EVALUATION KIT LCPB

DESCRIPTION

- Standard sensor system for the level measuring of aqueous media
- Scope of delivery
  - USB cable
  - Interface Box
  - Sensor cable
  - KIT-LCPB01A: 1x LCPB025D, 1x LCPB096D
  - KIT-LCPB02A: 2x LCPB025D
  - KIT-LCPB03A: 2x LCPB096D



BASIC TIPS ON ESD

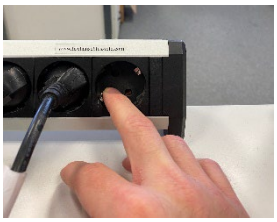
Electrostatic Discharge (ESD) can damage electronic components during the handling of circuit boards. The following tips help to reduce the probability of ESD events:

- Avoid charge separation
  - Do not wear (layers of) polyester clothes
  - Carpets – bad ←→ wood, tile or concrete flooring – good



- Support charge decay
  - Do not wear shoes with insulating (rubber) sole (e.g. Crocs)
  - Higher humidity dissipates static charge (dry heater air in winter → bad)

- If possible: Before touching the PCB, users should "ground" themselves, e.g. by touching the protective conductor of a socket or a bare part of a radiator.



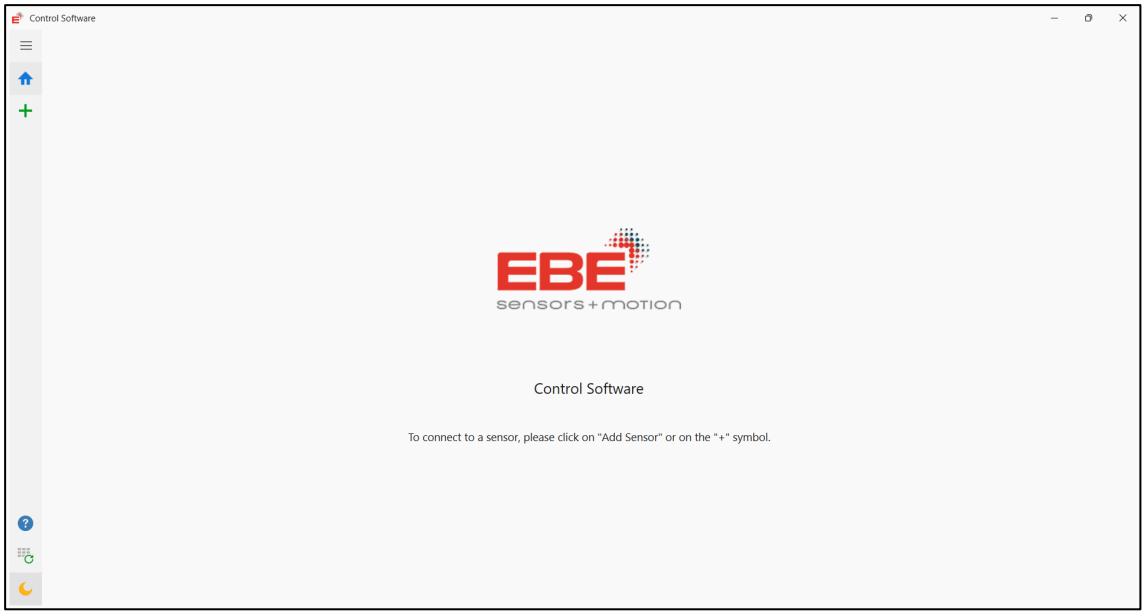
PREPARATION

- Download of EBE Control Software at https://www.ebe.de/en/downloads/
- Minimum software requirements: Windows 10 or Windows 11 and NET Framework 4.8
- Connecting the interface box via USB cable to the computer
- Connecting the sensor via sensor cable to the interface box
- For mounting of the sensor please refer to Data Sheet

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OPERATION

Starting the Control Software will lead to the following starting page:



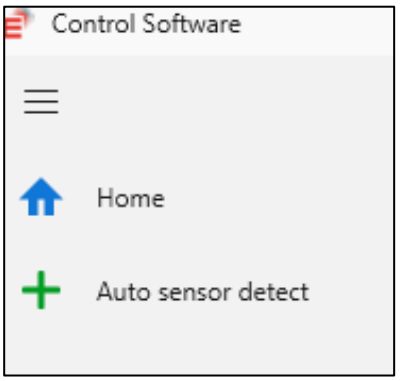
On the left side the menu band is located:

-  Allows to expanding the menu band
-  Home - Guiding back to the starting page.
-  Sensors can be added to the Control Software. Measurements can only be realised with added sensors.
-  Sensor symbol – a senor is connected to the Control Software. General information and measurement options are shown.
-  Help - Contact information of EBE.
-  This option checks if there is a new version of the Control Software available. If so, the EBE homepage will open for downloading the new version.
-  The day/night mode can be changed.

