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## Glossary

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DTCM - DVM Thermal Control Module

DVM - Density Viscosity Module

DVP - Density Viscosity Probe

RCP – Rheonics Control Panel Software

SME - Smart Module Electronics

SMET – Smart Module Electronics Transmitter

SME – TH – SME in Transmitter Housing

SME-TRD – SME in Transmitter Housing with Display

SRV - Symmetric Resonator Viscometer

SRD - Symmetric Resonator Densitometer

STCM – Sensor Thermal Control Module

## 1 Minimum System Requirements

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**Operating System:** Windows 7 or Higher (Windows 10 recommended)

**Required:** LabVIEW Run-Time Engine 2019, and NI-VISA Run-Time Engine 19.0. Included in the full installer *RCPSetup\_Vx.x.x.x\_full.exe*

*Both run-time engine installers are also available online at:*

<https://www.ni.com/en-us/support/downloads/software-products/download.labview-runtime.html#346222>

<https://www.ni.com/en-us/support/downloads/drivers/download.ni-visa.html#346210>

**Free Disk Space:** 2 GB (For full installation including run-time engines)

**RAM:** 4 GB






## 2 Installing the Rheonics Control Panel (RCP) Application

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The installation software is supplied on a USB drive (USB stick, flash drive). Updates can also be downloaded from Rheonics website, contact support.

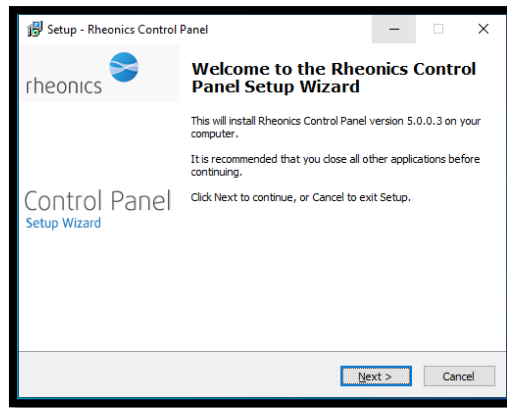
Open the folder on the USB drive to view files. If the system asks whether to repair the disk, select the “Open without repairing” option. Before proceeding, copy the files to a folder on your computer, and remove the USB stick and put it in a secure place.

The newly created installation folder will contain the following Setup files. Execute the *RCPSetup\_Vx.x.x.x\_full.exe* file.

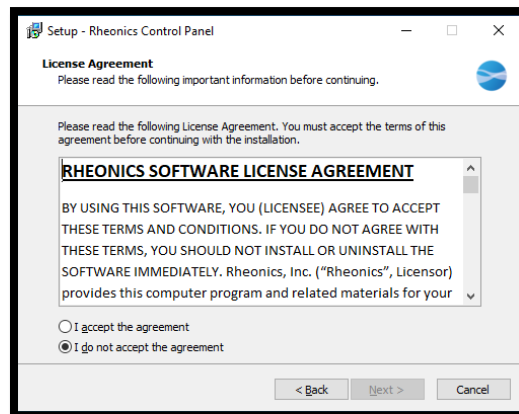
Name	Date modified
 Manuals	13/02/2020 12:36
 Win7_USB_Driver	29/08/2018 12:31
 RCPSetup_V4.3.0.2_full	5/03/2020 11:47
 Readme	16/04/2020 06:32
 Transmitter Display Module and USB Inst...	23/07/2018 01:06

The following procedure explains the full installation of the RCP software:

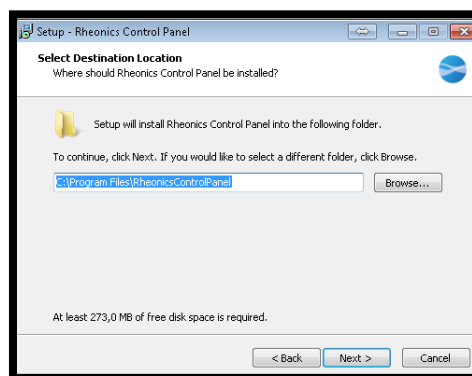
1. Double click on “*RCPSetup\_Vx.x.x.x.exe*” to start the installation process.
2. The installer will start the Setup Wizard Application. Click “Next” to continue the installation process.



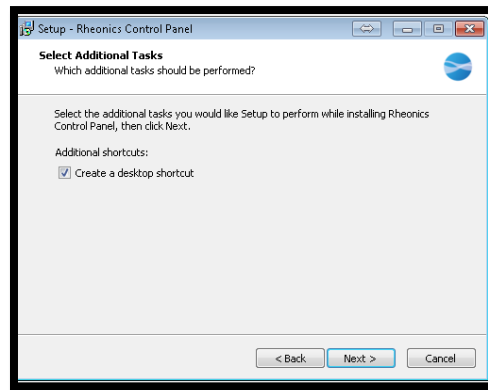
3. Review and accept the license agreement.



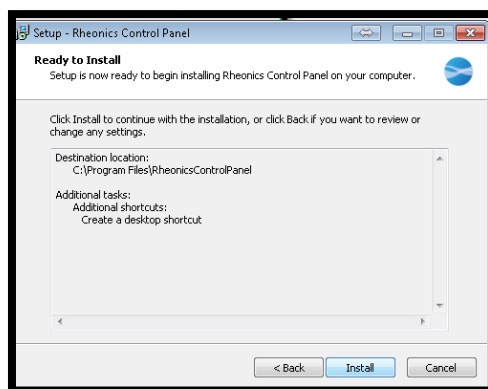
4. A dialog will appear to select the installation directories. Use the default, unless there is a reason to select a different location, and click "Next":



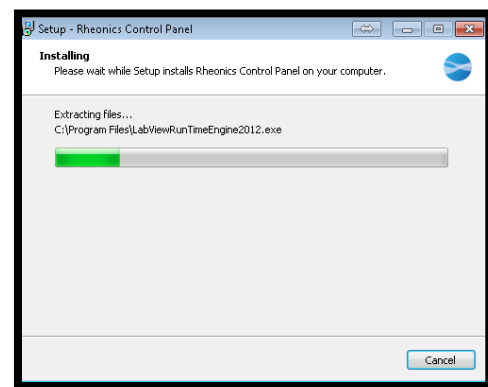
5. Click check box to create a Desktop shortcut, and click "Next":



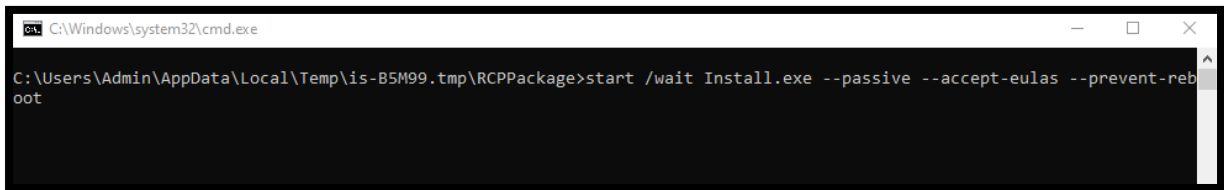
6. Click “Install” to complete the installation process of RCP:



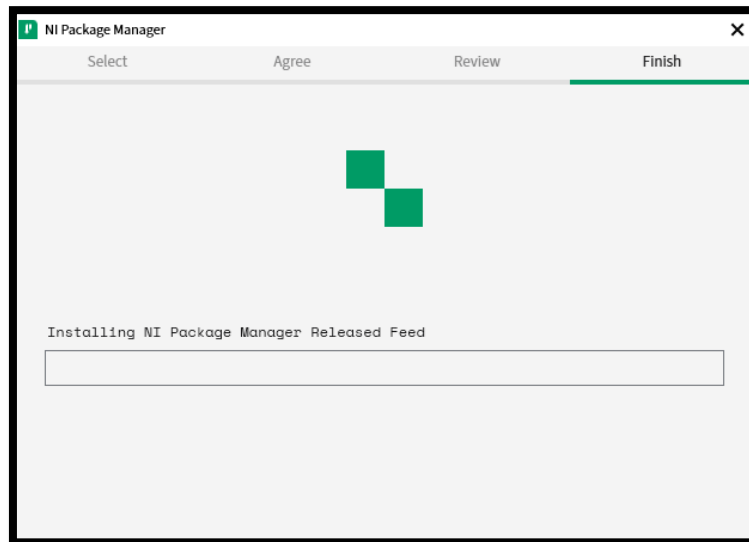
7. The installer will extract the files in the default destination.



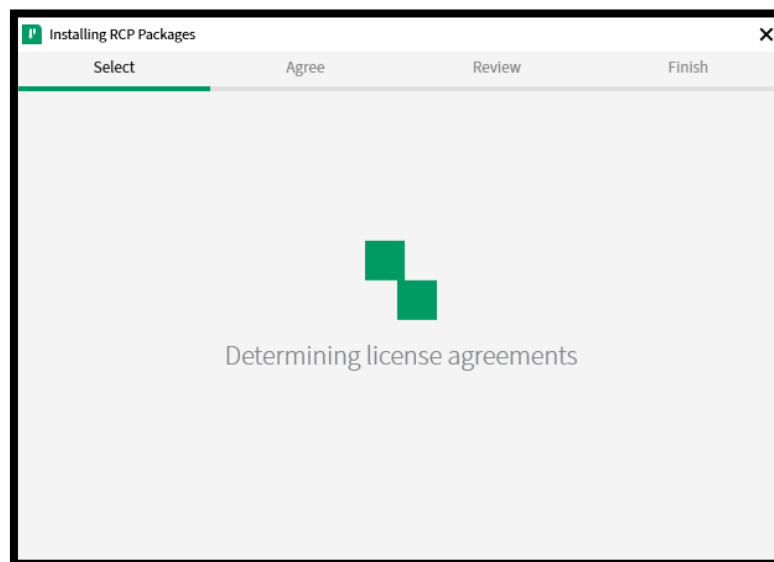
8. When the files are copied a command windows will be displayed. Do not close this window, it will close itself at the end of the process.



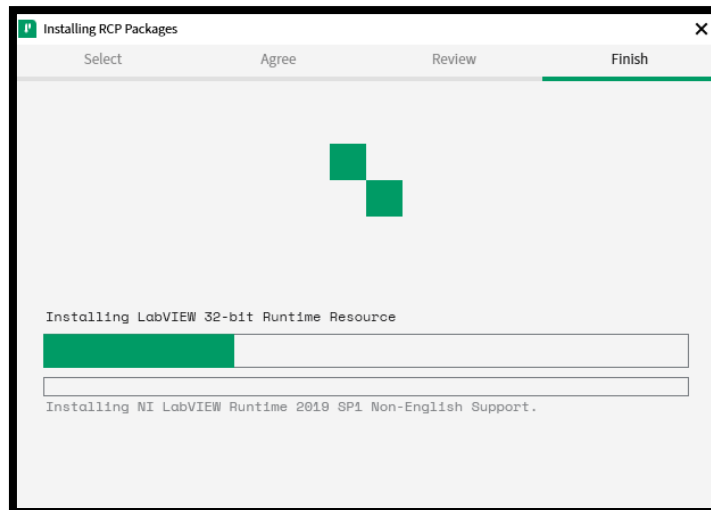
9. A window for installation of NI Package manager will be displayed. Wait until the process finishes.



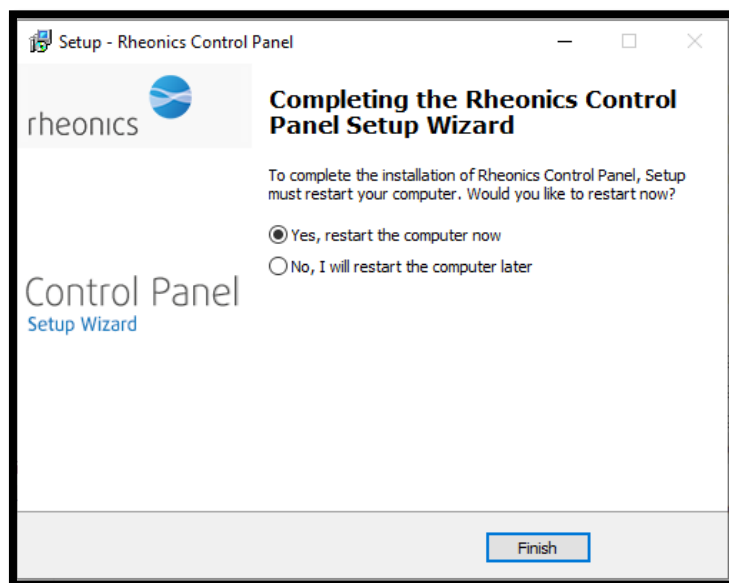
10. A window will be displayed indicating the installation progress of RCP Packages.



11. Wait until the progress bar is completed.



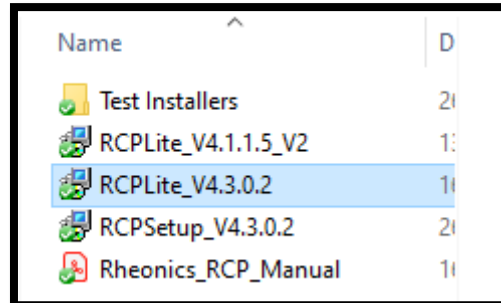
- 12.** When the process is over the installer will prompt for system restart. **YOU SHOULD RESTART THE SYSTEM FOR INSTALLATION TO BE COMPLETED**



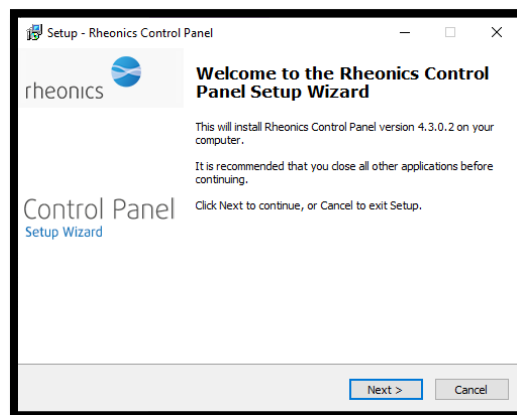
**ONCE RESTARTED, RCP SOFTWARE AND ITS DEPENDENCIES ARE INSTALLED ON YOUR SYSTEM AND READY FOR OPERATION**

## 2.1 RCP Lite Installer

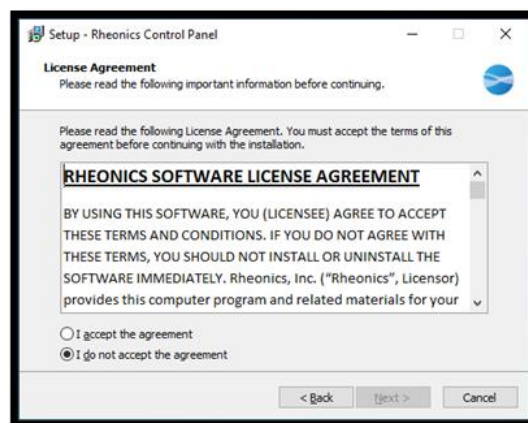
If you have installed a previous version of RCP (from 4.2.0.5 onwards), and want to update to a newer version, use the "RCP\_Lite\_Vx.x.x.x.exe" installer provided by Rheonics and skip the full install. Double click on the file to start the install process.



1. Click Next on the dialog below to start the installation process

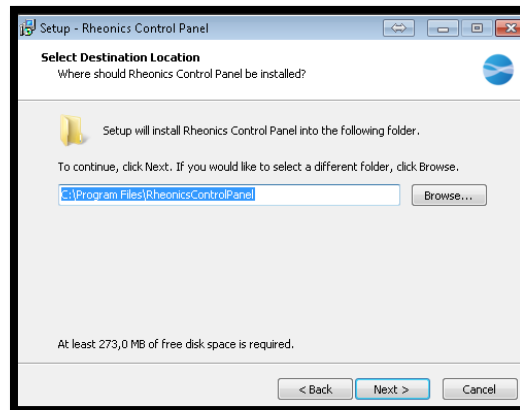


2. Review and accept the license agreement.

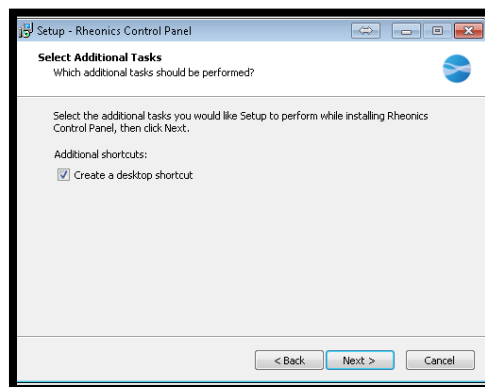




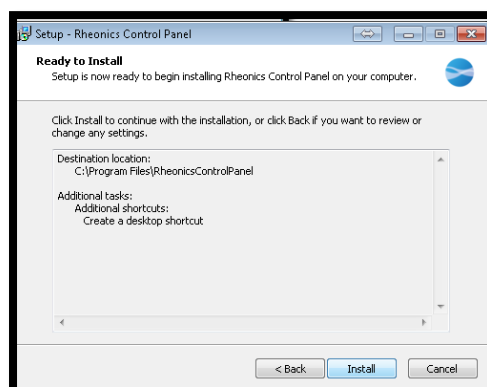
3. A dialog will appear to select the installation directory. Use the default, unless there is a reason to select a different location, then click "Next".



