TrigasDM

Durchflussmesser-Manufaktur

FlowHow+

Programming Software

for TriLIN LNA and Lysis LSA
Intelligent Flowmeter Electronics

User Manual

FlowHow+ EN / 10399

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1. General

Thank you for selecting a TrigasDM product for your flow measurement application.

Flow meter manufacture

As a specialist in flow measurement technology, TrigasDM supplies high-quality measuring instruments, electronics and calibrators for liquids and gases.

Made in Germany

Our products are exclusively developed and manufactured in Neufahrn, 20 km north of Munich, ensuring world-class technical know-how for our customers.

Contact

We are proud of our high-quality products and friendly customer service and welcome you as a valued customer to our growing family. You can benefit from our long-standing experience and our comprehensive technical support.

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This user manual contains information on the programming and troubleshooting of the TrigasDM Lysis LSA and TriLIN LNA Series of Linearizers/flow computers. For special applications, repair or further information on this or other products, please contact TrigasDM directly.

2. Safety Guidelines

2.1 Marking of important information

Important information is specially highlighted in this user manual.

CAUTION
Information related to danger to persons is marked with CAUTION.

ATTENTION
Information related to danger to equipment is marked with ATTENTION.

NOTE
Special information for operation, commissioning and maintenance is marked with NOTE.

Helpful hints

Hints marked with an "i" symbol provide application tips and other useful information, helping to avoid installation and application errors and ensure optimal use of the functions offered by the instrument. The text in the message box is displayed in italics.

2.2 General Safety Guidelines

Before using your TrigasDM instrument, this user manual and all safety instructions must be carefully read in their entirety and understood.

Take all necessary precautions to ensure the safety of personnel and equipment. These precautions include, but are NOT limited to, the following examples:

- Mechanical and electrical installations must only be carried out by qualified and authorized personnel.
- It must be ensured that the upper limit of the measuring range of the flow meter is not exceeded.
- Do not install measuring instruments and cables in the vicinity of strong magnetic sources, such as electrical cables, electric motors, transformers, welding equipment, relays or high-voltage cables. These sources can cause electrical noise, resulting in incorrect pulse signals.
- Flow meters which are designed for applications in liquids are not suitable for applications in gas.
- Applicable safety standards (for example the ones in accordance with the German Occupational Safety and Health Act) must be observed for the installation and/or operation of the flow meter. Non-observance can result in DANGER to personnel.
- A flow meter is a precision instrument. Do not use compressed air to clean the flow meter or check its function.

3. Tools required

The following tools are required for programming the TrigasDM electronics:

- Power supply, 6-36 VDC
- PC with USB interface and Windows operating system
- TrigasDM LNA/LSA Linearization Electronics
- User Manual for LNA/LSA Linearization Electronics
- Programming cable/modem (Modem only for Lysis LSA-ST-05-V1-05-05-00)
- Multimeter for performing the function test
- FlowHow+ Software

The FlowHow+ software automatically adapts to the hardware configuration. It can therefore be used for programming for any TrigasDM electronics. Functionality may vary depending on the configuration of the product.

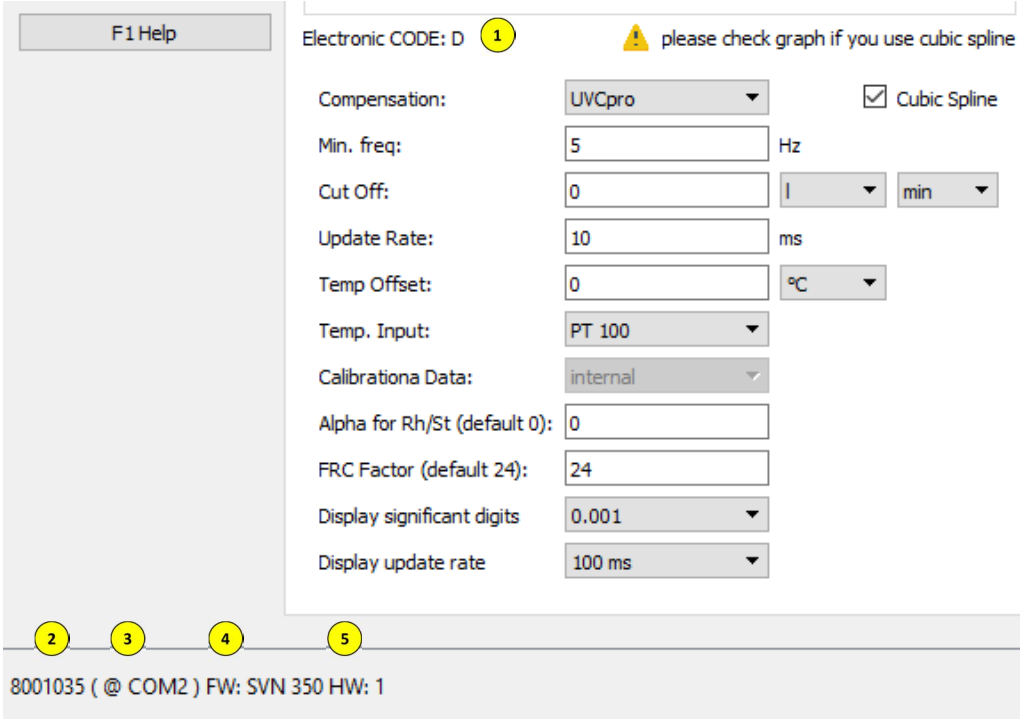

Fig. 1 Software Information screen

(1) Hardware Configuration code [Fig. 1]
The software functionality is automatically adapted to the configuration code.

(2) PCB Serial number [Fig. 1]

(3) COM Port [Fig. 1]
Automatically selected

(4) Firmware Rev. [Fig. 1]

(5) Hardware Rev. [Fig. 1]

Only a single instance of the FlowHow+ software can be run on any computer at any time.

4. Programming Process

In this section, a step-by-step explanation is given for the programming of the TrigasDM electronics using the FlowHow+ software.

While following the instructions in this section, it is very important to use the corresponding LNA/LSA Lysis/TriLIN electronics manual as a reference. It contains definitions and explanations for many of the terms used in the programming process.

4.1 Read out of the TrigasDM Elektronics

First, the information already stored in the TrigasDM electronics must be read out. To do this, the following steps must be carried out:

Connect the power supply to the electronics.

