Rheonics Density & Viscosity DVM Accessory

DTCM-BB Operator Manual

DVM Thermal Control Module Bath Based

Doc. ID: DTCM-BB-OP-2410

rheonics

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Contents

1 Before you begin

1.1 About the manual

This manual provides information and a quick guide for operating Rheonics Rheonics DTCM-BB-
This manual refers to external articles from Rheonics knowledge base, if any article link is not working, the user should refer to the main web page or contact Rheonics Support Team.

1.2 Contact

Contact the Rheonics team to help you with any inquiry.
For sales and delivery-related questions contact the Sales Team at info@rheonics.com
For installation, integration, and troubleshooting contact the Support Team at support@rheonics.com

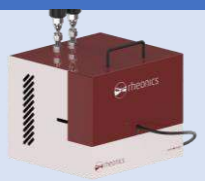
1.3 Who should use this document?

Users of Rheonics DTCM Bath Based.

1.4 Warning

The users should be trained in government and corporate safety standards that apply for their installation and use.
This installation manual is strictly for non-explosive atmospheres.

1.5 Nomenclature

Item	Abbreviation (short form)	Full-term	Meaning	Reference Image
1	**DTCM-BB**	DVM Thermal Control Module - Bath Based	Thermal Chamber for DVM	
2	**DVM**	Density Viscosity Module	High-pressure and temperature Density and Viscosity Sensor Module	
3	**SME-BOX-E4**	Smart Module Electronics – BOX – E4 variant	Sensor electronics with integrated industrial PC with display	

1.6 Related Documentation

You can find all product documentation on the USB storage device shipped with the sensors. You can also find them on the website: https://rheonics.com/resources
For more information on the DTCM accessory, refer to the following documents on Rheonics website. Contact Rheonics Support Team if you cannot find a document online.

Title	Code	Description
DTCM-BB Operator Manual	**DTCM-BB-OP**	**DTCM Bath-Based Operator Manual**
DVM Operator Manual	DVM-OP	DVM Sensor Operator Manual
SME Operator Manual	SME-OP	Sensor Electronics (all variants) Operator Manual
RCP Software Manual	RCP-OM	Rheonics Software Installation and User Manual
DVM Datasheet	DVM-DS	Rheonics DVM Datasheet

2 Technical Specifications

2.1 SME-BOX (E4)

SME-BOX-TCM is Rheonics electronics variant especially suited for the TCM-units, namely the STCM and DTCM. This device is designed for tabletop, desktop, or laboratory setups. It contains the sensor electronics, the TCM-control system, and an industrial PC with Rheonics standard softwares.

Power the SME-BOX with either 110VAC or 220VAC. Once the system has power, the computer will boot automatically and is operational.
Connect the sensor cable to the “SENSOR” for operation.
In case you need to access the industrial PC, use the USB/Ethernet or HDMI connections.
Note: The RS485 is not enabled in the standard version.

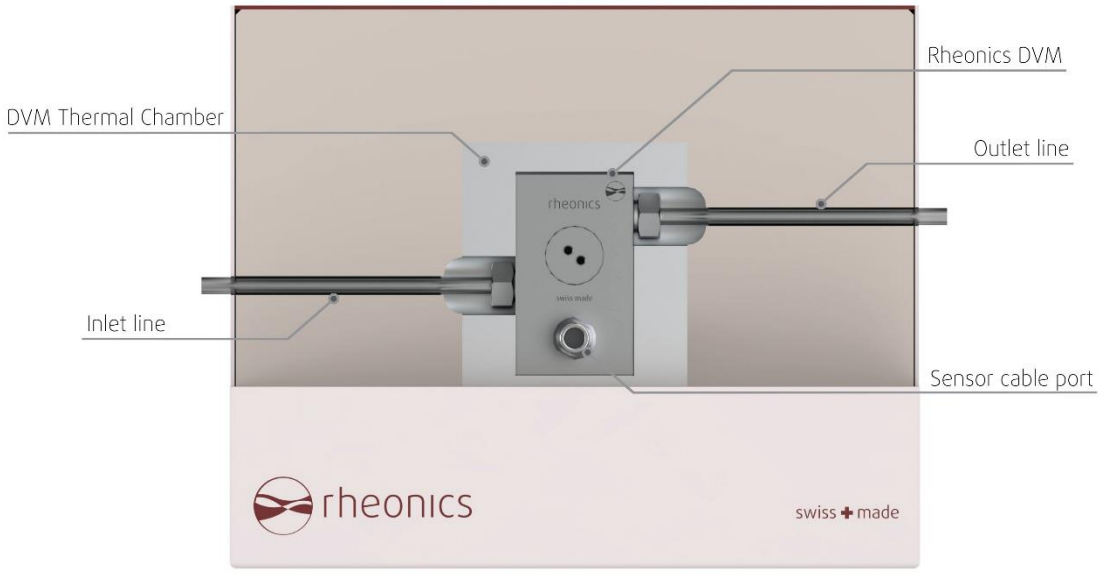
Parameter	Value
Dimensions	365 x 280 x 220 (mm) 14.4 x 11 x 8.7 (inch)
Power Input	110 / 220 V AC
Power consumption	max. 700W
Total Weight	9,500 g (21 lb)
Operating temperature	Max 65°C/150°F ambient
Communication interface	2x USB 1x Ethernet 1x HDMI 1x RS485 1x Wi-Fi
Sensor Connection	M12
Computer OS	Windows 10