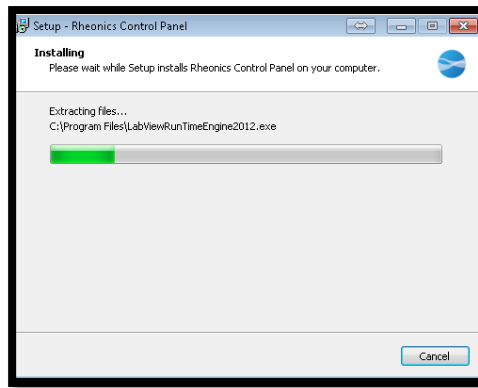
4. Click check box to create a Desktop shortcut, and then click "Next":



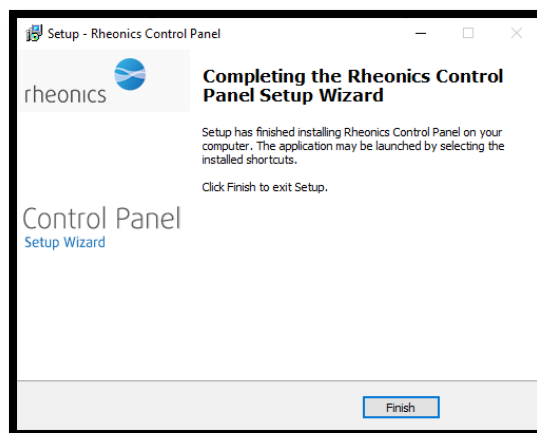
5. Click "Install" to complete the installation process of RCP:



6. The installer will install the files in the default or selected destination.



7. Click "Finish" to finish the install process.



**RCP software is now updated and ready to use.**

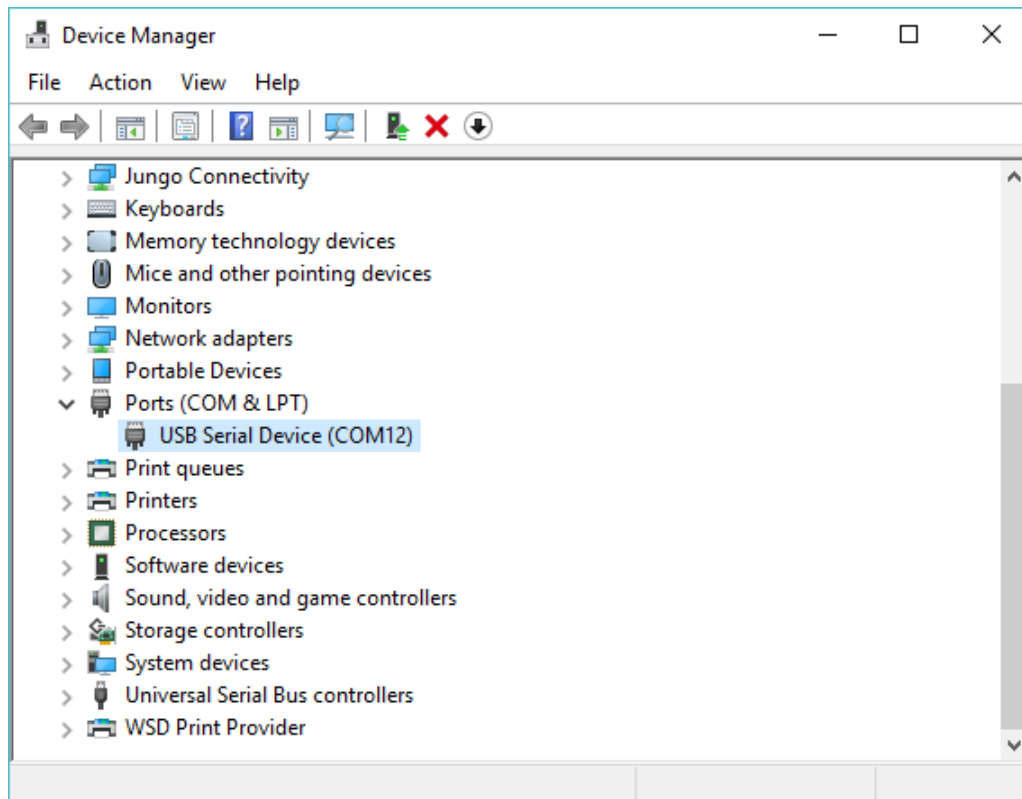
### 3 Installing Smart Measurement Electronics (SME) USB Drivers

The USB driver provides a virtual COM-Port on the computer used by the Rheonics Control Panel.

**For Windows 10 users:** The Drivers should install automatically when the computer detects the sensor connected on USB port (Device manager will show the sensor as a COM port).

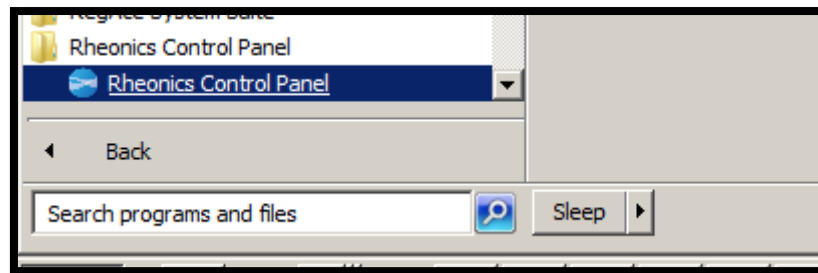
**For Windows 7 users:**

1. Connect the SME to the computer with the USB cable.
2. If the Windows does not find the drivers automatically, install the drivers manually.
3. The drivers will be located in the folder WIN7\_USB\_DRIVERS on the flash drive. If you received a zip archive of the drivers, extract the zip folder to your computer.
4. Select 'Browse my computer for driver software' and navigate to the USB driver folder: WIN7\_USB\_DRIVERS\USB\CDC
5. Ensure subfolder checkbox is selected.
6. Click Next and the driver will be installed.
7. On successful installation, the rheonics sensor will show up as SME in the device manager Ports (COM & LPT) list.

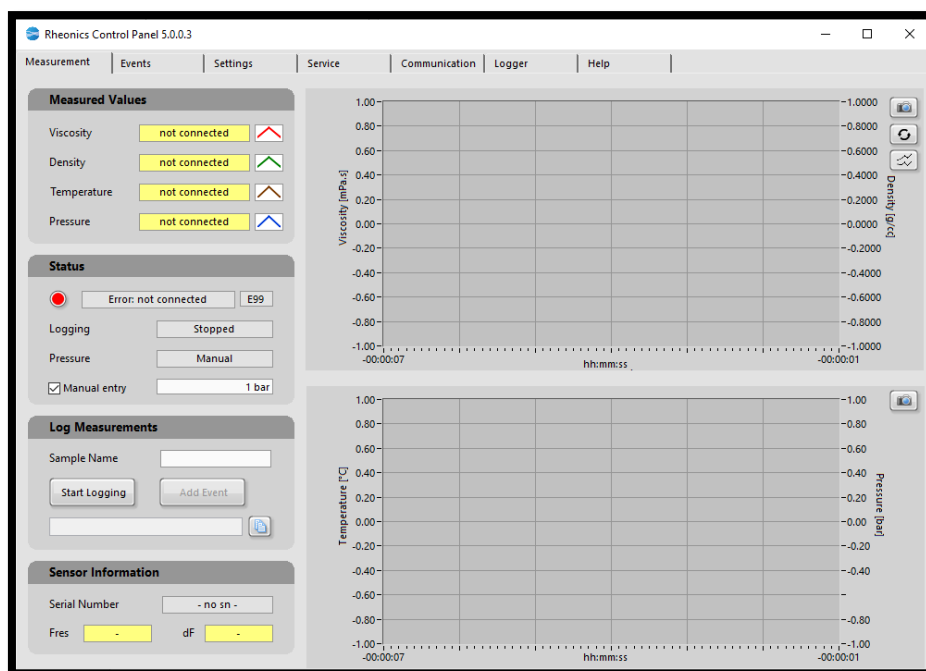


## 4 Running the program

Open the Rheonics Control Panel application from the Start menu or from its Desktop icon, if created during the installation process.



When the software is running, you will see a screen similar to the following:



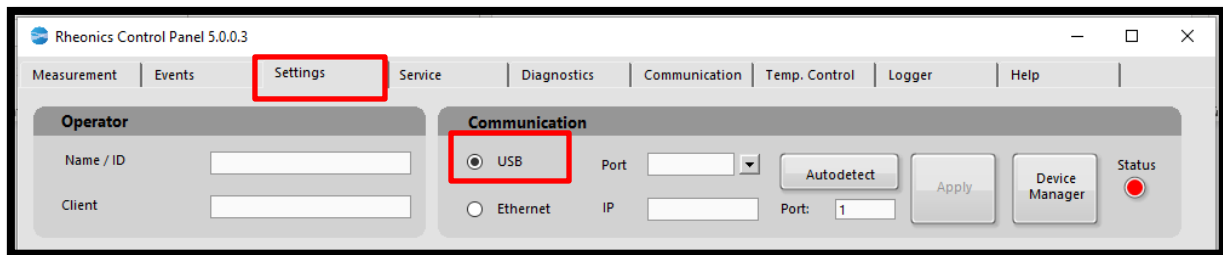
Notice that the “Status” indicator will probably be colored red, indicating that the SME is not connected.

### 4.1 Establishing communications between RCP Software and the SME

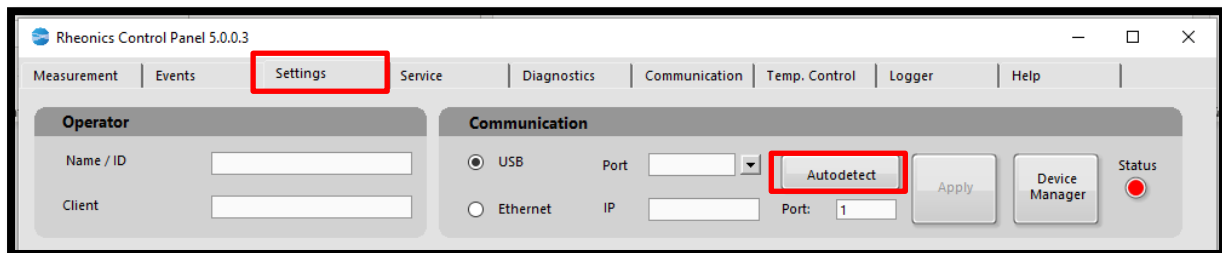
#### 4.1.1 USB connection

Power up the SME by connecting a suitable power supply to the power input terminal block. Make sure the USB cable is plugged into the micro-USB port on the SME and into a free USB port on your computer.

1. Select the “Settings” tab and select the “USB” button under the “Communication” panel:

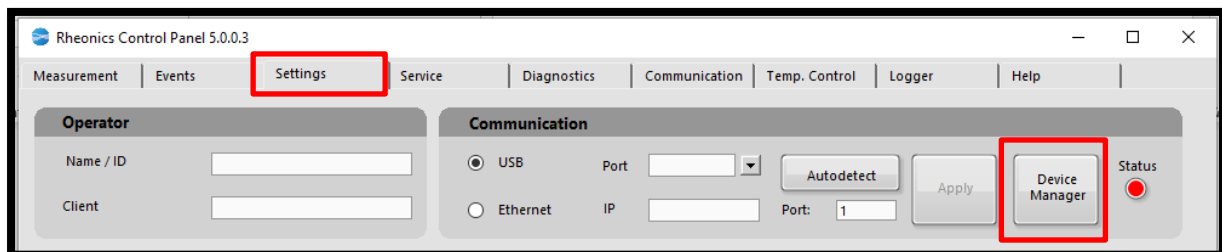


2. Click on the “Autodetect” button to automatically detect the sensor electronics and connect. The Status LED will turn green after successful connection.

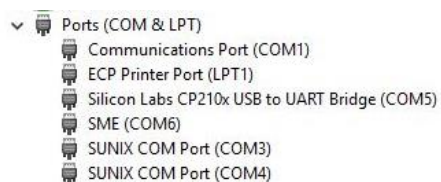


If the electronics is not detected using the “Autodetect” button you can proceed with a manual connection following these steps.

1. In settings click on the “Device Manager” button. This will open the device manager or the Windows OS.



2. Navigate to “Ports (COM & LPT)” tab and expand it.

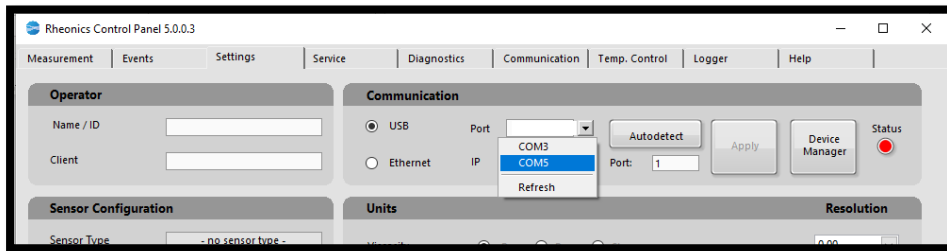


The interface used by the Electronics Box is labeled “SME” and is here assigned to Port COM6. Make a note of the COM port number and close the Device Manager.

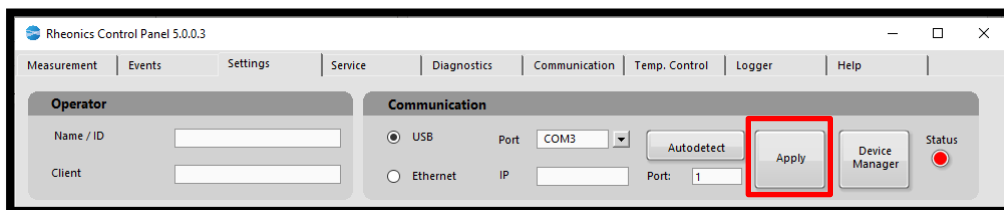
3. Select the COM Port you discovered (COM6 in this example) from the drop-down list. If you do not see the correct COM port in the dropdown list then click refresh and select the correct COM port.

If you do not see any COM port listed in the list but see them in the device manager, then it is likely you are missing VISA runtime in your installed version of RCP. Rerun installation to install the runtime.

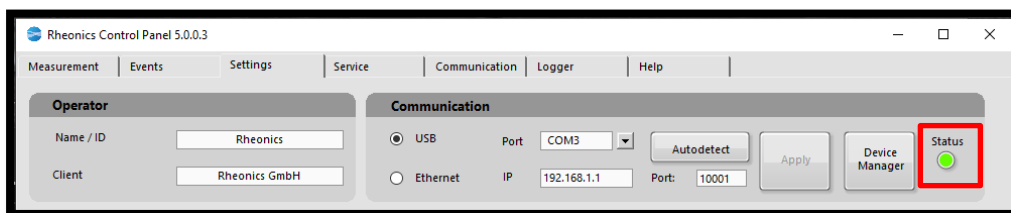
DO NOT WRITE COM PORT IN THE DROPDOWN LIST. IT WILL NOT WORK. COM PORT NEEDS TO POPULATE CORRECTLY FOR FUNCTIONAL SERIAL CONNECTION TO SME FROM RCP.



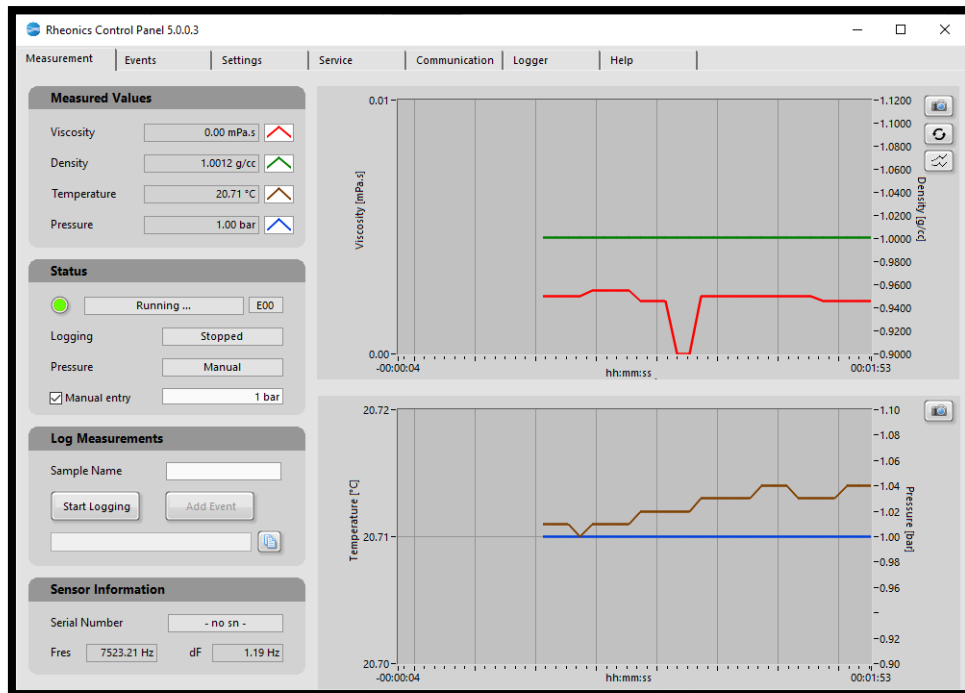
4. Press the “Apply” button to start the connection.



