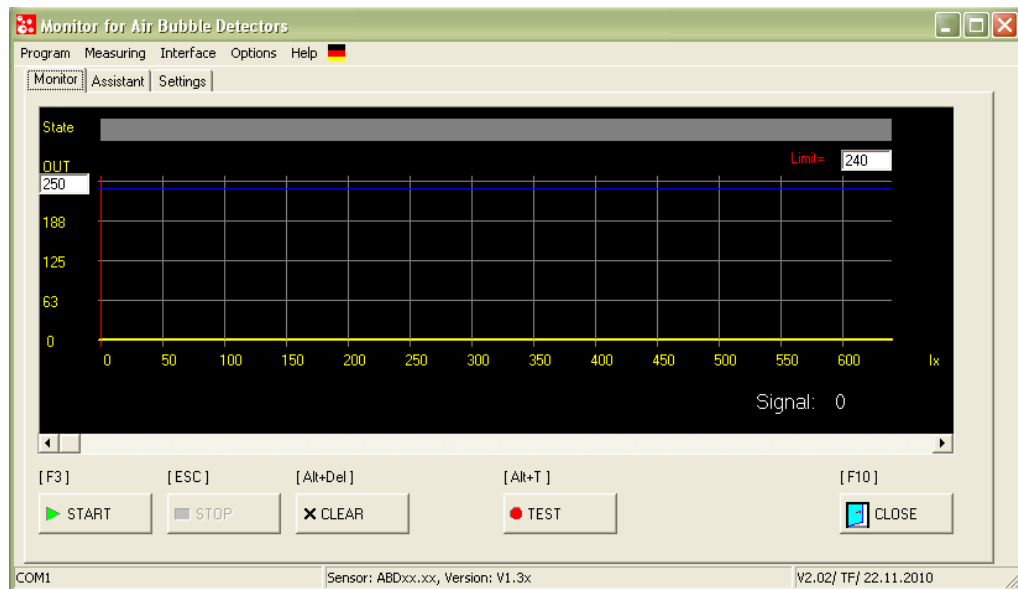


ABD Monitor Operating Manual

For SONOCHECK ABD05/ABD06 SENSORS



Manufacturer: SONOTEC Ultraschallsensorik Halle GmbH
Monitor model: ABDM V2.xx
For sensor types: Air bubble detector, SONOCHECK ABD05
and ABD06

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Revision: 2.0; Date: 2013-07-25

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1 Safety

1.1 Safety information

ABD Monitor for the SONOCHECK ABD05 and ABD06 sensors, and all accessories, are state of the art and complies with applicable safety regulations. The manufacturer has taken every possible action to guarantee safe operation. The user must ensure that the devices are installed in such a way as not to impair safe use. The devices are factory tested and are delivered in a safe operating condition.

This manual contains information and warnings, which the user must adhere to, in order to allow the devices to be operated safely.



Caution!

- When operating the associated USB data converter in conjunction with the ABD05 and ABD06 sensors, all safety information in the relevant manual must be observed.
- The USB data converter may only be operated with a supply voltage in the specified range.
- The housing of the USB data converter may not be opened.
- The USB data converter must be protected against moisture.
- The operator must ensure that the maximum switching current at the PNP switching output is not exceeded. For example, this can be done using an external fuse.

1.2 Intended use

The USB data converter is used for programming the ABD05 and ABD06 sensors using a computer. It is intended to support the operator in adjusting the air bubble sensors for a specific task and can provide assistance when diagnosing problems.

It is approved exclusively for this purpose and may only be operated if:

- The entire manual has been read and understood
- All conditions set out in the safety information are met

Any use other than the designated use is prohibited and can result in injury or damage to property. SONOTEC Ultraschallsensorik Halle GmbH accepts no liability for damage, including to third parties, caused by improper handling of ABD Monitor and its components.

