

User Installation Guide



Liquid cooled devices

Product Number: 7100117 | 7100118 | 7100170 | 7100171

Doc ID: 901818-000

03/2026

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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.
- Please always refer to the product manual applicable to the product, the steps described here are general and apply to all liquid cooled products.
- 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 installation guide is part of the LC device and must be retained until the device is disposed of or must be passed on with the LC device to new users.
- Contact INHECO if there are any uncertainty in operation or handling of the LC device.

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, Contact information.

1.2. 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.

1.3. 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 → 4. Maintenance
- 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.
- 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 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. → **5 Troubleshooting and Support**

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>GENERAL DANGER SIGN</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>BURNING HAZARD</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>CRUSHING HAZARD</p> <p>If the required warning notices are not observed, physical injuries can occur from closing mechanical parts of a machine.</p>

2.5. Information symbols

The information symbols listed here may appear in this document.

General Information Symbols

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

3. Installation Procedure

3.1. Tools

Not included in the set:

- Open-end wrench size 16 (Screw-on nozzle 90° rotatable)
- Hexagon screwdriver size 5 (screw plug CPLC)
- Slotted screwdriver 0.8x5.5mm (Reservoir-opening)

Included in the Device set:

- Hose Cutter
- Coolant

Included in the Heat Exchanger set:

- Funnel

3.2. Connectors

3.2.1. Screw-on nozzle straight

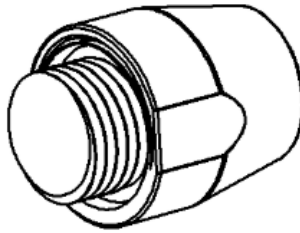


Figure 2: Screw-on nozzle straight (2300102)

3.2.2. Screw-on nozzle 90° rotatable

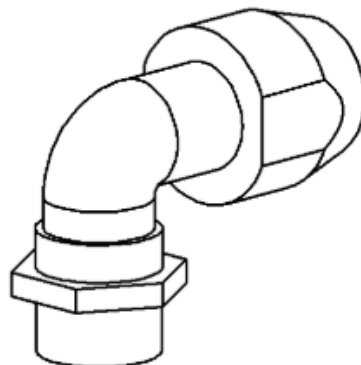


Figure 3: Screw-on nozzle 90° rotatable (2300107)

3.2.3. Quick connector

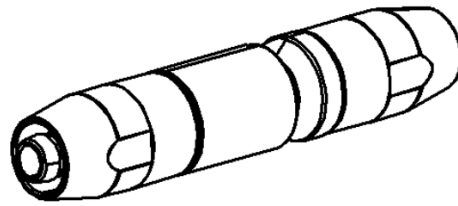


Figure 4: Quick connector (2300103)

3.3. Hose

NOTICE



It must be ensured that the hose (alpha tube TPV 12.7 / 7.6 black) does not bend as this impairs the flow of the coolant and therefore impairs the performance of the LC appliances and, in the worst case, can damage the appliance.

Depending on the conditions of the deck of the respective automation system, the hose routing between the assemblies and heat exchangers can differ significantly. Please contact Inheco for more information about the hose installation options.

3.4. Devices

3.4.1. CPLC

The flow of the coolant inside the heat exchanger of the appliance must be always in a U-shape (shown in blue). Inlet or outlet of the coolant are freely selectable.

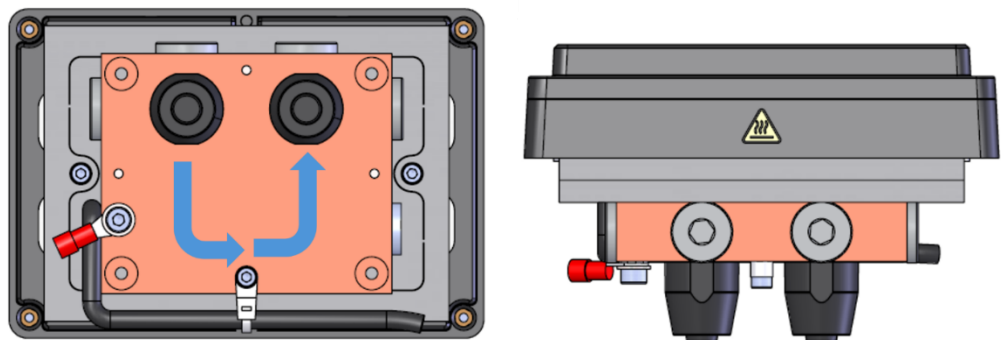


Figure 5: Installation at the bottom of the device.

