User Manual

RC1mx

High Performance Thermostat

METTLER TOLEDO

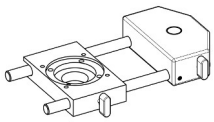
Table of Contents

1 Introduction

The RC1mx is a high performance thermostat with the possibility to measure calorimetric data. This product is equipped with the newest hardware and an easy-to-use touchscreen. Together with the iControl software RC1mx is a very powerful calorimeter. The highly reproducible results minimize experimental repetition. Conditions in the RC1mx mimic pilot or manufacturing scale and therefore allow direct assessment of process hazards and the development of safer processes ready for scale up. Decisions made by applying RC1mx data improve the effectiveness of chemical development and ensure that processes are better optimized, more robust, and economically viable.

Please also read the Operating Instructions for the full scope of functionalities of the device.

1.1 Scope of Delivery

Order number		Description	Quantity
30405800 30405799		RC1mx thermostat • Type L • Type H	1
30389896		Touchscreen	1
30398165		Display cable	1
30386516		Cable for stirrer motor	1
30386521		Stirrer motor holder incl. mounting plate	1
30260369		Emergency button	1
51103708		Accessory frame, big	1
51103713		Accessory platform	1

51190436		Oil container (10 L)	1
103026		Spill tray	1

Optional parts

These parts will be shipped according to your order.

Oil kits incl. antistatic additive and suitable O-rings	• MidTemp kit • LowTemp kit • HighTemp kit	• 30399947 • 30399946 • 30400338
Stirrer motors	• Standard torque stirrer • High torque stirrer	• 30899599 • 30899600
Reactors	• Glass reactors • Glass pressure reactors • High pressure reactors • Glass reactors with RTCAL sensors • Glass pressure reactors with RTCAL sensors	

1.2 Check on Arrival

Check the following conditions once the package has arrived:

- The package is in good condition.
- The content shows no signs of damage (e.g. scratches etc.).
- The content is complete (see packaging control list).

If one condition is not fulfilled, please contact your local support.

2 Safety Information

This thermostat has been tested for the intended purposes described in this document. However, this does not absolve you from the responsibility of performing your own tests of the product supplied by us regarding its suitability for the methods and purposes you intend to use it for. You should therefore observe the following safety measures.

We, Mettler-Toledo GmbH, accept no liability whatsoever if you do not observe the following rules and safety notes for safe operation of the thermostat.

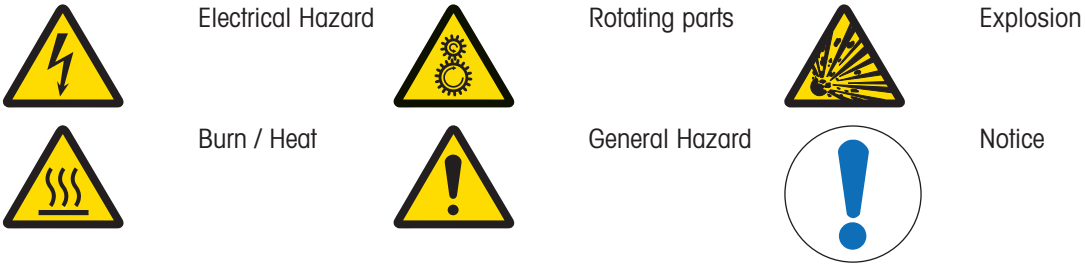
2.1 Definition of Signal Warnings and Symbols

Safety notes are indicated by signal words and warning symbols and contain warnings and information about safety issues. Ignoring safety notes can lead to personal injury, damage to the instrument, malfunctions and erroneous results.

Signal words

WARNING	A hazardous situation with medium risk, possibly resulting in death or severe injury if not avoided.
CAUTION	A hazardous situation with low risk, resulting in minor or moderate injury if not avoided.
NOTICE	A hazardous situation with low risk, resulting in damage to the instrument, other material damage, malfunctions and erroneous results, or loss of data.
Note	(no symbol) for useful information about the product.

Meaning of safety symbols



2.2 Intended Use

The RC1mx is a high performance thermostat which is used to perform chemical reactions and being able to measure calorimetry data for safety assessment purpose. Be aware that the responsibility for testing chemicals and reactions lies with the user.

Always operate and use your device in accordance with the instructions contained in this document; use it only together with equipment specified in this document.

Any other type of use and operation beyond the limits of these technical specifications without the written consent from Mettler-Toledo GmbH is considered as not intended.

2.3 Product-Specific Safety

Operational safety

For every instrument configuration used, you are responsible for ensuring that the entire system is safe if a power failure occurs and that the reaction in progress cannot get out of control. This especially applies to preprogramed and unattended experiments.

⚠ WARNING

Unqualified staff

Non intended or wrong use of the RC1mx is able to cause hazardous situations or runaway reactions. These events can lead to death or serious injuries.

– Please make sure that only qualified staff operate this device in accordance to general laboratory safety standards.

⚠ WARNING

Risk of electric shock

– Make sure to plug the power cable supplied into a power supply outlet that is grounded. A technical fault could otherwise result in serious injury or death.

⚠ WARNING

Failure of power or cooling

Implement appropriate measures against possibly fatal consequences of a power failure.

– Install a flow monitor with line-independent power supply and continuous monitoring of the coolant flow.

⚠ WARNING

Electrostatic discharges through stirring the reaction mass

The following conditions can form electrostatic charge:

- High flow rates (high stirrer speed) of nonpolar liquids with a high resistivity (>10^8 Ohmmeter).
- Two-phase systems with suspended solids (e.g. after crystallization processes in nonconductive solvents or immiscible liquids.)

– Work under an inert gas (nitrogen or argon).

⚠ WARNING

Risk of explosion due to electrostatic discharges

An explosion could be caused by electrostatic discharges from the flow of the heat transfer oil or stirring the reactor mass. To avoid electrostatic charges of the heat transfer oil do the following:

1 Add the antistatic additive delivered with the product.

2 Purge the oil tank with small amounts of dry nitrogen if you regularly work with an oil temperature (Tj) below room temperature or higher than 150 °C. Silicone oil may produce decomposition products under air.

➡ This prevents the ingress of atmospheric moisture which destroys the active compound in the antistatic additive.

⚠ WARNING

Hazardous operating situations

Hazardous operating situations could cause an explosion.

To prevent this trigger an emergency cooling, this is done by:

– Pressing the emergency button on the RC1mx.

➡ This cools the reactor to the lowest possible temperature and all operations controlled by a controller instrument will be stopped according to the safety linkage.

⚠ WARNING

Risk of explosion with critical reactions

Performing critical reactions could lead to explosions.

– Perform a safety analysis before starting an experiment with high hazardous potential for example by using a Differential Scanning Calorimeter.

⚠ WARNING

Risk of burns due to removal of protective shield

Do not remove the protective shield before the oil in the reactor jacket has reached room temperature.

⚠ WARNING

Risk of burns when opening the oil drain stopcock

Opening the oil drain stopcock could lead to serious burns if the oil has not reached room temperature.

– Do not open the oil drain stopcock before the oil reaches room temperature.

⚠ WARNING

Wrong oil type selected

– Select the oil type corresponding to that actually used in the RC1mx!

➡ Other oil types could lead to a malfunction of the safety system.

⚠ CAUTION

Rotating parts of stirrer

Rotating parts of a running stirrer may lead to injuries.

1 Do not touch rotating parts of a stirrer.

2 Do not wear loose clothing and make sure jewellery and long hair do not get entangled in the stirrer.

NOTICE

Thermal shock

Glass parts of the instrument or the reactor could get damaged.

– Do not pour cold liquids into hot glassware and vice versa.

NOTICE

Damage to device due to ice particles

If you work regularly with oil temperature below 0 °C ice particles can block the thermostat and lead to a malfunction.

– Purge the oil tank regularly with small amounts of dry nitrogen.

➡ This prevents the ingress and condensation of atmospheric moisture.

NOTICE

Manipulation of reactor inserts while stirrer is running

Inserts or stirrer could get damaged.

– Always turn off the stirrer when manipulating inserts.

NOTICE

Wrong coolant used

High chloride concentration or some additives in the coolant can lead to corrosion of the thermostat.

