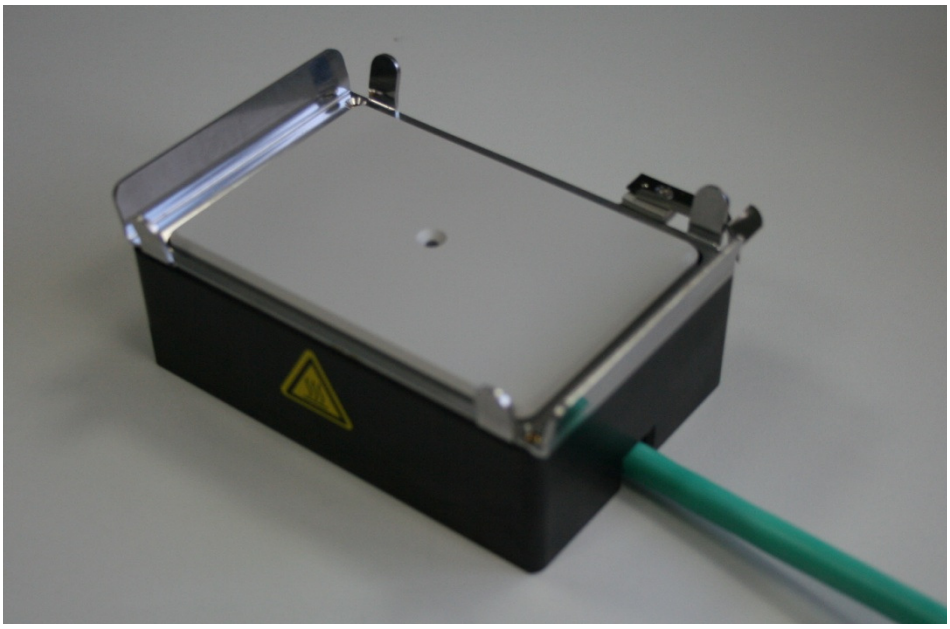
HeatPAC

Part No.: 7900046



User's Manual

Revision level V0.3

December 2010

Always keep this manual with the instrument.
Read carefully before working with the instrument.

How to contact us:

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This manual belongs to

Type _____

Serial No. _____

Year of Manufacturing:_____

Order Confirming No. _____

To be filled in by customer:

Inventory No. _____

Place of installation_____

Significance of this Operating Manual

This operating manual is part of the HeatPAC and must

⇒ remain with the HeatPAC until its final destruction.
⇒ be passed on if the HeatPAC is sold or lent.

Please contact the manufacturer in the event that you do not understand the operating manual or portions of it.

Your opinion regarding the operating manual gives us valuable insights into how we can continue to serve you best. Please do not hesitate to send us your remarks; see the address or telephone numbers on page 3.

The safety instructions must be read with the greatest care and attentiveness. They must be understood and observed in order to ensure safe handling of the instrument.

Insufficient or lacking knowledge of the contents of the operating manual relieves INHECO GmbH of liability. Therefore the operator should request an orientation from the distributor, INHECO GmbH.

Content

1 Explanation of Symbols

A possible danger, leading to serious bodily harm is being pointed out to you.

Caution: hot surface

!

A possible danger leading to less serious bodily harm is being pointed out to you. This signal also warns you of tangible damage.

A possible dangerous situation leading to material damage is being pointed out to you.

Important!

This sign refers to useful information as to installation etc.

- Bullet points refer to enumeration.

⇒ These arrows indicate instructions.

■ The squares refer to procedures running automatically and the results to be achieved.

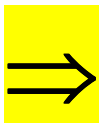
2 Safety Instructions

Avoid accidents. Always make sure that the unit is disconnected from the power supply system during any installation process.

Electric Shock Hazard

You can suffer an electric shock, if the unit is not connected properly or if you did not disconnect the unit from the power supply system before opening the housing.