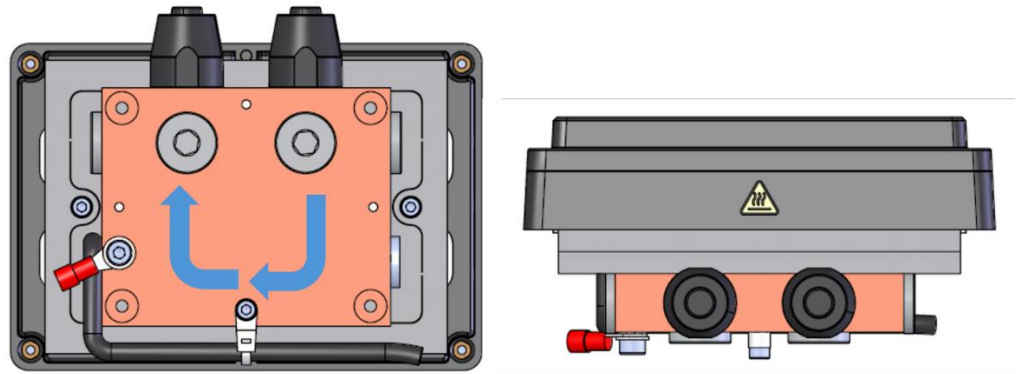


Figure 6: Installation parallel at the side of the device.

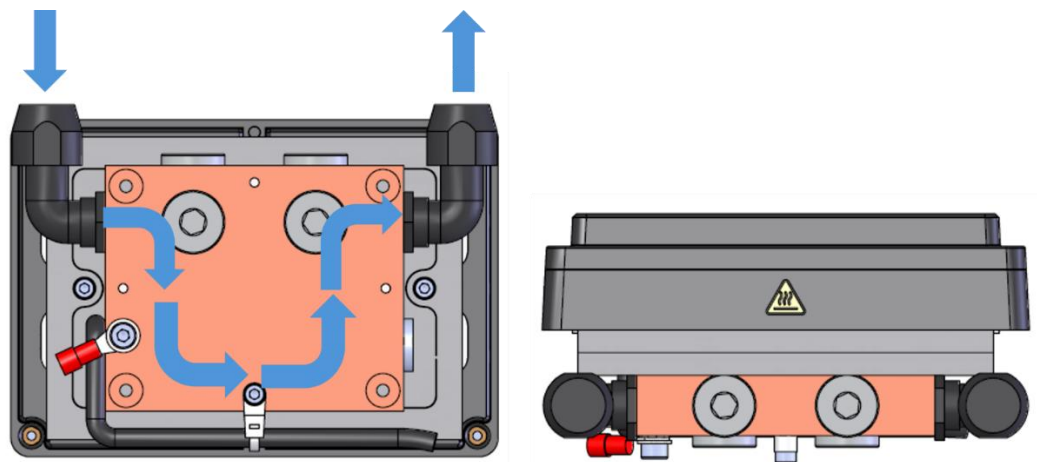


Figure 7: Installation on the opposite side connections of the device.

The heat exchanger installed in the CPLC module offers three connection options in relation to the respective output and input. Figures 4 to 6 show examples of how the CPLC assemblies can be configured. When configuring, it should always be noted that the inputs and outputs must be selected so that the coolant can flow through the heat exchanger in a U-shape.

The connections are available in straight and angled versions. All inputs/outputs are fitted with blanking plugs at the factory.

NOTICE

An incorrect configuration can be seen in Fig. 7. In this case, the coolant does not flow through the entire heat exchanger (U-shape). This significantly minimizes the performance of the CPLC module.

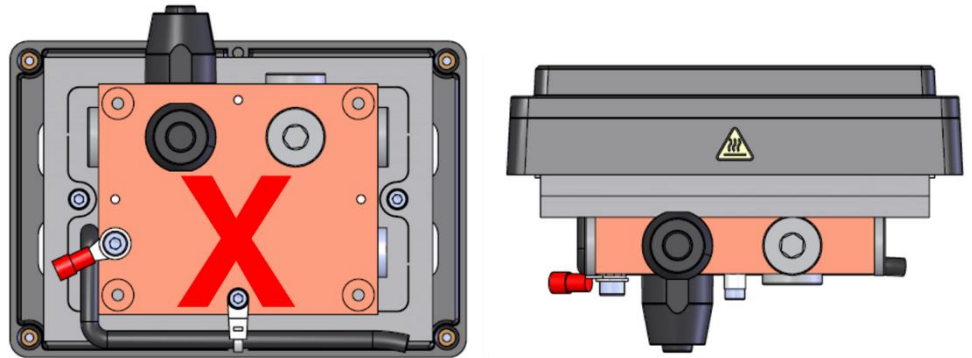


Figure 8: Incorrect installation example

3.4.2. Thermoshake AC LC

The following steps show how to install the LC Thermoshake variants:

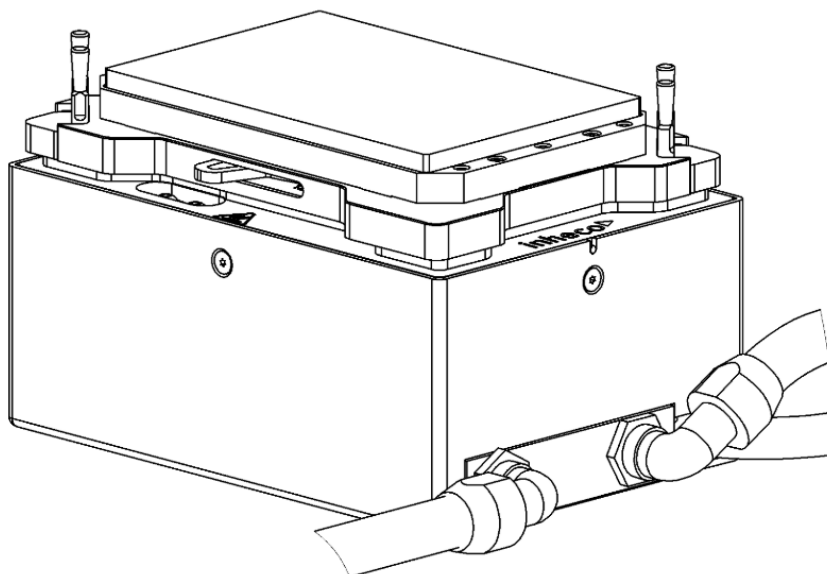


Figure 9: Thermoshake AC LC (7100171)

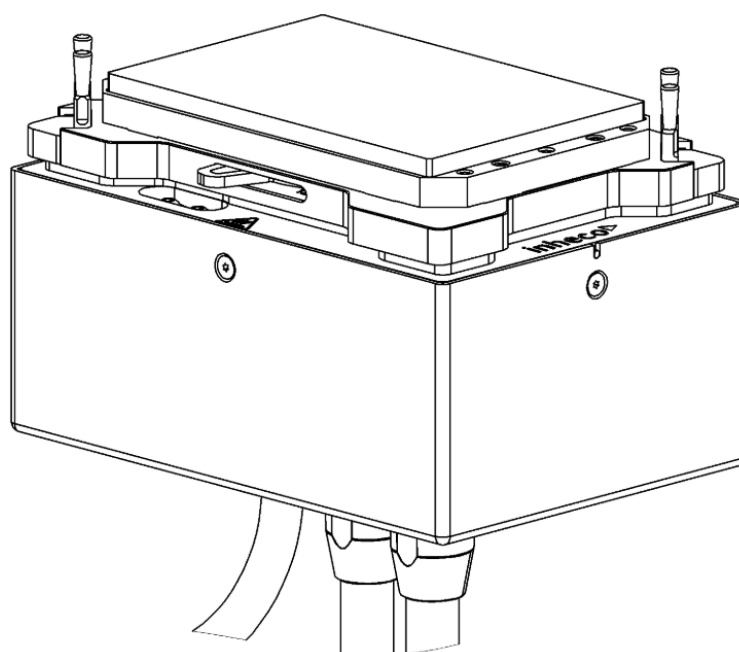


Figure 10: Thermoshake AC LC (7100170)

