

# ScanMaster FZC500

## Diagnostic and verification software for ProcessMaster / HygienicMaster



**MAK**  
AUTOMATIZACIÓN

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Power and productivity  
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ScanMaster FZC500  
Diagnostic and verification software

User Manual  
UM/FZC500-EN

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# Contents

<b>1</b>	<b>Safety.....</b>	<b>4</b>
1.1	General information and notes for the reader.....	4
1.2	Note symbols .....	4
1.3	Intended use.....	4
1.4	Target groups and qualifications .....	4
1.5	Warranty provisions .....	4
<b>2</b>	<b>General description.....</b>	<b>5</b>
2.1	ScanMaster option .....	5
2.2	System requirements .....	5
2.3	Contents of CD.....	5
<b>3</b>	<b>Installation .....</b>	<b>6</b>
3.1	HART communication via 20 mA cable .....	6
3.1.1	Installation requirements .....	6
3.1.2	Installation .....	6
3.1.3	Configuring the network in the frame application ..	9
3.1.4	Starting ScanMaster DTM.....	10
3.2	HART communication via FZA100 infrared service port adapter.....	11
3.2.1	Installation requirements .....	11
3.2.2	Installing the USB driver under Windows 2000 ...	11
3.2.3	Installing the USB driver under Windows XP, Windows Vista, and Windows 7 (32-bit versions only).....	15
3.2.4	Positioning the infrared service port adapter on the transmitter .....	16
3.2.5	Installing the service port splitter .....	16
3.2.6	Configuring the service port splitter .....	16
3.2.7	Installing the HART communication service port DTM .....	19
3.2.8	Installation of ScanMaster DTM.....	19
3.2.9	Starting the frame application.....	19
3.2.10	Configuring the network in the frame application	22
3.2.11	Starting ScanMaster DTM.....	24
<b>4</b>	<b>Operation.....</b>	<b>25</b>
4.1	Verification of a device .....	25
4.2	Displays the test reports stored in the database .	29
4.3	Sample test report .....	30
<b>5</b>	<b>Error messages .....</b>	<b>31</b>
5.1	Error messages in the ScanMaster report .....	39
5.1.1	Errors affecting the flowmeter sensor .....	39
5.1.2	Errors affecting the transmitter .....	41
5.2	Error messages on the LCD display .....	42
5.2.1	Errors .....	42
5.2.2	Function check .....	43
5.2.3	Operation outside specifications .....	45
5.2.4	Maintenance.....	46

# 1 Safety

## 1.1 General information and notes for the reader

Read these instructions carefully prior to installation and use. These instructions are an important part of the product and must be kept for future reference.

These instructions are intended as an overview and do not contain detailed information on all designs for this product or every possible aspect of use.

For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.

The content of these instructions is neither part of any previous or existing agreement, promise or legal relationship nor is it intended to change the same.

Following the instructions is an essential prerequisite for safe and fault-free operation of the product.

## 1.2 Note symbols



### IMPORTANT (NOTE)

This symbol indicates operator tips, particularly useful information, or important information about the product or its further uses. It does not indicate a dangerous or harmful situation.

---

## 1.3 Intended use

ScanMaster DTM is a piece of diagnostic and verification software that enables cyclic checking of the ProcessMaster and HygienicMaster series 300 and 500 electromagnetic flowmeters.

## 1.4 Target groups and qualifications

Only trained specialist personnel who have been authorized by the plant operator accordingly are permitted to install and use the product. The specialist personnel must have read and understood the manual and must comply with its instructions.

## 1.5 Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

## 2 General description

ScanMaster provides an easy way of checking measured values and proper functioning of the ProcessMaster 300 / 500 and HygienicMaster 300 / 500 electromagnetic flowmeters.

The test and verification results produced are stored in a database and can be accessed and printed if required.

### ScanMaster

- Checks the integrity of the flowmeter sensor without the need for disassembly
- Checks the input and output functionality of the transmitter without the need for disassembly
- Is quick and easy to operate
- Uses the technically mature self-monitoring and diagnostic functions of the ProcessMaster or HygienicMaster
- Uses fingerprint technology and compares the current state of the flowmeter sensor and transmitter against a reference data record
- Produces a graphical representation of gradual changes that are recorded in the ProcessMaster 500 as a trend, for example

ScanMaster is based on DTM technology and can be run on Asset Vision Basic or other frame applications (as of FDT 1.2). Communication with the device is configured via the frame application.

Different connection types and software installations apply according to the communication type (HART, PROFIBUS PA and FOUNDATION Fieldbus).



### IMPORTANT (NOTE)

To use ScanMaster, the software revision of the connected device must be as follows (see name plate):

- With HART communication  $\geq 01.02.00$
- With PROFIBUS PA or FOUNDATION fieldbus H1  $\geq 00.01.01$

### 2.1 ScanMaster option

The ScanMaster option must be activated in the flowmeter so that data can be read out from the device. When purchasing a new device, the ScanMaster option can be specified in the order number code.

You can find out whether the ScanMaster option is activated on the device by selecting the "Device info \ Transmitter \ ScanMaster Option" menu in the device software.

The ScanMaster CD contains the "ScanMaster Enabler" software tool which can be used to activate the ScanMaster option if it is not activated on delivery.



### IMPORTANT (NOTE)

For more information about the "ScanMaster Enabler" software tool, see the operating instructions in the "CD:\ScanMaster Enabler" directory.

### 2.2 System requirements

- Processor, Intel-compatible (2 GHz)  
Minimum 512 MB RAM  
400 MB free space on hard disk  
1024 x 768 screen resolution
- Microsoft Windows 2000 SP4 / Windows XP SP2 / Windows VISTA SP2 / Windows 7 (32-bit versions only)
- Microsoft .NET Framework 2.0
- Microsoft Internet Explorer 6.0 or higher
- Adobe Reader, latest version
- Frame application: Asset Vision Basic or similar frame application capable of supporting Device Type Manager (DTM) version 1.2 or higher

### 2.3 Contents of CD

Folder structure on the CD	Description
ABB DTM HART Communication ServicePort 5.00.01	Setup directory for HART Communication DTM
Asset_Vision_Basic_1.0.18	ABB frame application capable of supporting DTMs version 1.2 and higher
Documentation	Operating instructions and additional instructions for DTMs
HMI Emulation 1.2.1.1	Remote control software for the transmitter
MS .NET 2.0	Microsoft .NET Framework
ScanMaster	Setup directory of ScanMaster DTM
ScanMaster Enabler	Software for activating the ScanMaster option in the transmitter on site post-delivery
Service port splitter 1.1.09	Software for the service port splitter
IFAK modem	Driver for the IFAK HART modem
USB driver	USB driver for the infrared service port adapter for Windows 2000, Windows XP, Windows Vista, Windows 7

3 Installation

**i IMPORTANT (NOTE)**  
Communication between the flowmeter and the PC / laptop can be implemented either via a HART modem or using the FZA100 infrared service adapter.

**i IMPORTANT (NOTE)**  
The screens in the operating system you are using may differ from those shown in this document, which have been taken from Windows 2000.

3.1 HART communication via 20 mA cable

3.1.1 Installation requirements

- PC with frame application installed (e.g., Asset Vision Basic)
- USB HART modem with COM-DTM installed in the frame application
- ScanMaster CD

An IFAK HART modem is used for communication.

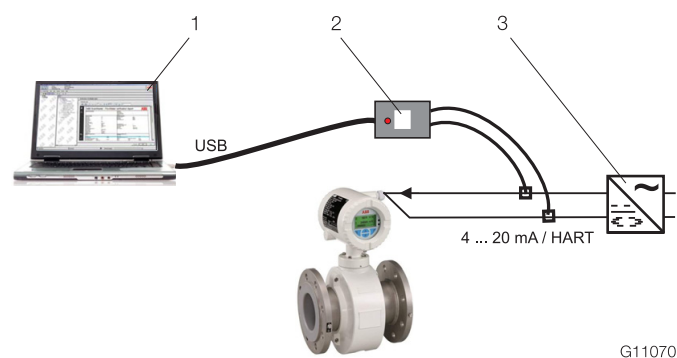


Fig. 1  
1 Frame application | 2 IFAK HART modem | 3 Power supply unit

Frame application	For example: <ul style="list-style-type: none"><li>— DAT200 Asset Vision Basic</li><li>— Communication DTM: "is HRT USB"</li><li>— ScanMaster DTM</li></ul>
IFAK HART modem	Electrical isolation, e.g., NHA121Nx (hazardous areas) or NHA121No (standard)

3.1.2 Installation

**i IMPORTANT (NOTE)**  
Check whether the frame application is installed on the PC.

If the frame application is not installed on the PC, install "Asset Vision Basic" from the ScanMaster CD.  
Path: "CD:\Asset\_Vision\_Basic\_1.0.18\Setup.exe"

1. Install the communication DTM ("is HRT USB") for the IFAK HART modem.
2. Set the COM for the IFAK HART modem: Open "Start > ifak-system > is HRT Configurator" and select "Provide as serial COM-Port".

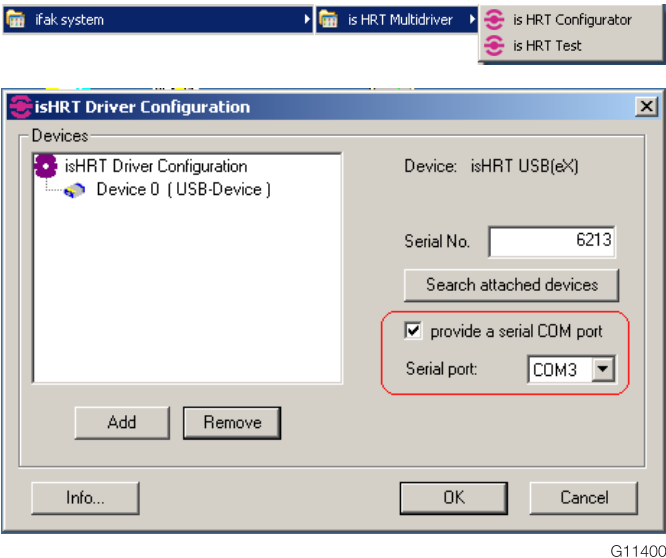


Fig. 2

3. Install ScanMaster DTM: Run the "Setup.exe" file in the "CD:\ScanMaster" directory.

The installation wizard guides you through the installation process.

**i IMPORTANT (NOTE)**  
You might have to disable the virus scanner before starting DTM installation.

4. Start the frame application.

5. Select expert mode for "Asset Vision Basic".

**i**

**IMPORTANT (NOTE)**

If the window for selecting an action is displayed after "Asset Vision Basic" starts up, select expert mode before proceeding.

**Activating expert mode for "Asset Vision Basic"**

1. In the window for selecting an action, select "Automatic device selection (online)" and click "Next".

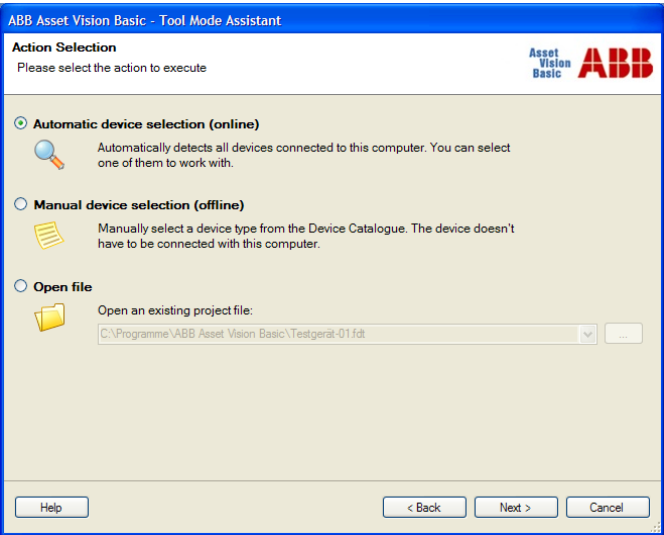


Fig. 3

2. Select the "HART" communication protocol and the "ABB HART Communication ServicePort" communication interface. Click "Next".

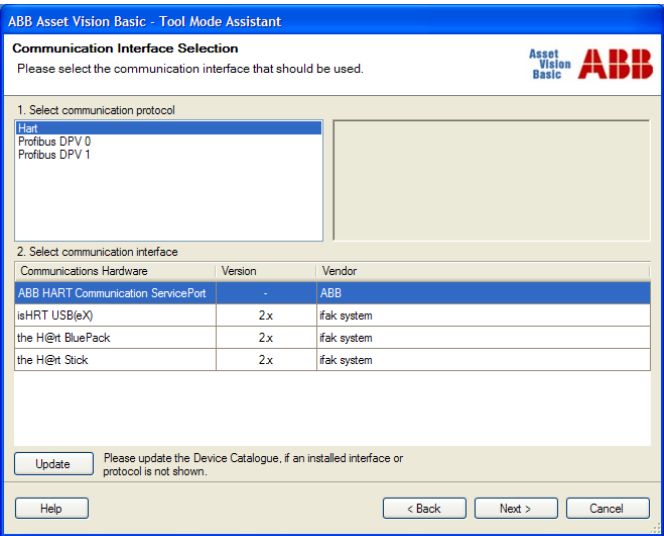


Fig. 4

3. Under the basic settings for the "COM port", select the virtual COM port activated in the service port splitter for the HART protocol.

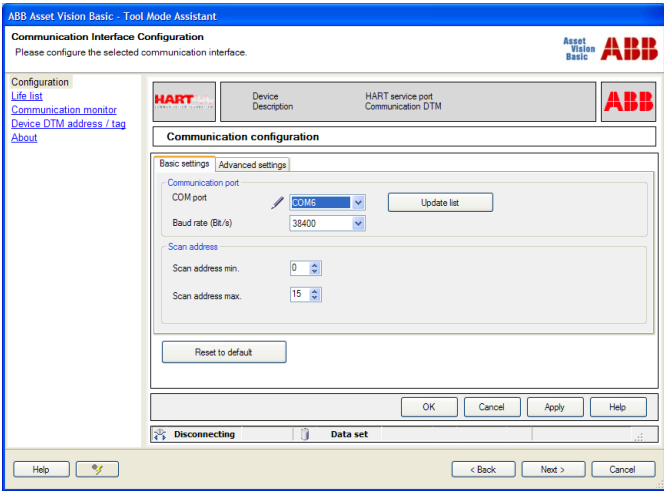


Fig. 5

4. Click "Apply" followed by "OK".

5. Click "Next".

The frame application searches for connected devices.

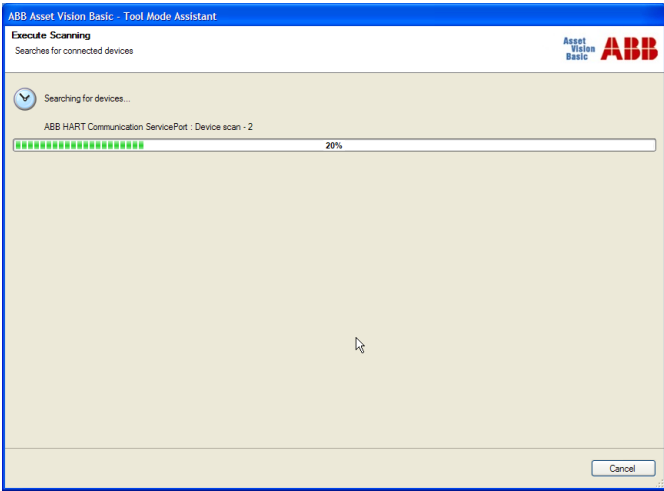


Fig. 6

6. The ScanMaster is listed in the "Device selection" window as "ABB FZC500 Tool ScanMaster". Select the device and click "Next".

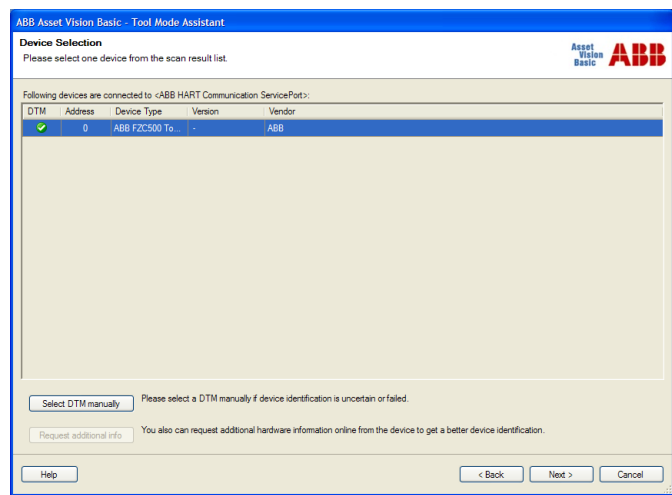


Fig. 7

7. Click "No" in response to the prompt that is displayed.

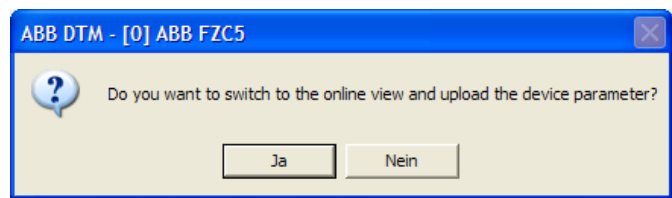


Fig. 8

8. Click "Device data" on the menu bar and select "Close".

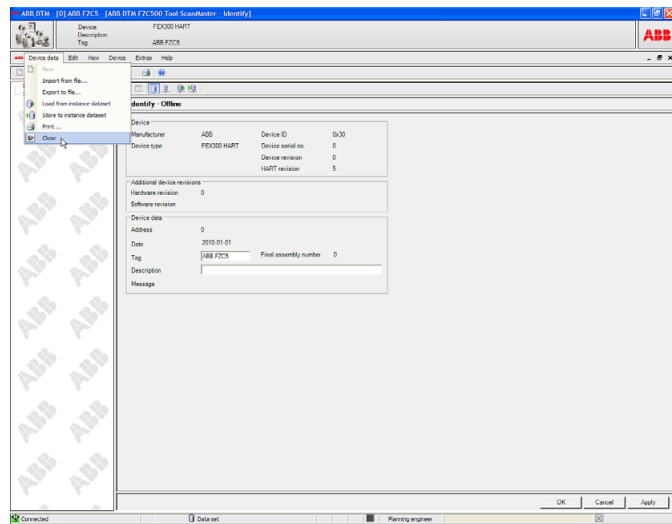


Fig. 9

9. Click "View" on the menu bar and select "Expert mode".

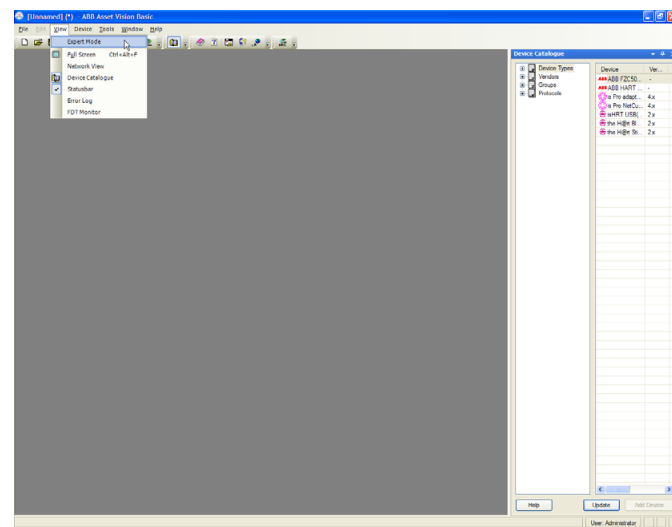


Fig. 10

10. Click "Tools" on the menu bar and select "Options".

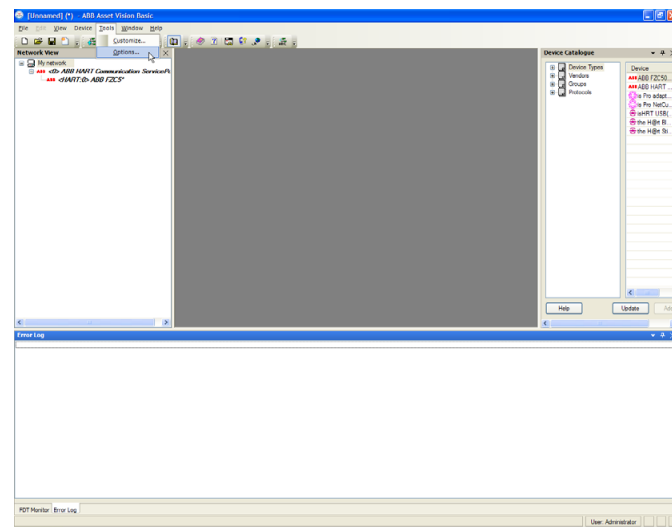


Fig. 11

11. In the navigation column, open the "Tool Mode Wizard" folder and click "Select tool mode".

G11430

G11431

G11429



12. Select "Prompt at start of program" as the preferred mode and click "Apply".

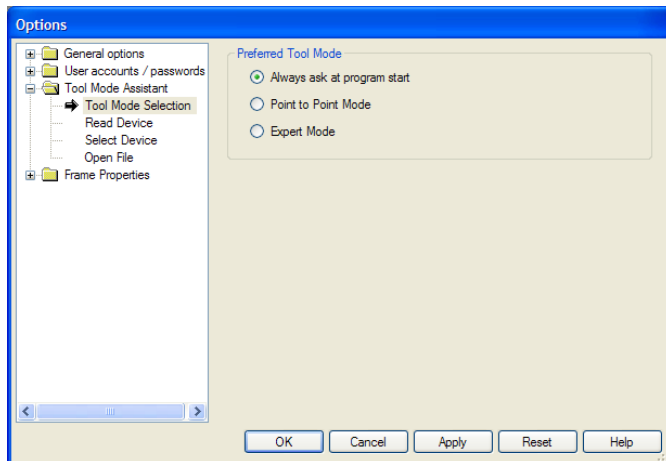


Fig. 12

G11432



#### IMPORTANT (NOTE)

The language can be changed if necessary under "General settings".

