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HEI-CHILL 35

OPERATOR'S MANUAL

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Content

1 General

1.1 Introduction

This Operation manual is an important help for successful and safe operation of the COOL STATION.

The Operation manual contains important information to operate the COOL STATION in a safe, proper and economic way.

Observing the manual contributes to prevent repair costs and downtime, and to increase the reliability and service life of the COOL STATION.

The Operation manual must always be available at the COOL STATION , and read and observed by every person entrusted with work with/on the COOL STATION, for example:

- Operation, troubleshooting in the work sequence,
- Maintenance (service, upkeep, repairs) and/or
- Transport

1.2 Information about property rights and copyrights

Keep this Operation manual confidential. It must only be made available to authorized persons.

Transferring to third parties is only allowed with express written consent by ***Huber Inc.***

All documents are protected by copyright law.

Transferring or copying of documents, even in extracts, and the exploitation of the content are forbidden, unless permitted in writing.

Contraventions shall be punishable and obligate compensation for damages.

We reserve the right to exercise industrial property rights.

1.3 Information for the operator

The Operation manual is an integral part of the COOL STATION. The operator has to take care that the operating personnel takes notice of these guidelines.

As the Operation manual will surely be subject to intensive use where the COOL STATION is used, the operator must:

- Keep the original at a safe place,
- Make sure that a copy of the Operation manual is permanently available at the COOL STATION,
- and that every user reads the Operation manual carefully, observes, and follows the instructions.

The operator must complete the Operation manual with instructions due to existing national regulations for the prevention of accidents, including information about supervisory and reporting duties to consider occupational particularities, for example with regard to work organization and assigned personnel.

In addition to the Operation manual and the binding valid regulations for the prevention of accidents in the country and at the location of use, observe the accepted technical rules for safe and professional work.

Without approval of ***Huber Inc. or the manufacturer***, the operator/user must not make any modifications, attachments or rebuilds on the COOL STATION, which might affect safety.

This is particularly valid for the installation and the adjustment of safety devices.

Spare parts to be used must meet the requirements of the technical regulations stipulated by **Fehler! Verweisquelle konnte nicht gefunden werden.**.

This is always the case with original spare parts.

Only assign trained and instructed personnel. Clearly determine the personnel responsibilities for operation, maintenance and repair.

Maintenance jobs on the COOL STATION must only be performed by specifically trained personnel from ***Huber Inc. or the manufacturer***.

Huber Inc. and the manufacturer reserves the right to make technical product changes during repairs, which are necessary for trouble-free functioning in the sense of a product improvement.

1.4 Cooling unit log sheet/ unit records

If coolant of more than 3,5 kg R134a or 3,9 kg R449A is used, the owner or operator must keep unit records (log sheets) of the COOL STATION up to date.

The unit records (log sheets) must be kept by the owner/operator and provided near the unit, or the information must be stored in a computer, with a printout at the unit.

In this case, information must be made available to the expert for maintenance and inspections.

The log file contains:

- Details about maintenance and repair jobs
- Amount and type of coolant to be filled
- Amount and type of coolant to be drained
- Modifications on and exchange of components
- Results of all regular routine checks
- Prolonged shutdowns
- Results of the annual leakage test

1.5 Service and warranty

We do our best to reply to your questions and orders as soon as possible.

We ask you the transmit to us the identification data of your COOL STATION before every inquiry. They can be found on the cover sheet of this Operation manual.

Warranty of *Fehler! Verweisquelle konnte nicht gefunden werden.* for the COOL STATION during the guarantee period shall be limited to damage that can clearly be traced back to design, material or production faults.

Excluded are all components subject to functional wear.

The warranty period starts at the manufacturer's delivery date.

Full warranty is only assumed if:

- The COOL STATION is only used as intended
- Maintenance and service instructions are strictly observed.

In the event of a claim, warranty is limited to rectification, cost-free repair, or supply of a new unit, according to our choice.

Defective parts are repaired or replaced free of charge if a material or production fault is clearly the origin for a malfunction or fault.

Other compensation claims are excluded.

The spare parts prices of ***Huber Inc.*** shall be valid.

In addition, we refer to the warranty regulations as well as the general Conditions of Sale by **Fehler! Verweisquelle konnte nicht gefunden werden.**.

If you have questions, get in touch with ***Huber Inc.*** The address is on the title page.

2 Safety

2.1 General

The COOL STATION is built according to the state of technology and the recognized safety-related rules and regulations. Nevertheless, its use may pose risks to the operator or third parties, and/or defects on the COOL STATION, or other values might be the consequence if it:

- Is not operated by skilled personnel
- Is not used as intended
- Is improperly serviced or maintained.

2.2 Proper use

The COOL STATION by ***Huber Inc.*** serves exclusively for cooling of externally connected devices and machines requiring a constant supply temperature.

The cooling fluid between COOL STATION and the device to be cooled is “HKF10.1” or purified water with sodium hydrogen carbonate (see also 2.2.1).

Deionized or purified water may only be used in pure form as coolant if all components in the cooling circuit consist of stainless steel or synthetic material.

Cooling fluid HKF15 must be used for units which are designed for outdoor installation and whose ambient temperature might reach -15°C when the unit is not in service. Supply temperatures below 10°C also require antifreeze additive with HKF15.

If ambient temperatures or supply temperatures of below -15°C are expected, contact ***Huber Inc.*** for information about the coolant to be used. (For special releases see the technical data.)

Connect the COOL STATION only to liquid-cooled devices meeting the COOL STATION parameters.

The thermal load of the unit to be cooled must not exceed the indicated cooling capacity of the cooler.

The flow resistance of the unit to be cooled must at least be 15% below the indicated maximum pump pressure.

Only connect devices to be cooled which are approved for the maximum admissible water pump delivery pressure.

Any other applications, or applications beyond this, are no usage as intended, for example if used as a cooling device for food.

The COOL STATION operator alone shall be made liable for damage resulting from usage not according to the intended purpose.

This shall also be valid for unauthorized modifications on the COOL STATION.

Components/spare parts that are not perfect must be replaced immediately.

Only use original spare parts.

In some circumstances, proper functioning may not be guaranteed with foreign spare parts.

Usage as intended also implies the observance of the instructions regarding:

- Safety
- Operation
- Maintenance and
- Service

which are described in this operation manual.

Caution! If the coolant circuit is defective, there is a risk that oil can penetrate from the refrigeration circuit (compressor) of the recirculating chiller into the cooling liquid.

Observe all legal rules and regulations and those from the water supply companies, which are valid at the place of operation.

2.2.1 General information about secondary coolant

All COOL STATION models equipped with delivery pumps must only be operated with “HKF 10.1” coolant. This applies to temperature ranges in the secondary water inlet ≥ +10°C.

Coolant can be purchased from ***Huber Inc.or manufacturer***. Ask the manufacturer if secondary inlet temperatures are deeper.

As an alternative to “HKF10.1”, a mixture of purified water and sodium hydrogen carbonate can be used. Add 1.68 gram $NaHCO_3$ per liter of purified water.

Caution! Strictly observe the mixing ratio, as a pH value of approximately 8.0 should result from this ratio of amounts. Check this desired pH value, and again every six months.

With neutral pH-value and lime-free and/or residual-free water, nothing can deposit on the mechanical seal of a delivery pump, which avoids leaks over a longer period.

Caution! This does not apply to solenoid-coupled pumps.

All COOL STATION models equipped with deionizers must only be operated with deionized water. This applies to temperature ranges in the secondary water inlet ≥ +10°C. All water-guiding components in the secondary cooling circuit of the COOL STATION are of synthetic material or stainless steel.

The same is valid for the COOL STATION operation with purified water.

With neutral pH-value and lime-free and/or residual-free water, no deposits can form on the mechanical seal of a delivery pump, which avoids leaks over a longer period.

If normal drinking water or a mixture with, for example, deionized water is used, any warranty for a leaking pump shall be void if sediments can be found on the mechanical seal, which can be traced back to the usage of such fluids.

This is not valid for pumps without seals (solenoid-coupled pumps).

A defective mechanical seal must therefore always be returned to the manufacturer to make appropriate investigations.

In addition, ensure cleanliness of every fluid.

The anti-algae agent “Thermoclean” may be used as a water additive.

Take the metering information from the data sheet and strictly observe the indicated values.

(Thermoclean can be purchased from ***Van der Heijden Labortechnik GmbH***.)

Avoid incidence of light on all water-guiding parts as this favors algae growth in the fluid.

If algae are in water, pumps with a mechanical seal will become leaky.

The mechanical seal of the delivery pump is a *wear part*. For this reason, strictly avoid sediments from hard water, wrong additives, growth of algae and bacteria, etc.

Information: Sediments will inevitably lead to leaks and malfunctions of the delivery pump.

Leaks on the pump can also be caused by a startup which has not been performed according to the regulations.

Startup must strictly be performed according to the instructions; otherwise, the delivery pump might run dry for a short time.

Grooves on the mechanical seal are the consequence of dry running. The result is a leaking pump.

Using the following coolants (also in the form of a mixture with water) is not as intended:

- Solvents of any kind
- Combustible fluids
- Explosive fluids or
- Etching fluids

2.2.2 General information about primary coolant

(Valid for all water-cooled devices)

For any kind of water-cooled COOL STATION models connected to a drinking water network, facility cooling system or similar, see the data sheets of this operation manual for the composition of the required cooling water.

Although high-quality V4A heat exchangers have been used, plate material or soldered connecting points may be impacted if the instructions are ignored.