Please observe the following measures in order to avoid muscle convulsions, burns, unconsciousness, apnea or even death:



⇒ Do not work with open housing when unit is connected to the power supply system.
⇒ Always switch off the unit before implementing any alterations.
The unit is operated at a voltage of up to DC 24V.

Burn Hazard

You can burn your skin when touching the inner parts and especially contact surface and disposables. These parts can reach up to 135°C. Do not use materials that are not sufficiently temperature resistant at temperatures of 135°C.

Use in Biosafety Laboratory Environment

When using the HeatPAC in a biosafety Laboratory Environment the user of the HeatPAC is responsible for labeling the device according to the WHO Laboratory Biosafety Manual (ISBN 92 4154650 6). The user is furthermore responsible for operating the HeatPAC depending on the biosafety level regulations according the WHO Laboratory biosafety manual.

The safety regulations valid for the lab are to be constantly observed when working with the device.

3 Operation Instructions

The HeatPAC is a state-of-the-art design for SBS listed microplates including flat bottom and PCR. The temperature controlled HeatPAC is a ready-to-install high performance unit.

Conventional usage

The HeatPAC meets the current technical level and complies with today's standards. The manufacturer paid attention to the user's safety.

The following rules apply to the user:

- Rules of accident prevention
- General rules for technical safety
- EU and other country specific directives

The HeatPAC device is designed for the usage in Life Science and IVD (in vitro diagnostic) environments. The HeatPAC is prepared for an easy integration into IVD applications, but the final IVD validation has to be performed by the first marketer.

The HeatPAC device is intended for Indoor use only.

The CE and UL compliance of HeatPAC module can only be guaranteed if the HeatPAC is used together with the STC / MTC board.

Who is permitted to operate this unit?

Only instructed and skilled personnel is permitted to operate this unit.

Repair

The HeatPAC must be repaired by authorized INHECO service technicians only. In special cases the HeatPAC may need to be sent to the manufacturer.

Shut down and Disposal

The unit is to be disposed off in accordance with the environmental directives in effect in the respective country.

Ventilation requirements

Free air supply must be ensured to prevent injuries to persons and/or damage to the unit. Do not exceed the maximum ambient temperature to avoid damage to the HeatPAC. Ensure that a minimum of at least 250 mm or 10 inches free spaces between the ventilation openings and the adjacent devices or walls.

Caution!

Important!

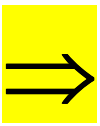
On non-observance the unit could eventually overheat.
We strongly recommend mounting the HeatPAC unit to the surface it stands on with the mounting threads built in for this purpose.
Additionally, the HeatPAC unit can be positioned with adjusting pins.
The unit may not be stored below –10 °C.

Technical Alterations

Important!

- Do not alter the product. For safety reasons no technical changes to this unit are allowed by unauthorized persons. Any modification or change, which is not approved off by the manufacturer leads to loss of guaranty.
- The original parts are especially designed for the HeatPAC. Parts provided by other suppliers are not tested and therefore not approved by **INHECO** GmbH. Using such parts can impair the functionality of the unit.
- For damages which may occur due to the usage of non original parts, liability is excluded by **INHECO** GmbH.

Malfunctions



⇒ Report occurring malfunctions immediately to INHECO technical hotline named on page 3 of this manual.
⇒ Ensure that the unit is secured against violation and misuse.
⇒ Before the initial operation dismantled safety relevant parts have to be mounted and checked.