13. Click "OK" to confirm your entries.
14. Click "File" on the menu bar and select "Exit".

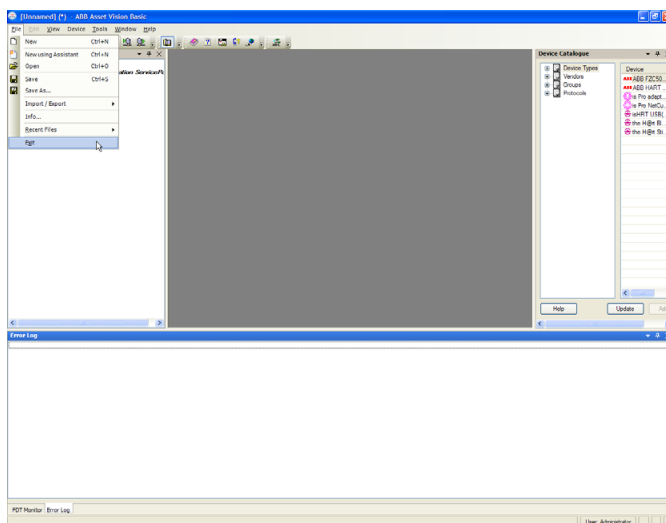
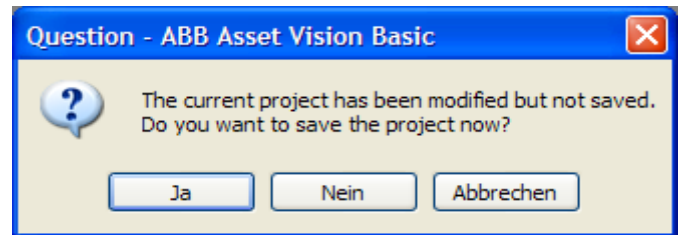


Fig. 13

G11433

15. Click "No" in response to the prompt that is displayed asking if you wish to save the project.



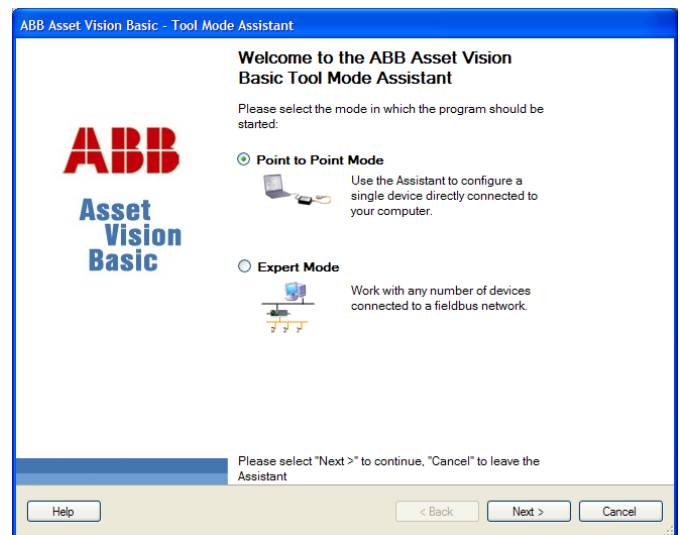
G11434

Fig. 14

Configuration is now complete.

16. Restart "Asset Vision Basic".

Expert mode can be selected when "Asset Vision Basic" starts up.



G11435

Fig. 15

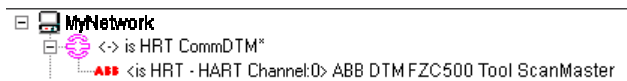
### 3.1.3 Configuring the network in the frame application

1. In the frame application, add ScanMaster DTM on the network under the HART communication DTM of the USB HART modem.



#### IMPORTANT (NOTE)

If ScanMaster DTM is not displayed in the device catalog, you need to update the device catalog. ScanMaster DTM is listed in the device catalog as "ABB FZC500 Tool ScanMaster".



G11072

Fig. 16: Example of linking based on the ABB frame application "Asset Vision Basic"

3.1.4 Starting ScanMaster DTM

- 1. Before starting ScanMaster DTM, establish the connection on the network by opening the DTM drop-down menu and clicking "Establish connection".

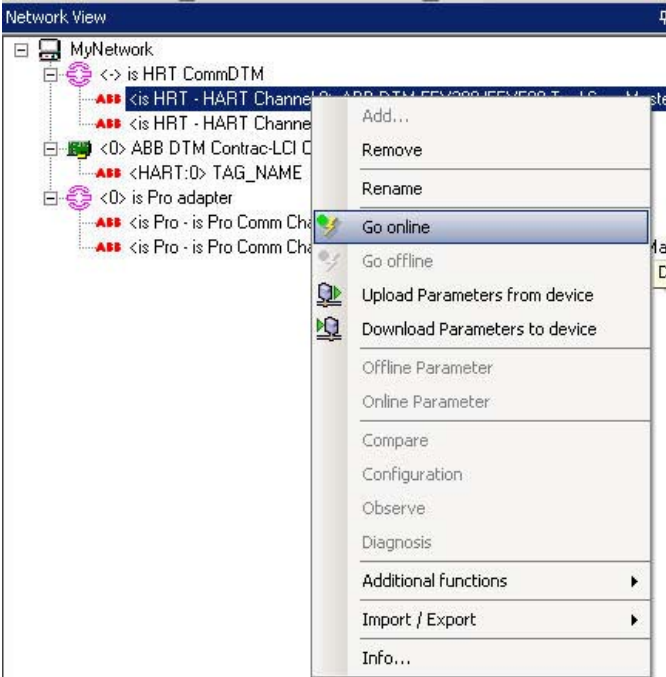


Fig. 17

G11073

- 2. Once the connection is established, the "HART communication DTM" and "ScanMaster DTM" entries are highlighted in bold and italics.

To actually start the DTM, select "Other functions / identify" from the same drop-down menu.

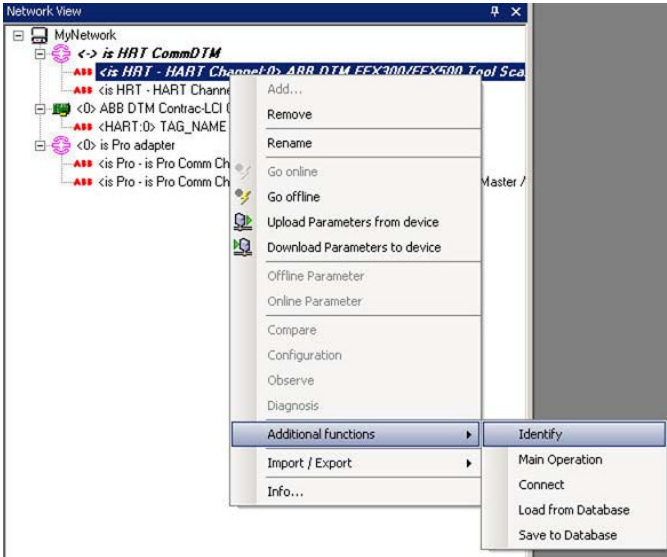


Fig. 18

G11074

**i** **IMPORTANT (NOTE)**  
For more information, see the "ScanMaster tool additional info" file in the "Documentation" directory on the CD or the DTM online help.

### 3.2 HART communication via FZA100 infrared service port adapter

#### 3.2.1 Installation requirements

- PC / laptop with frame application installed (e.g., Asset Vision Basic)
- Infrared service port adapter FZA100
- ScanMaster CD

In order to use this type of communication, the flowmeter must be freely accessible.

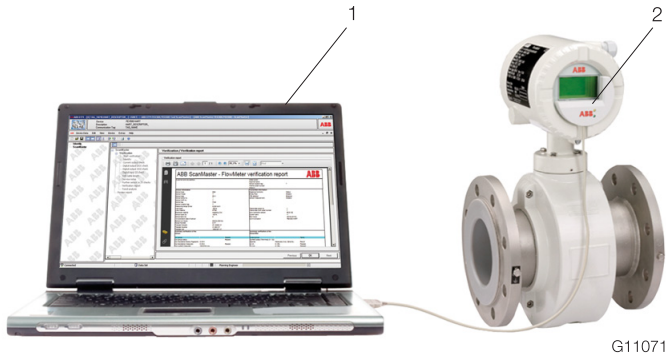


Fig. 19  
1 Frame application | 2 Infrared service port adapter FZA100

Frame application	<p>For example:</p> <ul style="list-style-type: none"> <li>— DAT200 Asset Vision Basic</li> <li>— Communication DTM: DTM HART communication service port</li> <li>— ScanMaster DTM</li> <li>— Service port splitter software</li> </ul>
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#### 3.2.2 Installing the USB driver under Windows 2000



#### IMPORTANT (NOTE)

Check whether the frame application is installed on the PC.

If the frame application is not installed on the PC, install "Asset Vision Basic" from the ScanMaster CD.

Path: "CD:\Asset\_Vision\_Basic\_1.0.18\Setup.exe"

1. Connect the infrared service port adapter to a free USB port and insert the CD supplied into the drive. Windows automatically recognizes the new hardware as a USB Composite Device.

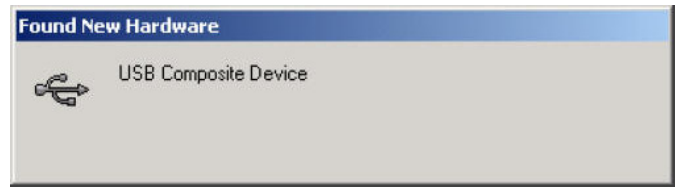


Fig. 20

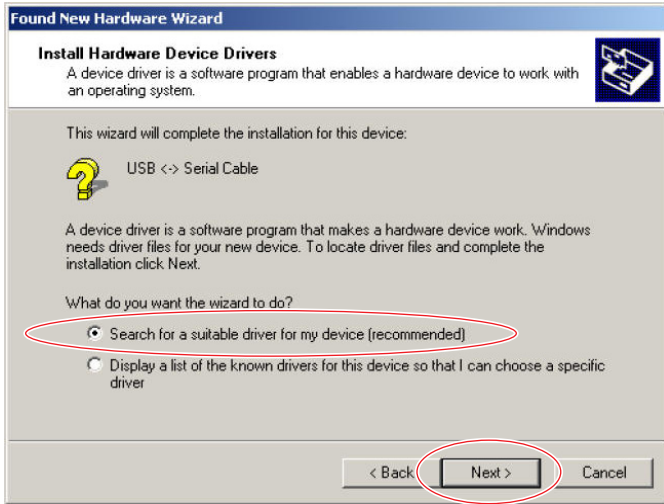
The hardware wizard starts up after the hardware has been detected.

2. Click "Next".



Fig. 21

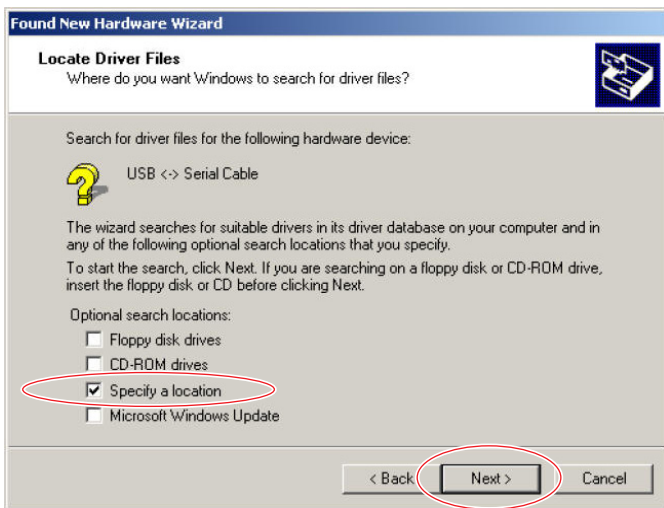
3. Select the option "Search for a suitable driver for my device (recommended)" and click "Next".



G10765

Fig. 22

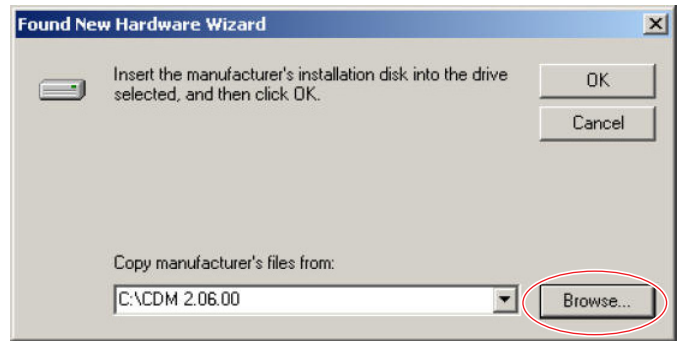
4. Select the option "Specify a location" and click "Next".



G10766

Fig. 23

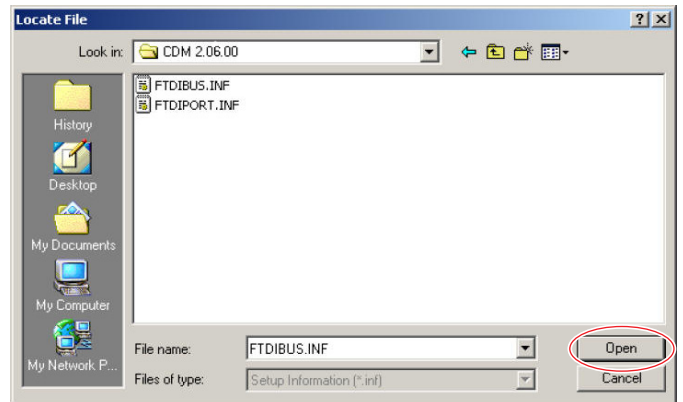
5. Select the driver's location:  
Click "Browse" and select the "CD:\USB-Driver\CDM 2.06.00" directory in the next dialog that appears.



G10767

Fig. 24

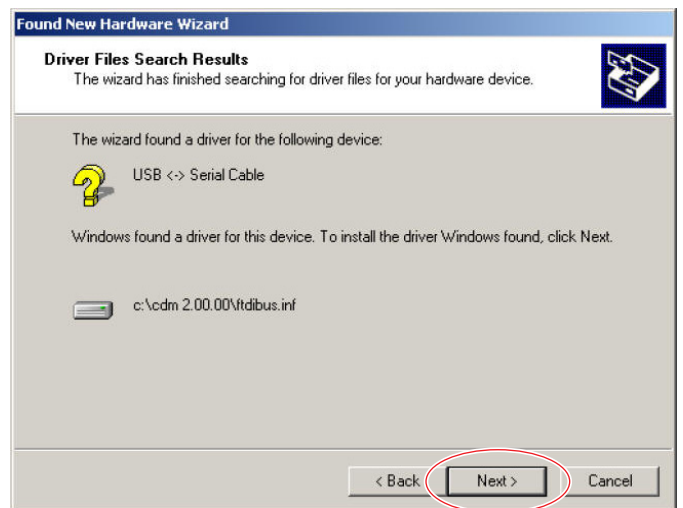
6. Select the "FTDIBUS.INF" driver file and click "Open".



G11419

Fig. 25

7. Once you have selected the driver, click "Next".



G10768

Fig. 26

Following successful installation, the message "Completing the Found New Hardware Wizard" will appear.

8. To complete installation of the first driver, click "Finish".

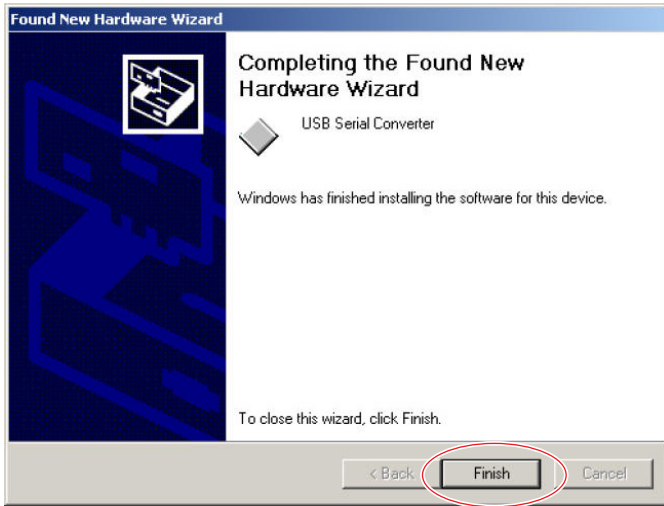


Fig. 27

9. Install the second driver for the COM port.

The installation procedure continues automatically.

