Rheonics Training Session

Rheonics | Inline process viscosity and density monitoring

Rheonics DTCM

Rheonics DVM Thermal Control Module

Rheonics

Winterthur, Switzerland & Sugar Land, Texas, U.S.A.

Agenda

1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

rheonics

inline process
density and viscosity
monitoring

Agenda

1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

rheonics

inline process
density and viscosity
monitoring

1. Rheonics DTCM

DTCM (DVM Thermal Control Module) is the thermal chamber that uses DVM

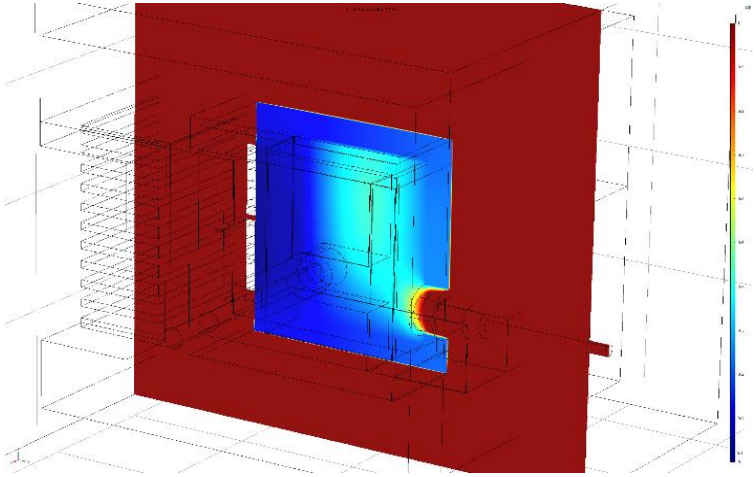
DVM (Density Viscosity Module) is the measuring sensor

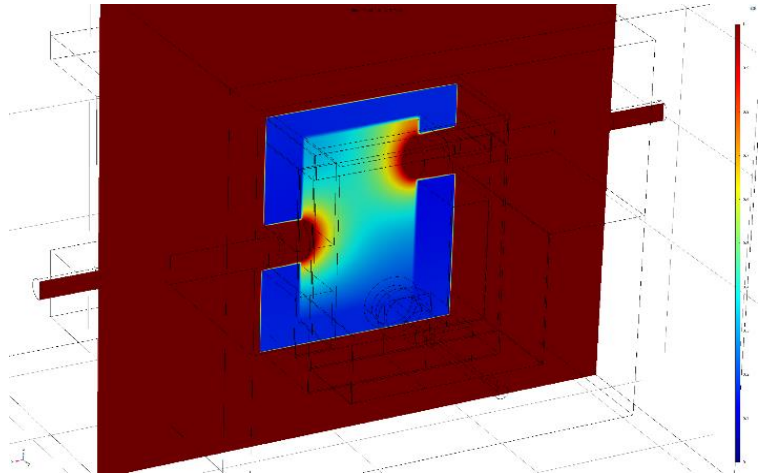
1. Rheonics DTCM

- DTCM is custom designed to ensure uniform temperature distribution across DVM even when installed in a flow loop.
- DVM measure density and viscosity of small fluid volumes, static or flowing.
- DTCM uses a DVM in a controlled temperature module while monitoring and tracking parameters with DTCM HMI.

1. Rheonics DTCM

- DTCM eliminates the need for bulky and expensive thermal test chambers (climate chambers) for temperature control.
- It achieve 10x faster stability and uniformity compared to a typical 100L commercial thermal chamber. It enables HPHT fluid analysis with DVM in field and mobile units without compromising data integrity.