It is essential to install a primary-side water filter ahead of the water inlet. Filter mesh size should at least be 90 µm. Rust particles from steel pipes can also destroy V4A plates due to corrosive behavior.

Warranty shall not be assumed in such cases. The origin of pitting corrosion or similar produces high costs. Above all, this applies to COOL STATION models with active cooling devices.

Contamination/ Fouling

Make sure that the DIN directives for drinking and heating water, the VdTÜV directives of ADFW, and the Swep directives for water substances are kept. (See table.)

Various factors can influence fouling and contamination. These are, for example;

Flow velocity, temperature, turbulence, distribution, water quality.

Fluids must circulate with highest-possible mass flow. If mass flow (partial load) is too low, turbulence in the heat exchanger can reduce and thus, contamination tendency can increase.

Calcium may deposit in the heat exchanger at temperatures above +60°C, depending on the water quality. Turbulent flow and lower temperatures reduce the risk of calcification.

When switching off the COOL STATION, make sure that the secondary side is switched off first, and the primary side afterwards.

When switching on, switch on the primary side first, and the secondary side afterwards. In this way, overheating of the heat exchanger is avoided.

Cleaning

If the formation of deposits is to be expected (for example, due to high water hardness or severe contamination), clean the unit at regular intervals. Flushing is a cleaning possibility.

Flush the heat exchanger against the normal flow direction, using appropriate cleaning solution. If

chemicals are used for cleaning, make sure that they are compatible with stainless steel, copper or nickel.

Non-observance can destroy the heat exchanger.

Corrosion resistance of soldered plate-type heat exchanges against water substances.

The soldered plate-type heat exchanger consists of embossed stainless-steel plates. Therefore, consider the corrosive behavior of stainless steel and the soldering material copper or nickel.

Influence of water quality on corrosion resistance

The following guide is intended to provide an overview of the corrosion resistance of stainless steels and brazing materials in tap water at room temperature. Several important components are listed in the table, but the actual corrusion is a very complex process, influenced by many different components in combination. This table therefore represents a considerable simplification

Explanations:

+ Good resistance under normal conditions
0 Corrusion may occur, especially if other factors are rated 0.
- Usage not recommended

			plate material			solder material		
WATER CONTENT	**CONCENTRATION (mg/l or ppm)**	**TIME LIMITS Analysis before**	**AISI 304**	**AISI 316**	**254 SMO**	**COPPER**	**NICKEL**	**RUST-FREE**
alkalinity (HCO_3^-)	< 70	Within 24 hours	+	+	+	0	+	+
	70-300		+	+	+	+	+	+
	>300		+	+	+	0/+	+	+
sulphate[1] (SO_4^{2-})	<70	no limit	+	+	+	+	+	+
	70-300		+	+	+	0/+	+	+
	>300		+	+	+	-	+	+
HCO_3^- / SO_4^{2-}	>1.0	no limit	+	+	+	+	+	+
	<1.0		+	+	+	0/-	+	+
Electrical conductivity	<10 µS/cm	no limit	+	+	+	0	+	+
	10-500 µS/cm		+	+	+	+	+	+
	>500 µS/cm		+	+	+	0	+	+
pH[2]	<6.0	Within 24 hours	0	0	0	0	+	+
	6.0-7.5		+	+	+	0	+	+
	7.5-9.0		+	+	+	+	+	+
	>9.0		+	+	+	0	+	+
ammonium (NH_4^+)	<2	Within 24 hours	+	+	+	+	+	+
	2.0-20		+	+	+	0	+	+
	>20		+	+	+	-	+	+
chlorides (Cl^-) Siehe auch nachstehende Tabelle	<100	no limit	+	+	+	+	+	+
	100-200		0	+	+	+	+	+
	200-300		-	+	+	+	+	+
	>300		-	-	+	0/+	+	+
Free chlorine (Cl_2)	<1	Within 5 hours	+	+	+	+	+	+
	1.0-5		-	-	0	0	+	+
	>5		-	-	-	0/-	+	+
hydrogen sulphide (H_2S)	<0.05	no limit		+	+	+	+	+
	>0.05			+	+	0/-	+	+
Free (aggressive) carbon dioxide (CO_2)	<5	no limit	+	+	+	+	+	+
	5.0-20		+	+	+	0	+	+
	>20		+	+	+	-	+	+
total hardness (°dH)	4.0-8.5	no limit	+	+	+	+	+	+
nitrate[1](NO_3^-)	<100	no limit	+	+	+	+	+	+
	>100		+	+	+	0	+	+
iron[3](Fe)	<0.2	no limit	+	+	+	+	+	+
	>0.2		+	+	+	0	+	+
Aluminium (Al)	<0.2	no limit	+	+	+	+	+	+
	>0.2		+	+	+	0	+	+
manganese[3](Mn)	<0.1	no limit	+	+	+	+	+	+
	>0.1		+	+	+	0	+	+

[1] Sulphates and nitrates act as inhibitors of pitting corrosion caused by chlorides in pH-neutral environments

[2] In general, a low pH value (below 6) increases the risk of corrusion and a high pH value (above 7.5) reduces the risk of corrusion.

[3] Fe^{3+} and Mn^{4+} are strong oxidizing agents and can increase the risk of local corrusion in stainless steels.

SiO_2 above 150 ppm increase the risk of calcification

The information in this document is subject to change without notice.

Influence of water quality on corrosion resistance

chloride content	**maximum temperature** 60°C	80°C	120°C	130°C
= 10 ppm	SS304	SS 304	SS 304	SS 316
= 25 ppm	SS304	SS 304	SS 316	SS 316
= 50 ppm	SS304	SS 316	SS 316	Ti / 254 SMO
= 80 ppm	SS 316	SS 316	SS 316	Ti / 254 SMO
= 150 ppm	SS 316	SS 316	Ti / 254 SMO	Ti / 254 SMO
= 300 ppm	SS 316	Ti / 254 SMO	Ti / 254 SMO	Ti / 254 SMO
> 300 ppm	Ti / 254 SMO	Ti / 254 SMO	Ti / 254 SMO	Ti / 254 SMO

2.3 Safety instructions for external cooling water supply

Depending on the design, either a water-cooled or a water-water version, the COOL STATION is supplied with coolant from the facility water unit or municipal water via the primary circuit. The same applies to the options “emergency cooling” and “automatic refill”. Both options must be connected to an external water circuit to fulfill their function.

As the external water supply systems are not self-locking, a leakage can cause an uncontrolled water outlet.

Therefore, the corresponding area of the COOL STATION, the connecting hoses, and the unit to be cooled must be monitored by moisture sensors. An additional bottom drain is recommended.

To avoid major damage in the event of a leakage, make sure that all water supplies and the COOL STATION are switched off immediately and are secured against restarting.

2.4 Information about signs and symbols

In this Operation manual, the following designations and/or signs are used for safety instructions and particularly important information:

Danger!

Informs about imminent danger resulting in most serious injuries or death of a person if the relevant instruction is not strictly observed.

Warning!

Informs about a possibly hazardous situation which can result in most serious injuries or death of a person if the relevant instruction is not strictly observed.

Caution!

Informs about a possibly hazardous situation or unsafe hazardous procedures which can result in injuries of persons or material damage to the COOL STATION or its surroundings.

All these WARNINGS must be strictly observed!

This informs about particular facts, and the observance of which ensures safe, professional and efficient handling of the COOL STATION. All instructions must be observed in order to ensure an intended usage of the COOL STATION . Forward all references to other users.

Information!

This informs about particular facts, and the observance of which ensures safe, professional and efficient handling of the COOL STATION. All instructions must be observed in order to ensure an intended usage of the COOL STATION . Forward all references to other users.

- The bullet points indicates process and/or operating steps. Carry out all steps from the top downwards.

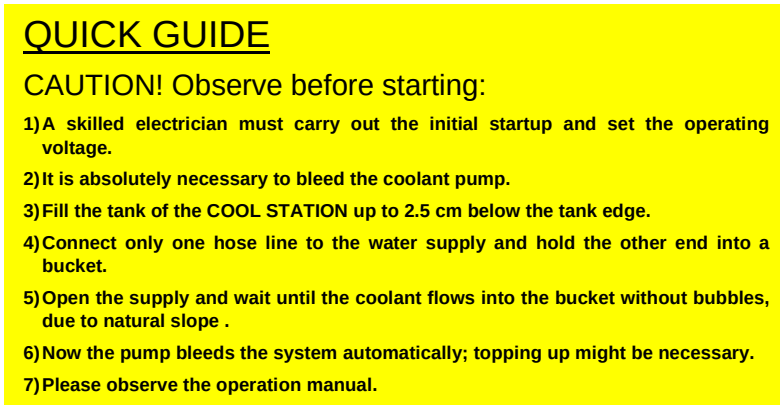
– A hyphen indicates listings.

Strictly observe information and symbols directly on the COOL STATION such as warning plates, warning labels, quick guides, component designations, etc.

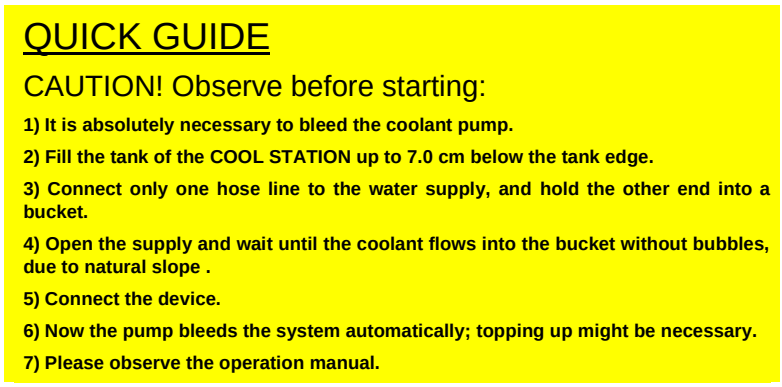
Such information and symbols attached directly to the COOL STATION must not be removed, and they must be kept fully legible.