10. Select the option "Search for a suitable driver for my device (recommended)" and click "Next".

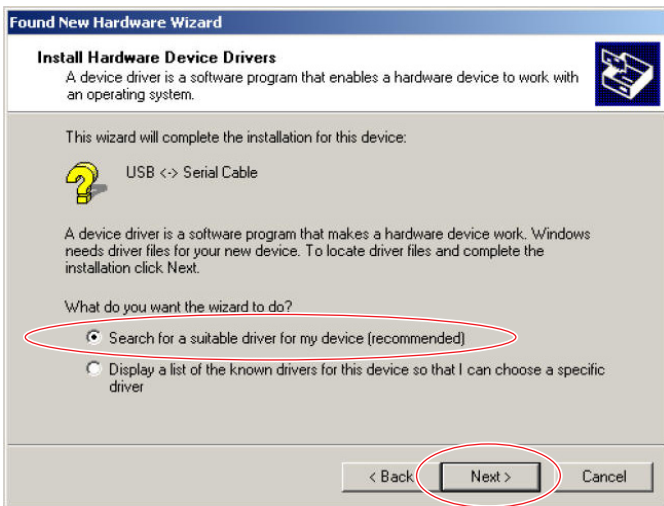


Fig. 28

11. Select the option "Specify a location" and click "Next".

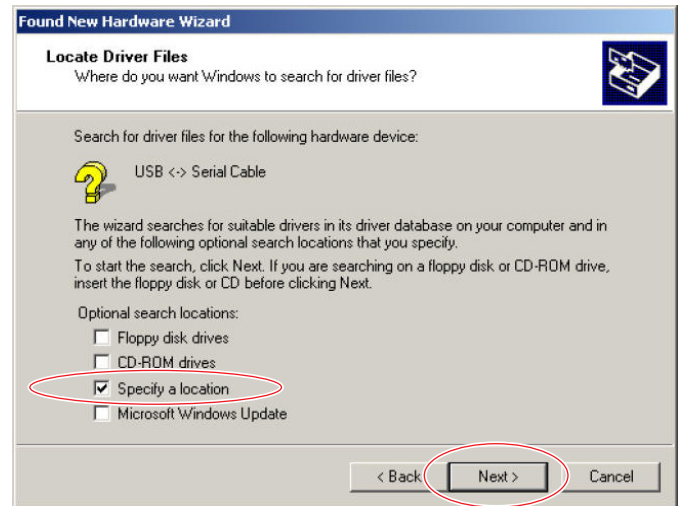


Fig. 29

12. Select the driver's location: Click "Browse" and select the "CD:\USB-Driver\CDM 2.06.00" directory in the next dialog that appears.

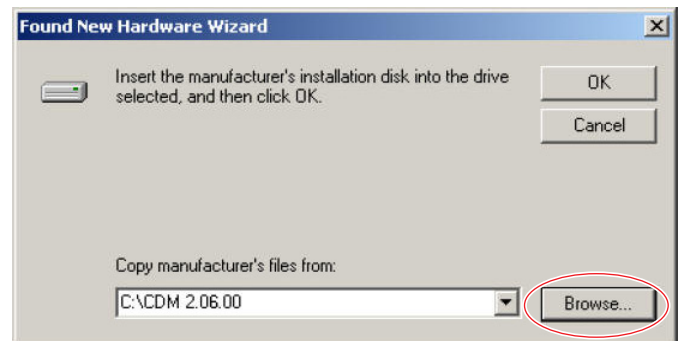


Fig. 30

13. Select the "FTDIPORT.INF" driver file and click "Open".

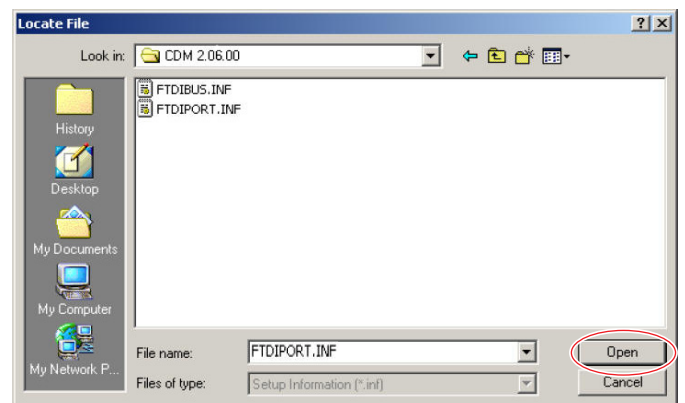
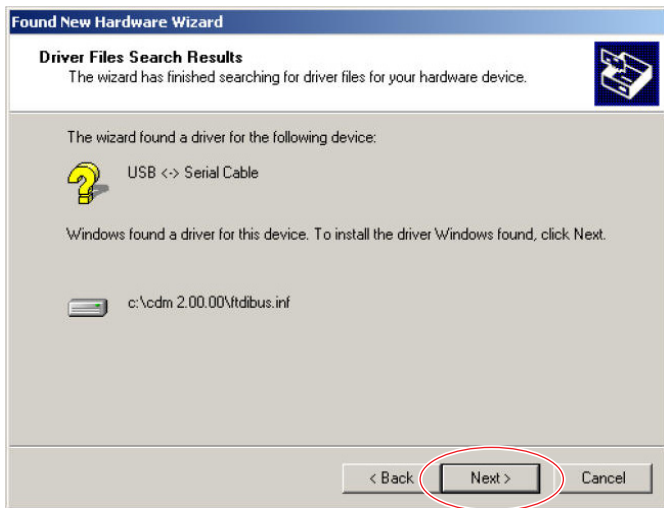


Fig. 31



14. Once you have selected the driver, click "Next".



G10768

Fig. 32

Following successful installation, the message "Completing the Found New Hardware Wizard" will appear.

15. To complete installation of the second driver, click "Finish".

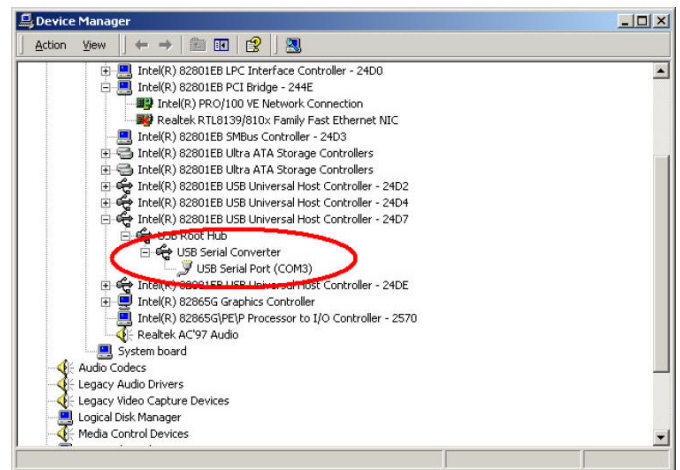


G11420

Fig. 33

Driver installation is now complete.

16. In the "Device Manager", check the virtual COM port of the adapter (Start -> Settings -> Control Panel -> System -> Hardware -> Device Manager -> Ports (COM & LPT)).



G10769

Fig. 34

The COM port number is assigned on an individual basis and depends on the configuration of the computer being used. In the example shown, COM port 3 has been assigned to the adapter. Every time a connection to the computer used is established, therefore, COM port 3 is assigned to the adapter.



#### IMPORTANT (NOTE)

Always connect the adapter to the USB port which was used during installation.

### 3.2.3 Installing the USB driver under Windows XP, Windows Vista, and Windows 7 (32-bit versions only)



#### IMPORTANT (NOTE)

Check whether the frame application is installed on the PC.

If the frame application is not installed on the PC, install "Asset Vision Basic" from the ScanMaster CD.

Path: "CD:\Asset\_Vision\_Basic\_1.0.18\Setup.exe"

1. Connect the infrared service port adapter to a free USB port.



#### IMPORTANT (NOTE)

Under Microsoft Windows XP SP2, Windows Vista, and Windows 7 (32-bit), the driver is automatically installed in the background. Once it has been installed, the infrared service port adapter can be used straightaway.



#### IMPORTANT (NOTE)

The USB driver in the "CD:\USB-Driver\CDM 2.08.14" directory supports the Windows XP, Windows Vista, and Windows 7 (32-bit) operating systems.

2. Under Microsoft Windows XP without Service Pack 2, insert the CD supplied into the drive.

The hardware wizard starts up after the hardware has been detected.

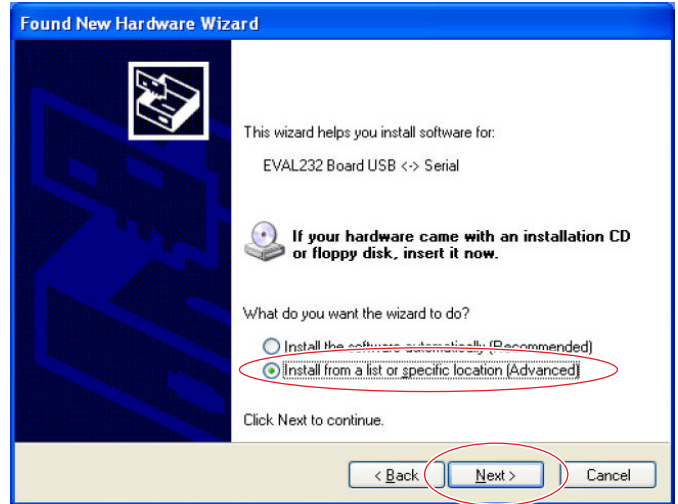
3. Select the option "No, not this time" and click "Next".



G10770

Fig. 35

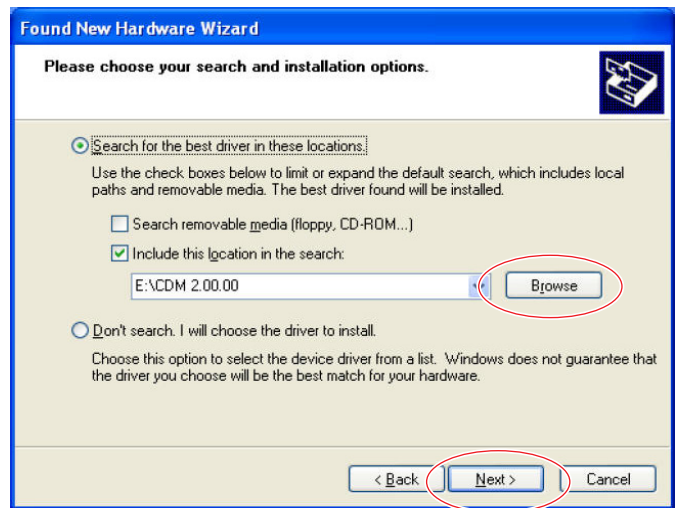
4. Select the option "Install from a list or specific location (Advanced)" and click "Next".



G10771

Fig. 36

5. Select the driver's location: Click "Browse" and select the "CD:\USB-Driver\CDM 2.08.14" directory in the next dialog that appears.

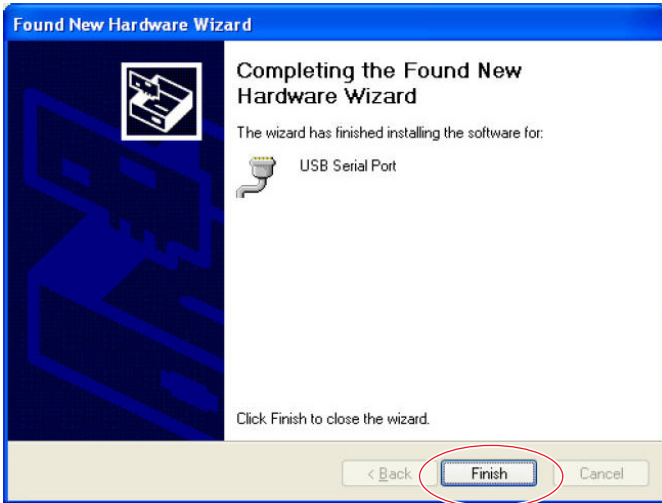


G10772

Fig. 37

Following successful installation, the message "Completing the Found New Hardware Wizard" will appear.

- To complete installation of the driver, click "Finish".

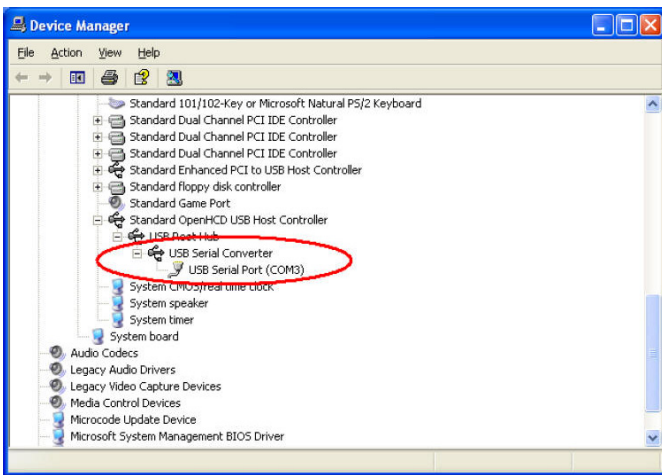


G11422

Fig. 38

Driver installation is now complete.

- In the "Device Manager", check the virtual COM port of the adapter (Start -> Settings -> Control Panel -> System -> Hardware -> Device Manager -> Ports (COM & LPT)).



G10773

Fig. 39

The COM port number is assigned on an individual basis and depends on the configuration of the computer being used. In the example shown, COM port 3 has been assigned to the adapter. Every time a connection to the computer used is established, therefore, COM port 3 is assigned to the adapter.



#### IMPORTANT (NOTE)

Always connect the adapter to the USB port which was used during installation.

### 3.2.4 Positioning the infrared service port adapter on the transmitter

- Once the USB driver has been installed on the PC, the infrared service port adapter must be attached to the transmitter. The figures below show the adapter attached correctly.



Simulator (only possible if the compact device cover is used)	Field-mount housing	Compact device
--	---------------------	----------------

Fig. 40: Mounting examples



#### IMPORTANT (NOTE)

The bottom and right-hand edges of the LCD display can be used to position the adapter correctly.

### 3.2.5 Installing the service port splitter



#### IMPORTANT (NOTE)

Install Microsoft .NET Framework (if it has not been installed already) by running the "dotnetfx.exe" file in the "CD:\MS .NET 2.0" directory.  
The service port splitter software currently only supports 32-bit operating systems.

- Open the "CD:\Service Port Splitter 1.1.09" directory.
- Run the "Setup.exe" file and follow the instructions.

### 3.2.6 Configuring the service port splitter

Requirements for configuration:

- Position the infrared service port adapter correctly on the transmitter and connect it to the USB port.
- Connect the transmitter to the power supply.

The service port splitter can be configured in such a way that up to four virtual COM ports can be assigned to the individual client applications.

Data can then be transferred to and read from several virtual COM ports simultaneously.



A typical virtual COM port configuration may feature the following settings:

- Client 1:  
Assigned to the external HMI application.
- Client 2:  
Assigned to a HART-compatible application.
- Client 3:  
Assigned for outputting cyclic data (as a \*.csv text file).
- Client 4:  
Assigned for outputting parameter data (as a \*.csv text file). The parameter data contains the transmitter's configuration settings.

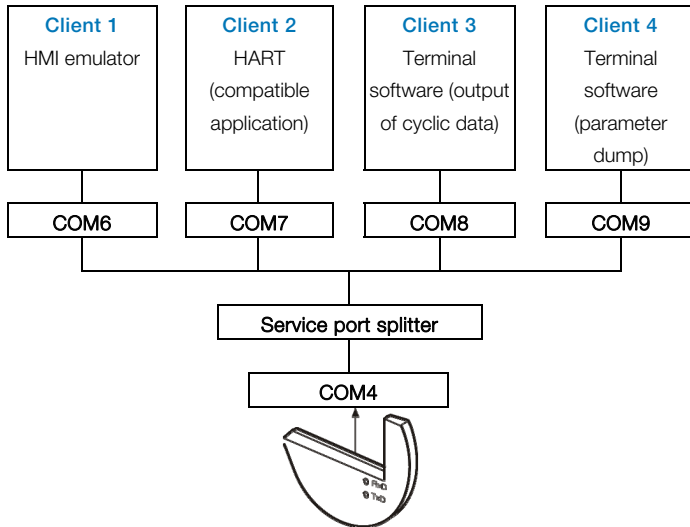


Fig. 41: Typical configuration of the service port splitter

The service port splitter enables several device services to be used simultaneously.



#### IMPORTANT (NOTE)

If services run simultaneously, the data transmission rate will be shared between them. Therefore, certain services may run with a delay!

1. Start the service port splitter by selecting "Start\Programs\ABB\Service Port Splitter".

Shortly after startup, the time window disappears again and the service port splitter appears as an icon in the quick start bar.

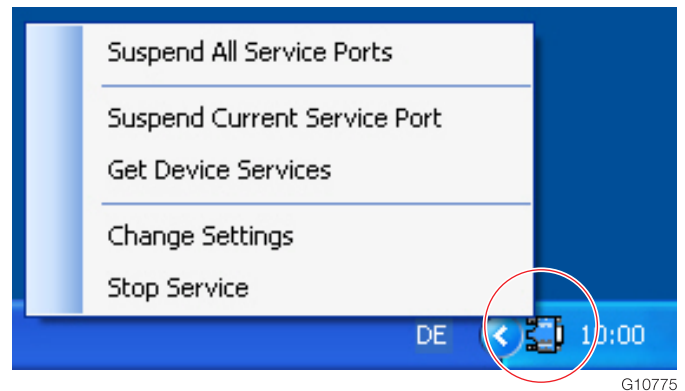


Fig. 42

2. Right-click the icon to call up the shortcut menu.
- "Stop Service" stops the service port splitter.
3. Double-click the icon to open the configuration window.
4. Click the "Add Channel" button to open the "Set New Channel Port" window and select the COM port of the infrared service port adapter.

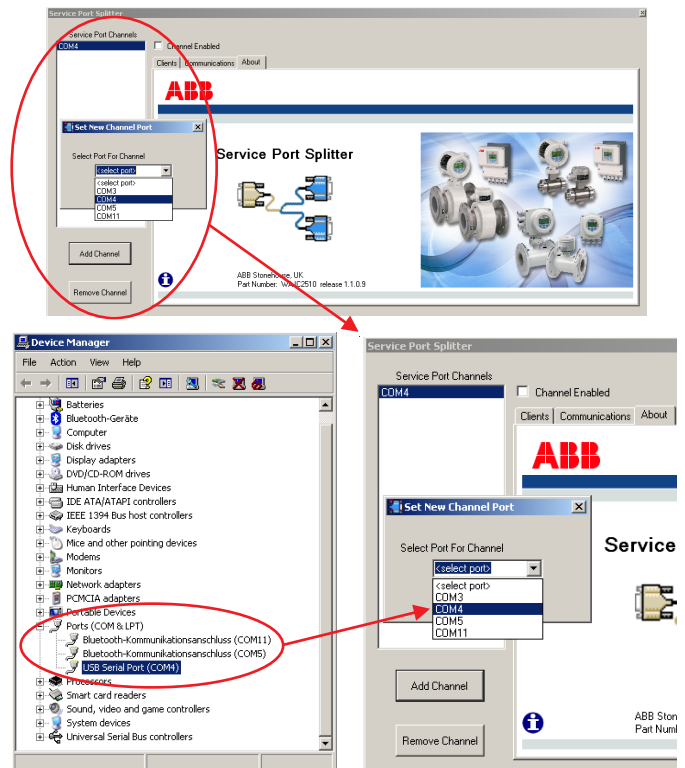


Fig. 43

# i

## IMPORTANT (NOTE)

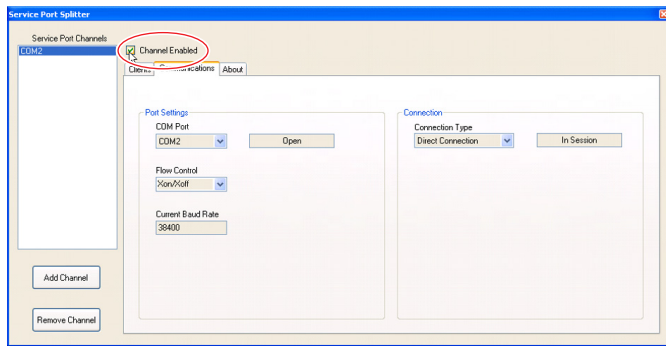
The COM port set in the service port splitter must match the settings in the "Device Manager" (Start -> Settings -> Control Panel -> System -> Hardware -> Device Manager -> Ports (COM & LPT)).

