

## Personal Synthesis Workstation



**METTLER TOLEDO**



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## 1 Introduction

The METTLER TOLEDO EasyMax™ 102 is an easy-to-use personal synthesis workstation that allows you to run two reactions simultaneously in an accurate and reproducible way.







The main features of the EasyMax 102 are:

- Two independently controlled reactor zones
- Different volumes of reaction vessels: 100 mL and 50 mL reactors or vials for 25 mL, 10 mL and 8 mL
- Overhead and magnetic stirring
- No oil or ice baths
- Minimize the size of your cryostat
- Easy touchscreen control
- Full compatibility with selected METTLER TOLEDO devices, including the DU SP-50, ECB, EasySampler and the SevenExcellence pH meter
- You can export the acquired data to another program for further processing.
- A Pt100 sensor measures the temperature of the reactor content for monitoring, temperature control and data capture.

Please also read the Operating Instructions for the full scope of functionalities of the device. The Operating Instructions can be found on the USB stick.

### 1.1 Scope of delivery

The following items are included in the EasyMax 102 Basic and EasyMax 102 Advanced thermostat set:

| Order number    |                                                                                     | Description                                    | Quantity |
|-----------------|-------------------------------------------------------------------------------------|------------------------------------------------|----------|
|                 |                                                                                     | EasyMax 102 thermostat                         | 1        |
| <b>51161883</b> |   | TFT touchscreen 7", 1 m cable                  | 1        |
| <b>11132570</b> |  | Protective cover for touchscreen               | 1        |
| <b>51191125</b> |  | PVC hose, soft, for reflux condenser, 5 m      | 1        |
| <b>51161187</b> |  | PVC industrial hose for coolant, 15 bar, 2.5 m | 2        |
| <b>51192239</b> |  | PVC industrial hose for purge gas, 18 bar, 2 m | 1        |
| <b>51161186</b> |  | PVC hose for purge gas, 2 m                    | 2        |

|                 |                                                                                     |                                            |   |
|-----------------|-------------------------------------------------------------------------------------|--------------------------------------------|---|
| <b>51191373</b> |    | Y-piece for gas tubing                     | 2 |
| <b>51191916</b> |    | Reducing connector for purge gas tubing    | 1 |
| <b>51161827</b> |    | Flowmeter set                              | 1 |
| <b>51190324</b> |    | Quick connect coupling for purge gas inlet | 3 |
| <b>51192126</b> |   | Hose clamp for PVC tube                    | 8 |
| <b>51191915</b> |  | Flow indicator for coolant                 | 1 |
| <b>51191914</b> |  | Knurled screw, M6 x 10 (already mounted)   | 3 |
|                 |                                                                                     | USB Stick RXE/CSS with documents           | 1 |
|                 |                                                                                     | User Manual                                | 1 |

#### Additional items shipped with EasyMax 102 Advanced

|  |                                              |   |
|--|----------------------------------------------|---|
|  | iControl software CD package                 | 1 |
|  | iControl Office License (license sheet only) | 1 |

If an item is missing, please contact your local support team.

## 1.2 Check on arrival

Check the following conditions once the package has arrived:

- The package is in good condition.
- The contents show no signs of damage (e.g. broken covers, scratches, etc.)
- The content is complete (see [Scope of delivery Page 3]).

If any one of these condition is not fulfilled, please contact your local support team.

## 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.

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

#### Meaning of safety symbols

|                                                                                     |                   |                                                                                     |              |                                                                                      |                     |
|-------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------|---------------------|
|   | Electrical Hazard |   | Explosion    |  | Burns / Hot Surface |
|  | Rotating parts    |  | General note |                                                                                      |                     |

### 2.2 Intended use

The METTLER TOLEDO EasyMax 102 is a reactor system for performing parallel synthesis, with 8 mL, 10 mL, 25 mL, 50 mL and 100 mL glass reactors and 100 mL pressure reactors.

The device is designed to be used in a laboratory environment and operated in a fume hood. All users should be trained to work in a laboratory and with this device.

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

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



#### **WARNING**

##### **Risk of electric shock**

- 1 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.
- 2 Only use the METTLER TOLEDO power supply cable and AC power adapter designed for your instrument.



### **WARNING**

#### **Power failure**

A power failure can lead to explosion with possibly fatal consequences.

- Implement appropriate measures like an uninterruptible power supply (UPS).



### **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 explosion due to damaged reactors**

Explosion of a reactor could cause serious injury.

- Check the reactor before each use for damage (scratches, formation of cracks).



### **CAUTION**

#### **Hot parts when working above 50 °C**

Touching hot parts can cause burns.

- Do not touch the cover plate of the device, the fixing ring, the reactor covers, attachments of the reactor or the overhead stirrer if you work above 50 °C.



### **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**

#### **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<sub>2</sub> or DW-Therm.
- 2 Check compatibility with the wetted parts of the coolant system.



### **NOTICE**

#### **Wrong connection or disconnection of cables**

A wrong connection or disconnection of cables during operation could lead to instrument damage.

- 1 Before switching the device on, connect the cables of stirrers and sensors to their respective inputs and outputs.
- 2 Do not disconnect the cables while the instrument is operating.





## NOTICE

### Condensation of atmospheric moisture

The condensation of atmospheric moisture can cause corrosion of the instrument.

- 1 Always purge the instrument when it is in use. This removes any condensation that has formed.
- 2 Purge it with dry air, nitrogen or argon.