1 Do not use solutions of NaCl, $CaCl_2$ or DW-Therm.

2 Check compatibility with the wetted parts of the coolant system.

NOTICE

Cooling with cryostats

The cold fluid remaining in the cooling coil would slowly heat up after the RC1mx has been switched off and hence expand. It is possible that the pressure produced by this fluid expansion leads to cracks in the soldering points of the heat exchanger.

– Do not close the input and output of the RC1mx heat exchanger by valves or stopcocks if you use a cryostat to cool the RC1mx.

NOTICE

Service

Comply with the installation requirements concerning location, electrical and water connections.

Contact the METTLER TOLEDO Service if you wish to install or relocate the RC1mx.

Have repair work carried out only by METTLER TOLEDO service. Any unqualified attempt to repair the instrument can endanger the safety system.

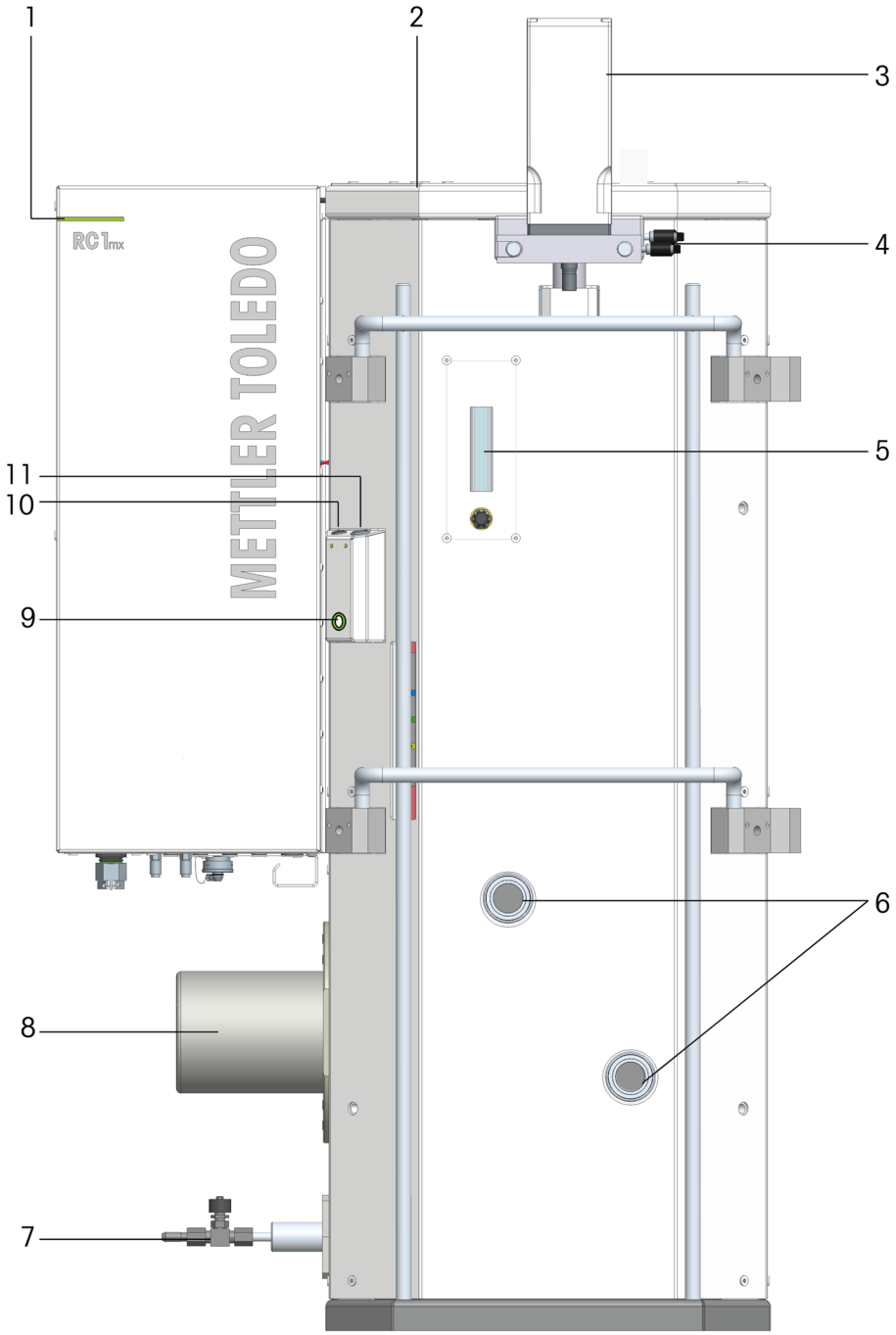
NOTICE

System impedance

This device is intended for connection to a power supply system with a maximum admissible system impedance Zmax of 0.031 Ω at the interface point of the user's power supply.