2 Product information

2.1 Functional description

ABD Monitor (ABD = Air Bubble Detector) is used in conjunction with a computer for remote diagnostics and for fine adjustment of parameters. It enables data to be recorded, the sensor to be adjusted for specific applications and particular parameter settings to be made, for example:

- Response time / holding time for output conditions
- Adjustment to a specific tube type

2.2 System requirements

The software is optimised for the following systems:

System	Requirements
Operating system	Win95, Win98, Win2000 or WinXP
Screen resolution	800 x 600 or higher
Interface	Minimum 1 USB port
Processor	Pentium 700 MHz or higher
RAM	256 MB or higher

Table 1: System requirements overview

2.3 Components of ABD Monitors

The ABD Monitor is made up of the following components:

- USB data converter type 007 for ABD05 sensor
- USB data converter type 005 for ABD06 sensor
- CD with software (ABD Monitor) and drivers (USB data converter)
- M12 cable (5-pin)
- USB cable (type A-B), length 2 m
- Power supply unit (optional)
- ABD Monitor operating manual

2.4 USB data converter design

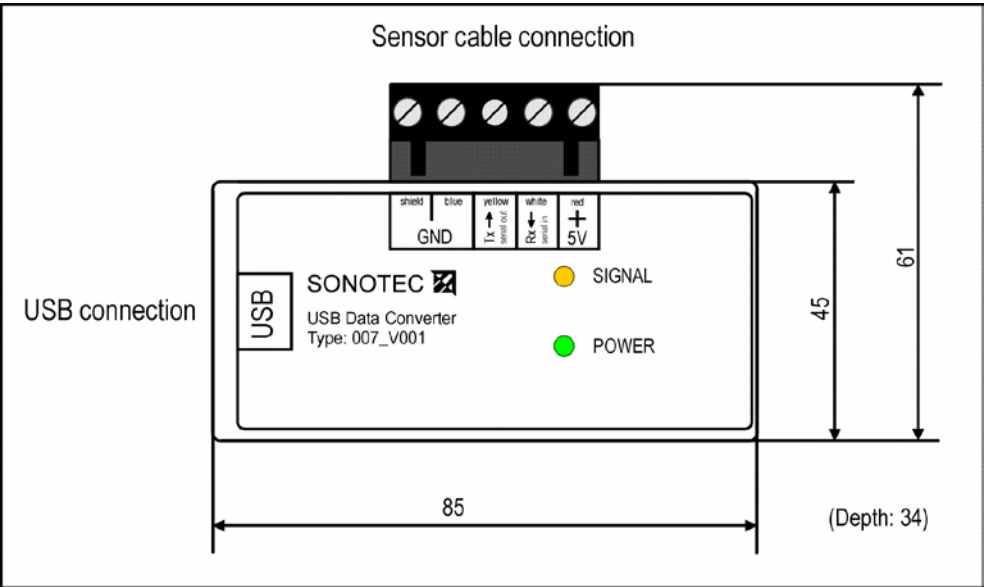


Figure 1: USB data converter type 007 for ABD05 sensor

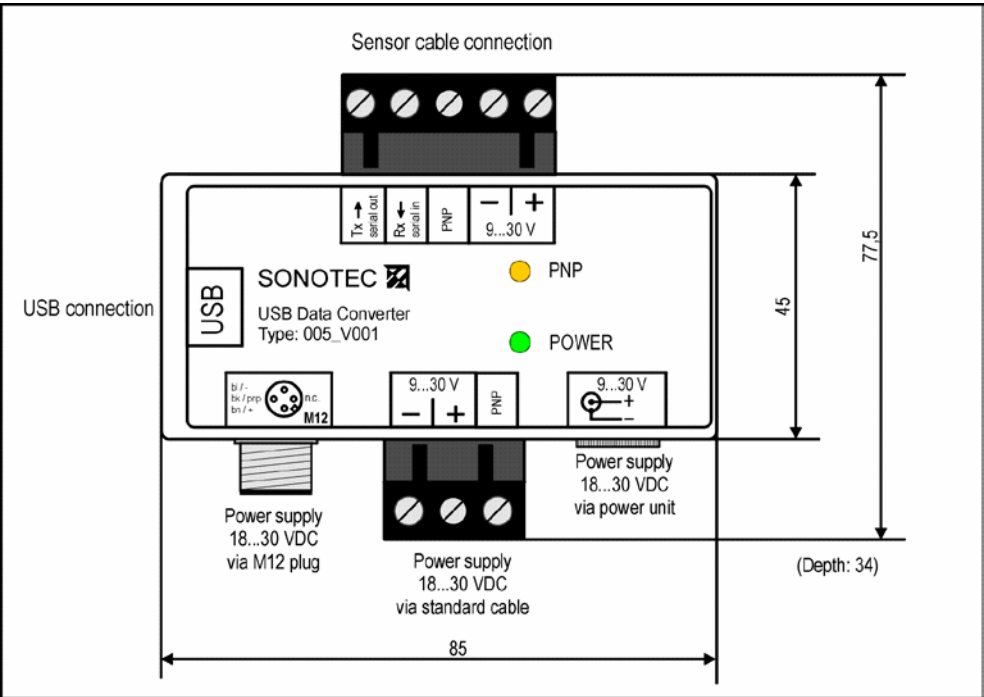


Figure 2: USB data converter type 005 for ABD06 sensor

3 Connecting the USB data converter


Caution!