3.4.3. Heat Exchanger

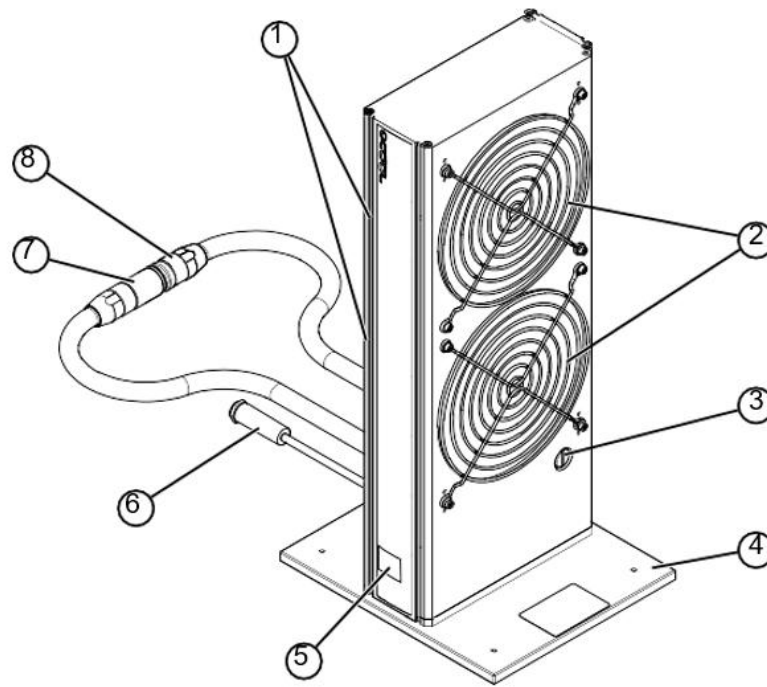


Figure 11: Heat Exchanger Liquid cooling small (2300110)

1	Ventilation Inlett	2	Ventilation Outlet
3	Reservoir opening	4	Stand
5	Viewing window	6	Connector
7	Liquid inlet	8	Liquid outlet

3.4.4. TEC Controller



Figure 12: TEC Controllers (MTC 8900030, STC 8900031, MTC Compact 8900029)

3.5. Single device installation

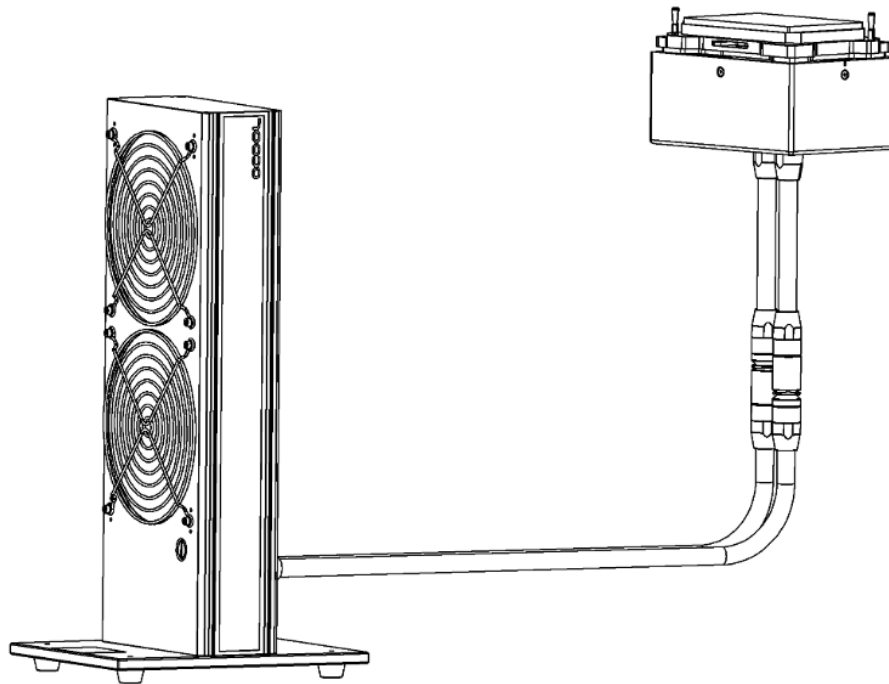


Figure 13: Complete system demo unit consisting of radiator (left) and Thermoshake AC LC (right.)

Step 1: Cut the hose with the included hose cutter to the desired length

Step 2: LC Device: Choose In- and Outlet. If necessary, remove screw plug with Hexagon screwdriver size 5

Step 3: Choose Screw-on nozzle

Screw-on nozzle straight:



Figure 14: Screw-on nozzle straight

Step 1: Screw-on nozzle (2) screwing by hand

Step 2: spout (1) push on hose

Step 3: Push serrated washer (3) approx. 5mm on hose

Step 4: Push the hose on the screw-on nozzle (2)

Step 5: Screw the spout (1) on the screw-on nozzle (2) by hand

Screw-on nozzle 90° rotatable:



Figure 15: Screw-on nozzle 90° rotatable

Step 1: Screw the screw-on nozzle (2) with an open-end wrench size 16

Step 2: Push the spout (1) on the hose

Step 3: Push the hose on the screw-on nozzle (2)

Step 4: Screw the spout (1) on the screw-on nozzle (2) by hand

Step 5: Mount the Quick coupling on the other side of the hoses

The installation is the same as with Screw-on nozzle straight.