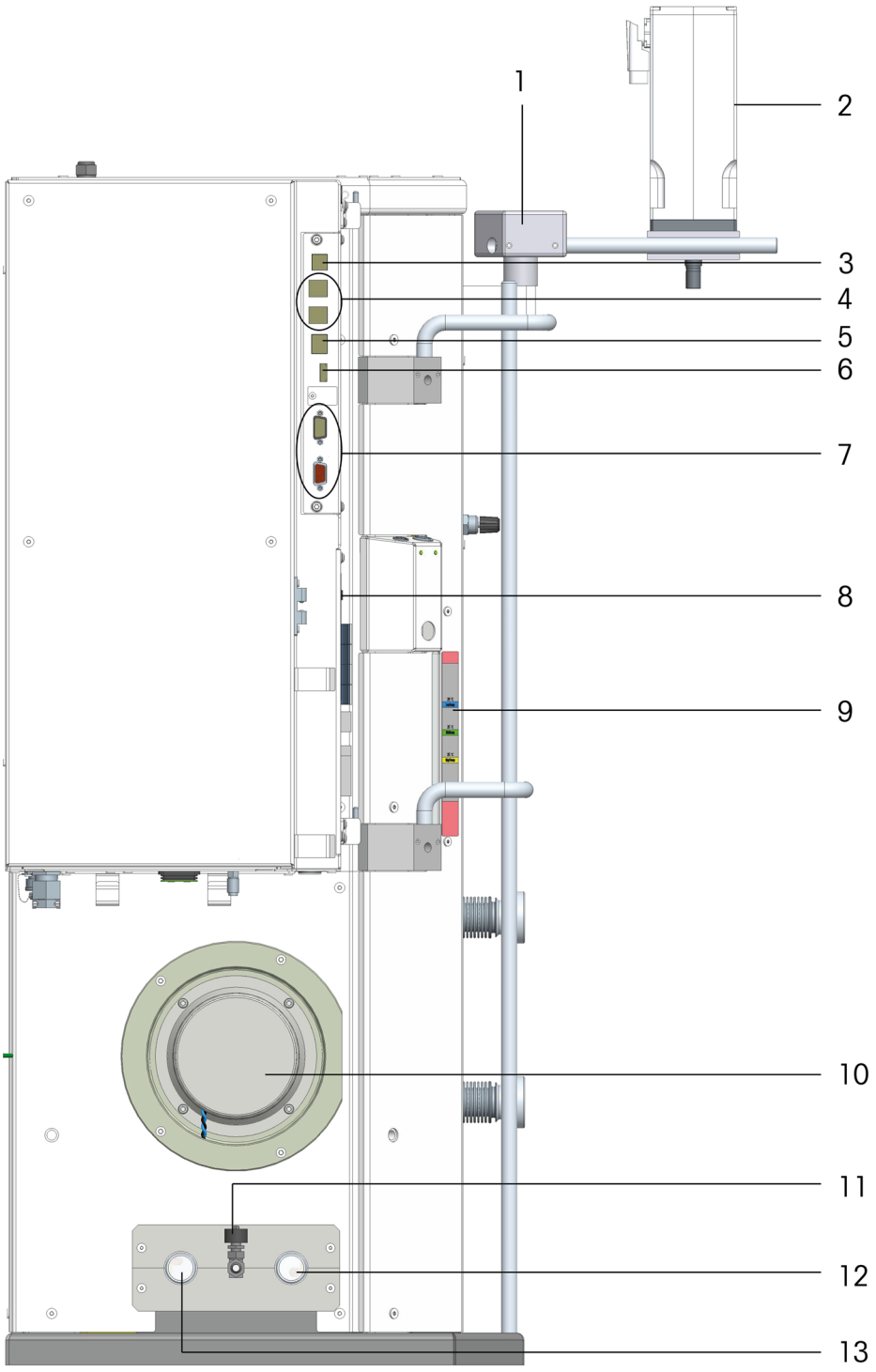
3 Overview

Front side



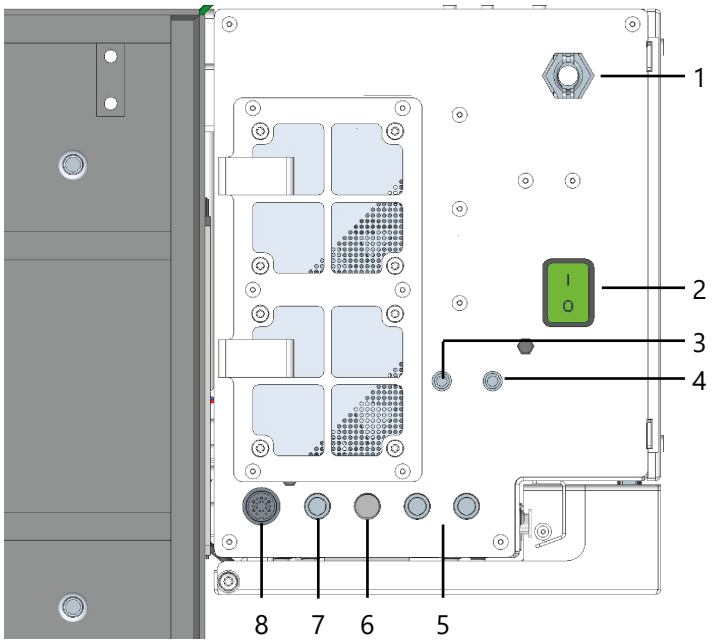
1	Statuslight	2	Stirrer motor socket
3	Stirrer motor	4	Positioning screws
5	Purge gas rotameter	6	Oil connections to reactor
7	Oil drain stopcock	8	Cover for control valve
9	Stirrer on/off button	10	Tr sensor socket
11	Calibration heater socket		

Left side



1	Motor support	2	Stirrer motor
3	CAN-1 Out socket	4	USB (4x) sockets
5	Ethernet socket	6	Control unit socket (Touchscreen)
7	RS-232 sockets (2x)	8	Oil type switch
9	Oil level window	10	Cover for control valve
11	Oil drain stopcock	12	Coolant out
13	Coolant in		

Bottom of electronics cabinet



1	Power cable socket	2	Power button (ON/OFF)
3	Purge-1 Oil socket	4	Purge-2 Electronic Cabinet socket
5	Output DC 24V (2x) socket	6	Safety Relay socket
7	Safeguard Button socket	8	RTCal socket

4 Installation

4.1 Installation Requirements

⚠ CAUTION

Unqualified installation and relocating of the device

An improper installation could lead to a malfunction of the device and serious injuries. The installation of this device should only be done by a trained METTLER TOLEDO Service Engineer. Do not install or relocate the device without the assistance of a METTLER TOLEDO Service Engineer.

⚠ CAUTION

High accessible voltage

– The device must either be permanently connected or use IEC 60309 conform plugs and sockets.

Please consult the RC1mx Pre-Installation Guide to ensure all requirements for a proper installation are fulfilled.

We highly recommend to install an uninterruptible power supply. This can prevent hazardous reactions in case of a power failure.

Location of the device

- Always position the device in a well-ventilated fume hood.
- Always install the device on a surface that is able to carry the weight of the device.
- Install the device in an "autoclave room" when dealing with potentially explosive reactions.

Site requirements

The instrument has been developed for indoor operation in a well-ventilated area. Avoid the following environmental influences:

- Conditions outside of the ambient conditions specified in the technical data
- Powerful vibrations
- Direct sunlight
- Corrosive gas atmosphere
- Explosive atmosphere of gases, steam, fog, dust and flammable dust
- Powerful electric or magnetic fields

4.2 Connecting Power to the Device

⚠ WARNING

Risk of electric shock

– Make sure to plug the power cable supplied into a power supply outlet that is grounded. A technical fault could otherwise result in serious injury or death.

1 Connect the instrument to the mains using the cable attached to the device.

2 Insert the plug of the power cable into a grounded power outlet that is easily accessible.

4.3 Connecting Emergency Button

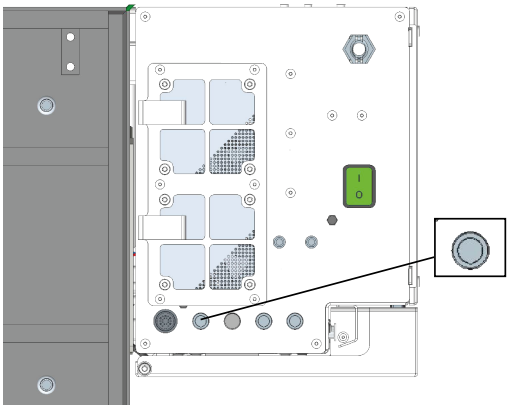
⚠ WARNING

Risk of explosion due to not accessible safeguard button or touchscreen

To be able to prevent a runaway:

– Make sure that the safeguard button and the touchscreen are accessible any time during the experiment.

– Connect the safeguard button to the **Safeguard button** socket on the bottom of the electronics cabinet.



4.4 Connecting Touchscreen to RC1mx

⚠ WARNING

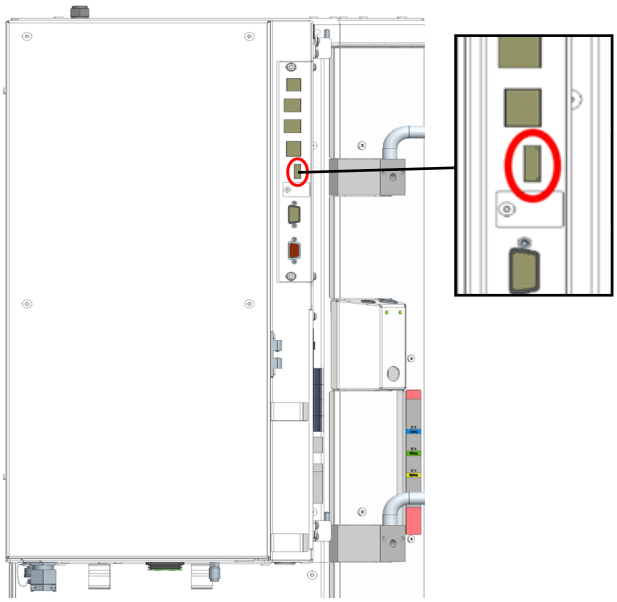
Risk of explosion due to not accessible safeguard button or touchscreen

To be able to prevent a runaway:

– Make sure that the safeguard button and the touchscreen are accessible any time during the experiment.

1 Open the door of electronics cabinet.

2 The touchscreen socket is labelled Control Unit (see picture).



3 Connect the touchscreen cable to the socket.

4.5 Installing a Reactor

Detailed instructions about installing a specific reactor are in the respective Operating Instructions.

⚠ WARNING

Risk of explosion due to damaged reactors!

Scratches and cracks on the reactor surface can lead to an explosions of the reactor and cause serious injuries.

– Check the reactor before each use for damage (scratches or formation of cracks).

4.6 Installing a Stirrer

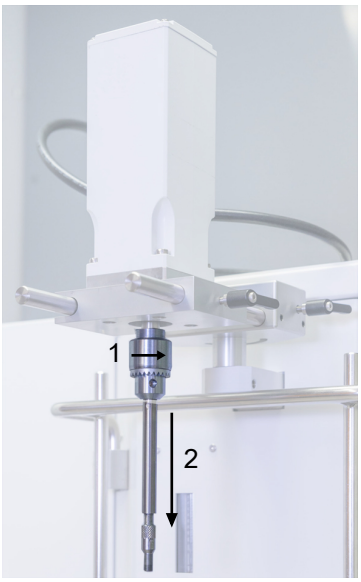
This is an typical instruction for glass reactors, please also consult the respective reactor Operating Instructions for more detailed information.

