DR. NEUMANN
TECHNIK Peltier

Thermoelectric Heating & Cooling Thermostat

LABChill-600

Original Operating Manual

V1REV3

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Preliminary remark

This operating manual contains important information on the safe handling of the thermoelectric heating & cooling thermostat. Read this operating manual thoroughly and completely before the initial operation.

Have the operating personnel of the machine also read this operating manual thoroughly and completely.

Have the operating personnel confirm in writing that they have read and understood this operating manual.

Keep this operating manual within reach of the machine for future reference.

1 Safety

1.1 Remarks in this manual and on the machine

1.1.1 Safety-related information

The equipment may only be operated in accordance with its intended use and the instructions in this operating manual. Any other mode of operation is considered improper and may impair the protection provided by the equipment.

The devices are not intended for use under medical conditions according to DIN EN 60602-2 or IEC 60101-1.

The operating manual is part of the device. The information must be kept in immediate vicinity of the device. Keep the operating manual in a safe place.

If the operating manual is lost, you can download it again from our homepage.

The use of the device results in hazards due to low and high temperatures and the use of electrical energy. The hazards of the device have been eliminated as far as possible by design measures in accordance with applicable standards. Remaining hazards are reduced by observing the following measures:

- Use hoses from the original accessories or at least suitable hoses (temperature range and pressure). Hot liquid can leak due to hose rupture and be hazardous to persons and material.
- The functionality of the device must be maintained by appropriate maintenance activities (see also maintenance schedule).
- The warning symbols on the device must be observed.
- The safety instructions in the operating manual must be observed.
- Requirements for the personnel and for the personal safety equipment of the personnel must be observed.

1.1.2 Safety instructions in this manual

Safety instructions are introduced with the warning sign shown here.
The entire section labeled as such conveys safety-relevant information to you.

1.1.3 Warning notices in this manual

Warnings are related to a specific action (for example, a maintenance step). The different signal terms (Danger, Warning, Caution and Attention) indicate different degrees of danger.

Warning of a hazard that **leads** to death or serious bodily injury:

DANGER TYPE AND SOURCE

Consequences of non-compliance

- Measure 1
- Measure ...

Warning of a danger that **can lead** to death or serious bodily injury:

WARNING TYPE AND SOURCE

Consequences of non-compliance

- Measure 1
- Measure ...

Warning for a danger that **can lead** to slight bodily injury:

CAUTION TYPE AND SOURCE

Consequences of non-compliance

- Measure 1
- Measure ...

Warning sign for a danger that **can lead** to property damage, no warning sign is shown here

ATTENTION TYPE AND SOURCE

Consequences of non-compliance

- Measure 1
- Measure ...

1.1.4 Other symbols in this manual

Dispose of materials separately for recycling

Reference to other important information

1.2 Applied guidelines and product certifications

Directives	Description
CE	**CE Labeling** The device complies with all specifications of the following directives: • 2006/42/EG Machinery Directive • 2014/30/EU EMC Directive

1.2.1 EMC requirements

Device	Interference immunity requirement	Emission level	Mains connection customer
LABChill-600	Table 2 according to EN 61326-1	Emission level B according to CISPR 11	Worldwide No restriction

1.3 Intended use

As intended:

The thermoelectric heating & cooling thermostat may only be used for temperature control and conveying of non-flammable liquids in closed circuits.

Not as intended:

The thermoelectric heating & cooling thermostat must expressly not be used in potentially explosive atmospheres or for the direct temperature control of foodstuffs.

1.3.1 Predictable misapplication

Misuse is considered to be any use that deviates from or exceeds the before mentioned intended use.

- Operating the unit with incorrect or flammable temperature control liquid,
- Operating the unit with bypassed safety features,
- Operating the unit with incomplete safety devices,
- Use of other than original spare parts or accessories,
- Unauthorized installation or modification of the unit,
- Unauthorized repairs to the unit,
- Non-compliance with the safety instructions,
- Operating the device in a technically unsatisfactory condition, not being aware of safety and hazards and not observing all instructions in the documentation.

Any use not in accordance with the intended use excludes the manufacturer's liability and results in the loss of warranty and guarantee.

1.3.2 Materials and components

All parts in contact with the tempering fluid are made of high-quality materials adapted to the operating temperature. High-quality stainless steel, aluminum and high-quality, temperature-resistant plastics are used.

1.3.3 Tempering fluid

The unit is intended exclusively for operation with NON-flammable fluids corresponding to class designation I according to DIN 12876-1. Please use the tempering fluid from the original accessories.

The safety data sheet of the tempering fluid specifies all possible dangers and corresponding safety measures for handling. The safety data sheet must therefore be referenced for the intended use of the device.

1.3.4 Application limits

The unit may be used in the following areas

- Commercial areas
- Indoor areas

- Altitude up to 2,000m ASL
- Ambient temperature from +5 °C to +45 °C, non-condensing
- Fluctuations of the mains voltage up to ± 10 % of the nominal voltage
- Transient overvoltages up to the values of overvoltage category II
- Temporary overvoltages occurring in the mains power supply
- Pollution degree 2

1.4 Personnel qualification

The operating personnel must read the operating manual before operating the device. The operator must have understood the operating manual.

Certain qualifications are required for some activities. Only persons with the specified qualifications are permitted:

Activity	Qualification
Maintenance work	According to maintenance plan
Repair work on device	Specialized personnel of manufacturer

1.5 Residual risks

The device was designed and developed in strict compliance with the relevant legal and normative requirements. The current standards for technical development and safety have been adhered to.

Even when the device is used exclusively for its intended purpose, residual risks, i.e. unavoidable dangers, still exist. These dangers are described in this operating manual.

2 Unpack

DANGER TRANSPORT DAMAGE

Electric shock

- Check the device carefully for transport damage before putting it into operation.
- If you have detected transport damage, do not put the device into operation!

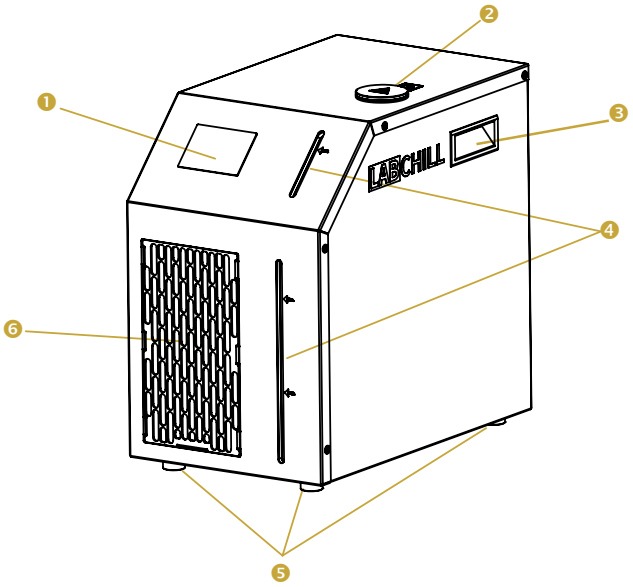
Use the handles on the left and right for lifting and carrying.