Figure 16: Screw-on nozzle straight



Figure 17: Quick connector

Only 2 quick-release couplings may be installed (1x for the inlet and 1x for the outlet of the liquid loop). These must be used to connect to the Heat Exchanger Liquid Cooling Small.

3.6. Multi device installation

The following steps explain the installation of several Liquid cooling devices in a network. The Heat Exchanger may be operated with a maximum of 5 LC devices.

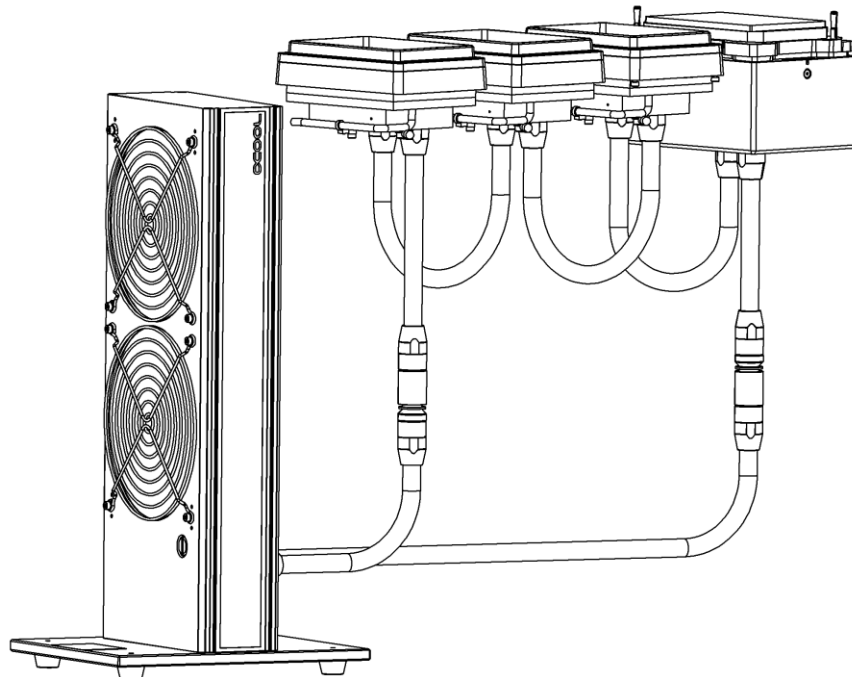


Figure 18: Complete system demo unit consisting of radiator (left) and CPLC system (right).

If several LC devices are installed (up to 5 possible), the devices must be connected directly in series.

The tubing procedure is as described in chapter **3.4 Devices**.

Screw-on nozzle straight:

The distance between the inlet and outlet of the adjacent devices must be approx. 10 cm and needs a length approx. 25 cm to ensure that the hose does not kink when it is installed as shown in the picture.

To calculate the minimum length required, use the following formula:

(Distance between inlet and outlet [cm] x pi / 2) + 10cm

Screw-on nozzle 90° rotatable:

For a direct connection with screw-on nozzle 90° rotatable, you must calculate the length of the hose as follows. (Distance between inlet and outlet -32 mm)

3.7. Installation Heat Exchanger

The Heat Exchanger has its own stand and can stand freely. When setting it up, make sure:

- the connecting device is in reach of the hoses.
- possible spillage will not damage other devices.
- air can flow freely in and out of the Heat Exchanger.

Step 1: Set up the Heat Exchanger in the desired place.

Step 2: Make sure the hoses are tight by turning the connectors clockwise.