Name Plates and Labels

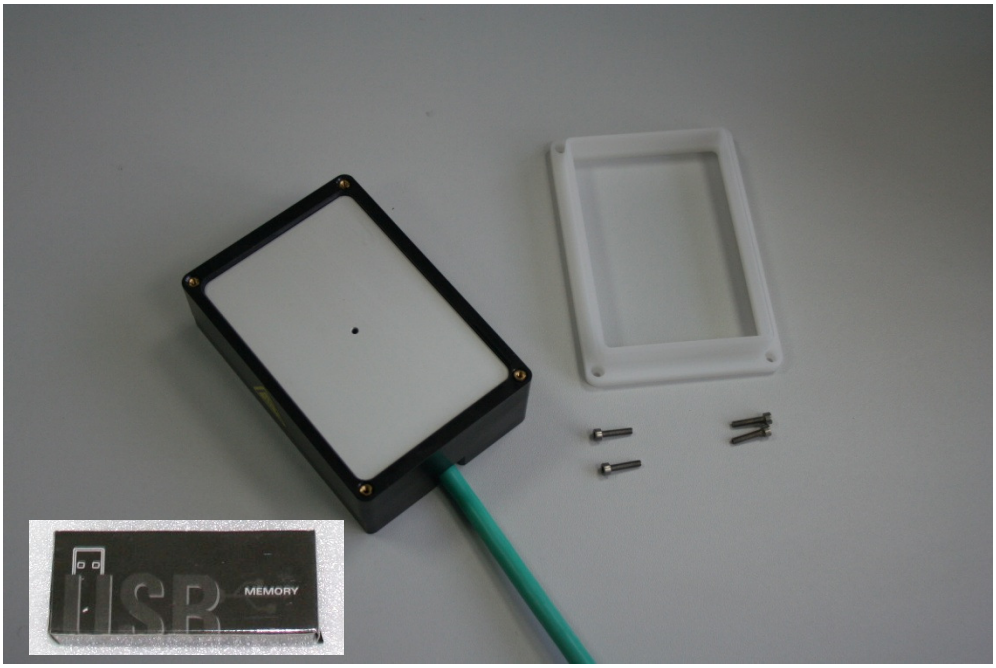
⇒ Please check all name plates and labels and ensure that their legibility is maintained at all times during the life cycle of this unit.
⇒ Replace all name plates and labels if their legibility is no longer ensured.

4 Operating HeatPAC

4.1 Scope of Supply

Before initial operation make sure that shipment of your unit is complete and no parts are damaged. The following components should be included in each shipment:

1. HeatPAC unit
2. Mounting frame for PCR-adapter plate + 4 mounting screws
3. User's Manual HeatPAC (stored on USB stick)



Picture 1: Scope of Supply – Basic Version

4.2 Additional Options

Controller:

Multi Tec Control (MTC) and Single Tec Control (STC)

- Comfortable Plug & Play MTC / STC

Adapter Plates:

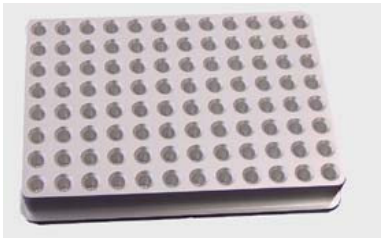
Plate Flat Bottom #7900016

- Adapter Plate for Tempering of Microplates with Flat Bottom
- Reproduceable Positioning of Plates by Spring System