## NOTICE

### Reactor breaking due to freezing

The reactor can break or get stuck in the reactor zone of the thermostat when atmospheric moisture or any liquids freeze on the outside of the reactor or in the reactor zone of the thermostat.

- 1 Make sure the reactor zone of the thermostat and the reactor itself are clean and dry before inserting.
- 2 Make sure that when cooling below 0 °C, there is enough purge to minimize condensation.



## 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

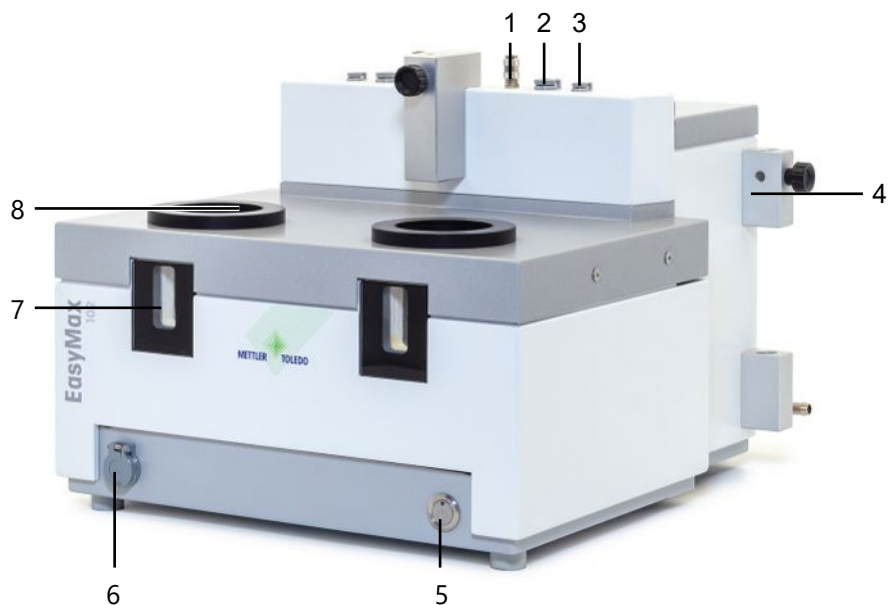
### Risk of reactor breakage when sealed hermetically

Hermetical sealing could lead to pressure build-up when using gas or when the reactor is heated.

- Make sure venting is always possible.

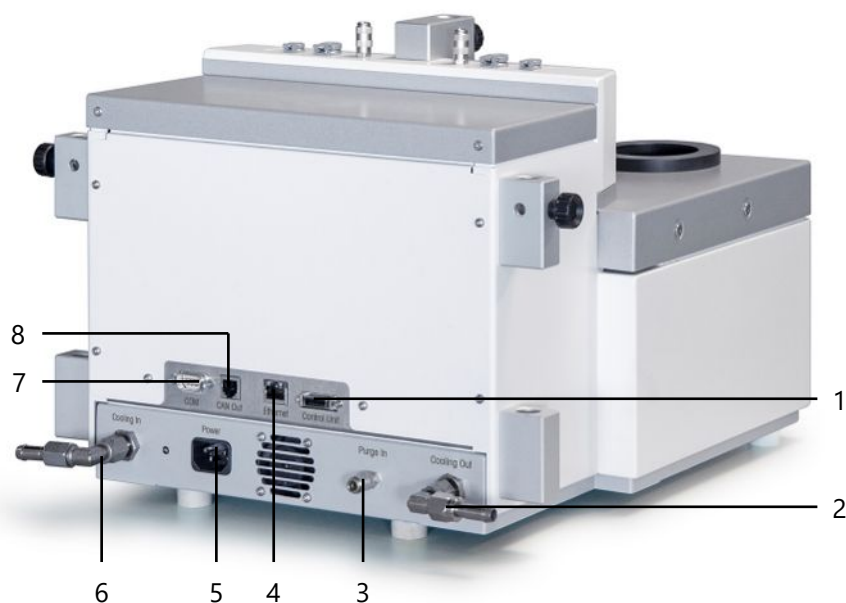
### 3 Overview

#### Front view



|          |                                                   |          |                      |
|----------|---------------------------------------------------|----------|----------------------|
| <b>1</b> | Reactor purge gas outlet (quick connect coupling) | <b>2</b> | Stirrer socket       |
| <b>3</b> | Tr sensor socket                                  | <b>4</b> | Holder for lab bars  |
| <b>5</b> | Power button                                      | <b>6</b> | USB Socket           |
| <b>7</b> | Window (with backlight)                           | <b>8</b> | Opening for reactors |

#### Rear view



|          |                        |          |                     |
|----------|------------------------|----------|---------------------|
| <b>1</b> | Touchscreen connection | <b>2</b> | Coolant out         |
| <b>3</b> | Purge in connection    | <b>4</b> | Ethernet connection |
| <b>5</b> | Power supply           | <b>6</b> | Coolant in          |
| <b>7</b> | RS232                  | <b>8</b> | CAN out             |

## 4 Installation

### 4.1 Installation requirements

- The device should be installed in a fume hood.
- Make sure there is enough space (about 10 cm) between the ventilation slots at the back side of the instrument and any other object or the wall.
- Make sure you install the device in accordance with the technical data.

#### 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 Unpacking and transporting device

#### Unpack the device

- 1 Grip the device under the base plate.
- 2 Lift the device up and out of the foam packing material.
- 3 Place the device on the lab bench.

#### Transport the device

- 1 Unplug the power adapter.
- 2 Disconnect the device properly from the cooling media.
- 3 Grip the device under the base plate.