1 Push the stirrer shaft from below through the opening of the reactor cover.

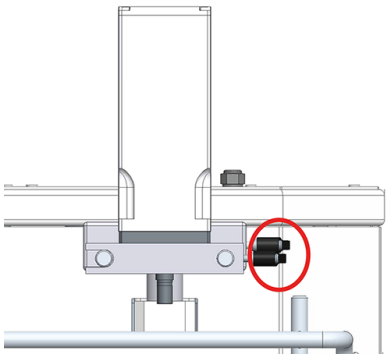
2 Push the stirrer bearing onto the stirrer shaft.

3 Carefully place the cover (with stirrer) on the PTFE ring so that the stirrer does not jam anywhere.

4 Open the chuck (1) using the key and pull the sleeve of the coupling shaft downward (2).



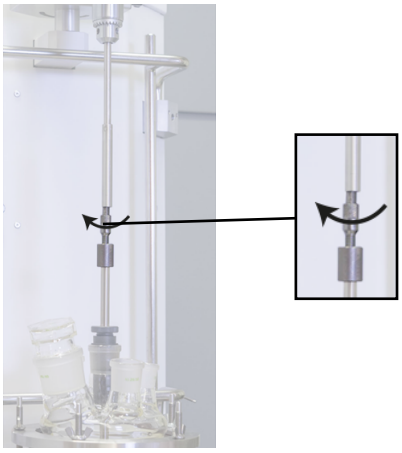
5 Loosen the positioning screws.



6 Align the coupling over the stirrer bearing of the stirrer shaft by moving the stirrer motor slightly to the left and right, or backward and forward.

7 Tighten the positioning screws again.

8 Screw the stirrer shaft and the coupling together.



9 Check that the stirrer rotates properly by turning it manually at the chuck; the flexible shaft must not touch the sleeve.

10 Position the stirrer about 1 cm above the bottom of the reactor and tighten the chuck.

4.7 First Oil Fill

- Make sure you have already mounted the correct reactor.
- Emergency button is released.
- The RC1mx is switched off.

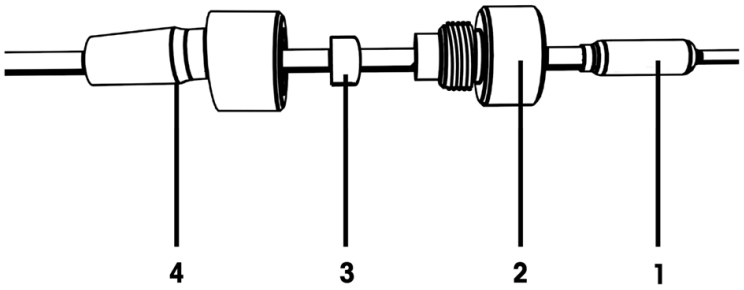
1 Connect the tubing to the oil drain stopcock on the side of instrument.
2 Secure it with a hose clamp.
3 Connect the other end of the tubing to the provided oil container (10 L volume).
4 Secure it with a hose clamp.
5 Fill the first small oil container (approx. 5 L) into the 10 L container.
6 Add one bottle of antistatic additive.
7 Fill the second small oil container (approx. 5 L) into the 10 L container.
8 Place the oil container on a higher level than the oil drain stopcock.
9 Open the oil drain stopcock.
10 Check the oil level window on the front panel of the device and wait until the appropriate level for the oil type is reached.
11 Close the oil drain stopcock.
12 Open the electronics cabinet and put the oil type switch to the correct position.
13 Switch on the RC1mx.
   ➡ When switching on the RC1mx the touchscreen may show a manipulation warning which you have to acknowledge or decline.
14 Enter a Tj of 25 °C on the touchscreen and allow the oil to circulate for approx. 5 minutes to check whether the oil level changes due to trapped air bubbles.
15 Check the oil level in the oil level window. If it becomes too low, put the device to stand-by mode and fill in more oil until the correct level has been reached. Then re-start the temperature control.
16 Let it run for about 10 minutes to drive off all air bubbles.

4.8 Connecting Tr sensor

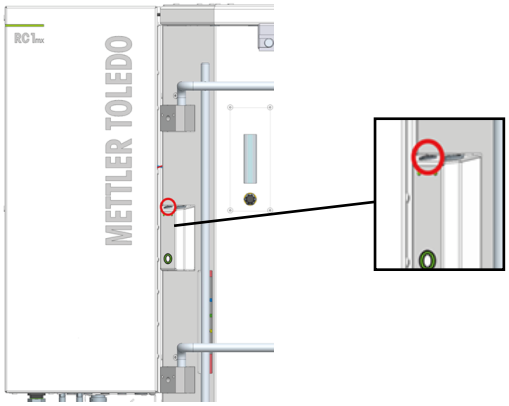
NOTICE

Do not disconnect the cables by pulling on the cable

This could damage the connectors. Only pull out the cable at the end using the plug.



1 Unscrew the pressing screw (**2**) from the adapter and push it over the sensor (**1**).
2 Push the sealing ring (**3**) over the Tr sensor with the round side pointing to the screw (**2**).
3 Push the lower part of the adapter (**4**) over the Tr sensor.
4 Screw the adapter (**3** & **2**) lightly together.
5 Install the Tr sensor (**1**) on the reactor cover (in an appropriate port).
6 Connect the Tr sensor to the Tr connection on the instrument.



7 The Tr sensor connection is on the side of the instrument (see red marking).
8 Align the red dot on the plug with the red dot on the socket of the instrument.
9 Check that the Tr sensor is sufficiently immersed into the reaction mass.

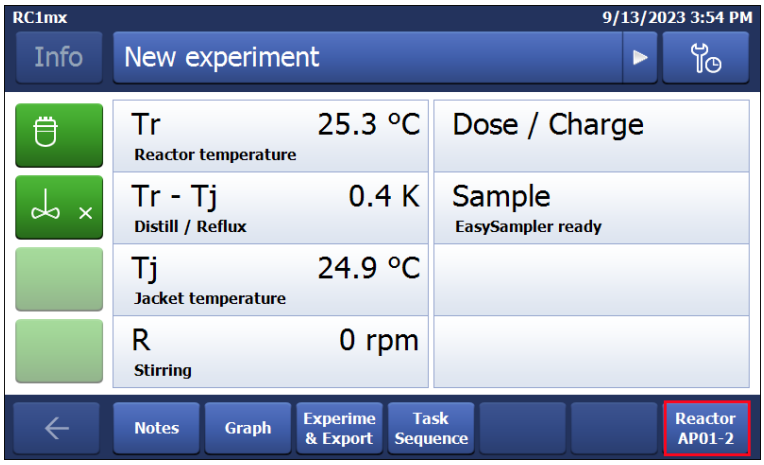
4.9 Turn on Device

- Make sure the device is properly installed and the reactor correctly mounted.
– Press the ON/OFF Button on the bottom of the electronics cabinet.
➡ The touchscreen should illuminate.
➡ The Statuslight should turn green.

