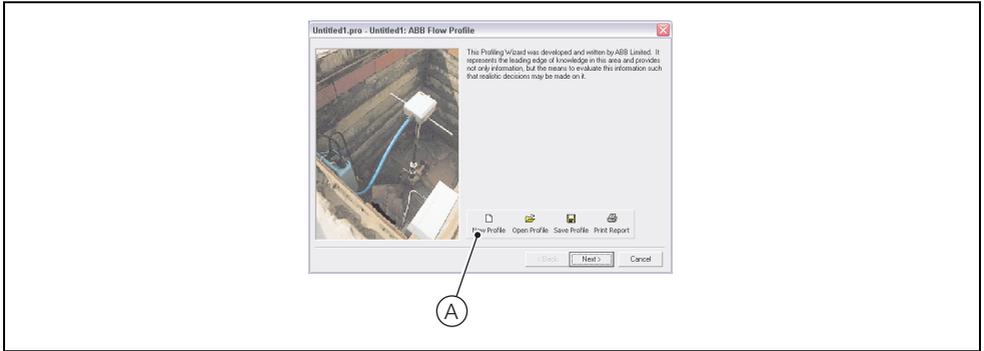
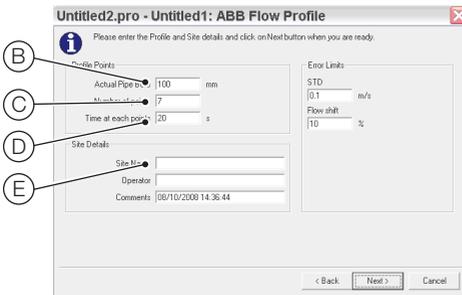


Fig. 7.4 ABB Flow Profiling Screen

To create a new flow profile:

1. Referring to Fig. 7.4, click button (A). The following screen is displayed:



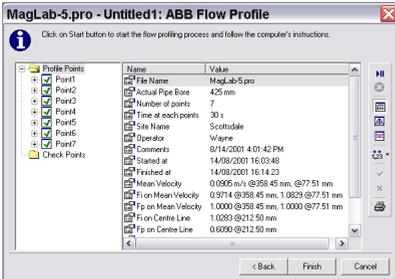
2. Enter the pipe internal diameter (B).

Note. Do not enter the nominal pipe diameter. Enter an accurate measurement of the actual pipe diameter.

3. Enter the number of sampling points (C).

Note. Enter an **odd** number between 7 and 29. An odd number ensures that the middle measurement falls on the centre line of the pipe.

4. Enter a sampling time at each point of between 20 and 60 seconds (D).
 5. Enter the site name, operator details and any comments (E).
 6. Click . The following screen is displayed:

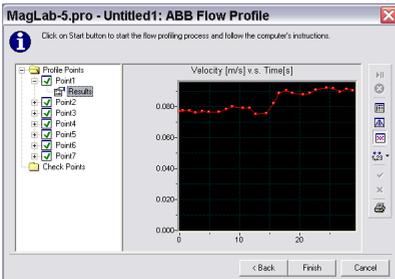


7. Click to start the flow profiling process and follow the on-screen instructions.

Note.

- As flow profiling proceeds, the user is prompted to insert the AquaProbe into the pipe until it touches the opposite side. When in this position, mark the probe shaft at the top of the insertion fitting to create a reference point for all subsequent probe positions.
- All positioning calculations take into account the location of the AquaProbe's velocity sensing spot (30 mm [1.2 in] from the tip of the probe).

8. As sampling progresses, the data is recorded and displayed graphically:

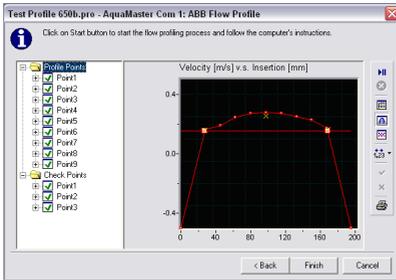


9. When sampling at each measurement point is completed, the data is checked against limits contained in the software and acceptance or rejection is advised. Click to accept or to reject the results.

If the result is accepted, the user is prompted to move the probe to the next measurement point.

If the result is rejected, the user is prompted to leave the probe at the current position and sampling at that point is repeated.

10. When sampling at all measurement points is completed and the results accepted, the software calculates the pipe's flow profile and displays it graphically:



Based on the results from the sampling, the ABB Flow Profiling software calculates the average (mean) velocity (V_{avg}) in the pipe and two factors – the Profile Factor (F_p) and the Insertion Factor (F_i) – for possible final AquaProbe fitted positions.

The AquaProbe itself affects the measured flow velocity and factor F_i corrects for this. F_i depends on the size of the probe, the size of the pipe and the insertion depth of the probe. The software calculates F_i for all points of V_{avg} and the centerline position.

V_{avg} is measured by the AquaProbe only when it is positioned at a point in the pipe where the actual velocity is equal to V_{avg} . In this case, $F_p = 1.000$. There should be at least 2 points on either side of the pipe's centerline where $F_p = 1.000$.

The flow rate is calculated by multiplying V_{avg} [m/s] x 3.14159 (Pi) x ID2 [m]/4.

11. Select a point in the pipe's profile where $F_p = 1.000$ and position and secure the AquaProbe at that position.

Note. ABB recommend that the chosen point in the pipe's profile where $F_p = 1.000$ is the one closest to the side of the pipe on which the AquaProbe is fitted.

12. Referring to the transmitter's configuration manual, enter the values for F_p and F_i into Flow Profile Factor and Insertion Factor respectively. Enter the calibrated internal diameter of the pipe into Sensor Size (Probe Bore).

8 Glossary of Terms

Communication Address

ABB communication protocol uses this address to identify a transmitter. It is also known as Transmitter ID (TXM ID) or Meter Number.

Current Item

The highlighted item in Item ID, Name list box.

Current Transmitter

Communication address of selected transmitter. (Range 0 to 79. Default value: 1).

Current Unit

Unit of measurement of the current item. If an item is read or modified, the list of available units for the current item is displayed with the current unit highlighted. The item value is always displayed in current units.

Item

Any measured or calculated value, variable or constant in a transmitter that can be accessed via serial communications protocol.

Output Item List

Contains the ID, symbol and name of those items that may be assigned to the Frequency, Current Output or PID Controller.

Notes

Acknowledgments

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