

Installing and Getting Started



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RX-10™ – Scope of Delivery

Number	Description	30208790	30217050
1	RX-10 main unit	1	1
2	Touchscreen 7", with protective cover, 1 m cable	1	-
	Touchscreen 7", with protective cover, 3 m cable	-	1
3	Power supply	1	1
4	Lab bar holder	1	1
5	RS232 cable set for thermostat/stirrer	1	1
6	RX-10 User Manual	1	1

Introduction

This is a step-by-step guide to install an RX-10 unit, connect it to the thermostat and stirrer, and to operate the most common functions of the system.

The RX-10 is capable of controlling and/or monitoring the following equipment:

Thermostats



Huber



Julabo



Lauda

Sensors for SmartConnect™ Port

Generic current/voltage sensor
 (-10 V to 10 V and 0 mA to 20 mA)
 Order No. for sensor cable: 30267165
 Temperature sensor Pt100 (4 wires)
 Order No. for sensor cable: 30267163

Stirrers



IKA



Heidolph



Chemglass



J-KEM



Emergency button
 Order No.: 30260369

Safety relay (LEMO plug)
 LEMO Order No.: FGG.1B.303.CLAD62

NOTE: Thermostats and Stirrers are manufactured by 3rd party vendors reserving the rights for any technical changes and upgrades leading to potential variations in device behavior. Please contact MT representative e.g. Technical Application Consultant for more information.

Other Specifications

Supported reactor volume and temperature range

RX-10 is not limiting the range of any process parameters. The maximum possible performance solely depends on the connected third-party equipment such as thermostat or the reactor.

Supported sensors

Any analog sensor providing one of the following signals using the respective METTLER TOLEDO SmartConnect sensor cable:

- Current (0/4 mA to 20 mA)
- Voltage (-10 V to 10 V)
- Temperature sensor Pt100 with 4 wires

} With 10 W / 24 V optional power source

Step 1 – RX-10 Installation

- Place the unit and touchscreen so that the touchscreen is easily accessible. Note that the RX-10 main unit and the touchscreen are resistant to most common solvents.
- You may want to mount the RX-10 to lab bars inside the fume hood using the provided holder.



- Connect the power cable and touchscreen to the RX-10.



- Connect power supply to mains. Press the power button to switch on the RX-10.




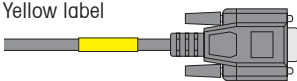

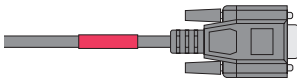

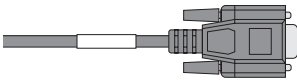

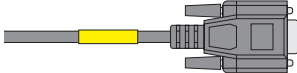

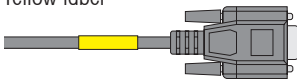

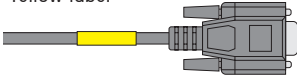

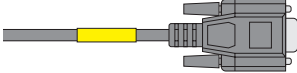
NOTE:

RX-10 controls the stirrer within the following range between 35 and 500 rpm. The values outside of the RX10 range can be applied directly from the stirrer if supported.

RX-10 does not show the stirrer control limits which either within or beyond RX-10 supported range.

Step 2 – Connecting the Stirrer

- Select the correct RS232 cable according to the table below.

Stirrer Model	RS232 Cable to Use
IKA 	Yellow label 
IKA 	Red label 
Heidolph RZR 	White label 
Heidolph Hei-Torque 	Please use the RS232 cable provided by Heidolph or the standard yellow label cable 
Chemglass Chemstir 	Yellow label  The Chemglass Firmware compatible with the RX-10 started with 1.3.0 Display and 1.2.4 Mainboard.
Chemglass 	Yellow label  The Chemglass Firmware compatible with the RX-10 started with 1.3.0 Display and 1.2.4 Mainboard.
J-KEM 	Yellow label 

NOTE: The yellow cable is a standard cable. Additional yellow cables can be bought in the local store if needed.

Chemglass stirrers might show a torque offset between displayed on RX-10 touchscreen and the stirrer.

Step 3 – Operating the Stirrer

- The connection to the stirrer is plug-and-play, meaning that you can switch on and off your stirrer or RX-10 at any time. The stirrer will automatically appear on the touchscreen after switching it on and the current stirrer speed (R) will be displayed.