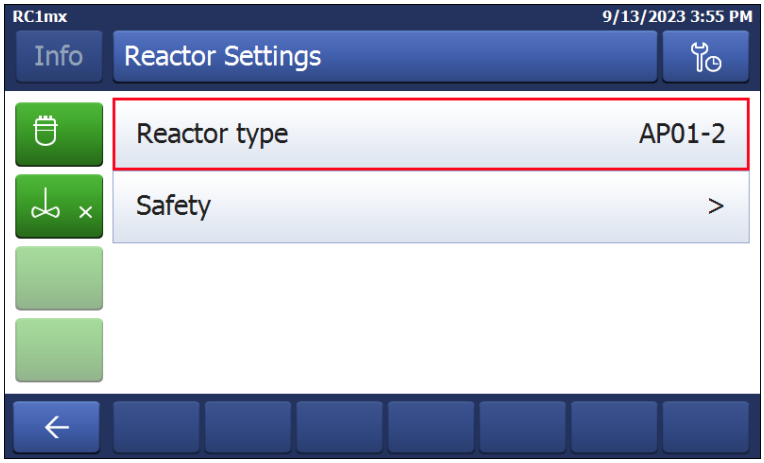
5 Operation

5.1 Select Reactor Type

1 Tap the button **Reactor AP01-2**.

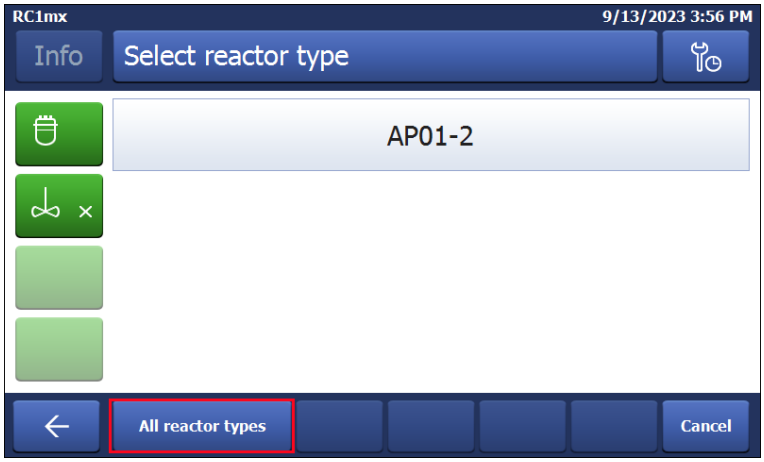


2 Tap the **Reactor type** field.



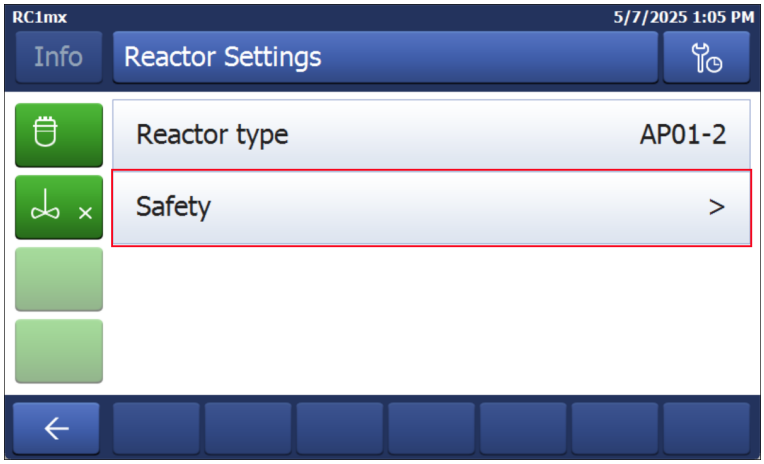
3 Select the reactor type that is installed.

4 More reactor types can be found under **All reactor types**.



5.2 Change safety settings

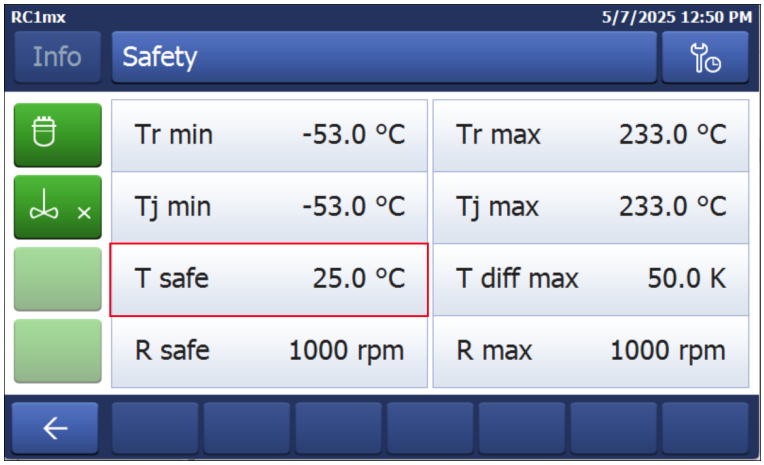
1 Tap the Reactor button.



2 Tap on the **Safety** field.

3 Change the necessary parameters according to your experiment and setup.

5.2.1 Change safety temperature (T safe)



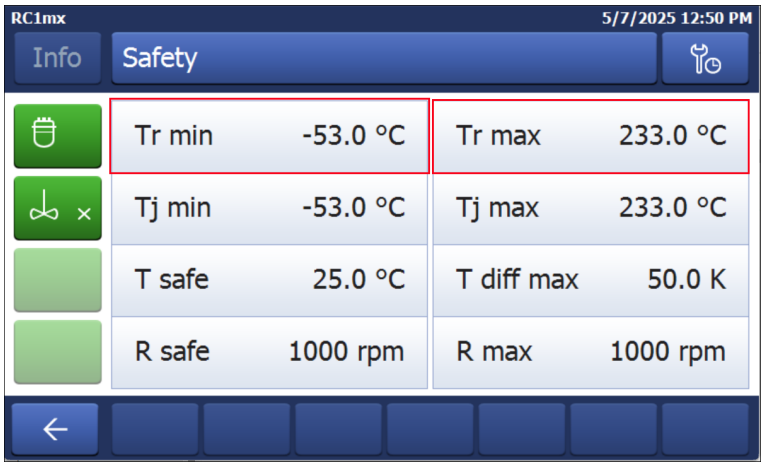
1 Tap on **T safe**.

2 Enter a value for **T safe** that is valid for your experiment.

3 Tap **OK**.

Parameter	Description	Values
Tsafe	Defines the temperature to which the reaction will be cooled in case of an emergency program B or C.	According to your chemistry

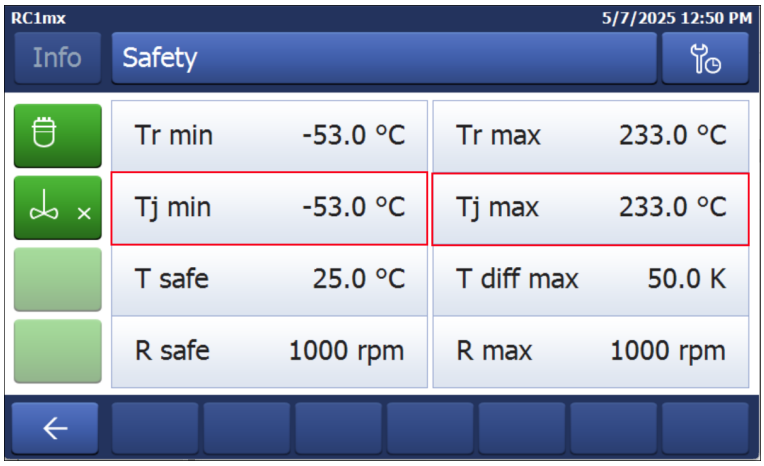
5.2.2 Change reaction temperature limits (Tr)



1 Tap on **Tr max** or / and **Tr min**.
2 Enter a value for **Tr max** and **Tr min** that is valid for your experiment.
3 Tap **OK**.

Parameter	Description	Values
Tr max	Defines the maximum temperature a Tr value can reach during an experiment and the user can enter in the reactor view. If the temperature rises above that value the emergency program A is triggered.	Dependent on: • Oil type • Reactor type
Tr min	Defines the minimum temperature the Tr value can reach during an experiment and the user can enter in the reactor view. If the temperature falls below that value the emergency program C is triggered.	Dependent on: • Oil type • Reactor type

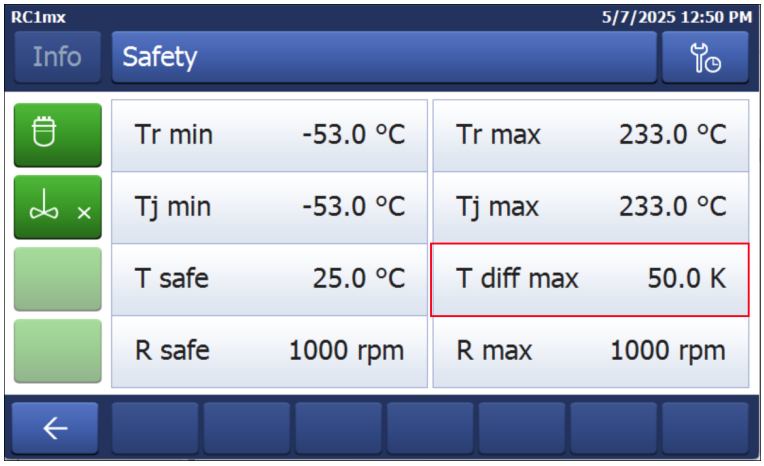
5.2.3 Change range of jacket temperature (Tj)



1 Tap on **Tj min** or / and **Tj max**.
2 Enter a value for **Tj min** and **Tj max** that is valid for your experiment.
3 Tap **OK**.