2.5 Information signs COOL STATION

The following information signs are attached to the COOL STATION :

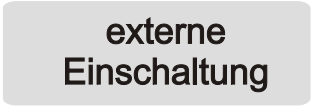


This label **up to size 08** is attached inside the folding cover next to the COOL STATION type plate.



This label **from size 1** is attached to the rear of the housing next to the COOL STATION type plate.

The label “Caution! Electric voltage” is attached on the rear of the COOL STATION .



These labels with different texts for the designation of the individual components are attached to all fittings, connections and cables on the rear of the COOL STATION .

The CE mark is labeled on the type plate of the COOL STATION .

Type plate

The type plate is attached below the folding cover or on the rear of the COOL STATION .

2.6 Safety instructions for the operating personnel

The COOL STATION must only be used if in technically perfect condition and as intended, with safety consciousness and risk awareness, and in accordance with this Operation manual.

Malfunctions, and particularly such malfunctions affecting safety, must be repaired immediately.

Every person assigned with setup, startup maintenance or troubleshooting of the COOL STATION must have read and understood this Operation manual completely, particularly the *Safety* chapter, *before starting work*.

During the work assignment is too late.

This applies particularly to personnel who work only temporarily on the COOL STATION .

The Operation manual must always be available near the COOL STATION . We do not assume any liability for damage or accidents resulting from non-observance of the Operation manual.

Observe the relevant accident prevention rules and other generally accepted rules for safety and occupational health.

If malfunctions or safety-relevant variations of the operational behavior are noticed on the COOL STATION , turn off the device immediately and report the incident to the unit or person in charge.

Work on the COOL STATION must only be performed by reliable and instructed personnel.

Only assign trained and instructed personnel.

2.6.1 Personal protective equipment

The personal protective equipment must be provided for and used by every person in charge of maintenance, repair and recovery:

- For all coolants and independently of the function of the coolant:
  - ***Protective gloves, safety boots (S3) and eye protection***

2.7 Safety instructions for the operation of the COOL STATION

For all jobs concerning

- Operation,
- Adjustment of the COOL STATION and its safety devices and
- Maintenance,

starting and turning-off procedures according to this Operation manual, as well as the maintenance instructions must be observed.

The COOL STATION may only be operated if all protective and safety devices such as removable guards, housing interlocks, etc. are present and functional.

2.7.1 Visual inspection

At least every six months, the COOL STATION must be inspected for visual damage on the outside. Report changes (including the operational behavior) immediately to the shift supervisor or works manager in charge.

2.7.2 Coolant

Check the coolant quality in regular intervals (at least once per month) to avoid contamination.

Chemical or biological contamination must be removed immediately to prevent damage from the COOL STATION, and particularly from the pump.

2.7.3 Leakage test

Check the coolant circuit with appropriate filling level once per year and do the leakage test. (See also item 1.4 and 7.5.5)

The leakage test must be performed by an authorized service technician or expert, under observance of all safety regulations, and must be recorded in the log file.

2.7.4 Electric power connection

The power plug serves as a protective separation from the electric power network and must always be freely accessible.

Never start the unit if the power cable is damaged.

2.7.5 Power connection with voltage switch

Before the initial connection of the COOL STATION, a technician authorized for such installations must set the voltage switch.

In the factory, the COOL STATION has been set to an operating voltage of 230VAC (Switch position 0).

Later readjustment, for example by the operator, is forbidden. *Damage can be prevented from the COOL STATION only in this way.*

Paragraph 2.7.4 is also valid here.

2.8 Safety instructions for maintenance

The operating personnel of the device to be cooled must be informed prior to performing special and maintenance work.

Keep the prescribed deadlines and those stipulated in this Operation manual for regular checks and inspections.

For inspections, maintenance and repairs of the COOL STATION and the safety devices, strictly observe the information about maintenance jobs in chapter 7, *Maintenance*.

For carrying out maintenance jobs, personal protective equipment and a proper workshop for the job is absolutely required.

Switch off the COOL STATION for maintenance, repair and service jobs, and secure it against unexpected restarting by:

- Switching the COOL STATION into standby mode by operating the pushbutton  , and then
- Disconnecting the electric power cable of the COOL STATION from the electric power network (e.g. by taking the plug out of the socket).
- After switching off the COOL STATION , allow hot components to cool down.

Work on electrical equipment must only be performed by skilled electricians.

Always tighten screwed connections again after unscrewing during maintenance and service jobs.

If safety devices must be disassembled during service or maintenance jobs, reinstall and check the safety devices again *immediately* after completion of the service and maintenance jobs.

Before starting maintenance/repair/service jobs, the COOL STATION , and particularly its connections and fittings, must be cleaned from all residues and contamination, such as: Dust, operating fluids or cleaning agents.

Only use mild, water-based cleaners. Observe the manufacturer's declarations. Do not use organic solvents as there might be a risk of fire and explosion.

2.9 Information about particular types of danger

2.9.1 Electrical energy

On the power network side, only use original fuses with the prescribed amperage. Never work on live parts.

When carrying out repairs, make sure that design features are not modified so that safety is impaired.

In particular, creepage and air distances as well as distances must not be reduced by insulations.

The unit must only be connected to electric sockets with earth contact (PE).

Automatic disconnection of the power supply by a residual current device (RCD) is recommended to avoid hazardous situations from a contact voltage with poor ground potential at the socket.

In the event of malfunctions of the electrical power supply, immediately disconnect the COOL STATION from the power network by:

– Switching the COOL STATION into standby mode by operating the pushbutton  .

– Disconnecting the COOL STATION from the power network.

Huber Inc. and the manufacturer does not assume any liability for personal injury or damage resulting from non-observance of these recommendations.

2.9.2 Pumps

Information about rebuilds, repairs or modifications:

Keep the information at the pump legible, such as rotation arrow and designations of coolant connections. Do not remove the touch guards for hot and cold parts, and parts moving during operation.

If required, use protective equipment. Perform jobs on the pump only when it is stopped.

For all assembly and maintenance jobs, disconnect the motor from the power supply and secure it against restarting.

After completion of the work on the pump, install the safety guards properly again.

Other hazards:

Open, long hair can be drawn in at the motor guards.

Wear a hairnet when the COOL STATION is opened.

Injuries from ejected objects which are inserted into the openings of the motor fan hood.

Do not insert any objects!

Burns or scalds from hot surfaces of hot coolant.

Do not touch!

Wear protective equipment to accident prevention regulations.

Injuries from leaking coolant if seals are defective.

Switch off pump!

Have pump repaired.

Special hazards

Solenoid drive

The strong magnetic field in the area of solenoid couplings or single magnets can lead to the following hazards:

Risk of death for persons wearing a cardiac pacemaker.

Damage to magnetic data carriers (ID cards with magnetic strips, credit or bank cards, electrical, electronic, mechanical precision equipment, components or instruments such as mechanical or digital watches, pocket calculators, hard disk drives)

Uncontrolled pull of magnetic parts (for example tools, screws)

Information!

- Keep a safety distance of at least 15 mm between magnetically-sensitive objects and open magnets of magnetic couplings.
- Also keep a minimum distance of 150 mm between plug-in units that are not installed in the drive unit, between incomplete drive units and magnetically-sensitive objects or cardiac pacemakers.

Information!

Distance to completely assembled pumps:

If pumps are assembled completely, magnetic fields of the solenoid coupling are completely shielded by the surrounding components.

The solenoid couplings do not represent a danger when stopped or in operation.

Danger!

Observe the information at the pump.

Strong magnetic field in the area of the solenoid coupling, single magnets, plug-in units of pump heads.

Risk of death and material damage from magnetic fields!

Make sure that no person wearing a cardiac pacemaker performs jobs on the pump.

Secure the workplace; if required, put a barrier around it:

- Make sure that persons wearing cardiac pacemakers keep a distance of > 1 m.
- Make sure that no magnetizable metal parts can be attracted by the solenoid coupling.
- Make sure that no parts of the solenoid coupling can be attracted by magnetizable metal parts.

Keep a safety distance of >150 mm between solenoid coupling or pump head and magnetically-sensitive objects.

2.9.3 Coolant and other chemical substances

When handling chemical substances, observe and follow the corresponding manufacturer's regulations and safety data sheets regarding storage, handling, application and disposal.

It is forbidden to eat, drink, smoke and store food in rooms where chemicals are stored.

Never store dangerous substances in containers or jars which are intended for food. Always use containers which are approved for the individual substance, and clearly mark them.

For the coolant, observe the safety data sheet that comes along with the device or the safety data sheet in the Operation manual.

2.9.4 Hazards

If vaporizers or air coolers are installed in the close proximity of heat sources, take effective measures to avoid that these vaporizers or air coolers are subject to too an intense heat which leads to high pressures. Liquefiers and fluid collectors must not be arranged in the close proximity of heat sources.

Hazards from temperatures in cooling systems are basically coming from simultaneous formation of liquid and steam phases.

In addition, the condition of the coolant and the stresses on the different parts do not only depend on processes and functions within the unit but also from outside factors.