1. Unpack the device and keep the original packaging for later transport.
2. Check the device and accessories for completeness and transport damage after delivery. If the device or accessories are damaged, inform the carrier immediately so that the transport damage can be checked.
   Also notify the DR. NEUMANN Service or a qualified service partner. You will find the contact details in the corresponding chapter.

Device type	Description	Number	Order number
all devices	Operating manual	1	--
all devices	Hose nozzle CPC	2	005169
all devices	Hose clamp	2	005298
all devices	Power cable 2,0 m	1	005328
all devices	Evacuation hose with fitting	1	005276

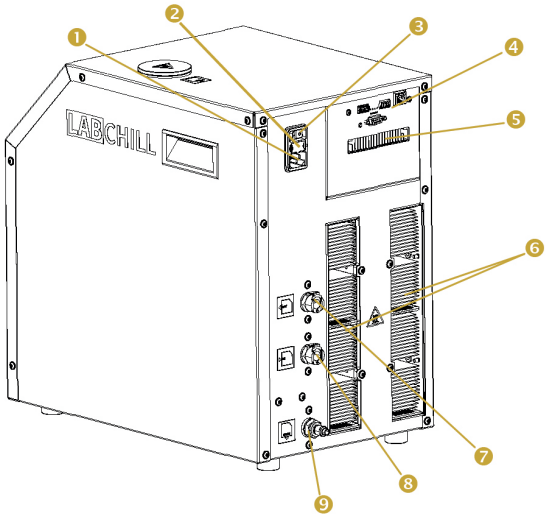
3 Layout and operating buttons

3.1 Device layout



1. Touch-Screen
2. Tank cap
3. Carrying handles (concealed on left)
4. Analog level indicator
5. 4 feet
6. Air intake (filter optional)

Fig. 1 Device front



1. Device plug
2. Compartment for 2 fuses
3. Power switch
4. Communication interfaces
5. Exhaust port electronics
6. Exhaust air opening Peltier
7. Connection OUT (to consumer)
8. Connection IN (from consumer)
9. Connection EMPTY (tank drain)

Fig. 2 Device back

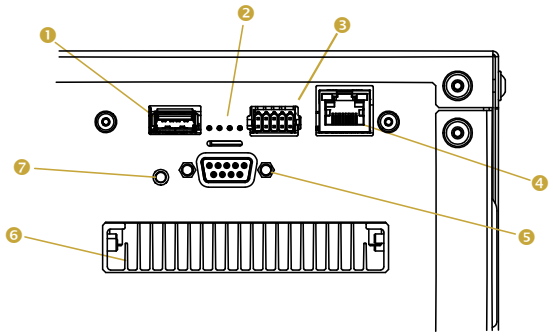


Fig. 3 Detail communication interface

1. USB A for software update or memory expansion
2. Status-LEDs
3. Connectors for potential-free status-switches
4. Ethernet interface
5. RS-232 interface
6. Ventilation opening for electronics
7. Push butoon (without function)

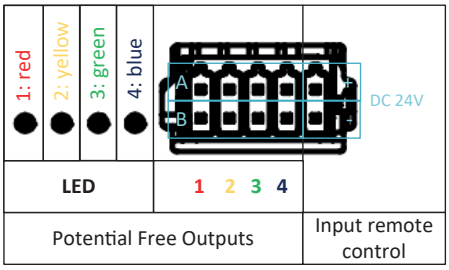


Fig. 4: Detail of status switch connector

Error:	red LED, outlet 1
Warning:	yellow LED, outlet 2
Stable (0,5 °C > 10s):	green LED, outlet 3
Control active:	blue LED, outlet 4

4 Operation

4.1 Approved tempering fluids

- The tempering fluids each cover a recommended temperature range and must be suitable for the temperature range of your application.
- Do not use any contaminated or degenerated liquids.
- You can request the safety data sheets of tempering fluids at any time.

Description	Chemical description	Temperature range [°C]	Viscosity @ 20°C [mm²/s]	Order number
Destitherm 90	Decalcified water	+5 °C ... +90 °C	1	005396
Glycotherm® 5	Monoethylene glycol water mix	-5 °C ... +90 °C	1.43	005362
Glycotherm® 20	Monoethylene glycol water mix	-20 °C ... +90 °C	2.60	005235
Glycotherm® 30	Monoethylene glycol water mix	-30 °C ... +90 °C	3.69	005363

Tempering fluid Glycotherm®5, 20, 30

When working at elevated temperatures for longer periods, the water proportion decreases and the mixture becomes flammable with a flash point of 119 °C at the most. Check the mixing ratio regularly with a density spindle or a refractometer according to DIN 51529.

Tempering fluid Water

- The proportion of alkaline earth ions in the water must be between 0.71 mmol/l and 1.42 mmol/l. Harder water can lead to lime deposits and have an influence on the cooling and heating performance.
- The pH value must be between 6.0 and 8.5.
- Due to its corrosive properties, distilled, deionized, demineralized or seawater is not suitable for temperature control.
- Distilled and ultrapure water can be used after adding 0.1 g of soda per liter of water.
- Do **not** add chlorine to the water.
- Water containing iron should not be used due to the increased risk of rust.
- River water is not to be used due to the formation of algae.
- The water must be free of impurities.
- The addition of ammonia is not permitted.

4.2 Device set up and hose connection

WARNING DROPPING OR OVERTURNING DEVICE

Bruise, impact

- Do not tip the device.
- Place the device on a level, non-slip surface with sufficient load-bearing capacity.
- Do not place the device close to table edges.
- Use the carrying handles.

ATTENTION OVERHEATING

Power reduction, failure

- Keep the minimum distances between devices, to the wall and to the edge of the table.
- Do not cover the air inlet and outlet openings of the device.
- Do not leave loose paper or similar in front of the device.
- When using an air filter: Dirty air filters must be replaced.
- When using an air filter: Pay attention to the maintenance cycles.

- Use the provided handles for lifting and carrying.
- Place the device on a level surface.
- Do not cover the ventilation openings.
- Secure the hose nozzle and the hose using the hose clamps supplied.
- The connections on the device are self-locking when unplugged, so no liquid will leak from the device except for the dead volume.
- The supplied hose nozzles are self-locking when unplugged, so no liquid will leak from the device except for the holdup.
- Absorb any dripping with a dry wipe and dispose of it.