The device or the sensor may be damaged.

- The sensor must be connected correctly. Never connect the plug for serial data transmission using the mains connection or the switching output.
- Before connecting the sensor, the power supply to the USB data converter must be disconnected.

3.1 ABD05: Connecting for test mode

For test mode, the sensor is connected to a free USB port on the computer using the USB data converter type 007.

The USB data converter provides two additional lines for turning the sensor on and off and for generating the signal for a bubble test.

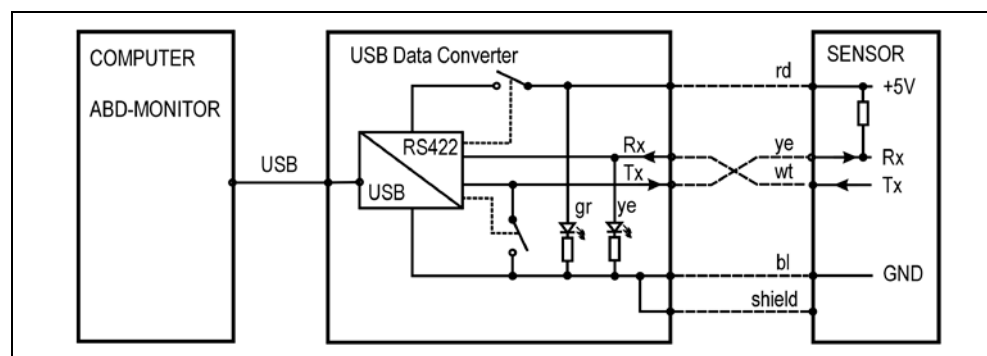


Figure 3: Connecting for test mode with USB data converter type 007

USB data converter type 007		Sensor	
		Colour	Connection
+ 5 VDC	→	Red	Operating voltage 5 ± 0.2 VDC; max. 50 mA
Tx → Serial output	→	Yellow	Rx serial input, max. + 5 VDC
Rx ← Serial input	→	White	Tx serial output, max. + 5 VDC
GND	→	Blue	Ground (GND)
Shield	→	Screening	Connect to ground

Table 2: Connection from USB data converter type 007 to sensor

⇒ Connect the sensor for test mode using the USB data converter type 007 (see Figure 3; Table 2).

🔌 The “POWER” LED on the USB data converter lights up green.

The “SIGNAL” LED lights up yellow if no tube is inserted or if there is an air bubble in the tube.

The USB data converter type 007 provides the connections for serial communication using the additional 5-pin cable.



Notice

If the power supply through the USB data converter is very low, the sensor requires an external power supply.

3.2 ABD06: Connecting for test mode

For test mode, the USB data converter type 005 must be connected between the machine controller and the sensor with the 5-pin M12 cable.

Connection to sensor

On the sensor side, the USB data converter type 005 is connected as follows using the 5-pin cable.

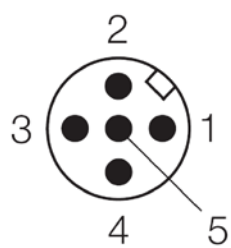
USB data converter type 005		5-pin M12 cable to sensor			
		Plug	Color	Connection	
Tx → Serial output	→	2	White	Rx serial input, max. + +5 VDC Connect to ground if not used	 <p>View of M12 plug for sensor</p>
Rx ← Serial input	→	5	Grey	Tx serial output, max. + +5 VDC Connect to ground if not used	
PNP	→	4	Black	Switching output, PNP, max. 150 mA	
-9 to 30 VDC	→	3	Blue	Ground (GND)	
+9 to 30 VDC	→	1	Brown	Operating voltage +9 to +30 VDC ± 10 % Max. 70 mA (no load)	
			Screening	Not connected for test	

Table 3: Connection from USB data converter type 005 to sensor

Connection to controller

On the controller side, the USB data converter type 005 is connected to the machine. There are three different options (represented by colors) to connect the sensor to the power using the adapter:

