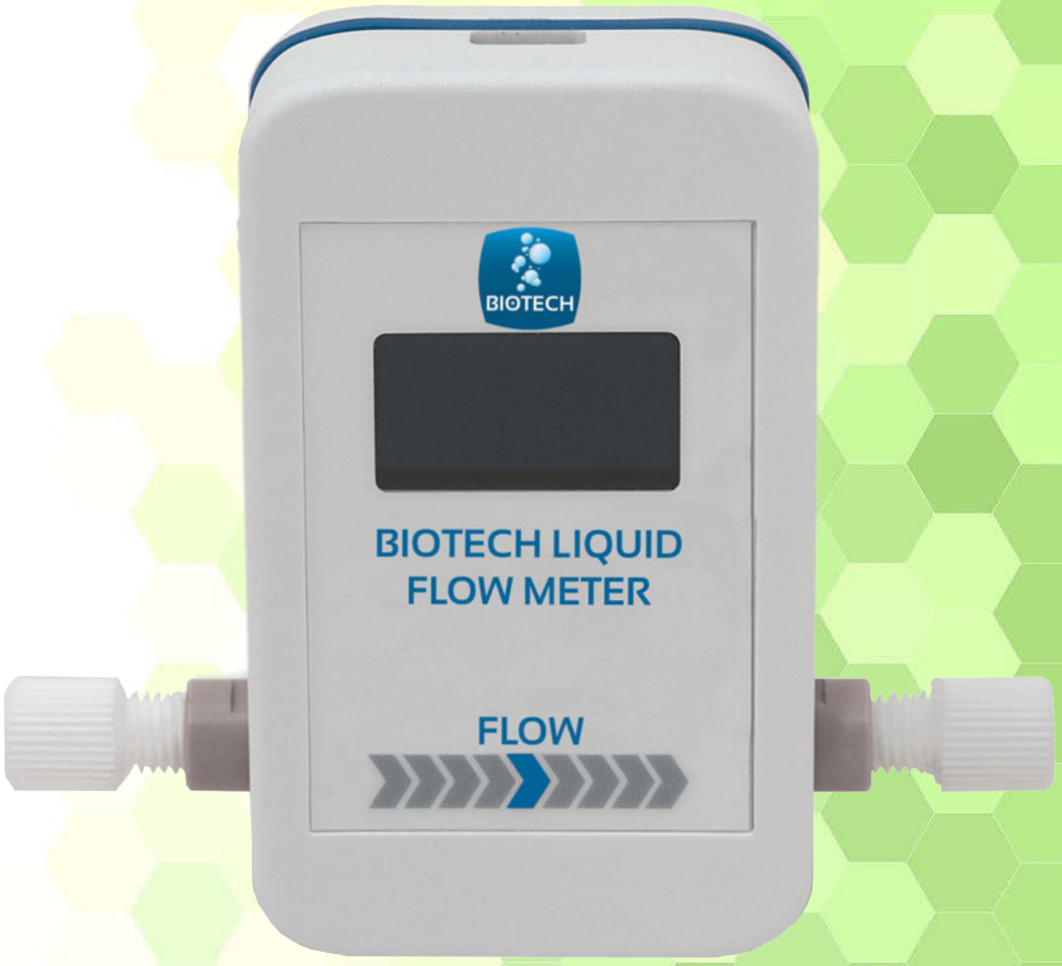
BIOTECH LIQUID FLOW METER



User Manual

AB-40008, AB-40010,
AB-40040, AB-40650

BGB GC LC MS CE

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1. NOTICES

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Research Use Only.
Not for use in Diagnostic Procedures.

2. WARRANTY

Biotech AB makes no warranty, included but not limited to the common warranty legislation, for Quality and fitness of the product to a determined purpose.
In no event shall Biotech AB be liable for direct, indirect, special and consequent damages connected to the delivery, use or application of the product or its components.
Biotech AB guarantees that the product is free from hardware defects within the Warranty validity time. Should, within this time, a defect occurs, we will correct it free of charge.

All servicing will be handled by:
Biotech AB
Råövägen 300
439 92 Onsala
Sweden
Phone: +46 300 56 91 80
info@biotechfluidics.com

Freight expenses for the safe transport of the product to Biotech AB and back, must be carried by the customer.

Biotech AB grants no warranty for: Routine checks, Maintenance, Repair or Parts Replacement after normal wear; Consumables; Damages caused by total or partial blockage of tubings; Any type of Software; Damages caused by modification of the product without consent of Biotech AB; Warranty repair is void when the damages or errors where caused by: Unqualified or wrong handling like fall or strong Vibration of the Product. Accidents, natural catastrophe and all other causes which cannot be foreseen or controlled by Biotech AB, including but not limited to Storm, Water, Fire, Riot and abnormal Climate conditions.

Warranty validity Time
The validity Time of the Warranty is, if not otherwise agreed, one years from the day of purchase according to the Biotech General Terms, found on www.biotechfluidics.com/general-terms/

Safety
Safety rules according to the Swedish and European guidelines 89/3 92/EWG §1.1.2.b have been taken into account during design of the instrument. All electronic In- and Outputs are very sensitive to electrostatic discharge (ESD). The use of strong electromagnetic sources like Cellular Telephones or Radio Transmitters near the instrument should be avoided.

3. IMPORTANT USER INFORMATION

All users must read this manual to fully understand the safe use of the Liquid Flow Meter.

WARNING!

The WARNING! Sign highlights instructions that must be followed to avoid damage. Do not proceed until all stated conditions are clearly understood and met.

4. CE CERTIFYING

This product meets all requirements of applicable CE-directives. A copy of the corresponding Declaration of Conformity is available on request. The CE symbol and corresponding declaration of conformity, is valid for the instrument when it is:

- Used as a stand-alone unit, or
- Connected to other CE-marked Biotech AB instruments, or
- Connected to other products recommended or described in this manual, and
- Used in the same state as it was delivered from Biotech AB except for alterations described in this manual.

5. RECYCLING

This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.

6. WARNING!

This is a Class A product. In a domestic environment, it might cause radio interference, in which case the user might be required to take appropriate measures.

By using the Liquid Flow Meter our tips/ warnings as well as our terms of delivery are accepted.

1. Only use in laboratory! The use for medical purposes, in the food- or beverage processing, plant breeding or something else is expressly required or permitted. Any type of use and the related specific suitability of the product for this purpose is to be checked by the user.
2. **This product may be used only by trained personal.** Correct behavior in the laboratory are presupposed by trained personal. We accept no liability for improper use of the product. If in doubt, ask the competent commissioner for laboratory safety.
3. Notes on environmental and health hazards and also the handling and disposal of the solvent used must be taken from the safety data sheets of the solvent suppliers.
4. We advise the customer orally, writing or by trials, this must be done in good faith but without liability for us, and does not exempt the customer from testing the goods to their suitability for the intended processes and uses.