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SENSOR CONNECTION

The Control Software can detect EBE sensors automatically. Connection can be established by clicking on the green cross symbol or “Auto sensor detect” text.

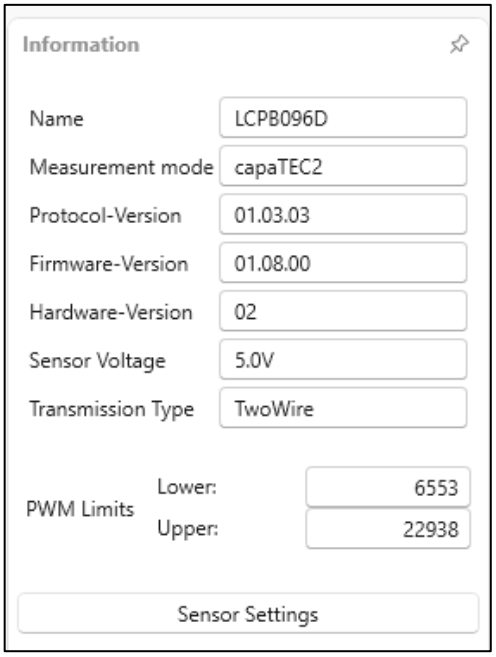


After a short time the Control Software establishes the communication with the sensor. If this operation is successful, the sensor is added to the menu band and three windows appear: Information window, Sensor data window, Measurement and logging window.

Information window

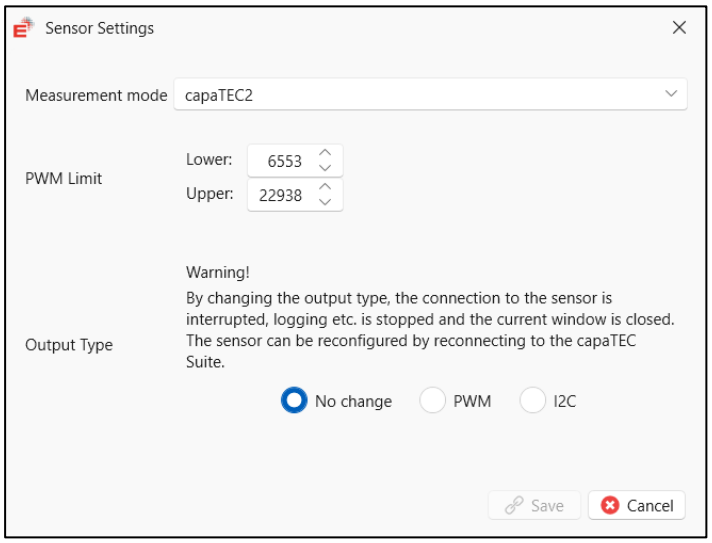
This window provides general information about the currently used sensor:

- Name
  The EBE name of the sensor (here a 96mm LCPB) sensor is used with TwoWire output.
- Measurement mode
  The selected measurement algorithm values, which will be used for PWM calculation, when PWM is used as output mode (only one capaTEC® value via PWM).
- Protocol-Version
  The internal EBE communication protocol version which is applied.
- Firmware-Version
  The firmware version of the sensor.
- Hardware-Version
  The hardware version of the sensor.
- Sensor Voltage
  The applied supply voltage
- Transmission Type
  One- or TwoWire communication.
- PWM Limits
  The lower and upper PWM limits are shown.