2.2 DTCM-BB

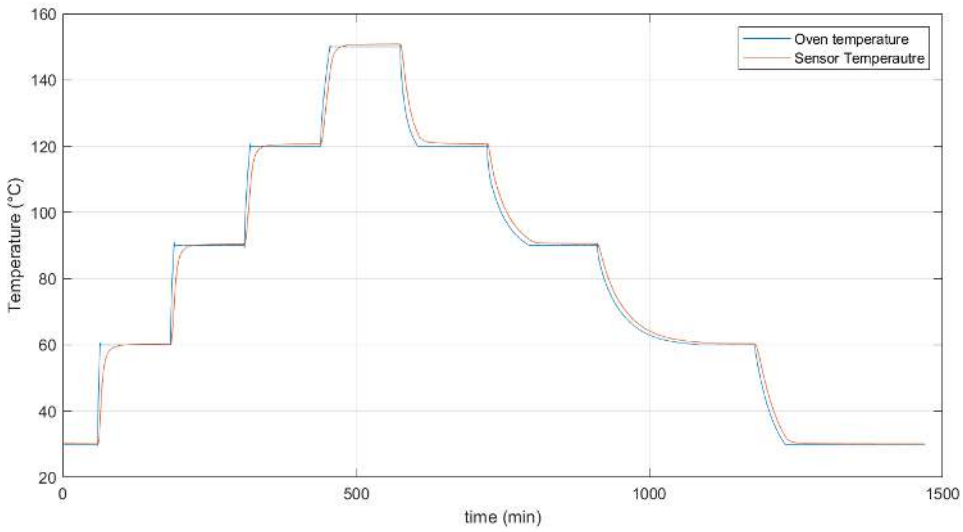
Rheonics DTCM is custom designed to ensure uniform temperature distribution across DVM even when installed in a flow loop. Heating and cooling are achieved through an external bath.

Parameter	Value
Dimensions	240 x 260 x 260 (mm) 9.5 x 10 x 10 (inch)
Total Weight	8.6 kg (19 lb)
Temperature stability	0.005°C
Temperature accuracy	Dependent on the bath
Operating temperature	-40 to 200°C
Compatible Sensor type	DVM

During operation, the DVM is placed in a thermally uniform aluminum block. This thermal cell is built such that the inlet- and outlet line can be connected while the DVM is within the DTCM stage, allowing the DVM to be part of a flow loop. For a stable measurement, the flow rate must be zero i.e. fluid should be static, otherwise, the fluid temperature can't be controlled properly.



Rheonics Control Panel Software controls the temperature (see RCP Manual for details). Therein, temperature profiles can be defined to scan viscosity and density over a broad range of temperatures. Once the desired temperature is reached, additional time will be needed to achieve a thermally uniform state around the DVM, this is the so-called time-delay or dwell time between oven temperature and sensor temperature.



Accurate measurements require that the sensor temperature does not change over time, i.e. the sensor temperature is close to its thermal equilibrium which will be reached after a sufficiently long dwell time. Accurate measurements can be conducted after approx. 3600s. For high-accuracy measurements, Rheonics recommends a dwell time of 7200s.

3 Packing list

Item	Name	Quantity	Reference Image
1	SME-BOX (E4)	1	
2	DTCM-BB	1	
3	Julabo DYNEO DD-200F (If ordered)	1	
4	Adapter Swagelok 8mm to M16x1.5 Note: is already installed	2	
5	High-Temperature Hose	2	
6	Power cable for E04-BOX	1	
7	USB-A to USB-B	1	

4 Quick Start

4.1 Installation of the thermostat

Rheonics standard thermostat is the Julabo DYNEO DD-200F. The thermostat needs to be installed according to Julabo's instructions.
To connect to the E4-box, proceed as follows:
Note: This can be done before the bath has been filled with fluid. The error message regarding the unfilled bath may be ignored.

1. Click on "Menü" (use the large bottom)

2. Click on "Einstellungen"

3. Click on “Sprache”

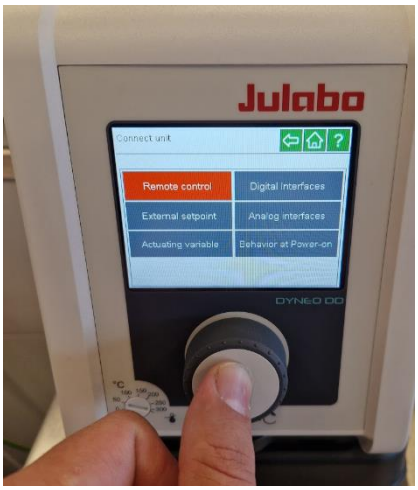
4. Set the desired language e.g. English