5. Wait until the “Status” indicator turns to green.



The communication over USB is now established and the configuration and measurement values from the SME are displayed on the Rheonics Control Panel.



#### 4.1.2 Ethernet connection

This section applies only to devices with Ethernet enabled and describes how to connect the SME via Ethernet to the Rheonics Control Panel. If your device does not have the Ethernet enabled, consult your sales representative for information on ordering this option.

##### 1. Connecting the Electronics Box to your network (DHCP)

- a. Connect the Electronics Box to your network with an Ethernet cable
- b. Power on the Electronics Box



Ethernet cable must be plugged in before powering on the Electronics Box!

The Electronics Box is set by default to obtain an IP-Address from the network (DHCP)

##### 2. Detect the electronics box on the network

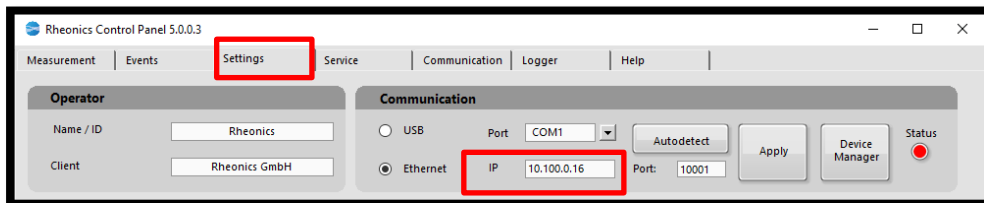
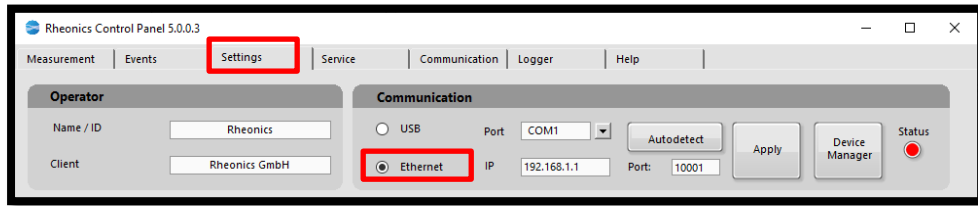
You LAN switch should be consulted to get the correct IP and MAC address for the SME electronics.

##### 3. Enter the IP-Address on Rheonics Control Panel

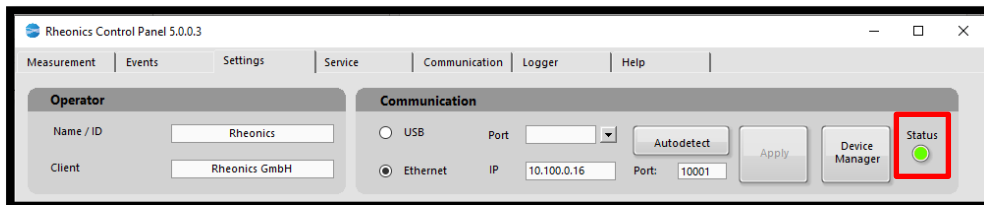
- a. Start Rheonics Control Panel
- b. Open tab "Settings" and select the radio button "Ethernet"

##### 4. Select "Ethernet" on Communication section

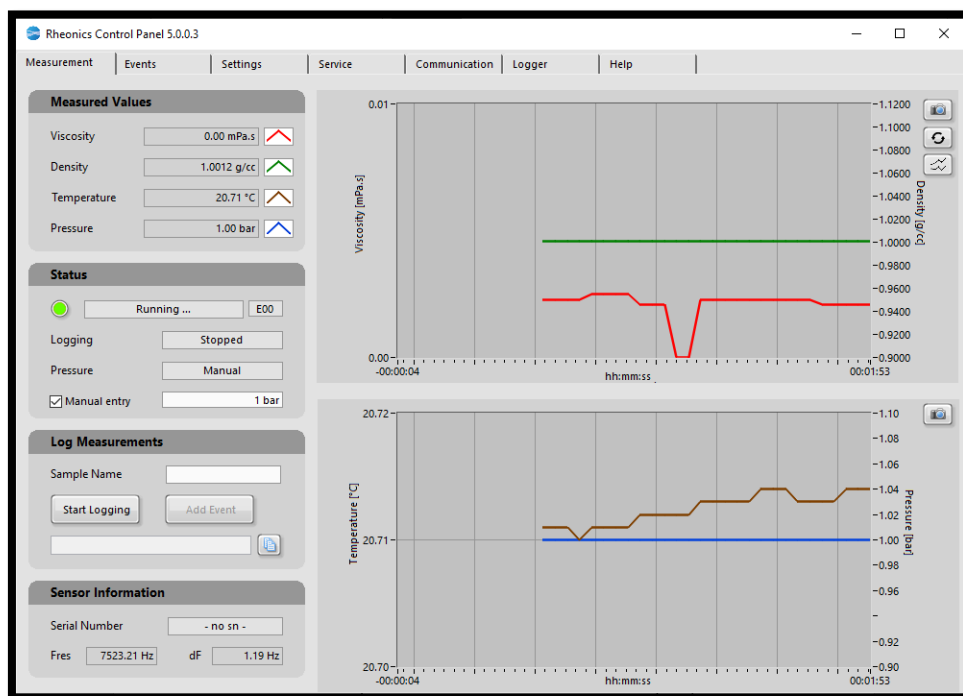
5. Enter the IP-Address of the SME electronics



6. Press the “Apply” button to establish the connection and wait until the “Status” indicator turns green.



The communication over Ethernet is now established and the measurement values from the SME are displayed on the Rheonics Control Panel.

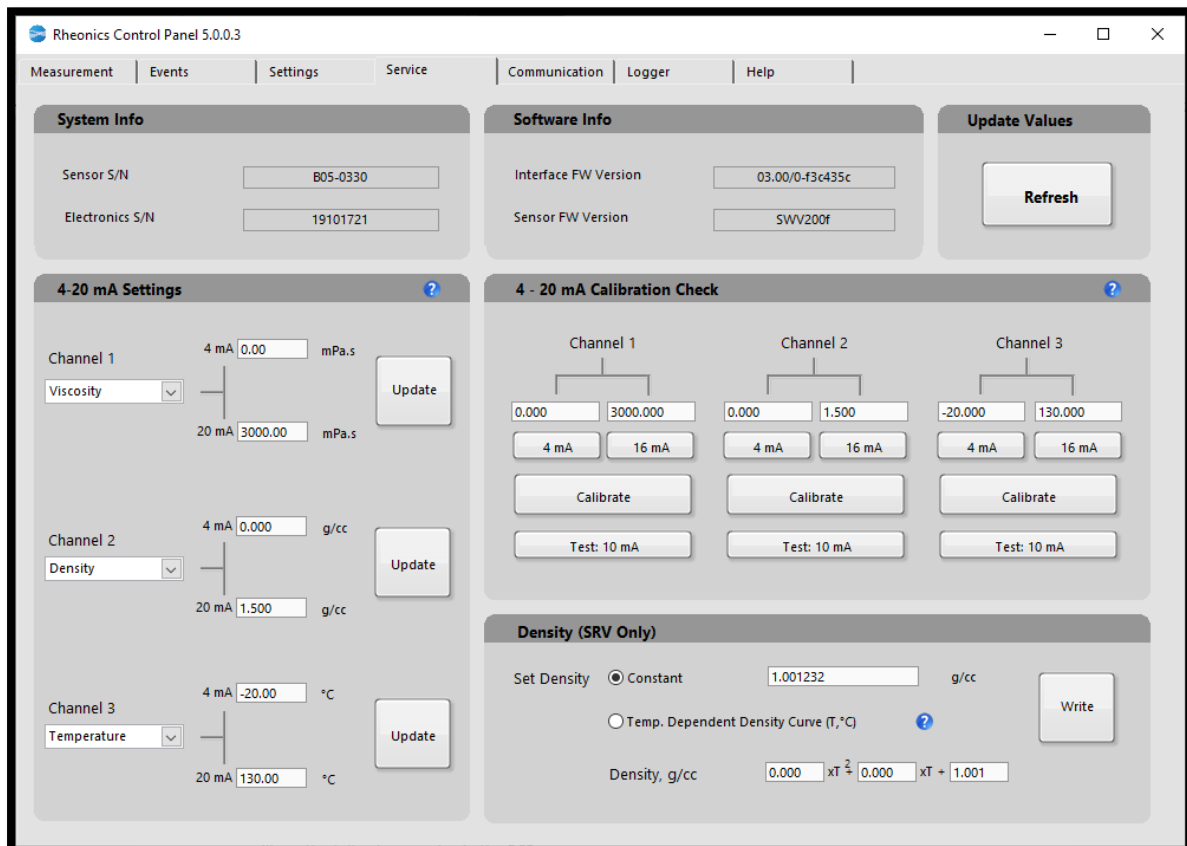




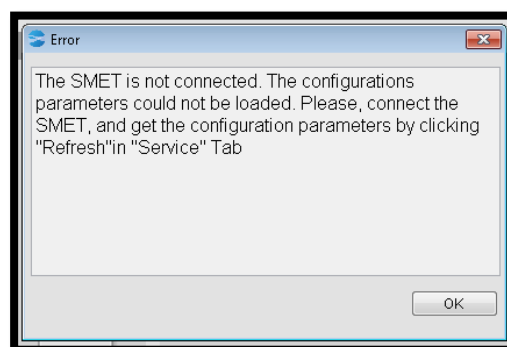
## 4.2 Loading the configuration parameters

The Rheonics Control Panel automatically loads the configuration for the specific sensor that you are using. Once the connection between the RCP and the SME is established, the RCP will automatically load the configuration parameters from SME.

To check that the configuration parameters are loaded go to the “Service” Tab and verify that the “**System Info**” panel shows the correct sensor serial number (S/N). A unique sensor serial number is printed on each Rheonics sensor.



If there was a problem loading the configuration parameters due to disconnection of the SME, you will see the following warning in the RCP:



You can attempt to load or refresh the configuration parameters by clicking the “Refresh” button in “Service” Tab.

## 5 Operating the system

After installing the port and the software, the system may now be started.

THE SME MUST BE ATTACHED TO THE COMPUTER WITH THE USB CABLE  
AND POWERED UP IN ORDER FOR THE SYSTEM TO OPERATE

1. Connect the micro USB cable to the SME. Connect the other end to a free USB port on the computer.
2. Start the SME by connecting the power adapter to the unit.

### 5.1 Navigation

The display shows six tabs, each with different sections. The content of the tabs is described above.

#### 5.1.1 Measurements Tab

The measurements tab shows the last measurements of the SME, the status of the sensor, the configuration of logging, the sensor information and several plots.



1. **Measured Values** displays the current readings of Viscosity, Density and Temperature measured by the sensor. The displayed pressure is either manually

input or read from an external pressure gauge over RS232 (more information in pressure section under settings tab).

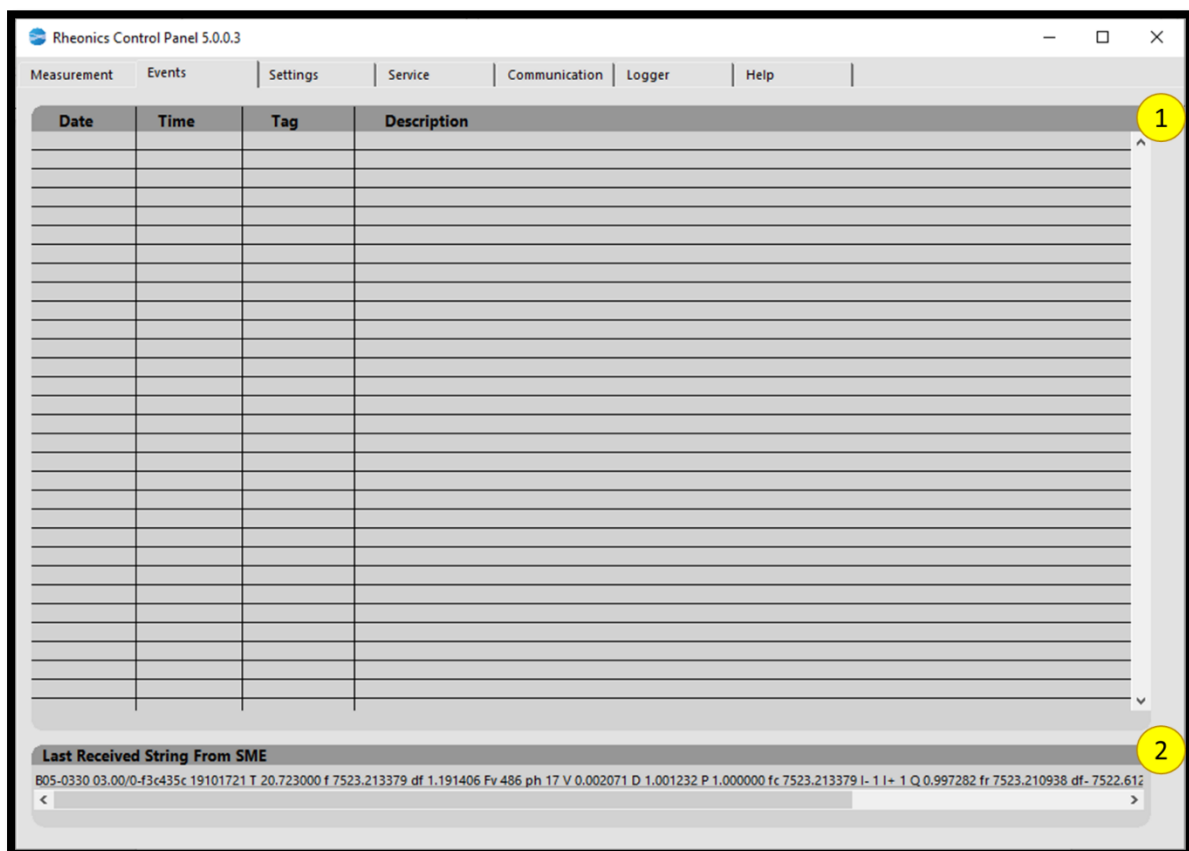
2. **Status** indicating the communication between the communication box and its state, the logging state and the acquisition of the pressure.
3. **Logging** is a set of buttons to start, pause, and end data logging. The Sample Name field is for user input, and must be filled in before data logging can be started.
4. **Sensor Information** displays the type of sensor and its serial number. The actual sensor frequency and its damping are also displayed.
5. **Real-time Viscosity graph**
6. **Real-time Density graph (measured or user input)**
7. **Real-time Temperature graph**
8. **Pressure graph (measured or manually input)**

On each graph pane, press the save button in upper most right corner to save a bitmap file of its graphs.

The Rheonics Dataview window is accessible by clicking the highlighted button in the density graph area. The dataview window is described in section 5.6.

### 5.1.2 Events Tab

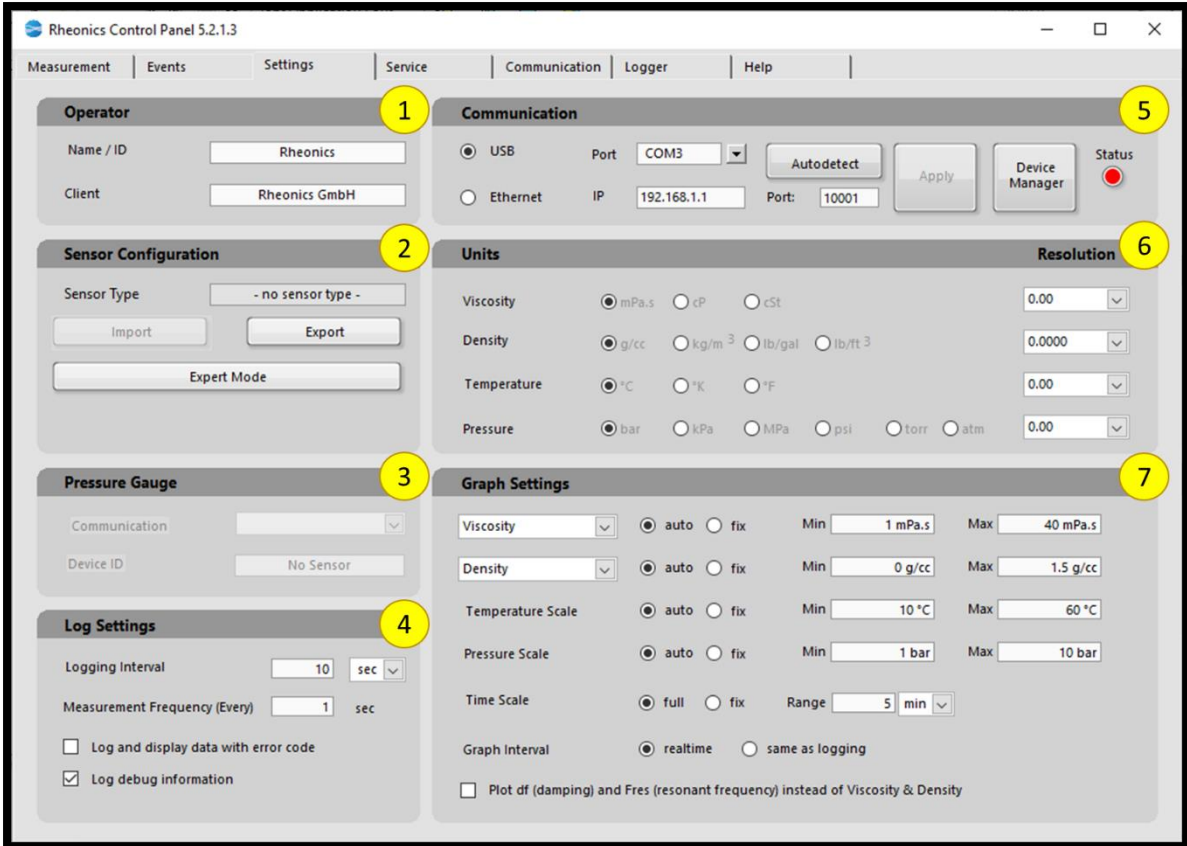
This tab shows the events logged by the user, when logging is enabled. For more information about log configuration refer to section on logging.