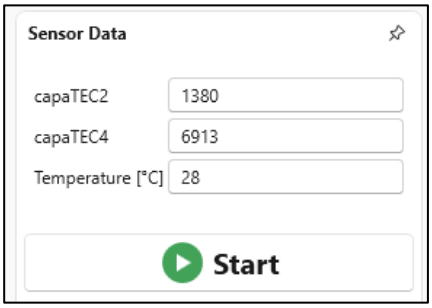
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At the bottom of the Information window the sensor settings are shown. Changing the measurement mode will define the data path for PWM calculation. Two different modes can be selected by the user (capaTEC2 or capaTEC4). When using PWM as output signal, upper and lower boundaries can be set for scaling the PWM values. Using different measurement modes, adaptation of the boundaries might be necessary. Using I²C as output, capaTEC 2 and capaTEC4 values can be read simultaneously as well as sensor temperature..



Sensor Data window

Displays the actual sensor output values – capaTEC2 value, capaTEC4 value and temperature.



Data acquisition is started by pressing the button “Start”.

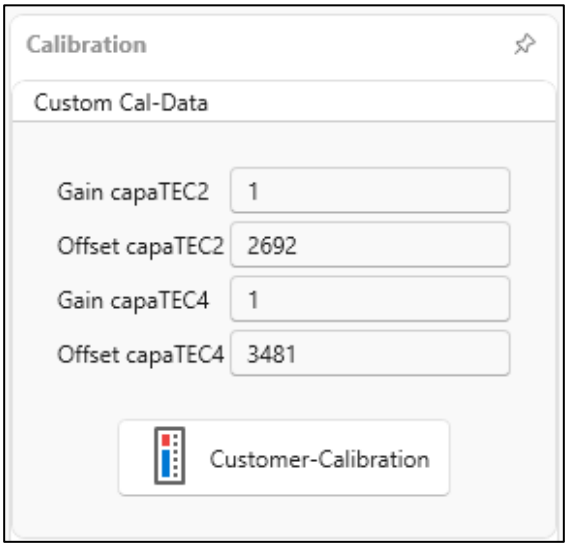
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Calibration window

It is possible to carry out a calibration on customer side. Click on the calibration tab in the bottom left corner to open the corresponding settings.

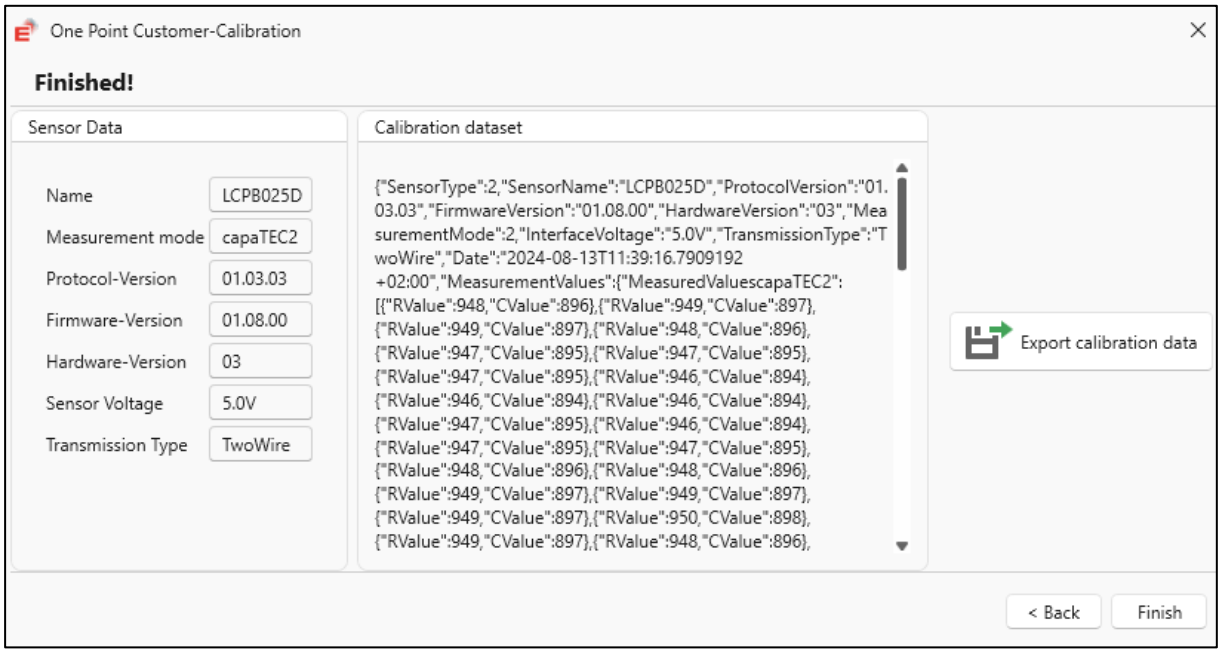
These settings can only be called up when the sensor is paused.