Disconnected or switched off stirrer

RX-10			
Info New experiment			
	Tr	----	Dose /
		Not connected	
	Tr - Tj	----	Sampl
	Distill / Reflux		EasySampl
	Tj	----	pH
		Not connected	
	R	----	
		Not connected	

Connected stirrer

RX-10			
Info New experiment			
	Tr	0.0 °C	Dose /
	Reactor temperature		
	Tr - Tj	0.0 K	Sampl
	Distill / Reflux		
	Tj	0.0 °C	pH
	Jacket temperature		
	R	0 rpm	
	Stirring		

- To change the stirrer speed, press the **R** tab on the touchscreen and enter the target speed. Confirm your input with **Start**.

RX-10			
Info New experiment			
	Tr	0.0 °C	Dose / C
	Reactor temperature		
	Tr - Tj	0.0 K	Sample
	Distill / Reflux		
	Tj	0.0 °C	pH
	Jacket temperature		
	R	0 rpm	
	Stirring		

RX-10			
Info Enter stirring speed			
	100 rpm		
	Min:	50 rpm	
	Max:	1600 rpm	
	1	2	3
	4	5	6
	7	8	9
			0
	Manual Control	Advanced	Start Cancel

- To display the stirrer torque (Rt) on the homescreen, press an **empty** tab on the homescreen and select the trend you want to display in the empty field.


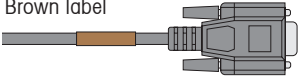
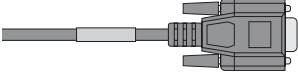




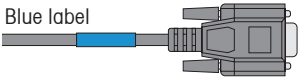

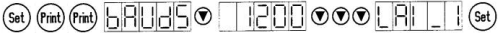
experiment			
temperature	0.0 °C	Dose / Charge	
tj	0.0 K	Sample	
temperature	0.0 °C	pH	7.00
	0 rpm		

RX-10			
Info Display value			
	None		Rt
	Trend1		
			Cancel

NOTE: When connecting the stirrer make sure the local knob is set to 0 rpm.

Step 4a – Connecting the Thermostat (Huber)

- The type of RS232 cable to use to connect a Huber thermostat depends on the type of the controller. Select the correct cable according to the following guide:

Huber Controller Unit	RS232 Cable to Use
Pilot One 	Brown label  or Grey label (Service Interface 15-pin) 
CC-Pilot 	NOTE: The Service Interface is usually located at the back of the unit. Use it in case the standard RS232 port is already occupied. NEVER disconnect the Huber control unit from the thermostat! To use the Service Interface on the Pilot Nuevo, use the Huber cable (Or. num. 16338) and connect it AFTER switching on the unit
Pilot Nuevo 	NOTE: The Service Interface is usually located at the back of the unit. Use it in case the standard RS232 port is already occupied. NEVER disconnect the Huber control unit from the thermostat! To use the Service Interface on the Pilot Nuevo, use the Huber cable (Or. num. 16338) and connect it AFTER switching on the unit
Unistat Control 	
Polystat CC3 	Blue label 
CC 	NOTE: For CC thermostats, the default SW protocol needs to be changed from IF232 to LAI-1 by pressing the following buttons: 

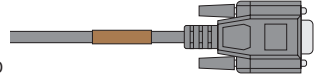
- By default, RS232 communication is enabled on Huber thermostats. There are no further configuration steps required. In case the thermostat was previously connected to another control software, make sure the communication parameters are set as follows:

Interface type: RS232 / Baud rate: 9600 or 1200, Lai/Slave-Address: 1

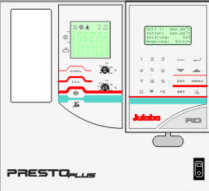

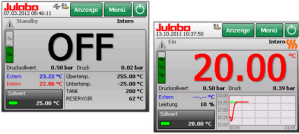


Consult the Huber manual for instructions on how to change communication parameters.

Step 4b – Connecting the Thermostat (Julabo)

- Use the cable with the brown label to connect any type of Julabo thermostat.
- For newer Presto models, use the cable provided by Julabo or any standard straight RS232 cable



NOTE: By default, external setpoint control is not enabled on Julabo thermostats. Enabling it depends on the Julabo User Interface of your thermostat. Please refer to the corresponding Julabo manual. Below are two examples:

Thermostat	Enabling external setpoint and RS232 control
<p>Presto Plus LH46 / LH85</p> 	<ul style="list-style-type: none"> • Go to the Main Menu • Select Configuration • Select Setpoint and set RS232 <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> <pre>>Configuration Control param. Profile Start Int. Programmer Inputs/Outputs Limits Interface Temp. Sensor Pump</pre> </div> <div style="margin-right: 10px;">  </div> <div style="border: 1px solid black; padding: 5px;"> <pre>>Configuration >Identif. off Setpoint keyb Autostart on Standby no Language german IdentNo 0</pre> </div> <div style="margin-left: 20px;"> <p>keyb/eprog/RS232</p> </div> </div>
<p>Presto Line</p> 	<ul style="list-style-type: none"> • Go to the Main Menu • Select the "Connect unit" menu • Set Remote control to RS232 <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> <p>Connect unit</p> </div> <div style="margin-right: 10px;">  </div> <div style="border: 1px solid black; padding: 5px;"> <pre>Julabo Connect Unit Remote control Off Digital Interfaces external setp. etc. Controller Use Manual Settings</pre> </div> <div style="margin-right: 10px;">  </div> <div style="border: 1px solid black; padding: 5px;"> <pre>Julabo Remote control Off RS232 USB</pre> </div> </div>

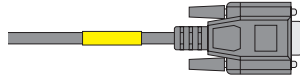
NOTE: The thermostat cannot be operated locally anymore if remote control via RS232 is active!

- By default, the RS232 communication parameters are set as expected by the RX-10. In case the thermostat was connected to another control software before, make sure the communication parameters are set as follows:
 Interface type: RS232 / Baud rate: 4800, Parity: Even, Handshake: Hardware or None depending on thermostat model.
 NOTE: Julabo Magio and Julabo Dyneo models might require the settings to be Handshake: Software






Consult the Julabo manual for instructions on how to change communication parameters.

Step 4c – Connecting the Thermostat (Lauda)

Use the cable with the yellow label or any commercially available RS232 (straight) cable to connect LAUDA thermostats.



The following LAUDA thermostat models are compatible with the RX-10:

LAUDA Thermostat name	Control unit
Lauda ECO RS232 default: no*	
Lauda PRO RS232 default: no*	
Lauda Proline C/Edition X RS232 default: yes, on the back of the command interface	
LAUDA Integral XT RS232 default: yes, on the back of the command interface	
LAUDA Variocool RS232 default: no*	

*Any of the supported LAUDA thermostat models can be retrofitted with an RS232 communication module (Lauda ref. number: LRZ 913.)



- By default, RS232 communication is enabled on LAUDA thermostats. There are no further configuration steps required. If factory communication settings were changed, set the parameters as follows: Interface type: RS232 / Baud rate: 9600
- Recommended minimum firmware versions:
 RS232 module: 3.19 / Command Touch: 1.10 / Command (Integral/Proline): 3.42

NOTE: The yellow cable is a standard cable. Additional yellow cables can be bought in the local store if needed

Step 5 – Operating the Thermostat

- The connection to the thermostat is plug-and-play meaning that you can switch on and off your thermostat or RX-10 at any time. The current jacket oil (Tj) and reactor (Tr) temperature will automatically appear on the touchscreen after switching the thermostat or RX-10 on.

NOTE: Tr only displays a value if a corresponding sensor is connected. Tj always shows a value if the thermostat is properly connected.

Disconnected or switched off thermostat

Info New experiment			
Tr	Not connected	Dose / Charge	
Tr - Tj	Not connected	Sample	
Distill / Reflux EasySampler ready			
Tj	Not connected	pH	
Not connected			
R	Not connected		
Stirring			
Notes Graph Experiments & Export Task Sequence			

Connected thermostat

Info New experiment			
Tr	0.0 °C	Dose /	
Reactor temperature			
Tr - Tj	0.0 K	Sample	
Distill / Reflux			
Tj	0.0 °C	pH	
Jacket temperature			
R	0 rpm		
Stirring			

- To change the jacket fluid (Tj) or reactor (Tr) temperature, press the **Tr** or **Tj** tab on the touchscreen and enter the target set value. You may press **Advanced** to enter ramps with a certain duration or rate.