Connect the programming cable/modem to the electronics

Launch the "FlowHow+" software. [Fig. 2]

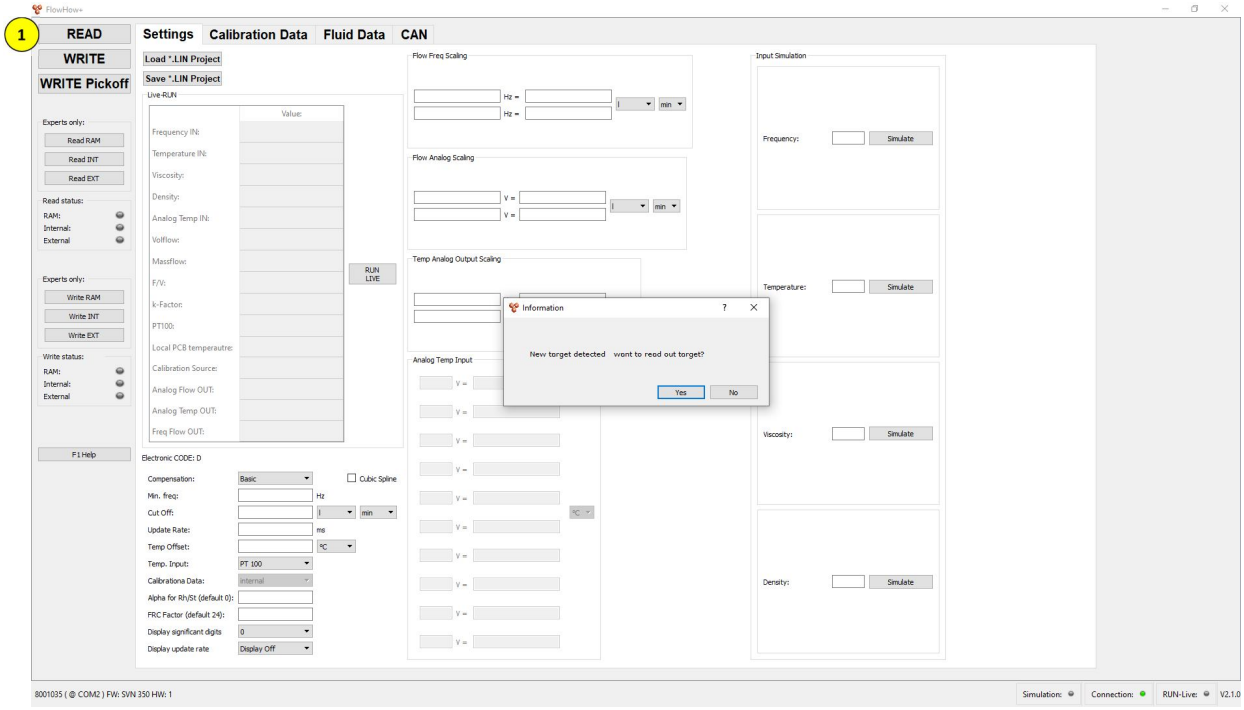

Fig. 2 Main Screen of the FlowHow+ Software

If the TrigasDM electronics have been successfully detected by the software, the following dialog window will automatically open [Fig. 3]:

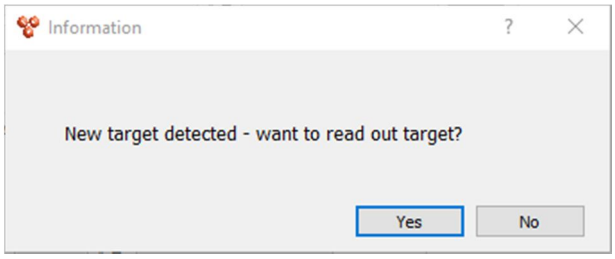

Fig. 3 Dialog window - Confirm reading of the electronics

▶ Confirm with “Yes“ . [Fig. 3]

Reading can also be started manually

▶ Press „READ“ **(1)** button. [Fig. 2].

If the electronics have been successfully detected and read out, ...

- · ... the status LED "Connection" lights up green **(1)**. [Fig. 4]
- · ... the data fields **(2)** [Fig. 4] are automatically filled with the stored parameters.
- · ... the status LED "Read Status" lights up green **(3)**. [Fig. 4]

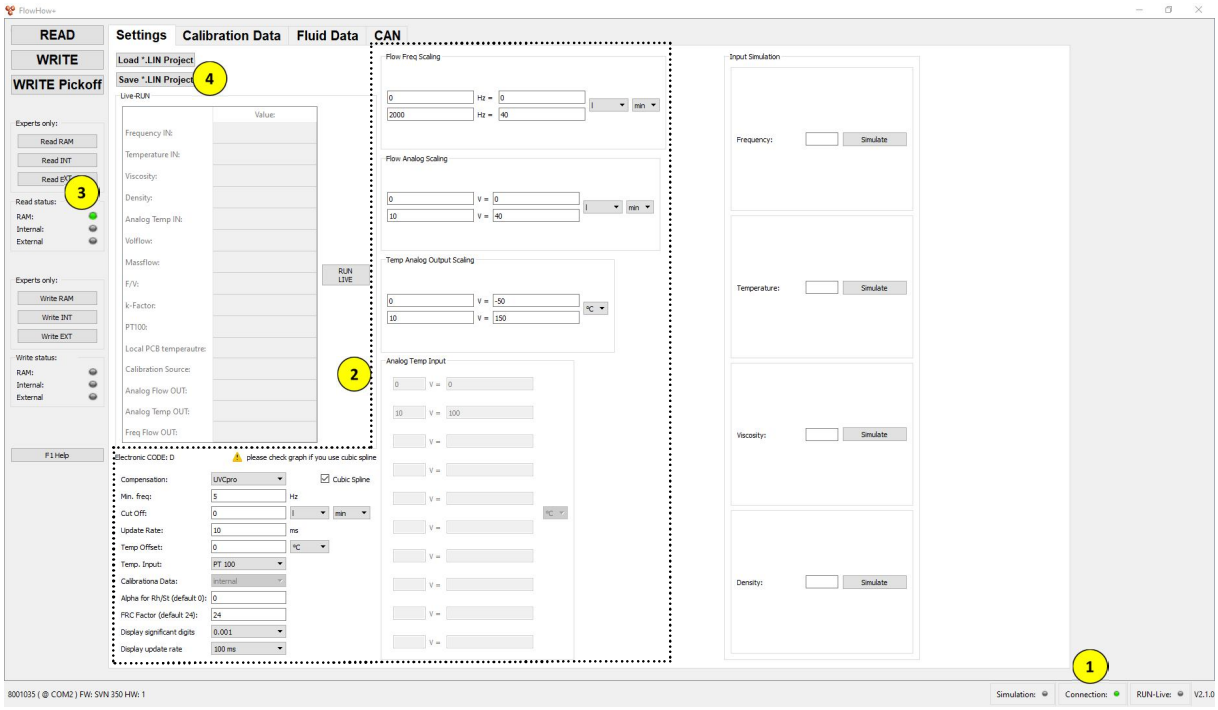

Fig. 4 Screen appearing after readout of the information contained in the Electronics

You can use the "Save Lin Project" function to save all data from the Electronic to your computer. This file contains the calibration data as well as the fluid properties tables. This allows easy reload the data from a project back into the TriLIN/Lysis Electronic when required.

It is recommended that you back up before programming the new data.

*" "Save *. Press and save LIN Project" (4)* [**Fig. 4**]

4.2 Importing of the Flowmeter Calibration Data

A TrigasFI calibration file with the format *.sav is required for import.

