

## User and Installation Manual



# CPLC Ultraflat MTC

Heating and Cooling Unit  
Part no.: 7100117

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**INHECO Industrial Heating and Cooling GmbH** reserves the right to modify their products for quality improvement. Please note that such modifications may not be documented in this manual.

This manual and the information herein have been assembled with due diligence.

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# 1 About this manual

## 1.1 General information

- Read the manual completely.
- If the instructions in this manual are not followed, injury or product damage cannot be ruled out.
- Missing or insufficient knowledge of the manual leads to loss of liability against INHECO GmbH.
- This manual is part of the CLPC and must be retained until the device is disposed of or must be passed on with the CLPC to new users.
- Contact INHECO if there are any uncertainty in operation or handling of the CLPC.

Your opinion about this manual provides us with valuable insights on how we can improve this document. Please do not hesitate to direct your comments to [sales@inheco.com](mailto:sales@inheco.com), Contact information.

## 1.2 Contact information

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Website	<a href="http://www.inheco.com">www.inheco.com</a>

Technical Support & Trouble Shooting Instructions:

<https://www.inheco.com/tech-support.html>

## 1.3 Warranty

The warranty period starts on the date of shipment. Any damage caused by operating the Shaking devices outside the specifications and guidelines leads to the loss of warranty. Broken seals on INHECO devices lead to the loss of warranty as well.

INHECO will only accept parts / devices for return that do not pose a threat to the health of our staff. In particular, the devices may not have been used in Biosafety Level 3 and 4 environments or have been exposed to radioactive or radiation materials.

Devices exposed to Biosafety Level 3 and 4 Environments are not accepted by INHECO for return.

## 1.4 Abbreviations and glossary

The following acronyms and items are used in this document	
°C	Degree Celsius
°F	Degree Fahrenheit
AC	Auto Clamping
Adc	Ampere direct current
Calibration	Calibration is the validation of specific measurement techniques and equipment. At the simplest level, calibration is a comparison between measurements - one of known magnitude or correctness - made or set with one device and another measurement made in as similar a way as possible with a second device.
CE	Conformité Européenne (European conformity)
dB(A)	Decibel
FDA	Food and Drug Administration
Hz	Hertz [1/s]
in	Inch
IVD	In Vitro Diagnostic
K	Kelvin
kg	Kilogram
lbs	Pounds
LC	Liquid Cooling
Liquid cooled MTC / STC devices	All devices cooled with the "Heat Exchanger Liquid cooling"
mm	Millimeter
MTC	Multi TEC Control controls up to 6 INHECO devices individually
Offset	The difference between the set temperature and actual value once the temperature is stable
PE	Protective Earth
PT100	PT100 is a Resistive-Temperature-Detector (RTD). This sensor increases its resistance with increasing temperature.
RH	relative humidity
rpm	revolutions per minute
STC	Single TEC Control controls 1 INHECO device
TEC	Thermo Electric Cooler (Thermoelectric Module)
UL	Underwriter Laboratories certification
Vdc	Voltage direct current
W	Watt

## 2 Safety instructions

### 2.1 Product-specific risks

**! WARNING**



**WARNING**

Follow the safety instructions given below in order to avoid danger to the user.

**General**

- The device needs maintenance on a regular basis → **Maintenance, page Fehler! Textmarke nicht definiert..**
- The device must be placed in an upright position. On non-observance, it will eventually overheat, causing the temperature fuse to blow.
- Do not exceed minimum or maximum ambient temperature and humidity conditions during operation or storage of the device → **Technical data, page Fehler! Textmarke nicht definiert..**
- The device must not be used in environments with risk of explosion.
- The device is for indoor use only.

**! WARNING**



**Burning hazard**

Devices can burn your skin. Even after switching off the Device, its surface can still be hot and could seriously burn your skin as the material’s temperature can reach up to +125 °C [+257 °F]!

- Let the device cool down before touching it. This might take a while.

**! WARNING**



**Pinching of finger**

While the clamp mechanism is closing you might pinch your finger or your glove. Closing or opening takes about 2-5 sec.