The following hazards are to be mentioned:

- *Hazards from a direct influence of extreme temperatures, for example:*
  - Material embrittlement at deep temperatures
  - Freezing of trapped fluid
  - Thermal stress
  - Volume change due to temperature changes
  - Injury to persons, caused by deep temperatures
  - Accessibility of hot surfaces

- *Hazards from excessive pressure, for example:*
  - Increase of liquefying pressure, caused by insufficient cooling
  - Increase of steam pressure from temperature increase from outside
  - Volume extension of liquid coolant from increase of outside temperature
  - Fire

- *Hazards from a direct influence of the liquid phase, for example:*
  - Excessive filling amount
  - Fluid in the intensifier
  - Water hammers in pipes
  - Lubrication failure due to thinning of oil

- *Hazards from evaporating coolant, for example:*
  - Explosion
  - Fire
  - Toxicity
  - Skin freezing
  - panic
  - Thinning of the ozone layer
  - Greenhouse effect

- *Hazards from moving parts in machines, for example:*
  - Injury
  - Hearing loss from excessive noise
  - Damage from vibrations
- Hazards that are valid for all units, for example:
  - Excessive temperatures
  - Wrong operation
  - Reduction of mechanical strength from corrosion
  - Reduction of mechanical strength from erosion
  - Reduction of mechanical strength from thermal load
  - Reduction of mechanical strength from vibrations

2.9.5 Noise

The A-rated, equivalent permanent sound pressure level at the operator's place on the COOL STATION is measured at a distance of 2 m without reflexion in normal operating mode.

Depending on the local conditions, a higher sound pressure level may prevail in the environment of the COOL STATION .

This increased sound pressure level can be caused by adjacent devices/machines and cause hearing impairment.

3 Product description

Information!

Some features described in this Operation manual are available only with particular COOL STATION models.

These optional features are marked in the appendix.

3.1 Explanation of terms

Secondary:

Water supply: Outlet of cold coolant from the COOL STATION and/or inlet into the device to be cooled.

Water return: Outlet of the warmed coolant out of the device to be cooled and/or inlet into the COOL STATION .

Primary:

Water inlet: Inlet of municipal water or coolant from the facility water system into the COOL STATION .

Water outlet: Outlet of the warmed coolant from the COOL STATION into a drain or the return line of the facility water system.

3.2 Overview

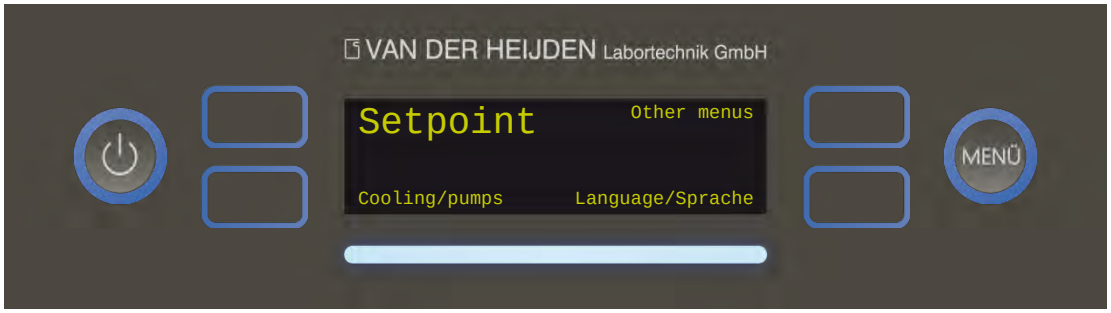


Figure: Operator panel

-Figure: Main switch at the front-side control cabinet door size 1 and higher

3.3 Functional notes

1. Before startup, connect the power cable to the device. Make a corresponding connection at the rear. Appropriate power cables are part of the device.

   ⚠ **When connecting the power cable, pay attention to the voltage type to prevent damage from the COOL STATION.**

   When connecting the supply voltage to the three-phase current network, observe the rotary field. The COOL STATION is wired for a *clockwise rotary field* and must be connected accordingly.

   Make the power supply for the COOL STATION such that it can be switched off independently from the power supply for other electrical devices, in particular lighting systems, ventilations systems, alarm units and other safety devices.

2. The coolant circuit of the unit is laid out as an “open” circuit. The delivery pump evacuates the coolant from the tank and delivers it to the device to be cooled via the water supply system.

   The warmed coolant is returned to the coolant tank through the return system where it cools down and starts a new cycle.

3. The high-pressure pressurestat protects the refrigerant circuit in compressor devices (type LG/WG) against excessive pressure. If it is no longer ensured that the overheated refrigerant can be sufficiently cooled down in the condenser, the negative pressure switch is activated to prevent serious damage.

   The fault is displayed in the display, and the status indicator brights red. An additional acoustic alarm sounds.

   Reasons can be for example: severe contamination of the condenser’s cooling lamella, or too high a coolant return temperature.

4. The low-pressure pressurestat protects the refrigerant circuit in compressor devices (type LG/WG) against negative pressure. If the refrigerant system becomes leaky, for example due to material fatigue, the low-pressure pressurestat switches the COOL STATION off before the system is emptied and air could penetrate.

   In addition, the low-pressure pressurestat is also a freeze protector for the plate-type heat exchanger (vaporizer).

   The fault message is shown on the display, the status indicator flashes red, and an acoustic alarm can be heard.

5. If faults occur in the refrigerant circuit, the delivery pump in the coolant circuit is also switched off.

   The corresponding fault is displayed in the display, and the status indicator brights red. An additional acoustic alarm sounds.

6. As soon as the coolant in the tank falls below a minimum level, *Lack of coolant* is indicated on the display, the status indicator flashes yellow, and an acoustic alarm sounds.

   In this state, the COOL STATION switches off.

   Before the COOL STATION can be operated again, the coolant level in the coolant tank must be topped up.

7. The actual coolant temperature in the cooling circuit is controlled by the electric control unit. On the membrane panel on the front side of the COOL STATION , actual and setpoint temperatures are displayed.

   The actual value is the coolant outlet temperature whose connection is designated “water supply” on the COOL STATION.

8. The coolant outlet temperature is permanently monitored and compared to the adjusted temperature setpoint. The temperature controller tries to compensate even the smallest deviation.

On compressor devices (type LG/WG), the correction variable is forwarded to a regulating proportional valve in the refrigeration circuit to compensate the disturbance variable.

The exact regular operation can be achieved by means of the tank heating. Permanent regulating of the heating system ensures a high temperature accuracy . As the regulation with a heating system requires a precise temperature (0.1 K/min), the cooling unit does not switch off but runs continuously.

On water-water units, the correction variable is forwarded directly to a regulating multi-port cooling water regulating valve on the primary side in order to compensate the disturbance variable.

9. On units without performance regulation, the coolant outlet temperature is permanently supervised and compared to the preset temperature setpoint. The regulating unit operates with a symmetric hysteresis. Thereby, cooling is switched off when the lower limit is reached, and it is switched on again at the upper limit.
10. As different thermal loads may occur, such load variations must be monitored and compensated permanently. This is necessary because highly constant temperatures are required.

    For major changes in thermal loads, the performance regulation requires a correction interval of approximately 10- 12 minutes. After that, the corresponding temperature stability of 0.1 K is reached again.

    Caution! If too low a thermal load is supplied, the stability of the supply temperature by the performance regulation is no longer ensured.

    The result is a supply temperature drop to the deactivation value of the cooling unit. However, the delivery pump continues to run.
11. The setpoint temperature is set by the factory. This temperature is sufficient for most applications.

    An adjustment of the setpoint temperature in the indicated range is possible in any case.

    If a deeper actual temperature is displayed in spite of a set coolant supply temperature, this is the consequence of a thermal load which is too low (the device to be cooled transmits not enough heat to the coolant).

    In this case it is not possible to compensate the full performance range. However, this phenomenon does not have an influence on the stability of the actual temperature in the water supply. To achieve a high temperature stability, make sure that the COOL STATION runs in continuous operation.

    The continuous operation is achieved by continuous performance adjustment. It was consciously done without a separate heating unit in order not to waste energy unnecessarily.
    The refrigeration capacity dissipated toward the outside is reduced in this way.
12. If the setpoint is fallen below excessively, the low-temperature protection (not the low-temperature alarm) switches off cooling. The circulating pump continues to run, and no alarm is displayed.

    As soon as the setpoint temperature in the refrigeration circuit is reached again, the refrigeration circuit is switched on again.
13. If the coolant supply temperature reaches the set temperature alarm, the unit is switched off completely.

    The corresponding fault message (excessive temperature alarm or low-temperature alarm) is indicated in the display. In addition, an acoustic alarm sounds, and the status indicator flashes red.

3.4 Accessories and options

3.4.1 Potential-free contact

The potential-free contact is closed during normal operation of the COOL STATION . In the event of a fault/failure of the COOL STATION , the potential-free contact opens.

In particular if the device to be cooled is strongly temperature-sensitive, it can be switched off immediately by the switching contact or the deactivation procedure can be started to avoid further damage.

The potential-free contact is connected to the COOL STATION with a pluggable two-pole contact.

The plug is part of the COOL STATION scope of supply.

The rated voltage for the potential-free contact is 250 V AC/DC. The rated current is 10 A AC/DC.

These are maximum values and must not be exceeded.

3.4.2 Remote control

On a COOL STATION with remote control, the operating panel is not installed on the unit but in a separate desk housing with a sufficiently long connecting cable to the COOL STATION .

On the remote control, the same functions can be controlled as directly on the COOL STATION .

A total cable length of up to 40 meters is feasible.

3.4.3 Operating hours meter

The operating hours meter indicates only the operating times without standby intervals.

