

Trace<sub>2</sub>O



**HTCOD-TR**

**HydroTest<sup>®</sup>**  
**COD Thermoreactor**  
**Instruction Manual**

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# 1. HTCOD-TR

## 1.1 Introduction

Please read the manual before using the unit in particular taking note of the warning symbols listed below.

The manufacture does not take responsibility for any issues caused by use of the unit not in accordance with the instructions laid out in this manual.

### 1.1.1 Preface

The reactor is only suitable for 16 mm Ø test tubes, closed with a lid. The unit has a transparent cover, which has to be closed during the heating process. The required temperatures and the corresponding time periods are specific for the different test tube types and specified in the corresponding method descriptions. Don't exceed temperatures or time spans in any case.

All warning labels must NOT be removed and should be replaced if they become damaged or faded.

### 1.1.2 Guide to symbols

The symbols below are used in this manual to indicate where there is risk of injury or damaging devices or to indicate especially useful information:



**DANGER!**

Indicates risk of injury.

When not following instructions, severe injury or death may result.



**ATTENTION!**

Indicates possible damage to devices.

When not following instructions, devices may be heavily damaged.



**IMPORTANT!**

Indicates hints on operation and other useful information.



**ATTENTION!**

Hot surfaces! Do not touch, risk to be badly burned!

**Read all instructions before using the instrument.**

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## 1.2 Important information

### Note on reactor placement

The setup location must not be extremely hot, cold, humid or dusty. Heat and cold can impair the functionality of the reactor. Humidity and dust can cause the reactor to fail.

Do not place the reactor near heaters such as radiators or the like. Do not expose the reactor to mechanical vibrations or jarring.

Do not block or cover the ventilation openings.



### Notes on power connection

Only use the power cord designated for use in your country.



The wall outlet should be within easy reach.

Pulling the power plug is the only way to disconnect the reactor from the power source

### Safety instructions for operation



The power cord must not be damaged. Do not place any objects on the power cord and make sure it does not have any knots. To unplug the cord, always pull on the plug and not on the cable itself.

Avoid covering the ventilation slots. Air circulation is necessary to prevent the reactor from overheating. If the air circulation is restricted it could cause fire or damage the reactor.



Never open the reactor housing yourself. There is a danger of electric shock and other hazards. The reactor may only be opened and serviced by qualified professionals.

### Safety rules



The heating block if programmed, may reach a temperature of 150 °C, this happens during the heating phase when the red LED is lighted. Please note the unit will remain hot during the cooling phase even though the LED-light may be off.

During this phase the base of the instrument may be very hot!

Do not touch, risk to be badly burned!

The materials used during the work must be compatible with the temperatures reached by the unit.

### Cleaning

The heating plate must be allowed to cool before cleaning.

Use a damp cloth with a non flammable, non corrosive detergent .

### Personal Protection Equipment

The equipment used for personal protection must be compatible with the reached temperature and the dangers due to the working materials.

# 1. HTCOD-TR

## 1.3 Unpacking

Carefully inspect all items to ensure that every part on the list below is present and no visible damage has occurred during transportation.

Store the packing material to return the unit for repair or other kinds of transport.

The table below shows the parts included in the packing.

### Part list

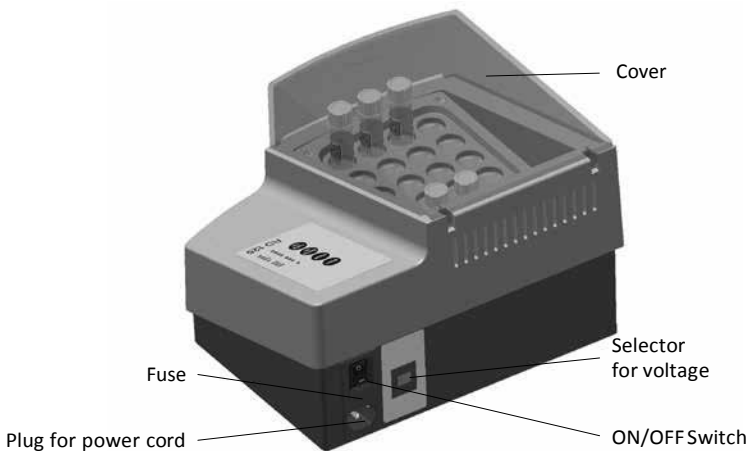
Part		Quantity
1	Thermoreactor HTCOD-TR	1
2	Power cord (European version)	1
3	Instruction manual	1