4.2.1 Device placement

Place the device on a level surface, observing the minimum distances:

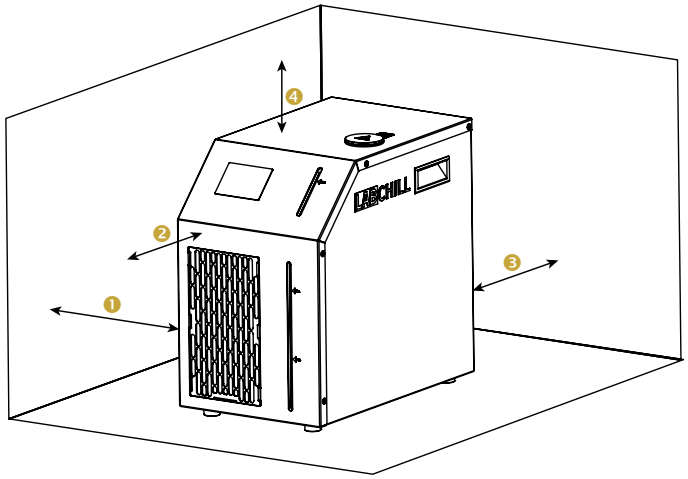


Fig. 5 Minimum distances

1. Left and right side: 10 cm
2. Front: 20 cm
3. Back: 25 cm
4. Top: 20 cm

When setting up the device, make sure that the front suction opening remains uncovered. Do not leave any loose paper or similar material in front of the device - it could be sucked in and cover the suction opening.

Make sure that the device is positioned in such a way that the air can exit from the back of the device

4.2.2 Hose device connection

CAUTION LEAKAGE OF LIQUID WHEN USING IMPROPER HOSES

Scalding, frostbite

- Only use hoses in accordance with the temperature, pressure and media resistance of your application.

1. Attach the supplied hose nozzles to each hose with a suitable inner diameter. Secure them with the hose clamps from the scope of supply.
2. Insert the pre-assembled hose, supplying your device with tempering fluid, into the supply connection.
3. Plug the hose with the return tempering fluid into the return connection.

The locking plate locks in the upper position by spring force when the connection is correct. A snapping sound indicates secure locking. If the hose nozzle cannot be inserted, the locking plate must be unlocked by pressing it downwards.

4.2.3 Hose removement from device

1. Unlock the locking plate by pressing it down.
2. Pull the hose out of the connection.
3. If necessary, collect any drips of liquid with a dry wipe and dispose of it.

4.3 Preparation of power supply

Please pay attention to the following instructions:

- Make sure that the device is only connected to a socket with a protective earth (PE) connection.
- On the installation side, the device must be protected by a 16 amp circuit breaker.
- The mains disconnecting switch is located on the mains plug. Keep it easily accessible.

1. Match your existing mains voltage and mains frequency with the voltage and frequency range on the type plate.
2. Connect the mains cable from the scope of delivery to the device and to the power supply.
3. Switch on the power switch.
4. The display switches on and the system boots.

4.4 Filling and drainng of tempering fluid

WARNING OVERFLOW AND SPLASHING OF LIQUID

Electric shock

- Fill the device only to the maximum limit.
- Use a suitable funnel for filling.
- Avoid splashing liquid.
- Immediately absorb any drips with a dry cloth and dispose of it.

⚠ WARNING DROPPING OR TILTING THE DEVICE

Bruise, impact

- Do not tilt the device.
- Place the device on a flat, non-slip surface with sufficient load-bearing capacity.
- Do not position the device close to table edges.
- Use the carrying handles.

⚠ CAUTION HOT OR COLD SURFACES

Scalding, frostbite

- Potentially hot or cold surfaces are labeled.
- Allow the system to cool to room temperature before filling or draining.

ATTENTION USE OF IMPROPER LIQUIDS

Performance reduction, failure

- Only use liquids in accordance with this operating manual.
- Select the tempering fluid according to the temperature range of your application.

No liability is accepted for damage caused by the use of an improper tempering fluid.

The use of an improper tempering fluid will result in the loss of the warranty.

In case of elevated consumers, if the pump is at a standstill and air enters (even if the circuit is closed), the upper volume may run dry. The device tank may overflow as a result!

Only pressure-tight consumers are to be connected to the system.

4.4.1 Filling of system

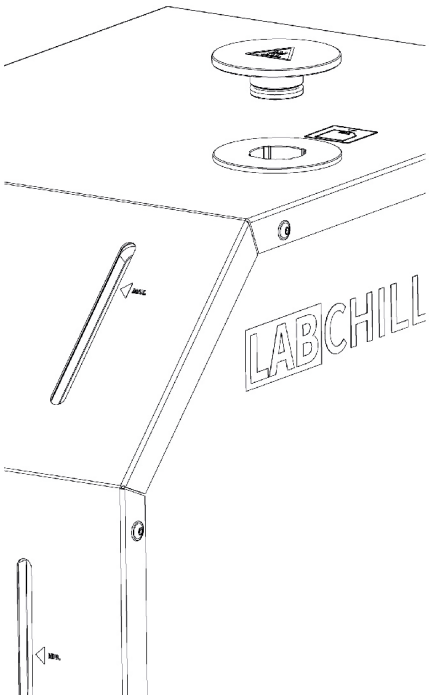


Fig. 6: Detail view filling

1. Plug in and turn on the device.
2. Make sure that the tank lighting is on.
3. Pull the tank cap upwards.
4. With the assistance of a funnel, fill the system to the "MID." limit for initial filling, and to the "MAX." limit for subsequent filling.
5. For initial filling continue with 6., for subsequent filling the filling process is completed.
6. Make sure that the hoses are connected to the device and the consumer.
7. Fill the system by pressing the start button. After 2s the filling switches off if there is still air in the system. Repeat starting until there is no more air in the system and the device no longer switches off.
8. Fill the system up to the "MAX." limit with the assistance of a funnel.

4.4.2 Draining of system

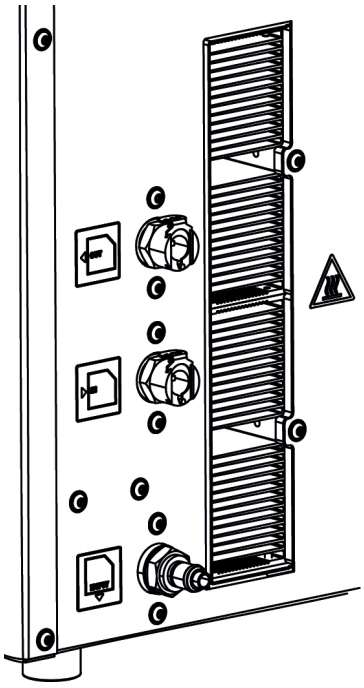


Abb. 7: Detail view draining

1. Switch off the temperature control and, if necessary, wait until the device has acclimatized.
2. Disconnect the hoses from the device and collect any drips that may escape with a cloth.
3. Place the device in an elevated position.
4. Take the evacuation hose with fitting (spare part art. no.: 005276) and insert the open end into an empty canister (at least 10l).
5. Plug the other end with the fitting onto the empty plug nipple.
6. Wait until no more liquid exits.
7. Disconnect the hose and collect any drips that may escape with a cloth.
8. Dispose of the canister with the evacuated liquid, observing regionally and nationally applicable laws and regulations.