The operating hours meter is programmed internally in the control system and can be called up on the front-side display.

3.4.4 Flow indicator

The flow indicator shows the actual water flow in the secondary cooling circuit.

The required flow rate is to be adjusted via the rear bypass valve.

As the flow indicator can be supplied in various designs, no picture is shown.

3.4.5 Flow meter

The flow meter measures the actual coolant flow in the secondary coolant circuit, and it is displayed on the front-side display.

The required flow rate is adjustable on the bypass valve.

The flow meter is installed internally in the unit, and settings must only be programmed by an expert.

Information The actually delivered amount of coolant can be read on the front-side display.

The display permanently shows the amount in liters/minute.

3.4.6 External activation module

With the external activation module, the COOL STATION can be switched on or off from any other location. When the external activation module is activated by the pluggable connection on the rear, the COOL STATION starts automatically.

The external connection supplies a voltage via a potential-free contact. When connecting, observe the switching voltage to prevent damage from the device.

The external activation module is connected to the COOL STATION by a two-pole plug and must be performed by a skilled expert.

The plug is part of the COOL STATION scope of supply.

After startup of the COOL STATION, the external activation must be connected. Only in this way, the COOL STATION can be switched on and operated via the front-side operator panel.

If the pluggable contact is closed when cooling is active, the operator panel is deactivated, and

"External activation active"

is shown on the display.

If the pluggable contact is closed before the pump and cooling are started, the operator panel is deactivated, and

"***External activation active - please disconnect***"

is displayed, and the status indicator flashes green.

3.4.7 Flow monitor

If the flow rate through the device to be cooled is insufficient, the flow monitor in the secondary water return switches the device off.

If the pump delivery rate is insufficient, the flow monitor in the secondary water supply switches the device off. It is to protect the pump.

The flow monitor in the secondary water return behind the internal plate-type heat exchanger switches the device off, if the flow rate through the heat exchanger is too low. It serves as ice protection.

The deactivation value is factory-set. Subsequent readjustment is possible at any time. The flow monitor is installed internally in the unit and must only be adjusted by an expert.

As the flow monitor can be supplied in various designs, no picture is shown.

3.4.8 Time relay for trail

The time relay is installed not visibly inside the housing. It makes sure that the COOL STATION trails for a preset time (e.g. for dissipation of residual heat of the device to be cooled) after switching over into standby mode.

Trail intervals of pump and fan, also in the event of faults, can be programmed separately.

The trail interval is usually adjusted before the delivery to the customer and according to the customer's demands, and it is firmly set afterwards.

3.4.9 Overflow

For safety reasons, COOL STATION models with automatic refill are always equipped with an overflow.

It serves as a protection to prevent an overflowing of the water tank in the event that a solenoid valve of the automatic overflow defective.

The “overflow” connection is on the rear of the COOL STATION. It is a hose connection.

Caution It is absolutely necessary to connect the overflow and to guide it into a pressureless drain with a slope.

The overflow line must under no circumstances be tapered.

3.4.10 Automatic refill

An automatic refill system inside the COOL STATION ensures that the water tank of the secondary circuit is always at an optimum filling level.

In the event of a water loss, a level switch is activated which switches a solenoid valve, and water can flow into the water tank.

The precondition for this function, however, is a permanent water supply to the “refill” connection.

⚠ Due to the automatic water refill, it may be possible that ice protection is insufficient if supply temperatures are below +10°C.

⚠ In the event of a leakage at the cooling circuit, an uncontrolled water outlet can be caused by the automatic refill.

Therefore, the corresponding area of the COOL STATION, of the connecting hoses and the unit to be cooled must be monitored by moisture sensors.

To avoid major damage in the event of a leakage, make sure that all water supplies and the COOL STATION are switched off immediately and are secured against restarting.

3.4.11 Bypass

If it is a cooling circuit type with bypass, the bypass regulating valve, which is required for adjustments, is on the rear of the housing. Thus it is possible to regulate the cooling fluid supply pressure with the delivered quantity and, in this way, influence the delivery flow rate of the circulating pump.

Make sure that the cooling fluid pressure always remains sufficient when opening the bypass valve.

The supply pressure can be read on the rear at the manometer (option), and can be set to the desired value. Clockwise increases pressure, and counterclockwise decreases pressure.

Make sure not to set unnecessarily high pressures.

The deeper the pressure is displayed on the manometer with a sufficient number of liters, the better for the coolant pump.

If equipped with an ***automatic bypass,*** the delivery rate is regulated automatically. The coolant quantity which is temporarily not required for cooling, is deviated from the main flow through the bypass, and directly fed into the water return line.

The automatic bypass valve is factory-set to an opening pressure. An adjustment is possible at any time.

For this, start the pump and close the water supply. After that, adjust the valve with the socket head screw.

Make adjustments with closed water supply and read the values on the manometer.

As the bypass regulating valve can be supplied in various designs, no picture is shown.

3.4.12 Manometer

The coolant pressure in the coolant supply is indicated at the manometer.

On COOL STATION models with bypass, * the supply pressure is indicated on the manometer. As the manometer can be supplied in various designs, no picture is shown.

3.4.13 Strainer

The strainer is installed into the primary water inlet or the secondary water supply. It cleans the coolant from dirt particles before flowing into the COOL STATION or the device to be cooled. As the strainer can be supplied in various designs, no picture is shown.

3.4.14 Fine filter

The fine filter is installed into the primary water inlet or the secondary water supply. It cleans the coolant from dirt particles before flowing into the COOL STATION or the device to be cooled. As the fine filter can be supplied in various designs, no picture is shown.

3.4.15 Cleaning the strainer

With weakening cooling capacity and/or too low a flow rate, clean the strainer in the water inlet (water-cooled devices), or in the water supply.

For cleaning/changing the strainer, switch off the unit, drain the coolant and, with water-cooled COOL STATION models, shut-off the primary coolant.

Open the strainer only after that. If the strainer can be washed out, it must not be renewed - cleaning is sufficient.

3.4.16 Cleaning the fine filter

With weakening cooling capacity and/or too low a flow, clean the fine filter in the water inlet* (water-cooled devices) or in the water supply.

For cleaning/changing the filter, switch off the unit, drain the coolant and, with water-cooled COOL STATION models, shut-off the primary coolant. Open the filter only after that.

If the fine filter can be washed out, it must not be renewed - cleaning is sufficient.

3.4.17 RS232 interface

The interface adapter VDH_SER1 is used for a remote control and reading out faults via a RS232 interface of COOL STATION models equipped with a VDHR201 controller.

The interface is electrically isolated from the controller to exclude disturbing influences.

It communicates with the controller via a simple text-oriented protocol. Existing programs can be connected.

For testing functions, the accessory program Hyper Terminal can be used on a Windows PC.

Interface parameters: 9600 Baud, 8 data bits, 1 stop bit, no parity, no flow control.

3.4.18 Geodetic height difference

The geodetic height difference is an option at which a check valve is installed in the coolant supply, and a solenoid valve is installed in the coolant return system.

This option must be installed if the COOL STATION is located at least 3 m deeper than the unit to be cooled.

The valves prevent a collapsing water column, and thus an overflowing coolant tank after the COOL STATION pumps have been switched off.

3.4.19 Tank drain

The tank drain connection is a ball valve with hose connection. Connect the tank drain with a slope to a pressureless drain or another water-collecting container.

Information!

The tank drain connection is located on the rear of the COOL STATION and has an angle pointing downward.

- Make sure to locate the COOL STATION at a place where the connecting hose between COOL STATION and drain cannot be walked on.
- Make sure to locate the COOL STATION at a place where the connecting hose between COOL STATION and drain is not in passage ways.

3.4.20 Automatic switching to water line in the event of a failure

If there is a failure of the COOL STATION or an electricity blackout, coolant supply and return are changed over to the facility water supply line. This mode is active as long as the failure or the current blackout have not been fixed.

Two connectors are located on the rear of the COOL STATION at which the pipes for water supply and discharge can be connected.

In the event of a leakage on the cooling circuit, an uncontrolled water outlet can be caused by the automatic changeover to the water line.

Therefore, the corresponding area of the COOL STATION, of the connecting hoses and the unit to be cooled must be monitored by moisture sensors.

To avoid major damage in the event of a leakage, make sure that all water supplies and the COOL STATION are switched off immediately and are secured against restarting.

3.5 Safety devices

The COOL STATION is equipped with safety devices so that it poses no risks for the operator's or a third party's safety and health when the COOL STATION is properly used.

The entire COOL STATION is built and manufactured according to the current state of technology, and the recognized safety-related rules and regulations.

To ensure safe operation for personnel and environment, the following precautions were made and/or safety devices have been installed: Unauthorized removal or bridging (deviating) of safety devices is a criminal act. In the event of a damage, any liability shall be void.

All components which may become hot or cold are located inside the housing, and thus secured by additional safety plates/gratings which can only be removed with a tool.

In the event of a failure or signaled faults, all elements of the control systems change into a safety mode for operator, COOL STATION and environment.

All live components are safeguarded against touching (insulated) and installed at a sufficient flashover distance.

Live components are only installed inside the housing and can only be opened with the help of tools.

All electrical components bear the CE symbol for low voltage and/or EMC.

For grounding the COOL STATION , equipotential bonding (>1.5 mm^2 dia.) for all live components is installed.

The COOL STATION is designed to type of enclosure IP 20. All connections of the control unit are clearly marked.

The electric wiring diagram with the corresponding spare parts lists can be found in the appendix.