## 1.4 Connecting

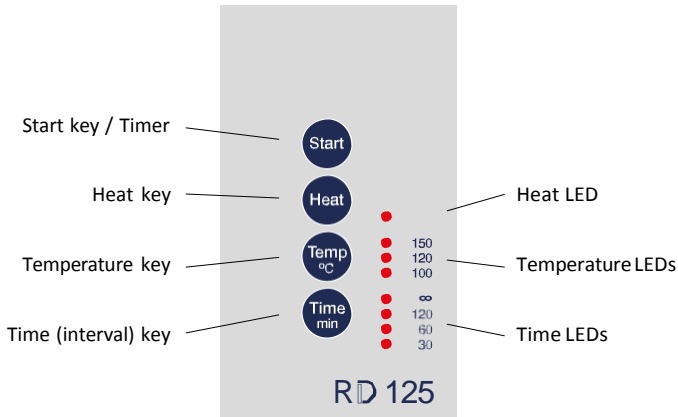
On the reverse side of the reactor:

- Selector for voltage 115 V / 230 V
- Plug for power cord
- Fuse 4 AT
- ON/OFF Switch (0/I)

Before connecting to power supply check that the ON/OFF switch is turned to “0” and check that the voltage selector (115 V/230 V) corresponds to the voltage supplied by the electric socket.



## 1.5 Buttons



## 1.6 Function of buttons

**Start key (for timer):** By pressing this key the work cycle will start with the pre-selected values for temperature and time. At the end of the work cycle the beeper will sound (Beeper, see p. 7) and the heater automatically switches off.

**Heat key:** By pressing this key (after switching the instrument on using the main on/off switch see page 17) the reactor will heat up to the pre-selected temperature.

**Temp key:** By pressing this key the temperature is selected (scrolling). It is possible to select between 100/120 and 150 °C. When a temperature is selected the corresponding LED will light.

**Time key:** By pressing this key the time is selected (scrolling). It is possible to select between: 30/60/120 min or ∞ (infinite). When a time is selected the corresponding LED will light.

## 2. Work session

This section describes the use of the reactor for a standard application. For further applications please refer to “Function schematics” (page 20).

After the unit is switched on (main switch, reverse side, position I) the keypad automatically shows the last selected temperature and time span. The corresponding LEDs are lighted.

After switching on the block heating does not commence automatically.

For heating up the unit press the “Heat” key.

After pressing this key the Heat LED is lighted.

Before and after pressing the “Heat” key temperature and time span still can be changed.

During heating up the Temperature LED will light intermediately, when the selected temperature is reached the Temperature LED is lighted permanently.

By pressing the “Start” key the timer starts the work cycles corresponding to the chosen time span (indication by Time LED). Starting the work cycle the Time LED changes from lighted to flashing.

When the work cycle ends Time LED and Temperature LED are lighted while the Heat LED is off.

At the end of the work cycle the heater is switched off.

## 3. Beeper

Select temperature or time:	short double beep (two frequencies)
Switch heater on:	long beep (one frequency)
Switch heater off:	long beep (one frequency)
Temperature reaches the selected value:	8 x short beep (two frequencies)
Start of countdown:	long beep (one frequency)
End of countdown:	16 x short beep (two frequencies)
Pressing a key which is inactive (at the moment):	short beep (one frequency)
Malfunction:	Continuous beep (2 frequencies) until the instruments is switched off with the main switch (position “O”). In this case the LED combination according pages 12/13 allows a failure defi

After switching on the instrument with the main on/off switch, the heater is not active. Press the HEAT-key for heating up (status 1).  
 After heating up to the selected temperature the timer starts after pressing START-key (status 3).