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5 Operation

5.1 General safety instructions

CAUTION OVERHEATING ABOVE MAXIMUM APPLICATION TEMPERATURE

Burning, scalding

- In the event of a failure, up to 120 °C can occur at the heat sink under high load. Do not touch the heat sink.
- Always move the device using the handles provided for this purpose.

5.2 Start sequence

1. Switch on the device at the main switch.
2. The display backlight and the tank light turn on.
3. After a few seconds, the start screen appears.

FIG. 8: Boot screen

4. Once the system has fully booted, the home screen appears. The system is ready for operation.

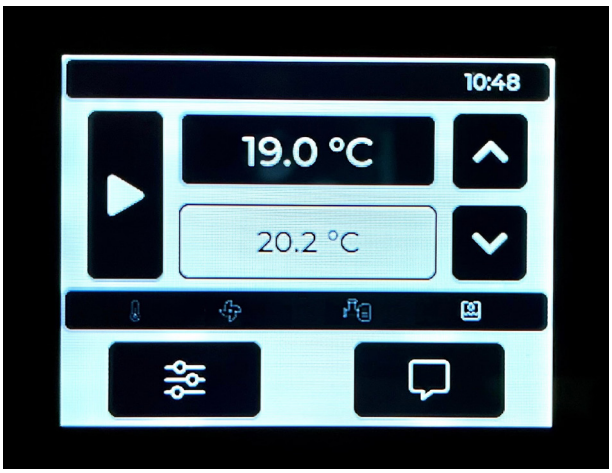


Fig. 9: Home screen

5.3 Menu navigation and layout

The device has a capacitive touch display. You can use the display to control all menus and specify values.

The menus are structured as follows:

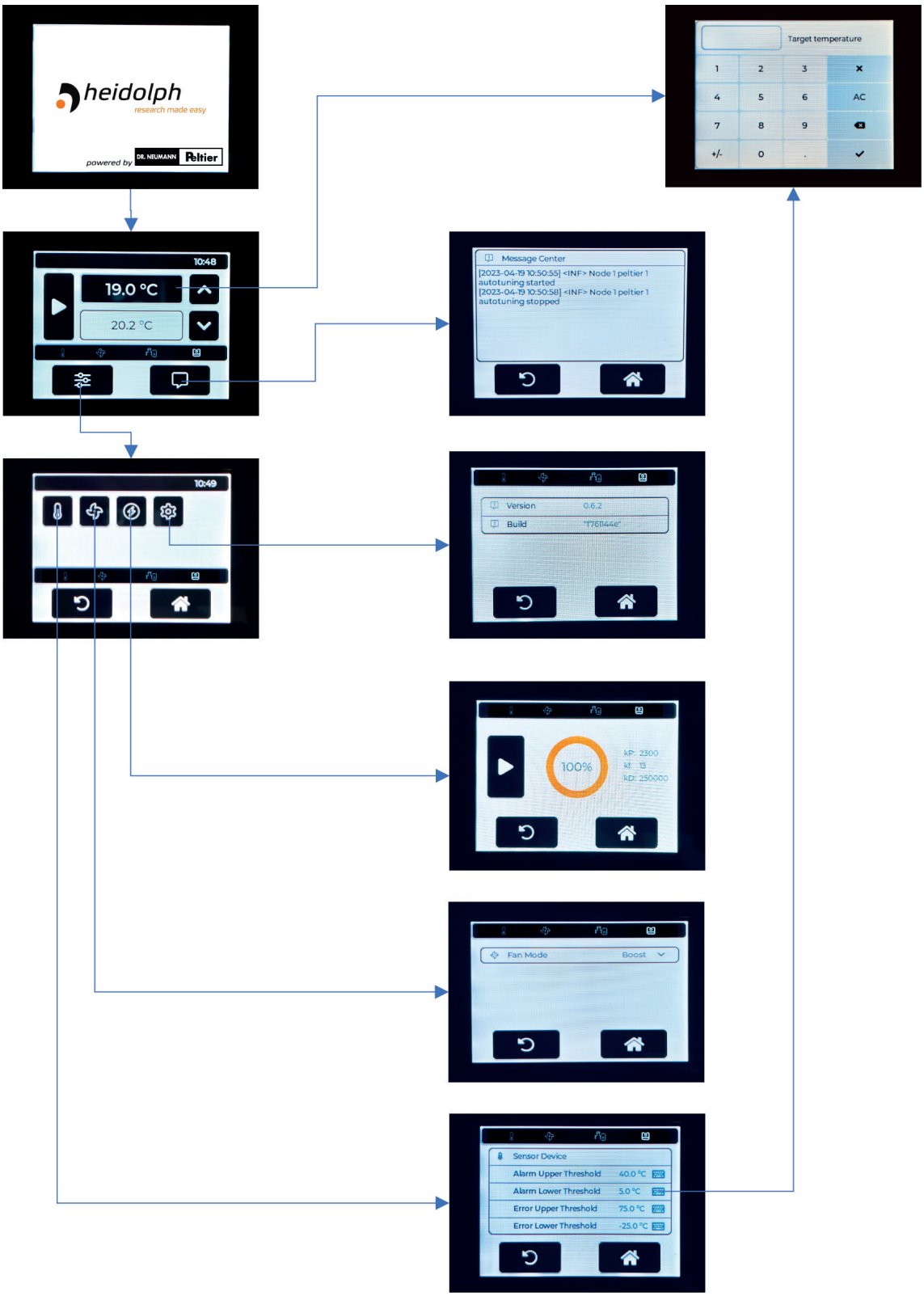


Fig. 10: Menu layout tree

5.3.1 Global symbols and their functions

Status overview

Fig. 11: Status overview bar

The status overview shows the status of the most important components and consumers. It is visible in all menus except the message center and the on-screen keyboard.

The temperature, fan and pump symbols appear when the temperature control is on. The tank symbol indicates the current fill level. If one of the symbols turns yellow, a warning has been triggered and has not yet been corrected. If one of the symbols turns red, an error has been triggered and has not yet been corrected.

Back-Button

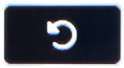


Fig. 12: Back-Button

Clicking on the icon takes the user back to the previous menu view.

Home-Button

Fig. 13: Home-Button

Clicking on the icon takes the user to the home screen.

On-screen keyboard

Fig. 14: On-screen keyboard

The symbol indicates that a parameter can be changed. Clicking on it opens the on-screen keyboard.