4 Transport, storage and startup

4.1 Transport

The COOL STATION is supplied upright in a wooden box.

(Modifications of the package see attachment)

For transporting the wooden box, the following possibilities are admissible:

– Fork lift truck and

– Pallet trucks.

Danger!

Risk of death from falling of the wooden box with the COOL STATION inside!

From improper transport of the wooden boxes, the box with the COOL STATION inside can fall down and cause most severe injuries or death.

Only use suitable lifting and attaching devices!

The driver must have a license for driving a fork lift truck or pallet truck.

Observe the following information about the transport of the COOL STATION :

The fork lift truck/pallet truck must be approved for the total weight of wooden boxes plus COOL STATION (Weight information: see chapter 9.1, *Technical data*).

The fork length of the fork lift truck/pallet truck must have a suitable length.

All persons must get out of the working range of the fork lift truck/pallet truck before lifting the COOL STATION .

The COOL STATION is a sensitive device and must therefore be transported carefully in the wooden box to its installation site.

Avoid hard shocks for the wooden box when lowering (for example on the load area of a transport vehicle).

Secure the wooden box on the transport vehicle against shifting or tilting.

Secure the wooden box against tilting during transport.

Transport and store the wooden box exclusively in dry conditions.

Arrows on transport boxes must point upward.

Other information on the packaging must also be observed.

Observe applicable accident prevention and occupational safety rules and regulations.

4.2 Unpacking/scope of delivery

Information!

Unpack the COOL STATION directly after the delivery.

On delivery, it is essential to check for destruction and/or damage from improper transport.

When unpacking the COOL STATION , proceed as follows:

- Remove all screws on the cover and the front of the wooden box.
- Take off the cover and the front side.
- Unscrew the screws by means of which the inner frame is attached for the fixation the COOL STATION.
- Take the frame upward out of the transport box.
- Take off the upper foam parts from the COOL STATION (if existing).
- Using proper aids (fork lift truck/pallet truck), take the COOL STATION out of the wooden box . See chapter 4.1.
- Remove the foam parts on the underside of the COOL STATION (if existing), as soon as they are accessible.
- Check whether the delivery is complete; compare with the *delivery note*.
- Check the entire delivery for outer damage as it could have occurred during transport.
- In the event of transport damage, contact the supplier/forwarding agent immediately.
- **Later claims shall not be accepted!**
- If parts are missing or have been wrongly supplied, get in touch with **Fehler! Verweisquelle konnte nicht gefunden werden.**.

4.3 Installation

Information!

Unpack the COOL STATION directly after the delivery. When installing, make sure there is sufficient workspace around. Do not arrange the air inlet side of the COOL STATION in the direct vicinity of heating elements/heaters.

When arranging the COOL STATION , proceed as follows:

- Move the COOL STATION carefully and attentively to its point of installation.
- Arrange the COOL STATION on a straight, solid ground.
- Secure the COOL STATION against unintended rolling by lowering the locking brake on the rollers.

Information!

Air escaping toward the sides and the back must not be obstructed by an insufficient distance toward the wall. Hot air must be able to escape freely upward.

When arranging, also consider that the COOL STATION dissipates the cooled capacity as heat into the adjacent area. Emitted heat is also increased by the driving performance of the refrigerating unit.

The increased room temperature reduces the cooling capacity of the COOL STATION . Therefore, ensure sufficient air conditioning of the place of installation.

- Arrange the COOL STATION with at a sufficiently large distance of all sides of the device.
- If the COOL STATION tank is filled with coolant, its location must no longer be changed.
- If the COOL STATION tank is filled with coolant, it must no longer be tilted to prevent water from escaping.

4.4 Storage

Store the COOL STATION at a vibration-free, dry location which must be as dust-free as possible. It must not be stored outside of closed rooms.

Air temperature must be in a range between +5°C and +32°C.

Relative air humidity must not exceed 85%.

It is absolutely necessary to avoid condensation of air humidity on the surfaces of the COOL STATION .

4.5 Starting up the COOL STATION

Danger to life from electric shock!

Work on the electrical system must only be performed by skilled electricians.

Risk of electric shock of unprofessional work is carried out on electric components!

The following applies for devices with a voltage switch:

Before the initial connection of the COOL STATION, a technician authorized for such installations must set the voltage switch.

Please observe the factory settings. (See technical data.)

Later readjustment, for example by the operator, is forbidden.

Damage can be prevented from the COOL STATION only in this way.

Caution!

Irreparable damage to the cooling circuit may be the consequence!

Oil in the refrigerant circuit of the COOL STATION must accumulate first before switching on.

Switch on the COOL STATION at the earliest one hour after arrangement at its point of installation.

4.5.1 Bleeding of the circulation pump

To be able to deliver coolant, bleed the circulation pump (delivery pump) of the cooling circuit:

- Open the COOL STATION cover carefully backward.
- Open the coolant tank closing plug by turning counterclockwise.
- Fill the cooling tank below with coolant until shortly below the tank edge. Observe the maximum fill level given in the appendix.
- Connect a hose piece with the water supply.
- Guide the open end in a clean (!) bucket on the ground or any other container.
- As soon as the coolant escapes free of bubbles from the hose due to the natural geodetic slope, bleeding of the COOL STATION and/or the circulating pump is finished.
- Fill the escaped coolant from the bucket back into the coolant tank.
- Close the coolant tank again with the closing plug.

4.5.2 Coolant hoses secondary

Information!

Pay attention to the supply pressure when selecting coolant hoses for *water supply* and *return*.

Explanation of terms:

Water supply	Outlet of cold coolant from the COOL STATION and/or inlet into the devices to be cooled.
Water return	Inlet of the heated coolant into the COOL STATION and/or outlet from the devices to be cooled.

- Install the coolant hoses for *water supply* and *return* between the device to be cooled and the COOL STATION .
- At first, connect the coolant hoses for *water supply* and *return* to the device to be cooled.

Information!

- Make sure that the COOL STATION is arranged such that the coolant hoses to be connected between COOL STATION and the device to be cooled cannot be walked on.
- Make sure that the COOL STATION is arranged such that the coolant hoses to be connected between COOL STATION and the device to be cooled are not laid in passageways.

Information!

Avoid temperatures in the coolant return line (e. g. by connection of other devices to be cooled) exceeding +30°C to prevent overloading of and/or damage to the intensifier.

- Fasten the coolant hoses to the individual connections on the rear of the COOL STATION .
- Do not mix up the *water supply* and the *water return*. If you are in doubt, make a double check.

4.5.3 Primary connections

Pay attention to the pressure range when selecting coolant hoses for *water supply* and *return*. (Also see technical data.)

Explanation of terms:

Water inlet	Outlet of the cold water from the facility-internal circuit and/or inlet into the COOL STATION.
Water outlet	Outlet of the heated water from the COOL STATION and/or inlet into the facility-internal circuit.

- Install the coolant hoses for *water supply* and *outlet* between the facility-internal circuit the COOL STATION .
- Connect the coolant hoses for *water inlet* and *outlet* to the primary circuit of the COOL STATION.

Information!

The connections are located on the rear of the COOL STATION and have an angle pointing downward.

- Make sure that the COOL STATION is arranged such that the water hoses to be connected between the COOL STATION and the facility-internal circuit are not laid in passageways.
- Make sure that the COOL STATION is arranged such that the water hoses to be connected between the COOL STATION and the facility-internal circuit cannot be walked on.

 In the event of a leakage at the cooling circuit, an uncontrolled water outlet can be caused by the primary water cooling.

Therefore, the corresponding area of the COOL STATION, of the connecting hoses and the unit to be cooled must be monitored by moisture sensors.

To avoid further damage in the event of a leakage, make sure that all water supplies and the COOL STATION are switched off immediately and are secured against restarting.

4.5.4 Potential-free contact

The potential-free contact is closed during normal operation of the COOL STATION .

In the event of a fault/failure of the COOL STATION , the potential-free contact opens. In particular if the device to be cooled is strongly temperature-sensitive, it can be switched off immediately by the switching contact, or the deactivation procedure can be started to avoid further damage.

The potential-free contact is connected to the COOL STATION with a pluggable two-pole contact.

The plug is part of the COOL STATION scope of supply.

Connect the potential-free contact to the rear of the COOL STATION .

- Have the two-wire cable for the potential-free contact laid by a skilled electrician and connected to the plug afterwards.
- It is essential to connect the plug again and lock it.

Information!

If the COOL STATION is supplied with both a potential-free contact and an external activation * (see below), the two single connections are combined in a five-pole pluggable contact or in two pluggable contacts which are equipped with different, not interchangeable pluggable connections.

4.5.5 External activation module

With the external activation module, the COOL STATION can be switched on and off from any location, for example with the electron microscope.

The connection for the external activation of the COOL STATION is a pluggable contact on the rear.

The external activation module is activated with a potential-free contact or by a voltage, depending on the configuration.

- Have the cable for the external activation * laid and connected to the plug by a skilled electrician.

Information!

If the COOL STATION is to be connected to an external activation module, the contact (pluggable contact on the COOL STATION) to the COOL STATION must be inserted according to the configuration.

Before activating the external activation module, switch on the COOL STATION (switch on pump and cooling).

If the external activation module has been activated before switching on, the display indicates:

External activation active - please disconnect

The status indicator flashes green.

- If the default at the plug is *potential-free open* ☞ *"external activation active",* the external activation must be connected **before** starting the COOL STATION.
- If the default at the plug is *free from tension* ☞ *"external activation active",* the external activation must be connected **before** starting the COOL STATION.