Plate Multi Purpose #3200202

- Universal Adapter for Divers Applications

Plate 96 pos. PCR #3200203



- Adapter for the Tempering of 96-Pos. PCR-Plates

Plate 384 pos. PCR #3200204

- Adapter for the Tempering of 384-Pos. PCR-Plates

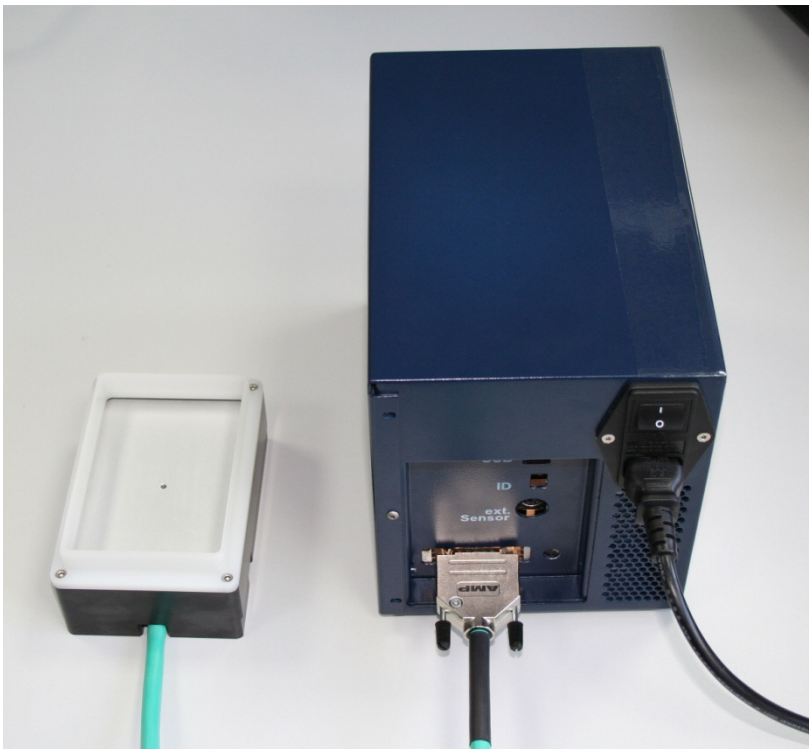
Tube Rack 24x1,5ml #7900015

- Adapter for the Tempering of Standard Reaction Tubes of 1,5ml (for example: Eppendorf make)

More detailed information about reachable temperature differences, homogenities, heating and cooling rates on request.

4.3 Initial Operation

⇒ Check that the main power switch at the rear panel of the MTC/STC is in the “0” (=off) position.
⇒ Connect the MTC/STC and the HeatPAC with the connecting cable
⇒ Attach the power cord to the MTC and to a wall outlet.
⇒ Switch on the MTC/STC by changing the main power switch to the “I” (=on) position.



Picture 2:Connecting cable HeatPAC and STC

4.5 Fixation of the Microplates

For special plate formats (96 PCR, 384 PCR, etc.) standard adapters are available at INHECO. The adapter is fixed by the central countersunk screws to the contact plate. The maximum torque allowed to fix the adapter is 0,3 Nm.

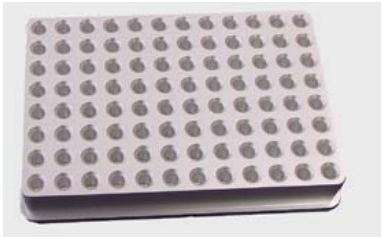
A proper fixation of the micro plate is absolutely essential, to avoid uncontrolled motions of the plate. The fixing of the microplate is effected by a spring

Plate Flat Bottom

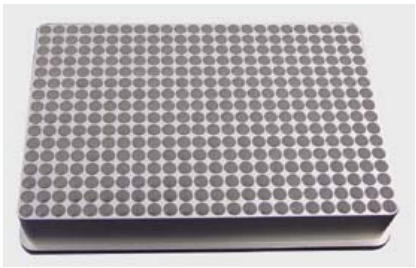
Picture 3: Adapter Plate for Tempering of Microplates with Flat Bottom; Reproducible Positioning of Plates by Spring System

Plate Multi Purpose

Picture 4: Universal Adapter for Divers Applications



Picture 5: 96 position PCR adapter plate



Picture 6: 384 position PCR adapter plate

For special adapter plates please contact INHECO for further information

More detailed information about reachable temperature differences, temperature uniformities, heating and cooling rates on request.

5 MTC Adjustment

For the precise procedure please refer to the MTC manual.

The PID Parameters of the MTC are preset for a HeatPAC configuration. Depending on the use of the HeatPAC with different disposable types (PCR Plates, Microplate, Deepwell Plates, Tubes, etc.) and corresponding adapters the PID parameters and offset values can be adjusted to achieve an optimized thermal behavior. Information about the adjustment of the PID-parameters can be found in the *MTC* manual.
If you need any assistance, please contact us.