**NOTICE**



**Biosafety laboratory environment**

When using the device in a biosafety laboratory environment, the user is responsible for labeling it according to the WHO Laboratory Biosafety Manual (ISBN 92 4154650 6) and for operating the devices in accordance with the Biosafety Level Regulations of the WHO Laboratory Biosafety Manual.

**NOTICE**



**Electromagnetic field**

The device is not designed for use in residential areas. Thus, there is no guarantee of adequate protection of radio reception in this area.

**NOTICE****Risk of damaging the device**

Operating the device with a different power supply than listed in → **Accessories, page 25** may cause damage to the device.

- When using a different 24V DC power supply the power supply to the device must be fused with 8A.

## 2.2 Technical alterations

- Do not alter the product. Any modification or change not approved by INHECO leads to the loss of warranty and INHECO's liability.
- Use only original parts provided by INHECO. Parts provided by other suppliers can impair the functionality of the unit.
- Damage due to the use of non-original parts are excluded from INHECO's liability.

## 2.3 Malfunctions

- In case of a malfunction, switch off and disconnect the device immediately. Make sure to inform the authorized person in charge.
- Make sure that the malfunctioning unit is not accidentally re-installed and used before the malfunction is effectively eliminated. → **Trouble Shooting and Support, page 24**.

## 2.4 Danger signs



Illustration 1: General danger sign

The general danger sign is used to indicate the danger of personal injury.

Danger sign	Description
	<p><b>GENERAL DANGER SIGN</b></p> <p>Failure to observe the warning notices can result in death, severe physical injury or damage to health, as well as severe property damage.</p>
	<p><b>BURNING HAZARD</b></p> <p>Failure to observe the required warning notices could result in serious injury or damage to products if contact is made with a hot surface.</p>
	<p><b>CRUSHING HAZARD</b></p> <p>If the required warning notices are not observed, physical injuries can occur from closing mechanical parts of a machine.</p>

Table 1: Danger Signs

## 2.5 Information symbols

The information symbols listed here may appear in this document.

### General Information Symbols

Information symbol	Description
	<p><b>IMPORTANT NOTE</b></p> <p>This information symbol indicates important instructions that should be observed in order to avoid problems with the product.</p>
	<p><b>INFORMATION</b></p> <p>This information symbol indicates useful notes that should be observed in order to work optimally with the product.</p>

Table 2: Information Symbols



## 3 Product description

### 3.1 Intended use

The CLPC is intended as a heated and cooled position built into the deck or ALP of a liquid handling system. It is meant to be fitted with most ANSI/SLAS disposables and is suited for tubes and other sample carriers.

The CLPC is mostly meant to be used on robotic platforms and systems in Lab Automation. It can be operated with two types of precise temperature controllers with integrated power supply (MTC or STC).

The CPLC devices are designed specifically for use in Life Science and In Vitro Diagnostics. The CPLC devices are prepared for easy integration into IVD applications, but the final IVD validation must be performed by the first marketer (IVD application).

#### Obligations of the operator

When using the devices of the CPLC family in a Biosafety Laboratory Environment, the user is responsible for labeling the devices according to the WHO Laboratory Biosafety Manual (ISBN 92 4154650 6) and for operating the devices according to this Biosafety Manual.

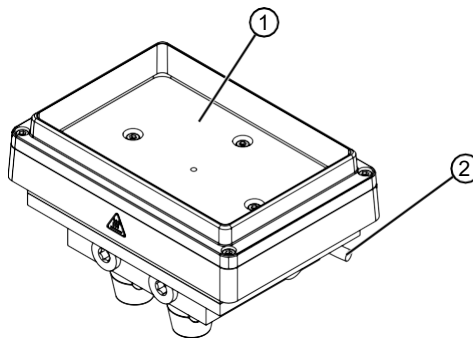
The CPLC must be used exclusively by laboratory professionals trained in laboratory techniques with labautomation systems and having studied the instructions for use of this instrument as well as the instructions of the workstation the device is used in.