- If the preset at the plug is *potential-free closed* ☞ *"external activation active",* the external activation must be connected **after** starting the COOL STATION.
- If the preset at the plug is *tension at plug* ☞ *"external activation active",* the external activation must be connected **after** starting the COOL STATION.

Information!

If the COOL STATION is supplied with an external activation and a potential-free contact * (see above), the two single connections are combined in a five-pole pluggable contact or a terminal box, or two pluggable contacts which are equipped with different, not interchangeable pluggable connections.

4.5.6 Remote control

On a COOL STATION with remote control, the membrane operating panel is not installed on the unit but in a separate desk housing with a sufficiently long connecting cable to the COOL STATION .

On the remote control, the same functions can be controlled as directly on the COOL STATION .

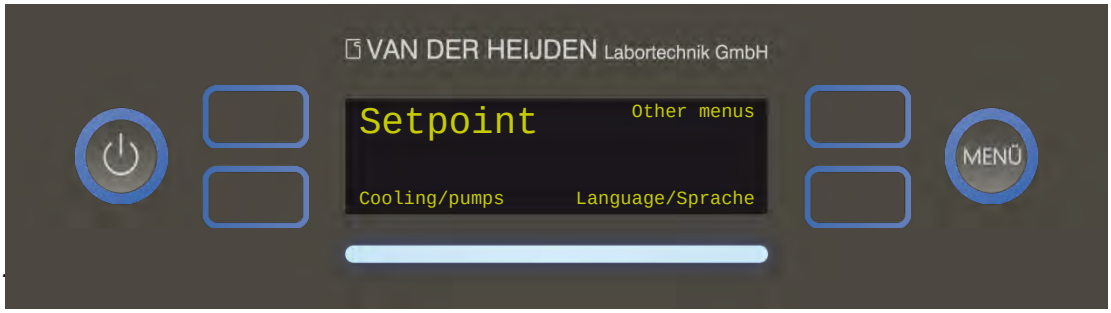
The remote control is connected to the COOL STATION with a 4-wire, shielded cable.

- Have the cable for the remote control laid by a skilled electrician.

5 Operating panel

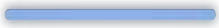
This chapter describes the functions of the operating panel, and the following chapter finally deals with the operation of the COOL STATION.

The COOL STATION is operated at the operating panel



Operating elements on the operating panel of the COOL STATION:

5.1 Operating elements

FIGURE	FUNCTION
	Operating button: With this button, the COOL STATION is switched “ON” and “OFF”. As soon as the control unit is supplied with operating voltage, the button is illuminated blue. *Exception:* Only with activated “external activation”, the button is illuminated but without function.
	The “menu” button allows to change between the operating display, the activation and parametrization display and the info display. ● The *operating display* shows all information, such as operating condition and temperatures, which is required for a trouble-free function. ● On the *activation and parametrization display*, the setpoint and the devices required for operation are adjusted. ● On the *info display*, parametrization, the fault memory and device information can be called up.
	On the different menu levels, functions with up to four function keys can be called and/or set.
	Status indicator blue: - The device is active. - Cooling and pump are operating. No fault present.
	Status indicator green: - If the controller is in standby mode, the indicator flashes green. o In standby mode, only the control unit is active. o All menu functions can be called. - Only when one pump is active, the status indicator brights permanently green.
	Status indicator red: - Fault! An additional acoustic alarm sounds. - The fault origin is indicated on the display. - With the inquiry of the fault origin via the function button, the acoustic alarm is simultaneously acknowledged. - The indicator continues to flash red. - Follow the menu for troubleshooting.
	Status indicator yellow: - If coolant is lacking, the indicator flashes yellow. o Proceed as for “status indicator red”. - When the fault origin (status display flashing red or yellow) is remedied, the status indicator brights permanently yellow. o Troubleshooting must be confirmed with the function key. o The device switches automatically back into the general operating mode as before the fault. (Status indicator changes to blue.)

6 Operation

6.1 General

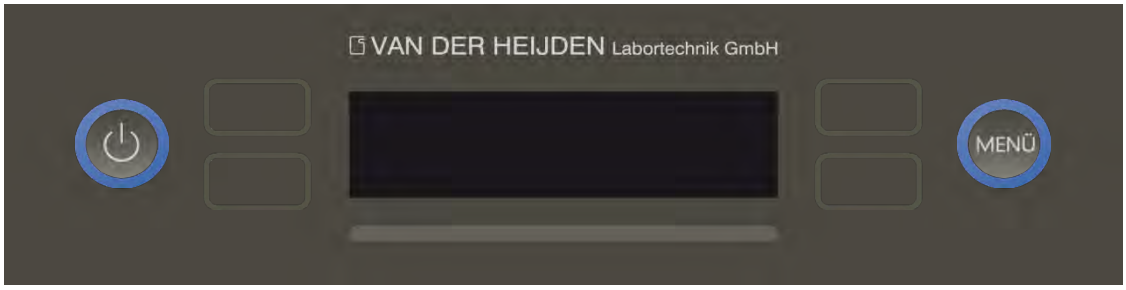
6.1.1 Operating conditions

Operate the COOL STATION at a location which must be as vibration-free, dust-free and dry as possible. The COOL STATION must not be operated outside closed rooms (except devices for outdoor installation). Air temperature must be in a range between +5°C and +32°C. Relative air humidity must not exceed 85 %. It is absolutely necessary to avoid condensation of air humidity on the surfaces of the COOL STATION.

6.2 Operation “ON”

Switch the COOL STATION to standby as follows:

- Plug the power cable of the COOL STATION into the socked.



-Figure: COOL STATION “OFF”-

- The operating button and the menu button are illuminated in blue and released for function.
- Operate button  . Then, setpoint and operating condition of pump and cooling system are displayed.

-Figure: “Standby”-

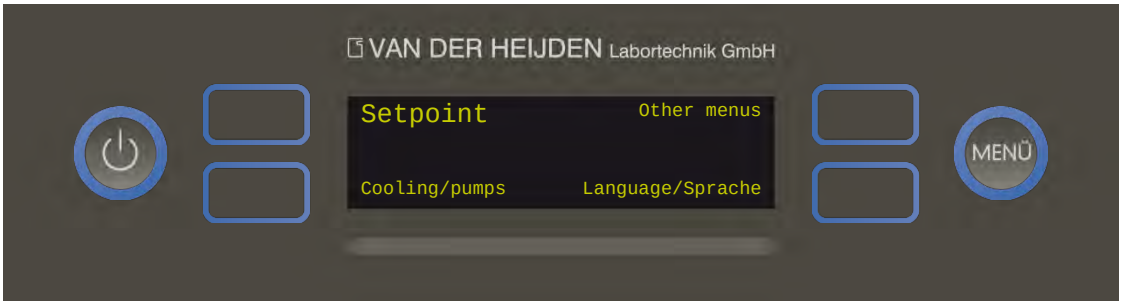
The status indicator below the display flashes green.

Information!

If a fault message is displayed and an acoustic alarm sounds, see the explanations in chapter 6.8.

If possible, open the fittings which you have installed into the coolant lines between COOL STATION and the device to be cooled.

6.3 Parametrization and activation



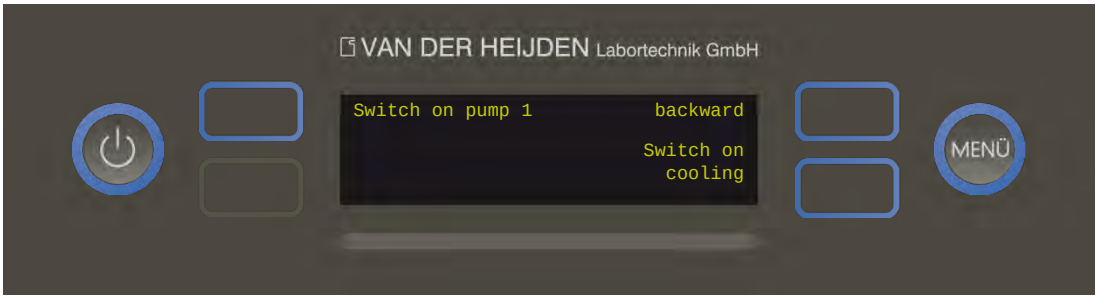
-Figure: "Activation and parametrization level"-

- Operate the menu button  to access the activation and parametrization display. (See figure.)
- Set the desired language with the function button. 
- Set the desired temperature setpoint with the function button. 

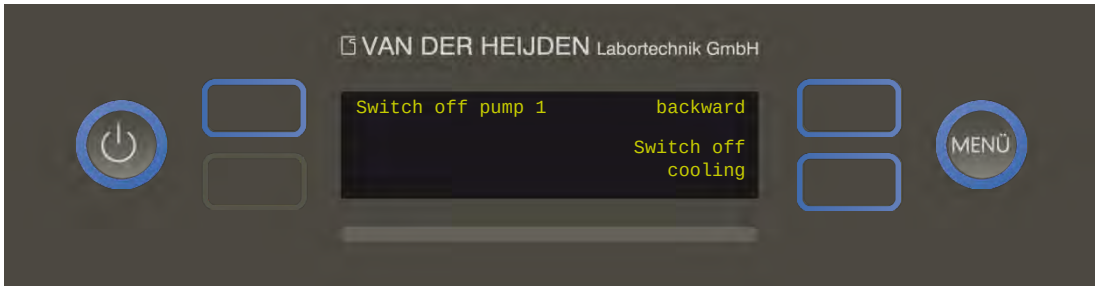
  Adjusting range: The temperature setpoint can be set within a limited range. (See technical data)
- The COOL STATION is now set to the desired application and can be switched on with the function button Pump/cooling.