Agenda

1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

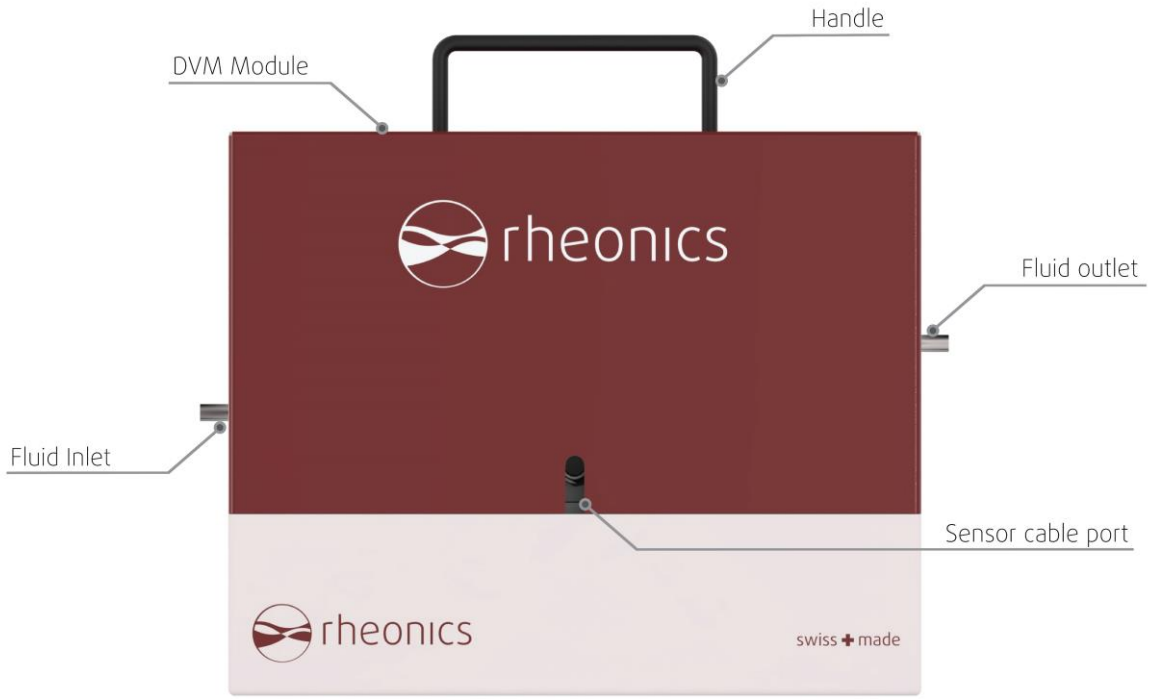
rheonics

inline process
density and viscosity
monitoring

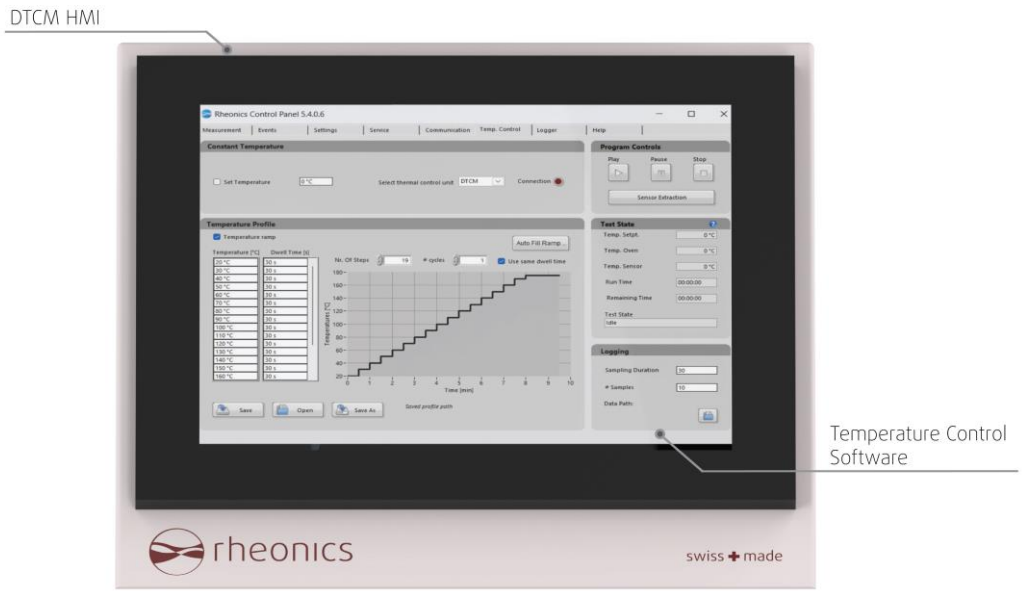
2. Hardware

- DVM in DTCM thermal chamber
- Temperature range: 10 °C to 150 °C
- 0.005 °C temperature stability
- 0.05 °C temperature accuracy
- Integrated temperature controller
- Ethernet, Wi-fi, RS485 ports for direct integration
- 7.5kg (16.5 lb) with DVM
- Integration with DTCM HMI