Status	Heat-LED	Temp.-LED	Time-LED	Heat-key	Start-key	Temp-/Time-key	Heater	next possible status
1. Waiting for pressing HEAT-key	Off	last selected temperature	last selected time-span	Press => Status 2	Ignore	Selection possible	Off	After pressing HEAT-key: Status 2
2. Heating up	On	Flashing	On	Press => Status 1	Ignore	Selection possible	Heating up or Cooling down	If selected temperature is reached: Status 3
3. Waiting for pressing START-key	On	On	On	Press => Status 1	Press for t = 30, 60, 120	Selection possible	Temperature-controlled for stability of the selected temperature	After pressing Start-key: Status 4 (t=∞)
					Ignore for t=∞			If selected temperature will be changed: Status 2
								If temperature to different to selected one: Status 2
4. Time: Count down	On	On	Flashing	Press => Status 1	Ignore	Ignore	Stable Temperature	End of count down: Status 1

Heat-LED On: Heating up or stabilizing selected temperature.  
 Off: Heater is off

Temp.-LED Flashing: Selected temperature is not reached (heating up or cooling down)  
 Together with HEAT-LED On: Selected temperature is reached  
 Together with HEAT-LED Off: Indicates selected temperature without indication of the real temperature of the reactor

Time-LED Flashing: Count down function  
 On: indication of selected time-span without count down function.



## 5. Maintenance

The unit is protected by a 4AT fuse. The position of the fuse holder is on the reverse side of the unit under the main switch.

Should the fuse need changing, disconnect the unit from the power supply and open the cover with a suitable tool to access the fuse.

## 6. Cleaning

No special maintenance is necessary apart from periodic cleaning of the unit. Disconnect the unit from power supply and use a dust-free cloth with a non flammable, non aggressive detergent to clean the unit.

ATTENTION:



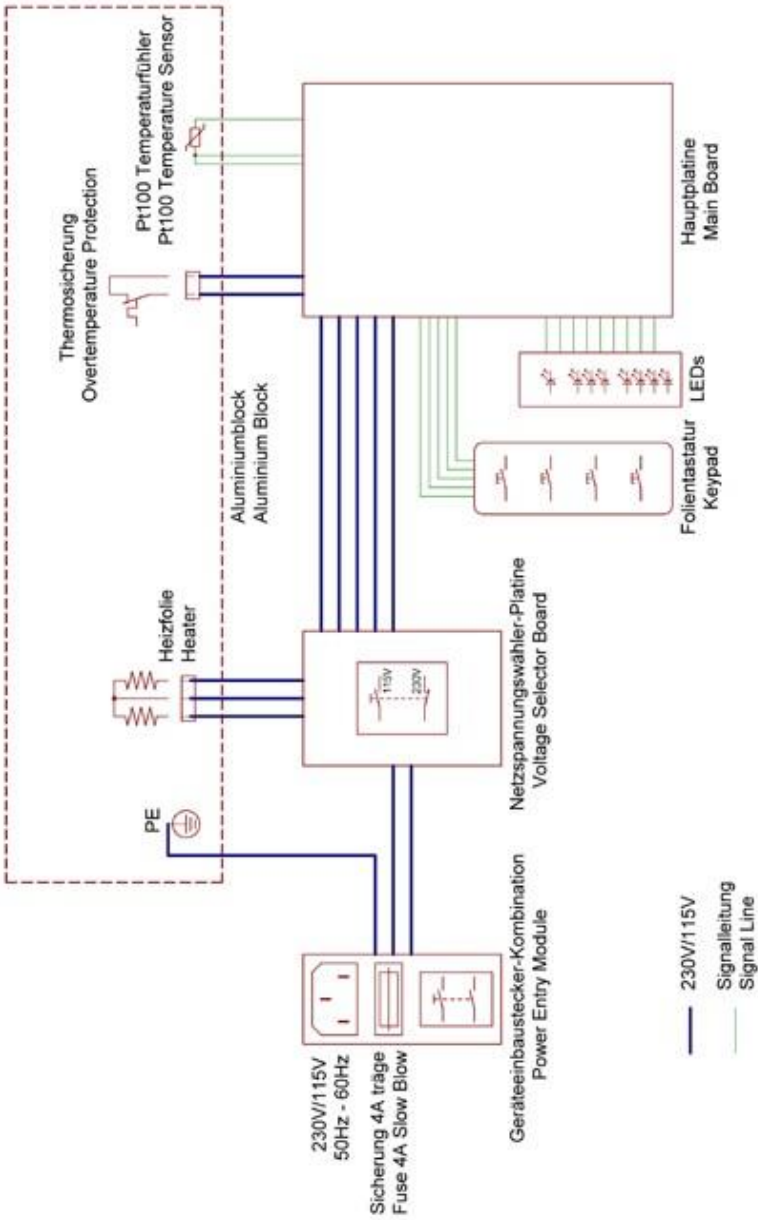
If the reactor is contaminated by spillage of the tube contents or breakage of the test tube, the disposal of waste (both glass and liquid) must be done according to the instructions set out in the Material Safety Data Sheet (MSDS) (Chapter 6 and/or 13).