IN ORDER TO UTILIZE THE INSTRUMENT'S FULL POTENTIAL, WE STRONGLY RECOMMEND YOU TO DOWNLOAD AND INSTALL OUR PC-APP.

7. FEATURES

7.1. INTRODUCTION

The Biotech Liquid Flow Meters are specifically designed for continuous measurement of flow rate without interference in Fluidic systems. Flow Meters with part numbers AB-40008 and AB-40010 are compatible with all HPLC and GPC/SEC solvents, while AB-40040 and AB-40650 should not be used with solvents like THF, alkanes and similar. See the table below for "wetted parts" of the flow meter you are using. Please check with your supplier if you are unsure about the chemical compatibility.

The Biotech Flow Meters are all conveniently sized and powers itself from a USB connection. A modern PC based app allows continuous recording and storage of the measured flow rates. The current flowrate is also displayed on the Flow Meter's integral high-resolution OLED Display, allowing easy control of current flow value.

Extraordinary high resolution and wide dynamic range makes the BIOTECH Liquid Flow Meter the perfect flow monitoring tool for the most demanding fluidic systems.

	Micro Flow AB-40008	**HPLC Flow** AB-40010	**Prep Flow** AB-40040	**High Flow** AB-40650
Measuring range	10 nL-80 uL/min	1 uL-5 mL/min	0.1-40 mL/min	0.1-650 mL/min
Maximum resolution	1 nL/min	1uL/min	0.1 mL/min	0.1 mL/min
Accuracy	>0.2% FSD	>0.2% FSD	>0.2% FSD	>0.2% FSD
Precision	>0.2% FSD	>0.2% FSD	>0.2% FSD	>0.2% FSD
Integration time factor	78, 312, 1172 (default), 5781 or 9844 milliseconds			
Maximum pressure	3 MPa(435 psi)	3 MPa(435 psi)	1.2 Mpa(174psi)	0.3 Mpa(43psi)
pH operating range	1 to 11	1 to 11	1 to 11	1 to 11
Measuring cell volume	5 uL	94 uL	58 uL	276 uL
Cell diameter	0.43 mm	1.8 mm	1.4 mm	4
Cell length	37 mm	37 mm	22 mm	22
Fluidic connectors	Female 1/4''-28 flat bottom	Female 1/4''-28 flat bottom	Female 1/4''-28 flat bottom	8 mm Barbed end with tubing***
Pressure drop	1 mbar	0.12 mbar*	<4 mbar	<4 mbar
Wetted materials	Quartz glass (borosilicate) and PEEK		PPS, SS-316 and epoxy resin	
Display	High resolution OLED display			
Control	USB-powered plug-and-play software			
Calibration	Validated with water. Calibrations factors included			
1. Water (validated)	Yes	Yes	Yes	Yes
2. Methanol	Yes	Yes	Yes	Yes
3. THF	Yes	Yes	-**	-**
4. Acetonitrile/water	Yes	Yes	Yes	Yes
		*@ 5 mL/min with water	** THF is not tolerated *** Tubing type to be agreed on	
	Temperature range 10-50 °C			

7.2. A NEW TECHNICAL APPROACH

It may look like you have a stable flow....

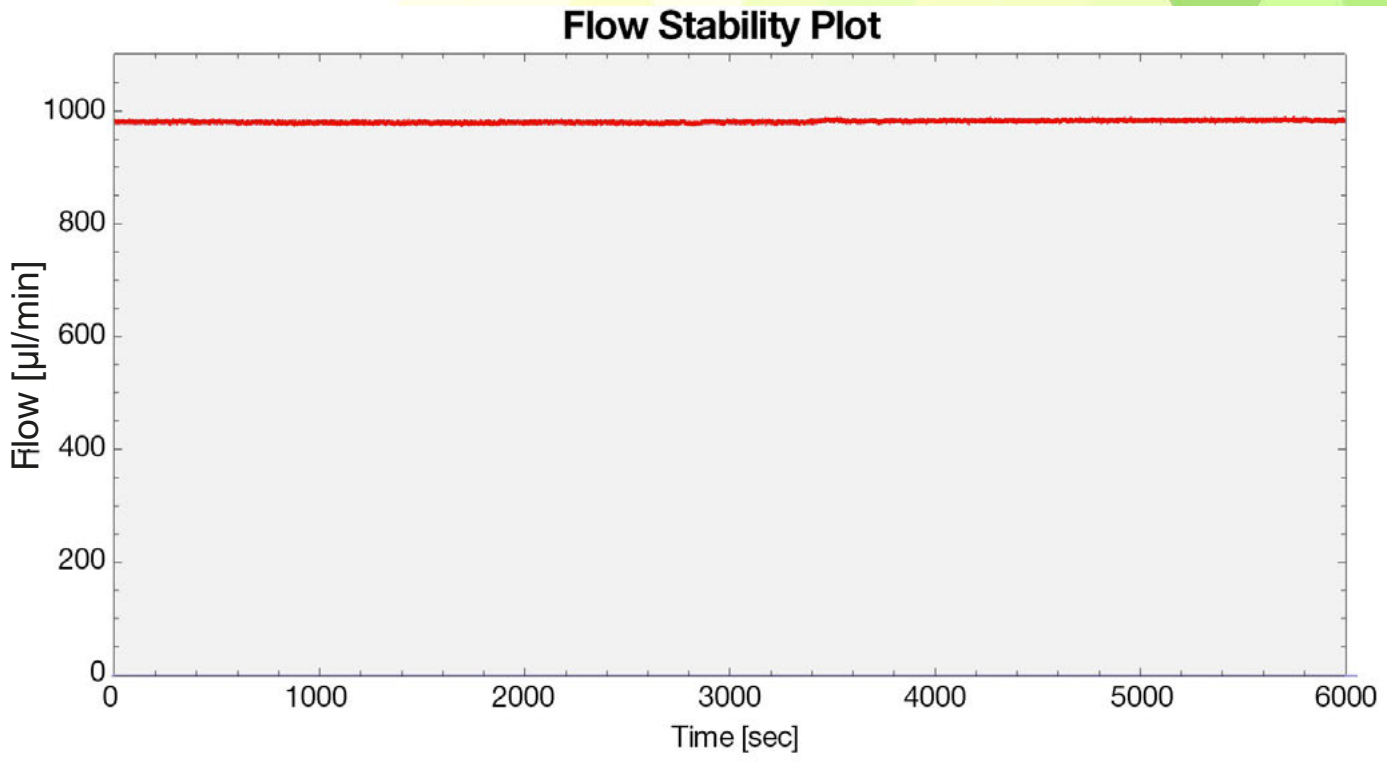

Fig.1

But when you take a closer look...