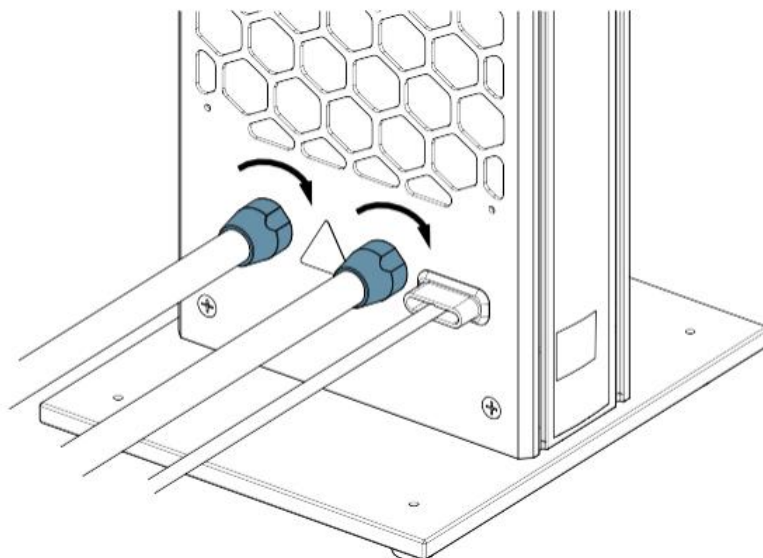


Figure 19: Tightening the hoses

Step 3: After setting up do not move the Heat Exchanger, as the connections might come loose.

NOTICE



Overtightening connectors and fittings

Tightening connectors and fittings with tools such as screwdrivers, pliers, wrenches or similar can overtighten the connection and therefore damage it. Tightening connectors and fitting with tools will void the warranty.

Tighten connectors and fittings only by hand.

3.7.1. Connecting a liquid cooled MTC / STC device

The cooling liquid circuit of the Heat Exchanger and the liquid cooled MTC/STC device are closed for transport by the quick-release couplings.

Step 1: Disconnect the quick couplings of the Heat Exchanger and liquid cooled MTC/STC device by pulling the ring (2) back.

This causes the quick release to pop open. When the quick-release couplings are disconnected, the internal water lock of the Heat Exchanger and MTC cooled device closes automatically, so no significant amount of coolant runs out.

Step 2: Connect the Heat Exchanger and liquid cooled MTC / STC device with hose couplings.

The quick-release couplings were mounted in such a way that it is not possible to mix up the inlet and outlet (key-lock principle).

Step 3: To close the quick-release couplings, plug the couplings together until you can hear a click. Make sure that the quick-release couplings are firmly tightened by a slight tensile test.

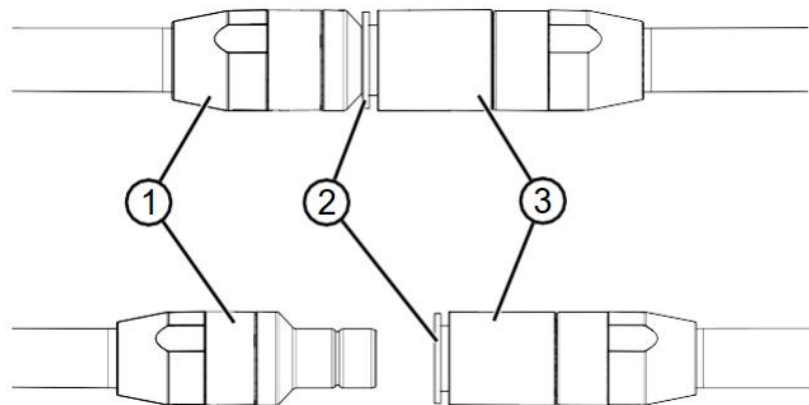


Figure 20: Tightening the hoses

1	Lock	2	Ring
3	Key		

Step 1:

To further increase safety, lock the connection with the provided locking clip (2).

An unlocking clip (1) makes it easier to open the quick release coupling if required.

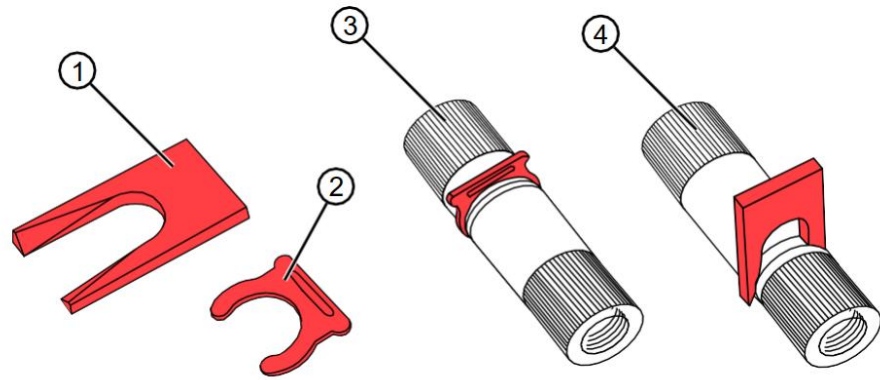


Figure 21: Locking and unlocking clip

1	Unlocking clip	2	Locking clip
3	Secure connection	4	Open connection

3.8. Refill cooling liquid

The Heat Exchanger needs cooling liquid to work properly and to avoid damage to the system. To ensure that the unit does not run dry please check the liquid reservoir regularly.