Drop-down menu

Abb. 15: Drop-down menu

The symbol indicates that a parameter can be changed. Clicking on it opens a drop-down menu.

5.3.2 Layout home screen

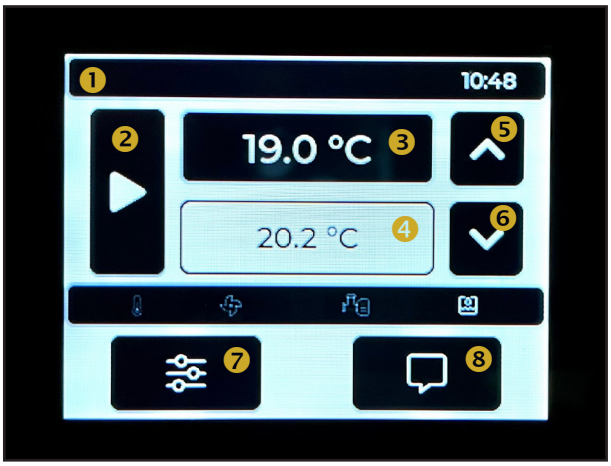


Fig. 16: Home screen explained

1. Connection status with time
2. Start, Stop

One click starts or stops the control.

3. Current setpoint temperature

A click on the current setpoint temperature opens the on-screen keyboard. Any temperature value between the limits of temperature-setting of the device can be entered there.

4. Current temperature
5. Increase setpoint temperature

The set temperature is increased by 0.1 °C per click. If the button is held down, the temperature increases by 0.1 °C/sec. After three seconds, the set temperature is increased by 0.5 °C/s, after another three seconds by 1 °C/s.

6. Decrease setpoint temperature

The set temperature is reduced by 0.1 °C per click. If the button is held down, the temperature is reduced by 0.1 °C/s. After three seconds, the set temperature is reduced by 0.5 °C/s, after another three seconds by 1 °C/s.

7. App center

Clicking opens the app center.

8. Message center

Clicking opens the message center.

5.3.3 Layout app center

The app center is the central point to all settings

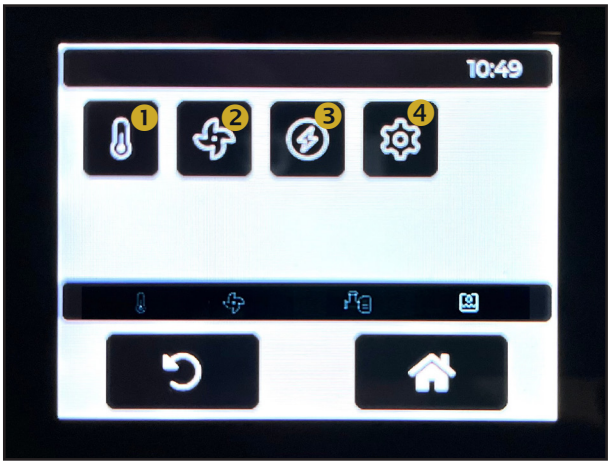


Fig. 17: App center explained

1 Temperature settings

Clicking opens temperature settings

2 Fan settings

Clicking opens fan settings

3 Autotune

Clicking opens autotune

4 General settings

Clicking opens general settings

5.4 Regular operation

Extensive sensor systems ensure proper operation.

During tempering, a constant check is made to ensure that the tempering fluid is flowing properly through the system. This also prevents that accidental disconnection of the hose leads to coolant leakage or damage to the device.

The tank level is constantly monitored. You will be alerted by the message center when the tank should be refilled. If the level falls below a critical point, the control is switched off to prevent damage to the system. The message center also informs you if the tempering fluid is missing.

1. Start the control by pressing the Start/Stop button. The temperature symbol appears in the status overview.

The performance of the Peltier device is continuously controlled in order to reach and exactly maintain the set temperature value.
With high Peltier performance, the fans rotate faster; noticeable by the starting noise caused by the fans.

2. The pump starts pumping tempering fluid through the system. The pump symbol appears in the status overview.
3. Clicking on the set temperature opens the on-screen keyboard. As soon as the value is entered and confirmed, the control moves to the new point.
4. The setpoint temperature can also be changed using the arrow keys. Further information on the arrow keys can be found in chapter 5.3.2 "Home screen layout".

The setpoint temperature can only be adjusted within the operating limits. If a value above or below is entered, the possible maximum or minimum value is automatically adopted..

5. To stop the control, simply press the Start/Stop button again.

The menu and the message center can also be opened without stopping the control. Changes to the limit values or other settings can also be made. Autotune can also be started.

5.5 Calling up event, warning and error messages

The message center can be opened manually by clicking on the corresponding icon on the home screen. It is also automatically invoked by all error messages and user-defined warnings..

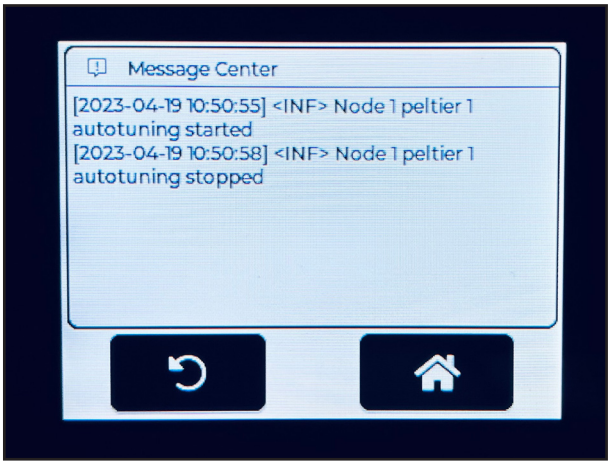


Fig. 18: Message center explained

In the message window you can find generically generated the latest event, warning and error messages with plain text and timestamp. Further information about the messages can be found in chapter 7 "Faults and messages".

5.6 Setting temperature error and alarm values

Error and alarm values can be defined by the user in the "Temperature settings" menu. An error leads to a user-defined shutdown of the temperature control, the temperature symbol of the status overview turns red. An alarm serves as user-defined information and is signaled by a yellow colored temperature symbol in the status overview. In both cases, the message center is automatically opened and the user is thus made aware of this.

The following settings can be made:

Group	Description	Unit	Default	Maximum adjustable value	Minimal adjustable value
Sensor Device	Alarm Upper Threshold	°C	+40.0	+75.0	-25.0
	Alarm Lower Threshold	°C	+5.0	+75.0	-25.0
	Error Upper Threshold	°C	+75.0	+75.0	-25.0
	Error Lower Threshold	°C	-25.0	+75.0	-25.0
Sensor Extern	Alarm Upper Threshold	°C	+40.0	+75.0	-25.0
	Alarm Lower Threshold	°C	+5.0	+75.0	-25.0
	Error Upper Threshold	°C	+75.0	+75.0	-25.0
	Error Lower Threshold	°C	-25.0	+75.0	-25.0

5.7 Selection of fan mode

You can change the fan mode in the "Fan settings" menu. The fan mode determines the maximum speed, respectively the noise level at maximum input power. A different maximum power is set for each fan mode. The recommended mode for all applications is Normal mode.