Parameter	Description	Values
Tj max	Defines the maximum temperature a Tj value can reach during an experiment and the user can enter in the reactor view. If the temperature rises above that value the emergency program A is triggered.	Dependent on: • Oil type • Reactor type
Tj min	Defines the minimum temperature the Tj value can reach during an experiment and the user can enter in the reactor view. If the temperature falls below that value the emergency program C is triggered.	Dependent on: • Oil type • Reactor type

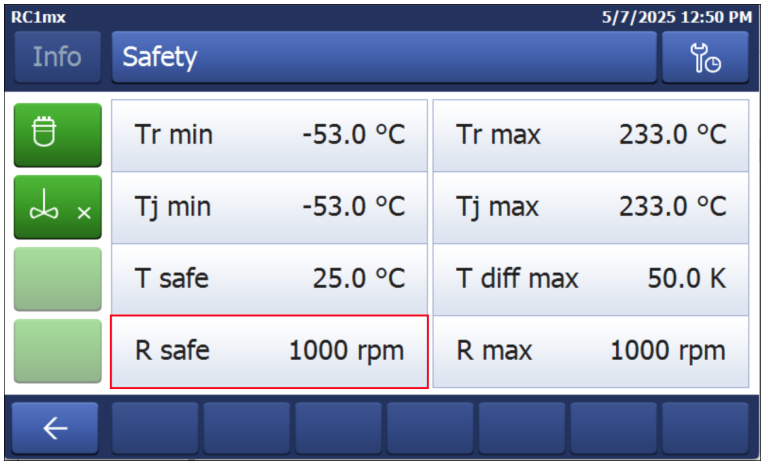
5.2.4 Change T diff max



1 Tap on **T diff max**.
2 Enter a value for **T diff max** that is valid for your experiment.
3 Tap **OK**.

Parameter	Description	Values
T diff max	Defines the temperature difference that is allowed between Tj and Tr.	Dependent on: • Reactor type

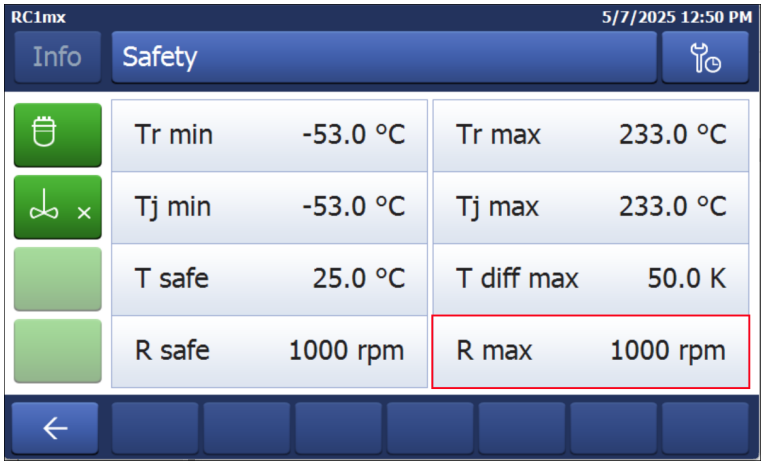
5.2.5 Change Rsafe



1 Tap on **Rsafe**.
2 Enter a value for **Rsafe** that is valid for your experiment.
3 Tap **OK**.

Parameter	Description	Values
Rsafe	Determines the stirrer speed in case of an emergency.	• Hold rpm • User-defined rpm: 0 -2500 rpm

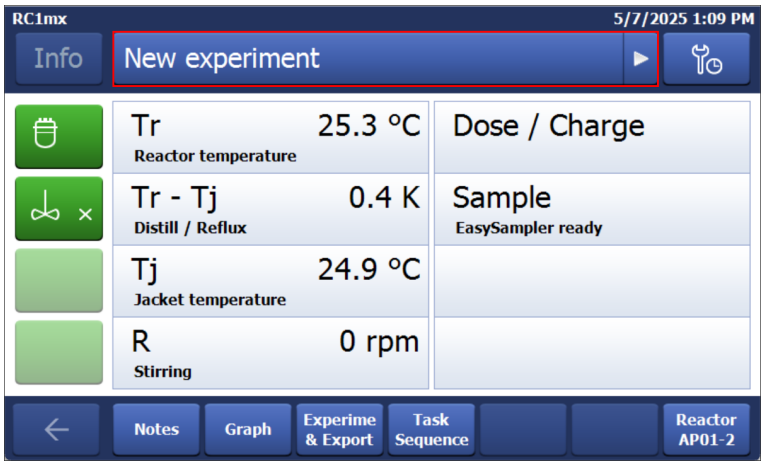
5.2.6 Change Rmax



1 Tap on **Rmax**.
2 Enter a value for **Rmax** that is valid for your experiments.
3 Tap **OK**.

Parameter	Description	Values
Rmax	Defines the maximum stirrer speed the stirrer can reach during an experiment. Should the value of Rmax be exceeded an emergency will be triggered. If the experiment is controlled with iControl all stirrer types already have defined maximum stirrer speeds. It is possible to define a narrower maximum stirrer speed due to experimental conditions.	Depended on: • Stirrer • Reactor type

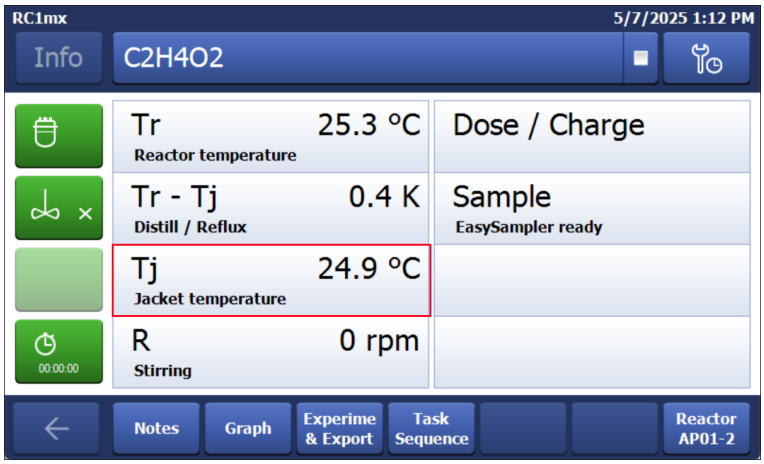
5.3 Start an experiment



1 Tap the experiment button on the main screen.
2 Enter an **experiment name**.
3 Tap **Start** to start the experiment.
➡ All tasks that are executed will be saved under the experiment and available for export.

5.4 Change Tj

Note The value cannot be higher than the safety limit value.

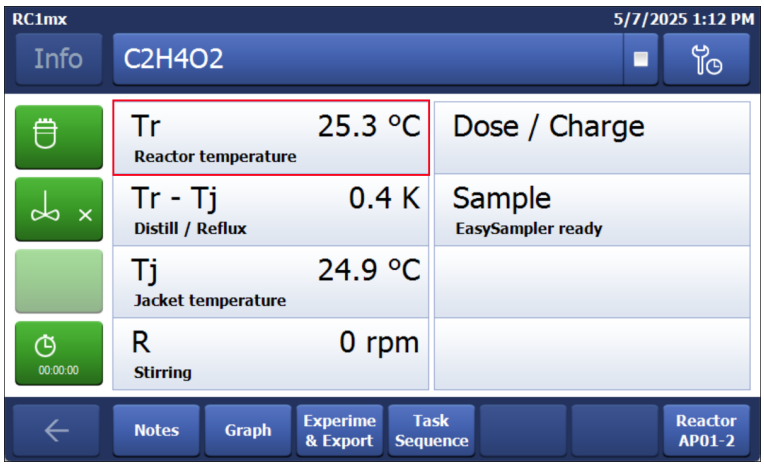


1 Tap the **Tj** value field on the main screen.
2 Enter the end temperature for **Tj**.
3 Tap **Start** to initiate the task.
➡ The task will start immediately.

5.5 Change Tr

Note The value cannot be higher than the safety limit value.

- A Tr sensor is connected to the thermostat.