Required tools and consumables

- Funnel or fill bottle
- Screwdriver 0.8x5.5 mm
- Cooling liquid Tyfocor L 40%

We recommend to use Tyfocor L 40%, pure distilled or osmosis filtered water as cooling liquid. Else, the components of the liquid circuit could be damaged. If you have previously used Mannol, you can refill with Tyfocor L 40%. Mannol and Tyfocor are compatible.

Procedure

Step 1: Lay the Heat Exchanger on its side, with the refill opening pointing upwards

Step 2: Remove the screw plug with the Screwdriver 0.8x5.5 mm.

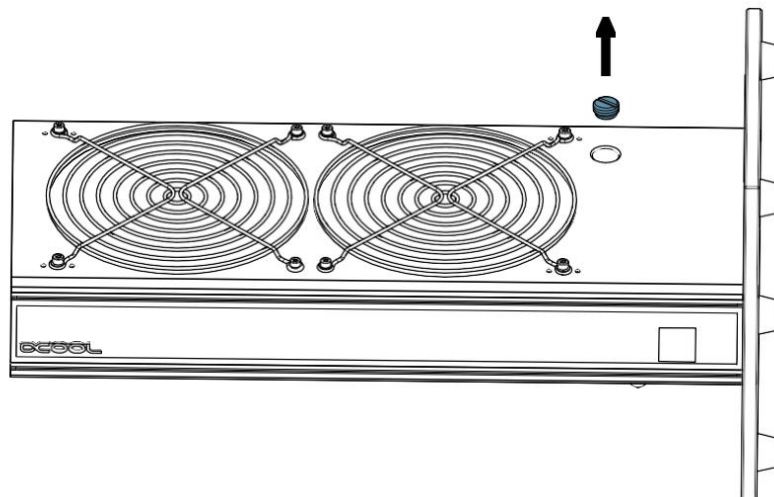


Figure 22: Refill opening

Step 3: Insert the funnel into the opening.

Step 4: Fill up the cooling liquid reservoir with cooling liquid [a] until full (1).

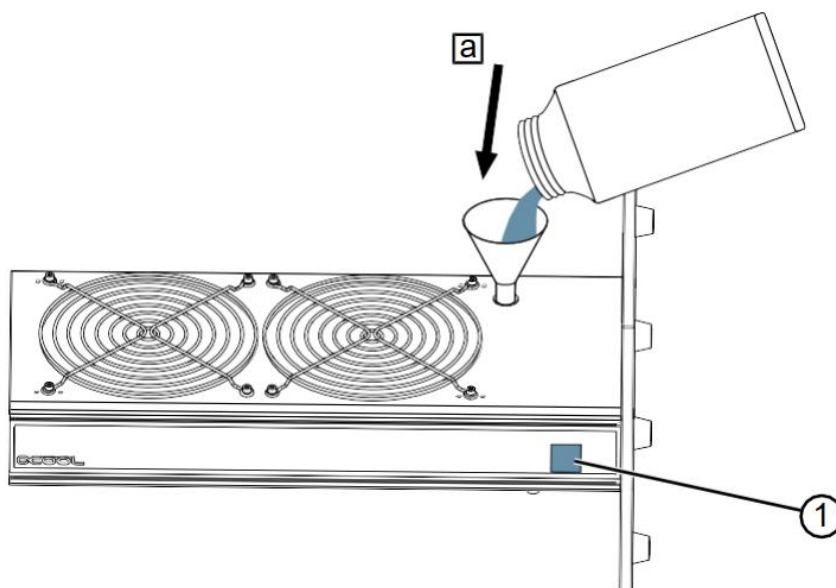


Figure 23: Refilling cooling liquid

Step 5: Remove the funnel.

Step 6: Insert the screw plug and tighten with the Screwdriver 0.8x5.5 mm.

Step 7: Clean up any excess cooling liquid.