A contaminated aluminium block must be replaced prior to further use of the reactor. The reactor should be sent to the manufacturer or an authorised service centre.

## 7. Technical data

<b>Power supply</b>	V/Hz	230 / 50-60 or 115 / 50-60 selectable
<b>Power</b>	W	550
<b>Size</b>	mm	248 x 219 x 171
<b>Weight</b>	kg	3.9
<b>Construction materials</b>		Housing: ABS Protection grid: PPS Lid: PC Block insert: PBT Heating block: Aluminium
<b>Holes in the aluminium block</b>		24 holes, $\varnothing$ 16.2 mm $\pm$ 0.2 mm
<b>Selectable temperatures</b>	$^{\circ}$ C	100 / 120 / 150
<b>Probe type</b>		Pt100 A class
<b>Temperature stability at the Pt100</b>	$^{\circ}$ C	$\pm$ 1
<b>Selected time</b>	min	30 / 60 / 120 / continuous ( $\infty$ )
<b>Heating up from (20<math>^{\circ}</math>C --&gt; 150<math>^{\circ}</math>C)</b>	min	12
<b>Thermoregulation</b>		Microprocessor
<b>Protection against overheating</b>	$^{\circ}$ C	at the Alublock for 190
<b>Beeper</b>	dB	max. 88
<b>Environmental conditions (operation)</b>		
<b>Temperature</b>	$^{\circ}$ C	10 – 40
<b>Humidity</b>	%	max. 85

# 8. Wiring diagram



## 9. Error Code (LED indication)

No.	Error type	Possible reason(s)	Temp LED	LED 30 min	LED 60 min	LED 120 min	LED $\infty$	Continuous beep
1	Power supply frequency	Frequency higher/lower 50Hz / 60Hz; Mainboard faulty	on	off	off	off	on	yes
2	Safety feature reaction	Mainboard faulty	on	off	off	on	off	yes
3	ADC error	Mainboard faulty	on	off	off	on	on	yes
4	Wiring problem	internal connection incomplete	on	off	on	off	off	yes
5	Heating problem	- no power; - reactor power - probe problem	on	off	on	off	on	yes
6	T value underrange	Mainboard faulty	on	off	on	on	off	yes
7	T value overrange	Mainboard faulty	on	off	on	on	on	yes
8	Temperature too high	Probe connection faulty Mainboard faulty	on	on	off	off	off	yes
9	Microprocessor failure	EMC-interference	100° on 120° off 150° on	on	off	on	off	no
10	Temperature on mainboard too high	Unit overheated	on	on	on	off	off	yes



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