5. Check the "Channel Enabled" box to activate the connection.

The service port splitter establishes communication with the transmitter. The connection status can be checked on the "Communications" tab.

The baud rate must be set in the transmitter (see operating instructions "OI/FEX300/FEX500"). The factory setting in the transmitter is 38,400 baud.

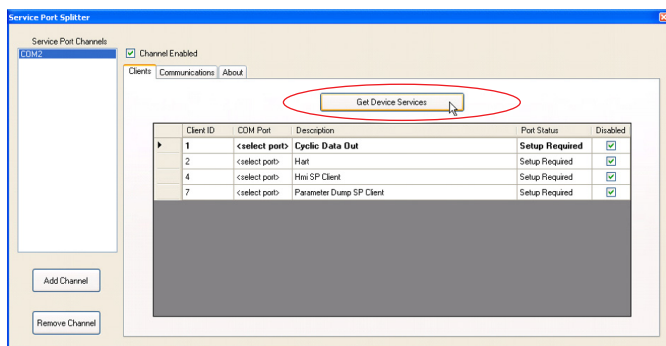
The connection to the device can be interrupted at any time by unchecking the "Channel Enabled" box.



G10777

Fig. 44

6. Once the connection has been established, the device services can be configured on the "Clients" tab.
7. Click "Get Device Services" to list the available device services.



G10778

Fig. 45

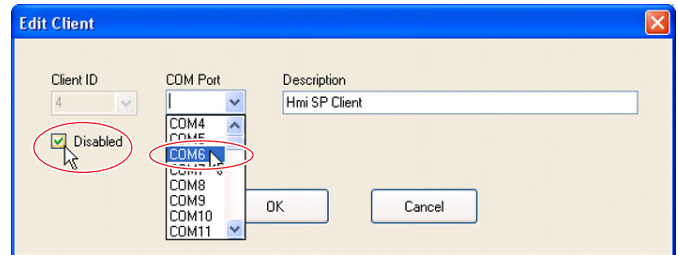
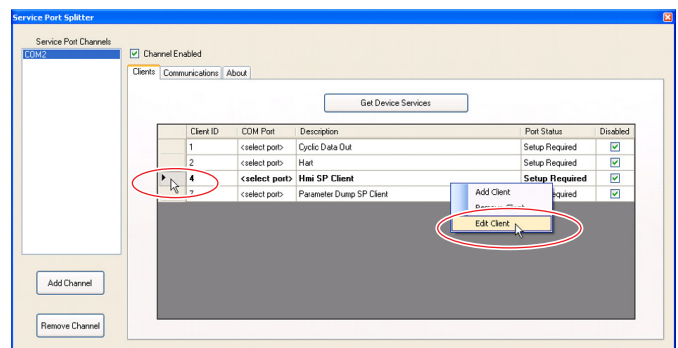
The "Port Status" column shows the current status of the service:

- "Setup Required":  
The service has not yet been configured.
- "Ready":  
The service has been configured and is available.
- "Active":  
The service is being used by an external application.

8. To configure a service, select it, right-click to call up the shortcut menu, and select "Edit Client".

9. In the next window, select the required virtual COM port and uncheck the "Disabled" box.

10. Click "OK" to confirm your entries.



G10779

Fig. 46

# i

## IMPORTANT (NOTE)

If a service has been deleted using "Remove Client", the list can be updated by clicking "Get Device Services".

Following configuration, an external application such as a terminal software program (HyperTerminal) or the HMI emulator can establish a connection to the service via the assigned virtual COM port.

11. When preparing to configure the ScanMaster, select the "HART" service, right-click to call up the shortcut menu, and select "Edit Client".

12. In the next window, select the required virtual COM port (e.g., COM6) and uncheck the "Disabled" box.
13. Click "OK" to confirm your entries.



#### IMPORTANT (NOTE)

For communication to be possible via the infrared service port adapter, the adapter might also have to be activated in the transmitter device software: "Communication \ Service Port \ Service Port (HART)".  
When communication via the service port is activated, HART communication via the current output is deactivated.

### 3.2.7 Installing the HART communication service port DTM

1. Run the "Setup.exe" file in the "CD:\ABB DTM HART Communication ServicePort" directory.

The installation wizard guides you through the installation process.



#### IMPORTANT (NOTE)

You might have to disable the virus scanner before starting DTM installation.

### 3.2.8 Installation of ScanMaster DTM

1. To install ScanMaster DTM, run the "Setup.exe" file in the "CD:\ScanMaster" directory.

The installation wizard guides you through the installation process.



#### IMPORTANT (NOTE)

You might have to disable the virus scanner before starting DTM installation.

### 3.2.9 Starting the frame application

1. First, start the service port splitter.
2. Then start the frame application.
3. Select expert mode for "Asset Vision Basic".

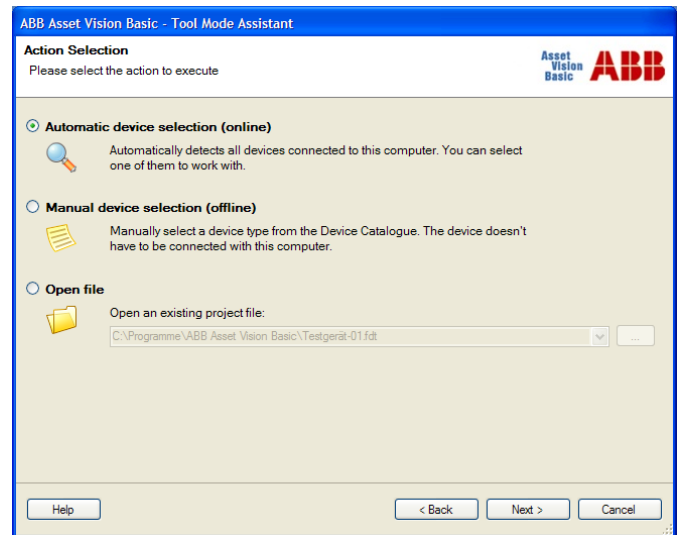


#### IMPORTANT (NOTE)

If the window for selecting an action is displayed after "Asset Vision Basic" starts up, select expert mode before proceeding.

### Activating expert mode for "Asset Vision Basic"

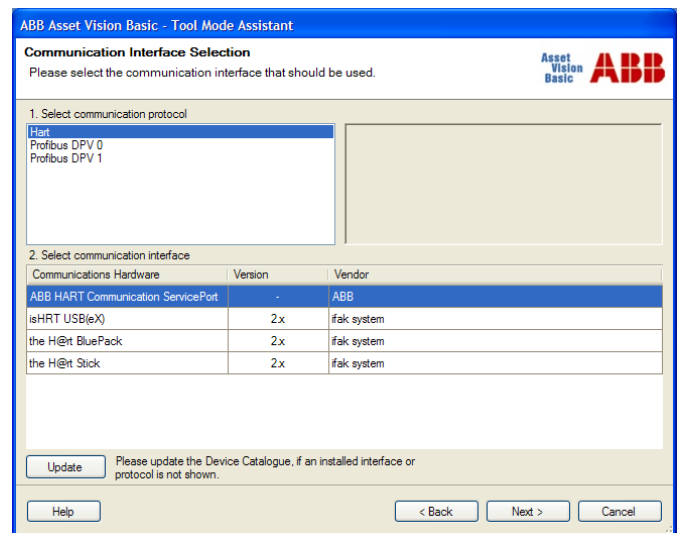
1. In the window for selecting an action, select "Automatic device selection (online)" and click "Next".



G11423

Fig. 47

2. Select the "HART" communication protocol and the "ABB HART Communication ServicePort" communication interface. Click "Next".



G11424

Fig. 48

- Under the basic settings for the "COM port", select the virtual COM port activated in the service port splitter for the HART protocol.

- The ScanMaster is listed in the "Device selection" window as "ABB FZC500 Tool ScanMaster". Select the device and click "Next".

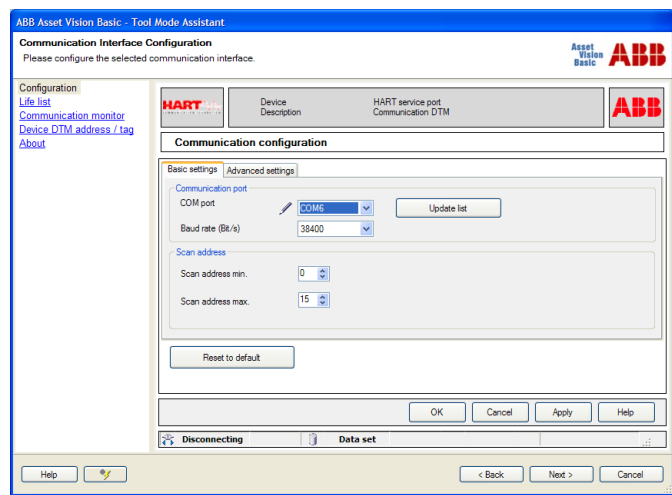


Fig. 49

- Click "Apply" followed by "OK".
- Click "Next".

The frame application searches for connected devices.

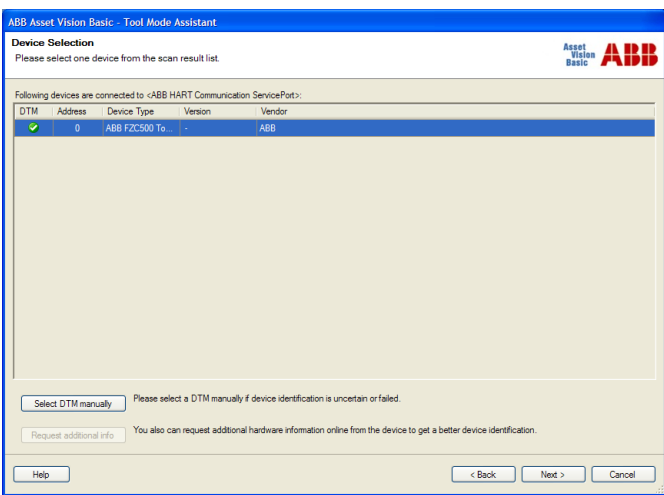


Fig. 51

- Click "No" in response to the prompt that is displayed.

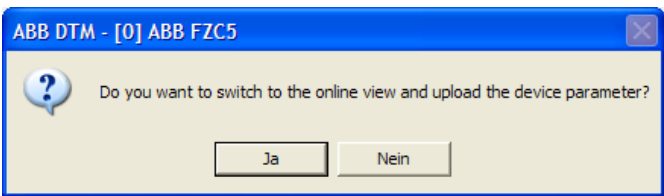


Fig. 52

- Click "Device data" on the menu bar and select "Close".

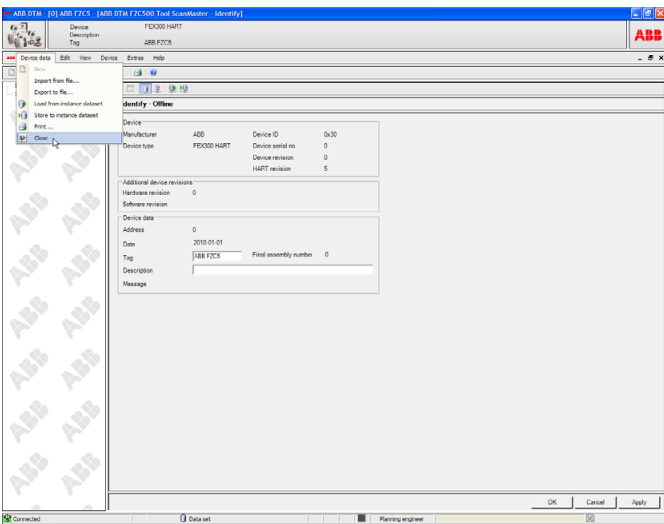


Fig. 53

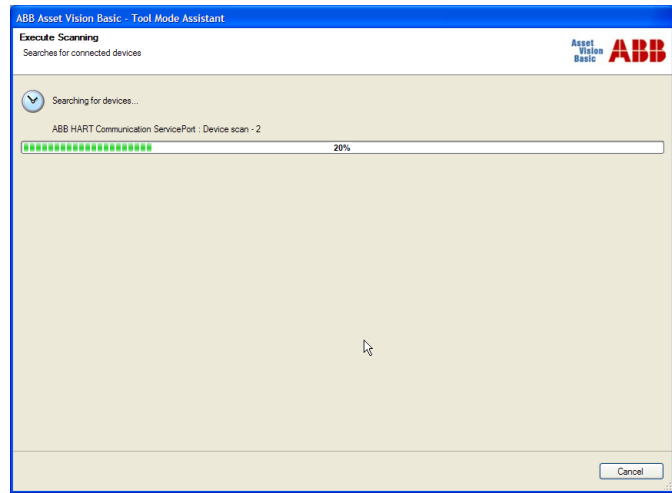


Fig. 50

9. Click "View" on the menu bar and select "Expert mode".

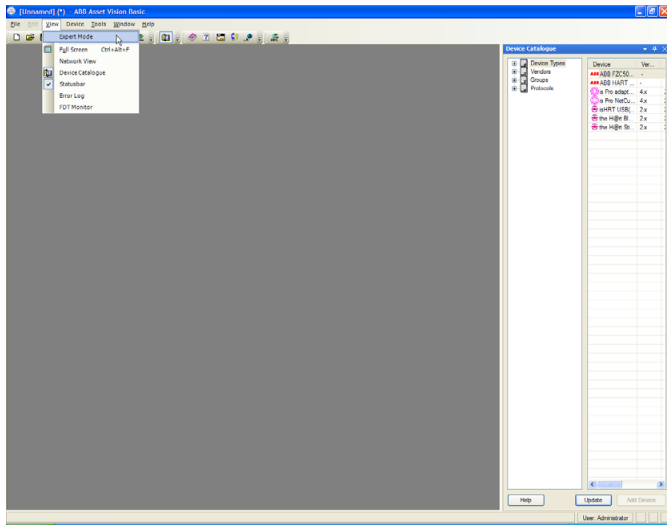


Fig. 54

10. Click "Tools" on the menu bar and select "Options".

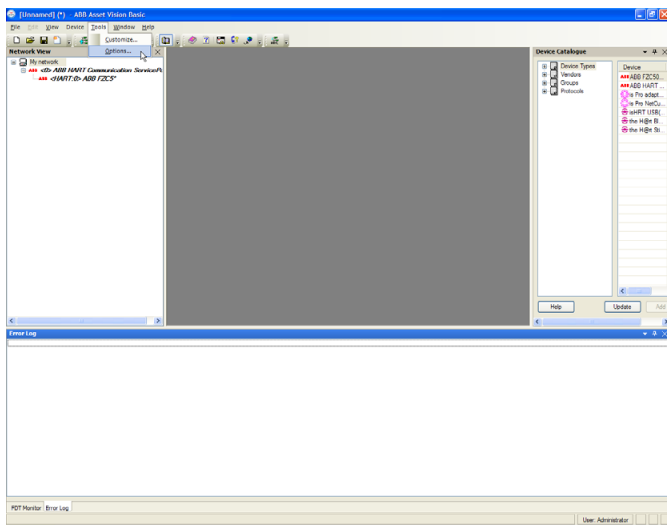


Fig. 55

11. In the navigation column, open the "Tool Mode Wizard" folder and click "Select tool mode".

12. Select "Prompt at start of program" as the preferred mode and click "Apply".

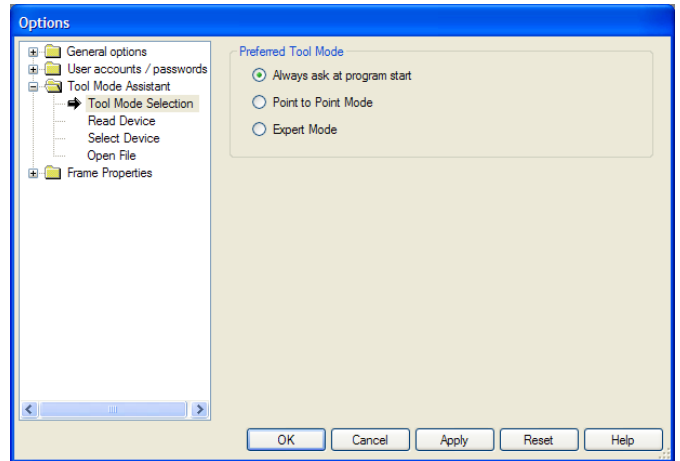


Fig. 56



### IMPORTANT (NOTE)

The language can be changed if necessary under "General settings".

13. Click "OK" to confirm your entries.

14. Click "File" on the menu bar and select "Exit".

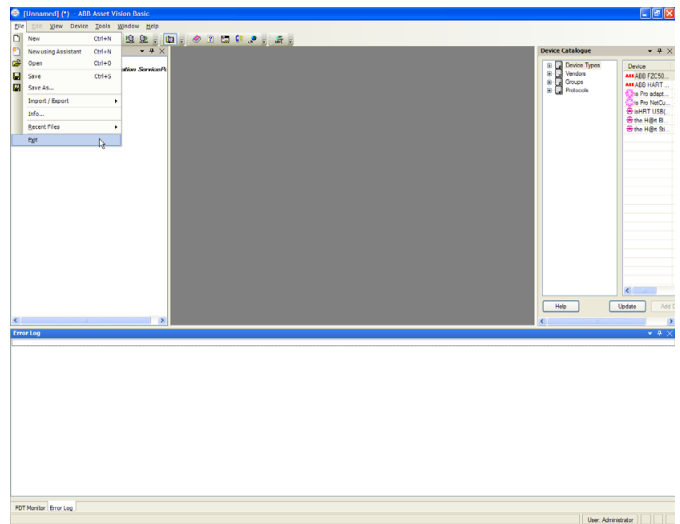
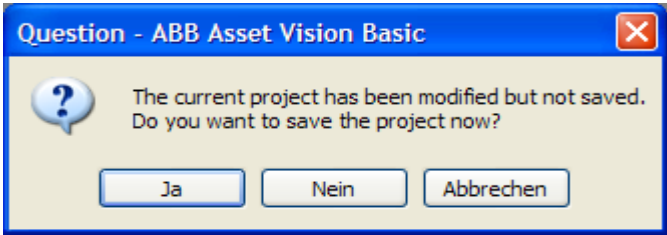


Fig. 57

- Click "No" in response to the prompt that is displayed asking if you wish to save the project.