If a certain temperature value has to be reached as quickly as possible, or increased power is required for a short time and the noise level is secondary, the Boost mode can be selected.

Silent mode can be used in noise-sensitive environments. Here, the least cooling power is available.

5.8 Performing autotune

The default PID values are very suitable for most applications. If the temperature or a system still oscillates around the operating point, autotune can be performed.
With autotune, new PID values are determined for the specific operating point.

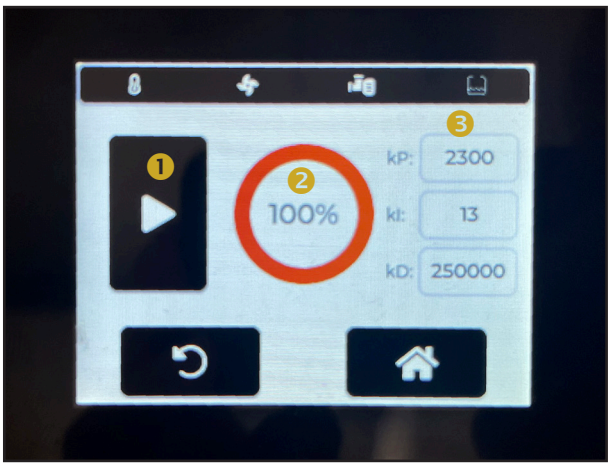


Fig. 19: Autotune menu explained

Before autotune can be started, the fan mode must be set to "Normal".

Clicking the start button (❶) starts the autotuning, the progress bar (❷) resets to 0% and starts rotating. With each autotuning iteration the bar and the display grow by 10%. Until the end of the current PID values (❸) are displayed. After successful completion of the autotuning, the old PID-Vaules are overwritten.

By clicking on the PID values they can be edited manually.

The following PID values are set by default:

Type	Standard value
kP	2300
kI	13
kD	250000

5.9 General settings

5.9.1 Display current firmware version

In the general settings, the current firmware version and the associated build are displayed. This data is important for servicing or for checking the availability of a software update.

5.9.2 Set time and change of time zone

The time is preset. If the setting is lost, the device can simply be connected to a network - the system time will be adopted as the time.

The time zone can be changed in general settings. The following selection is available:

Time zone
America/ New_York
Asia_/ Hong_Kong
Europe/ Berlin

5.9.3 Readout of operating hours

The operating hours can be read out in the general settings. In addition to the operating time, the control mode time can also be read out.

5.10 RS 232 Communication

5.10.1 General

The RS 232 interface can only be operated without hardware handshake.
Terminate each command with CRLF (Carriage Return Linefeed Hex: 0D0A).
The feedback from the heating/ cooling thermostat is always terminated with CRLF.
Interface parameters RS 232: 9600 baud, no parity, 8 bit, 1 stop bit.
Data format: XX.X or -XX.X

5.10.2 Interface assignment

The RS 232 interface is assigned as follows:

PIN	RS232
2	Tx
3	Rx
7	RTS
8	CTS

5.10.3 Writing commands

Command	Feedback from Cooler	Meaning
OUT_SP_00 XX.X	OK	Temperature set point liquid
OUT_SP_04 XX.X	OK	Flow temperature: Limitation of the upper value
OUT_SP_05 XX.X	OK	Flow temperature: Limitation of the lower value
START	OK	Switch on device from standby
STOP	OK	Switch device to standby (Pump and Peltier cooler off)

5.10.4 Reading commands

Command	Feedback from Cooler	Meaning
IN_PV_00	XX.X	Query of flow temperature
IN_SP_00	XX.X	Query of temperature set point
IN_SP_04	XX.X	Query of upper flow temperature limit
IN_SP_05	XX.X	Query of lower flow temperature limit
TYPE	3	Hei-Chill Peltier
VERSION	X.X.X	Query of software version number

6 Maintenance

6.1 General safety instructions

DANGER CONTACT WITH LIVE OR ACTIVE PARTS

Electric shock, retraction, cutting, crushing, impact

- Switch off the device and disconnect the power plug before carrying out any maintenance work.
- Repairs may only be carried out by qualified personnel.

WARNING INGRESS OF LIQUIDS DURING CLEANING

Electric shock

- Use only a slightly damp cloth for cleaning.

WARNING CONTACT WITH HOT OR COLD LIQUIDS

Scalding or frostbite

- Bring the tempering fluid to room temperature before draining.

CAUTION HOT OR COLD SURFACES

Scalding, frostbite

- Potentially hot or cold surfaces are marked.
- Allow the system to cool to room temperature before maintenance.

Observe the following instructions:

- Prior to any maintenance or repair work, ensure that the device has been decontaminated if it has been in contact with any hazardous materials.
- Residual tempering fluids should be wiped up with a cloth if necessary and disposed of.

6.2 Maintenance intervals

6.2.1 Mandatory maintenance intervals

The following maintenance intervals described in the table are mandatory. The maintenance steps must also be carried out before any longer, unattended operation.

Interval	Maintenance
Monthly	• Visual inspection of the hoses, connection fittings and hose clamps for leaks and material fatigue. • Visual inspection of the air filter (if used).
Semi-annually	• Inspection of tempering fluid. • Replacement of air filter (if used). • Visual inspection of fans for damage. • Visual inspection of the tank for contamination. • Visual inspection of the casing for damage.

6.2.2 Recommended maintenance intervals

The following maintenance intervals ensure extended serviceability, accuracy and service life. If the work is carried out by a service center qualified by the manufacturer, a warranty extension can also be purchased as part of a maintenance contract.

Interval	Maintenance
Yearly	• Factory calibration of the flow temperature. • Checking the cooling capacity according to DIN 12876. • Checking the pumping capacity according to DIN 12876. • Evaluation and diagnosis of the event log. • Electrotechnical check according to DGUV V3.

6.3 Visual inspections

6.3.1 Visual inspection of the hoses, connection fittings and hose clamps

Check whether liquid residues on the hoses, fittings and hose clamps indicate leaks.

Check that the hoses are firmly seated on the fittings and firmly secured by the hose clamps.

Check the hoses for porous spots.