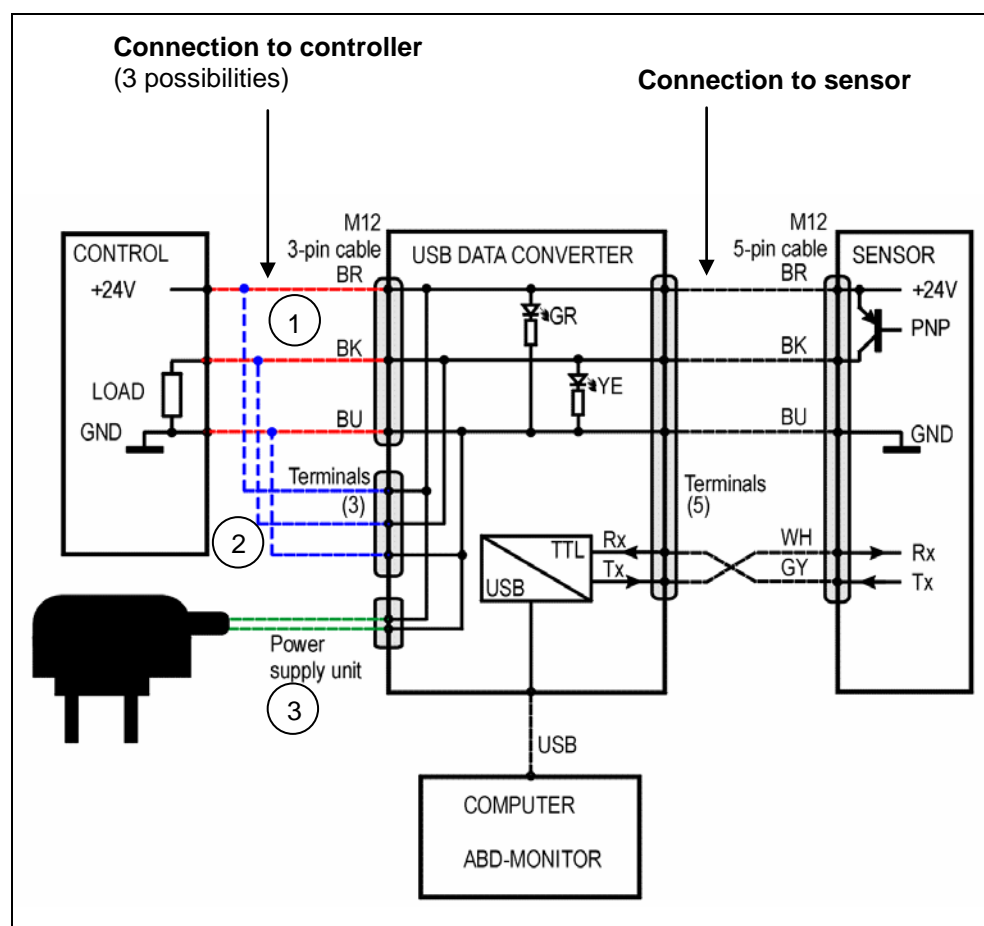


Figure 4: Connection for test mode with USB data converter type 005 and additional 5-pin cable

M12 3-pin sensor cable (1)		3-pin standard cable (2)	Mains / power connection (3)		Connection to controller
1	Brown	+9 to 30 VDC	Internal	→	Operating voltage +9 to 30 VDC ± 10 %
2	-	-	-	→	Not connected
3	Blue	-9 to 30 VDC	External	→	Ground (GND)
4	Black	PNP	-	→	Switching output, PNP, max. 150 mA, yellow LED lit at a switching level of 24 V (H)
	Screening	-	-	→	Connect to ground (blue) on side of control unit

Table 4: Connection from USB data converter to controller

⇒ Connect the sensor for test mode using the USB data converter type 005 (see Figure 4, Table 3 and Table 4):

↳ The “POWER” LED on the USB data converter lights up green.

The “PNP” LED lights up yellow if no tube is inserted or if there is an air bubble in the tube.

The USB data converter type 005 provides the connections for serial communication using the additional 5-pin cable.

4 Installing the driver and copying the software

Before using the ABD Monitor, the driver for the associated USB data converter must be installed and the required files copied to the hard disk.