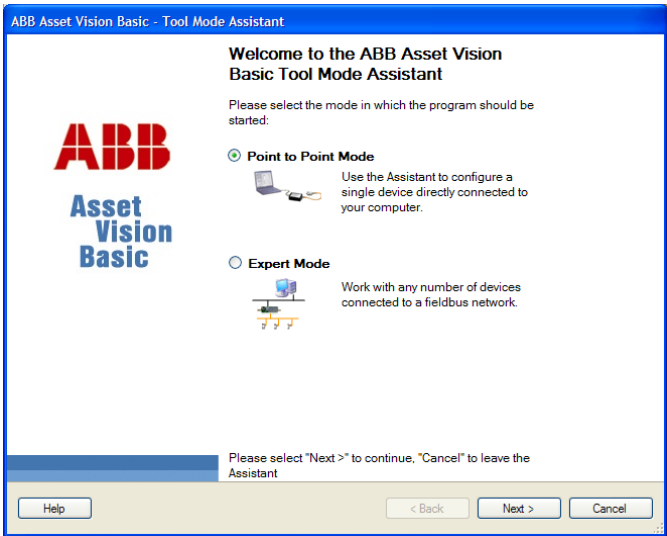
G11434

Fig. 58

Configuration is now complete.

- Restart "Asset Vision Basic".

Expert mode can be selected when "Asset Vision Basic" starts up.



G11435

Fig. 59

### 3.2.10 Configuring the network in the frame application

- First, link the "HART Communication ServicePort DTM" to the network.

i

**IMPORTANT (NOTE)**

If ScanMaster DTM is not displayed in the device catalog, you need to update the device catalog. ScanMaster DTM is listed in the device catalog as "ABB FZC500 Tool ScanMaster".

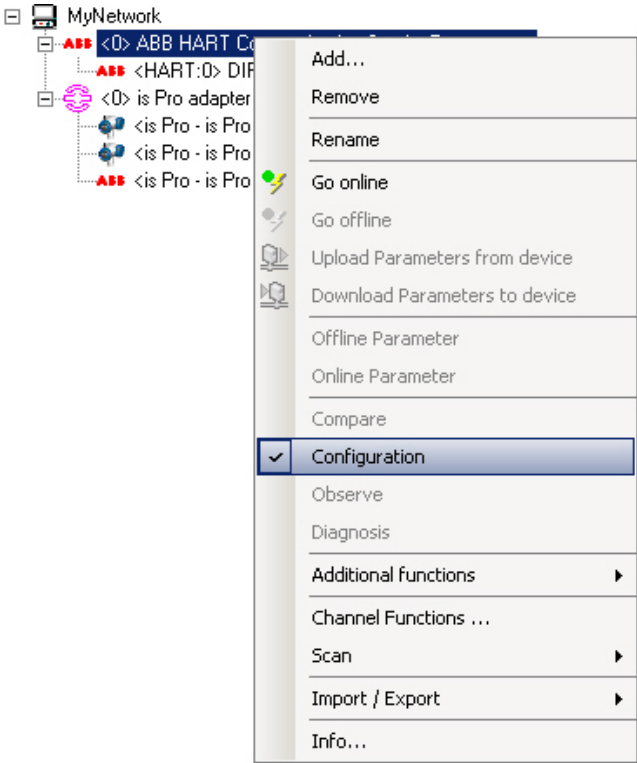


G11076

Fig. 60: Example of linking based on the ABB frame application "Asset Vision Basic"

### Configuring the COM port for the HART communication service port DTM

- Select the HART communication service port DTM then right-click and open "Configuration".



G11077

Fig. 61: Configuring the DTM by selecting "Configuration"

- Select the COM port assigned to the HART channel in the service port splitter software (e.g., COM6).

Run the service port splitter software for this purpose.

- Set the baud rate to 38,400 baud.

4. Save the data by clicking "Apply".

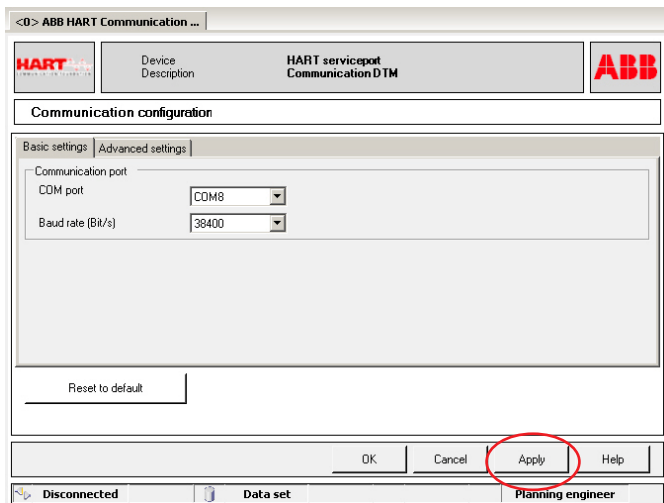


Fig. 62

G11078

### Integrating ScanMaster DTM into the network

1. Select the HART communication service port DTM then right-click and open "Add".

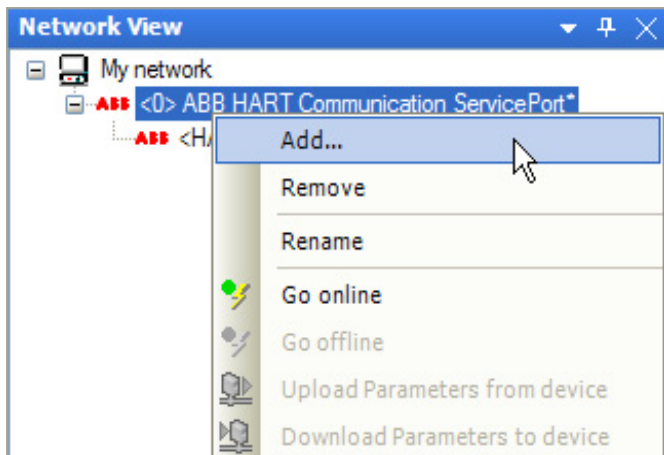


Fig. 63

G11436

2. Select ScanMaster DTM and click "OK".

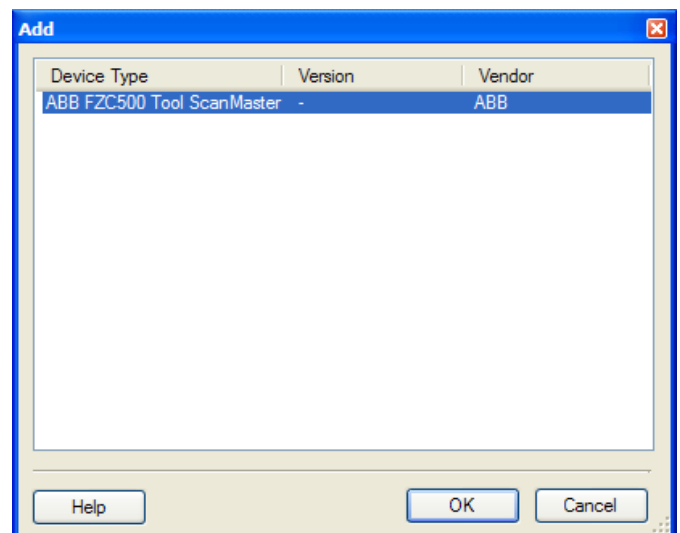


Fig. 64

G11437

3. ScanMaster DTM is now displayed in the network view under the HART communication DTM.



Fig. 65

G11079

3.2.11 Starting ScanMaster DTM

- 1. Before starting ScanMaster DTM, establish a connection on the network by right-clicking to open the DTM drop-down menu and clicking "Establish connection".

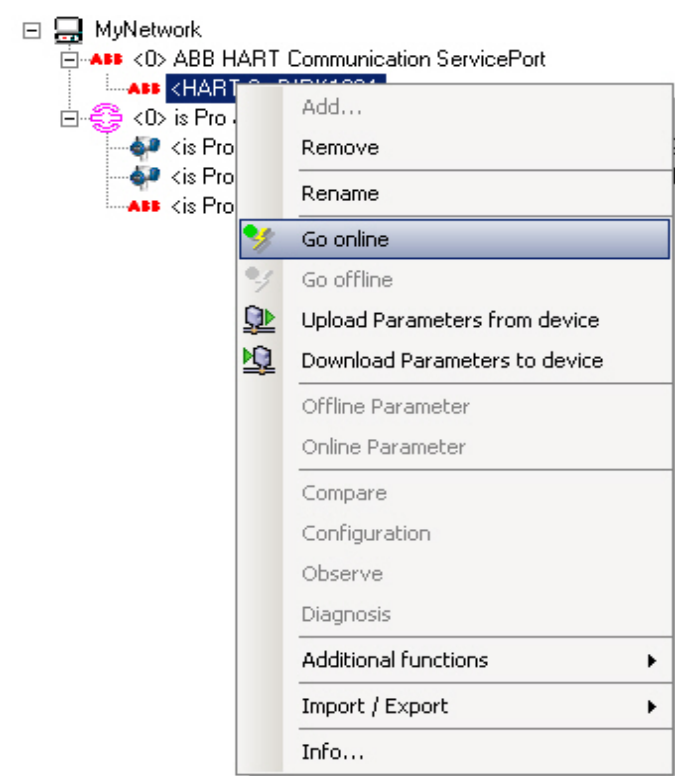


Fig. 66

G11080

- 2. Once the connection is established, the "HART communication DTM" and "ScanMaster DTM" entries are highlighted in bold and italics.

To actually start the DTM, select "Other functions / identify" from the same drop-down menu.

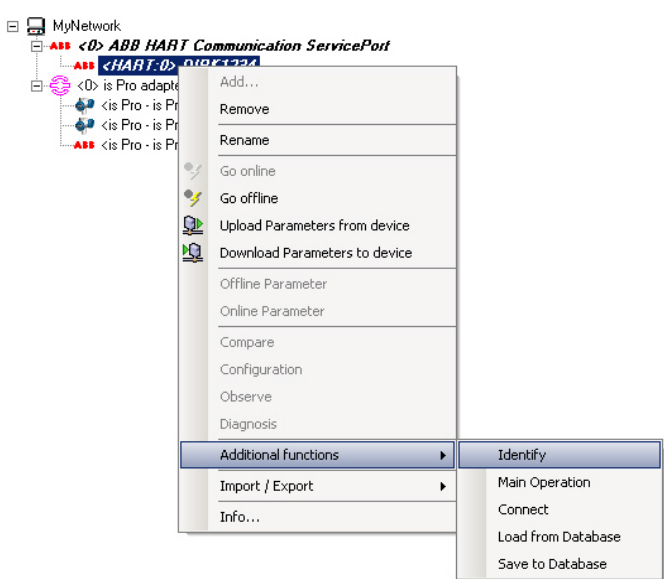


Fig. 67

G11081

i

IMPORTANT (NOTE)

For more information, see the "ScanMaster tool additional info" file in the "Documentation" directory on the CD or in the DTM online help.



## 4 Operation

### 4.1 Verification of a device

**i**

#### IMPORTANT (NOTE)

ScanMaster is largely self-explanatory. The user is guided through the verification process.

1. Once the connection is established on the network, start ScanMaster.

Once the connection is established, the HART communication DTM and ScanMaster DTM entries are highlighted in bold and italics.

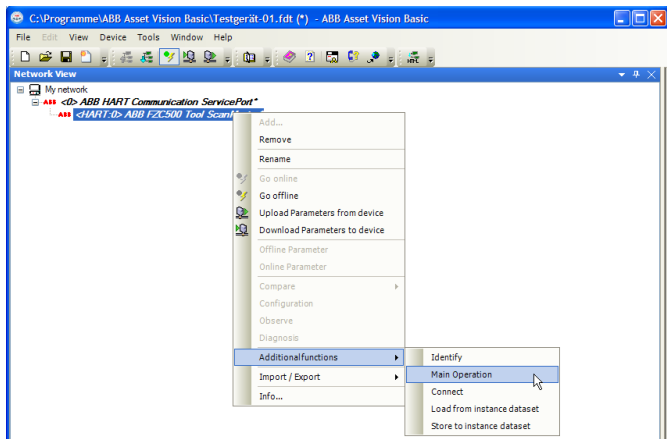


Fig. 68

In order to identify the device for the report, data must be read out from the device.

2. Click the "Yes" button to confirm your selection.

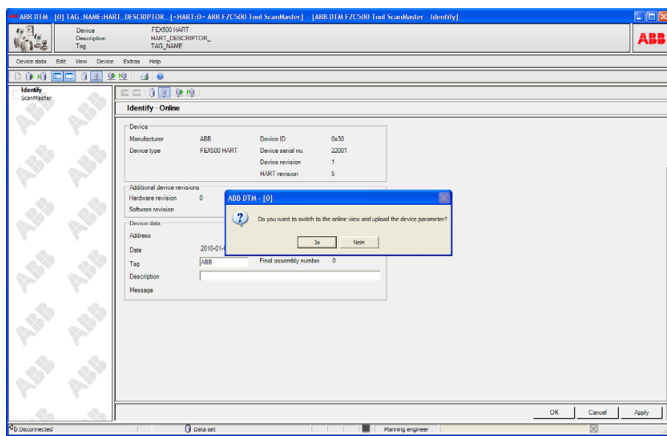
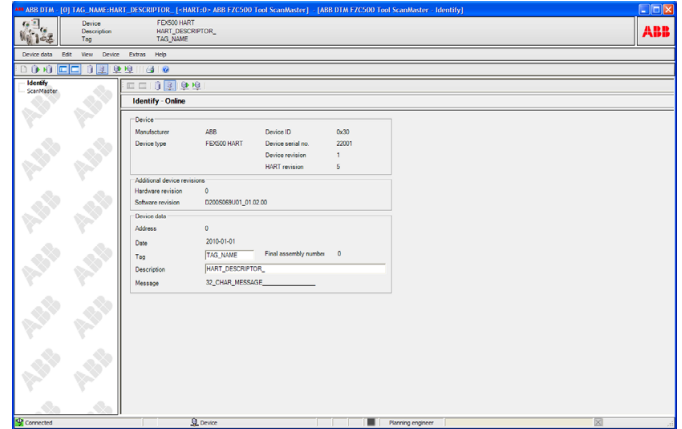


Fig. 69

Following startup, the device ID is displayed first. The column on the left is used for navigation in ScanMaster.



G11403

Fig. 70

The following data is read out:

Device	Description
Manufacturer	HART manufacturer ID
Model	Displays the transmitter type and communication type
Dev. ID	Displays the HART device ID
Device serial number	Serial number for identification by the manufacturer
Device revision	Field device ID
HART revision	Revision of device universal command revision

Additional device revisions	Description
Hardware version	Hardware version
Software revision	Transmitter firmware version

Device data	Description
Address	HART device address. The HART protocol has provisions for creating a bus with up to 15 devices (1 - 15). <b>IMPORTANT (NOTE)</b> If an address greater than 0 is selected: — The device works in multidrop mode — The current output is fixed at 4 mA — HART communication runs solely via the current output Factory setting: 0
Date	Date for information purposes
Tag	Entry of the communication tag (alphanumeric, max. 8 characters)
Final assembly number	Device ID number
Description	Entry of the HART descriptor
Supplementary information	Displays an alphanumeric string (alphanumeric, maximum 32 characters)

3. Click "ScanMaster" in the navigation column on the left.

The following functions are made available in the column in the center:

- "Verification": Starts the device check
- "Show report" Calls up the reports of devices that have already been tested from the database

5. Click the "Next" button to continue the check.

Data is now read out from the device so that the test report can be prepared.

6. Enter general data in the input fields to supplement the data read out.

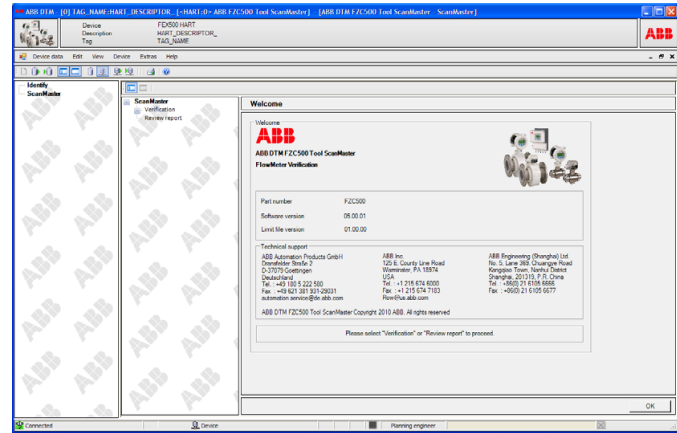
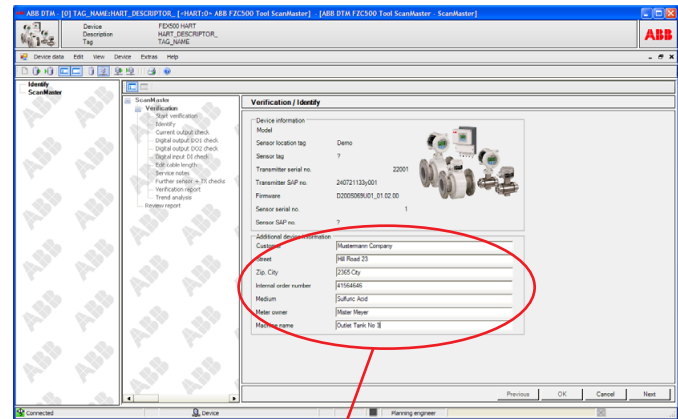


Fig. 71

4. Click the "Verification" function. The following important information is displayed:

**i IMPORTANT (NOTE)**  
The flowmeter is now switching to simulation mode and the output signals from the transmitter no longer reflect the actual flow conditions. Therefore, the measuring point must be switched to "manual mode" in the control system.

ScanMaster - FlowMeter verification report		
Customer address Hutten Company 448 Road 23 2300 City	Meter owner Machine name Sensor location tag Internal order number Medium Meter owner Meter name	Meter Meyer Outlet Tank No 3 41564646 Medium Sulfuric Acid
<b>Sensor information</b> Sensor type Sensor model Sensor size Sensor serial no. Sensor SAP no. Sensor tag Sensor location tag Measuring range Omax User span Liver material Electrode material Sensor span Ss Sensor zero Ss 1st calibration date of sensor Sensor run hours Actual flowrate Totalizer forward Totalizer reverse Totalizer not	<b>Transmitter information</b> Transmitter serial no. Transmitter SAP order number Gun controller version System zero Run hours Communication	Status Enabled Disable 42602 7 00.01.02 -1.114458 88hrs 10mins FE3500 1447T
Summary verification of the sensor	Summary verification of the transmitter	

Fig. 73

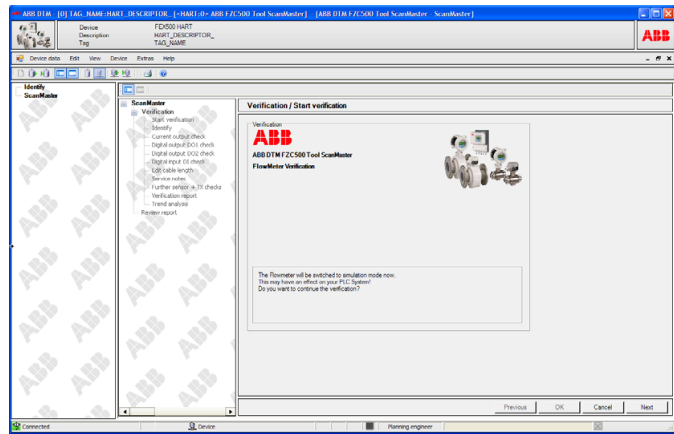


Fig. 72

Device overview	Description
Model	Short-form model number of the connected device
Sensor measuring point	Flowmeter sensor measuring point. The measuring point is displayed in the top left-hand corner of the ProcessMaster LCD display (alphanumeric, max. 20 characters).
Sensor tag number	Tag number of the flowmeter sensor
Transmitter serial no.	ID number of the transmitter
Transmitter SAP no.	SAP order number of the transmitter
Firmware	Software version of the transmitter
Sensor serial no.	ID number of the flowmeter sensor
Sensor SAP no.	SAP order number of the flowmeter sensor

Additional Information	Description
Customer	Entry of customer name
Zip code, city	Entry of zip code and city
Internal order number	Entry of internal customer order number
Medium	Entry of medium being measured
Address	Entry of address
Person responsible for measuring point	Entry of the name of the person responsible for running the installation
Name of installation	Entry of the name of the installation

7. Click the "Next" button to proceed with checking the current output.

The steps to be completed are displayed on the screen.