### 3.2 Scope of delivery

Before initial operation, make sure the shipment of your CLPC and its scope of supply is complete and no parts are damaged. No traces of leaking liquid on the surface or packaging should be visible.

In case of parcel or product damages, take photos of the damaged boxes and products and email these to [techhotline@inheco.com](mailto:techhotline@inheco.com) immediately.

Transportation damages must be reported to INHECO within 7 days of delivery.



*Illustration 2: Scope of delivery*

- CLPC (1) with Sub-D-Connector (2)

### 3.3 Functional elements

The functional elements of the CPLC devices are the temperature-controlled contact surface (1). The devices must be controlled via a TEC Control Unit (MTC or a STC).

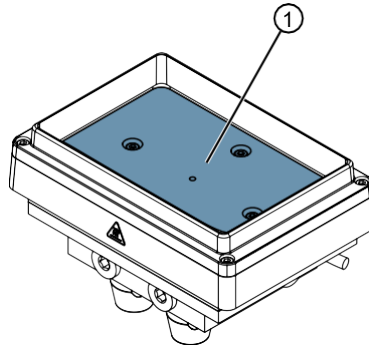


Illustration 3: Functional Elements of the CLPC

### 3.4 Labels and serial numbers

The identification label with part number and serial number also contains important technical indications. The electrical specification on the label must meet your local situation. The label is placed on the bottom panel of the CPLC device. The identification label must not be removed. If it has become illegible or falls off, it must be replaced by a new identification label. New labels can be ordered at INHECO. In case the label is missing and you do not know the part number and serial number, they can also be read out with the software (MTC/STC Demo Tool) which can be downloaded from INHECO' login section on [www.inheco.com](http://www.inheco.com).  
 → **Troubleshooting and support, page 25**



Illustration 4: Example for product label on the device (marking varies depending on the device)

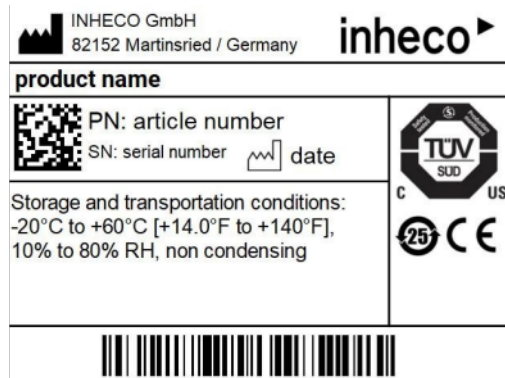


Illustration 5: Example for shipment labels on the package



Caution Hot

Illustration 6: Label on instrument

### 3.5 Technical Data

CPLC type	Ultraflat HT 2-TEC
Product number	7100117
Input voltage / max. current	24Vdc / 4.08A
Temperature range	+4°C to + 105°C [+39.2°F to +221°F]
Temperature cycling	yes
Max reachable temperature difference in the <b>heating</b> mode	up to 80K
Max. reachable temperature difference in the <b>cooling</b> mode	up to 30K
Sensor type	PT100
Inlet and outlet hose connection in mm	outer diameter 12.7 inner diameter 7.6
Outer dimensions for length x width in mm	128.9 x 89.1
Outer dimensions for height in mm	66.1
Weight incl. cord	approx. 1.10 kg [2.43 lbs]
Noise	0dB(A) (max)

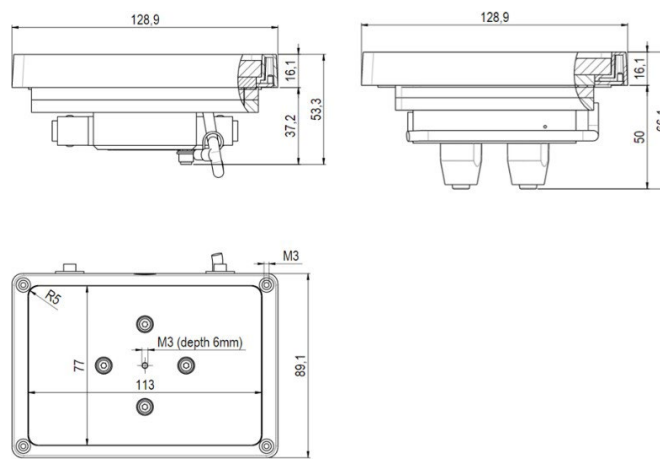
Table 3: Technical Data incl. Dimensions