- Navigation to the Calibration Data tab. [Fig. 5]
  Here are 5 data sets for importing calibration curves.
- Select desired record via "Activate" (1). [Fig. 5]
  This is automatically greened after activation.
- To load the calibration curve, press "Load *.sav" (2) button and select desired file. [Fig. 5]

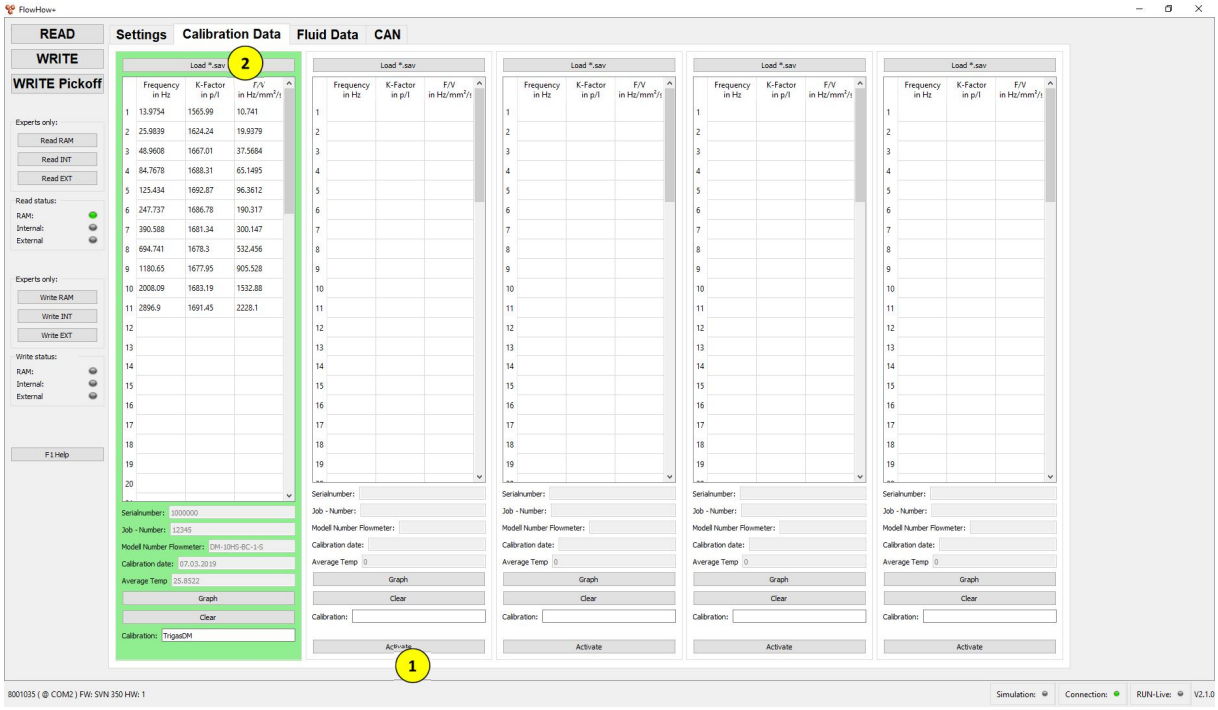

Fig. 5 Select data set and load calibration data

Die Tabelle und die weiteren Daten **(1)** [Fig. 6] werden im Anschluss automatisch befüllt.

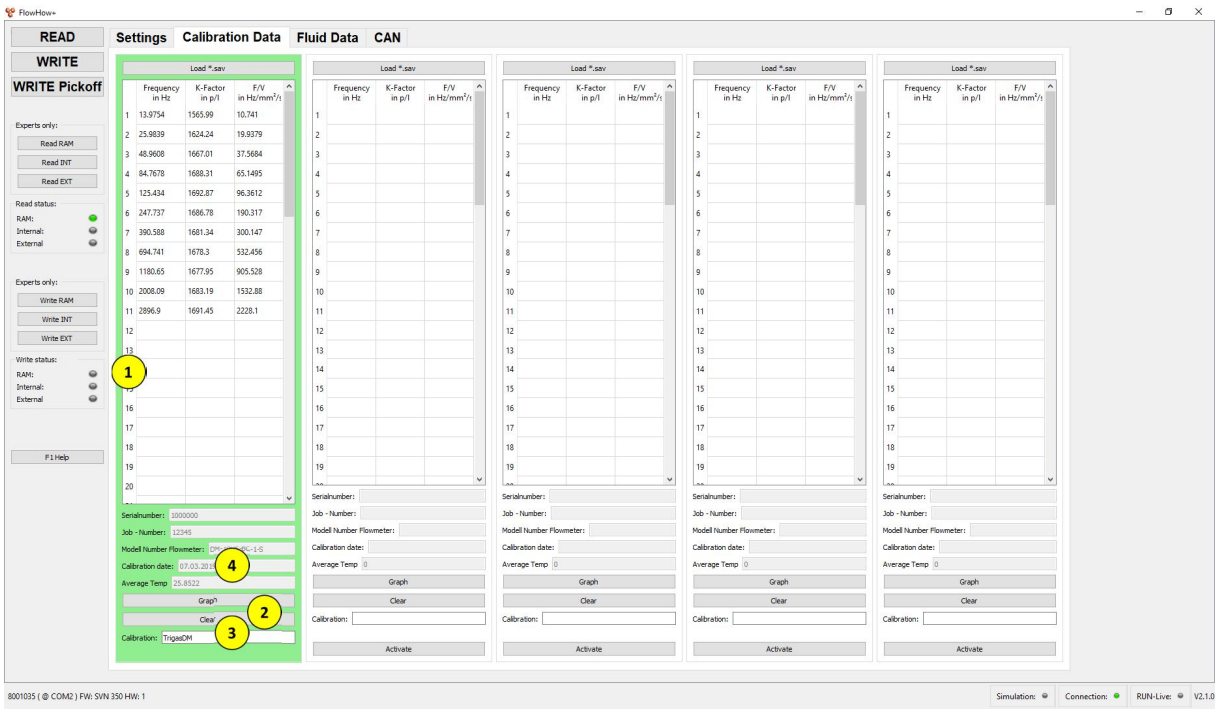

Fig. 6 Calibration data being loaded

Manual input of the data is also possible. However, this is only necessary if the data are not available in electronic form.

Number values must be entered with "." as decimal separator

Example: 1,3 = Incorrect // 1.3 = Correct

In addition, the following actions can be performed in the Calibration Data tab after automatic or manual data import:

- Deleting table data **(2)** [Fig. 6]
- Optional deposit of a note **(3)** [Fig. 6]
- Calling the calibration curve **(4)** [Fig. 6]