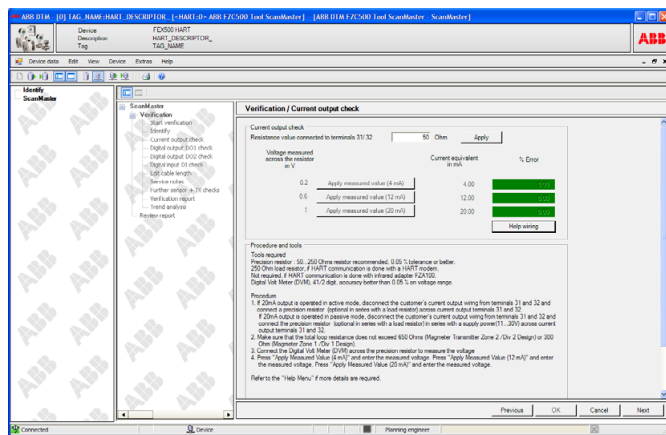
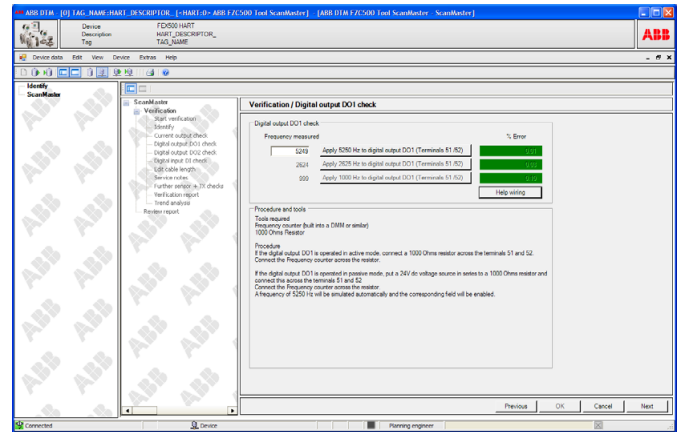


Fig. 74

G11407

8. Click the "Next" button to proceed with checking the digital output DO1.

The steps to be completed are displayed on the screen.

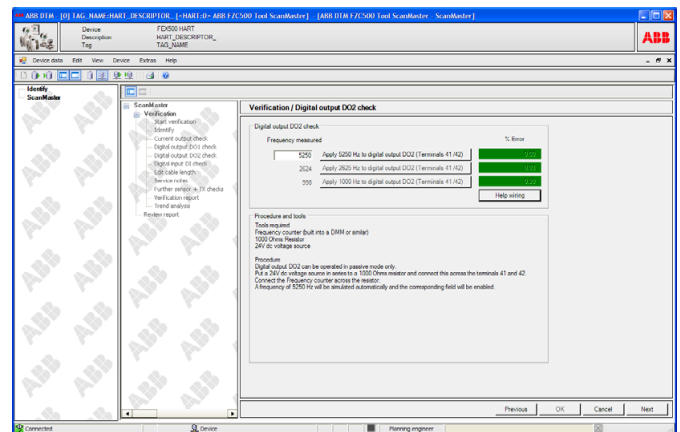


G11408

Fig. 75

9. Click the "Next" button to proceed with checking the digital output DO2.

The steps to be completed are displayed on the screen.



G11409

Fig. 76

10. Click the "Next" button to proceed with checking the digital input DI.

The steps to be completed are displayed on the screen.

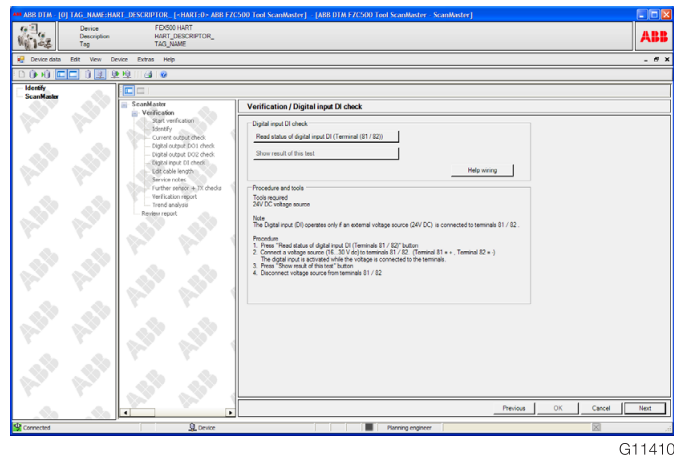


Fig. 77

11. Click the "Next" button to proceed with checking the signal cable length.

The signal cable length is required to check the coil resistance. ScanMaster reads the signal cable length set in the transmitter in the Easy Set-up menu.

If verification is to be carried out with a different cable length, enter this length and click the "Use new cable length" button.

12. Click the "Next" button to enter additional comments about installation or grounding.

i

**IMPORTANT (NOTE)**  
We recommend using this screen to keep a record of the testing equipment used in the check.

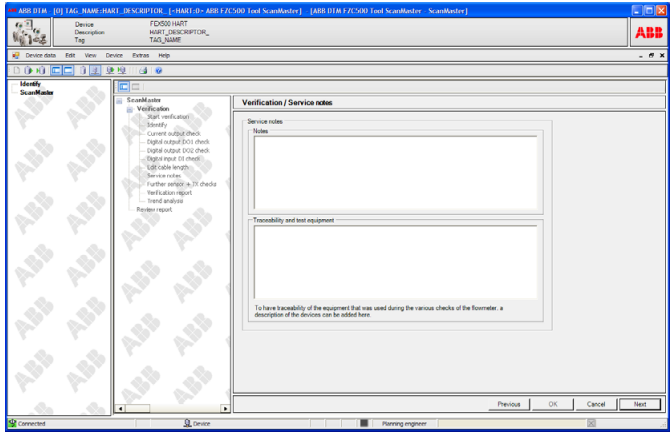


Fig. 78

13. Click the "Next" button to proceed with the "Other flowmeter sensor and transmitter tests" function.

14. Click the "Start test" button.

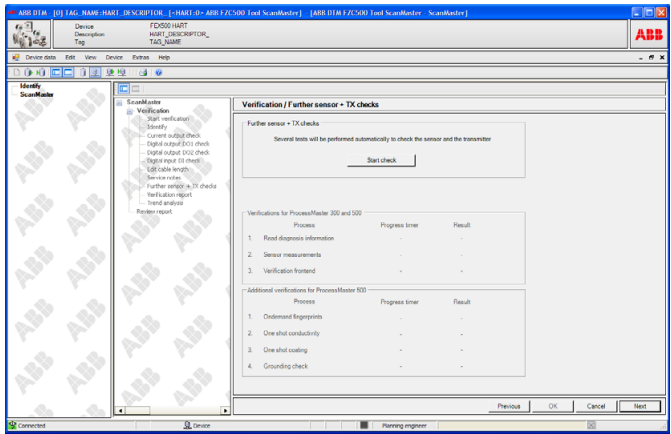


Fig. 79

Various tests are carried out automatically in the flowmeter sensor and the transmitter.

The green "Passed" field confirms that the tests have been carried out successfully (no interruptions in communication, etc.).

File Edit View Device Process Help

Device: FCD001\_HART\_TCD... [ABB E181 (C500) Test Scanner] [ABB E181 (C500) Test Scanner]

Description: HART\_DESCRIPTOR\_...  
Tag: NAME

sensor data Edit View Device Process Help

sensorMaster

Verification

- Start verification
- Identify
- Current output check
- Digital output 1/2/3 check
- Digital output 1/2/3 check
- Digital input 1/2/3 check
- USB cable length
- Set new rates
- Further output at TX check
- Verification report 1
- Trend analysis

Verification / Further sensor = TX checks

Further sensor = TX checks

Several tests will be performed automatically to check the sensor and the transmitter

Start check

Verifications for ProcessFactor 300 and 500

Process	Progress timer	Result
1. Read diagnosis information	-	-
2. Sensor measurements	100	<div><div></div></div>
3. Verification finished	100	<div><div></div></div>

Additional verifications for ProcessMaster 500

Process	Progress timer	Result
1. Outdated fingerprints	100	<div><div></div></div>
2. One shot conductivity	100	<div><div></div></div>
3. One shot coating	100	<div><div></div></div>
4. Grounding check	100	<div><div></div></div>

Previous OK Cancel Next

G11414

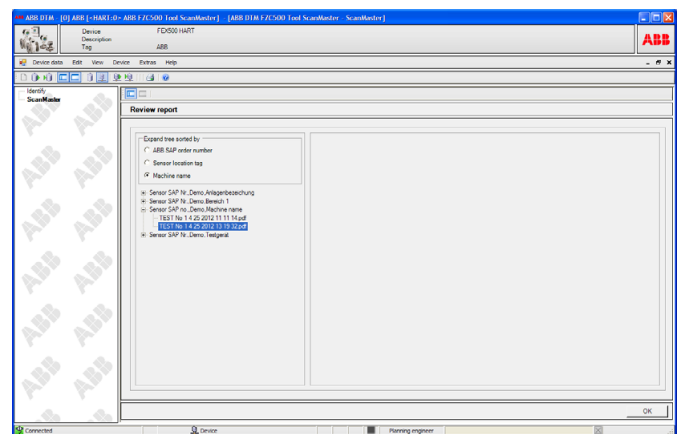
ScanMaster starts Adobe Reader as an external application and displays the report.

[illegible]

G11415

1. Select "ScanMaster" in the navigation column on the left.
2. Then select the "Show report" function in the navigation column in the center.

Selecting report sorting	
ABB SAP order number	Sorting based on the SAP order number
Sensor measuring point	Sorting based on the measuring point
Name of installation	Sorting based on the name of the installation



G11416

## 4.3 Sample test report

ScanMaster - FlowMeter verification report				
Customer and site address Musterman Company Hill Road 23 2365 City		Meter owner Machine name Sensor location tag Internal order number Medium		Mister Meyer Outlet Tank No 3  41564646 Sulfuric Acid
Sensor information Sensor type Hygienic 500 series Sensor model FEH521 Sensor size DN 25 Sensor serial no. 17924 Sensor SAP no. 240567713X003 Sensor tag FIQ7 Sensor location tag Measuring range Qmax 25.00002 l/min User span 100 % Liner material PFA Electrode material SST 1.4539 (904L) Sensor span Ss 124.07 % Sensor zero Sz 0.9829 1st calibration date of sensor 00:00:00 2011/03/18 Sensor run hours 173hrs 45mins Actual flowrate 0 l/min Totalizer forward 15239.65 l Totalizer reverse 1578.478 l Totalizer net 13661.2 l		Transmitter information Diagnosis functions Status Empty Pipe Enabled Sensor measurement Disable Transmitter serial no. 42602 Transmitter SAP order number ? Com controller version 00.01.02 System zero -1.114458 Run hours 85hrs 10mins Communication FEX500 HART		
Summary verification of the sensor		Summary verification of the transmitter		
Coil group Passed		Output group		
Coil group status		Current output (Terminals 31 / 32)		
Coil resistance factory fingerprint	42.86536 Ohm			
Coil resistance measured	43.41589 Ohm	Applied	Measured (mA)   Error(%)	Result
Coil current measured	199.677 mA	4 mA	4   0%	Passed
Reference	62813	12 mA	12   0%	Passed
Cable length	0.3 m	20 mA	20   0%	Passed
Electrode group Passed		Digital output DO1 (Terminals 51 / 52)		
Electrode group status		Applied	Measured (Hz)   Error(%)	Result
		5250 Hz	5250   0%	Passed
		2625 Hz	2625   0%	Passed
		1000 Hz	1000   0%	Passed
Sensor group Passed		Digital output DO2 (Terminals 41 / 42)		
Sensor group status		Applied	Measured (Hz)   Error(%)	Result
		5250 Hz	5250   0%	Passed
		2625 Hz	2625   0%	Passed
		1000 Hz	1000   0%	Passed
Pipe status Full		Digital input DI (Terminals 81 / 82)		
Empty Pipe		Transmitter group Passed		
Detector 2025 Hz		Transmitter signal status		
Threshold 2500 Hz		Transmitter calibration verification Passed		
TFE		Factory fingerprint   Measured (m/s)   Result		
Detector		10 m/s	10.2666   10.1759	Passed
Threshold		5 m/s	5.12633   5.08187	Passed
		Common mode rejection	0.00630   0.01047	Passed
Scanmaster information		Signal quality		
Version	05.00.01	NV resets / s 0 Info only		
Limit file version	01.00.00	Signal Quality (SNR) -33 Info only		
Comments (Installation rounding etc.) Sufficient straight pipe runs upstream and downstream Sensor is installed in plastic pipe 2 grounding rings are in place				
Traceability test equipment Multimeter Fluke 87 serial no 45343				
Overall status : Passed				
This flowmeter has been tested and the results verify that the flowmeter is functioning within normal working limits.				
Date : 26.01.2012 19:14:14		Operator signature		Print name

G11417

## 5 Error messages

Error description	Cause of error	Remedy
ScanMaster is not enabled in the transmitter.	The ScanMaster option must be activated in the flowmeter so that data can be read out from the device.	<p>When purchasing a new device, the ScanMaster option can be specified in the order number code.</p> <p>The ScanMaster CD contains the "ScanMaster Enabler" software tool which can be used to activate the ScanMaster option if it is not activated on delivery (HART firmware version 01.02.00 and higher).</p>

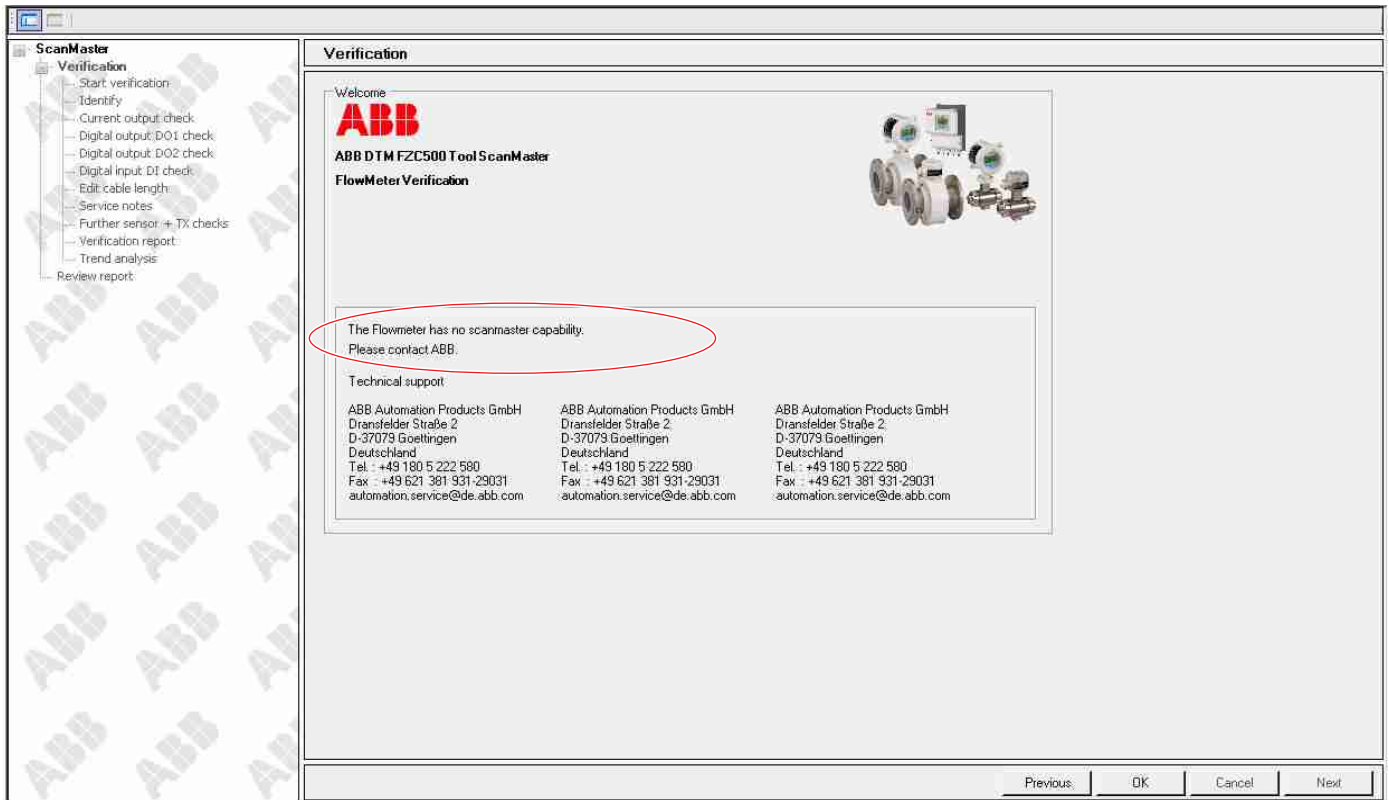










Fig. 83

G11439

Error description	Cause of error	Remedy
The firmware version of the transmitter is too old.	—	<p>ScanMaster can communicate with the transmitter with the following firmware version:</p> <ul style="list-style-type: none"> <li>— HART firmware 01.02.00 and higher</li> <li>— Profibus PA or FOUNDATION Fieldbus firmware 00.02.00 and higher</li> </ul> <p>If the transmitter firmware is older than this, an update must be carried out locally before the transmitter can be checked with ScanMaster.</p> <p>Contact ABB Service to make the necessary arrangements.</p> <p>Check the hardware version of the transmitter.</p>

Part no. transmitter module	Original Firmware version	Update option to firmware version	Comment
D674A880U01 old series / 24 V / HART	00.01.01	00.01.02	No ScanMaster capability.
D674A881U01 old series / 230 V / HART	00.01.01	00.01.02	Update the module then enable ScanMaster and create default fingerprint. Then run ScanMaster.
D674A899U01 old series / 24 V / HART	00.01.02	—	
D674A900U01 old series / 230 V / HART	00.01.02	—	
D674A901U01 old series / 24 V / HART	00.02.01	00.03.00	
D674A902U01 old series / 230 V / HART	00.02.01	00.03.00	<p>ScanMaster capability.</p> <p>Function can be enabled.</p> <p>Note:</p> <p>For operation with ScanMaster, the transmitter must have a specific software level:</p> <p>HART transmitter: Minimum software level 01.02.00</p> <p>Profibus PA / FOUNDATION Fieldbus transmitter: Minimum software level 00.</p>
D674A903U01 500 series / 24 V / HART	01.01.02	01.02.00	
D674A903U02 500 series / 24 V / PA	00.01.02	00.02.00	
D674A903U03 500 series / 24 V / FF	00.01.02	00.02.00	
D674A904U01 500 series / 230 V / HART	01.01.02	01.02.00	
D674A904U02 500 series / 230 V / PA	00.01.02	00.02.00	
D674A904U03 500 series / 230 V / FF	00.01.02	00.02.00	
D674A905U01 300 series / 24 V / HART	01.01.02	01.02.00	
D674A905U02 300 series / 24 V / PA	00.01.02	00.02.00	
D674A905U03 300 series / 24 V / FF	00.01.02	00.02.00	
D674A906U01 300 series / 230 V / HART	01.01.02	01.02.00	
D674A906U02 300 series / 230 V / PA	00.01.02	00.02.00	
D674A906U03 300 series / 230 V / FF	00.01.02	00.02.00	