5. Go back to the home

6. Click on “Menu”

7. Click on “Connect Unit”

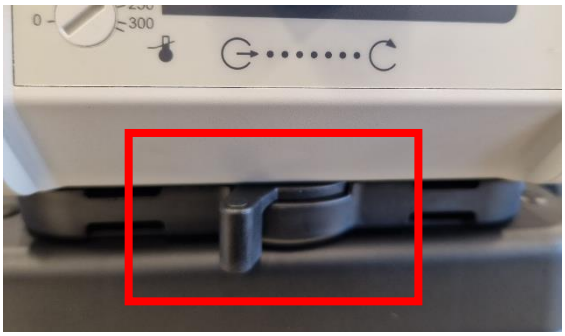
8. Click on “Remote control”



9. Select “USB” and go back to home

10. The display should say R-OFF, indicating the remote-control state.
    Set the temperature limit to the proper value. Turn the wheel in the bottom left to the maximum temperature that is safe for operation. This will depend on the fluid you fill in the bath. It is the responsibility of the operator to ensure the temperature limit is set correctly.

11. Move the lever to the left. This will set the bath to “external circulation” as is needed to operate the DCM-BB.



4.2 Bath fluids

Rheonics does not provide bath fluids. It's the responsibility of the operator to choose the correct fluid with the proper temperature range. For operation with the DTCM-BB, the fluid must also be compatible with the following materials:

- FKM
- Aluminium (AW-6060)
- Stainless steel 304/316L (1.4301, 1.4404)

The fluid's viscosity should be below 20 cP for proper heat transport to the DTCM-BB.

4.2.1 User and Password

To access the SME-BOX-E4 a user and password are required.

User: administrator
Password: rheonics[SN] e.g. for serial number E04-0000, password is: rheonicsE04-0000

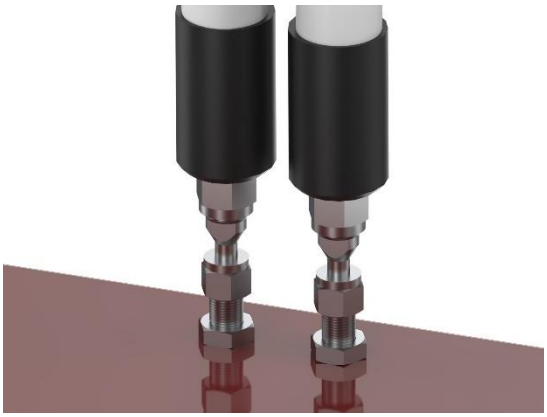
4.3 Installation of the DTCM-BB

1. Connect the hose from the DTCM-BB to the Julabo bath.

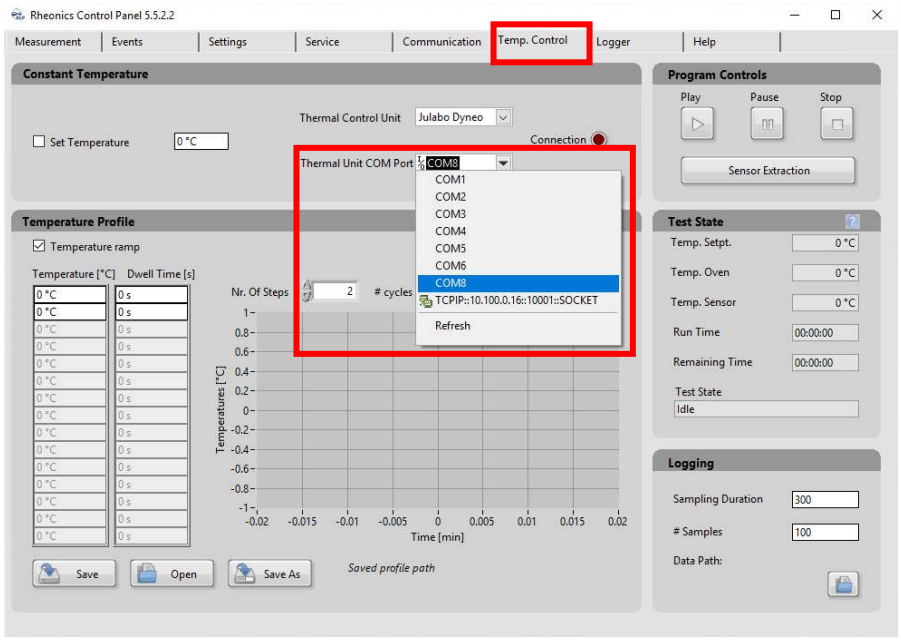
Note: Inlet and outlet are irrelevant.

Dyneo DD-200F

DTCM-BB



2. Connect the Dyneo DD-200F to the E4 box with the supplied USB-Cable. Open RCP in the E4-Box, go to the Temp. Control Tab and select the COM Port for the Julabo.
   Note: COM Ports 1-6 are always visible. The Julabo will be on the additionally appearing COM Port.



For additional information, consult the RCP Manual (Help Tab).

5 Notes/Errata:

6 Revision and Approvals

Version	Nature of changes	Approvals	Date
1.1	Added Part index table	S. Kumar D. Brunner B. Rosas	03.10.2024
1.0	Original version	S. Kumar D. Brunner B. Rosas	25.09.2024