2. Hardware

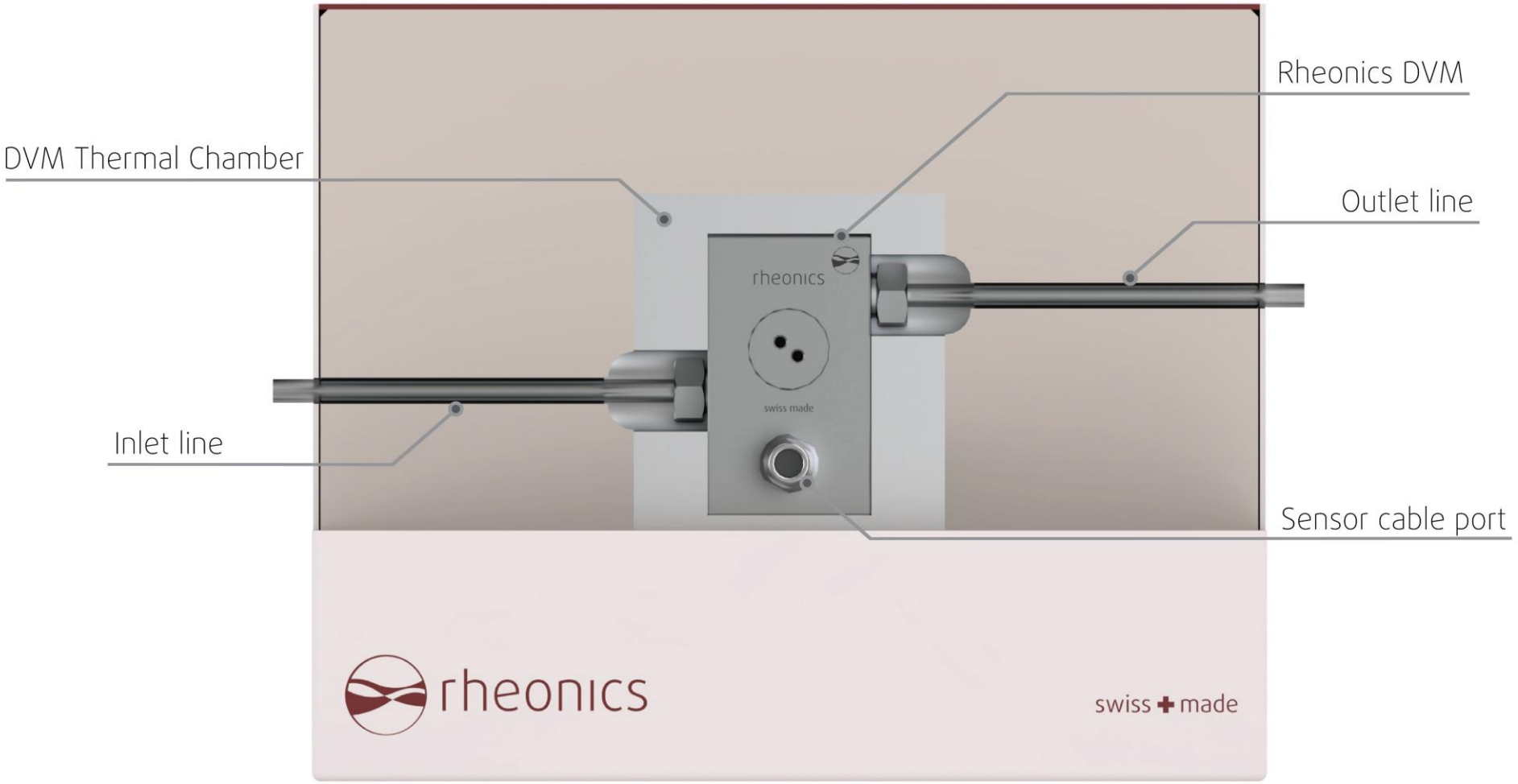


DVM module parts



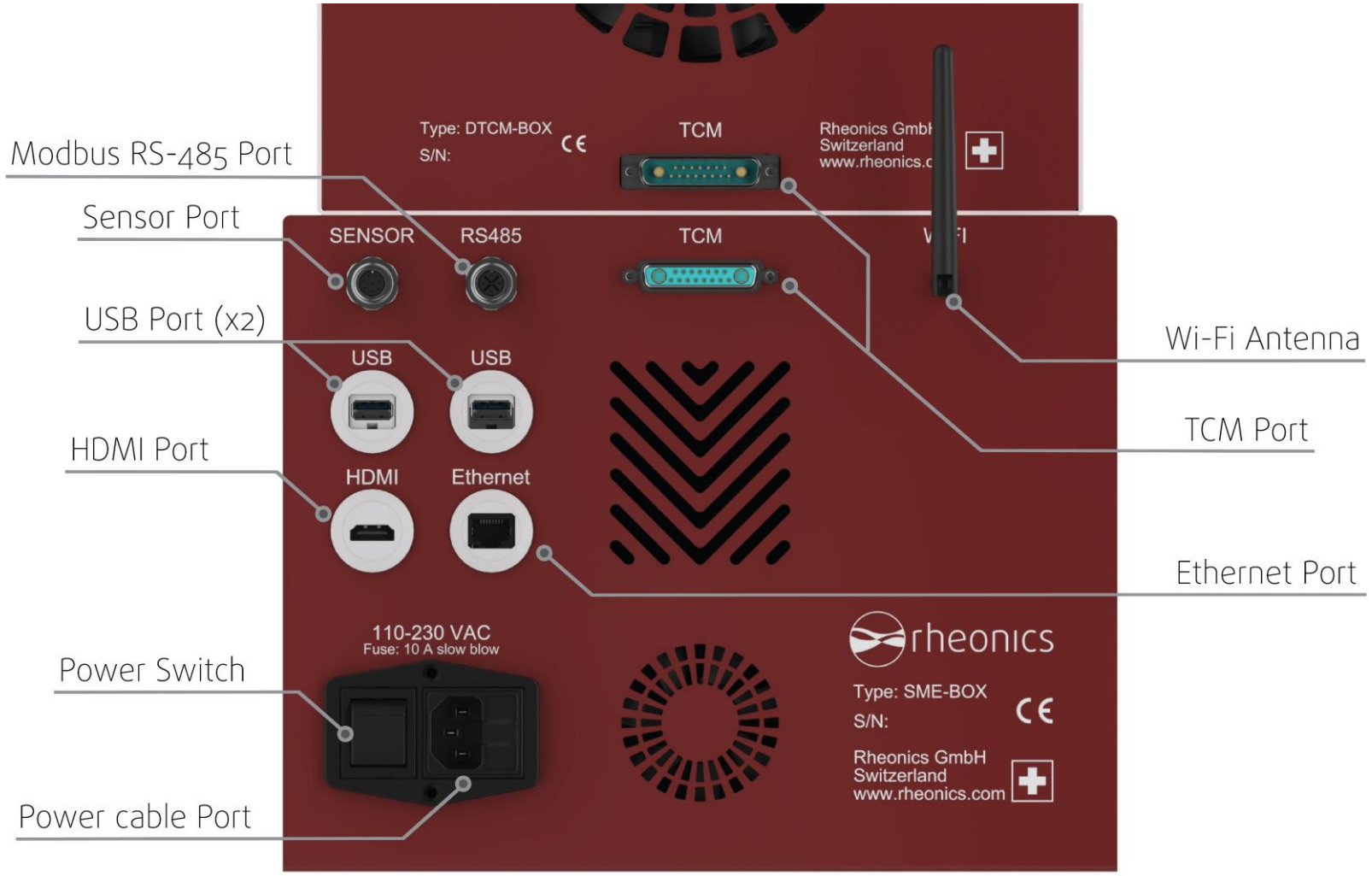
Sensor electronics parts

2. Hardware



DVM module inner parts

2. Hardware

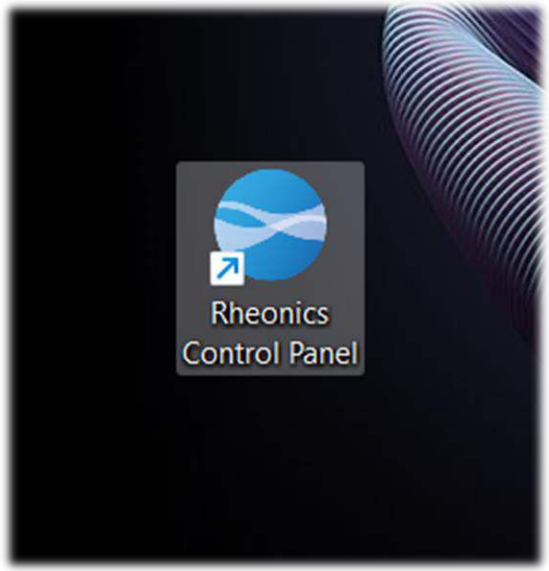


DVM module parts

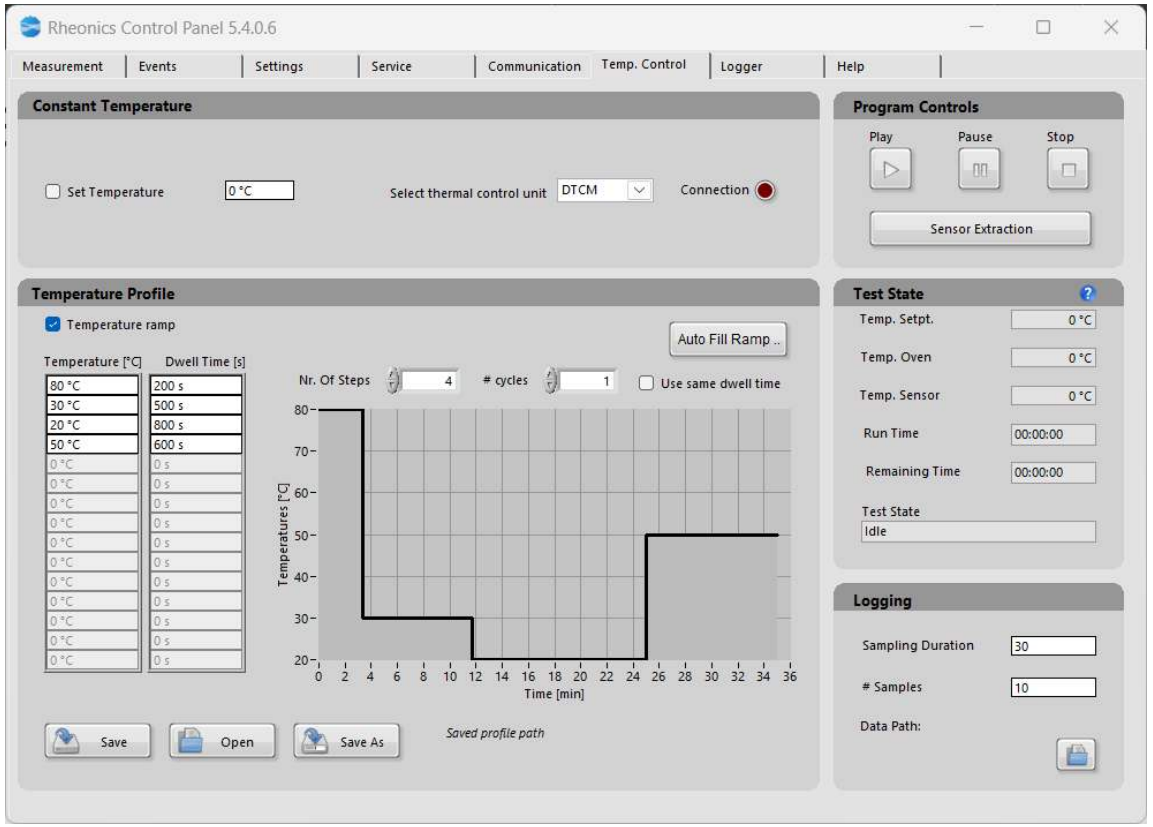
Agenda

1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

3. Software



The software that the DTCM uses is a specific version of the Rheonics Control Panel



There you can find the Temperature Control Tab for the tests

Agenda