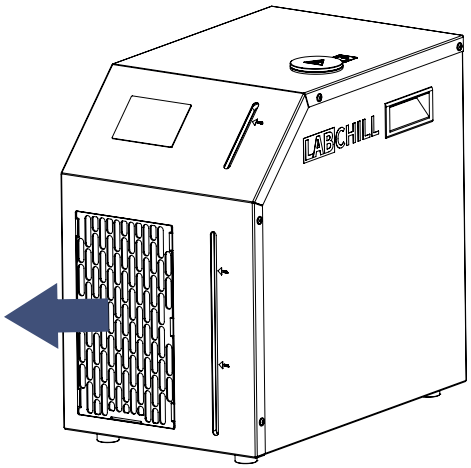
Make sure the hoses are not installed in a too tight radius. When not in motion, the radius should not fall below five times the diameter of the hose. When in motion, the hose should be guided on a drag chain and the radius should not be less than ten times the hose diameter.

6.3.2 Visual inspection of the air filter and fans

CAUTION ROTATING PARTS

Danger of drawing in

- Switch off the device and disconnect the power plug before starting maintenance work.



1. Switch off and unplug the device.
2. Pull off the magnetic filter frame by prying it open.
3. Check the rotor of the fan for damage. If damaged, put the device out of operation and contact customer service.
4. Check the air filter for damage and contamination. If necessary, replace the air filter or clean it if it is slightly dirty as described in the corresponding chapter.
5. Insert the filter and close the device.

Fig. 20: Detail of filter frame removal

6.3.3 Visual inspection of the tank for contamination

1. Pull off the tank lid upwards.
2. With the aid of a lamp, check the tank contents for contamination.
3. If there is any contamination, the tempering fluid must be drained and the contamination removed by flushing several times if necessary.

6.3.4 Visual inspection of the casing for damage

1. Check all sides of the casing for damage.
2. Check the inscriptions and the label for damage.
3. If damaged, contact the manufacturer or qualified service partner for replacement parts.
4. Contaminants should be removed as described in the corresponding chapter on cleaning.

6.4 Further maintenance work

6.4.1 Check tempering fluid

The tempering fluids must be checked according to the maintenance schedule as per DIN 51529. Further use of the tempering fluid is only permissible with corresponding test results.

Contaminated tempering fluids must be replaced. In addition, the chapter 4.1 "Approved tempering liquids" must be observed.

6.4.2 Cleaning the device

WARNING INGRESS OF LIQUIDS DURING CLEANING

Electric shock

- Only use a slightly damp cloth for cleaning.

The device can be cleaned with water and detergent.

Furthermore, Isopropanol 70% is permissible for cleaning.

When cleaning with Isopropanol 70%, do not apply any pressure. High pressure can damage the surface. The safety guidelines for handling Isopropanol must be observed.

Ensure decontamination if the device has come into contact with dangerous materials.

Do not use any decontamination or cleaning agents that may cause a hazard if they come into contact with other substances or parts of the device.

If there is any doubt regarding compatibility, contact the manufacturer or a certified service partner.

7 Malfunctions and messages

7.1 General malfunctions

Malfunction	Possible origin	Measure
Device does not switch on -> Screen without image and illumination, tank without illumination	Power plug not plugged in.	Check the mains plug.
	Device fuse defective.	Check the device fuse.
Screen malfunction -> Tank is illuminated, backlight screen may be on	Device has not started up properly.	Switch off the device, wait 10 seconds and switch on the device again.
Leakage at device connection fitting	Valve defective.	Replace device connection fitting (see spare parts list).

7.2 Message center

Message	Meaning/ possible origin	Measure
Info general: system booted	The device has been turned on and the system has booted properly.	None
Info peltier: temp control started	The control system has been started.	None
Info peltier: temp control stopped	The regulation has been stopped. -> By Stop button or Error -> If by Error, triggering reason precedes the message	None
Error peltier: current difference too high	Current monitoring, difference too high • Defect at controller • Defect at Peltier device	Switch off the device and restart it after 10 seconds. If the problem continues to occur, put the device out of operation and contact the manufacturer or a certified service partner.
Error peltier: current too high	Current monitoring, current too high • Defect at controller • Defect at Peltier device	
Warning peltier: power reduced	Device protection activated, power was reduced due to overtemperature at the controller.	Place the device in a cooler environment.

Message	Meaning/ possible origin	Measure
Warning heatsink 1(2, 3, 4) temperature: too high	Internal device monitoring Warning Heat exchangers too hot	Check the airways for continuity and clean them if necessary. Ensure that the minimum distances are maintained. If you use an air filter, replace it.
Error heatsink 1 (2, 3, 4) temperature: too high	Internal device monitoring Error including device shutdown Heat exchanger temperature has exceeded maximum value	
Warning heatsink 1 (2, 3, 4) temperature: too low	Internal device monitoring Warning Heat exchangers too cold	
Error heatsink 1 (2, 3, 4) temperature: too low	Internal device monitoring Error including device shutdown Heat exchanger temperature has fallen below the minimum value	
Warning board temperature: too high	Internal device monitoring Warning Controller board temperature is too hot	Check the rear air outlet. Ensure that the minimum distances are maintained.
Error board temperature: too high	Internal device monitoring Error including shutdown Controller board temperature has exceeded maximum value	
Info fan 1 (2, board): started	Fan has been turned on	None
Info fan 1 (2, board): stopped	Fan has been turned off	None
Error fan 1 (2): no tachometer pulses	Internal device monitoring Error including device shutdown Fan is not reporting speed	Check if the fan is rotating. Check the air intake paths. If there is a foreign object in the fan, switch off the device and disconnect the power plug. Then remove the foreign object.
Error fan 1 (2): target rpm not reached	Internal device monitoring Error including device shutdown Target speed not reached	Check the airways for continuity and clean them if necessary. Ensure that the minimum distances are maintained. If you use an air filter, replace it.
Warning board fan: max pwm set	Internal device monitoring Warning Maximum speed of internal fan reached	Check the rear air outlet. Ensure that the minimum distances are maintained.
Error level: too low	Error with shutdown Level in the tank below minimum level	Fill the tank with tempering fluid.