Error description	Cause of error	Remedy
Communication failure.	When using the infrared service port adapter or the HART modem, in a very small number of cases there is a risk of communication with the transmitter failing. Should communication fail, a corresponding message is displayed on the screen (see screenshot).	<p>Restart the ScanMaster check.</p> <p>When the check is complete, check the following parameter settings:</p> <ul style="list-style-type: none"> <li>— The pulse width</li> <li>— The configuration of the DO1 and DO2 outputs</li> </ul> <ol style="list-style-type: none"> <li>1. To check the pulse width at the transmitter, click  or  and select "Easy Set-up".</li> <li>2. Click  to select the "Pulse width" function and make any necessary adjustments.</li> <li>3. To check the configuration of the DO1 and DO2 outputs at the transmitter, click  or  and select "Input / Output".</li> <li>4. Click ,  and  to select the individual functions and make any necessary adjustments.</li> </ol>

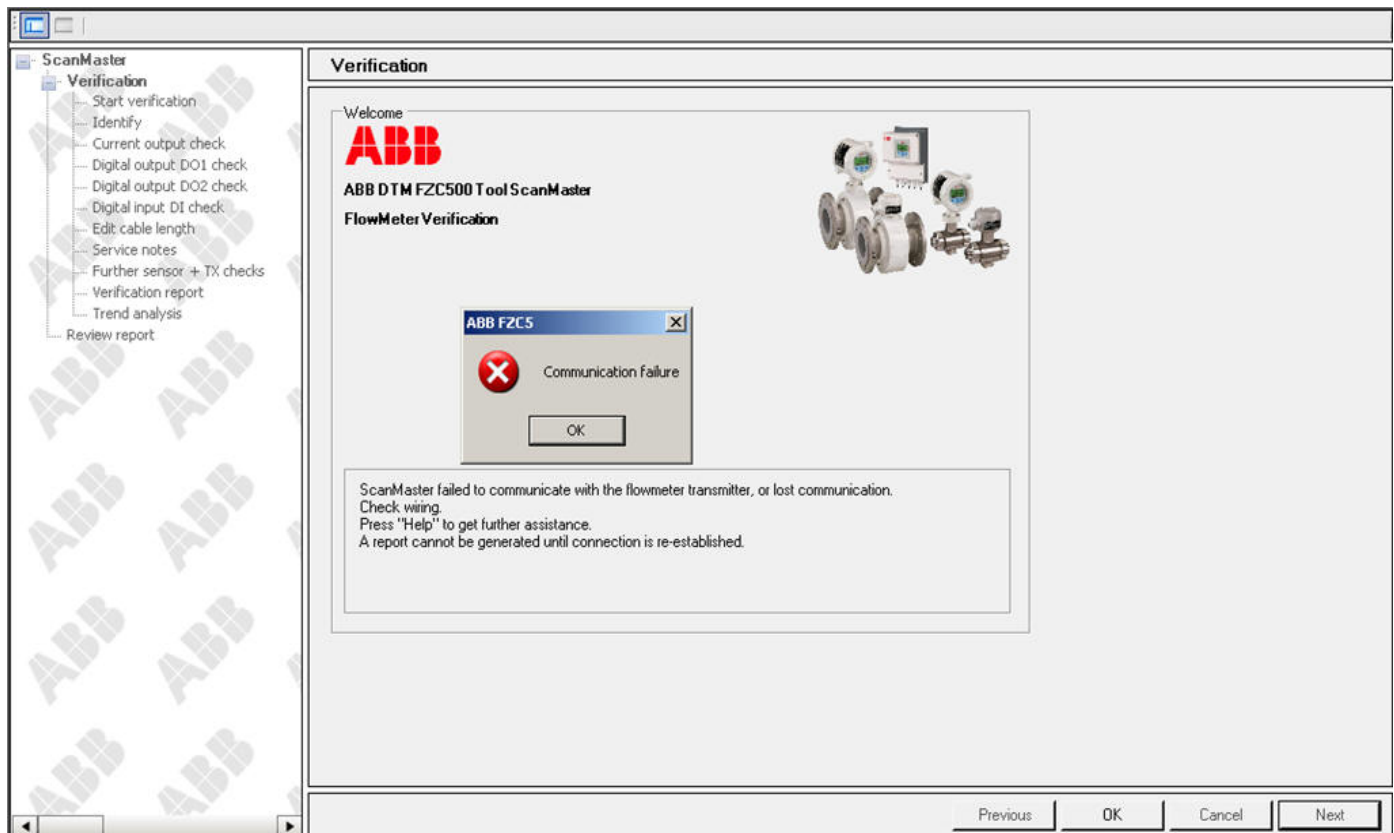
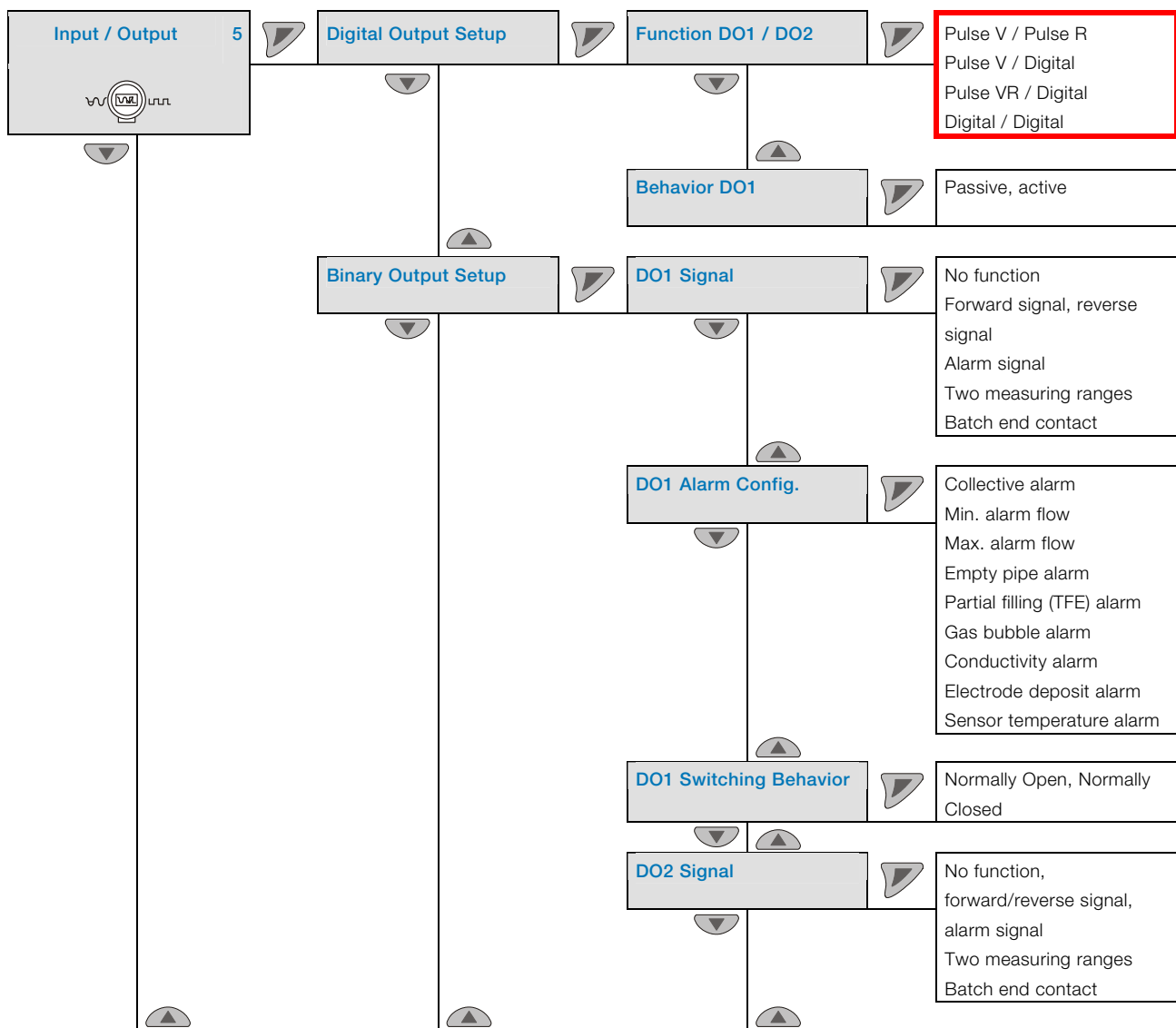
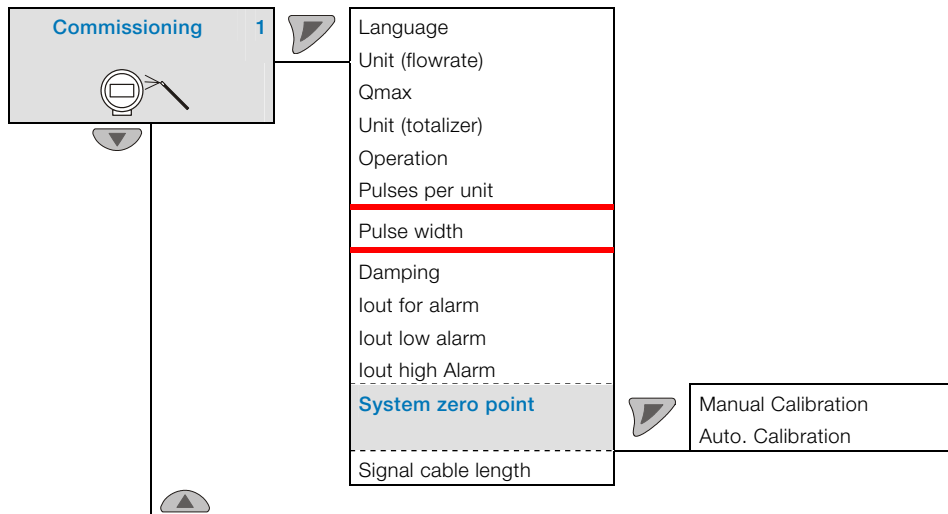


Fig. 84

G11454



Error description	Cause of error	Remedy
<p>The values of the specimen's inputs and outputs are outside the permissible limits.</p> <p>If a value outside the permissible limits is detected when the current output is checked, this is indicated by a red field.</p>	<p>The current output is outside the permissible limits.</p>	<ul style="list-style-type: none"> <li>Click "Back" and repeat the check. Enter the decimal places correctly! If you are working in German, use a comma as the decimal separator. If you are working in English, use a period as the decimal separator.</li> <li>Check wiring.</li> <li>Check the measuring range of the multimeter.</li> </ul> <p>If the three errors listed above cannot be rectified by taking these actions, contact ABB Service.</p>

**ScanMaster**

- Verification
  - Start verification
  - Identify
  - Current output check
  - Digital output DO1 check
  - Digital output DO2 check
  - Digital input DI check
  - Edit cable length
  - Service notes
  - Further sensor + TX checks
  - Verification report
  - Trend analysis
  - Review report

**Verification / Current output check**

Current output check

Resistance value connected to terminals 31/ 32: 50 Ohm

Voltage measured across the resistor in V	Current equivalent in mA	% Error
0.2 <input type="button" value="Apply measured value (4 mA)"/>	4.00	0.00
0.62 <input type="button" value="Apply measured value (12 mA)"/>	12.40	9.99
0 <input type="button" value="Apply measured value (20 mA)"/>	0.00	0.00

**Procedure and tools**

**Tools required**  
 Precision resistor : 50...250 Ohms resistor recommended, 0.05 % tolerance or better.  
 250 Ohm load resistor, if HART communication is done with a HART modem.  
 Not required, if HART communication is done with infrared adapter FZA100.  
 Digital Volt Meter (DVM), 41/2 digit, accuracy better than 0.05 % on voltage range.

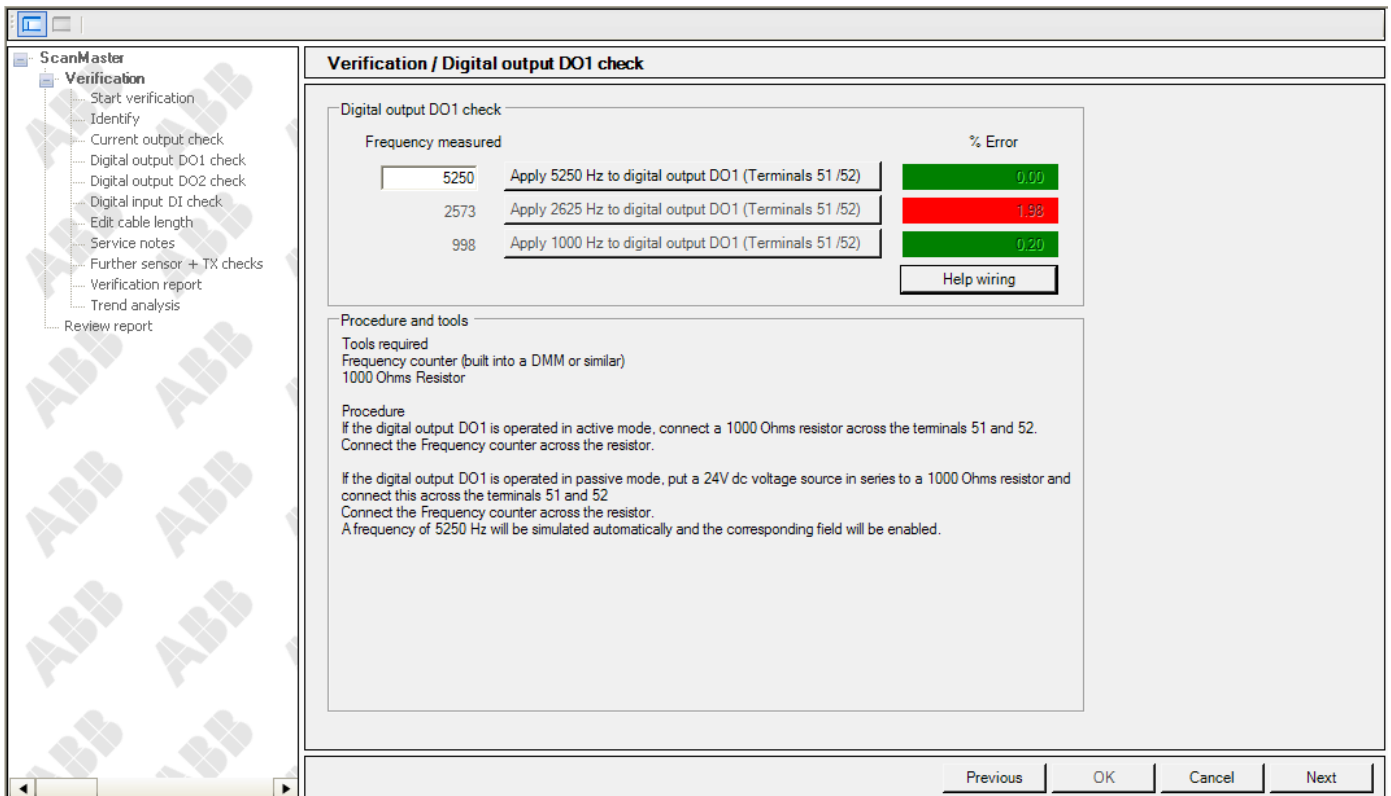
**Procedure**  
 1. If 20mA output is operated in active mode, disconnect the customer's current output wiring from terminals 31 and 32 and connect a precision resistor (optional in series with a load resistor) across current output terminals 31 and 32.  
 If 20mA output is operated in passive mode, disconnect the customer's current output wiring from terminals 31 and 32 and connect the precision resistor (optional in series with a load resistor) in series with a supply power(11...30V) across current output terminals 31 and 32.  
 2. Make sure that the total loop resistance does not exceed 650 Ohms (Magmeter Transmitter Zone 2 /Div 2 Design) or 300 Ohm (Magmeter Zone 1 /Div 1 Design).  
 3. Connect the Digital Volt Meter (DVM) across the precision resistor to measure the voltage  
 4. Press "Apply Measured Value (4 mA)" and enter the measured voltage. Press "Apply Measured Value (12 mA)" and enter the measured voltage. Press "Apply Measured Value (20 mA)" and enter the measured voltage.

Refer to the "Help Menu" if more details are required.

G11448

Fig. 85

Error description	Cause of error	Remedy
<p>The values of the specimen's inputs and outputs are outside the permissible limits.</p> <p>If a value outside the permissible limits is detected when the digital output is checked, this is indicated by a red field.</p>	<p>The digital output is outside the permissible limits.</p>	<ul style="list-style-type: none"> <li>Click "Back" and repeat the check. Enter the decimal places correctly! If you are working in German, use a comma as the decimal separator. If you are working in English, use a period as the decimal separator.</li> <li>Check wiring.</li> <li>Check the measuring range of the multimeter.</li> </ul> <p>If the three errors listed above cannot be rectified by taking these actions, contact ABB Service.</p>



G11449

Fig. 86

Error description	Cause of error	Remedy
<p>The values of the other checks that are carried out automatically are outside the permissible limits.</p> <p>If values outside the permissible limits are detected when the other automatic checks are carried out, this is indicated by a red field.</p>	"Sensor Measurements Failed".	Check the alarms on the transmitter display.
	"Verification Frontend Failed": <ul style="list-style-type: none"> <li>— The sensor is only partially full and the "empty pipe" detector has triggered an alarm.</li> <li>— The values for the transmitter are outside the permissible limits.</li> </ul>	Check whether the sensor is completely full. If it is ("Yes"), contact ABB Service.
	"On demand Fingerprints Failed": This secondary error occurs as a consequence of "Verification Frontend" failing.	

**ScanMaster**

- Verification
  - Start verification
  - Identify
  - Current output check
  - Digital output DO1 check
  - Digital output DO2 check
  - Digital input DI check
  - Edit cable length
  - Service notes
  - Further sensor + TX checks
  - Verification report
  - Trend analysis
  - Review report

**Verification / Further sensor + TX checks**

Further sensor + TX checks

Several tests will be performed automatically to check the sensor and the transmitter

**Start check**

Check in progress. Please wait . . .