Info New experiment			
Tr	0.0 °C	Dose / C	
Reactor temperature			
Tr - Tj	0.0 K	Sample	
Distill / Reflux			
Tj	0.0 °C	pH	
Jacket temperature			
R	0 rpm		
Stirring			

Info Enter Tr end temperature			
20.0 °C			
Min:	-80.0 °C	1	2
Max:	230.0 °C	3	<X>
		4	5
		6	
		7	8
		9	
		+/-	0
		.	
Thermost off			
Advanced Start Cancel			

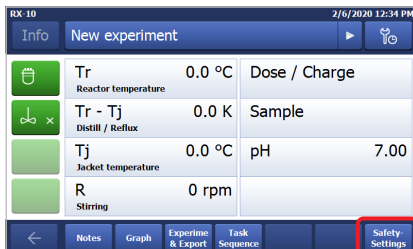
Info Tr Ramp parameters			
Tr end		20.0 °C	
Duration	0:10:00	Rate	
Linear ramp		Exponent=1	
Start Cancel			

Step 6 – Configuring the Safety Settings of the RX-10

The RX-10 features a sophisticated safety concept to mitigate damage to the chemistry in the vessel, equipment or staff. In case of dangerous events such as a violated temperature limit due to an unexpected strong exothermic event, a broken stirrer or a pressed emergency button, the RX-10 automatically controls the thermostat to a safe temperature and stops the execution of all active ramps.

The safe temperature (T_{safe}) as well as the allowed temperature range may be defined as follows:

- Press **Safety Settings** at the bottom right corner of the home screen.



- Enter the desired safety limits and the safe temperature (T_{safe}).

R_{max} is set to the maximum speed supported by the connected stirrer.



NOTE: Please check the safety settings on your thermostat because the product specific limits may not be communicated to the RX-10. If required modify the safety settings on the RX-10 before starting an experiment.

NOTE: The safety settings used before power off remain the same after a new start of the RX-10.

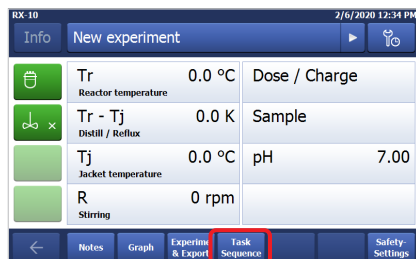
Step 7 – Using the Basic Functions of the Touchscreen

The screenshot shows the RK-10 touchscreen interface. At the top, the status bar displays 'RK-10' on the left and '2/6/2020 12:34 PM' on the right. Below the status bar is a navigation bar with 'Info', 'New experiment', a play button, and a settings icon. The main display area is divided into two columns. The left column contains four green buttons with icons: a beaker, a stirrer, a jacket, and a stirrer. The right column contains four rows of data: 'Tr Reactor temperature 0.0 °C', 'Tr - Tj Distill / Reflux 0.0 K', 'Tj Jacket temperature 0.0 °C', and 'R Stirring 0 rpm'. At the bottom is a menu bar with buttons for '←', 'Notes', 'Graph', 'Experime & Export', 'Task Sequence', and 'Safety-Settings'. Callouts with lines pointing to various elements provide the following descriptions:

- Navigate to the Home Screen (points to the 'Info' button)
- Start/Stop the stirrer (points to the stirrer icon button)
- Start/Stop an experiment (points to the beaker icon button)
- Set the time, network details, language, etc. (points to the settings icon)
- Capture sampling times and IDs (points to the play button)
- Press to show Smart Connect sensor values on the Home Screen (points to the settings icon)
- Text capture for notes (points to the 'Notes' button)
- Graphical view of trends (points to the 'Graph' button)
- Export data to a USB stick (points to the 'Experime & Export' button)
- Pre-program a recipe (points to the 'Task Sequence' button)
- Define safety limits (points to the 'Safety-Settings' button)

Step 8 – Pre-programming a Recipe

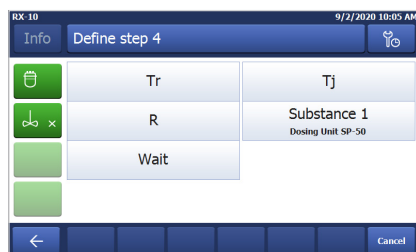
Simple recipes may be pre-programmed on the touchscreen as shown below. For more advanced recipes with an unlimited number of operations and additional control capabilities, please use the iControl™ software.



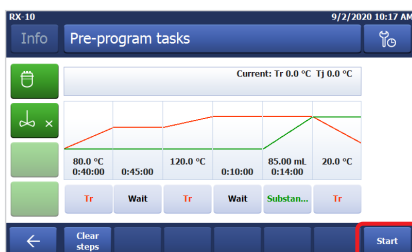
- Press **Task Sequence** on the Home Screen.



- Define up to 6 recipe steps by pressing the **Step #** button.



- Select the type of control you want to execute.



- When done with the definition of the desired steps, press **Start**. The steps will execute automatically.