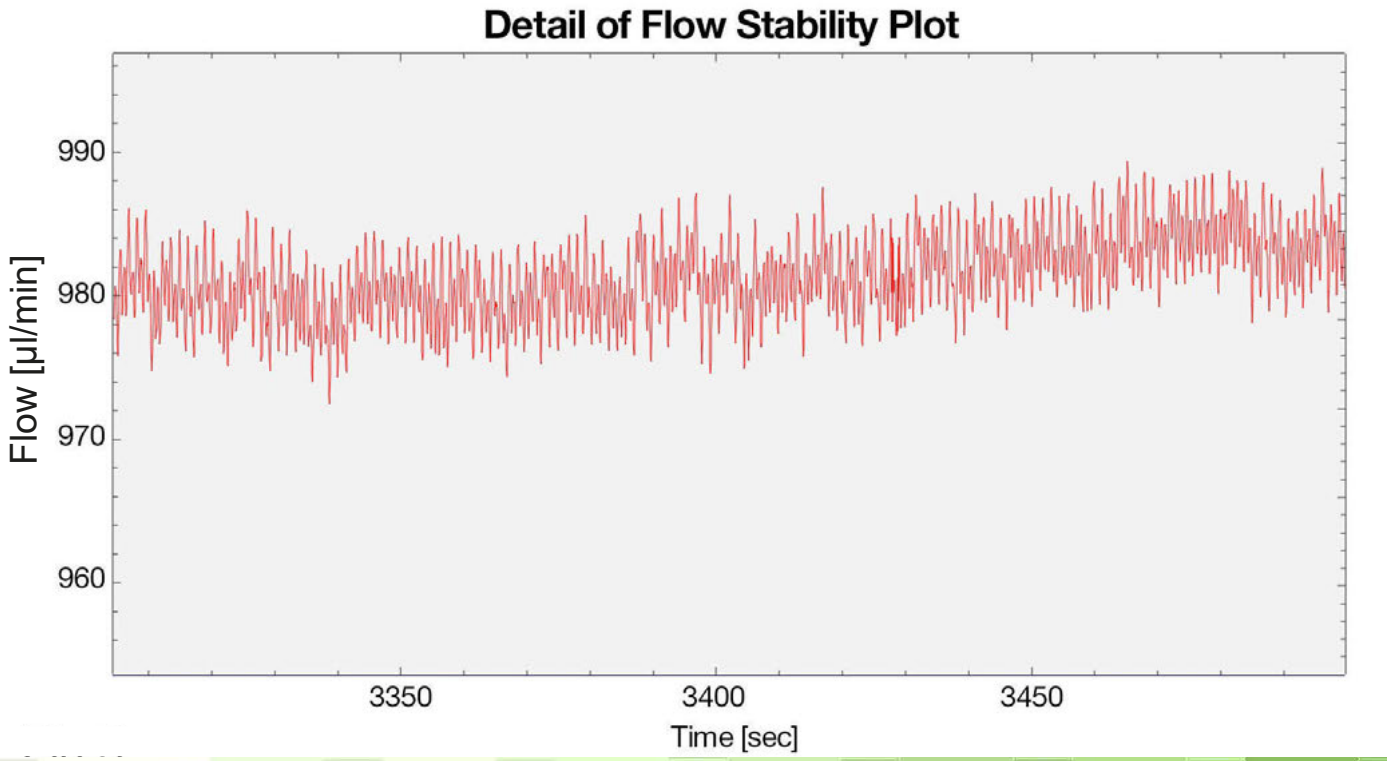

Fig. 2

7.3. CALIBRATION

Factory settings with calibration for water and 4 additional solvents (examples valid for AB-40008 and AB-40010),

- Water (Default)
- Tetrahydrofuran "THF"
- Methanol
- Ethanol-Water 1:9
- Acetonitrile – Water 40:60

Easily select the calibration factor to be used (via the app)

- New calibration factors and solvent names can be stored

7.4. SELECTABLE INTEGRATION TIME - TIME FACTOR SETTINGS MADE VIA THE APP

78 msec (No Integration)

- Real time measurement. Useful for tracking high frequency pulsation of the pump and detecting defective seal rings and/or check valves

300 msec

- Equivalent to traditional volumetric flowmeters
- Useful for detecting overall performance of pumps

1 sec

- This integration time targets system validation applications where pulsation of the pump is not relevant and long term stability is desired

2 sec

- Same as for 1 sec integration time but targeted to flowrate of 1 mL/min and above

10 sec

- Extremely useful for absolute calibration of flow rate of the pump
- This ensures that no sporadic effects influence the calibration