4.1 Installing the USB data converter driver

To install the driver correctly:

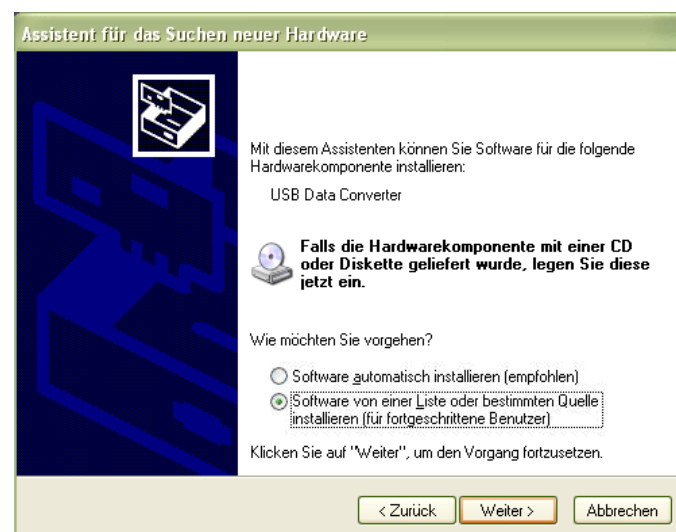
1. Connect the USB cable to the associated USB data converter.
2. Plug the other end into a free USB port on your computer.

Windows detects a new device and automatically opens the following window:



3. Select **No, not this time**.

4. Click on **Next**.



5. Insert the CD.

↳ The installation continues automatically.

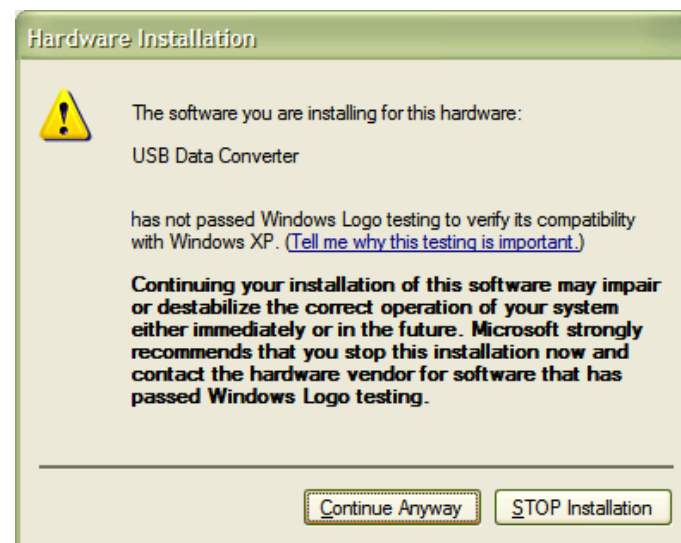
If the device is not detected automatically, select:

Install from a list or specific location (Advanced) and click on **Next**.

6. Select the **<Driver>** directory on the CD.

7. Click on **Next**.

↳ The driver is installed. The following window appears:



8. Click on **Continue Installation**.

↳ A new window appears.

9. Click on **Finish**.

↳ The driver installation is complete.

4.2 Copying the software

The ABD Monitor is not installed using a setup program. You can launch the program directly from the data carrier. If you want to store the program on your computer:

1. Delete any previous versions of ABD Monitor and all associated files.
2. If it does not yet exist, create a folder on your computer's hard disk:

Example: C:\Program Files\SONOTEC

3. Copy the entire content of the Software folder on the CD into the new folder created.

🖱 The software can be launched by double-clicking on the file **ABDM.exe**.



Notice

ABD Monitor does not make any changes to your system. The registry and any *.ini files are not changed.

If you want a shortcut on the desktop, you must create this manually.