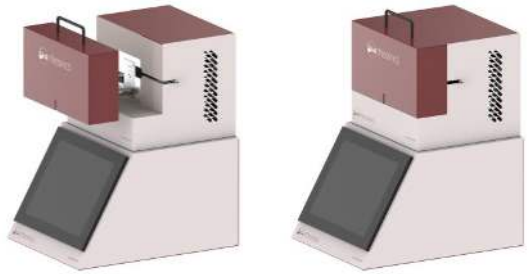
1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

4. How to set up

a. Remove the lid of the DTCM Module

b. insert DVM in the DTCM. DVM already has its inlet and outlet lines connected.

C. Mount the lid of the DTCM Module



d. Wire the Power cable, Sensor M12 connector, and the TCM ports. Also you can wire your necessary communication ports

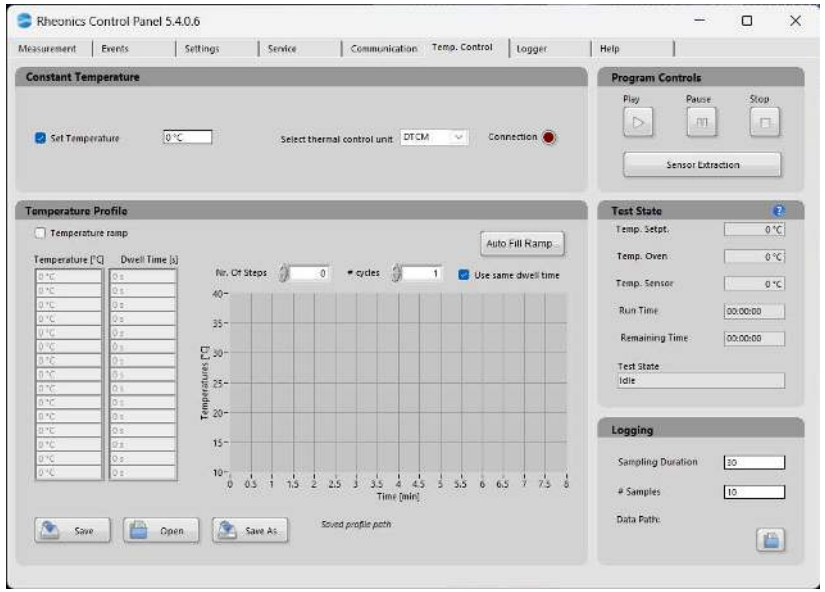
e. Turn on the DTCM with the power switch, and use the inlet line to fill it with your fluid.