### 4.3 Connecting power to the device



#### WARNING

##### Risk of electric shock

- 1 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.
- 2 Only use the METTLER TOLEDO power supply cable and AC power adapter designed for your instrument.

- 1 The power supply connection is on the back side of the device.
- 2 Connect the instrument to the power supply using the included country-specific cable.
- 3 Insert the plug of the power cable in a grounded power outlet that is easily accessible.



### 4.4 Connecting a flowmeter

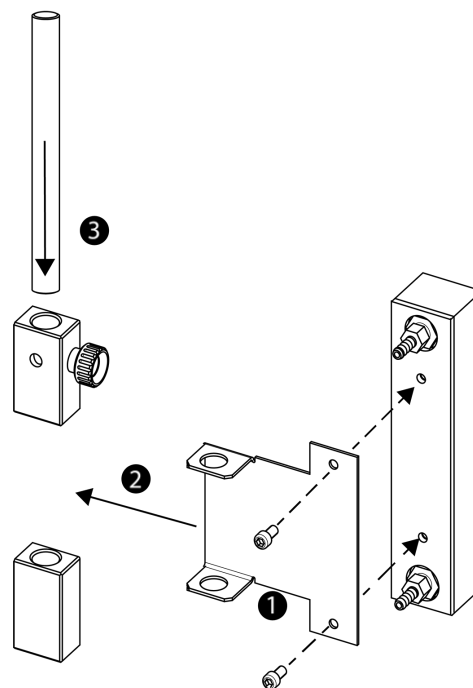


#### NOTICE

##### Damage of Flowmeter

The flowmeter is not resistant to any liquids other than water! Do not use it with other coolants.

- 1 Screw the flowmeter with the knurled screw onto the metal holder.
- 2 Insert the holder into the space between the lab bar holders.
- 3 Slide the lab bar through the lab bar holes and the holes of the metal holder.
- 4 Tighten the screw on the lab bar holder to fasten the lab bar.



## 4.5 Installing instrument cooling

There are two possibilities to cool the instrument:

- Connect to in-house coolant supply
- Connect to cryostat



### NOTICE

#### Damage of Flowmeter

The flowmeter is not resistant to any liquids other than water! Do not use it with other coolants.



### NOTICE

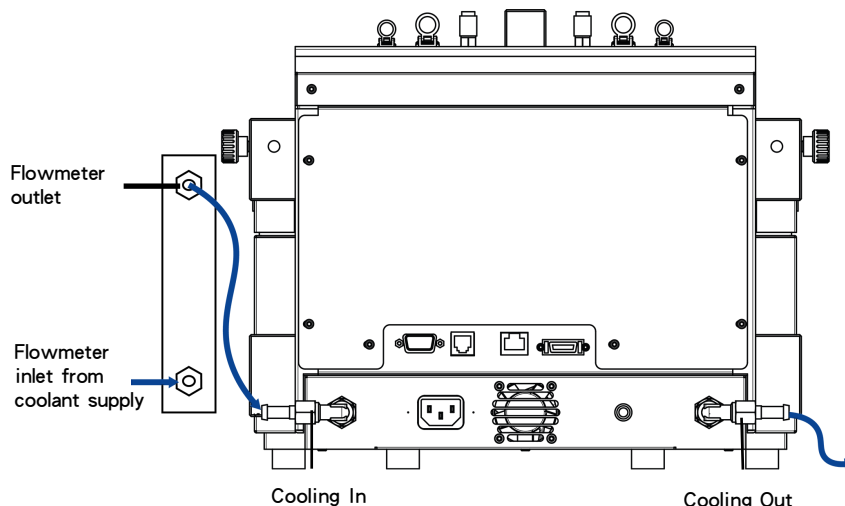
#### Wrong coolant used

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

- 1 Do not use solutions of NaCl, CaCl<sub>2</sub> or DW-Therm.
- 2 Check compatibility with the wetted parts of the coolant system.

## 4.5.1 Connecting in-house coolant supply

The instrument needs a constant flow of the cooling medium.



The instrument is delivered with two PVC industrial tubes. If you use the flowmeter, you need a third piece which can be cut away from one of the delivered tubes.

- 1 Push one piece of the PVC industrial hose (51161187) over the cooling inlet of the coolant flowmeter.
- 2 Secure it with a hose clamp.
- 3 Connect it to the coolant supply.
- 4 Push the cut piece of the PVC tube over the outlet of the coolant flowmeter.
- 5 Connect the other end to the elbow coupling of the **Cooling In** on the back side of the instrument.
- 6 Secure both connections with a hose clamp.
- 7 Push the other PVC tube over the elbow coupling of the **Cooling Out** on the back side of the instrument.
- 8 Secure it with a hose clamp.
- 9 Connect it to the cooling outlet of the fume hood.

## 4.5.2 Connecting cryostat cooling



### NOTICE

#### Damage of Flowmeter

The flowmeter is not resistant to any liquids other than water! Do not use it with other coolants.

Do not use the flowmeter with the cryostat in order to have full capacity.

The instrument needs a constant flow of the cooling medium.

- 1 Screw the insulated connection tube over the **Cooling In** on the back of the instrument.
- 2 Use a wrench to tighten the connection to the instrument.
- 3 Screw the second insulated connection tube over the **Cooling Out** on the back of the instrument.
- 4 Use a wrench to tighten the connection to the instrument.