Checking the liquid level

Regularly before and while operating the Heat Exchanger check the liquid level.
To do so:

Step 1: Check the liquid level via the viewing window.

Step 2: Listen to the Heat Exchanger during operation. If the liquid level is low noise is audible.

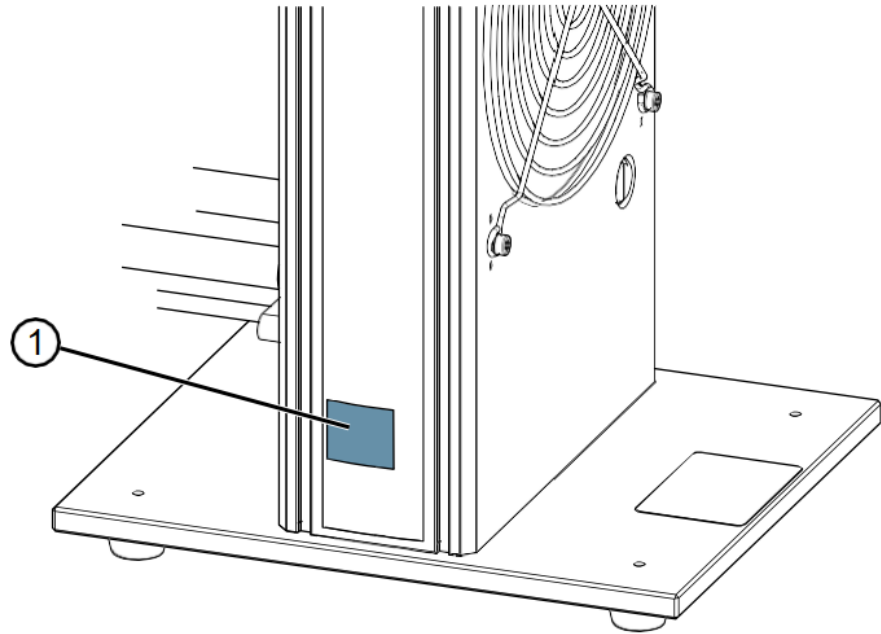


Figure 24: Viewing window

The Heat Exchanger should be filled as much as possible.

3.9. Connection to MTC/STC-Device

The following steps explain how to operate with the module(s) in conjunction with the MTC.

Step 1: Connect CPLC to [MTC](#) (black slot)/Connect Thermoshake LC to MTC (yellow slot)

Step 2: Connect MTC with power cord (IEC 60320 connector) to the socket

Step 3: Connect MTC with USB-cable to your Computer

Step 4: Switch MTC on

Refer to [User and Installation Manual CPLC Ultraflat MTC](#)

4. Maintenance

4.1. Cleaning

The contact surface should be cleaned regularly to ensure optimum heat transfer into the microplate and assay. Always clean the contact surface after a spillage. Use a cloth with a 50:50 water / isopropanol solution and make sure that no deposits are left on the surface. Liquids must not enter into the unit.

Do not use aggressive cleaning fluids such as acetone or abrasive cleaners.

Contact INHECO in case you prefer other cleaning liquids or methods as they might be harmful for the material of the devices.

4.2. Transportation and Storage

It is recommended to keep the original packaging. INHECO devices should be shipped and stored in their original packaging. Adhere to required environmental conditions for transportation and storage.

4.3. Shut Down and Disposal

The device must be disposed of in accordance with environmental and biosafety directives. You must arrange for correct electric waste disposal following current safety regulations of your country.

All INHECO devices are RoHS and WEEE compliant.

5. Troubleshooting and Support

In case of an operation failure follow the troubleshooting instructions of this chapter. INHECO needs the below-mentioned information to help you troubleshooting the operation failure.

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
- Reported Errors
- Information about setup of devices:
 - integrated in workstation
 - controlled by workstation software or INHECO software

The serial number is shown on the device labels and can be read out with the Device Manager.

The Device Manager must also be used to generate the above-mentioned report of error codes for the connected devices.

Based on the above information, INHECO's TechHotline decides about the requirement for a return. → **Return for Repair only with RMA Number.**

Our Return process is explained here: <https://www.inheco.com/rma-process.html>

The contact surface should be cleaned regularly to ensure optimum heat transfer into the microplate and assay. Always clean the contact surface after a spillage. Use a cloth with a 50:50 water / isopropanol solution and make sure that no deposits are left on the surface. Liquids must not enter into the unit.

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