Agenda

1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

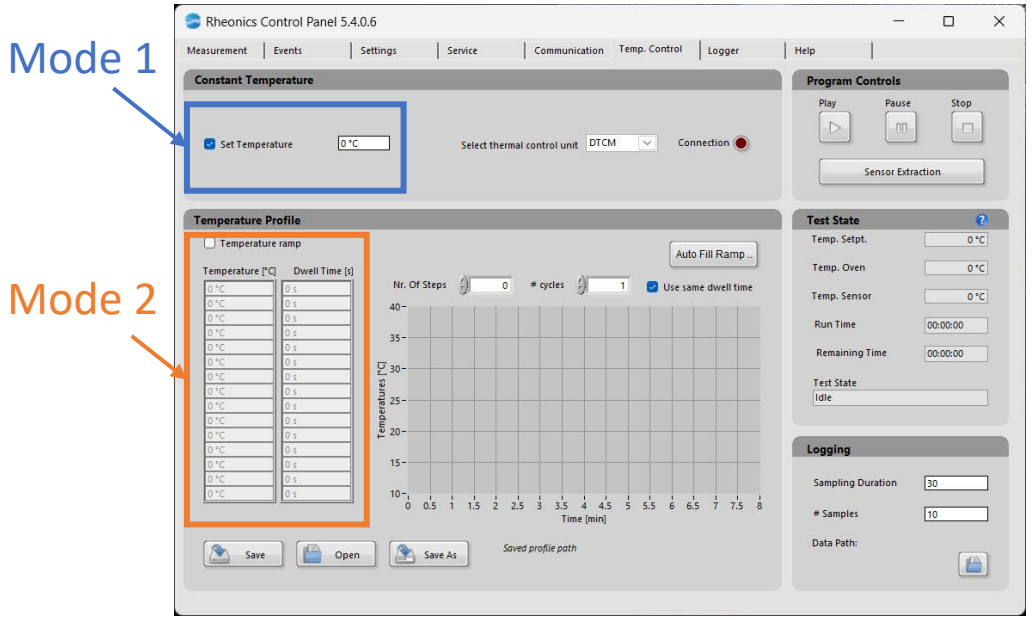
5. How to start a run

1. Temperature control Tab



- Open the Rheonics control panel on the Sensor electronics E4.
- Go to “Temp. Control” tab

2. Temperature mode configuration



The temperature control has two modes:

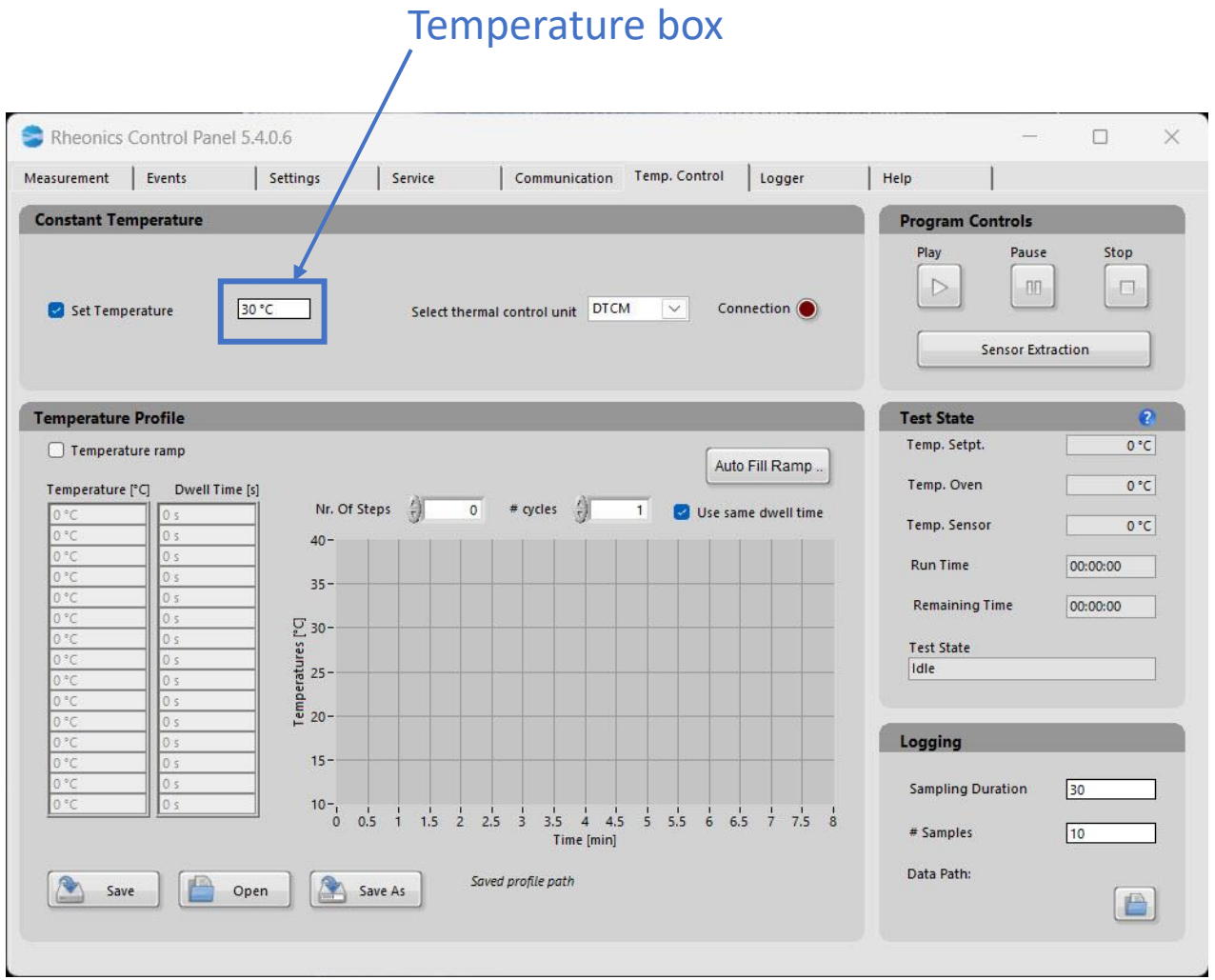
- Mode 1: Constant temperature.
- Mode 2: Temperature profile. You can set a time based temperature profile.

5. How to start a run

Mode 1: Constant Temperature

a. Check the “set temperature” box.

b. DTCM heats or cools the DVM to the user set temperature.