## 4.6 Connecting instrument purge



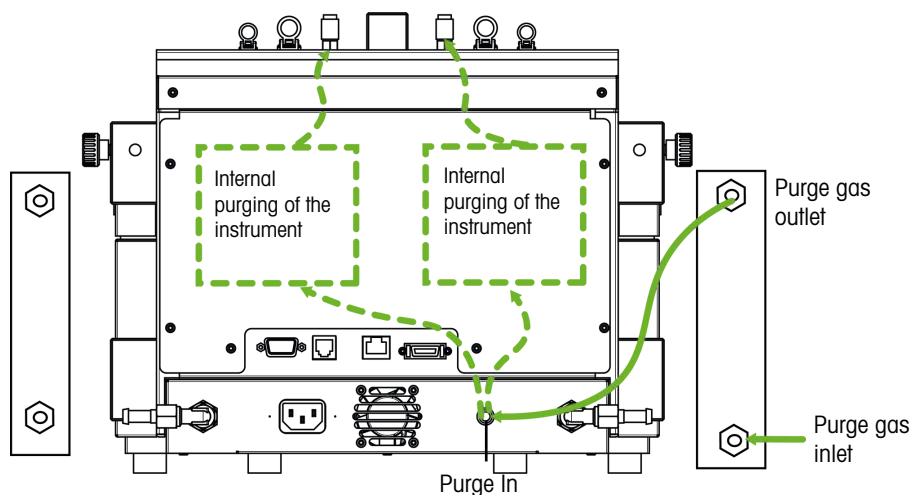
### NOTICE

#### Condensation of atmospheric moisture

The condensation of atmospheric moisture can cause corrosion of the instrument.

- 1 Always purge the instrument when it is in use. This removes any condensation that has formed.
- 2 Purge it with dry air, nitrogen or argon.

To prevent corrosion by condensed atmospheric moisture, purge the instrument with a dry gas, e.g. dry air (dew point -70 °C), dry nitrogen or dry argon.



- 1 Install the quick connect coupling (51190324) with the PVC tubing (51161186) on the purge gas inlet connector.
- 2 Secure it with a hose clamp.
- 3 Connect the PVC tubing to the gas supply.

#### 4.7 Connecting touchscreen to EasyMax

- 1 The touchscreen connection is on the back side of the instrument (see picture).
- 2 Connect the touchscreen cable to the socket.
- 3 Position the touchscreen so that it is always readable.

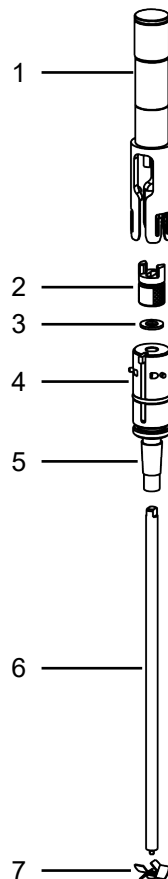


#### 4.8 Assembling the stirrer

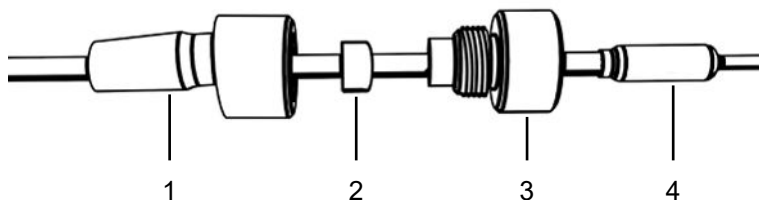
The overhead stirrer consists of the stirrer motor and a stirrer shaft that can be equipped with several stirrer elements (see Synthesis Workstation Catalog).

- 1 Screw the pitched-blade element (7) onto the stirrer shaft (6).

- 2 Push the stirrer shaft (6) or the glass stirrer from below through the opening of the reactor cover.
- 3 Push the adapter (5) with the height adjustment unit (4) over the stirrer shaft and insert it into the tapered opening of the cover.
- 4 Place the PA washer (3) over the stirrer shaft onto the adjustment unit (4).
- 5 Push the lower coupling (2) onto the stirrer shaft.
- 6 Push the stirrer motor (1) over the adjustment unit (4) in such a way that it snaps into its three pins.
- 7 Check that the stirrer blade does not touch any inserts.
- 8 Secure the adapter on the reactor with a Keck clamp.



#### 4.9 Installing a Tr sensor



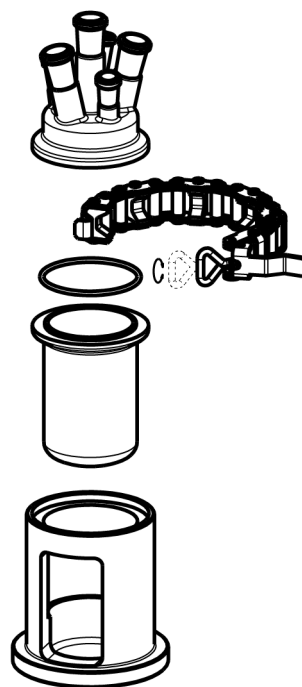
- 1 Slide a UNF 1/4" G 28 nut (3) over the sensor (4).
- 2 Slide a UNF 1/4" G 28 ferrule (2) over the sensor with the narrow end facing the nut.
- 3 Screw the nut lightly into the adapter (1) to press the ferrule into the nut.
- 4 Check that the Tr sensors does not touch the stirrer blades or other inserts.