Tolerable relative humidity	Operation	30-80% relative (non-condensing*)
	Transportation and storage	10-80% relative (non-condensing*)
Temperature	Operation	+15°C to +32°C [+59°F to +90°F]
	Transportation and storage	-20°C to +60°C [-4°F to +140°F], (non-condensing*)

Table 4: Environmental Conditions

\*Condensate can prevent the CPLC from operating properly and can damage the CPLC. Condensate should be eliminated on a daily basis or more often, for example by heating cycles in between cooling cycles.

### Dimensions



*Illustration 7:* Dimensions of the CPLC Ultraflat (left) and 7100117 (right); top view dimensions are equal; values in mm.

## 4 Installation

### 4.1 Hardware installation

#### 4.1.1 Scope of Supply

Before installation, make sure the shipment of your unit is complete and neither packaging nor parts are damaged → **Scope of delivery, page 9**.

#### 4.1.2 Labware Use

Each labware needs an adapter to ensure a uniform heat exchange.

Several standard adapters are available by INHECO (→ **Accessories, page 25**).

INHECO also offers to design and manufacture customized adapters.

#### NOTICE



Optimized temperature settings require a temperature offset value adjusted to the thermal characteristics of the disposable. See Manual MTC/STC for further details.

#### 4.1.3 Installation of Adapter Plates

Custom-fit adapters are required for all tubes, reservoirs and plates without flat bottoms, to ensure temperature transfer into the disposable/assay, safe positioning and easy robotic handling of the plate.

You can find a list of adapters for tubes, reservoirs or plates at [www.inheco.com](http://www.inheco.com). For custom solutions, please contact [sales@inheco.com](mailto:sales@inheco.com).

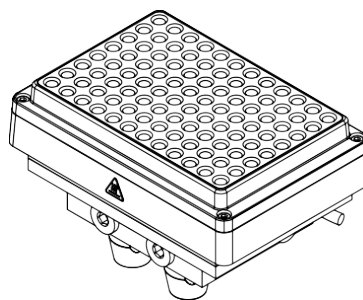
##### 4.1.3.1 Installation of PCR Adapter

The mounting frame for PCR Adapter (sold separately, → **Accessories, page 25**) is already fixed on the device when purchased directly from INHECO.

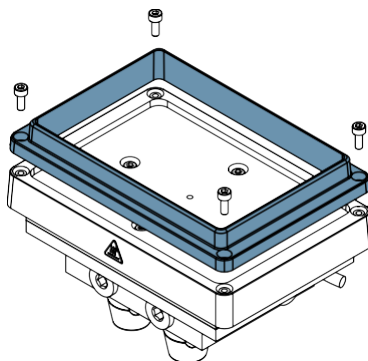
A different set up might be delivered if the CPAC devices were ordered from your workstation provider. In this case the PCR Adapter or another adapter might already be pre-installed.

To install the desired adapter:

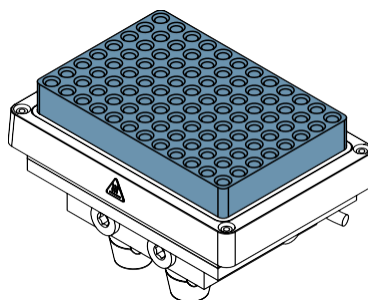
**Step 1:** Unscrew the mounting frame screws (1) and put aside.