NOTE: Update the firmware of your product regularly.

Connecting the emergency button

To ensure a safe operation an emergency button can be connected

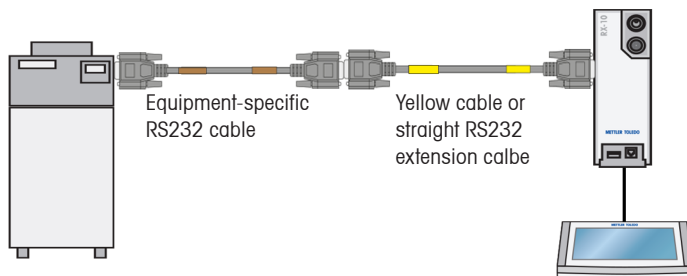
- Connect the emergency button on the backside of the RX-10



Extending RS232 cable length

The yellow cable or any straight RS232 cable may be used to extend the cable length in case the distance between the thermostat/stirrer and the RX-10 exceeds 3 m.

Important: Make sure the equipment specific cable is always connected directly to the thermostat/stirrer and the extension cable is connected to the RX-10.



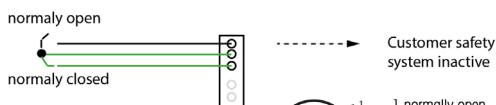
Safety Relay

It acts as connection to the customers security system to initiate safety measures on power failure (discharge of the reactor, quenching of the reaction).

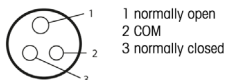
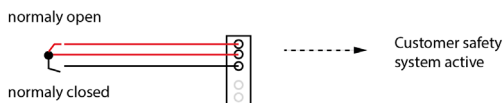
In case of an emergency the safety relay will change switch position:

- to close the normally open circuit and therefore activates the customers safety system.
- to open the normally closed circuit.

No Emergency



Active Emergency program



To avoid unnecessary inflow of the quench product or inadvertent outflow of the charge you should install an additional manual valve below the solenoid valve and/or a bypass circuit in the electrical connection.

Cleaning and Decontaminating RX-10

Clean the outside of the housing with a cloth moistened with ethanol.

The RX-10 can only be cleaned on the outside. In case chemicals contaminate the inside of the box, the box has to be disposed.

Accessories and Peripherals

Accessory Parts

Order Number	Product Description
30281496	Lab bar holder
30281497	Thermostat/stirrer RS232 cable set
51161883	Touchscreen 7", with protective cover, 1 m cable
30303580	Touchscreen 7", with protective cover, 3 m cable
30778593	Protective cover for touchscreen
30260369	Emergency button for RX-10/RC1mx
30267163	SmartConnect Pt100 cable, with loose ends
30267165	SmartConnect generic sensor cable, with loose ends
30405876	SmartConnect Universal Temperature Probe
30254779	SmartConnect LEO3/EV-120 pressure sensor cable

Peripherals

Order Number	Product Description
51161770	Dosing unit SP-50 set
30083901	EasySampler 1210 system complete
30212440	ECB - Easy Control Box
30046240	SevenExcellence

Software

Additional purchased software or upgrade licenses are sent out electronically by e-mail.

Other helpful documentation

There are other helpful resources to read:

- User Manual and Operating Instructions ECB
- User Manual SmartConnect Cables
- User Manual SevenExcellence
- User Manual and Operating Instructions EasySampler
- Operating Instructions Dosing Unit SP-50

Please be aware that some instructions might be found in one of those manuals.

METTLER TOLEDO Product Compliance Document System

Certification 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.

Technical Data

Dimensions, WxDxH	70 mm x 152 mm x 215 mm (2.75" x 5.98" x 8.46")
Weight	2.88 kg including touchscreen
Materials	Housing: Powder-Coated stainless steel USB connector: Stainless steel with protection cap in PSU On/Off switch: Stainless steel Touchscreen: PA 12, aluminum Protective cover for Touchscreen: Barex®
Connectivity and data Transfer	Ethernet: Communication to PC (iControl/iC Data Center) CAN: Interface for plug-and-play accessories USB: Data export to USB stick
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
Power	Max. 120 W
Supported line voltage	100 V to 240 V, 50 Hz / 60 Hz
Mains supply voltage fluctuations	Up to ± 10 % of the nominal voltage
Overvoltage category	II
Pollution degree	2
Usage	For indoor use only