1. **Events list:** A list of the user events, with date and time.
2. **Last Received String From E-Box:** Shows the last string received from SME. This string is not logged in the Events file. You can keep track of received strings by selecting the option “Log Debug Information” in the “Log Settings” Section of “Settings Tab”. The strings will be saved in a Debug file.

### 5.1.3 Settings Tab

The settings tab contains information about the sensor and the main configuration parameters of the system.



The screenshot shows the 'Settings' tab of the Rheonics Control Panel Software. The interface is organized into several sections, each with a numbered callout:

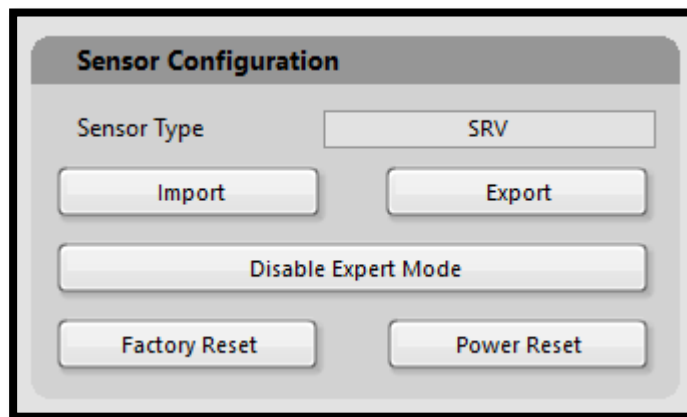
- 1. Operator:** Fields for Name / ID (Rheonics) and Client (Rheonics GmbH).
- 2. Sensor Configuration:** Sensor Type dropdown (no sensor type -), Import and Export buttons, and an Expert Mode button.
- 3. Pressure Gauge:** Communication dropdown and Device ID field (No Sensor).
- 4. Log Settings:** Logging Interval (10 sec), Measurement Frequency (Every 1 sec), and checkboxes for 'Log and display data with error code' and 'Log debug information'.
- 5. Communication:** Radio buttons for USB and Ethernet. USB is selected with Port COM3. Ethernet is selected with IP 192.168.1.1 and Port 10001. Buttons for Autodetect, Apply, and Device Manager are present.
- 6. Units:** Radio buttons for various units (mPa.s, cP, cSt, g/cc, kg/m<sup>3</sup>, lb/gal, lb/ft<sup>3</sup>, °C, °K, °F, bar, kPa, MPa, psi, torr, atm). Resolution dropdowns are shown for each unit.
- 7. Graph Settings:** Dropdowns for Viscosity and Density, radio buttons for auto/fix, and Min/Max value fields. Also includes Temperature Scale, Pressure Scale, Time Scale, Graph Interval, and a checkbox for plotting damping and resonant frequency.

1. **Operator:** The entered information will be stored to the log file header
2. **Sensor Configuration:** Import (for older sensor versions of Electronics Box, this button allows the user to import the sensor configuration file, for SME this Button refresh the "Service" tab values),
  - a. **Export:** Use this function to export sensor diagnosis information. This will generate a log in a .zip folder. Send this .zip folder to rheonics support. [support@rheonics.com](mailto:support@rheonics.com) or create a support ticket on <https://support.rheonics.com/support/home>
  - b. **Expert Mode:** Click on expert mode to enable advanced user features in software. These are scaling and calculation tabs. To know more about this functions go to sections 5.1.7 and 5.1.8

Expert mode password:

**Jdc7bpPt**

Expert mode also enables some extra settings features like the ability to import configurations into the SMET, restart the SMET and factory reset the SMET settings for scaling and calibration.



- c. **Import:** This feature allows you to upload new configurations into the SMET. These settings should be provided by Rheonics in a special configuration file. To upload a configuration file:
    - i. Click Import
    - ii. Select the file provided by Rheonics and click “OK”
    - iii. Wait for the “Import” button to acknowledge a correct upload.
    - iv. Select a path to export the file that will be generating after finalizing the process. Send this file to Rheonics support to verify that configurations are as expected.
  - d. **Factory Reset:** Use this button to *restore to factory default values all the calculation and scaling settings*. Use this feature when you are certain that calculated models and scaling are no longer needed for ALL the parameters. This feature requires a password. Contact Rheonics support for this password or for your custom configuration file to restore the default.
  - e. **Power Reset:** Click this button to restart the SMET (power reset). This feature does not require special passwords since it does not affect the configuration of the sensor.
3. **Pressure gauge:**
- **Manual entry:** Enter the pressure in the “Manual entry” user input field. The default setting is 1 bar, and may be modified “on the fly” during a logging run.
  - **External Pressure:** Uncheck the “Manual entry” check button for using an external pressure instrument.
    - a. Click on “Settings” tab and select “External Sensor” option from the dropdown list in “Pressure Gauge”.
    - b. Select the external pressure library from the directory  
c:\programData\RheonicsControlPanel
    - c. Configure the right COM port for RS232 communication between RCP and the external pressure instrument.
    - d. RCP will continuously communicate with external pressure to read the pressure measurements.

4. **Log Settings:** Enter the logging interval desired for saving the data points in the log file.

Select the appropriate logging mode on the other check boxes.

- a. Selecting “Log and display data with error codes” shows data from sensor even when the sensor may not be in a stable measurement mode.
- b. Selecting “Log debug information” creates a debug file with diagnostic data along with the log file. This is useful in case the sensor has an issue that needs investigation by the rheonics technical support team.

5. **Communication:** Select the data input from the SME. See 4.1

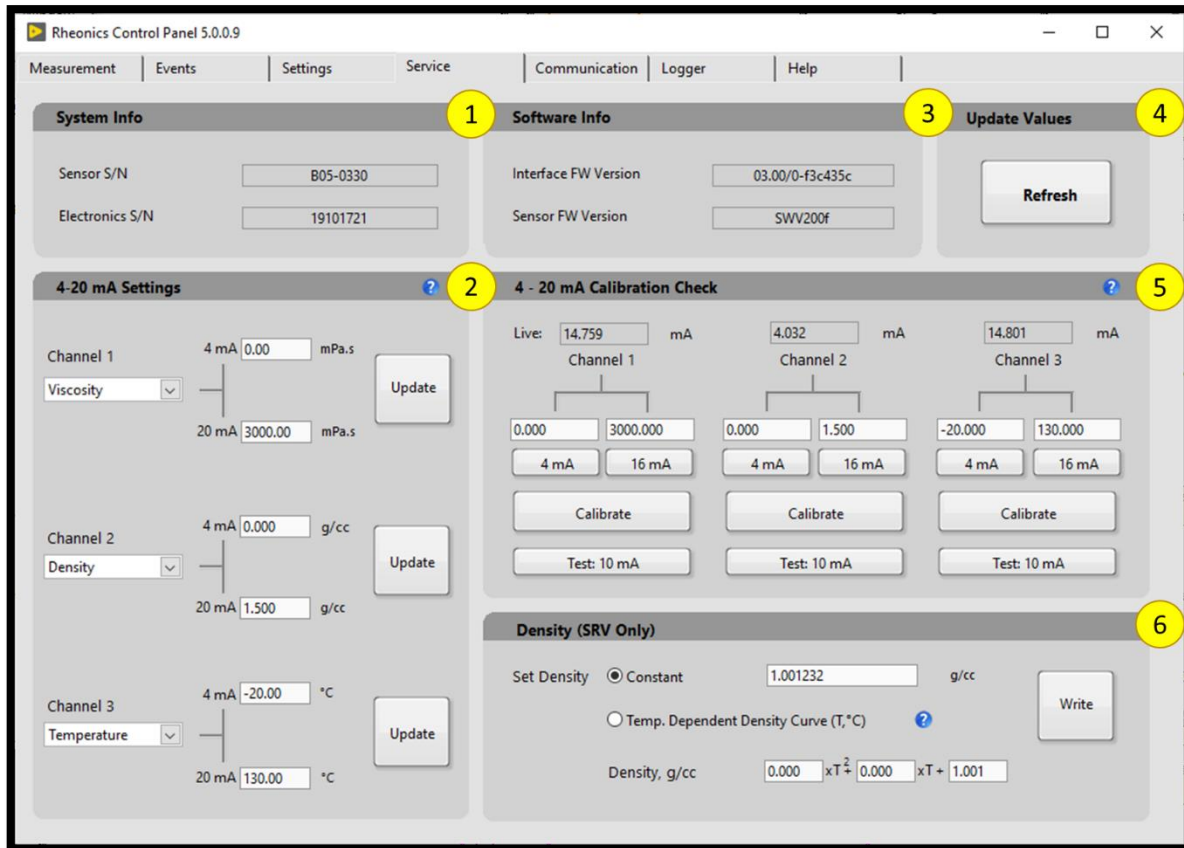
6. **Units and Resolution:** Select the desired units and resolution for Viscosity, Density, Temperature and Pressure.

The selected units are also recorded along with measurement data in the log file.


7. **Graph Settings:** Control the formatting of the graphs on the “Measurement” panel.
  - a. **Parameter:** For Viscosity and Density you can choose the parameter that will be displayed in the chart and logged in the logfile. For Viscosity you may choose between Viscosity median value, Kinematic Viscosity or calculated viscosity. For Density, you may choose between Density median value, calculated density, and concentration. Calculated viscosity and density values are configured in the calculation tab. For details go to section 5.1.8.
  - b. “Auto” on each measurement axis enables automatic ranging of the Y-axis.
  - c. “Fix” on each measurement axis allows user to set the minimum and maximum value for the Y-axis. This can be used to zoom into a range of interest for that parameter.
  - d. Selecting “full” on Time Scale sets the X-axis to show all the data in the buffer. User can select “fix” to set the time axis to a time slot – selected by choosing the time unit and amount of time required.
  - e. **Graph Interval** controls the display of data as received from the sensor in “realtime” or sampled and displayed at the time intervals set by “Logging interval”.

### 5.1.4 Service Tab

This tab is used to configure the communication channels on the sensor.



Correct execution of a function will turn the button **GREEN**. While the command is executing the button will be **YELLOW**. A fault with the execution will turn the button **RED**. In case a button turns **RED**, verify that the correct configuration parameters are set by clicking the “**REFRESH**” button. In case of an error repeat the steps again.

Help icons  are located in different parts of the program to offer more detailed information about the functions and characteristics of each section of the panel. By clicking the icon, a window with the description of the section to configure will be displayed.

1. **System Info:** Shows the sensor serial number and the SME serial number.
2. **4-20 mA Settings:** Reads and sets the upper and lower limits for each 4-20 mA measurement channel. Short steps are described below, a detailed description is in Section 5.1.4.2
  - a. Below the “Channel” tag, you can select in the dropdown list the parameter that will be assigned to that specific channel.
  - b. Set the value of the parameter for each channel that corresponds to 4mA and 20 mA.
  - c. Click “**Update**”
  - d. The output is then scaled accordingly on that specific 4-20mA channel. The figure shows an example where the range for viscosity is desired to be set from 0.0 cP to 3000.0 cP. Entering 0.0 for 4mA and 3000.0 for 20mA and clicking “Update” button sets the channel 1 output to the desired range.
3. **Software Info:** Displays Interface Firmware Version and Sensor Firmware Version



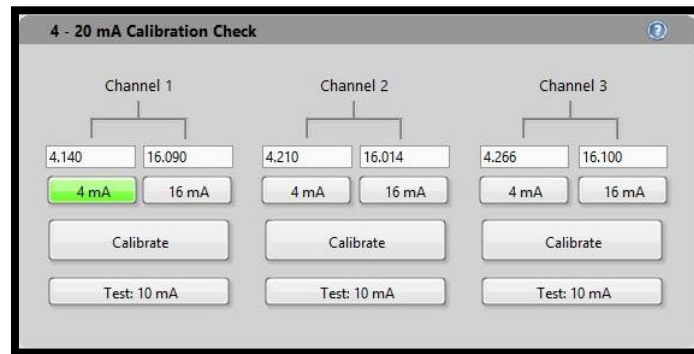
4. **Refresh** the configuration parameters in the tab.
5. **Shows the current 4-20mA channel calibration.** Verify and calibrate each 4-20mA output channel. The steps below describe calibrating 4-20mA channel 1, these can be repeated to calibrate the other two channels (2, 3). A detailed description is in Section 5.1.4.1. The “Live” or actual current output value is displayed on top of each channel.
  - a. Clicking “**4 mA**” button on Channel 1 sets the 4-20mA channel 1 to an nominal 4 mA signal. A high accuracy milliammeter or 4-20mA calibrator should be used to measure the actual output current. The value should be input in the box above the “**4 mA**” button. In the example, that value is 4.140.
  - b. Clicking “**16 mA**” button on Channel 1 sets the 4-20mA channel 1 to a nominal 16 mA signal. A high accuracy milliammeter or 4-20mA calibrator should be used to measure the output current. The value should be input in the box above the “**16 mA**” button. In the example, that value is 16.090.
  - c. Clicking the “**Calibrate**” button will calculate the correct coefficients (a linear polynomial) that accurately matches the current to the actual measurement, and uploads the coefficients to the SME.
  - d. To verify calibration, click the “**Test: 10 mA**” button, this outputs an accurate 10mA current on the SME channel 1. this can be verified using the current measurement setup above.
  - e. Click the “**Test: 10 mA**” button again to switch 4-20mA channel 1 to normal mode. Channel 1 will then output a calibrated signal corresponding to the measured viscosity.
6. **Density (SRV Only).** Set a constant or second order polynomial for density used in calculating the viscosity, since the primary measured value is the product of density and viscosity.
  - a. To set constant density, select “**Constant**”, input the desired value of density and click the “**Write**” button. This will set the density to the input value in the SME. The output viscosity from the SME will now be estimated by dividing the “density-viscosity” product actually measured by the SRV with the input density.
  - b. To set a temperature dependent density curve, select “**Temp. dependent density curve**” and input the coefficients for the curve. A second order polynomial can be input; setting the higher order coefficients to 0.0 will reduce the overall order of the polynomial curve. Click “**Write**” button to upload the coefficients to the SME.

#### 5.1.4.1 4-20 mA Calibration Check

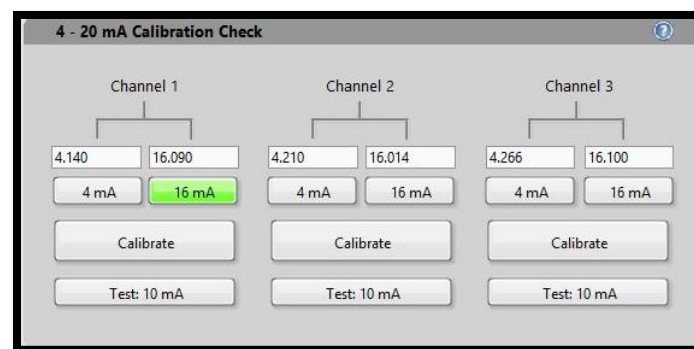
The SME has three 4-20 mA outputs; to output measured Viscosity, Density and Temperature. Each channel can be calibrated individually. To calibrate one channel (ch1 for example) follow these steps:

1. Attach a current measurement instrument to measure the current on channel 1, attach between -gnd and ch1. Ensure the instrument has a measurement accuracy better than desired accuracy. By default, the channels are factory calibrated to better than 1% absolute accuracy
2. Click the “**Service**” tab.