Here, a calibration on the customer application can be done. The factory calibration is not affected and is not changeable by the customer.



After 50 measurements within 10 seconds the values of capaTEC2 and capaTEC4 are set to 3500 and 4900 respectively.

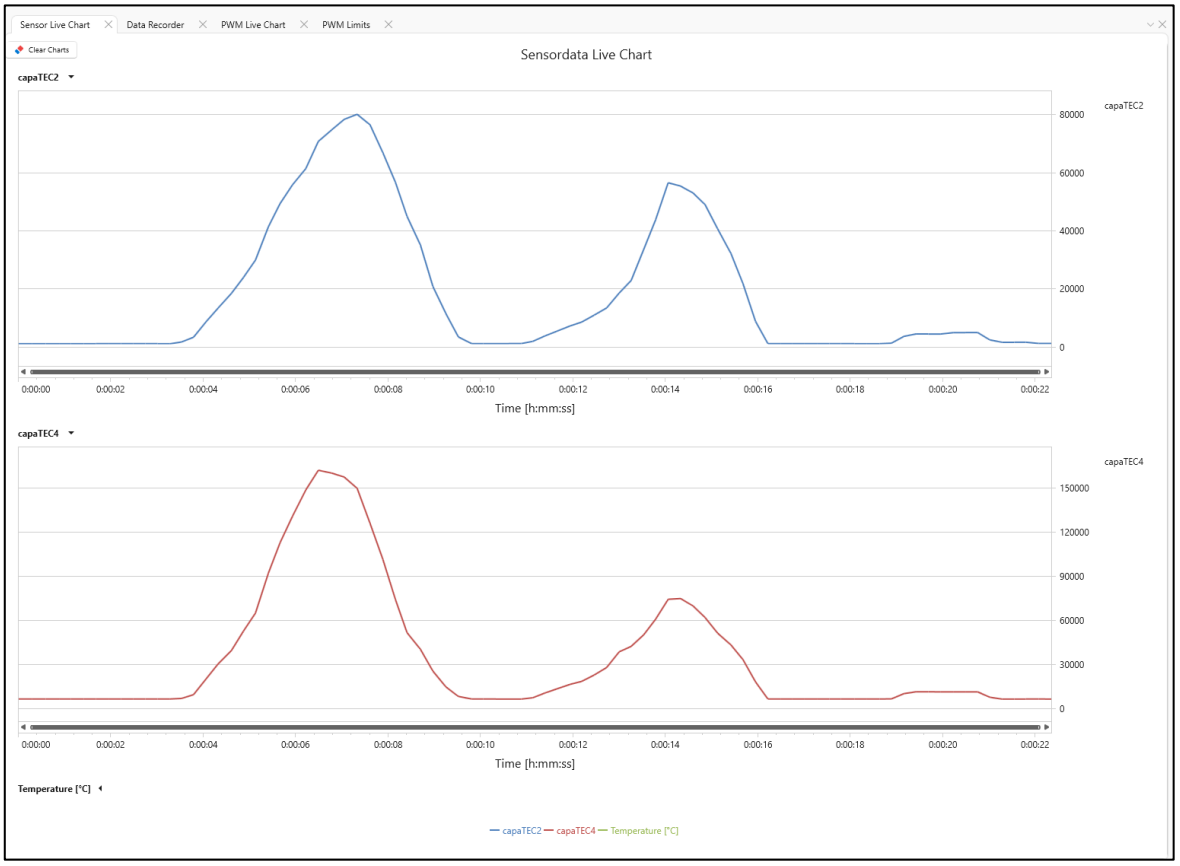
The value that has been raised is displayed in the Calibration Window.
These values are stored in the sensor after clicking on “Finish” at the end of the calibration process and can be saved as a .json file after clicking on “Export calibration data”.



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Measurement and Logging window

This window is divided into several tabs providing information and setting options for the sensor data: Sensor Live Chart, Data Recorder, PWM Live Chart, PWM Limits.



Sensor Live Chart

After pressing the Start Button located in the Sensor Data window the Sensor Live Chart shows the capaTEC2 values, capaTEC4 values and the temperature values. While the temperature values are collapsed by default.