**Note** Make sure the temperature sensor shows a sufficient immersion depth.

#### 4.10 Installing a two-piece 100 mL reactor

- 1 Push the glass stirrer or the stirrer shaft with anchor or pitched-blade element through the central opening of the reactor cover before you place the cover onto the reactor.

- 2 Connect the stirrer shaft to the stirrer motor.
- 3 Place the reactor in the reactor holder.
- 4 Place the O-Ring on the cover rim and place the cover on the reactor.
- 5 Place the clamp chain carefully around the cover and the reactor flanges.
- 6 Screw the hook in or out so that the buckle can be easily closed (with one finger).



#### 4.11 Turn on Device

- Power is connected.
- Cooling is connected and running.
- Purging of instrument is connected and running.
- Touchscreen is connected
- Press the ON/OFF button on the front side of the instrument.
  - ➔ You should hear an audible click and the LED illuminates.
  - ➔ The touchscreen shows a splash screen during start up phase.
- ➔ You can use the device as soon as the mainscreen appears.

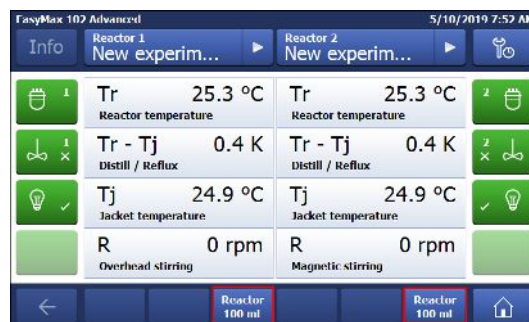


## 5 Operation

All operations can be changed individually for reactor zone 1 or 2.

### 5.1 Select Reactor Type

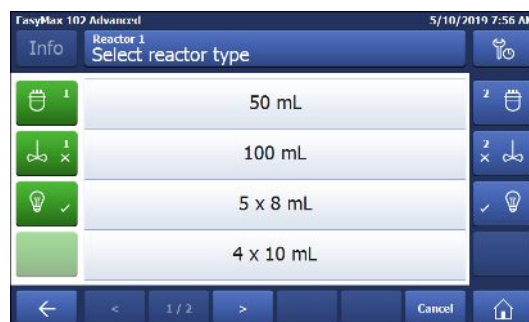
- 1 Tap the button **Reactor 100 mL**.
- 2 Tap the **Reactor type** field.



- 3 Select the reactor type that is installed.

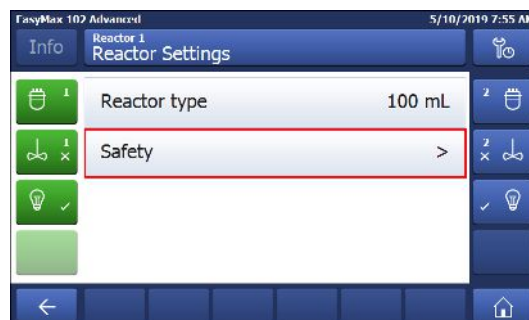
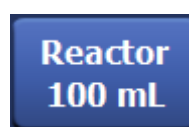


- ➔ Make sure the safety settings for the reactor are still within the range.



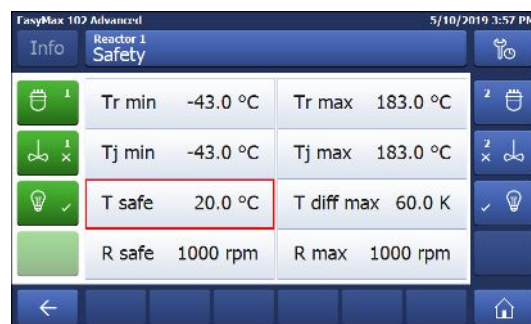
### 5.2 Change safety settings

- 1 Tap the Reactor button.
- 2 Tap on the **Safety** field.
- 3 Change the necessary parameters according to your experiment and setup.



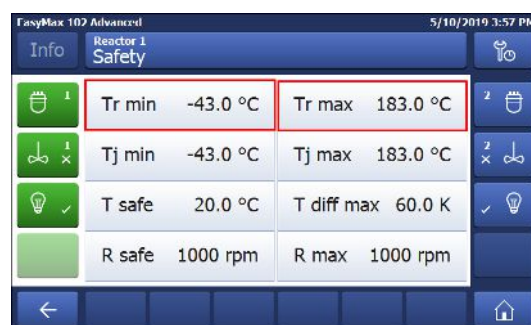
## 5.2.1 Change safety temperature (T safe)

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



## 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**.



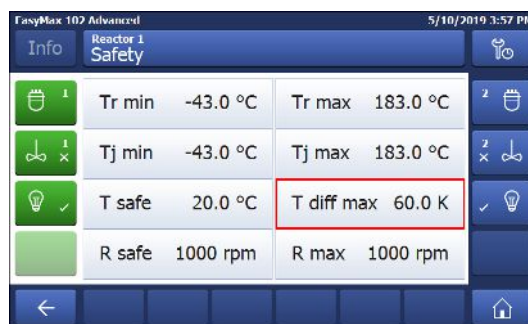
## 5.2.3 Change range of jacket temperature (Tj)

- 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**.