5. How to start a run

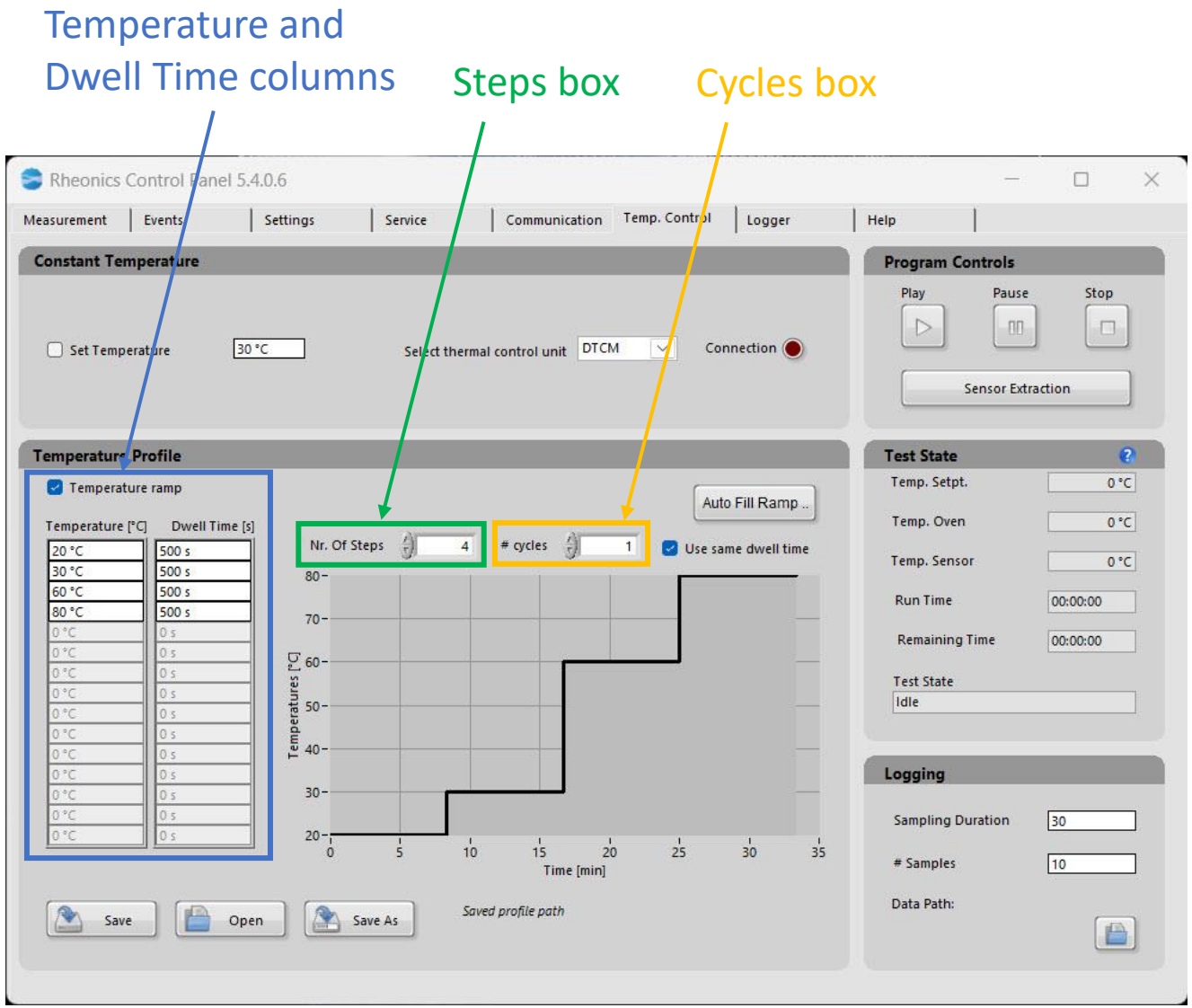
Mode 2-A: Temperature ramp – Manual fill

a. Check the “Temperature ramp” box.

b. Define the temperature ramp using steps box and cycles box.

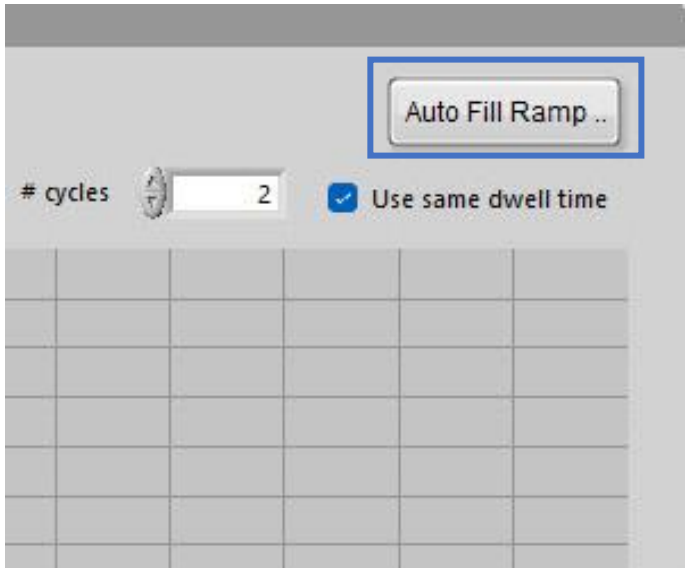
c. Enter temperature setpoint.

d. Enter dwell time for each setpoint.