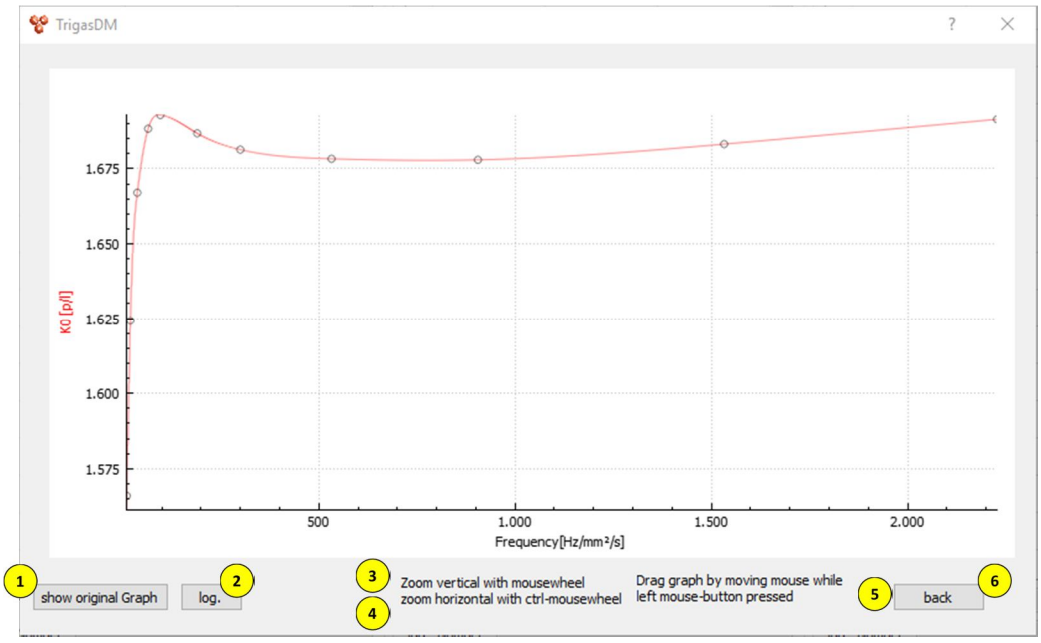

Fig. 7 Calibration curve and associated functions

(1) **"show original Graph":**
Back to the original curve [Fig. 7]

(2) **"Log.":**
Switching between linear and logarithmic representation [Fig. 7]

(3) **Mouse wheel:**
Zoom in Y direction [Fig. 7]

(4) **Ctrl + mouse wheel:**
Zoom in X direction [Fig. 7]

(5) **Hold down the left mouse button and move the mouse:**
Moving the graph [Fig. 7]

(6) **„back“:**
Back to the Software [Fig. 7]

4.3 Configuration of the TrigasDM Electronics

Navigation to the "Settings" tab.

Here the following parameters can be set on the TrigasDM electronics:

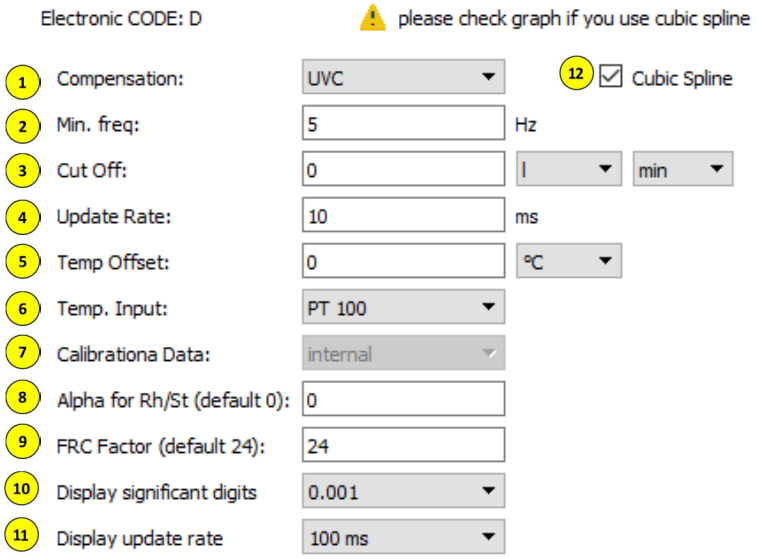

Fig. 8 Einstellparameter

- **(1)** Compensation [Fig. 8] Consult your electronics manual for details
  - o LIN-E: Without Temperature Compensation
  - o UVC: With Temperature Compensation (Universal Viscosity Curve)
  - o UVCpro: Proprietary UVC correction method resulting in greatly improved low flow accuracy.

- **(2)** Min. freq [Fig. 8]
  Lowest frequency [Hz]. Below this frequency, the flow output returns a value of "0".

For turbine flow meters, the recommended value is "5".

- **(3)** Cut Off [Fig. 8]
  Low level noise suppression. Below this frequency value, the flow output returns a value of 0.

The scaling units of the Flow Frequency and Flow Analog outputs are linked to this parameter and are automatically adjusted.

(4) Update Rate [Fig. 8] Duration [ms] until the next measured value is determined and calculated.
(5) Temp Offset [Fig. 8] Shift of the temperature data by the entered value °C/°F.

(6) Temperature Input [Fig. 8]
- o SMART-Pickoff: Temperature input via SMART Pickoff (only available with Lysis)
- o PT100: PT100 temperature sensor integrated in Pickoff
- o Analog Input: Freely adjustable input (only available if the hardware has been configured accordingly)

- **(7)** Calibration Data [Fig. 8]
  - o Internal: Internal storage of the data (SMART-Pickoff is ignored)
  - o SMART-mode: Storage of the data on SMART-Pickoff (only for Lysis possible)
- **(8)** Material Expansion Coefficient Alpha for Ro/St (default 0) [Fig. 8]
  Correction factor to compensate for the thermal expansion of the turbine flowmeter housing material.
- **(9)** FRC Frequency Calculation factor (default 24) [Fig. 8]
  Flow meter Frequency Calculation correction factor.
- **(10)** Display significant digits [Fig. 8]
  Number of displayed decimal places.
- **(11)** Display update rate [Fig. 8]
  Time [ms] between consecutive display updates,
  has to be higher as **Update rate (4)**
- **(12)** Cubic Spline [Fig. 8]
  - o Disabled: Linear interpolation of calibration data
  - o Enabled: Cubic spline interpolation of calibration data

  If the option has been activated, the following warning window [Fig. 9] appears in the software: [Fig. 9] in der Software:

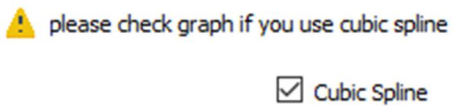

Fig. 9 Warning Window - Cubic Spline

Check Graph for discontinuities.

4.4 Scaling of the Outputs

- ▶ Navigation to the "Settings" tab.
- ▶ Enter the desired scaling at the various outputs and, if necessary, input:
  - Flow Freq Scaling [Fig. 10]:
    Scaling the flow frequency output

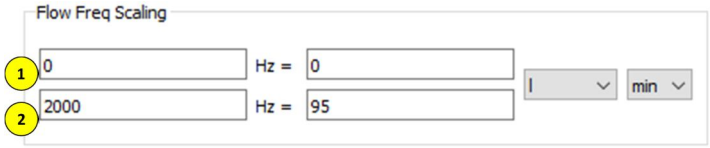

Fig. 10 Scaling flow frequency output

(1) Min. Frequenz ≙ Min. Durchfluss [Fig. 10]
(2) Max. Frequenz ≙ Max. Durchfluss [Fig. 10]