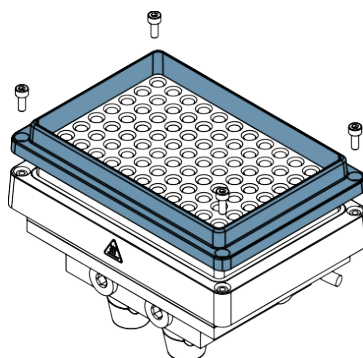
**Step 2:** Remove the mounting frame



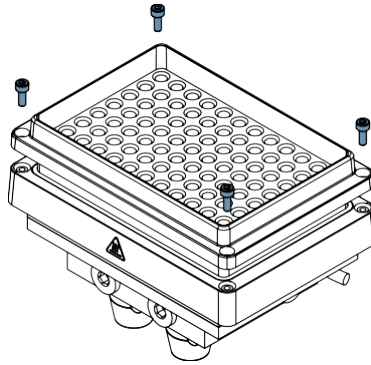
**Step 3:** Place the PCR Adapter on the CLPC .



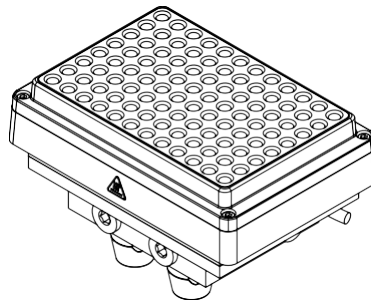
**Step 4:** Place the mounting frame over the PCR Adapter.



**Step 5:** Fasten the mounting frame with the mounting frame screws hand tight (0.25 Nm respectively)



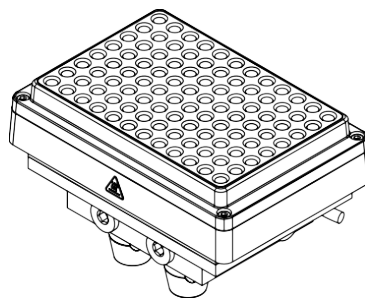
→ The PCR Adapter is installed.



#### 4.1.3.2 Installation of Flat Bottom Adapter

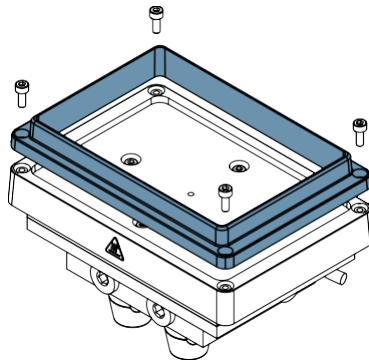
To mount the Flat Bottom Adapter:

**Step 1:** Unscrew the mounting frame screws (1) and put aside.

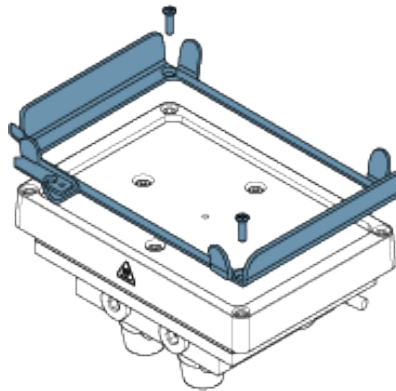




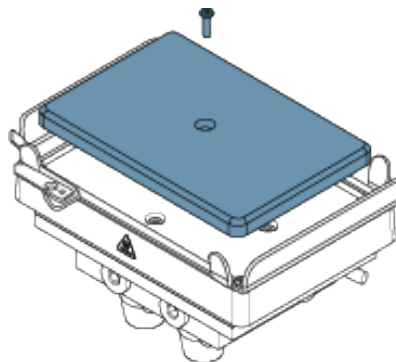
**Step 2:** Remove the mounting frame



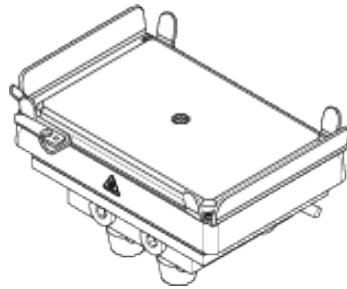
**Step 3:** Attach the outer frame of the flat bottom adapter with 2 screws.



**Step 4:** Attach the plate of the flat bottom adapter with one screw.



→ The flat bottom adapter is assembled.