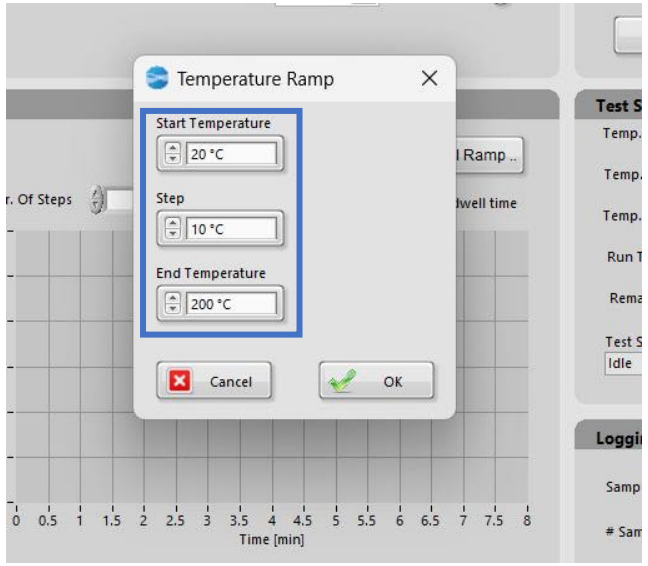


5. How to start a run

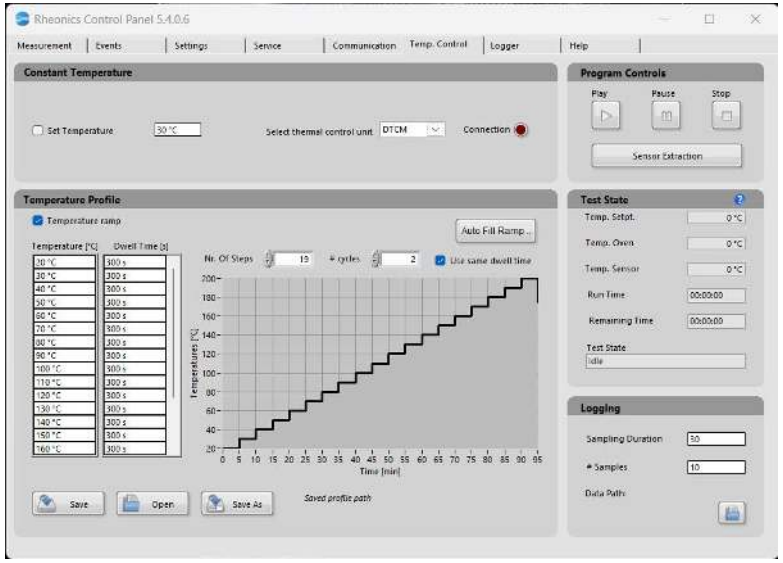
Mode 2-B: Temperature ramp – Auto fill Ramp



a. Click on the Auto Fill Ramp button.



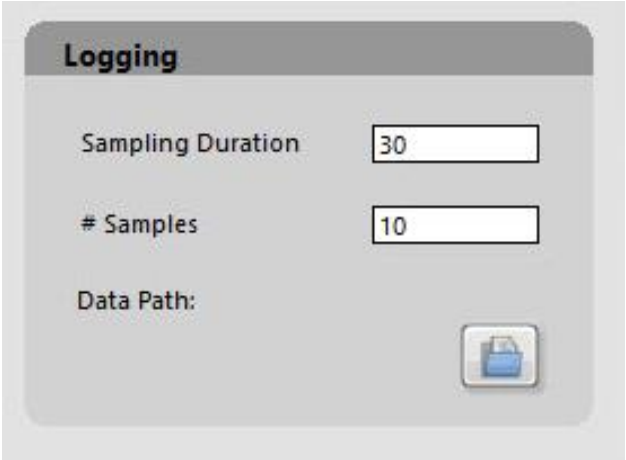
b. Set the “start temperature”, the “step” and the “end temperature” and click “OK” to create the temperature ramp.



C. A new ramp with your parameters will be created.

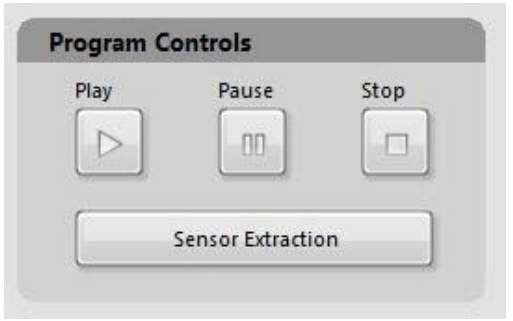
5. DTCM operation

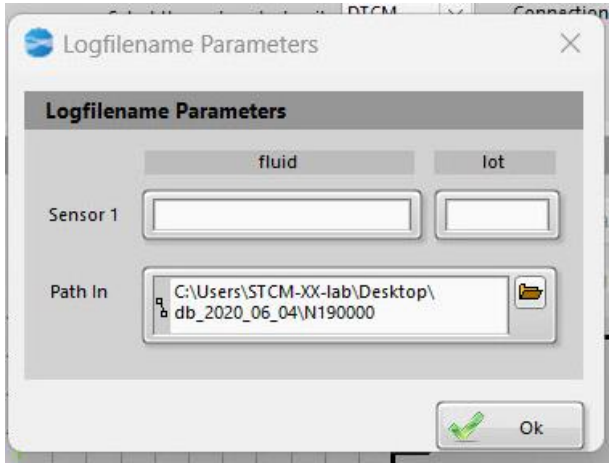
3. Logging configuration



- Configure how often the DTCM logs the data in seconds and how many samples will be taken. The data starts logging when the DTCM reaches the established temperature.
- You can change the path where data will be saved.

4. Start button





Once all the parameters are configured you can start the process with “Play” button. Additionally, user must define the fluid, lot and the path that the data will be storage.

Also, user can pause the DTCM operation at any temperature step using pause button.

Agenda

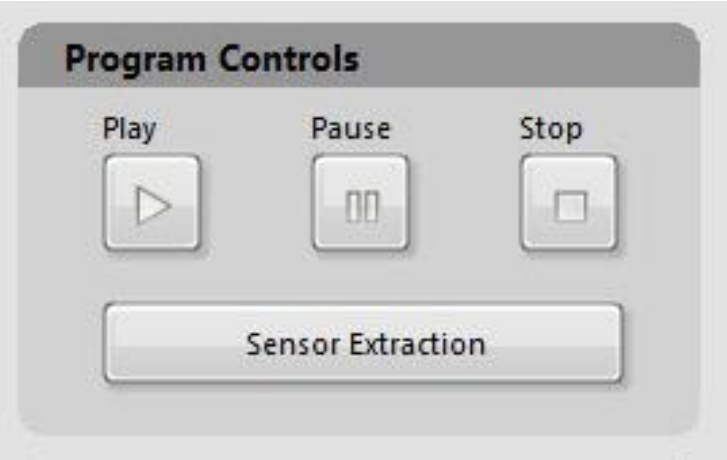
1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

rheonics

inline process
density and viscosity
monitoring

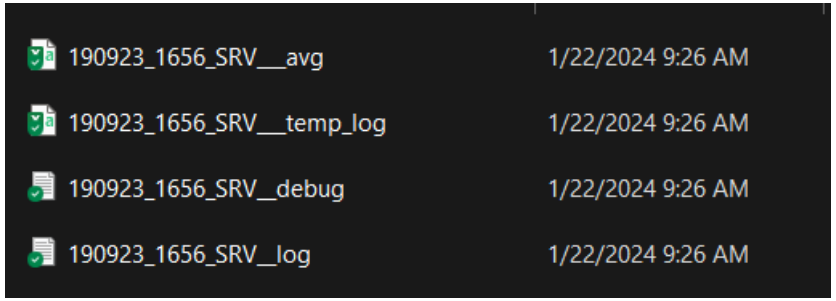
6. How to finish a run

1. Stop button



To finish the run you have to click on the Stop button and the DTCM stops heating.