6 Maintenance

6.1 Cleaning

Before cleaning the HeatPAC, disconnect the power and make sure that the temperature at the contact surface is below +50°C.

The contact surface (anodized or nickel-plated aluminum) should be cleaned regularly to ensure optimum heat transfer to the microplates. Always clean the contact surface if there has been a spillage.

A solution of 70% alcohol can also be used where effective for target organisms.
Make sure, that no moisture enters inner parts!

The plastic frame and body of the HeatPAC can be cleaned with a cloth dipped in water or methanol. No part of the body should be immersed in the solvents.

Do not use aggressive solutions such as acetone, or abrasive cleaners.

Before using any cleaning method except those recommended here, the responsible operator should check with INHECO that proposed method would not damage the equipment.

6.2 Decontamination

The most common decontamination method is by fumigation with formaldehyde or ethylene oxide gas.
The surface decontamination can include a wipe-down of the housing surface. A solution of 70% alcohol should be used where effective for target organisms. It is recommended that the HeatPAC is running during decontamination and is running for at least 5 minutes in order to purge the atmosphere inside before it is switched off.
Make sure, that no moisture enters inner parts!

6.3 Calibration

For proper thermal performance of the MTC Unit and the connected devices, it is recommended to check the calibration once a year. Depending on the application, shorter calibration intervals may be required. Certified recalibration can be done at the INHECO service center Munich – Germany.

6.4 Spare Parts

Spare Parts for the device must be ordered by INHECO. Only original parts from INHECO may be used.

7 Technical Specifications

7.1 Technical Data

Table 1: Technical Data

HeatPAC	Technical Data
Input voltage	24Vdc ±10%
Heating capacity	100 Watt
Limits for ambient operating temperature	+5°C to +32°C, no condensation [+41°F to 89.6°F]
Temperature operating range p/n 7900046	+15°C to +135°C [+59°F to +275°F]
Storage conditions	- 10°C to +60°C, non condensing [+14°F to +140°F]
Maximum ΔT ($=T_{ambient} - T_{target}$)	120°C (heating mode only) [248°F]
Tolerable relative humidity	75%, not condensing
Length x Width x Height	128 mm x 88 mm x 40 mm [5.04 in x 3.47 in x 1.57 in]
Weight including cables	About 0.86kg [1.9 lbs]
Maximum operating altitude	2000m
Requirement for ventilation	Passive ventilation

8 Warranty

2 Years from date of shipment. Any damage by abuse or caused by operation different from this Instruction is not covered.

Annex A: Glossary

Derivative
Limits the rate of change of the process to eliminate overshoot in slow or lagging loads (de=ra).

Integral
Accumulates errors to eliminate offset or droop (lt=1/re).

Calibration
Adjusting an instrument to a known value.

PID
(Proportional, Integral, Derivative). A control mode: proportional action sets the system, integral reduces droop, derivative reduces overshoot and undershoot.

PT100
IT is Resistive-Temperature-Detector (RTD). A sensor whose resistance increases with increasing temperature.

Set point
The desired process value programmed into a control

Annex B: Index of Acronyms

Adc	Direct current
B/W	Width
H	Height
Hz	Hertz 1/s
L	Length
PID	**P**roportional-, **I**ntegral- und **D**erivative Function of TEC Control
TEC	Thermo-Electric-Module
Vac	AC Voltage
Vdc	DC Voltage
W	Watt
rpm	Rounds per minute

Table 2: Index of acronyms

Annex C: Index of Tables

Annex D: Index of Illustrations

Annex E: Index / Alphabetic

Annex F: Document history

Version	Date	Name	Comment
0.1	03.11.2010	AJA	First release
0.2	16.11.2010	AJA	Added information about conventional usage p.7 “The CE and UL compliance of HeatPAC module can only be guaranteed if the HeatPAC is used together with the STC / MTC board” Updated technical data p.18
0.3	2.12.2010	AJA	Added information about ventilation requirements p.7