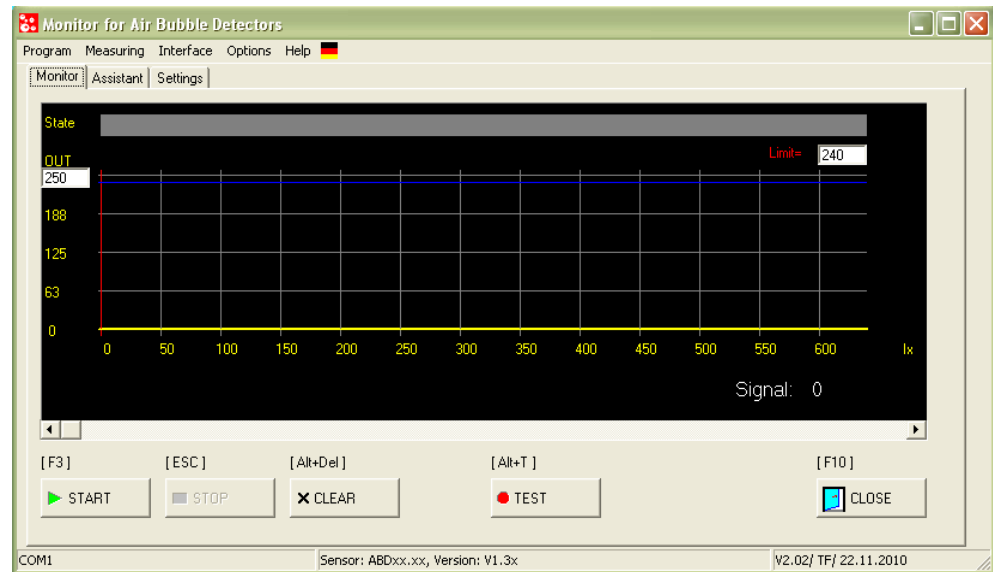
4.3 Uninstalling ABD Monitor

If you have copied files onto your hard disk, you only have to delete these files. You do not need to uninstall, as the software was not registered on your computer.

You can uninstall the driver for the relevant USB data converter at any time using the Device Manager.

5 Program functions

5.1 Monitor: Signal output range



Field	Meaning	Values
Out	Measure for signal	For information (optimum setting)
Limit	Threshold value for bubbles	For information (amplitude height for signal)
State	Measuring signal display	Green = Liquid (signal for full tube) Red = Bubble (signal for empty tube)
Graph	Bubble value	0 to 240 (240 = alarm)
Ix	Time line	Ascending from 0
Signal	Signal amplitude	From 0 to 655

Table 5: Description of fields in Monitor area

Information in the status bar:

- Connection: USB data converter type
- Operation / error messages
- Software version

5.2 Menu options in the main toolbar


Menu	Menu options	Function
Program	Exit program (F10)	Exits ABD Monitor
Measurement	START (F3)	Starts a measurement
	STOP (ESC)	Stops a measurement
	Delete measured values (Alt + Del)	Deletes recorded measured values
	Data overload: <ul style="list-style-type: none"> Stop measurement Overwrite Restart measurement 	Specifies how the sensor will respond in case of a data overload (3 options)
	Export measured data	Exports measured data to a .txt format file (encoded)
	Reset sensor (Alt + R)	Restarts the sensor
	Read IDENT (F2)	For checking the version and the communication test
Interface	Select connection <ul style="list-style-type: none"> Up to USB 16 Up to COM 235 	Assigns a connection
	Reset USB (F4)	Closes and re-initialises all interfaces
Options	Language <ul style="list-style-type: none"> German English 	Selects the menu language
	Beeper	Turns the acoustic indicator for the "bubble" signal on or off
Help	Documents (F1)	Provides Help documents
	Clicking toggles the setting between the available menu languages (English and German).	

Table 6: Overview of program functions in main menu

5.3 Functions on module pages

Tab	Menu options	Function
Monitor	START (F3)	Starts measurement
	STOP (ESC)	Stops measurement
	DELETE (Alt + Del)	Deletes measured values in chart
	TEST (Alt + T)	Initiates a test signal (bubble simulation)
	EXIT (F10)	Exits ABD Monitor
Wizard	Menu steps 1-6	Menu system for adjusting the sensor
Settings (for Service)	Sensor: Read/Write	
	Read IDENT (F2)	For checking the version and the communication test
	Read (Ctrl + R)	For file export: Reads parameters
	Write (Ctrl + W)	For file import: Writes parameters
	File: Import/Export	
	Open	Opens parameters from a file to import
	Save	Saves current parameters in a file

Table 7: Functions on the module tabs

6 Parameterization

The ABDM software enables you to perform the following tasks:

- Determine new parameters
- Save parameters as a data record
- Transfer existing parameters to sensor

6.1 Specifying custom parameters using the wizard

To record new parameters, the sensor must be set up as described in section 3 and connected to the computer using the USB data converter.

⇒ Launch the software by double-clicking on the file **ABDM.exe**.

✚ The main window appears.

⇒ Select the **wizard** tab.

✚ The following message appears:

START:

Wizard for adjusting ABD05/ABD06 sensors.

⇒ Select the **Next** button to start the wizard.

Step 1: Adjusting the parameters



Sensor type:


⇒ Select your sensor type in the drop-down list.

The sensor type can be found on the rating plate on the side of your sensor.

Output and holding time:

⇒ Click on the letters to define the logical output for liquid, air and error.


↪ The assignment changes from L to H or from H to L.