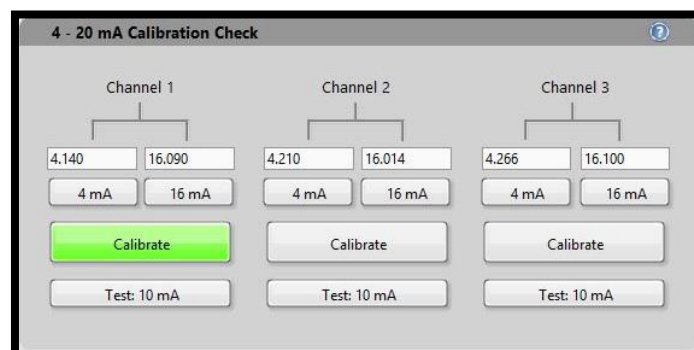
- In **"Service"** tab click the **"4 mA"** button, under the **"channel 1"** label. This will output a 4 mA current through ch1. The 4 mA button will turn green to indicate that the SME is in "4mA mode"



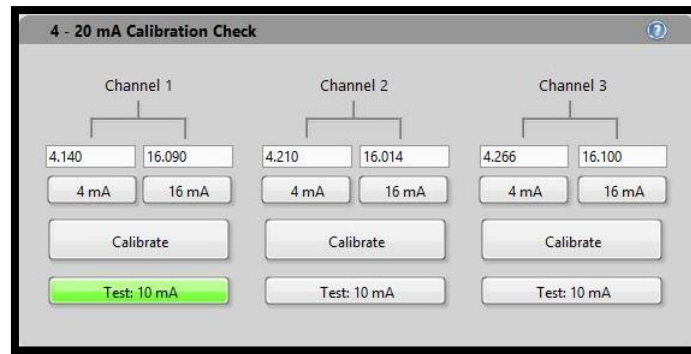
- Register the value measured with the millimeter in the box above the 4 mA button.
- Click the **"16 mA"** button, under Channel 1 tag to output a 16 mA current through channel 1. The 16 mA button will turn green to indicate that the SME is in 16 mA mode. Also, the 4 mA button will go back to gray color, since the SME is no longer in that state.



- Register the measured value in the box above the 16 mA button.
- Press **"Calibrate"** button to send the measured values to the SME. If the command was correct, the button will turn green for two seconds and go back to gray, to indicate that the SME is in measurement mode.



- To verify the calibration, click on the **"Test: 10 mA"** button, to output a calibrated 10 mA current through the channel. The button will remain green until you press it again, and then the system will go back to measurements mode.



The screenshot shows the '4 - 20 mA Calibration Check' window. It is divided into three columns for Channel 1, Channel 2, and Channel 3. Each channel has two input boxes for '4 mA' and '20 mA' values, a 'Calibrate' button, and a 'Test: 10 mA' button. Channel 1 values are 4.140 and 16.090. Channel 2 values are 4.210 and 16.014. Channel 3 values are 4.266 and 16.100.

Repeat this process for each channel.

#### 5.1.4.2 4-20 mA Settings

The RCP can be used to change the measurements limits for each channel, in the measurement units selected in **“Settings”** tab for Viscosity, Density and Temperature. To change the upper and lower limits, follow the next steps:

1. Enter the desired lower limit on the box labeled **“4 mA”**.
2. Write the desired upper limit on the box labeled **“20 mA”**.
3. Click the **“Update”** button to send the new values to the SME. If the write operation succeeds, the **“Write”** button will turn green for a few seconds. Otherwise will turn red and the boxes will go back to the previous values.

Repeat the process for each channel.



The screenshot shows the '4-20 mA Settings' window. It is divided into three sections for Channel 1 (Viscosity), Channel 2 (Density), and Channel 3 (Temperature). Each section has two input boxes for '4 mA' and '20 mA' values, and an 'Update' button. Channel 1 values are 0.00 mPa.s and 3.00E+3 mPa.s. Channel 2 values are 0.000 g/cc and 1.000 g/cc. Channel 3 values are -20.00 °C and 130.00 °C.

#### 5.1.4.3 Density input for SRV

## APPLICABLE ONLY FOR SRV - INLINE VISCOMETER

The SRV measures the density-viscosity product of the fluid:

Density-Viscosity Product =  $\rho \cdot \eta$

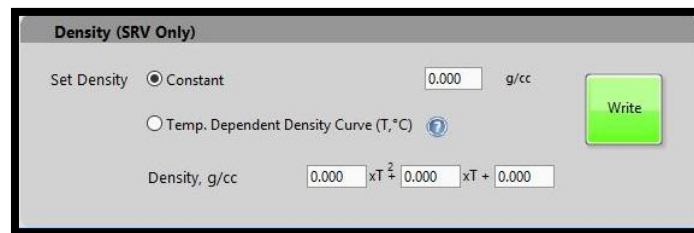
$\rho$  = Density [g/cc]

$\eta$  = Dynamic viscosity [mPa.s]

The Rheonics Control Panel allows you to enter the appropriate fluid density to obtain the dynamic viscosity ( $\eta$ , in mPa.s) or kinematic viscosity ( $\eta/\rho$ , in cSt). By default, the electronics and software use 1 g/cc as the density. To enter the actual density of the fluid in the software you can choose a constant density or a second order, temperature dependent polynomial.

#### Entering a constant Density

1. Select **“Constant Density”** radio button in the **“Service”** Tab.
2. Update the constant density in the box on the right of the radio button, with the measurement units that you set in **“Settings”** tab.
3. Click **“Write”** to write the density value. If the command succeeds, the button will turn green for a few seconds. Otherwise the button will turn red.



#### Setting a second order polynomial:

1. Select the **“Temp. Dependent Density”** button.
2. Fill the coefficients of the polynomial. The second order coefficient has units of g/cc/T<sup>2</sup>, the first order has units of g/cc/T, and the constant coefficient has units of g/cc. Temperature is in °C.
3. Click the **“Write”** button to write the new values in the SME. If Ok, the button will turn green. Otherwise, it will turn red for a few seconds.

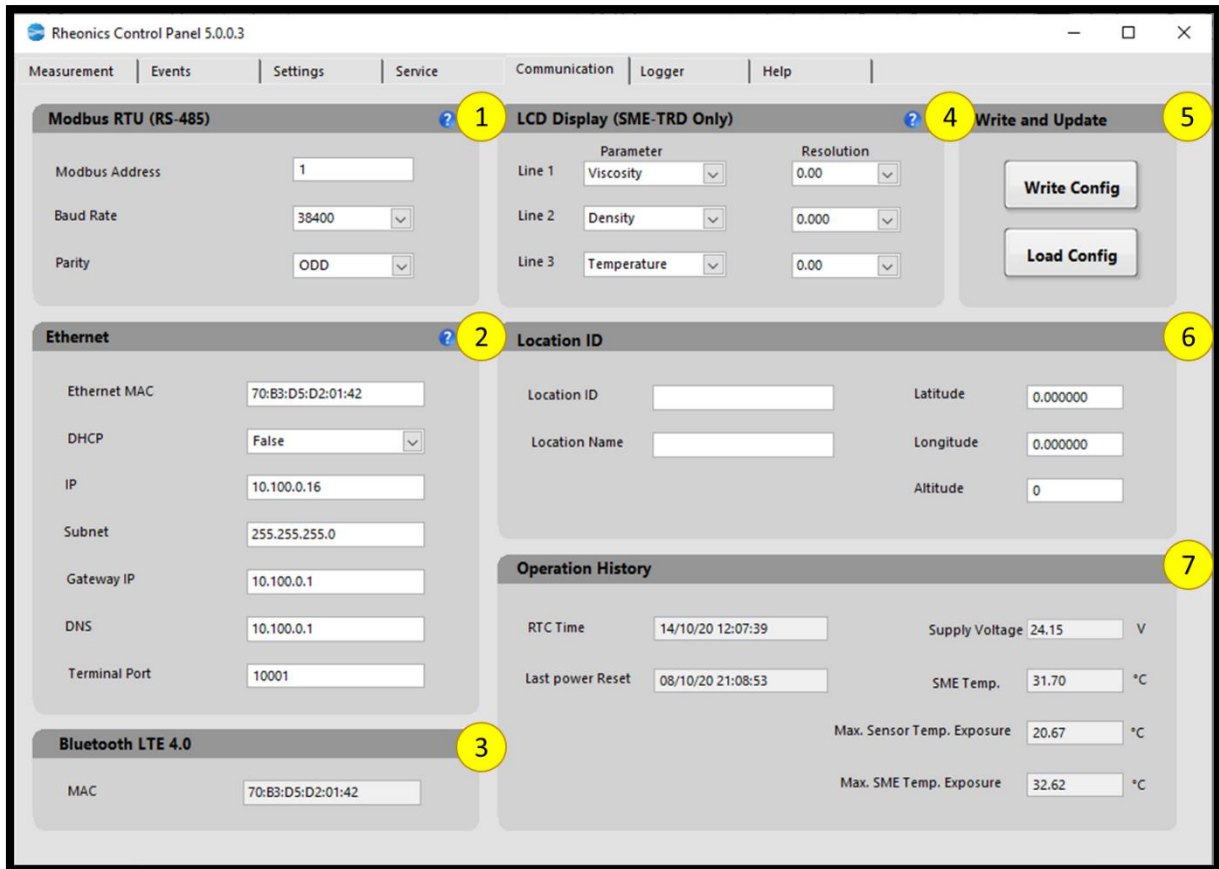
### 5.1.5 Diagnostics Tab (Service Mode)

1. **Errors and Warnings:** Shows a list of last application errors and warnings. This information is useful to set or restore the normal functionality of the application, in case of any error or wrong configuration. Please refer to section 6 to see the most common codes and warnings and possible solutions.
  - a. **Click** the “Open Error File” link, to open the error file and get more information about errors and warnings.
  - b. **Click** the “X” to clear the error list.
2. **E-Box String Reception:** Shows a list of the last received strings from the SME.
  - a. **Click** the “Open Debug File” link, to open the debug file and get more information about the received strings. To open this file, you must be logging the measurements. Please refer to section 5.1.11 to log and set events.
  - b. **Click** the “X” to clear the strings list.



### 5.1.6 Communication Tab.

This tab can be used to configure the communication settings of the SMET, as well as interphase characteristics, and operation information. This tab will be enabled if the connected device is an SMET and after the configurations are correctly loaded from the sensor.



The screenshot displays the 'Communication' tab of the Rheonics Control Panel 5.0.0.3. The interface is organized into several sections, each with a numbered callout:

- 1. Modbus RTU (RS-485):** Includes fields for Modbus Address (1), Baud Rate (38400), and Parity (ODD).
- 2. Ethernet:** Includes fields for Ethernet MAC (70:B3:D5:D2:01:42), DHCP (False), IP (10.100.0.16), Subnet (255.255.255.0), Gateway IP (10.100.0.1), DNS (10.100.0.1), and Terminal Port (10001).
- 3. Bluetooth LTE 4.0:** Includes a field for MAC (70:B3:D5:D2:01:42).
- 4. LCD Display (SME-TRD Only):** Includes a table for LCD lines with columns for Parameter and Resolution. Line 1 is Viscosity (0.00), Line 2 is Density (0.000), and Line 3 is Temperature (0.00).
- 5. Write and Update:** Includes buttons for 'Write Config' and 'Load Config'.
- 6. Location ID:** Includes fields for Location ID, Location Name, Latitude (0.000000), Longitude (0.000000), and Altitude (0).
- 7. Operation History:** Includes fields for RTC Time (14/10/20 12:07:39), Last power Reset (08/10/20 21:08:53), Supply Voltage (24.15 V), SME Temp. (31.70 °C), Max. Sensor Temp. Exposure (20.67 °C), and Max. SME Temp. Exposure (32.62 °C).

- 1. Modbus RTU (RS-485):** This section will be enabled if the SMET has Modbus characteristics. Modbus configurations can be set; address, baud rate and parity. Refer to Modbus manual for more information.
- 2. Ethernet:** This panel will be active if the SMET has Ethernet connection capabilities. This panel shows the MAC address of the device and allows user to set DHCP to true or false; if true, the IP, gateway, subnet, DNS and port will be automatically assigned by the switch on which the device is connected and will be read only by the RCP (not modifiable by user), otherwise, these parameters can be manually input by user.
- 3. Bluetooth LTE 4.0:** If the device has Bluetooth capabilities, this panel shows the device MAC address.
- 4. LCD Display (SMET-TRD Only):** If the SME has an LCD display enabled, this section will be active. On this section user can set the parameter to be displayed on each one of the three lines of the LCD. The resolution of each parameter can also be modified in the dropdown menu.
- 5. Write and Update:** In this section all the configurations input by user on the comm configure tab can be written to the SMET by clicking the "Update SMET" button. If the writing operation is successful the button will show a green light, otherwise will show a red light. The panel can be refreshed by clicking the "Refresh" button, reading all the configurations

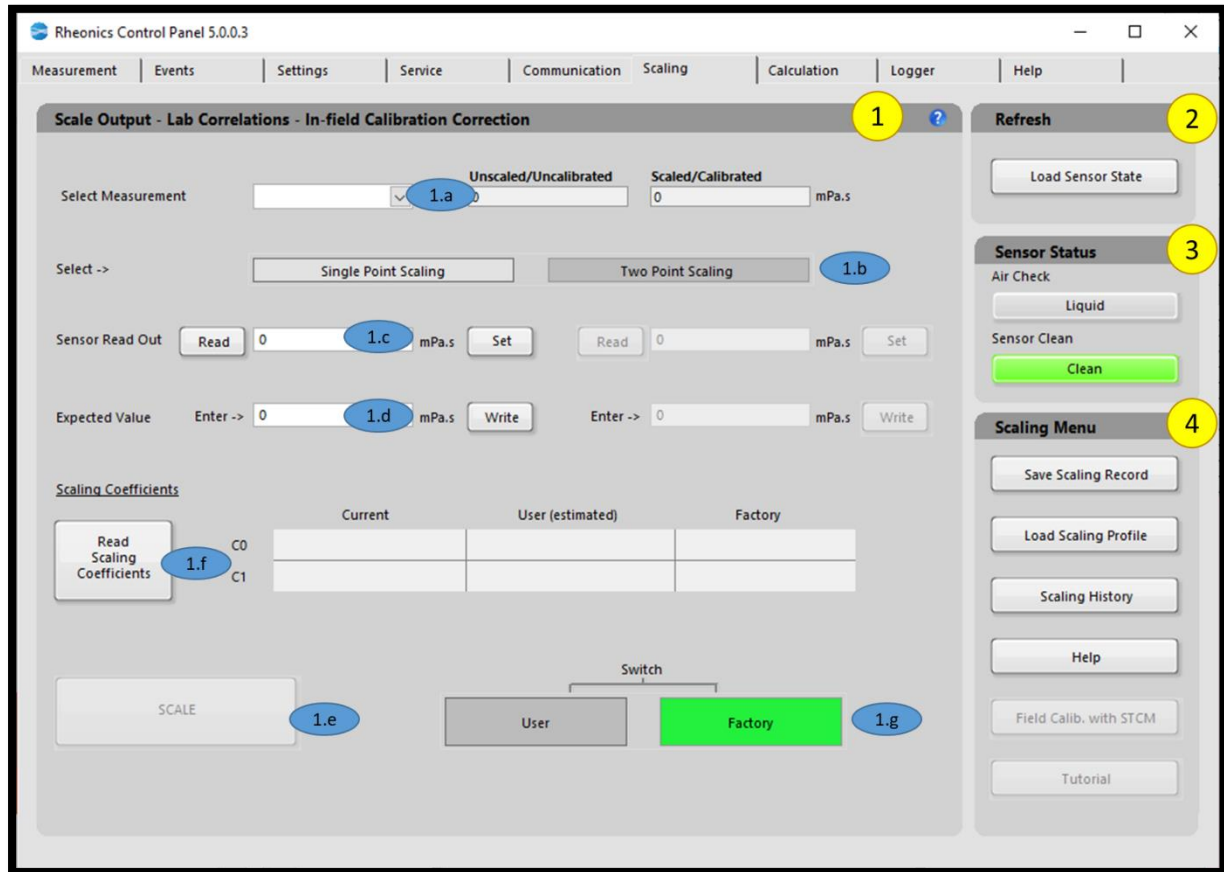
from the SMET. When the reading is complete and the panel is updated the buttons shows a green light, and if there is an error it will show a red light.

6. **Location ID:** The user can configure relevant location information of the device in this section, as location ID and location name, latitude, longitude and altitude.
7. **Operation History:** This is a read only panel that shows relevant information about the operation of the SMET as RTC time, last SMET power reset, hardware version, supply voltage, SME temperature, and maximal temperature exposure for both; sensor and SME.

### 5.1.7 Scaling Tab

This Tab allows you to scale, correlate and/or calibrate the main measurement parameters: Viscosity, Density, Temperature and Kinematic Viscosity. Two options are available: Single Point scaling (offset) and Two Point scaling (for Offset and Slope).