#### 4.1.3.3 Installation of different adapters

##### Info

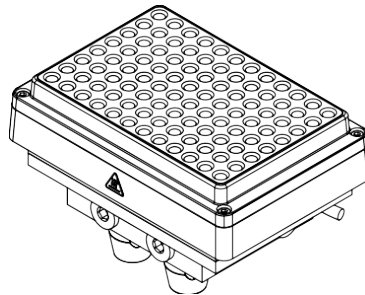


Adapters other than PCR-Adapter and Flat Bottom Adapter do not need a frame.

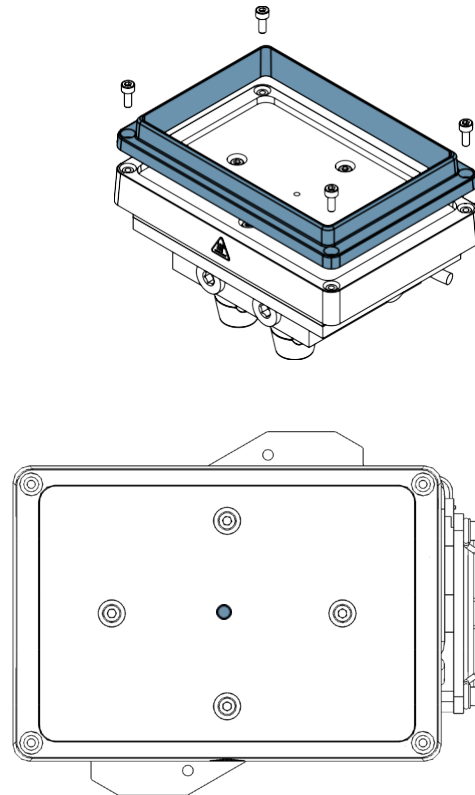
To install different adapters:

✓ The CPLC must be free of adapters.

**Step 1:** Unscrew the mounting frame screws (1) and put aside.



**Step 2:** Remove the mounting frame



**Step 3:** Screw in the adapter plate to the plate fixation hole

### 4.1.4 Mechanical Integration

The CPLC devices are usually integrated into liquid handling workstations. The way of fixation depends on the hardware provided by the automation platform manufacturer. The mounting surface must be firm and even.

**NOTICE**



Make sure there is no other electronic device installed next to the device or it's tubes that could be damaged by leaking coolant.

Drilling schematic for secure mounting of the CPLC unit on a working table is shown in the following figure.

- for CPLC Ultraflat 4 screws are necessary

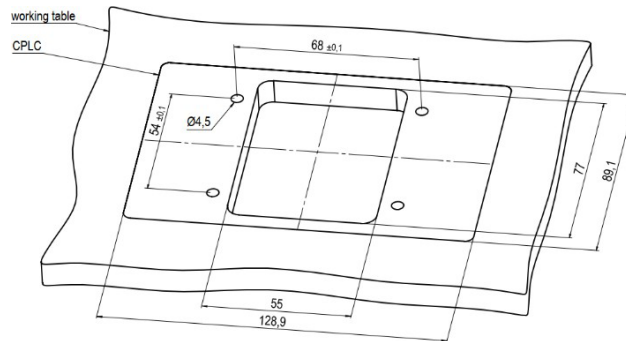


Illustration 8: Drilling Scheme for CPLC Ultraflat

Contact INHECO for further information how to place the devices onto the working table to prevent damage from the device or/and to assure that the CPLCs are working with the given specifications.

## 4.2 Software Installation

INHECO offers a software called Demo Tool to provide limited functional control (also possible via touchscreen of the MTC / STC) and the opportunity to send manually entered firmware commands to the devices.