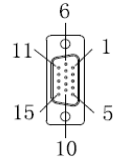
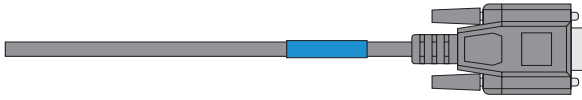
Pin assignment

Here are the pin assignments for the different RS-232 cables:

Blue cable



P1



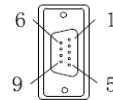
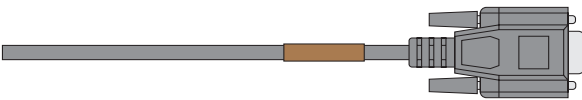
P2

P1	Color	P2
A-Shell	Braid	
A-2	Black	B-3
A-3	Red	B-2
A-5	Orange	B-5
A-4	Black	
A-6		
A-7	Black	
A-8		

Brown cable



P1



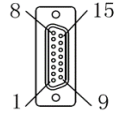
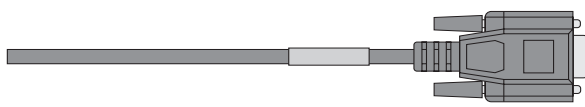
P2

P1	Color	P2
A-Shell	Braid	
A-2	Black	B-3
A-3	Red	B-2
A-5	Orange	B-5
A-4	Black	
A-6		
A-7	Black	
A-8		

Grey cable



P1



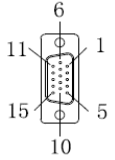
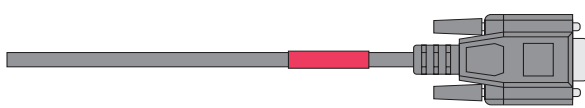
P2

P1	Color	P2
A-Shell	Braid	B-Shell
A-2	Black	B-1
A-3	Red	B-2
A-5	Orange	B-5

Red cable



P1



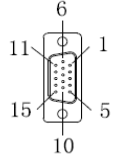
P2

P1	Color	P2
A-Shell	Braid	B-Shell
A-2	Black	B-3
A-3	Red	B-2
A-5	Orange	B-5
A-7	Yellow	B-8
A-8	Green	B-7

White cable



P1



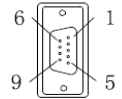
P2

P1	Color	P2
A-Shell	Braid	B-Shell
A-2	Black	B-1
A-3	Red	B-2
A-5	Orange	B-5

Yellow cable








P1



P2

P1	Color	P2
A-Shell	Braid	B-Shell
A-2	Black	B-2
A-3	Red	B-3
A-5	Orange	B-5
A-7	Yellow	B-7
A-8	Green	B-8

Safety Measures

 Risk of Electrical Shock	<p>Grounding of the Power Supply Outlet</p> <ul style="list-style-type: none"> • Plug the supplied power cable into a grounded outlet! A technical fault could otherwise result in serious injury or death.
 Caution	<p>General Conditions</p> <p>Exclude the following environmental influences:</p> <ul style="list-style-type: none"> • Powerful vibration • Direct sunlight • Temperature below 5 °C or above 40 °C • Powerful electric or magnetic fields
 Caution	<p>Usage</p> <ul style="list-style-type: none"> • In case of damage, please contact METTLER TOLEDO. • Never open the instrument! Have it serviced only by METTLER TOLEDO. • Operate the RX-10 only with equipment approved and/or documented by METTLER TOLEDO. • This document must be read and understood. If the RX-10 is not used according to this document, protection of the instrument may be impaired and METTLER TOLEDO assumes no liability. • The electrical connectors are not resistant to corrosive gases. Take appropriate measures and/or place the RX-10 in a suitable place in the lab or outside of the fume hood.
 Caution	<p>Maintenance</p> <ul style="list-style-type: none"> • Disconnect the RX-10 from the mains, when maintenance tasks are performed. • No hardware maintenance needed for this product.
 Risk of Explosion	<p>Potentially Explosive Environment</p> <ul style="list-style-type: none"> • Never work in an environment subject to explosion hazards! The housing of the RX-10 is not gas tight (explosion hazard due to spark formation, explosion caused by ingress of gases). • Avoid electrostatic charge formation.
	<p>Gas Emission</p> <ul style="list-style-type: none"> • The RX-10 does not emit any gases that could harm a person or the product.

RX-10™

Installing and Getting Started

www.mt.com/RX-10

For more Information

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Im Langacher 44
8606 Greifensee, Switzerland
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Subject to technical changes.
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