This feature is not available for SME firmware version below 3.00/1



1. **Scale Output:** This section allows you to scale the sensor measurements for different parameters (viscosity, density, temperature, kinematic Viscosity). The action buttons “Read”, “Set”, “Write”, “SCALE” and “Read Scaling Coefficients” should turn **GREEN** after successful operation. Otherwise, they will turn **RED**. You should repeat the process if button returns RED, since it means that the action was not achieved/stored in SMET.
  - a. **Select the measurement:** from the dropdown list select the measurement parameter to scale. When selected, the scaled and unscaled values for that measurement will be populated.
  - b. **Select scaling method:** Single Point for offset scaling, or Two Point for offset and slope scaling.
  - c. **Sensor Read Out:** Click “Read” to read the current *unscaled* sensor measurement or enter the SRV output value that should be scaled. Click “Set” to save that measurement as sample 1. Repeat for the two samples if a two-point scaling is selected.
  - d. **Expected value:** Write the expected value for the measurement. Click “Write” to store the value in SMET. Repeat the process for two-point scaling.

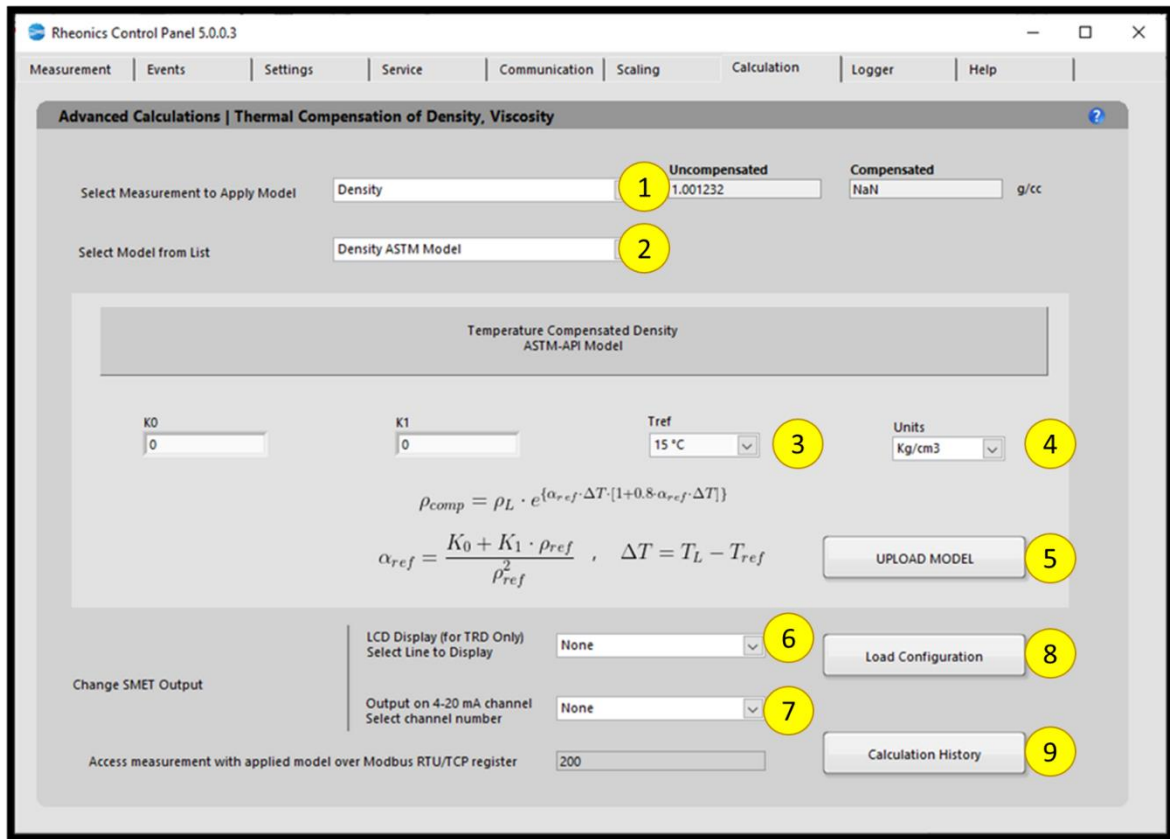


- e. **SCALE:** Click “SCALE” to use the stored samples to scale the SMET output.
  - f. **Read Scaling Coefficients:** Reads from SMET the current, user and factory scaling coefficients. If “current” value coefficients are equal to user coefficients, then the SMET is using the last loaded user scaling. If are equal to Factory scaling the SMET is using factory coefficients. I.e, no scale.
  - g. **Switch:** Click “Factory” or “User” to change between factory scaling and user scaling coefficients.
2. **Load Sensor State:** Reads the measurements, measurements status and sensor status. Click this button to refresh the sensor status.
3. **Sensor Status:** Displays whether the sensor is in air, or if it is in a fluid. If the sensor is in air, “Air Check” LED light will be **GREEN**, otherwise it will show a **gray** color. If sensor is in fluid, a **GREEN** light in the Sensor Clean LED indicates that the sensor is clean, if sensor is not clean, it will display a **RED** color.
4. **Scaling Menu:** Use these buttons to access:
- a. **Save Scaling Record:** Use this button to store the scaling measurements in a file for future use. It’s recommended this file is created after you’ve scaled all the desired parameters.
  - b. **Load Scaling Record:** Loads a scaling file into memory. This will load the measurements for previous scaling processes into the software. Then these measurements must be loaded into the SMET by following the scaling procedure; that is, clicking “Set”, to store the actual measurement, “Write” to store the laboratory samples or expected values, and “SCALE” to change the scaling.
  - c. **Field Calib. With STCM.** Available for users with Temperature control
  - d. **Scaling History:** Opens a csv file with the scaling history. This shows a list of scaled parameters and coefficients.
  - e. **Help:** Click help to display scaling help.

### 5.1.8 Calculation Tab

Calculation tab allows you to configure the SMET, to use the internal parameters; Viscosity, Density, Temperature etc, to estimate more complex parameters like temperature compensated viscosity and temperature compensated density.

This feature is not available for SME firmware version below 3.00

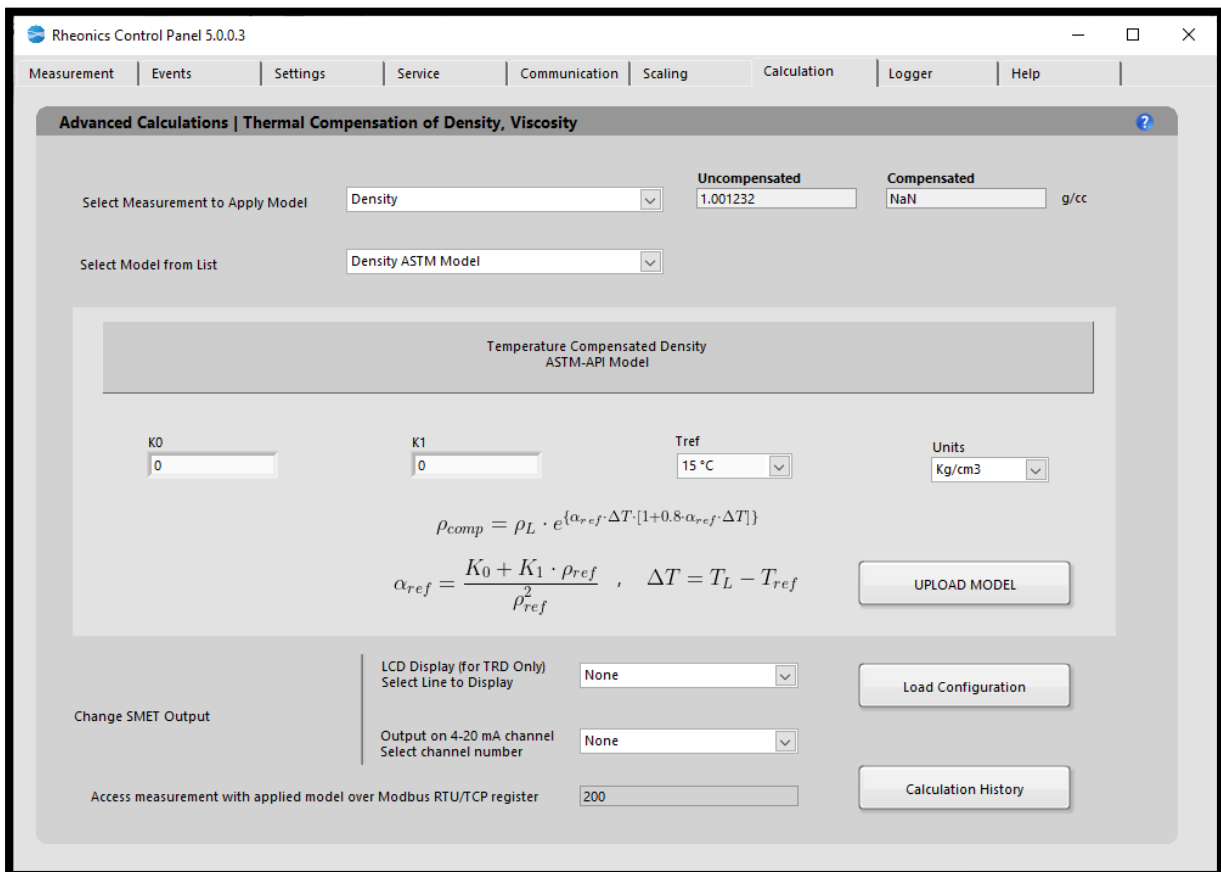


Once you setup a model, the calculation results can be output in any of the 4-20 mA channels, in Modbus registers and in the SMET display (for SMET-TRD only).

To configure a calculation model follow these steps.

1. In the Dropdown list "Select Measurement to Apply Model", switch between density and viscosity. That will modify the "Select Model From List" dropdown menu values. For example, if you select "Density" from the list, that will refresh the models available for density.
2. In "Select Model from list" select the model you would like to use for the specific parameter. When you select the model, you will get more information about the specific equation used and the coefficients you will need to apply that model. For example, in Density, the API-ASTM Model for compensation is available.
3. Input the coefficients needed for the model estimation. For example, in the case of API-ASTM Model, you would need the K0 and K1 coefficients for the conversion tables.
4. Select the measurement units you would like the parameter to be displayed or output from the SMET.

5. Click "UPLOAD MODEL" to load the model settings into SMET. The button should turn **GREEN** for a couple of seconds if the action was successful or turn **RED** if the operation was unsuccessful. This action will refresh the values for the Uncompensated and Compensated indicators. Here you can verify if the model is calculating the expected values. If not, you can correct and repeat the process.
6. Select from the dropdown list "LCD Display", the line where the calculation should be displayed. This only applies for SMET-TRD. For others, leave as "None".
7. Select the 4-20 mA channel (from Channels 1 to 3), where the values should be scaled and output. Leave as "None" if the parameter is not going to be output in any channel. Ensure you set the correct range for the 4-20 mA channel in the service tab. Channel limits will turn **red** until you configure the proper limits.
8. Click "Load Configuration" to update the display and channel configurations in SMET.
9. "Calculation History" button allows you to open a file where the last uploaded models and coefficients for these models are stored. This is for user reference.



Rheonics Control Panel 5.0.0.3

Measurement | Events | Settings | Service | Communication | Scaling | Calculation | Logger | Help

**Advanced Calculations | Thermal Compensation of Density, Viscosity**

Select Measurement to Apply Model: Density

Select Model from List: Density ASTM Model

Uncompensated: 1.001232

Compensated: NaN g/cc

Temperature Compensated Density  
ASTM-API Model

K0: 0

K1: 0

Tref: 15 °C

Units: Kg/cm3

$$\rho_{comp} = \rho_L \cdot e^{\{\alpha_{ref} \cdot \Delta T \cdot [1 + 0.8 \cdot \alpha_{ref} \cdot \Delta T]\}}$$

$$\alpha_{ref} = \frac{K_0 + K_1 \cdot \rho_{ref}}{\rho_{ref}^2}, \quad \Delta T = T_L - T_{ref}$$

Change SMET Output

LCD Display (for TRD Only)  
Select Line to Display: None

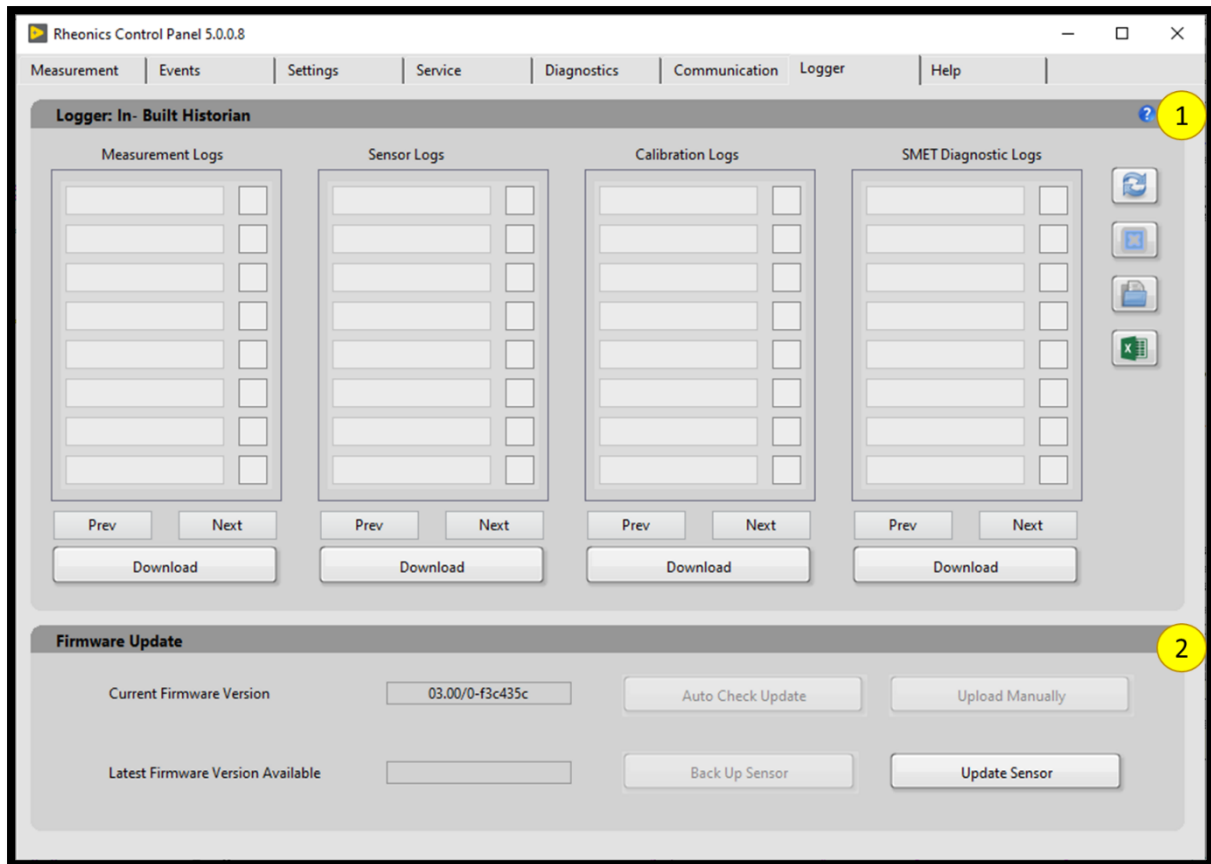
Output on 4-20 mA channel  
Select channel number: None

Access measurement with applied model over Modbus RTU/TCP register: 200


Buttons: UPLOAD MODEL, Load Configuration, Calculation History

### 5.1.9 SD Logger

This tab allows you to transfer from the SMET, the different type of log files that are kept in memory. Also, you can use the “Update Sensor” function to upgrade the SMET firmware.






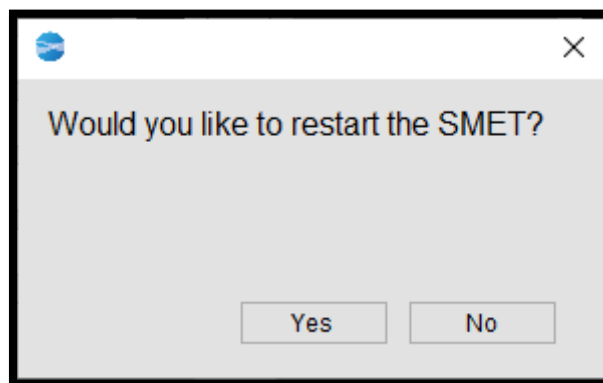
#### 1. Logger: In-Built Historian:

- a. Click the “Refresh”  button to populate the different file names according to its type. The name format corresponds with the date the file was created. This is, every day a set of new files is created.
  - i. Measurement logs; contains the measurement processed by the SMET in a csv format.
  - ii. Sensor logs; contains the sensor measurements ASCII string with relevant sensor information.
  - iii. Calibration Logs; These files store the calibration information, as parameters calibrated and coefficients.
  - iv. Diagnostics Logs: Relevant sensor and electronics diagnostics information for rheonics support.

After refreshing, check ☐ the files you wish to download. You can navigate to older files using “Next” button, and return to most recent using “Prev” Button.