2. Log files



Log files of your test will be in the path you chose previously.

Agenda

1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

rheonics

inline process
density and viscosity
monitoring

7. How to clean

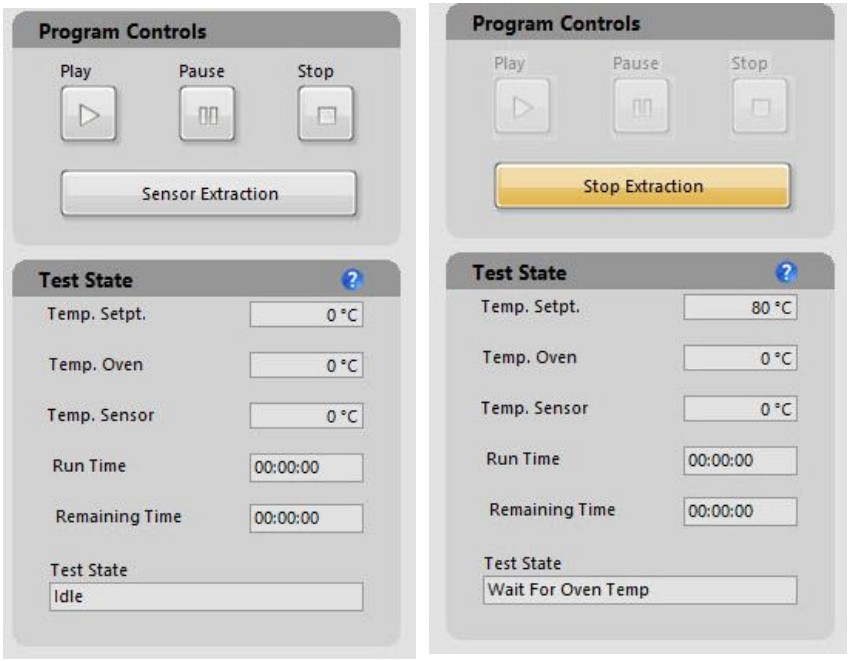
Clean in Place (CIP)

- The DVM can be cleaned in place by flushing it with solvent or cleaning fluid through the inlet/outlet lines.
- In-situ cleaning is recommended when process fluid does not have a tendency to leave deposits or adhere to the sensing element.

7. How to clean

Clean Manually

- Once all the processes are finished, to remove the DVM from the DTCM click on the “sensor extraction” button on the Rheonics Control Panel.
- The DTCM will be heated to reach 80 °C, at this temperature remove the lid and the DV module can be removed smoothly avoiding damage.



7. How to clean

- Remove the sensing element of the DV module.
- After that, you can use a solvent in a beaker or an ultrasonic bath for 5 or 10 minutes to clean the sensing element.
- At this point, you can also change the backup ring and the O-ring seal if you need it.
- Finally, mount the DV sensing element on the module and now it is ready to be used again.

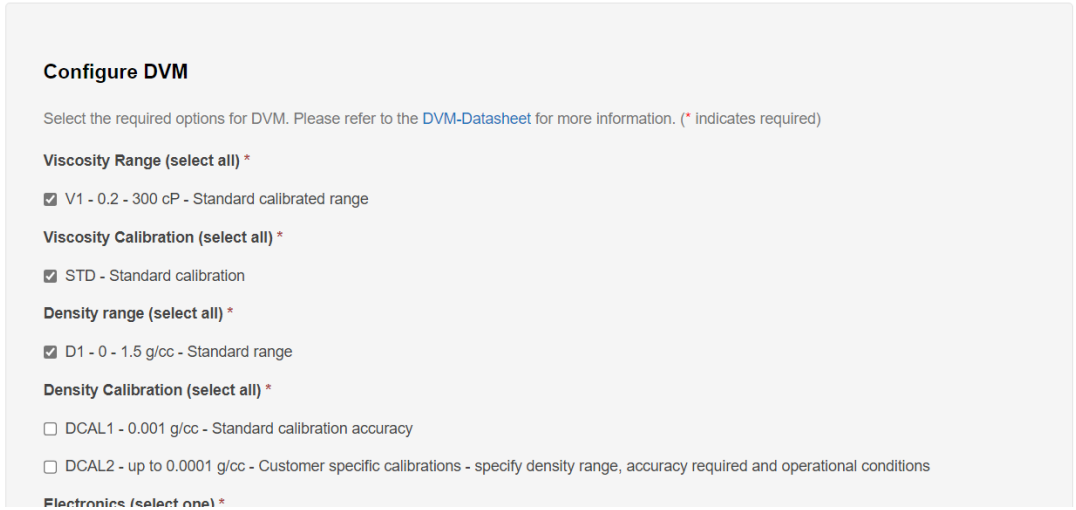
Learn how to remove and mount the DV sensing element here

Agenda

1. Rheonics DTCM
2. Hardware
3. Software
4. How to set up
5. How to start a run
6. How to finish a run
7. How to clean
8. Ordering options

8. Ordering options

DVM - Request for Quote Form



Configure DVM

Select the required options for DVM. Please refer to the DVM-Datasheet for more information. (* indicates required)

Viscosity Range (select all) *

- [x] V1 - 0.2 - 300 cP - Standard calibrated range

Viscosity Calibration (select all) *

- [x] STD - Standard calibration

Density range (select all) *

- [x] D1 - 0 - 1.5 g/cc - Standard range

Density Calibration (select all) *

- [ ] DCAL1 - 0.001 g/cc - Standard calibration accuracy
- [ ] DCAL2 - up to 0.0001 g/cc - Customer specific calibrations - specify density range, accuracy required and operational conditions

Electronics (select one) *

rheonics

inline process density and viscosity monitoring

You can order and see the DTCM and DVM options here

Rheonics resources available

Rheonics Web Page	Rheonics Resources Library	Rheonics Support Portal	Rheonics Partner Training
Science articles, Whitepapers, access to all resources of Rheonics sensors	Find DTCM documentation and other Rheonics integrated solutions	Multiple electronics, mechanics, integration articles	Presentation videos

rheonics
inline process density and viscosity monitoring