- Flow Analog Scaling [Fig. 11:]:
  Scaling the flow analog output

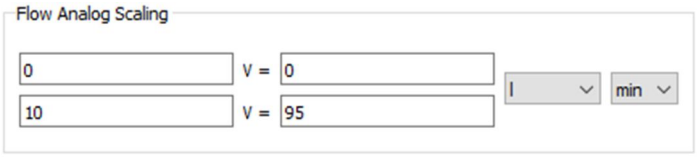

Fig. 11: Scaling flow-analog output

(1) Min. Voltage ≙ Min. Flowrate [Fig. 10]
(2) Max. Voltage ≙ Max. Flowrate [Fig. 10]

- Temp Analog Output Scaling [Fig. 12:]:
  Scaling the temperature analog output

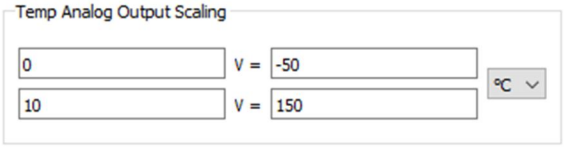

Fig. 12: Scaling temperature-analog output

(1) Min. Voltage ≙ Min. Temperature [Fig. 12:]
(2) Max. Voltage ≙ Max. Temperature [Fig. 12:]

- Analog Temp Input [Fig. 13:]:
  Scaling of the analog temperature input.

Scaling (up to 10 values) is only possible if the analog input is configured in the hardware and enabled in the software **(1)**. Otherwise, the input fields are grayed out **(2)**. [Fig. 13**:**]

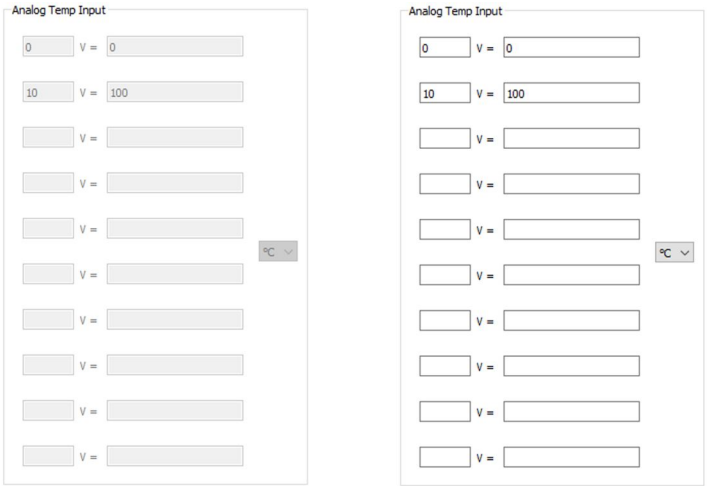

Fig. 13: Scaling temperature input - grayed out (left) vs. active (right)

4.5 Changing the Fluid Properties data

A change of the liquid data is only possible with configured and selected temperature compensation. If the parameters "Compensation" was set to the value "Basic" when the electronics were set, the temperature compensation is not active and the "Fluid Data" tab is automatically grayed out by the software.

To load or modify the Fluid properties data, the following procedure is to be followed:

Navigation to the “Fluid Data” tab.. [Fig. 14]

5 tables are available for importing an equal number of Fluid Properties data.

Press “Activate“ **(1)** to select desired table. [Fig. 14]

When activated, the table appears in Green trim.

To load the data, press "Load *.fcv" (2) and select the desired file. [Fig. 14]

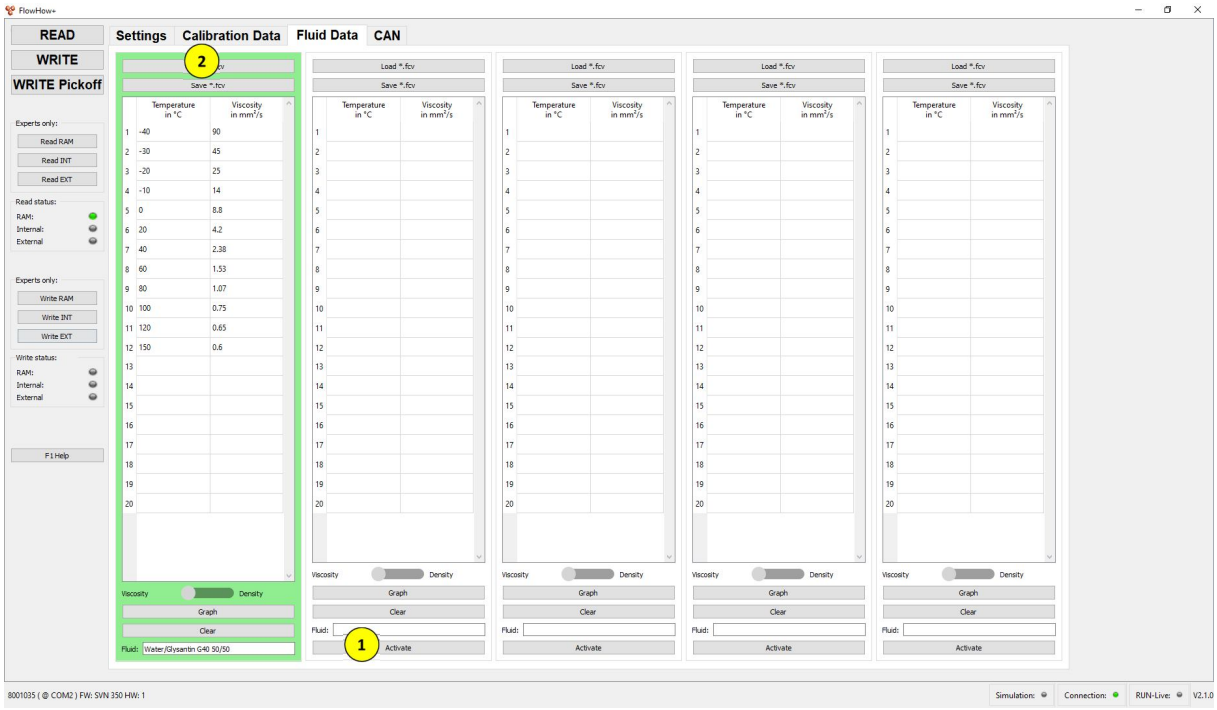

Fig. 14: Select data set and load fluid properties data

The table is then filled automatically. [Fig. 15]

Fig. 15 Fluid properties data has been loaded

A manual entry of the data with subsequent storage as a *.fcv file **(3)** is also possible. [Fig. 15]

Number values must be entered with "." as decimal separator

Example: 1,3 = Incorrect // 1.3 = Correct

In addition, the "Fluid Data" tab can perform the following actions:

- Switching between viscosity and density data **(4)** [Fig. 15]
- Deleting table data **(5)** [Fig. 15]
- Optional filing of a personal note **(6)** [Fig. 15]
- Naming the viscosity or density curve **(7)** [Fig. 15]