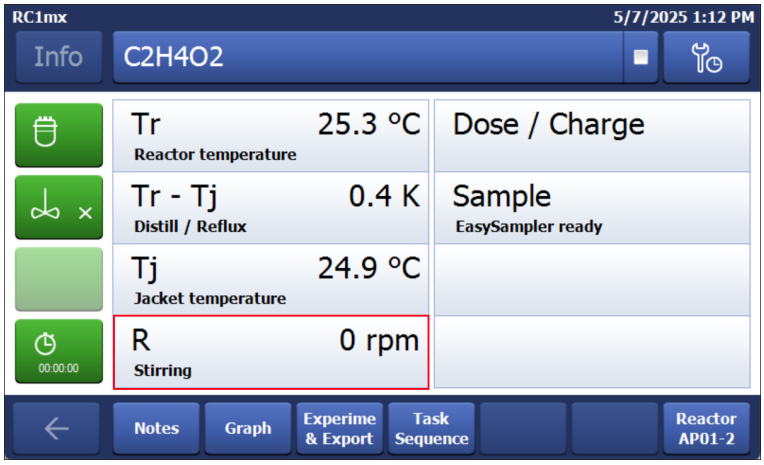


1 Tap the **Tr** value field on the main screen.
2 Enter the end temperature for Tr.
3 Tap **Start** to initiate the task.

5.6 Change stirrer speed

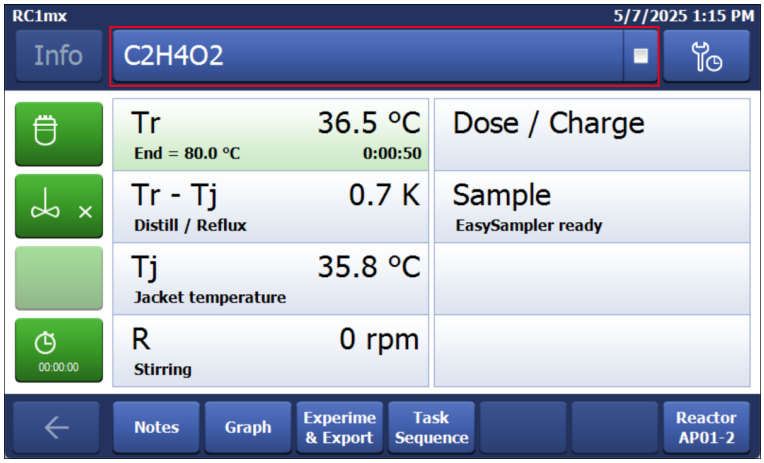
Note The value cannot be higher than the safety limit value.

- A stirrer is connected.

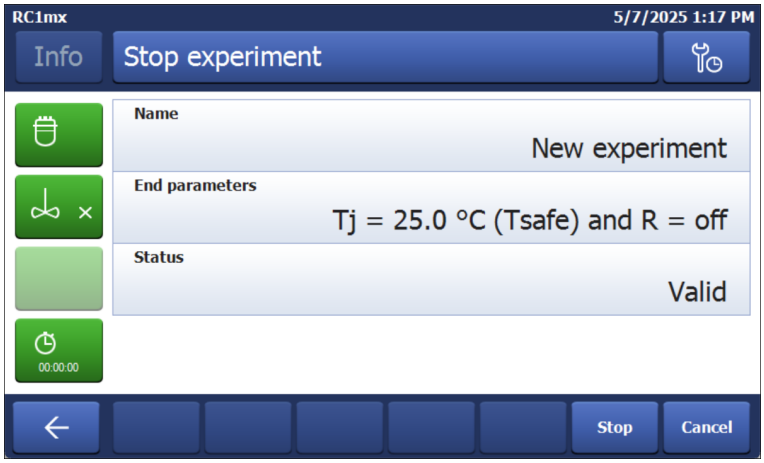


1 Tap on the **R** field.
2 Enter the desired value.
3 Tap **Start**.
➡ The stirrer will immediately start stirring.

5.7 End an experiment



1 Tap on the Stop button on the mainscreen.



2 Select your preferred option for experiment end conditions.

3 Tap **OK**.

➡ Your experiment is stored on the device and can be exported.

6 Maintenance

6.1 Update Firmware

The latest firmware versions and instructions for installation are available on the following website:

https://community.autochem.mt.com/?q=software

Note

The USB connector on the terminal is not supported by our devices. Do not use to upgrade the instrument software, export logfiles or obtain experiment data.

Always use one of the USB connectors on the device.

6.2 Checking the Reactor

To check the reactor vessel for possible damage (scratches and cracks), it must be empty, clean, dry and open. Small hairline cracks can be detected by refraction using an additional light source (focused, not dispersed light).

6.3 Cleaning the Instrument

⚠ CAUTION

Hot instrument parts

Touching hot parts of the instrument can result in burnings.

– Do not clean the instrument before all parts have reached room temperature.

NOTICE

Damage to the device due to incompatible cleaning agents

Inappropriate cleaning agents could damage the housing of the device.

1 Use the described cleaning agent.

2 Should you use other cleaning agents, ensure that they are compatible with the housing material.

The housing of the instrument is not watertight (i.e. splash proof). We therefore recommend that you clean it with a damp cloth using ethanol.

If you have questions about the compatibility of cleaning agents, contact your authorized METTLER TOLEDO dealer or service representative.

6.4 Calibration of Tr and Tj sensors

To ensure accurate measurement results, it is essential to calibrate the Tr and Tj sensors on a regular basis. We recommend calibrating these sensors at least once a quarter. Regular calibration helps to maintain the precision and reliability of your measurements. However, the optimal calibration interval may vary based on your specific requirements for deviation in your experiments.

You can easily access the calibration functionality in iControl.

6.5 Disposal

In conformance with the European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), this equipment may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this equipment in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this equipment. Should this equipment be passed on to other parties, the content of this directive must also be passed on to the other party.

7 Technical Data

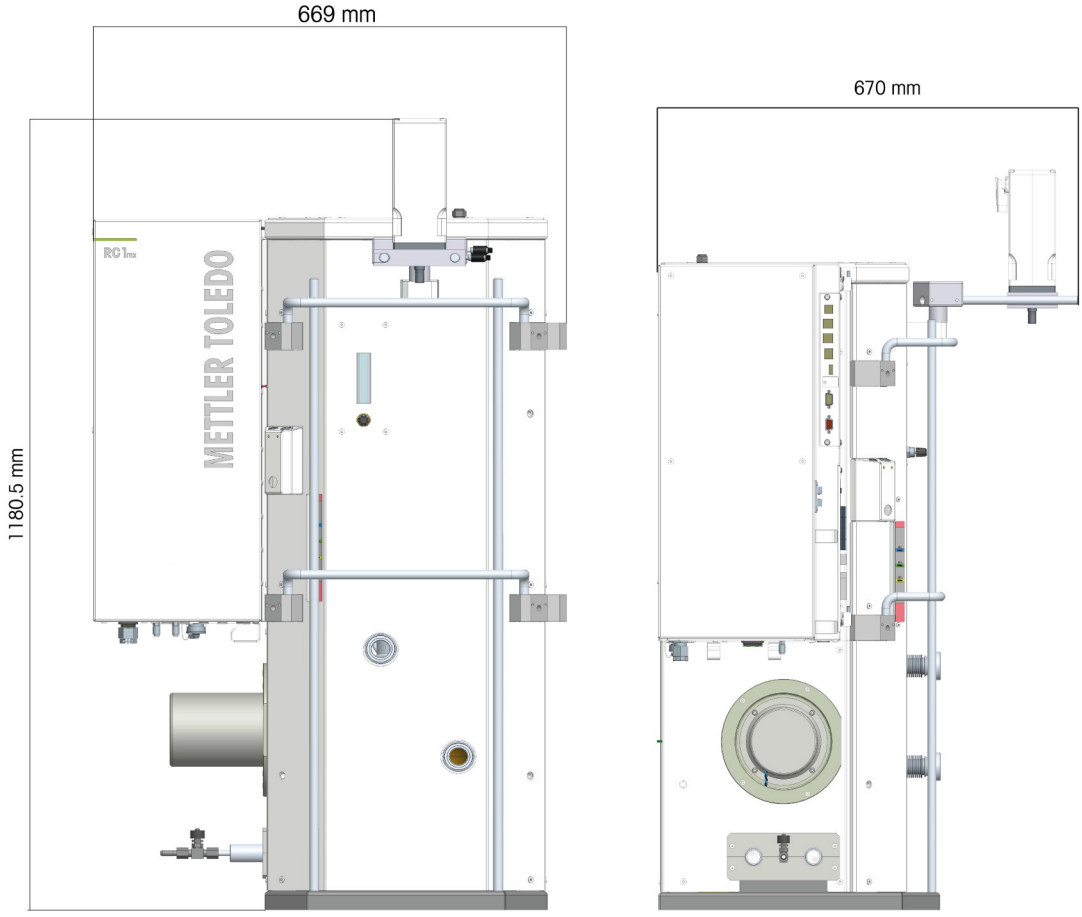
7.1 General

RC1mx (Type H)	Line voltage	350...415 V 3N~
	Permissible voltage fluctuations	Check ambient conditions
	Input frequency	50/60 Hz
	Power consumption	Max. 4800 W
	System impedance	Zmax = 0.031 Ω
	Fuses	• Motor + Heater: 4x T 10A H, 500 V fuse