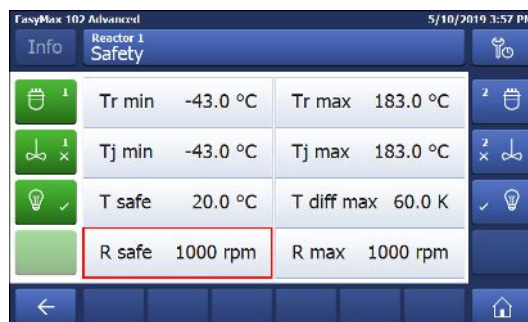
## 5.2.4 Change T diff max

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



## 5.2.5 Change Rsafe

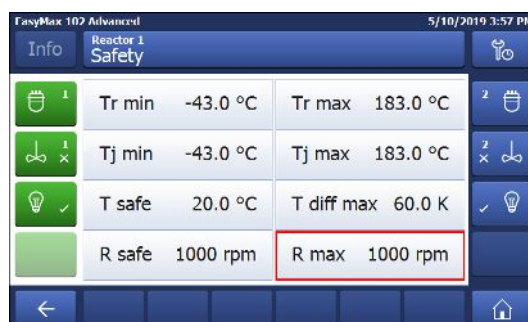
- 1 Tap on **Rsafe**.
- 2 Enter a value for **Rsafe** that is valid for your experiment.
- 3 Tap **OK**.



## 5.2.6 Change Rmax

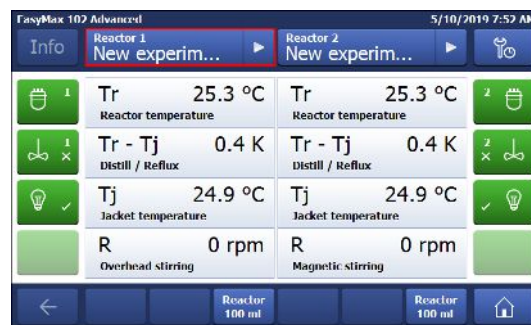
If you use any glass stirrer or metal anchor stirrer blade, please ensure that the Rmax is reduced to 500 rpm.

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



### 5.3 Start an experiment

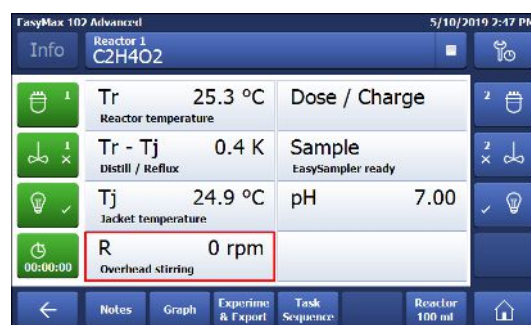
- 1 Tap the experiment button on the main screen.
  - 2 Enter an **experiment name**.
  - 3 Tap **Start** to start the experiment.
- ➔ All tasks that are executed will be saved under the experiment and available for export.



### 5.4 Change stirrer speed

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

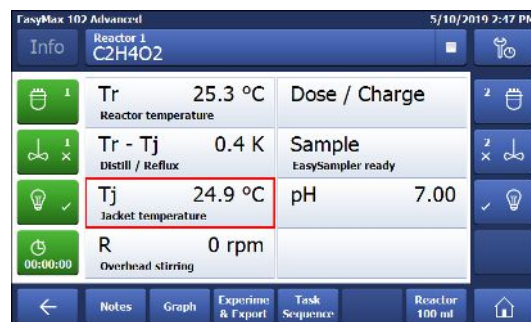
- A stirrer is connected.
- 1 Tap on the **R** field.
  - 2 Enter the desired value.
  - 3 Tap **Start**.
- ➔ The stirrer will immediately start stirring.



### 5.5 Change Tj

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

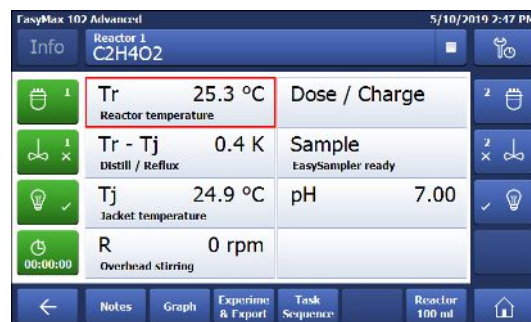
- 1 Tap the **Tj** value field on the main screen.
  - 2 Enter the end temperature for **Tj**.
  - 3 Tap **Start** to initiate the task.
- ➔ The task will start immediately.



### 5.6 Change Tr

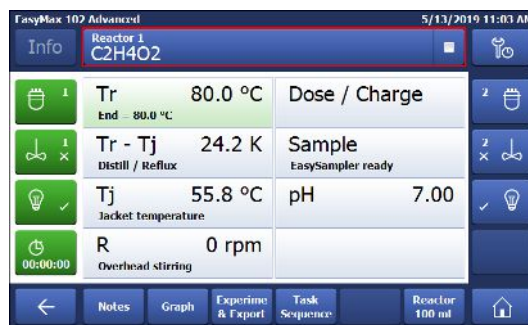
**Note** The value cannot be higher than the safety limit value.

- 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.



## 5.7 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

Maintenance tasks have to be performed in accordance with the instructions given in this chapter. After performing any maintenance tasks, it should be ensured that the device still meets all safety requirements.

### 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>

### 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 Disposal

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

Please dispose of this product 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 device. Should this device be passed on to other parties, the content of this regulation must also be related.



## 7 Technical Data

Certifications regarding this product can be found at <https://www.mt.com/us/en/home/search/compliance.html/>  
The product name of your device is the model number.