7.5. TIME FACTOR – HOW YOU MEASURE DECIDES WHAT YOU GET

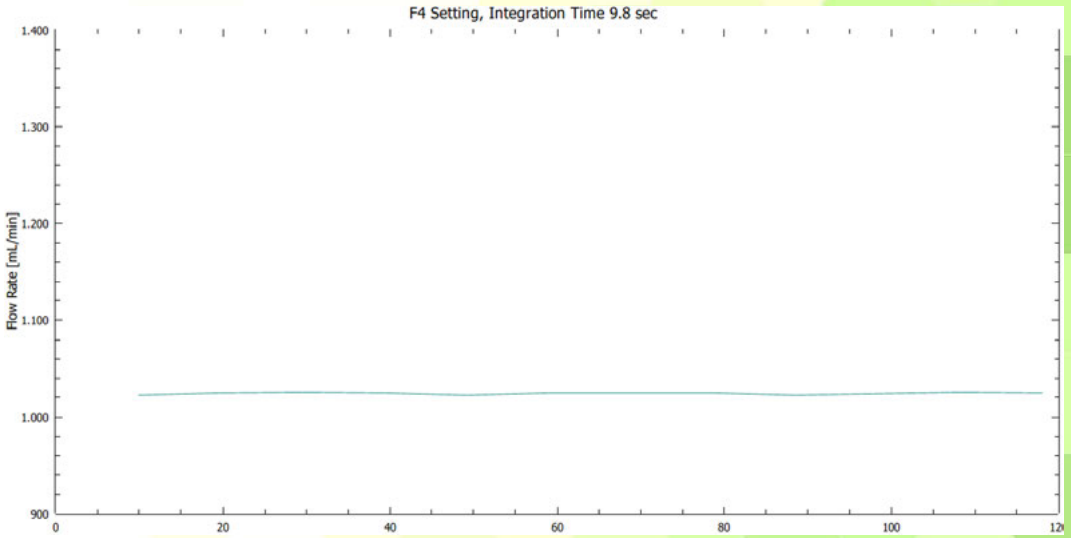

Fig.3 **9.8 sec integration time**

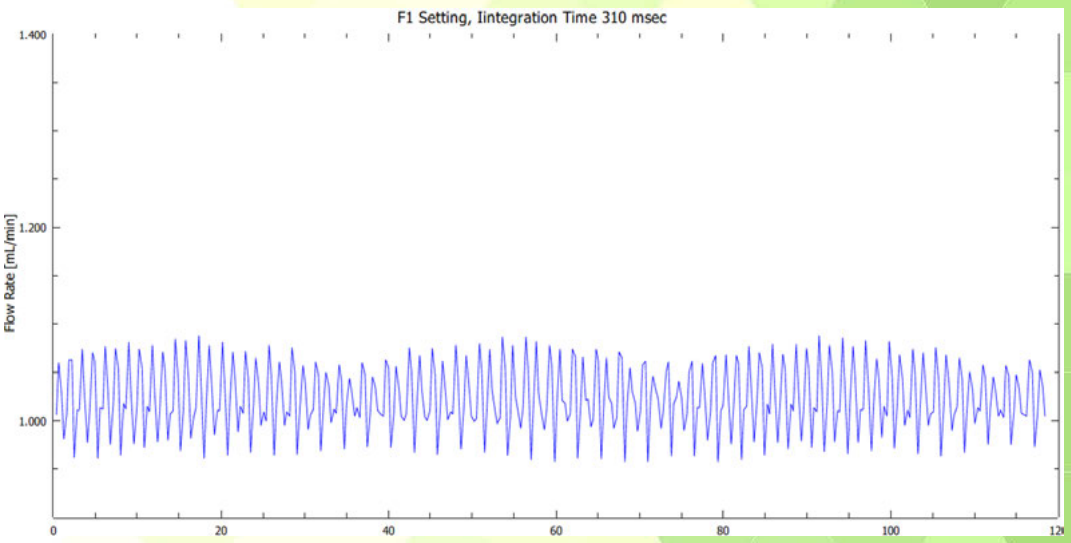

Fig. 4 **310 m sec integration time**

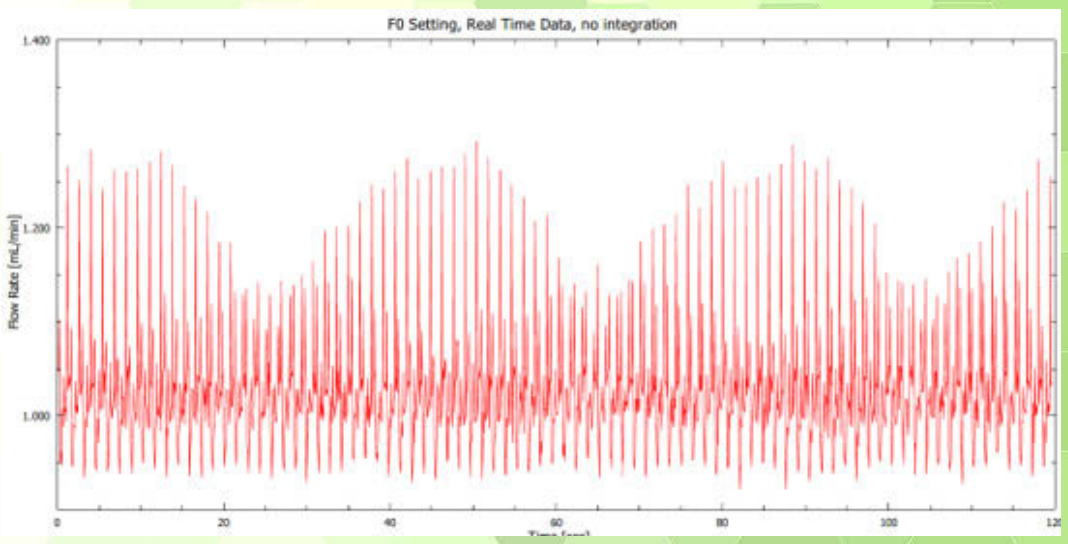

Fig.5 **78 m sec integration time**

7.6. SITE SELECTION

The Flow Meter should be installed in an area free of extreme temperature, humidity, sunlight, shocks and vibration. Use delivered Sticky Pads to place the Flow Meter correctly.

7.7. UNPACKING

Please check immediately after delivery the content of the package for transport damages.
Please also check after unpacking if all components are present. Should anything miss, please contact our Support Department

7.8. PACKING LIST

A complete delivery consists of:

- 1 Biotech Liquid Flow Meter
- 1 Mini-USB cable, 1m
- 2 PFA Plug, ¼"-28" Flat Bottom (AB-40008, AB-40010, AB-40040)
- 2 FEP Tubing, 1/16" OD, 0.75 mm ID 0,4m (AB-40010)
- 3 P-249 One-Piece Super Flangeless™ PEEK nut
  ¼ "- 28" Flat Bottom for 1/16" OD (AB-40010)
- 1 F-120 One-Piece 10-32 coned PEEK fitting 1/16" (AB-40010)
- 2 Sticky pads
- 1 User Instruction Manual.

8. FLUID CONNECTIONS

AB-40008, AB-40010 and AB-40040 are all having ¼"–28 female flat bottom ports.

First, remove the caps.

Note! As the thru-hole of the AB-40010 is 1.8mm, be sure that tubing with 1/16" OD tubing or smaller is not pushed into the flow meter cell. Nothing will be destroyed but the measurement will not work.

8.1. LEFT SIDE

Connect the FEP capillary with the Flat Bottom fitting at the left side of the Flow Meter. For the other side of the capillary take the Flat Bottom or the coned fitting, see Figure 6.

Fig. 6 Left Side, INLET Port Flow Meter

8.2. RIGHT SIDE

Route the other side of the capillary to a waste bottle or connect it to your fluidic system with a suitable fitting, see Figure 7.

Fig. 7 Right Side, OUTLET Port Flow Meter

If everything is connected properly, the Flow Meter should look Figure 8 (descripted picture, color of Fittings may change).

Fig. 8 Connection of the Flow Meter

The Flat Bottom fittings may only be tightened finger tight!

9. OPERATING

9.1. POWER-ON AND START

The Flow Meter is easy to use with USB-powered plug. Connect the delivered USB cable to the flow meter and a computer. Upon powering up the instrument the display will shortly presents the Biotech AB logo.

Figure 9 Flow Meter Start Screen

9.2. MAIN SCREEN

Fig.10 Flow Meter Main Screen

Value	Current Flow Rate
H2O	Show calibrated eluent [H2O; MeOH; THF; etcetera]
mL/min	Flow rate unit

9.3. DATA ACQUISITION

1. Start the app (see Chapter 10) or open a Terminal like HTERM and enter following settings:

Port	COM X -> find at device manager
BaudRate	9600
Data	8
Stop	1
Parity	None
CTS Flow control	No
Newline at	CR+LF

2. Press the connect button and data acquisition starts automatically.

10. HOW TO INSTALL THE FLOW METER APP

1. Start the Flowmeter_Vx.x.x.x_Setup.exe and follow the installation menu.

2. Connect the Flow Meter USB cable to a computer and start the App.

11. USING THE FLOW METER APP

11.1 MAIN SCREEN

After installing and connecting the Flow Meter, the main screen shows the status connected and the serial number of the connected device.