Features:

- While hovering with the mouse over a graph, the timestamp and the output data are displayed.
- Zoom in and out is possible (mouse wheel).
- Fade out and fade in of graphs.
- With the clear charts button [Clear Charts] the live chart is cleared and the time stamp starting from 00:00:00 again.

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Data Recorder

In this tab the recorded data is shown.
Data can be logged after pressing the stop button.



Features:

- Listed capaTEC2, capaTEC4 and temperature values with the particular timestamp.
- Clear previous logged data using the clear button 

.
- Export logging data to a .txt or .xls file.
- Possibility to provide further information in the Log File by using the operator and description window.

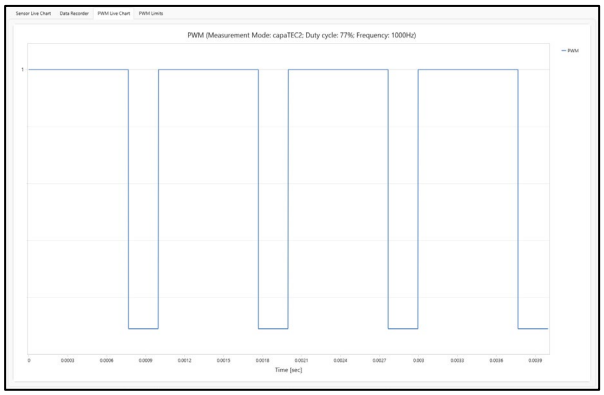


PWM Live Chart

The PWM Live Chart tab simulates the actual duty cycle for the sensor output.
This can be used to roughly determine the fitting PWM settings to the application.
The PWM limits can be quickly altered with the Sensor Settings button in the information window.

Note:

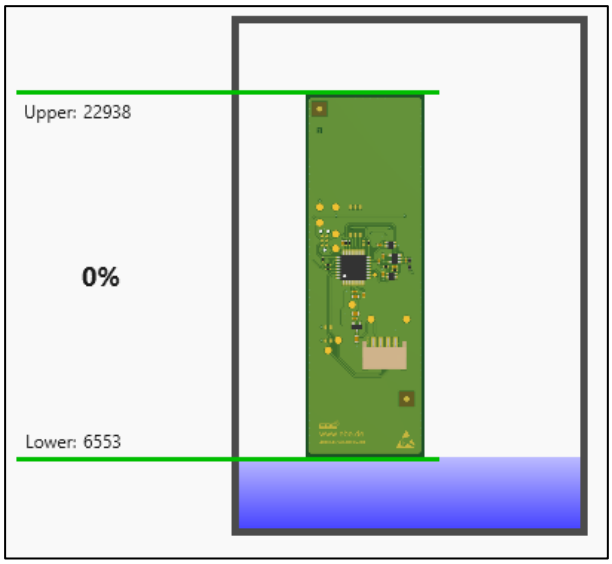
In PWM mode, the sensor can output capaTEC2 or capaTEC4 values.
The duty cycle of the sensor output can be varying between 10%-90%.



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PWM Limits

The PWM Limits tab will help to set the optimal PWM limits to the sensor. In the middle of this tab the sensor with its actual PWM limits is displayed.



The Control Software supports the configuration of the PWM limits by using the PWM Limits Wizard.