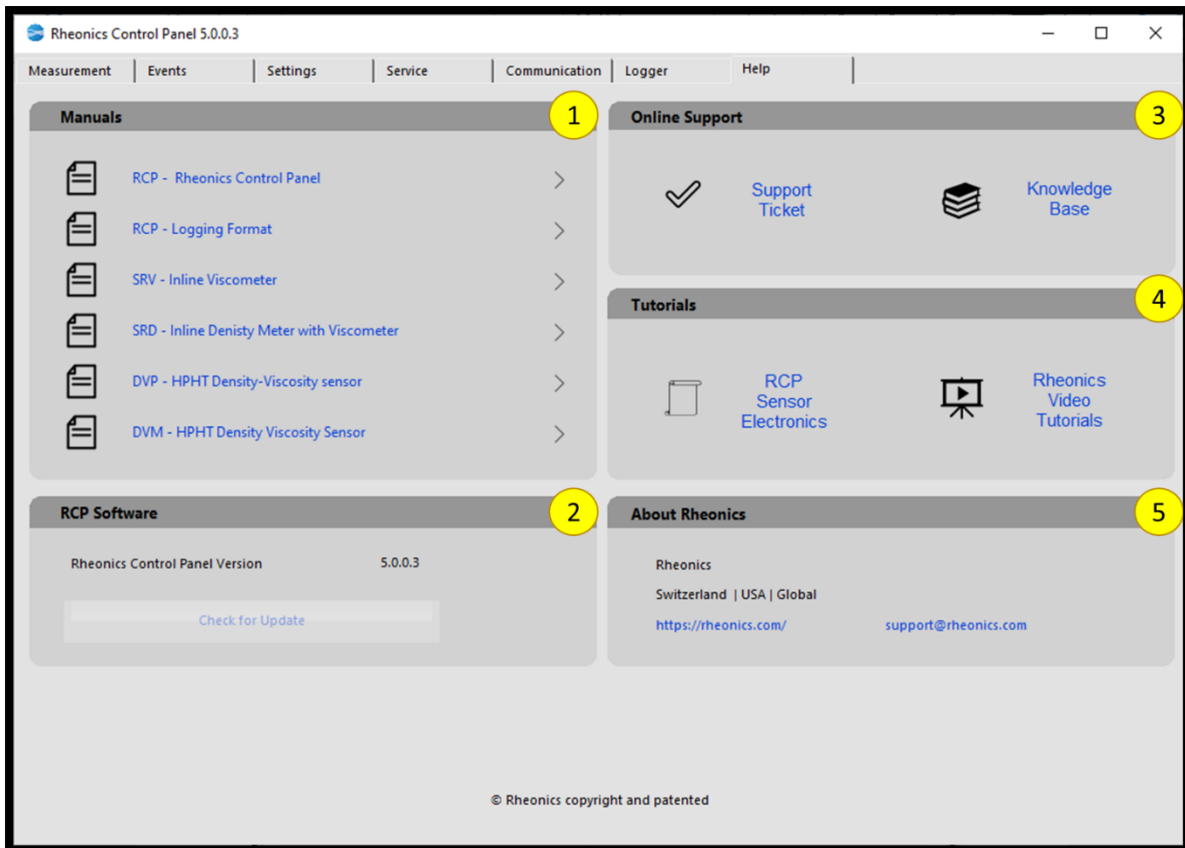
Click “Download” to start downloading the file. You will be prompted to select the target folder where the files will be stored and get a notification after successful or unsuccessful transfer.

- b. Click the “Clear All”  button to uncheck ALL the selected files.
- c. Click “Open Folder”  to open the target folder that contains the downloaded logfiles.
- d. **Export files to Excel:** Use this button  to export the SMET measurement logfiles and the RCP logfiles to Microsoft excel. By clicking this button, a file dialog will prompt you to choose a file to export. The files available will be of the -P type (corresponding to downloaded SMET measurement logfiles), or of the type “Filename\_log.txt”, where “Filename” is the name of a RCP measurements logfile created on a previous run.
  - i. For -P files, the software will export on first two columns the date and time of each data sample on UTC and local time, respectively. Other columns will display the measured values of all the measurement parameters.
  - ii. For RCP logfiles, RCP will copy the data of the logfile and assign each csv column into an excel column with no further modifications.
- e. Click “Update Sensor” to upload a new firmware to the SMET. The software will prompt for a file to upload. This file should be provided by rheonics. Select the file path. The software will upload it to the SMET and on successful upload give a dialog to reset the electronics. Click “Yes”, if you will like the SMET to be updated to the new firmware.



### 5.1.10 Help Tab.

The Help shows links to help files, and the main information of the application.

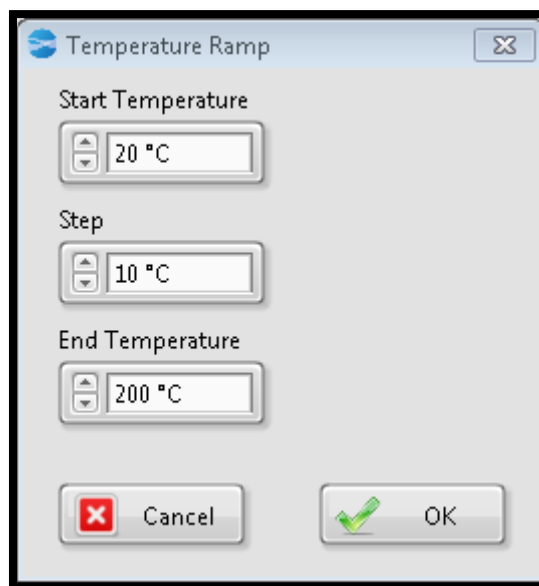


1. **Manuals:** A list of links to the main help files of the application and the different type of sensors. You can click on the “>” icon to be directed to website to request respective manual.
2. **RCP Software:** Information about RCP software version.
3. **Online Support:**
  - a. Click on “Support Ticket” to get redirected to the rheonics support site, where you can generate a support ticket with your specific request.
  - b. For FAQ click on “Knowledge Base”, where you will find articles and relevant information about sensors.
4. **Tutorials:**
  - a. On RCP sensor electronics, you will be redirected to the rheonics support site, where you will find more documentation about SMET.
  - b. Click on Video Tutorials to be redirected to the rheonics Youtube support channel.
5. **About Rheonics:** In this section you can find the web site link and support email address.

### 5.1.11 Temperature Control Tab. (DTCM Only)

The “Temperature Control” tab controls and monitors a Peltier element through a thermoelectric controller (TEC), to heat or cool the DVM sensor, according with the user’s requirements. This tab has five sections:

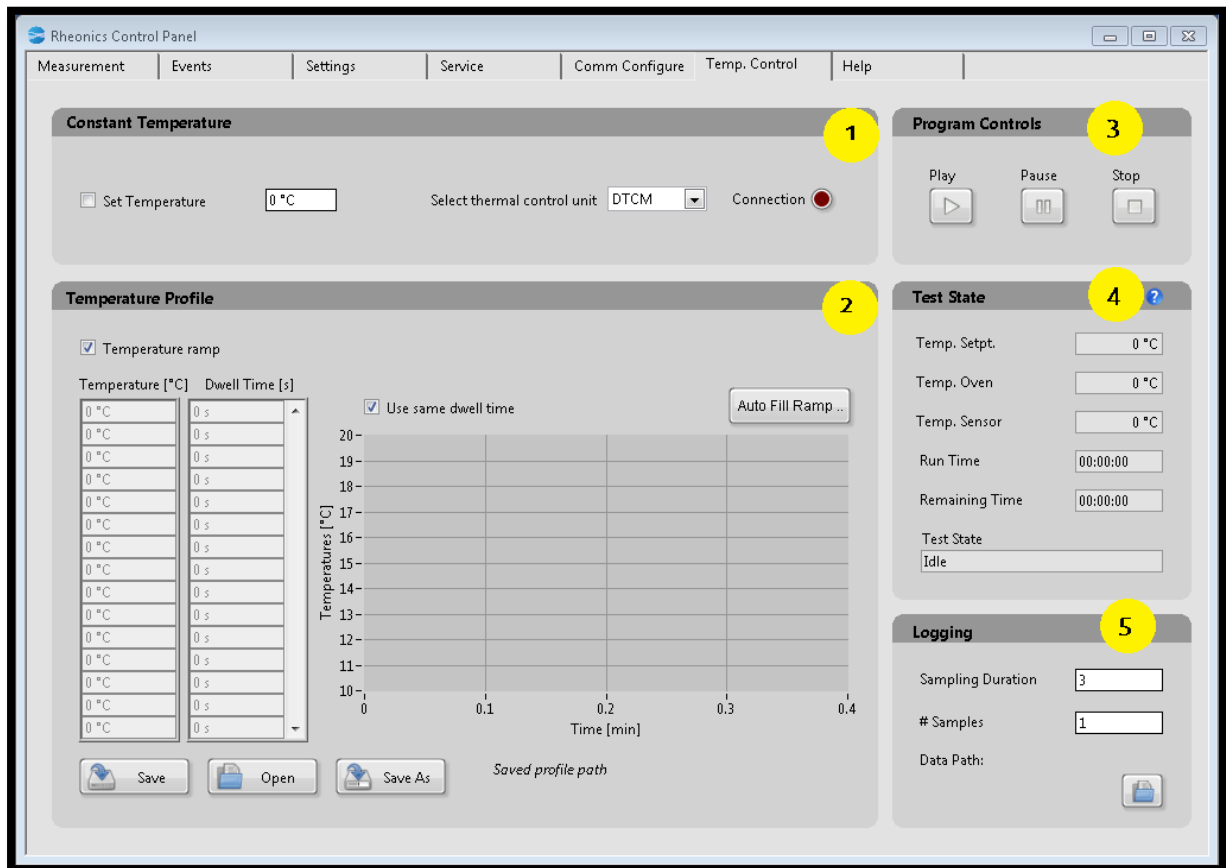
1. **Constant temperature:** Sets the constant temperature in constant mode operation (see section 5.1.11.1), and allows user to select the thermal control unit (DTCM by default). The “connection” indicator turns **GREEN** once the test is started and the control unit is connected. If no connection can be established the led will turn **RED**, and if a controller error occurs the led will turn **YELLOW**.
2. **Temperature Profile:** Sets the range of temperatures and wait times to operate in temperature profile mode (see section 5.1.11.2). By clicking the “Temperature Ramp” the test will run in this mode. The “Temperatures” can be manually input, or can be filled automatically with the “Auto Fill Ramp” function, setting only the start temperature, the end temperature and the step. The “Dwell Times” can also be filled manually; if “Use same dwell time” is enabled, the same dwell time will be used for each temperature, otherwise, a dwell time should be written for each step.



The test configuration can be saved in to a configuration file (\*.tcg) using the “Save” button. Also, a previously created configuration file can be loaded by means of the “open” button. By clicking the “save as” button, a configuration previously loaded can be saved in a new file.

3. **Program Controls:** To Play (Start), Pause or Stop a test.
4. **Test State:** Shows the parameters values read during the test. The “Temp. Setpt.” Shows the value in °C of the temperature setpoint read from the controller, the “Temp. Oven” indicates the Peltier temperature, and the “Temp. Sensor” shows the sensor temperature read from the DVM string. By clicking the help icon, a window is displayed showing more parameters read from the TEC, as offset, sink temperature, PWM % of the fan controllers, output current and output voltage.

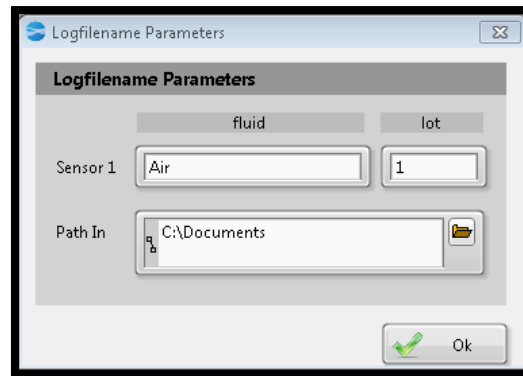
5. **Logging:** The “sampling duration” is a parameter used during temperature profile operation to calculate the “#samples” that should be taken on each step of the test. These parameters are not considered during constant temperature operation. The “Data Path” shows the path of the folder where the logfiles are being kept and the button next to it opens the folder where these files are located.



#### 5.1.11.1 Constant Temperature Mode

In constant temperature mode a constant temperature value is written to the TEC at the start of the test. The RCP will log during all the test, taking samples of the Peltier element and sensor temperature on each logging RCP interval. The test will last until the user clicks the “Stop” button. At the start of the test the user is prompted to select the path where the logfile, events file, debug file and temperature log file will be saved. The temperature logfile keeps the most relevant parameters, measured every 10 seconds from the TEC. The name format is in the form “Date\_Time\_SensorType\_Fluid\_Lot”.

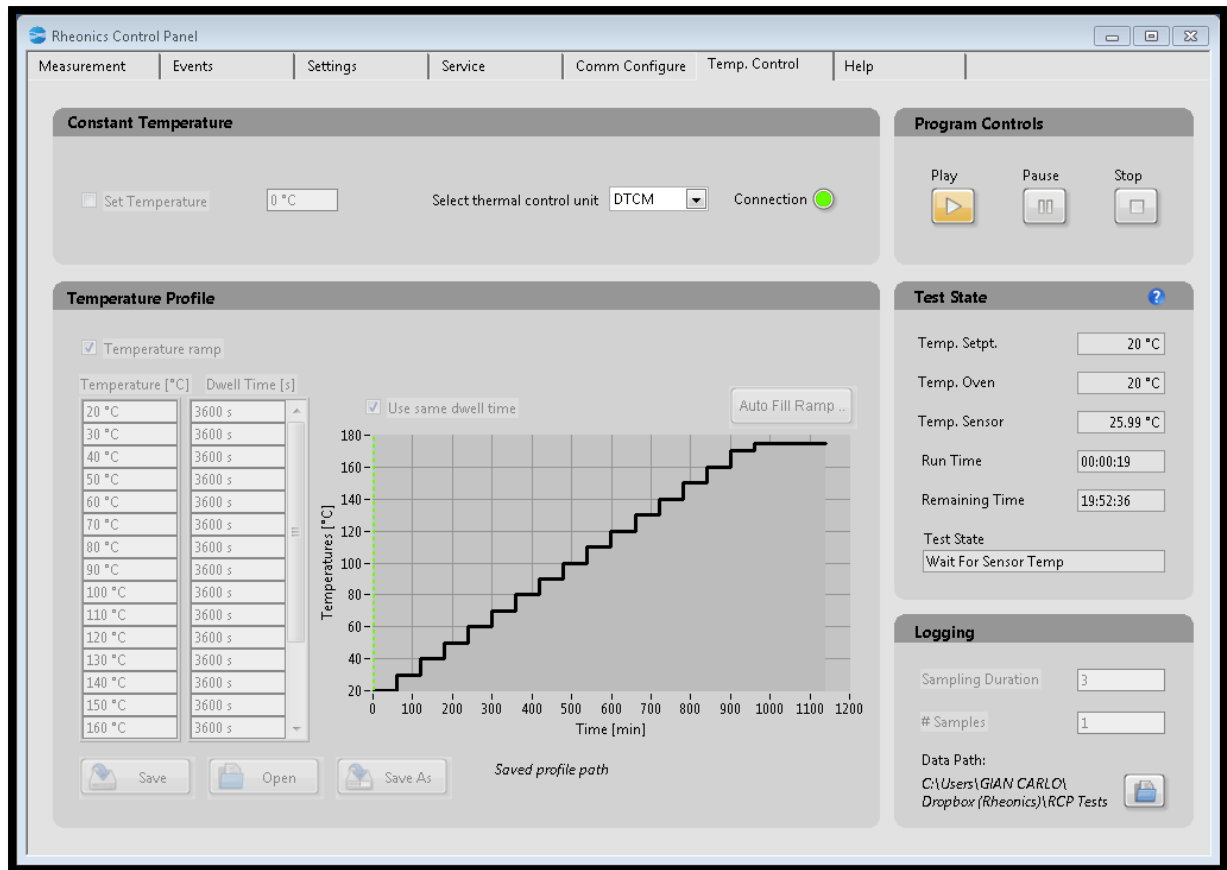




#### 5.1.11.2 Temperature Profile Mode

In this mode, a temperature profile can be obtained by setting a range of temperatures and taking a determined number of samples after the “Dwell Time” elapses for each temperature step. The “number of samples” is defined as the quotient between the “Sampling Duration” (in front panel) and the “Sensor Sample Period” (in the DTCM.ini file, 3 seconds by default). At the start the user is prompted to input the data path of the files, and six files are created; Logfile, debug file, events file, measurements file, average file, and temperature logfile. In the measurements file, the samples taken for each step are saved, meanwhile, in the average file, the average of the measured parameters on every temperature step is calculated.

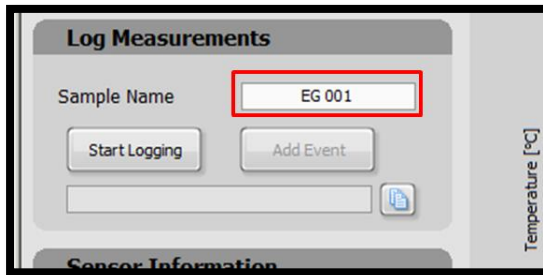
The test duration will depend on the dwell times for each step, the temperature difference between the steps, the number of samples to be measured and the logging interval between samples. If no errors, the test should end after the samples of the last temperature steps are taken. The dwell time between steps should be long enough to ensure that the temperature of the sensor is stabilized before taking the measurements (30 minutes approx.).