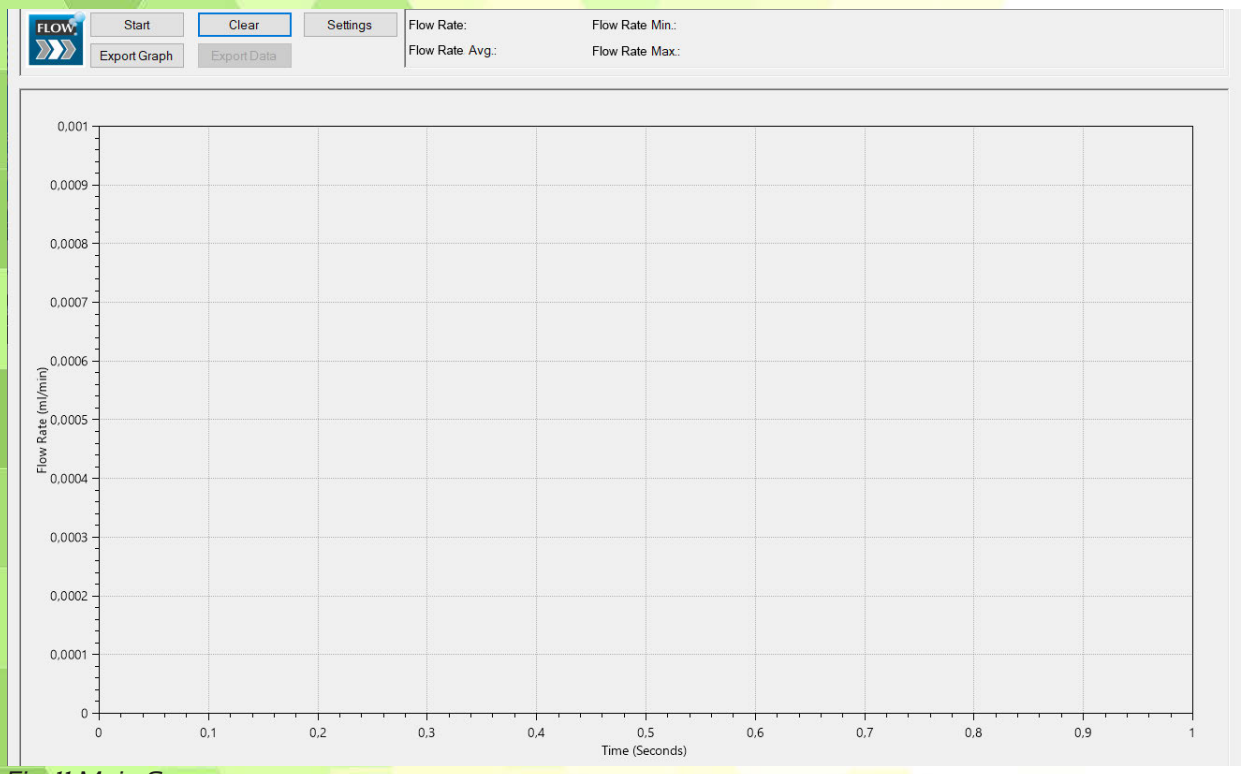

Fig. 11 Main Screen

Press START to begin the data collection.

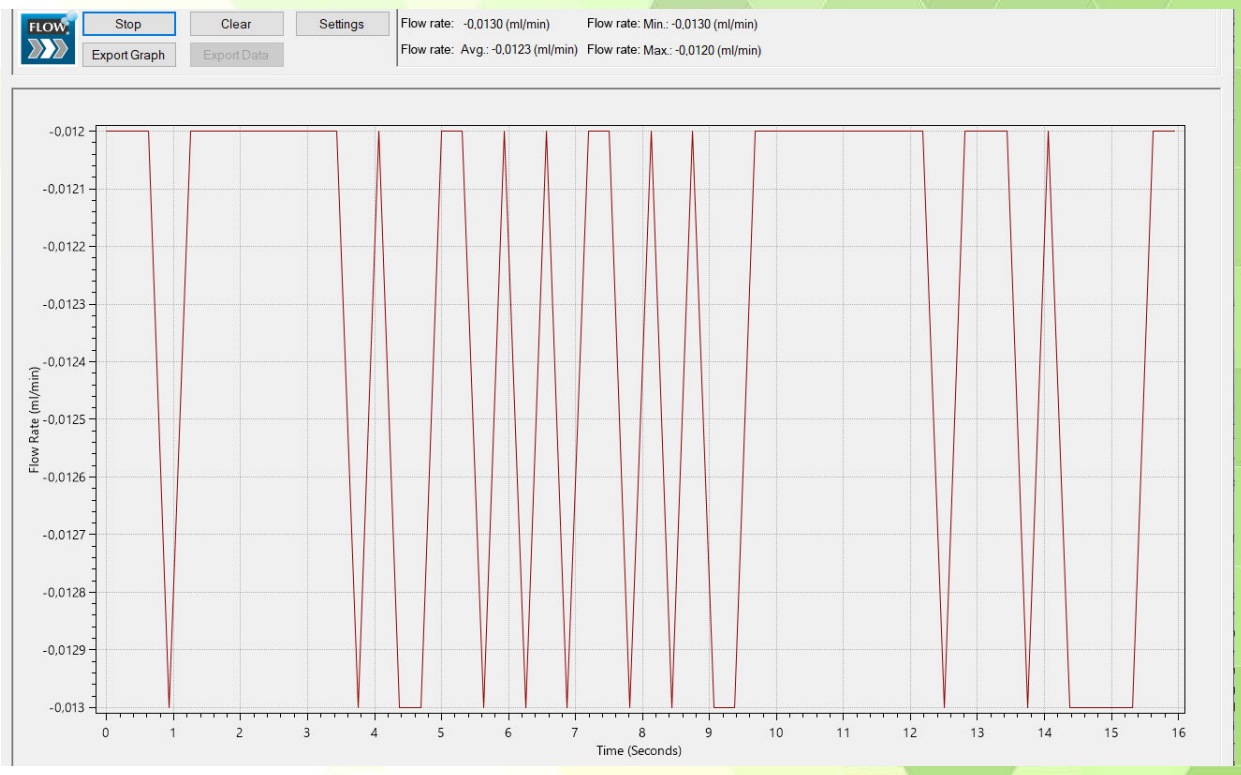

Fig. 12 Data Collection

Starting the data collection information about actual Minimum, Maximum and Average Flow Rate. By scrolling the mouse wheel, you can zoom in and out.

Press STOP to discontinue the data collection. The data will be saved automatically (default, change in settings -> logfiles).