	<p>Notice</p> <p>The holding time is the time after which the next change of state can be signalled. The default setting is 0 ms.</p> <p>If the sensor is connected to a programmable logic controller (PLC), for example, the holding time should be increased to between 100 and 200 ms.</p>
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⇒ Define the holding time in milliseconds (ms) by entering the value in the corresponding field.

⇒ Then click on the **Next** button.

Step 2: Determining the signal with an empty tube

	<p>Notice</p> <p>The signal amplitudes for an empty and full tube are necessary to determine the switching threshold.</p> <p>The switching threshold defines ranges for liquid and air. These depend largely on the type of tube used, the insertion force etc.</p>
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⇒ Click on the **Measure** button to determine the signal with an empty tube or enter the value manually, if it is known.

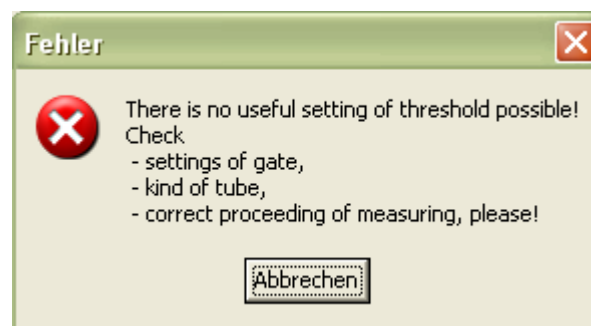
↪ The height of the signal amplitude appears in the input box.

⇒ Then click on the **Next** button.

Step 3: Determining the signal with a full tube

- ⇒ Click on the **Measure** button to determine the signal with a full tube or enter the value manually, if it is known.
- ↳ The height of the signal amplitude appears in the input box.
- ⇒ Then click on the **Next** button.

If the values are incorrect, the following message appears:



- ⇒ Click on **Cancel** and enter the values again.

Step 4: Calculated switching threshold

- ↳ Once the measured values for an empty and full tube have been recorded, the optimum switching threshold is automatically calculated and displayed in the window (values of 100 to max. 250 are typical).
- ⇒ If the values have been determined correctly, click on **Next**.
- ↳ The parameters are transferred to the sensor.

Step 5: Saving the parameters determined

- ↳ The following message appears:
You can save the settings in a file.
- ⇒ Click on the **save** button.
- ↳ The data can be saved in a file in *.hex format (encoded) for Service.

Step 6: Exiting the wizard

↳ The following message appears:

END: **The sensor adjustment is complete.**

⇒ Click on the **Next** button.

↳ The sensor now has an optimum configuration for most applications and the wizard is exited.

6.2 Importing parameters

If parameters are already known, the corresponding file can be transferred directly to the sensor.



Notice

When importing data, the file must contain the correct sensor type and the relevant version, otherwise the import does not work and will be cancelled with an error message.

⇒ Select the **Wizard** tab and, under **File: Import/Export**, click on **Open**.

↳ You can now open a corresponding file.

↳ The following message appears: **Import parameters: Everything OK**

6.3 Exporting data

⇒ Select the **Wizard** tab and, under **File: Import/Export**, click on **Save**.

↳ You can now save the data in a file in *.hex format (encoded for Service).

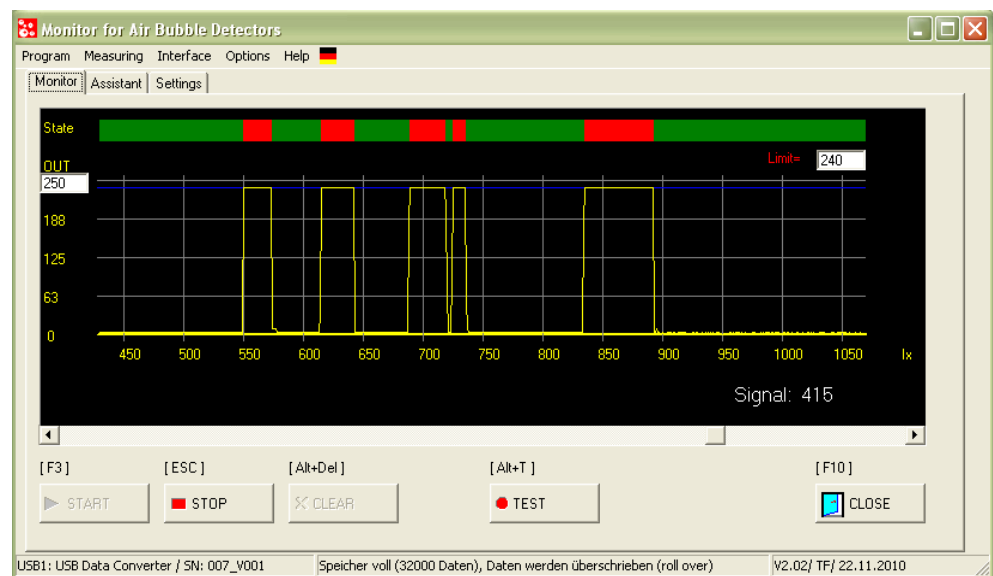
↳ The following message appears: **Export parameters: Everything OK**