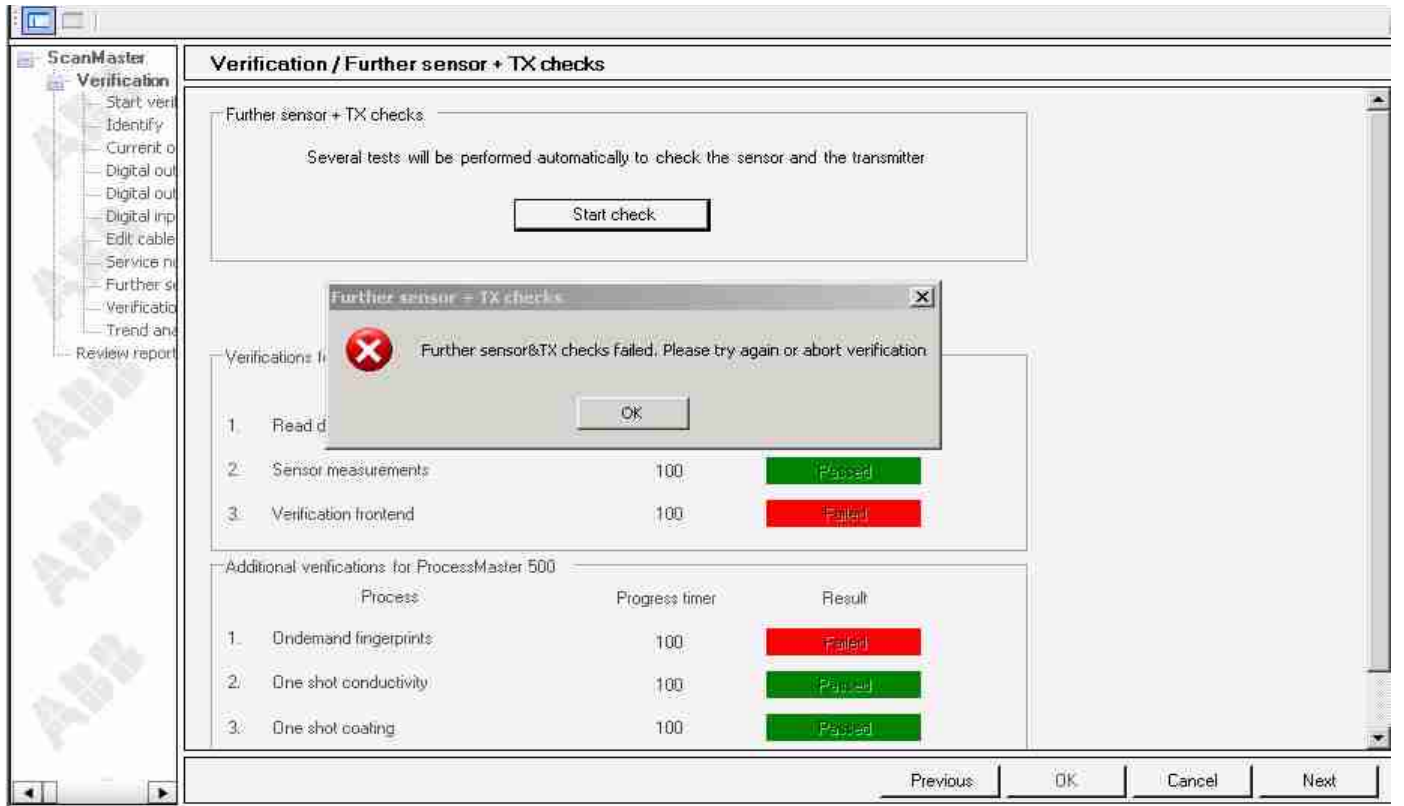
Verifications for ProcessMaster 300 and 500		
Process	Progress timer	Result
1. Read diagnosis information	-	-
2. Sensor measurements	100	Passed
3. Verification frontend	100	Failed

Additional verifications for ProcessMaster 500		
Process	Progress timer	Result
1. Ondemand fingerprints	-	-
2. One shot conductivity	-	-
3. One shot coating	-	-
4. Grounding check	-	-

Previous OK Cancel Next

Fig. 87

G11450



G11451

Fig. 88

## 5.1 Error messages in the ScanMaster report

### 5.1.1 Errors affecting the flowmeter sensor

Summary verification of the sensor		
Coil group		Failed
Coil group status	,S149	
Coil resistance factory fingerprint	17 Ohm	
Coil resistance measured	42.68406 Ohm	Failed
Coil current measured	199.8487 mA	
Reference	62867	
Cable length	0.3 m	
Electrode group		Failed
Electrode group status	S124,S142,S143	
Sensor group		Failed
Sensor group status	,S146,S141	
Pipe status		Full
Empty Pipe		
Detector	1887 Hz	
Threshold	2500 Hz	
TFE		
Detector		
Threshold		

G11452

Fig. 89

Error description	Cause of error	Remedy
Error in the coil group	The current coil resistance is above or below the limit value set on the transmitter (error S149; see also the operating instructions OI/FEX300/FEX500).	Check the values for "Rspule max. Alarm" (coil resistance max. alarm) and "Rspule min. Alarm" (coil resistance min. alarm) in the "Diagnostics\Diagnostic functions\Sensor measurements" menu.
	Set against the default fingerprint, the current fingerprint for the coil resistance is outside the maximum permissible deviation.	<ol style="list-style-type: none"> <li>1. Check the LCD display on the device for a sensor error message (e.g., "Reference voltage Uref = 0" or the error message "Coil resistance outside limits").</li> <li>2. Check the cable length setting in the "Easy Set-up\Signal cable length" menu. The set value must be greater than zero. Set 0.1 m for devices with integral mount design transmitters. For remote mount design devices, enter the length of the cable between the flowmeter sensor and the transmitter.</li> <li>3. Contact ABB Service.</li> </ol>
Error in the electrode group	<p>The error is being caused by an alarm relating to electrode deposits, conductivity, or electrode impedance (errors S124, S142, S143; see also the operating instructions OI/FEX300/FEX500).</p> <p>The values currently entered for the above parameters are above or below the limit value set at the transmitter.</p>	<ul style="list-style-type: none"> <li>— In the "Diagnostics\Diagnostic functions\Electrode deposits" menu, check the limit values for "Deposits QE max. alarm" and "Deposits QE min. alarm" against the current values "Deposits QE1" and "Deposits QE2".</li> <li>— In the "Diagnostics\Diagnostic functions\Conductivity" menu, check the limit values for "Conductivity max. alarm" and "Conductivity min. alarm" against the current value "Curr. conductivity".</li> <li>— In the "Diagnostics\Diagnostic functions\Conductivity" menu, check the limit values for the electrode impedance "Elect. imp. max. alarm" and "Elect. imp. min. alarm" against the current value "Elect. imp. E1-GND" and "Elect. imp. E1-GND".</li> </ul>
<p>Error in the sensor group</p> <p>The error may have been triggered due to process conditions or errors in the sensor hardware.</p>	Error due to process conditions:	<ul style="list-style-type: none"> <li>— Check the limit value for the gas bubble alarm in the "Diagnostics\Diagnostic functions\Gas bubble detection\Gas bubble threshold" menu against the current gas bubble value ("Curr. gas bubble value" menu).</li> <li>— Check the limit value for the sensor temperature in the "Diagnostics\Diagnostic functions\Sensor measurements" menu against the current sensor temperature ("Curr. sensor temp." menu).</li> </ul>
	The cause of the error is the gas bubble alarm (error S146) or sensor temperature alarm (S141). The current gas bubble value or sensor temperature is outside the limit value set at the transmitter.	
	The sensor is only partially full ("empty pipe" alarm, error S148).	Check the process conditions.
	<p>Sensor hardware error:</p> <p>Communication failure to SensorMemory (error M090).</p>	For remote mount devices, check the cabling of terminals D1 and D2.



## 5.1.2 Errors affecting the transmitter

Summary verification of the transmitter			
Output group			
Current output (Terminals 31 / 32)			
Applied	Measured (mA)   Error(%)		Result
4 mA	4	0%	Passed
12 mA	12	0%	Passed
20 mA	20	0%	Passed
Digital output DO1 (Terminals 51 / 52)			
Applied	Measured (Hz)   Error(%)		Result
5250 Hz	5250	0%	Passed
2625 Hz	2625	0%	Passed
1000 Hz	1000	0%	Passed
Digital output DO2 (Terminals 41 / 42)			
Applied	Measured (Hz)   Error(%)		Result
5250 Hz	5250	0%	Passed
2625 Hz	2625	0%	Passed
1000 Hz	1000	0%	Passed
Digital input DI (Terminals 81 / 82)			
Transmitter group			
Transmitter signal status			
Transmitter calibration verification			
	Factory fingerprint	Measured (m/s)	Result
10 m/s	10.2034	10.2214	Passed
5 m/s	5.10268	5.11658	Passed
Common mode rejection	0.02734	0.04991	Passed

G11453

Fig. 90

Error description	Cause of error	Remedy
Error in the output group	The values calculated for the current output, the digital output, or the digital input are outside the permissible limits.	See pages 35 and 36.
Error in the transmitter group	<ul style="list-style-type: none"> <li>Communication failure to internal RAM (error F250)</li> <li>NV Memory alarm (error M099)</li> <li>Digital potentiometer error (error)</li> <li>MSP error (error M094)</li> <li>ROM error (error F253)</li> <li>RAM error (error F254)</li> <li>SIL detector alarm (error F251)</li> </ul>	See the "Error messages" chapter of the operating instructions OI/FEX300/FEX500 or the online help in ScanMaster DTM.
Error during transmitter verification	The values for the transmitter are outside the permissible limits.	See pages 37 and 38.

## 5.2 Error messages on the LCD display

### 5.2.1 Errors

Error no. / Range	Text on the LCD display	Cause of error	Remedy
F254.038 Electronics unit	RAM Error in Transmitter Contact ABB Service	Error in the transmitter electronics unit.	Replace the electronics unit or contact ABB Service.
F253.037 Electronics unit	ROM Error in Transmitter Contact ABB Service	Error in the transmitter electronics unit.	Replace the electronics unit or contact ABB Service.
F252.017 Sensor	No Sensor Memory Check wiring Check switch SW3	Incorrectly wired terminals D1 and D2. Short circuit or break in wires for D1, D2. Jumper SW3 is not correctly plugged into the backplane. Old flowmeter sensor connected without SensorMemory.	Check the wiring for terminals D1, D2. If an old flowmeter sensor (e.g., model DE41F) is connected without SensorMemory, plug the jumper on the backplane in the "ON" position.
F251.040 Electronics unit	Self Check Alarm	The SIL monitoring function has detected a transmitter error.	Replace transmitter or contact ABB Service
F250.016 Electronics unit	Tx. memory fault detected Contact ABB Service	Error in the transmitter electronics unit.	Replace the electronics unit or contact ABB Service.
F248.036 Sensor	Incompatible snsTx+ snr are not the same series	Calibration mode is not compatible.	Contact ABB Service.
F246.032 Electronics unit	Defect digital potentiometer Transmitter Hardware fault ABB Service	Internal digital potentiometer for common mode rejection is defective.	Replace the electronics unit or contact ABB Service.
F245.047 Electronics unit	Stack NV Corrupt Contact ABB Service	The internal stack memory for PROFIBUS PA / FOUNDATION Fieldbus is defective.	Replace the electronics unit or contact ABB Service.
F244.031 Electronics unit	Internal supply voltage error Contact ABB Service	Failure of transmitter internal power supply.	Replace the electronics unit or contact ABB Service.
F236.024 Operation	DC to High Lot of NV-Resets Refer to instr. Manual	Multi-phase fluids that produce a very high level of noise. Stones or solids that produce a very high level of noise. Galvanic voltages at the measuring electrodes. Conductivity of fluid is not evenly distributed (e.g., directly after injection points).	Check electrical connections and grounding of device. Activate empty pipe detector and calibrate if the meter tube is empty. Contact ABB Service.

Error no. / Range	Text on the LCD display	Cause of error	Remedy
F232.022 Electronics unit	Driver Error Uref = 0 Check wiring for open circuit Check fuse	Incorrect wiring (terminals M1, M2) or wire break / short circuit. Defective fuse in the coil circuit or moisture in the terminal box.	Check that the wiring (terminals M1, M2) is connected properly, check for wire breaks and short circuits. Check the coil circuit fuse. Check the connection box for moisture.
F228.020 Electronics unit	Error in Coil circuit Check wiring for short circuit	Incorrect wiring (terminals M1, M2) or wire break / short circuit. Fuse in the coil circuit is defective.	Check that the wiring (terminals M1, M2) is connected properly, check for wire breaks and short circuits. Check the coil circuit fuse.
F226.019 Electronics unit	AD Converter saturated Check empty pipe or Galv. Voltage	Signal at the input of the AD converter exceeds the maximum value of 2.5 V. No further measurement is possible.	If the pipeline is empty, check whether the empty pipe detection function is activated. In the "Diagnostics" menu, activate the empty pipe detection function. Check whether the current flowrate exceeds the set upper range value. If it does, increase Qmax (the upper range value).

### 5.2.2 Function check

Error no. / Range	Text on the LCD display	Cause of error	Remedy
C190.045 Config.	An alarm is simulated Switch off alarm simulation	Simulation mode is activated.	In the "Diagnostics" menu, deactivate simulation mode.
C186.009 Config.	Tx Simulator/ Calibrator mode Switch off Calibrator Mode	The transmitter is operated on simulator 55XC4000.	In the "Diagnostics" menu, deactivate simulation mode.
C185.030 Operation	Hold last good known value Switch OFF Noise Reduction ABB Service	The noise exceeds the bandwidth set for noise reduction for a longer period of time.	Switch off noise reduction in the "Device Setup" menu or contact ABB Service.
C184.010 Config.	The Flowrate is set to zero Check digital in terminals 81,82	The function of the digital input DI is set to "External output switch-off" and the digital input DI is set to high signal (+24 V DC).	Set the digital input DI to low signal (0 V DC).
C182.008 Config.	Flowrate Simulation Switch off Simulation Mode	Simulation mode is activated. One of the following functions is simulated: — Flowrate [%] — Flowrate [unit] — Flow velocity These readings in simulation mode do not represent the system conditions.	In the "Diagnostics" menu, deactivate simulation mode.

Error no. / Range	Text on the LCD display	Cause of error	Remedy
C178.000 Config.	Simulated/ Fixed Current Output Simulation Mode? HART address>0?	The current output is simulated and is currently set to a specific value. The error message is displayed if the HART address is not 0 (HART multidrop mode, current output is fixed at 4 mA).	Deactivate simulation mode in the "Process Alarm" menu or set the HART address to 0 in the "Communication" menu.
C177.015 Config.	HART Address <>0 Multidrop Mode Set HART Addr. = 0	HART address not 0 (HART multidrop mode, current output is set permanently to 4 mA).	Set the HART address to 0 in the "Communication" menu.
C176.011 Config.	Totalizer Stop Check digital in terminals 81,82	The function of the digital input DI is set to "External totalizer stop" and the digital input DI is set to high signal (+24 V DC).	Set the digital input (DI) to low signal (0 V DC).
C175.013 Config.	Totalizer Reset Check digital in terminals 81,82	The function of the digital input DI is set to "External totalizer reset" and the digital input DI is set to high signal (+24 V DC).	Set the digital input (DI) to low signal (0 V DC).
C174.002 Config.	Pulse Simulation selected on DO1 Switch off Simulation Mode	Simulation mode is activated.	In the "Process Alarm" menu, deactivate simulation mode.
C172.004 Config.	Pulse Simulation selected on DO2 Switch off Simulation Mode	Simulation mode is activated.	In the "Process Alarm" menu, deactivate simulation mode.
C168.001 Config.	Logic Simulation selected on DO1 Switch off Simulation Mode	Simulation mode is activated.	In the "Process Alarm" menu, deactivate simulation mode.
C164.003 Config.	Logic Simulation selected on DO2 Switch off Simulation Mode	Simulation mode is activated.	In the "Process Alarm" menu, deactivate simulation mode.
C158.039 Config.	Simulation of HART frequency Switch off Simulation Mode	Simulation mode is activated.	In the "Process Alarm" menu, deactivate simulation mode.
C154.018 Config.	Simulation Digital In Switch off Simulation Mode	Simulation mode is activated.	In the "Process Alarm" menu, deactivate simulation mode.

### 5.2.3 Operation outside specifications

Error no. / Range	Text on the LCD display	Cause of error	Remedy
S149.021 Operation	Coil resistor out of limits Check wiring Contact ABB Service	Coil resistance too high: Coil or fuse for coil circuit is defective, or M1 / M2 wired incorrectly, or wire break, or medium is too hot. Coil resistance too low: Coil is defective or short circuit in M1 / M2 wiring.	Check wiring, check fuse for coil circuit, contact ABB Service.
S148.025 Operation	Empty Pipe Check Pipe	The pipeline in the system is empty.	Fill pipeline.
S146.043 Operation	Gas Bubble Alarm	Gas bubbles were detected in the medium. The measured value is above the set switching threshold.	Check the process.
S144.033 Operation	Partially filled pipe(TFE) Check Pipe Or adjust Detector	Alarm tripped by Partial Filling Detector.	Check process, fill pipeline.
S143.042 Operation	Electrode Coating Alarm	Insulating or conductive deposits detected on measuring electrodes. The deposit value is above the set switching threshold.	Check process, flush pipeline, clean measuring electrodes.
S142.041 Operation	Conductivity Alarm	The fluid conductivity is outside the configured limit values.	Check process, adjust alarm limits if required.
S141.046 Operation	Sensor and or Housing Temperature to high	The flowmeter sensor temperature is outside the configured limit values.	Check process, adjust alarm limits if required.
S140.007 Operation	Flowrate >103% Check Flowrate Check Range Setting	The flowrate in the system exceeds the configured flow range end value by more than 3 %.	Increase the upper range value in the "Easy Set-up - Qmax" menu.
S136.006 Operation	Max Alarm Flowrate	The current flowrate in the pipeline is greater than the max. alarm configured.	Reduce the flowrate or increase the value for the max. alarm.
S132.005 Operation	Min Alarm Flowrate	The current flowrate in the pipeline is lower than the min. alarm configured.	Increase the flowrate or increase the value for the min. alarm.
S124.029 Operation	Electr.Impedance too high Coating? Conductivity? Empty Pipe?	This could be caused by insulating deposits on the electrodes, conductivity that is too low, or an empty meter tube.	If the pipeline is empty, check whether the empty pipe detection function is activated. In the "Diagnostics" menu, activate the empty pipe detection function. Check conductivity, check deposits on the electrodes. Increase the value for "Elec. Imp. Max. Alarm" in the "Diagnostics - Alarm Limits" menu.
S122.026 Operation	Short-circuit E1 E2 with shield.	Galvanic voltages.	Increase the value in the "Diagnostics - Alarm Limits - Electr. V Max Alarm" menu and decrease the value for "Electr. V Min Alarm".
S120.023 Operation	Electrode Noise too high Switch on Noise Reduction	The noise at the measuring electrodes is above the limit value.	Check the process.
S110.035 Operation	Sensor setup Cal-Status Set Cal-Status to calibrated	Sensor is uncalibrated or Cal status is not set to "calibrated".	Contact ABB Service.
S108.044 Operation	Pulse output is cutted off Check pulse out configuration	Incorrect configuration.	In the "Easy Set-up" menu, reduce the "Pulses per unit" value.

## 5.2.4 Maintenance

Error no. / Range	Text on the LCD display	Cause of error	Remedy
M099.027 Electronics unit	NV Corrupt	NV Memory, SensorMemory, FRAM defective.	Contact ABB Service.
M094.034 Electronics unit	Current out fault Comms. to MSP Check wiring! 20mA passive? Check BR901!	20 mA loop open, wire break or no power connected during operation as passive 20 mA output, max. permissible load exceeded or hardware defective.	Check for incorrect wiring, wire break. Check that the jumper to the 20 mA active / passive switchover is connected correctly to the backplane in the transmitter housing. Check whether the external power is connected during operation as 20 mA passive.
M090.014 Sensor	Errors Sensor Comms Bad EMC environment Check wiring	EMC environment or loose contact on the D1 or D2 terminals, or incorrect wiring, or short circuit, or moisture in the terminal box.	Check for incorrect wiring (terminals D1, D2), check terminal box.
M080.012 Operation	Display value is <1600h at Qmax Change eng. Unitfor Totalizer	Display value <1,600 h for Qmax.	Change the totalizer unit.

# Notes

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