To start a new sequence, press CLEAR first and then START.

11.2 SETTINGS

In settings menu are the three registers: Device, Logfiles and About.

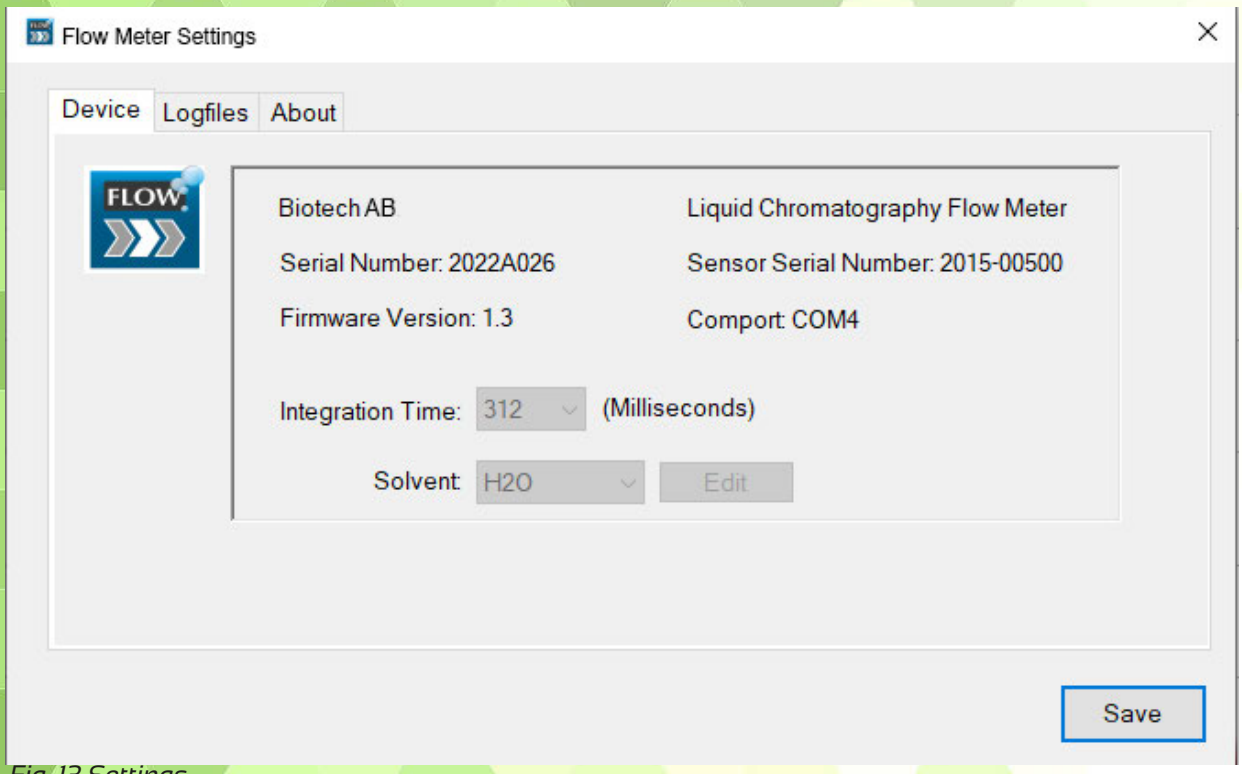

Fig. 13 Settings

DEVICE: Provides Information about the Serial Number, Firmware Version and Com port.

Set the Integration Time in Milli Seconds (default 312 ms)

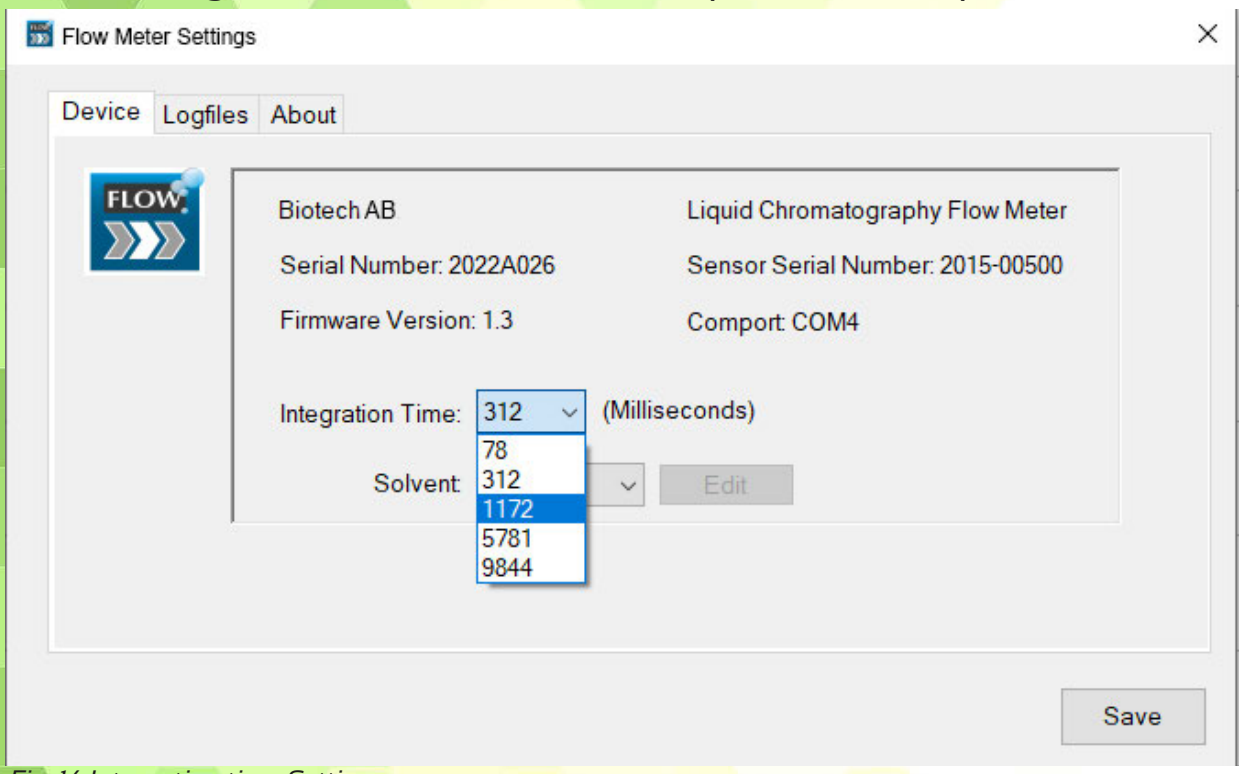

Fig. 14 Integration time Settings

Set the solvent in use (default H2O)