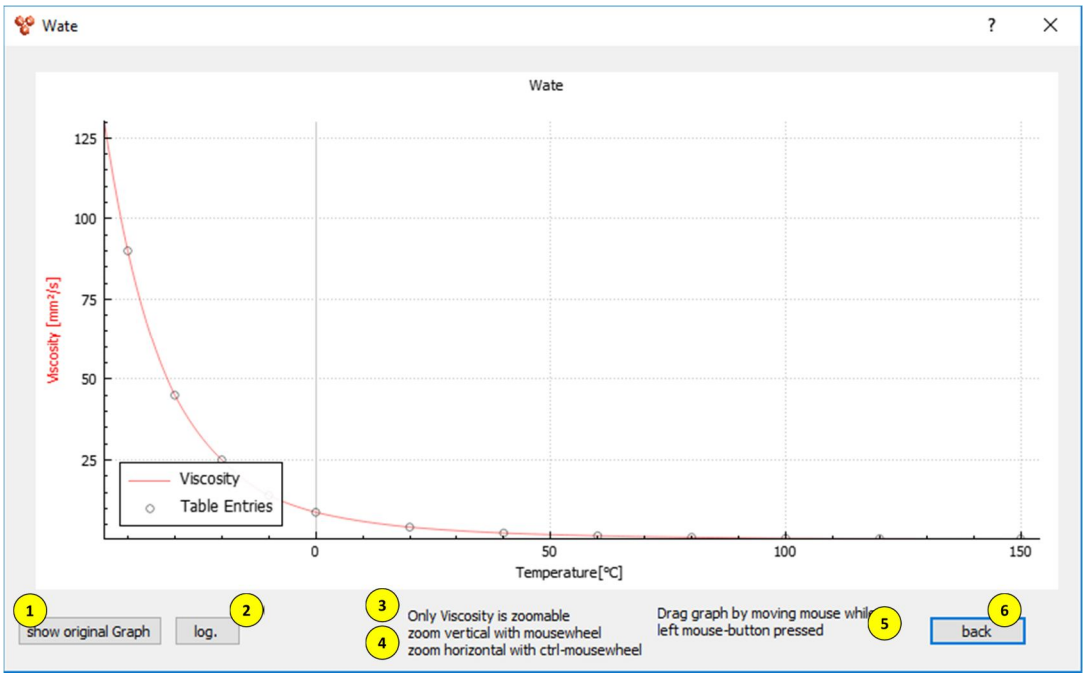

Fig. 16 Viscosity curve and associated functions

(1) „show original Graph“:
Back to the original curve [Fig. 16]

(2) „log.“:
Switching between linear and logarithmic presentation [Fig. 16]

(3) Mouse wheel:
Zoom along Y axis [Fig. 16]

(4) Crtl + Mouse wheel:
Zoom along in X axis [Fig. 16]

(5) Hold down the left mouse button and move the mouse:
Moving the graph [Fig. 16]

(6) „back“:
Back to the software [Fig. 16]

4.6 Programming

In order to program the set parameters on the TrigasDM linearization electronics, the following actions are necessary:

- Press "WRITE" button (1) to program the data onto the internal memory of the electronics. [Fig. 17]

OR

- Press "WRITE Pickoff" button (2) to save the data to a SMART Pickff (only available for Lysis!). [Fig. 17]

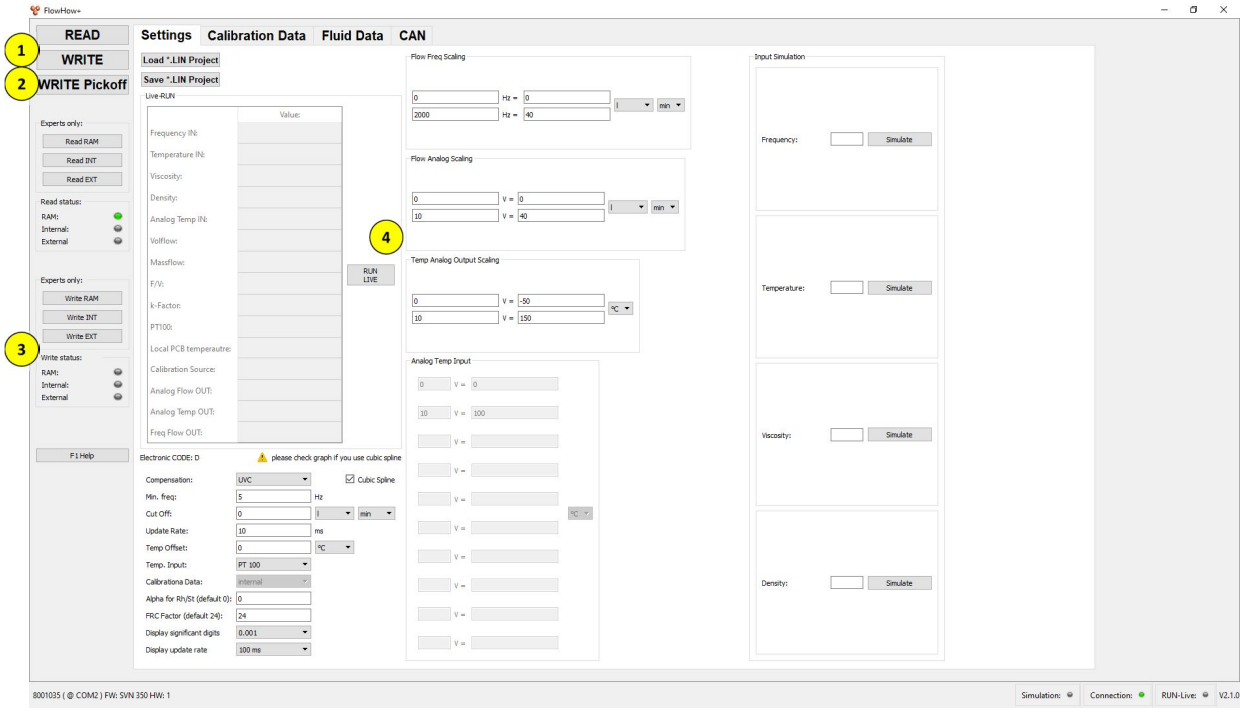

Fig. 17 Main programming screen

If the operation was successful, the corresponding status LED "Write Status" **(3)** lights up green. [Fig. 17]

After programming is complete, the FlowHow+ software enables real-time verification of the data programmed into the TrigasDM electronics.

- Press “Run Live“ **(4)** button. [Fig. 17]

The real-time data is then displayed in the "Live-RUN" **(1)** area and the status LED "RUN-Live" **(2)** lights up green [Fig. 18].

With the help of a Multimeter, the proper scaling of the outputs can now be checked.

Fig. 18 Live-RUN active

To Stop real-time checking:

- Press “Stop“ **(3)** button [Fig. 18].