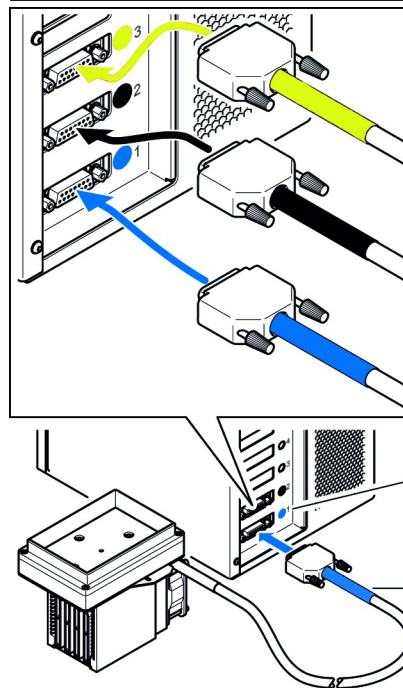
We recommend contacting your workstation provider for integration (including software integration) of the MTC / STC with devices into your workstation.

# 5 Initial Operation

## 5.1 Connecting devices to the MTC / STC

In order to connect an INHECO heating / cooling / shaking device, the TEC Control Unit has to be equipped with the corresponding Slot Module. There are blue, black, and yellow Slot Modules available. The following table shows the appropriate Slot Module for each heating / cooling / shaking devices.

Product	Color	Article No.	Heating / cooling / shaking Device
Black Slot Module	black	2400125	CPAC HT 2-TEC, HeatPAC, Heated Lid, Teleshake 95, Thermoshake AC
Blue Slot Module	blue	2400128	CPAC (only 7000190 & 7000179)
Yellow Slot Module	yellow	2400211	Thermoshake AC, Thermoshake AC 180, Thermoshake



For clear identification, all Slot Modules and connectors are marked in blue, black or yellow.

When connecting a new device, the color code has to be strictly respected.

In case of wrong connection, interaction will not be possible, and an error message will be issued.

The color coding of the Slot Modules is visible from the outside through small round windows.

At the connectors, the sleeve must be marked in the same color as the Slot Module.

Illustration 9: Example of connected heating / cooling / shaking device (image shows CPAC)

**Step 1:** Disconnect the power cord of the TEC Control Unit.

**Step 2:** Connect the Shaking device to the appropriate Slot Module and lock the connector.

✓ The Shaking device must be connected to a Yellow Slot Module.

**Step 1:** Connect the power cord of the TEC Control Unit.

**Step 2:** Switch the TEC Control Unit on.

→ The touch-screen display of the TEC Control Unit shows the name (or abbreviation) of the currently connected device. When multiple devices are installed, you can switch between the devices by touching the arrow left or arrow right button of the touch screen.

### NOTICE



Never plug in or plug out a device while the Controller is running. Always turn off the Controller before disconnecting or connecting the device.

## 6 Operation

### 6.1 Safety instructions for operation

#### WARNING



#### Risk of skin burning

The device can reach temperatures up to +110°C [+230°F] and seriously burn your skin, even after switching it off.

- Do not touch the device during operating or after operating.
  - Let the device cool down before touching it.
- Before starting the operation of the liquid cooled MTC/STC device make sure the Heat Exchanger is working properly, and the cooling circuit is not leaking or blocked.
  - For trouble free operation of the pump there must always be enough liquid in the reservoir. Dry running damages the bearing and leads to reduced flow or interruption of the pumping operation. Air in the system will cause audible noise and can therefore be detected.

#### NOTICE



#### Risk of damage

Do not operate the CLPC in an ambient temperature of more than 32°C (90°F). Otherwise, the device may not work properly or get damaged.

#### NOTICE



#### Risk of insufficient function

If there is not sufficient cooling liquid running through the liquid loop the function of the cooled MTC device might be impaired.

- When switching on the liquid cooled MTC/STC device, always make sure that the pump and the fans of the unit are working.

#### Info



For use with labware:

As the temperature can be selected up to +110°C [+230°F] check whether your labware is suited for the selected temperature. If the temperature is too high for the material of your labware, the labware might get squashy or even melt.

### 6.2 Operating the CPLC

The device can be operated by a MTC/STC, by the INHECO Demo Tool software or by the software of your liquid handling workstation.

The INHECO Demo Tool software and the MTC/STC allow programming basic temperature and shaking sequences. More complex control sequences can be performed with the software of your robotic platform provider or if you write your own software based on our Firmware Command Set and DLL.