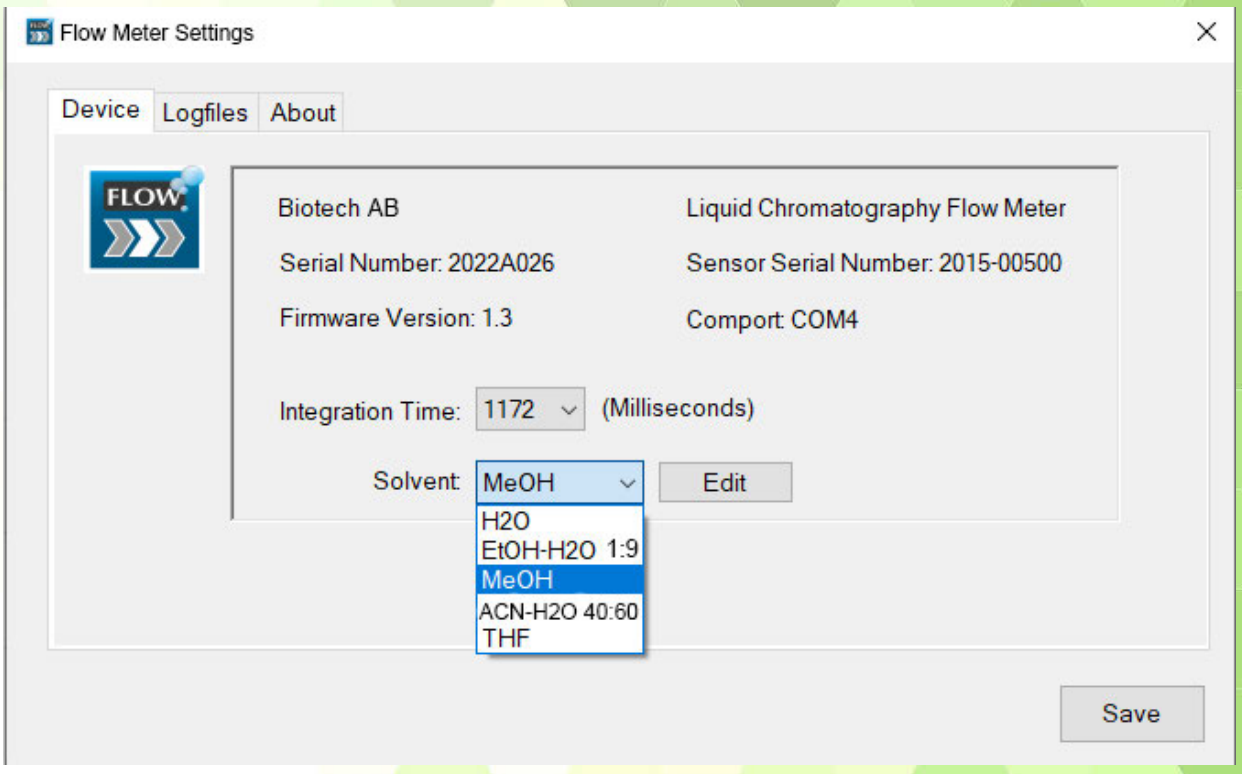

Fig. 15 Solvent Settings

NOTE: All changes are stored in the device itself

EDIT: Change the Solvent Calibration Factor (make sure to use the correct one)