4.7 Saving the Data

The data can be stored as follows:

Press “Save *. LIN Project" in the "Settings" **tab (1)** and save it as a file. [Fig. 19]

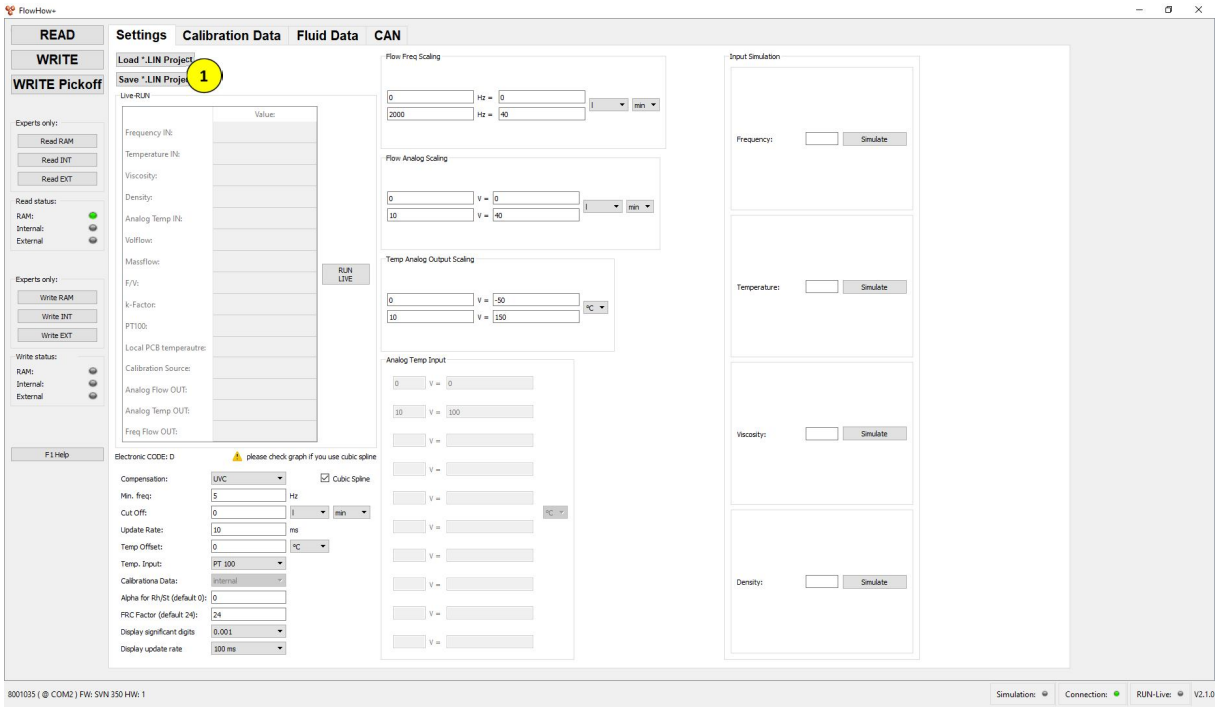

*Fig. 19 Save *.LIN Project*

4.8 Simulation

In the "Input Simulation" **(1)** area, the software allows simulation of the following input signals [Fig. 20]:

- Frequency **(2)** [Fig. 20]
- Temperature **(3)** [Fig. 20]
- Viskosity **(4)** [Fig. 20]
- Density **(5)** [Fig. 20]

If the temperature is simulated, no simulation of the viscosity or density is possible and vice versa.

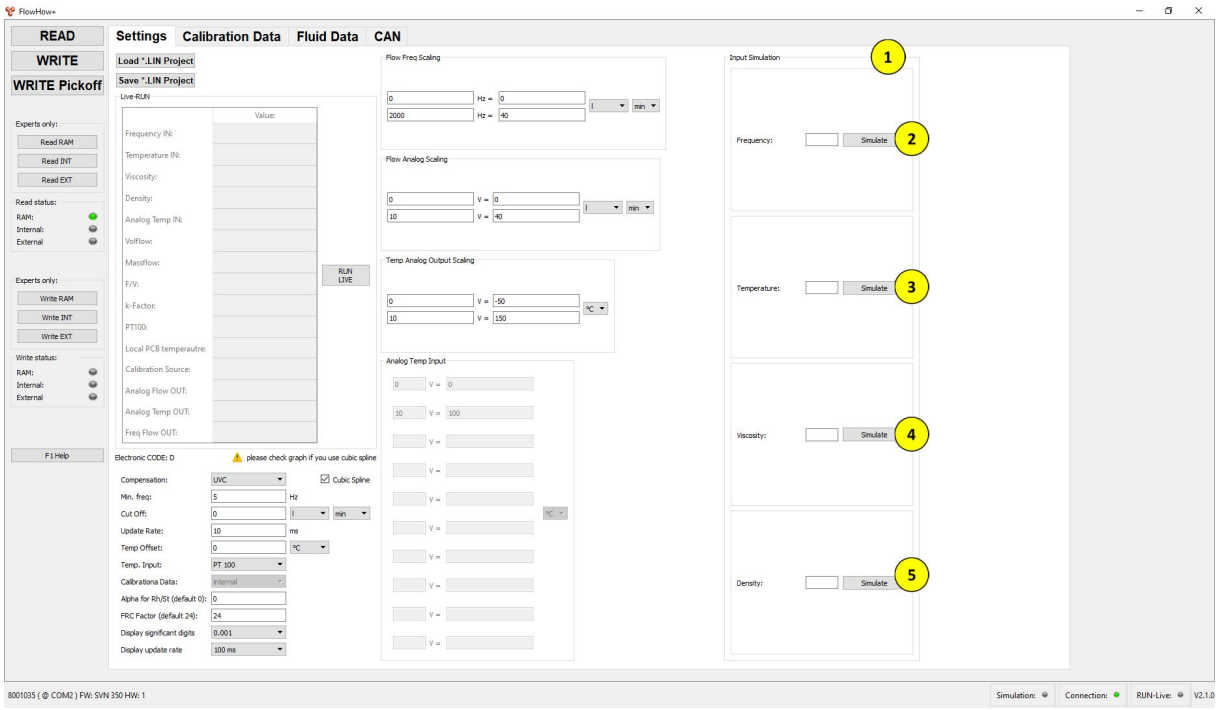

Fig. 20 Simulation

Example: Simulation of the input frequency 200 [Hz]:

- Enter "value "5" in input field "Frequency" **(1)**. [Fig. 21]
- Press "Simulate" button (2). [Fig. 21]
- Start Live RUN mode

Die Elektronik simuliert die Eingangsfrequenz und gibt die entsprechenden Ausgangswerte im Live-RUN-Modus aus **(3)**. [Fig. 21]

*The electronics simulates the input frequency and outputs the corresponding output values in live RUN mode **(3)**.* [Fig. 21]

To stop the simulation:
Press “Stop Simulation“ **(5)** button. [Fig. 21]