### Directives, standards and REACH regulation

SVHC candidate substances according to REACH (Article 33)

| Material                      | CAS No.  |
|-------------------------------|----------|
| Decamethylcyclopentasiloxane  | 541-02-6 |
| Dodecamethylcyclohexasiloxane | 540-97-6 |
| Octamethylcyclotetrasiloxane  | 556-67-2 |

### United States of America

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Power supply

|                                |                                 |               |
|--------------------------------|---------------------------------|---------------|
| <b>AC Power Adapter rating</b> | Voltages                        | 100 - 240 VAC |
|                                | Frequency                       | 50 Hz / 60 Hz |
|                                | Permissible voltage fluctuation | ±15%          |
| <b>Instrument rating</b>       | Power Consumption               | Max. 1000 VA  |

### Connections

|                              |                                           |
|------------------------------|-------------------------------------------|
| <b>USB</b>                   | Support of USB 2.0                        |
| <b>Electrical connectors</b> | RS232, USB, CAN, Ethernet and touchscreen |
| <b>Cable length</b>          | Limited to 3 m for RS232, USB, CAN        |

### Ambient Conditions

|                             |                                                                                                                 |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Humidity</b>             | Max. relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C |
| <b>Altitude</b>             | Up to 2000 m                                                                                                    |
| <b>Overvoltage category</b> | II                                                                                                              |
| <b>Pollution degree</b>     | 2                                                                                                               |
| <b>Ambient temperature</b>  | 5 °C...40 °C                                                                                                    |
| <b>Usage</b>                | For indoor use only                                                                                             |

### Materials

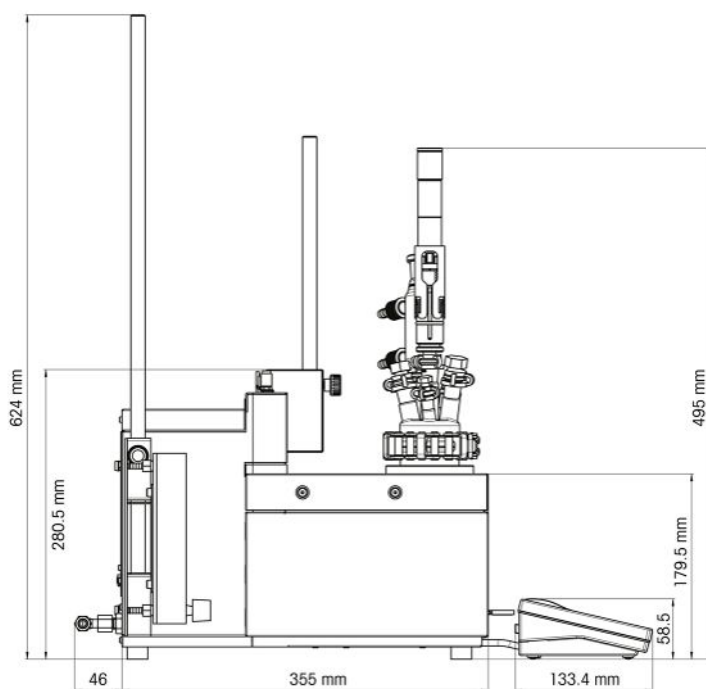
|                                 |                                      |
|---------------------------------|--------------------------------------|
| <b>Cover plate</b>              | Stainless steel coated with PFA/FEP  |
| <b>Housing material</b>         | Powder-Coated stainless steel        |
| <b>Connectors for purge gas</b> | Stainless steel, nickel-plated brass |
| <b>Purge gas lines</b>          | PVC, FEP, PP, PVDF, PTFE, aluminum   |

|                                                           |                                                |
|-----------------------------------------------------------|------------------------------------------------|
| <b>Coolant system (wetted parts)</b>                      | PVC, PTFE, PVDF, copper                        |
| <b>Cooling connector</b>                                  | Nickel-plated brass                            |
| <b>Holder for lab bars</b>                                | Aluminium                                      |
| <b>LEMO connectors for Tr sensor and overhead stirrer</b> | Chrome-plated brass with protection cap in PSU |
| <b>Reactor window</b>                                     | Borosilicate glass 3.3                         |
| <b>Receptacles for reactors</b>                           | Anodized aluminum                              |
| <b>Fixing rings of thermostats</b>                        | PTFE C25                                       |
| <b>USB connector</b>                                      | Stainless steel with protection cap in PSU     |
| <b>On/Off switch</b>                                      | Stainless steel                                |
| <b>Reactors</b>                                           | Borosilicate glass 3.3 and PTFE                |
| <b>Magnetic stirrer</b>                                   | PTFE coated                                    |
| <b>Overhead stirrer shaft</b>                             | Borosilicate glass 3.3, Alloy 22 or PTFE       |
| <b>Touchscreen</b>                                        | PA 12, aluminum                                |
| <b>Protective cover for Touchscreen</b>                   | Barex®                                         |