For more information consult the following documents:

- for touch-screen operation: MTC/STC Manual
- for software operation: Demo Tool Manual
- for firmware commands: MTC/STC Firmware Command Set

These documents can be downloaded from the INHECO login section on [www.inheco.com](http://www.inheco.com).

## 7 Maintenance

### 7.1 Refilling

Refilling the CLPC must be done via the Heat Exchanger.  
To refill, see separate Heat Exchanger Manual.

### 7.2 Software updates

For updates of the Demo Tool Software, contact: [sales@inheco.com](mailto:sales@inheco.com).

### 7.3 Calibration / verification

For proper performance of the CPLC devices, it is recommended to verify the thermal performance at least once a year. Depending on the application, shorter verification intervals may be required.

INHECO recommends to use the INHECO Measurement Plate (IMP) to perform the verification.

Please contact [techhotline@inheco.com](mailto:techhotline@inheco.com) in case of performance deviations from set values.

#### NOTICE



The set Heater Offset has an impact on the temperature verification of the device. Make sure the Heater Offset is considered when performing the temperature verification.

## 8 Troubleshooting and support

In case of an operation failure please contact INHECO (→ **Company information, page 2**) and provide the information below. INHECO can help you to trouble-shoot the reason for the operation failure.

Please provide the following when contacting INHECO for support:

- INHECO product number of the device (shown on device label)
- INHECO product name of the device (shown on device label)
- INHECO serial number of the device (shown on device label or via software)
- Detailed error description
- Information about setup of devices:
  - integrated in workstation

Serial numbers are shown on the device labels of the Heat Exchanger.

Based on the information above, INHECO's Techhotline will help you troubleshoot the device or decide about a requirement for a return.

### 8.1 Return device for repair

INHECO devices must be repaired by INHECO only. Parts must not be exchanged by the user. Exchange of parts or broken seals lead to the loss of warranty. Spare Parts must be ordered from INHECO.

INHECO will only accept parts / devices for return that do not pose a threat to the health of our staff. In particular, the devices may not have been used in Biosafety Level 3 and 4 environments or have been exposed to radioactive or radiation materials.

Devices which were exposed to biosafety level 3 and 4 environments or radioactive materials are not accepted by INHECO for return.

Please contact [techhotline@inheco.com](mailto:techhotline@inheco.com) or visit <http://www.inheco.com/service/returns-rma.html> for the return procedure before returning the device to INHECO. Do not return any devices without INHECO's RMA number. INHECO's RMA number must be shown on the outside of the return package. Returns without RMA number will not be processed by INHECO.

Devices should be returned in the original packaging. If not possible, ensure that devices are protected and cannot move within the package to avoid transportation damage or contact INHECO for a new packaging, see → **Technical Data, page 11**.



## 9 Accessories

### TEC Control

Product name	Description	Part number
Multi TEC Control (MTC)	controls up to 6 INHECO devices individually	8900030
Single TEC Control (STC)	controls 1 INHECO device	8900031

### Slot Modules

Product name	Description	Part number
Black Slot Module	connects CPAC HT 2-TEC, HeatPAC, Teleshake 95, Thermoshake, Heated Lid with MTC/STC	2400125
Blue Slot Module	connects CPAC with MTC/STC	2400128

### Thermal Adapter for Temperature Transfer

All standard adapter can be downloaded from [www.inheco.com](http://www.inheco.com) or requested from [sales@inheco.com](mailto:sales@inheco.com).

### Miscellaneous

Product name	Description	Part number
INHECO Measurement Plate (IMP)	verification of temperature and shaking performance	7901000
Heated Lid	heating up to +135°C	8900033

### Heat Exchanger

Product name	Description	Part number
Heat Exchanger Liquid Cooling small	Transfers heat load from the cooling liquid to the ambient air	2300110

### Cooling Liquid

Product name	Description	Part number
MANNOL Antifreeze AG11 (-40) Longterm	Transfers heat load from the liquid cooled MTC/STC device to the Heat Exchanger Liquid cooling small	2300104

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