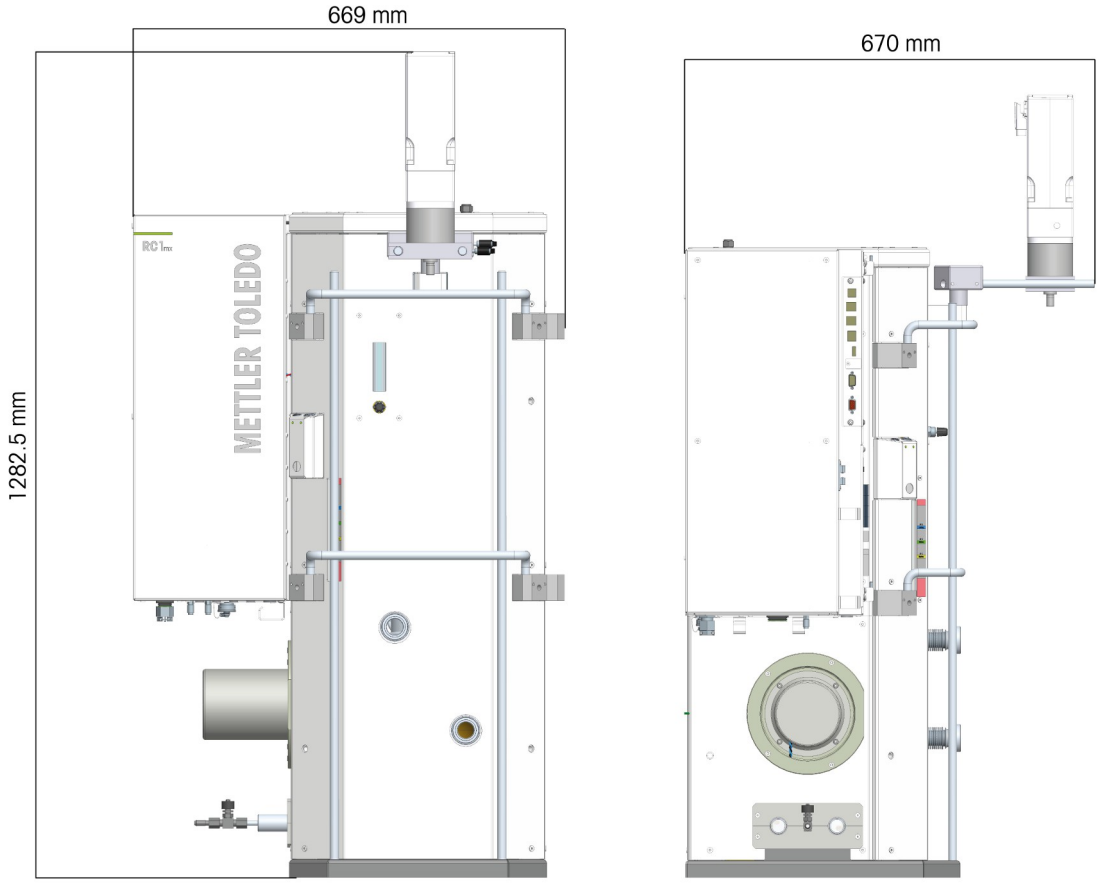
RC1mx (Type L)	Line voltage	200...240 V 3~
	Permissible voltage fluctuations	Check ambient conditions
	Input frequency	50/60 Hz
	Power consumption	Max. 4800 W
	System impedance	Zmax = 0.031 Ω
	Fuses	• Motor: 2x T 10A H, 500 V fuse • Heater: 2x T 20A H, 500 V fuse

Dimensions

RC1mx with Standard stirrer motor



RC1mx with high torque stirrer motor



Weight	170 kg

Materials

Housing	Reactor Frame Holder: Aluminium, anodized Panels: Aluminium, powder coated Frame: Steel, powder coated
Touchscreen	Crastin SO653 (PBT-GB20)
Protective cover for touchscreen	PET-A
Stirrer motor	Powder coated housing, anodized aluminum
Stirrer motor support	Flange: AlSi1MgMn Aluminium Rods: Stainless Steel 1.4301 (X5CrNi18-10) Wing screws: Stainless Steel 1.4404 (X2CrNiMo17-12-2)
Flanges	Tube: Stainless Steel 1.4541 (X6CrNiTi18-10) Flange: Stainless Steel 1.4301 (X5CrNi18-10)
Oil level window	PC
Electronics cabinet	Housing: Steel powder coated 1.0330 (DC01) Mesh: Stainless Steel 1.4301 (X5CrNi18-10)
Cover control valve	PP
Cover cooling inlet	PP
Coolant in/out connections	Stainless Steel
Spill Tray	Stainless Steel (X5CrNiMo18-10)
Connection for purge gas	Brass (CW617N)
Internal purge gas tubing	PVC, PTFE
Internal coolant line	Copper

Ambient conditions

Humidity	Max. relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C
Altitude	Up to 2000 m
Overvoltage category	II
Pollution degree	2
Ambient temperature	5 °C…40 °C
Usage	For indoor use only
Mains supply voltage fluctuations	Up to ± 10 % of the nominal voltage

7.2 Thermostat

LowTemp oil	Tj: -70 °C (with cryostat) to +80 °C
MidTemp oil	Tj: -50 (device limit) / -45 °C (oil viscosity limit) (with cryostat) to +230 °C
HighTemp oil	Tj: -5 °C (with cryostat) to +300 °C
Max. permissible errors valid for Pt100 sensor Class A	0,5 °C in the range of -20 to +100 °C 1,0 °C in the range of +100 to +200 °C
Long-term stability	± 0,1 °C

7.3 Cooling

Cooling medium	Water (unpolluted); otherwise install a filter Cryostat using: • Ethylene glycol • Ethanol • Silicone oil
Flowrate	≥ 10 L/min

7.4 Purge gas

Minimum flow	80 mL/min
Temperature range	Below room temperature and above 150 °C
Purge medium	Inert gas
Max inlet pressure	0.5 bar

7.5 Stirrer Motor

Standard torque stirrer

Speed	1…2500 rpm (depending on stirrer type and viscosity of the reaction mass), consult the reactor manuals for suitable stirrers and stirrer speed.
Operating	Control to constant value or ramp
Types (Material)	Anchor (glass/metal), pitched-blade (glass/metal), gassing stirrer (glass), Paravisc® stirrer (metal)
Torque	Max. 1 Nm

High torque stirrer

Speed	1…625 rpm (depending on stirrer type and viscosity of the reaction mass), consult the reactor manuals for suitable stirrers and stirrer speed.
Operating	Control to constant value or ramp
Types (Material)	Anchor (glass/metal), pitched-blade (glass/metal), gassing stirrer (glass), Paravisc® stirrer (metal)

Torque	Max. 4 Nm

7.6 Connections

All electrical connections	Not limited energy
HDMI	Only compatible with METTLER TOLEDO terminal
USB	Support of USB 2.0
Cable length	Limited to 3 m for RS232, USB, CAN, DC 24 V outputs, safety relay

Safety relay

Safety relay (passive) max.	30 VDC / 1 A
Connector type	LEMO ENG.1B.305.CLL

Output DC 24 V 1+2 and safety relay (active)

Max. current	1 A = I_{DC1} + I_{DC2} + I_{SR}
Nom. voltage	24 V

To protect your product's future:
METTLER TOLEDO Service assures the quality, measuring accuracy and preservation of value of this product for years to come.

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