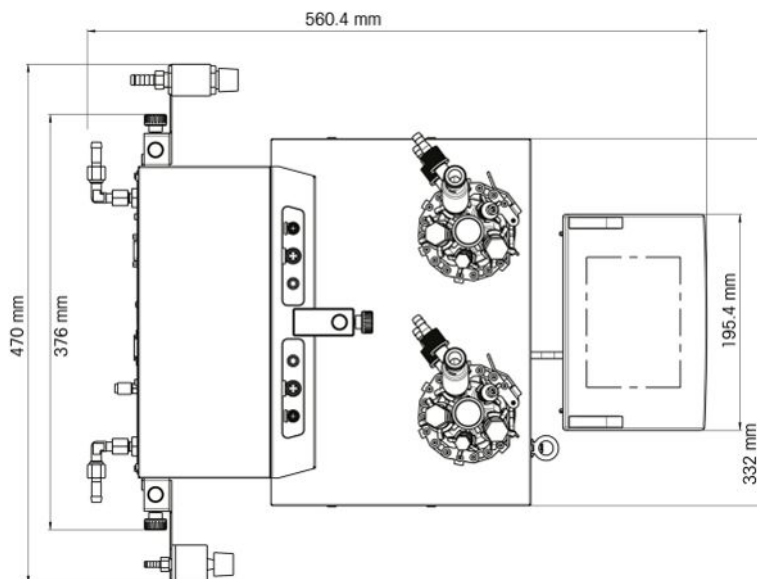
#### Device

|                                 |                   |
|---------------------------------|-------------------|
| <b>Weight incl. Touchscreen</b> | 16 kg             |
| <b>Backlight</b>                | 2 LED per reactor |

#### Dimensions







## 7.1 Thermostat

### Power

|                |                           |
|----------------|---------------------------|
| <b>Heating</b> | 360 W per thermostat      |
| <b>Cooling</b> | Max. 150 W per thermostat |

### Temperatures

|                                   |                                                                                                                                                                                                                               |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Range</b>                      | Tj: - 40 °C (with Tc < -15 °C) to 180 °C<br>Tr: - 40 °C (with Tc < -15 °C) to 180 °C*<br>Tc: - 40 °C to 60 °C<br>* The maximum and minimum Tr depends on heat transfer through the jacket and heat generated by the reaction. |
| <b>Resolution</b>                 | Tj: 0.1 K<br>Tr: 0.1 K                                                                                                                                                                                                        |
| <b>Maximum permissible errors</b> | ±1.0 K for the whole range, for Tr and Tj sensor                                                                                                                                                                              |
| <b>Data recording interval</b>    | Every 2 seconds                                                                                                                                                                                                               |

## 7.2 Reactors

|                 |                                           |
|-----------------|-------------------------------------------|
| <b>Volumes</b>  | 100 mL<br>50 mL<br>25 mL<br>10 mL<br>8 mL |
| <b>Pressure</b> | 0.05 bar to ambient pressure              |

### Cover for reactors

|                    |                                                                                                                                                                                                |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 50 mL glass cover  | <ul style="list-style-type: none"> <li>• 1 x ST7/16</li> <li>• 2 x ST10/19</li> <li>• 2 x GL14</li> <li>• 1x ST14/23: Central port for stirrer</li> </ul>                                      |
| 100 mL glass cover | <ul style="list-style-type: none"> <li>• 2 x ST10/19</li> <li>• 3 x ST14/23               <ul style="list-style-type: none"> <li>– 1x ST14/23: Central port for stirrer</li> </ul> </li> </ul> |

|                         |                                                                                                                                                                                                         |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 100 mL PTFE cover       | <ul style="list-style-type: none"> <li>• 1 x ST10/19</li> <li>• 3 x ST14/23 <ul style="list-style-type: none"> <li>– 1x ST14/23: Central port for stirrer</li> </ul> </li> <li>• 2 x ST19/26</li> </ul> |
| 100 mL PTFE 19 mm cover | <ul style="list-style-type: none"> <li>• 1 x ST10/19</li> <li>• 2 x ST14/23</li> <li>• 1 x 1/2" NPT</li> <li>• 1 x 19.25 mm</li> <li>• 1 x ST14 with 3/8" NPT: Central port for stirrer</li> </ul>      |

### 7.3 Stirrer

#### Overhead stirrer

|                                |                                   |
|--------------------------------|-----------------------------------|
| <b>Operating mode</b>          | Control to constant value or ramp |
| <b>Data recording interval</b> | Every 2 seconds                   |
| <b>Speed range</b>             | 50 to 1000 rpm                    |

#### Magnetic stirrer

|                    |                |
|--------------------|----------------|
| <b>Speed range</b> | 50 to 1000 rpm |
|--------------------|----------------|

### 7.4 Cooling

|                                |                                                                                                                                                                                                                                                                                 |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cooling medium                 | <ul style="list-style-type: none"> <li>• Water (unpolluted); otherwise install a filter</li> <li>• Ethylene glycol</li> <li>• Silicone oil</li> </ul> <p>Other cooling media have to be compatible with the wetted materials of the cooling system [Technical Data Page 21]</p> |
| Min. flow of cooling media     | 2 L/min                                                                                                                                                                                                                                                                         |
| Cooling types                  | In-house coolant supply or cryostat                                                                                                                                                                                                                                             |
| Max. pressure of cooling media | <ul style="list-style-type: none"> <li>• Without flowmeter: 3.5 bar</li> <li>• With flowmeter: 2 bar</li> </ul>                                                                                                                                                                 |

| Temperature (Tj) | In-house coolant supply | Cooling power of cryostat |
|------------------|-------------------------|---------------------------|
| > - 10 °C        | At 15 °C                | 1000 W at 20 °C           |
| - 40 °C          | Not possible            | Min. 450 W at -10 °C      |

### 7.5 Purge gas

|                            |                                                                                                                                                                         |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Max. inlet pressure</b> | 7 bar                                                                                                                                                                   |
| <b>Min gas flow</b>        | <ul style="list-style-type: none"> <li>• Instrument purge: 3 L/min [Connecting instrument purge Page 11]</li> <li>• Reactor purge: as required by experiment</li> </ul> |



**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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