7 Managing measured value

7.1 Recording measured values

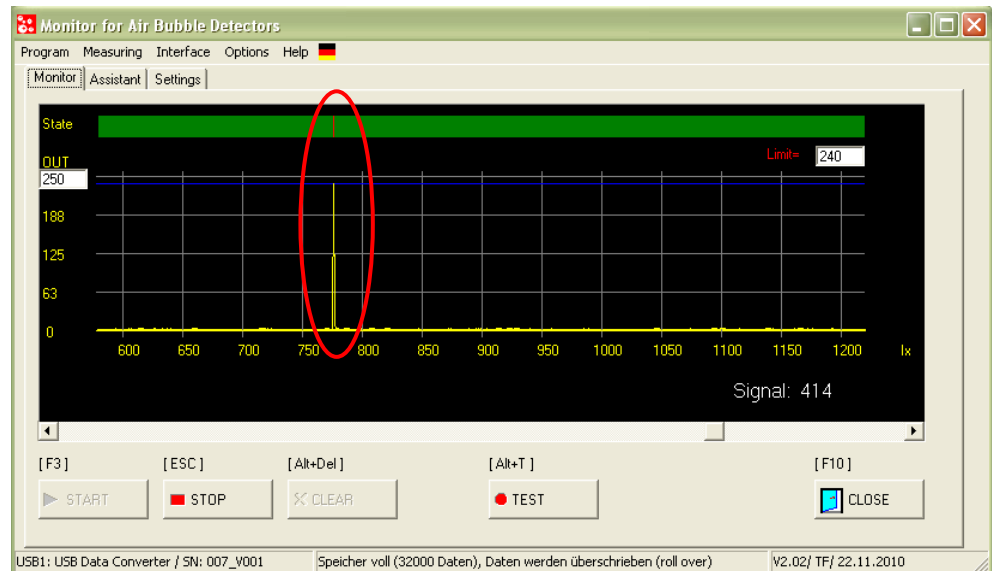
⇒ Click on the **start** button to begin the measurement.

↳ The software records the measured values and displays them graphically in a chart.



7.2 Bubble test

⇒ With a full tube, click on the **Test** button to simulate a bubble.



⇒ The signal for the simulated bubble is displayed in the Monitor area. The following message appears in the footer: **Bubble test: Everything OK**

7.3 Saving measured values

⇒ On the **Measurement** tab, select the **Export measured data** function and then select the file location and a file name.

⇒ The data is saved in a text file with the format *.txt (encoded for Service).

7.4 Deleting measured values

⇒ Click on the **Delete** button to delete recorded measured values.

8 Troubleshooting

If problems occur during configuration or determination of new parameters, please send us a parameter set. Any parameters you have determined yourself, as well as a brief description of the situation and the actions carried out, are also required. Based on this information, we will determine the necessary parameters for you.

9 Error messages

Error message	Possible cause	Remedy
SETTINGS: "No communication with sensor possible" or MONITOR/START: Status bar: "Ping: No or incomplete response"	Sensor is not connected correctly	Check the connections on the test equipment.
	No operating voltage	Check whether the USB cable is connected properly.
	Wrong sensor type	Check the sensor type and correct the setting using the wizard.
	Not connected to USB data converter correctly	Check the connection to the USB data converter. Reset USB (F4): Closes and reinitialises all interfaces
	Incorrect interface selected	Reset USB (F4): Closes and reinitialises all interfaces; then reselect USB
	Program open several times	Program may only be opened once as otherwise the USB is already busy.
WIZARD: "No threshold setting found. Please check."	Gate settings are incorrect	Check the sensor type.
	Tube type	Check whether the tube is properly positioned in the tube channel.
	Measurement not performed properly	Check whether ABD Monitor has been set up as specified in the manual.

Table 8: Error messages