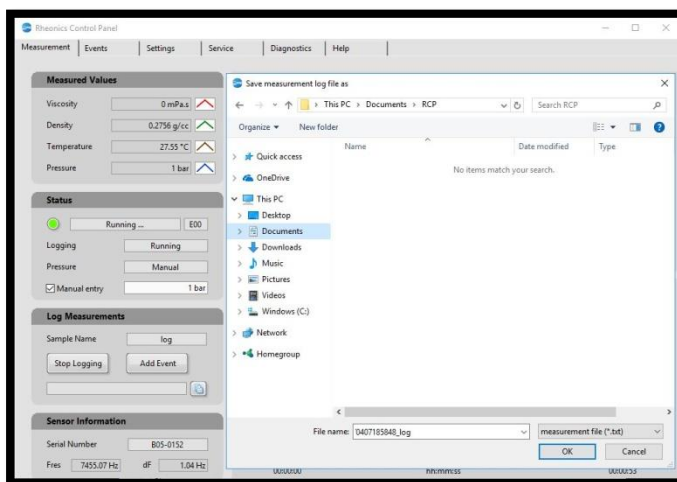
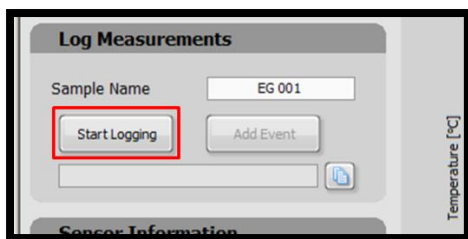
## 5.2 Logging data and set events

Logging the measurement data for further analyses

1. Before starting data logging, enter a sample name in the appropriate box:



2. When the **“Start Logging”** button is clicked, a file dialog pops up asking for a log file path. The default name is YYYYMMDDHHMMSS where the first 8 characters are a date code, and the next 6 are a time code. This can be changed to a user provided name:

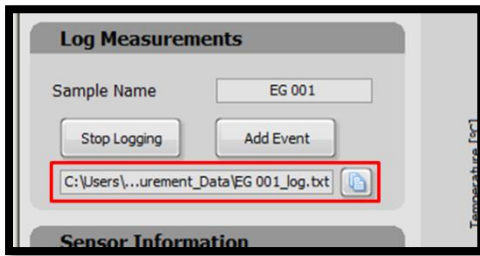


Navigate to the desired folder and click “OK”.

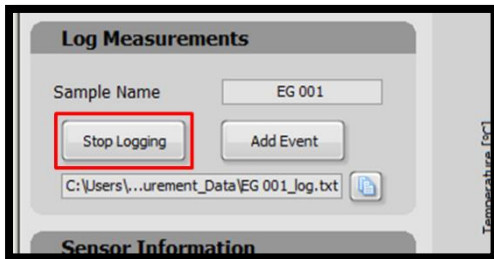
A data log file will be created, and will start logging data.

For more detail about the log files look up on “Help” -> “Log file description”.

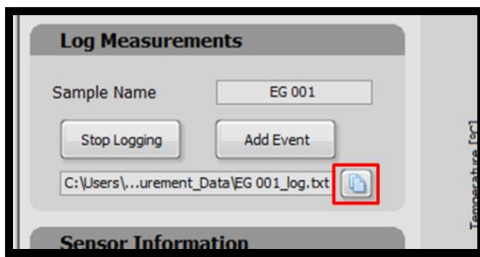
3. The folder and the log file name are shown in the path box:



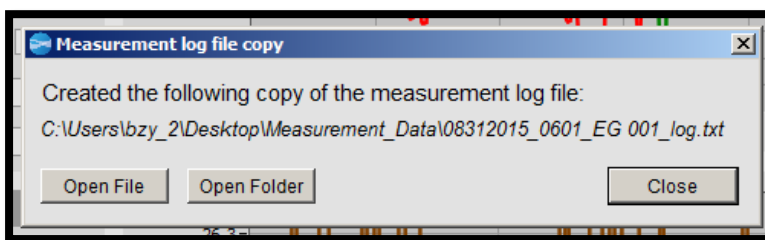
4. Clicking the “Stop Logging” button will stop the logging.



5. Especially when performing long logging runs, it may be desirable to see a “snapshot” of the data collected up to a given time without interrupting the logging process. This can be done by clicking on the button to the right of the log file path box:



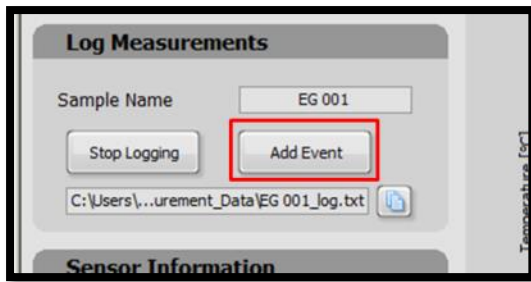
This will automatically store a copy of the log file with the name reported by the pop-up dialog that follows:



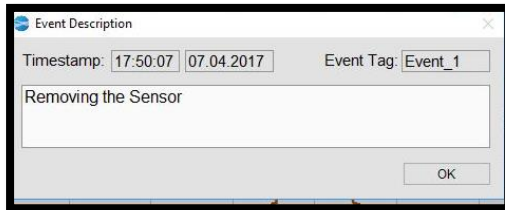
You can directly open the file by clicking the “Open File” button or opening the folder where the copy is saved - by clicking the “Open Folder” button. Close the dialog by pressing the “Close” button.

6. Adding an event to the log.

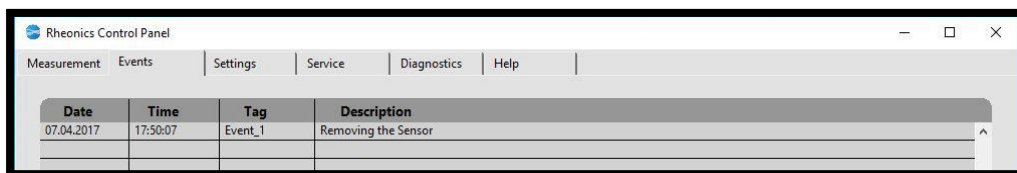
You can add events to log file - for example a change in the measurement condition as changing the sensor or modifying the fluid under test. To enter an event, click on the “Add Event” button:



Type in a description of the event



The entered events are shown in the “Event” panel and are stored in a log file with suffix “\_events.txt”. For more detail about the log files look up on “Help” -> “Log file description”.



NOTE: Each time a new data point is logged (set by the logging interval), the log file is closed, saved, and reopened. This guarantees that even in the event of computer crashes, power failures and other interruptions, that the previously logged data will be safeguarded. This is particularly important during long runs lasting hours or even days.

You can find more detailed information about the logfiles in the [Logfile Description Manual](#).

### 5.3 Rheonics Dataview Windows.

Rheonics Dataview Windows offers an extended and customized view of measured parameters. When the dataview button is clicked from the measurements tab, a new window is opened. This window has two views; by default the “measurements” page is shown.

#### 5.3.1 Measurements View

The measurements window by default shows two graphs, as shown in picture below; the first one plots density and viscosity, the second plots temperature and pressure.

1. On the top of the window, current measurement values are shown.
2. By clicking the **settings** button, the “Settings” page is viewed.
3. On the left side of the first plot a **tools palette** allows to move, vertical zoom, horizontal zoom, and fit the plot. When one of the tools is selected the control is highlighted and the mouse pointer changes when passed over the plot area. The tool can be disabled by clicking it again.
4. Shows the plot area of the first plot.
5. Tools palette of the second plot.
6. Plot area of the second plot.



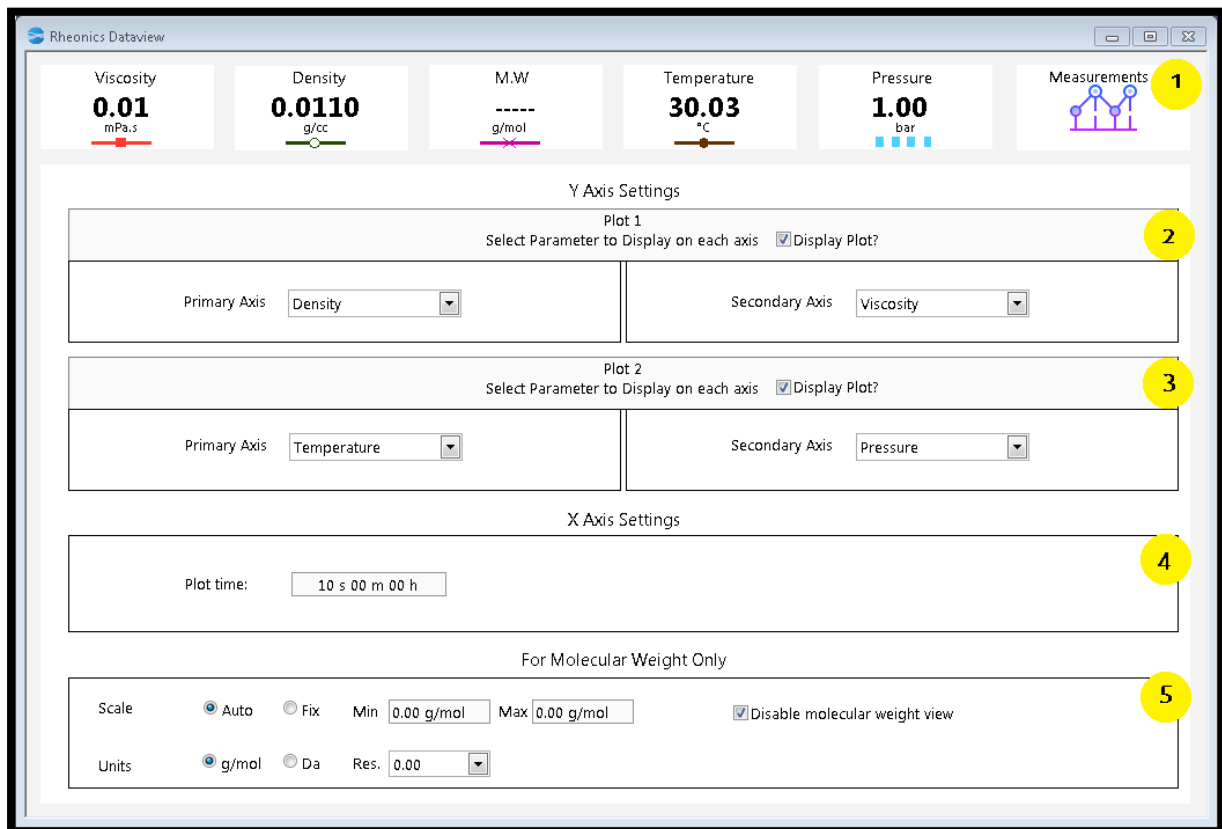
#### 5.3.2 Settings View

When the “Settings” button is clicked the windows switches to a settings page (Refer to image below).

1. Click this button to go back to “measurements” page.

2. **Y axis settings for plot 1;** the parameters to be plotted on each one of the two axes can be selected. Also, the graph itself can be made visible or not visible by checking the “Display plot” control.
3. **Y axis settings for plot 2.**
4. **X axis settings;** in this section the plot time can be modified. Top is 24 hours for real time plot update. It is independent of the time of the RCP graphs.
5. **For Molecular Weight Only:** The Dataview window has the capability of calculating the molecular weight for ideal gases. If Molecular weight is plotted on any of the charts, the y axis range, units and resolution can be modified. The calculation of molecular weight can be disabled.

For viscosity, density, temperature and pressure units and ranges, and for time interval, the Dataview takes the settings from the “Settings” tab of RCP.



The screenshot shows the Rheonics Dataview window with the following sections and settings:

- Measurements (1):** A row of six measurement cards: Viscosity (0.01 mPa.s), Density (0.0110 g/cc), M.W (g/mol), Temperature (30.03 °C), Pressure (1.00 bar), and a Measurements icon.
- Y Axis Settings (2):**
  - Plot 1:** Select Parameter to Display on each axis. ☒ Display Plot?. Primary Axis: Density. Secondary Axis: Viscosity.
  - Plot 2:** Select Parameter to Display on each axis. ☒ Display Plot?. Primary Axis: Temperature. Secondary Axis: Pressure.
- X Axis Settings (4):** Plot time: 10 s 00 m 00 h.
- For Molecular Weight Only (5):**
  - Scale: ☒ Auto ☐ Fix. Min: 0.00 g/mol. Max: 0.00 g/mol. ☒ Disable molecular weight view.
  - Units: ☒ g/mol ☐ Da. Res: 0.00.

## 6 RCP Error Codes and Warnings

Code	Tag	Description	Suggestions
<b>8</b>	"Unexpected Error"	The application does not have enough permissions to modify a system file.	Restart the application as "administrator"
- <b>107380</b> <b>7194</b>	"Communication Error"	The connection for the given serial session has been lost.	Disconnect and Reconnect the SME to the PC
- <b>107380</b> <b>7246</b>	"Communication Error"	The port is valid but the application can't access it	The USB could be disconnected or other application may be using the serial port. Ensure that the USB cable is properly connected and no other application is using the port.
	"Parameter File Not Found"	The application couldn't find the "program.ini" file in the directory "C:\Users\((Username))\Documents\RheonicsControlPanel"	Check if the "program.ini" file is in the directory. If not, contact Rheonics support to obtain the configuration file.
	"Sensor File Not Found"	The program couldn't find any configuration file for a specific sensor. The default configuration is loaded.	Import the configuration file that corresponds with your sensor. Refer to section 4.2
	"Default Sensor File Not Found"	The program couldn't find the default sensor configuration file. Default system values are loaded.	Check if the "sensor_default.config" file is in the directory "C:\ProgramData\RheonicsControl Panel". If not, contact Rheonics support to obtain the sensor default configuration file.
	"Measurement File Not Created"	The user is trying to access a measurement, event or debug file but no logging has been started.	Create a measurement file by starting a data log. Refer to section 5.1.11
	"Import failed"	The import of the sensor configuration file failed.	Retry and make sure that the file type is .config
	"File Creation Error"	There was an error creating the measurement, file.	Please make sure that the selected name and path are available and valid.
	"File Write Error"	There was a problem updating the measurement file	Make sure that the measurement file has not been deleted or isn't opened in another application



TEC controller common errors.

Code	Tag	Description	Suggestions
<b>30-37</b>	"Power error"	Supply There is an error with the TEC power supply.	Check that the power source is connected and within the correct
<b>60</b>	Overtemperature	The Peltier temperature is to high	Check is the fans are connected
<b>130-151</b>	Object temp. Measurement errors	Circuit measurement failures	
<b>140-144</b>	Sink Temp. errors	Errors with sink measurements	Check the fans and sink temperature.

For other error codes please contact Rheonics.

## 7 Common Sensor Errors

Code	Tag	Description	Suggestions
<b>10,20,30</b>	Low Accuracy	Sensor is Locked but measurement may not be stable for accuracy	Make sure sensor is not stable and not touching any surface
<b>1,2,11,12,21,22</b>	Sensor Unlocked	The sensor is not locking properly to a measurement value	Check the sensor position and wiring
<b>13</b>	Sensor is not connected	The sensor is not connected to the SME	Check sensor wiring
<b>20</b>	No power	No 24 V power supply connected to sensor	Connect the power source or check the power connections

## 8 Sensor Status Bits (found in -P files)

Bit	Hex	Name	Comment
<b>Bit 0</b>	0x0001	Frequency mismatch	The measured frequency does not match the sensor frequency. Derived from the string (E10)
<b>Bit 1</b>	0x0002	Not locked	The frequency is not locked. Derived from the string (E01)
<b>Bit 2</b>	0x0004	Lock incorrect	The sensor has locked on a wrong frequency. Derived from the string (E02)
<b>Bit 3</b>	0x0008	Analog sensor board communication error	
<b>Bit 4</b>	0x0010	Temperature sensor failed	The temperature sensor has failed. Derived from the string if temperature is -273.0

<b>Bit 5</b>	0x0020	Sensor too hot	If temperature is above the hardcoded physical temperature limit
<b>Bit 6</b>	0x0040	sensor communication error	
<b>Bit 7</b>	0x0080	Serial Changed	
<b>Bit 8</b>	0x0100	Status not clean	Sensor is not clean.
<b>Bit 9</b>	0x0200	Status in Air	Determines if sensor is in air
<b>Bit 10 - 15</b>	Unused		

The error status may contain the OR of the different bits, if various errors are present at the same time.

## 9 Notes/Errata:

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## 10 Changelog

Date	Changes	Responsible
05.03.2020	Added the strings sampling rate in seconds	M. H
16.04.2020	Changed the install procedure	M. H
26.05.2020	Added VISA install procedue	M. H
27.05.2020	Added RCP Lite install procedure	M. H
10.09.2020	Added Calibration tab Manual	M. H
19.10.2020	Added Calc. SD Logger, and updated screenshots	M. H
27.10.2020	Minor fixes	M. H
10.11.2020	Updated settings and added error status	M. H
13.11.2020	Updated settings	M. H