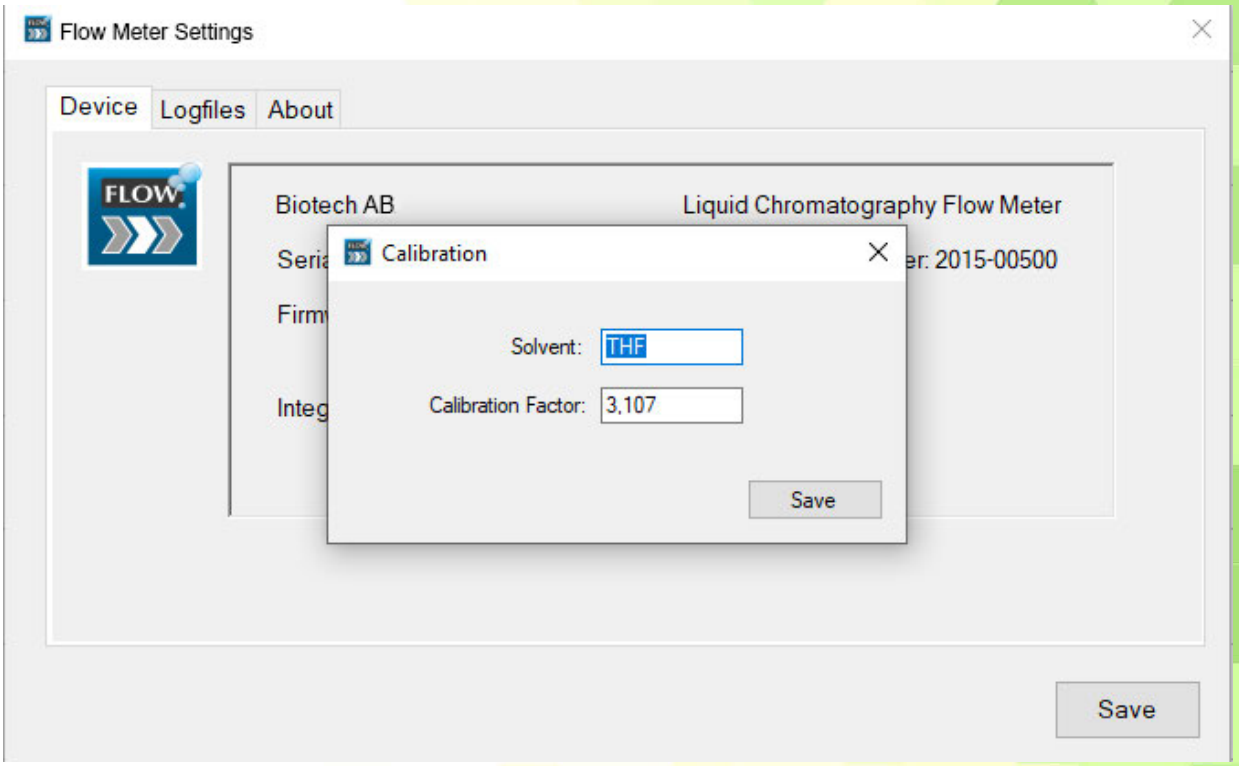

Fig. 16 Change THF Calibration Factor

LOGFILES: Provides information about data storage location

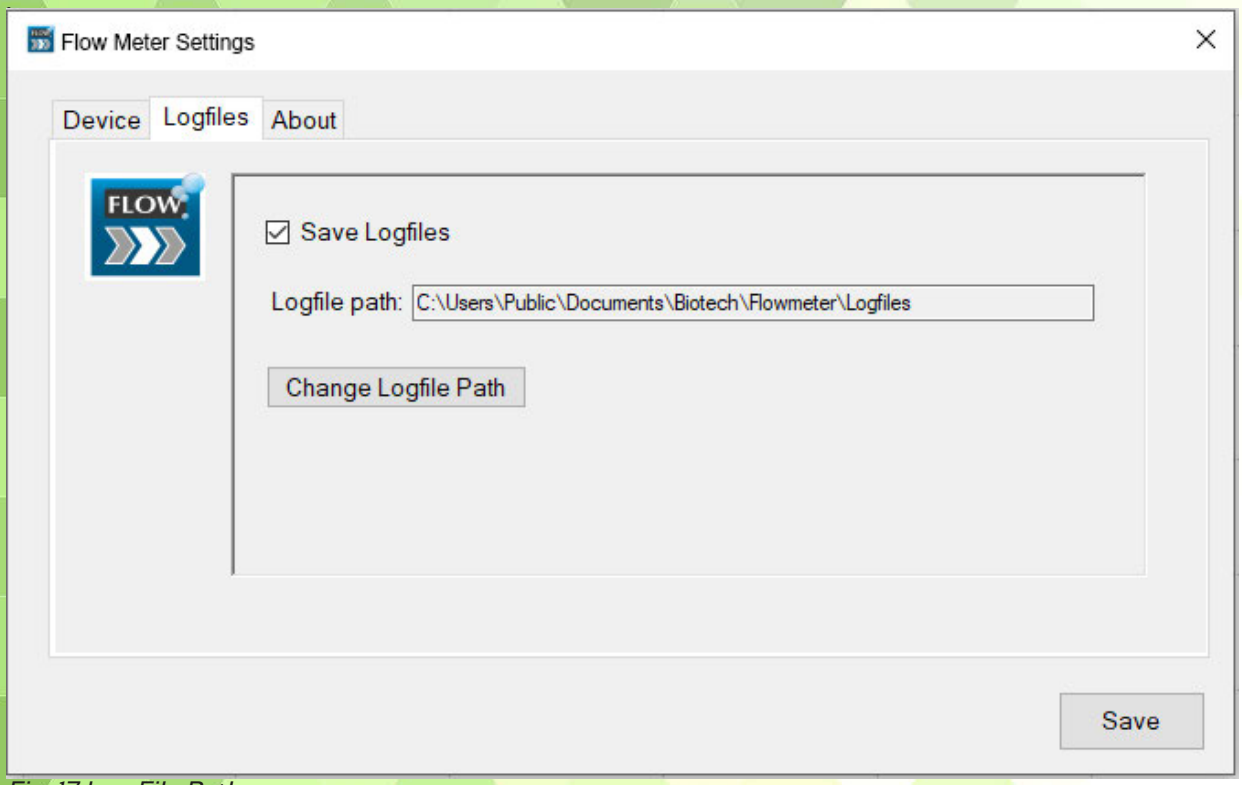

Fig. 17 Log File Path

Save Log Files:
Automatically save CSV logfile when measurement stops or at 100 000 data points (then a new sequence starts automatically).

Change Log File Path:
Change path for automatic log file storage.

ABOUT: Provides information about the manufacturer.

11.3 EXPORT GRAPH

Save the measurement as a PNG file.

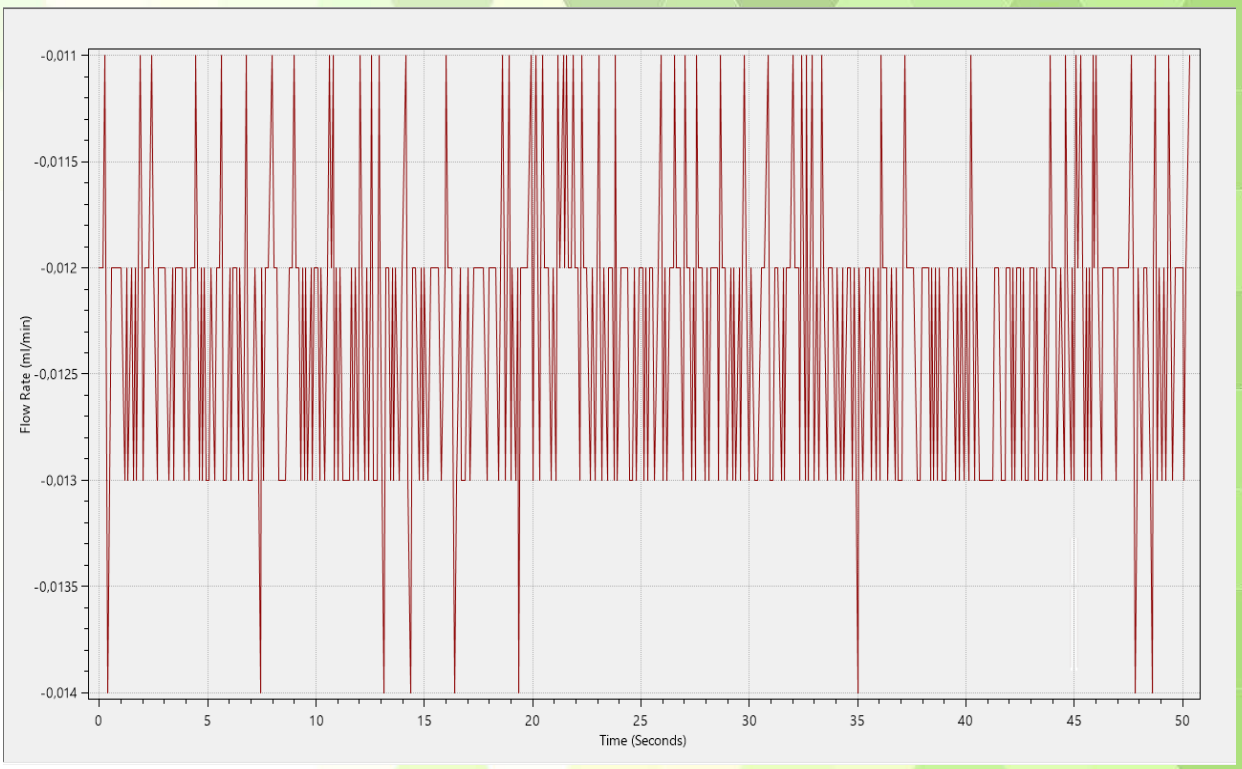

Fig. 18 PNG Data

11.4 EXPORT DATA

Export the measurement as CSV data. Measurements cannot be reloaded into the app.

12. TROUBLESHOOTING

Error	What to do
The Flow Meter initialization failed. Status: Not connected	Check the USB connection with the computer and the Flow Meter
	Make sure that no other software blocked the comport
	Restart the App
	Make sure that there is no power-safe modus (USB ports) set on the computer

Table 1 Troubleshooting

13. CONTACT

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