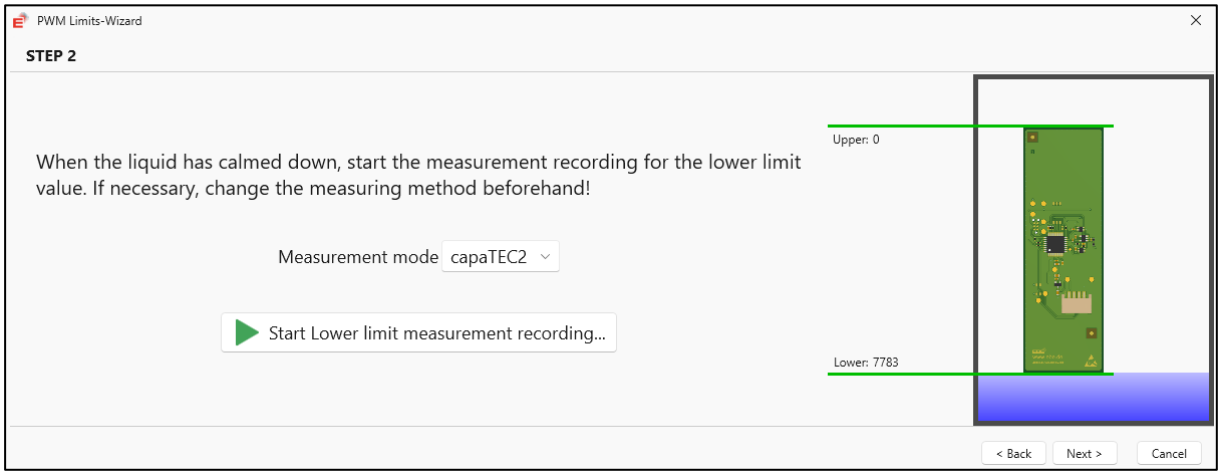


The PWM Limits Wizard opens a separated window, guiding through the individual steps to apply optimal conditions to the sensor in the application.

- Step 1: Fill the target medium in the application to the lower sensor electrode edge like shown in the picture above.

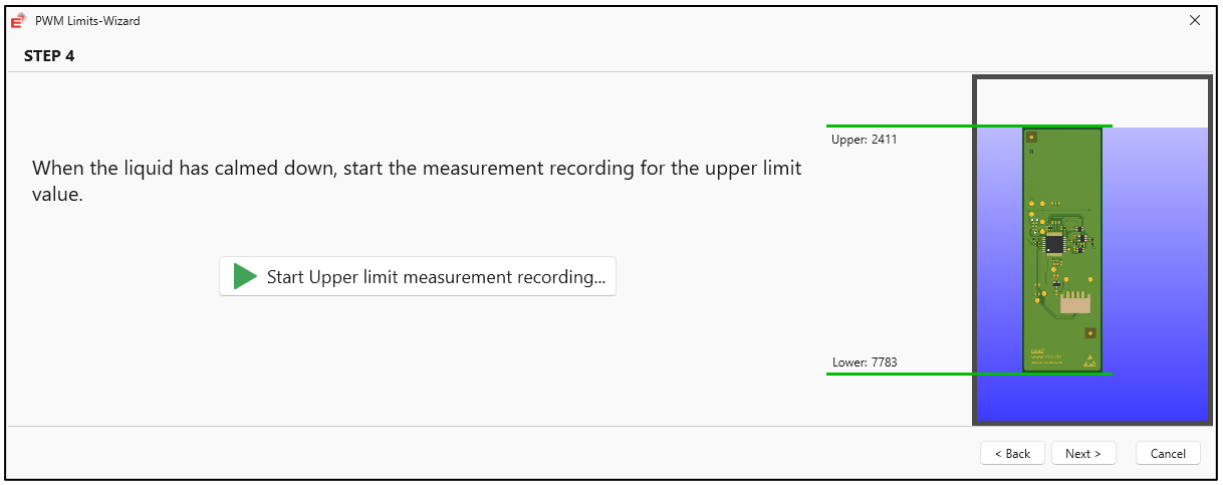
- Step 2: Choosing the measurement mode: capaTEC2 or capaTEC4.
  Start recording the lower PWM limit.

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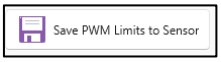
- Step 3: Fill the target medium in the application to the upper sensor electrode edge.

- Step 4: Start recording the upper PWM limit.



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- Step 5: Sensor information and measured PWM limits are displayed.

  Save the settings to the sensor: 

  The determined PWM limits can be saved as file. 

  This allows the PWM limits to be quickly uploaded to other sensors or for varying test cases.

  After clicking the finish button the new PWM limits are applied. This change can be detected in the information window on the left side of the Control Software where the new PWM limits are displayed.

Note

In general, the capaTEC values are inverted in relation to the fill level, lower fill level of your application leads to higher capaTEC values.

ADVICES

- Long term measurement
  The .csv data format is recommended for taking long term measurements.

- PWM usage
  It is not recommended to place the sensor to the bottom of the fill level container while measuring the PWM limits.
  There is a significant impact to the measured capacity when a small amount of liquid is in the fill level container compared to an empty container.
  Therefore, it is recommended to place the sensor higher than the lower edge of the fill level container or at least fill in a small amount of media before measuring the PWM limits.

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