Message	Meaning/ possible origin	Measure
Warning level: not optimal	Warning Level in the tank below the optimum level	Fill the tank with tempering fluid.
Error flow switch: no flow	Error with shutdown A lack of circulation in the temperature control fluid circuit was detected	Check the hosing

7.2.1 Adjustable messages

Message	Meaning/ possible origin	Measure
Warning internal (external) temperature: too high	Warning The set temperature has been exceeded	None
Error internal (external) temperature: too high	Error with shutdown The set temperature has been exceeded	None
Warning internal (external) temperature: too low	Warning The set temperature has been undercut	None
Error internal (external) temperature: too low	Error with shutdown The set temperature has been undercut	None

8 Spare parts and accessories

8.1 Spare parts & services

Description	Order number
Hose nozzle 9,5mm CPC PLC-series quick coupling (male) with valve	005169
Hose clamp 10-16 mm, width 9mm, stainless steel	005298
Mains cable 2.0 m Schuko plug angled, cold appliance connection straight	005328
Evacuation hose with fitting CPC PLC series	005276
Screw-in fitting for connections (IN/ OUT) 3/8" CPC PLC series quick coupling (female) with valve	004998
Screw-in fitting for connection (Empty) 3/8" CPC PLC series quick coupling (male) with valve	005171
Fan cover powder coated RAL9016	004969
Tank cover black anodized	004974

8.2 Liquids

Description	Order number
Destitherm 90	005396
Glycotherm 5	005362
Glycotherm 20	005235
Glycotherm 30	005263

8.3 Accessories

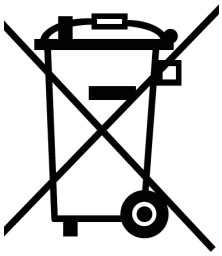
Description	Order number
Pleated filter with PES fleece frame, 236x128x18 mm, filter class G4	005230
Evacuation set (1m hose with fitting, 10l empty canister)	005232
2x connection hose Side 1: hose nozzle CPC Side 2: open Length: 2m	005233
2x connection hose insulated 2m Side 1: hose nozzle CPC Side 2: open Length: 2m	005234

9 Disassembly

Proceed as follows for disassembly:

1. Switch off the device and disconnect the power plug.
2. Pull off the hoses on the rear side.
3. Empty the device according to 4.4.2 "Emptying the system".
4. Pick up any drips with a wipe and dispose of it.

10 Disposal



When disposing of the device, observe the provisions of the WEEE Directive 2012/19/EU and its implementation in national law in the country of use.

When disposing of device batteries, observe the regulations according to the European Battery Directive 2013/56/EU and its implementation in national law in the country of use.

Check the device and all components for residues of substances hazardous to health, the environment, and biohazardous substances before disposal.

Remove and dispose of residues of substances hazardous to health, the environment, and biohazardous substances before disposal.

11 Storage

Store the product under the following conditions

Temperature range: - 20 °C to + 70 °C (non-condensing)

12 Technical data

If applicable, the technical data were determined in accordance with DIN 12876.

Specification	Unit	LABChill-600
Working temperature range	°C	-20 ... +70
Temperature constancy	K	± 0.05
Ambient temperature range	°C	+5 ... 45
Storage temperature range	°C	-30 ... +70 (not condensing)
Mains connection	---	100 - 240 VAC; 50/60 Hz
Maximum power consumption	kW	0.75
Heating power at ambient temperature 20 °C T_{Water} = 20 °C	W	1000
Cooling capacity at ambient temperature 20 °C T_{Water} = 20 °C T_{Water} = 15 °C	 W W	 600 400
Pump type		Centrifugal pump
Maximum pressure	bar	1.1
Maximum flow rate	L/min	22
Tank capacity	L	5.5
Hose connections	---	Hose nozzle CPC
Display	---	TFT Capacitive Touch
Size	Zoll	2.83
Setting resolution	°C	0.1
Display resolution	°C	0.1
Data input	---	Capacitive Touch
Electronic interface	---	RS232, Ethernet
Classification according to DIN 12876-1 for laboratory instruments - Class name - Labelling	 --- ---	 I NFL (non-flammable liquids)
Protection class (IP code) according to IEC 60529	---	IP 21
Protection class according to DIN EN 61140	---	I
Fuse	---	2 pieces 5x20 F 250V 10A
Dimensions device	mm^3	425 x 265 x 430
Weight	kg	21
Noise level (1m) 100% power consumption 60% power consumption	 dB(A) dB(A)	 < 63[1] < 56[2]

1 Measured at 100% power consumption in normal mode
2 Measured at 60% power consumption in normal mode

13 Appendix

13.1 General

The manufacturer reserves the right to make technical changes to the device.

Please contact DR. NEUMANN Peltier-Technik GmbH or one of the certified service partners in the following cases:

- Troubleshooting
- Technical questions
- Ordering accessories, spare parts and maintenance contracts

We are also available at any time for application-related questions.

13.2 Warranty declaration

DR. NEUMANN provides a one-year warranty against defects in material and manufacturing. The warranty can be extended up to 5 years with a maintenance contract.

Wear parts, transport damage, and damage resulting from improper handling or use of the product other than for its intended purpose are excluded from the warranty claim.

The warranty period for registered products starts from the date of purchase. Register your product with the enclosed warranty card or on our homepage www.DNPT.de.

The warranty period for non-registered products begins with the shipment from our shipping warehouse, identifiable by the serial number.

In the event of material or manufacturing defects, a free repair or complete product replacement will be made within the warranty period.

13.3 Return of goods

If you wish to return a product, you will need a processing number for the repair or claim. For this purpose, please contact DR. NEUMANN Peltier-Technik GmbH and request a part number.

You can reach us at +49 (0) 89 724 8150-0 or by mail info@dnpt.de.

For the return shipment, please fill out the clearance certificate in the attachment and enclose it with the product.

The return address is:

DR. NEUMANN Peltier-Technik GmbH

Gautinger Straße 45

82061 Neuried

Deutschland

Please complete the clearance certificate in full and enclose it with your device return. We cannot process any returns that do not include a clearance certificate!

Please fill in all required fields.

Notice:
The sender must pack the goods properly and appropriately for the transport.

DR. NEUMANN Peltier-Technik GmbH
Gautinger Straße 45
82061 Neuried, Germany

Phone: +49 (0) 89 7248150-0
Fax: +49 (0) 89 7248150-29
Mail: info@DNPT.de

Sender

Surname: Given name:

Company: Department:

Work group:

Street:

ZIP code/ City:

Country:

Phone:

Mail:

Device details

Serialnumber:

RMA number:

Return reason:

Has the device been cleaned and, if necessary, decontaminated/ disinfected? yes no

If yes, what measures have been implemented?

Does the device pose any risks to humans and/or the environment due to the processing of substances hazardous to health, the environment and/or biohazardous substances? yes no

If yes, with which substances did the device come into contact?

LEGALLY BINDING DECLARATION

The Client is aware that he is liable to the Contractor for damages caused by false information.

Date Signature Company stamp

13.5 Declaration of conformity

The CE marking and declaration(s) of conformity of the product are made in accordance with the following directives:

- Directive 2006/42/EG on machinery
- Directive 2011/65/EU on the restriction of hazardous substances in electrical and electronic equipment (RoHS),
  including the Delegated Directive 2015/863/EU of 31 March amending Annex II to Directive 2011/65/EU.
- Directive 2014/30/EU on electromagnetic compatibility (EMC)
- Regulation 1907/2006 on the restriction of chemicals in products
- Directive 2012/19/EU on the disposal of waste electrical and electronic equipment

The authorized representative of Dr. Neumann Peltier-Technik GmbH

Neuried, August 2020

The original EU Declaration of Conformity can be viewed at the manufacturer's premises.

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