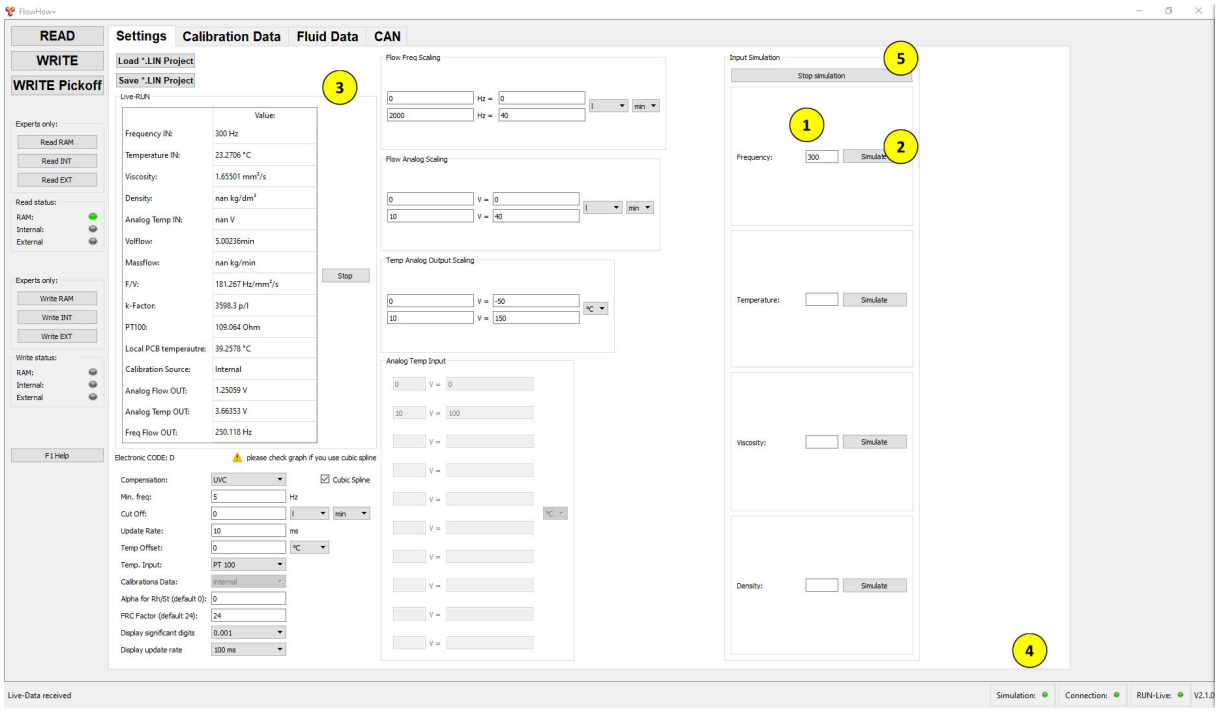

Fig. 21 Simulation example

5. Troubleshooting

5.1 No output signal detected at the electronics

If no output signal is detected by the electronics, the following measures can be taken:

Check supply voltage (6-32 VDC)

The standard current consumption is up to 60 mA (depending on configuration).

- Current > 100 mA: Board is defective.
- Current = 0 mA: Electronic is incorrectly connected.

Check functionality of the flow meter

Do not test the flow meter with compressed air! It can be damaged!

- Simulate flow:
  - Remove the Pickoff from the flowmeter
  - Move a ferritic (iron) object back and forth under the Pickoff
- Measure Pickoff Resistance:
  - RF Pickoffs: 10Ω ±15%
  - Magnetic Pickoffs: 1,5 – 2kΩ

Check status of electronics in Live-RUN mode

5.2 Output value is incorrect

If the output signal at the electronics is wrong, the following measures can be taken:

Check Live RUN mode

Check temperature sensor (or temperature analog input signal).

Compare signal of the analog temperature output with the temperature of the medium.

6. Software Update

Software updates can be performed using the "Update" application.

- Start the application. [Fig. 22]

Fig. 22 Application Update

If an update is available, the following window opens [Fig. 23]:

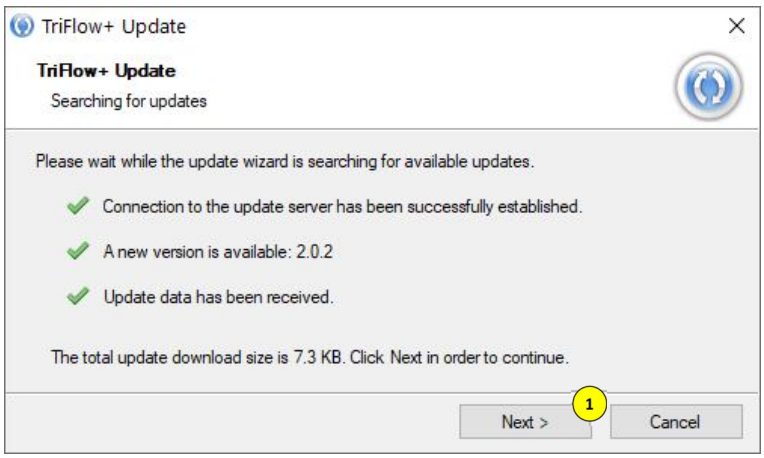

Fig. 23 Update available

- Click on "Next“ **(1)** [Fig. 23]

The download of the new software version will start automatically.
When the process is complete, the following window appears:

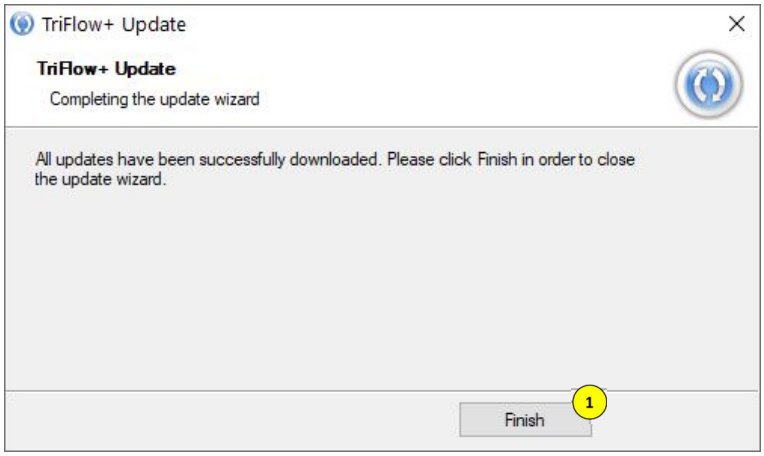

Fig. 24 Update downloaded

- Click on “Finish“ **(1)** to confirm. [Fig. 24]

The software update is now complete.

If no update is available, the following window appears:

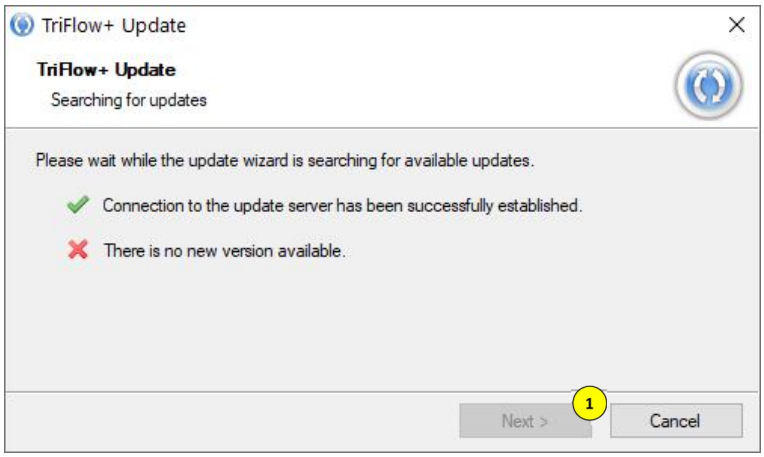

Fig. 25 No Update available

Terminate the process with “Cancel“ **(1)**. [Fig. 25]