6.4 Switching on

- Operate the function button Cooling/Pump



- Operate the function button the switch on the pump.
- Afterwards, operate the pushbutton again to switch on cooling.
- The status indicator brights blue.



- With the "Back" button, the display returns to the activation and parametrization menu.

- With the button 

, or after the expiry of 60 seconds, the overall operating condition with all relevant information is displayed.
- In addition to the information about pump and cooling, an active symbol (shown in the form of a circle) appears which describes the function.
- ***** Connect the pluggable contact for the (optional) external activation only now, which is on the rear of the COOL STATION. If the connection is correct, “External activation” is indicated on the display.

Information!

The operating keys on the COOL STATION are deactivated when the optional external activation is connected.
Thus, remote access via the membrane panel directly on the COOL STATION is prevented.

Information!

Only the activation sequence described above ensures that the settings for the chiller entered further above are stored by the control system.

-Figure showing “general operating condition”-

The COOL STATION is now ready for continuous operation.

6.5 Continuous operation

Perform the following jobs regularly if operated in continuous mode:

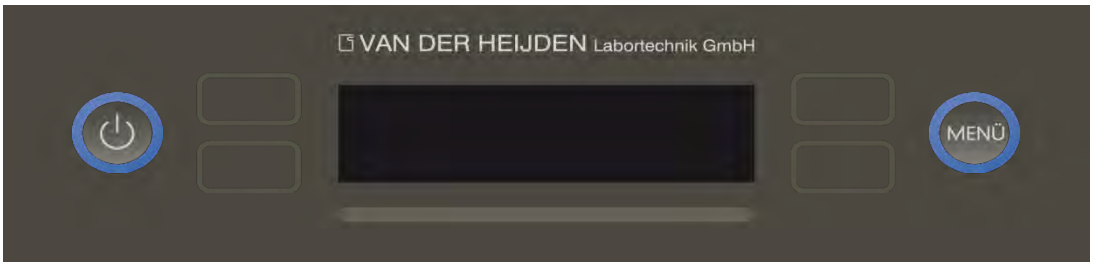
- Regular check of coolant level int the coolant tank of the COOL STATION .
- In the event of a noticeable loss of coolant over a short period in time, check the coolant circuit(s) between COOL STATION and the device to be cooled, and remove leaks.
- Regular checks and, if required, cleaning of the condenser air inlet by blowing out with oil-free compressed air or nitrogen.
- Regular checks of the coolant quality (algae, slime-producing bacteria).
- If necessary, add Thermoclean DC against algae growth (see accessory and spare parts list).

6.6 Deactivation

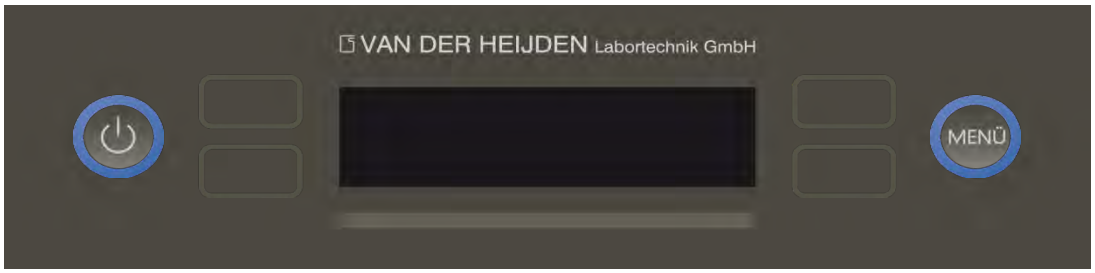
Information!

The COOL STATION is laid out for continuous operation. Therefore it can be operated continuously over a longer period in time. To save energy costs and where appropriate, turn it off if it is not used for a prolonged interval.

- Make sure that the deactivation of the COOL STATION does not endanger the operation of the device to be cooled.
- Deactivate the external activation module via the device to be cooled or, if applicable, unplug the pluggable contact for the external activation module ***** on the rear of the COOL STATION. The display “external activation” goes out.
- Cooling and pump are now turned off. The COOL STATION is changed to “OFF” mode.



- To switch off the COOL STATION without the option “external activation”, operate the button  .
- In an additional inquiry, the procedure must be confirmed in order to avoid unintended deactivation.
- Cooling and pumps are now turned off. The COOL STATION is changed to “OFF” mode.



- After operating the button  , the COOL STATION returns to the last operating mode before deactivation.

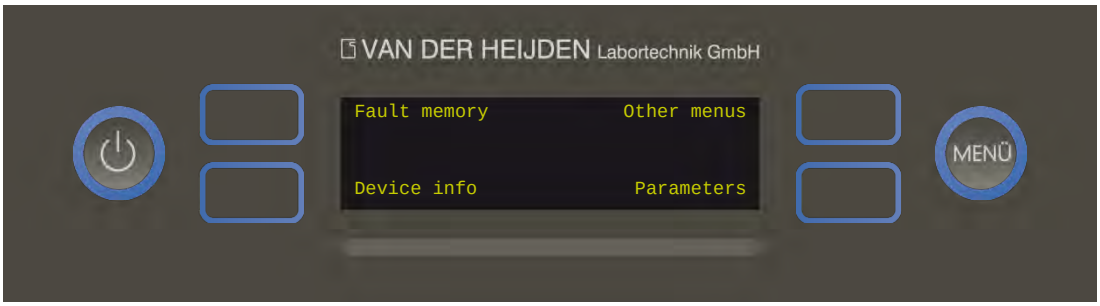
Information!

Note in the event of a power failure:

When electric current is available again after a power failure, the COOL STATION , returns to the last operating mode before the power failure. In such a case, adjustments or checks on the COOL STATION are not necessary.

6.7 Info display

On the info display, parametrization, the fault memory, device information and display settings can be called up with the function keys.



-Figure: Info display-

6.7.1 Parameters

On the parameter level, all control units settings can be called up using the function buttons.

Changes cannot be made in this menu.

6.7.2 Fault memory

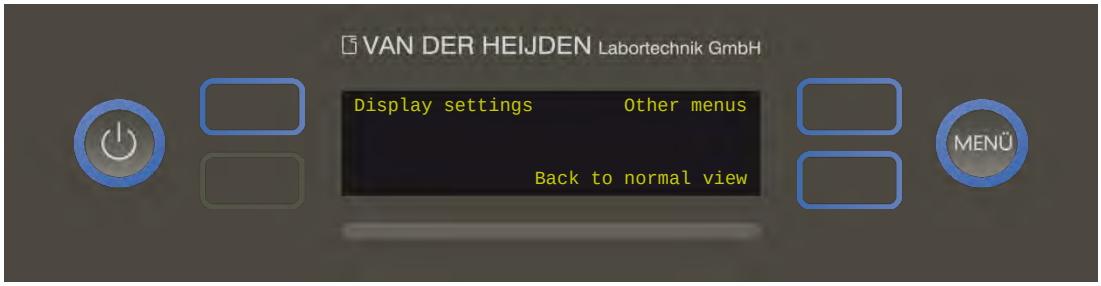
The fault memory stores all faults with time information.

It records when a fault occurred and when it had been removed.

6.7.3 Device data

Among other information, the device data contain the COOL STATION and the control system serial numbers, and the address and telephone number of Van der Heijden Labortechnik GmbH.

6.7.4 Display settings



-Figure: Info display (2nd level)

The brightness of the display can be changed in the display settings.

6.8 Fault messages and troubleshooting

Fault messages are displayed by an acoustic signal, a message on the setpoint temperature display, and a red or yellow status indication.

(Corresponding alarms are described in the table at the very end.)

Caution!

Irreparable damage to the COOL STATION is possible if the cause for the fault is not removed immediately.

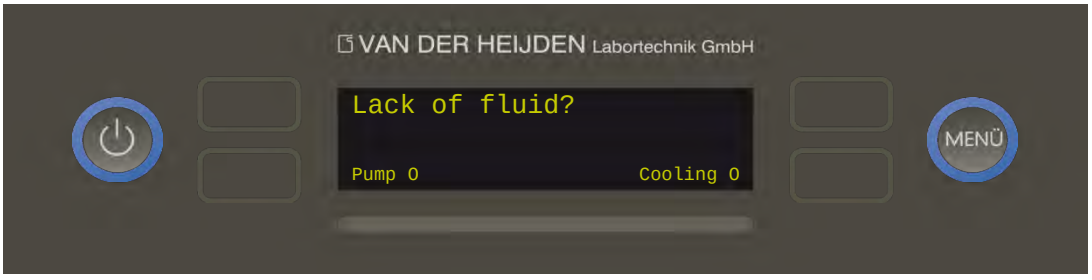
Remove the cause for the fault immediately.

By operating the function button, the acoustic warning signal is switched off.

After troubleshooting, reset all fault messages by operating the function key.

6.8.1 List of possible alarms:

Fault: lack of fluid



-Figure: "Fault: lack of fluid"-

The following changes appear on the display:

- The controller beeps, and the status indicator flashes yellow.
- Active symbols stop

Troubleshooting:

- A fault can be acknowledged by the function key, and the menu can be called for troubleshooting.
- Follow the instructions.
- When the fault is removed, the status indicator brights permanently, and the inquiry on the display can be acknowledged.
- The displays switch to trouble-free operation.
- The active symbols turn again, and the status indicator is blue again.

Other failures:

• *Excessive temperature alarm*
• *Low temperature alarm*
• *High-pressure fault, refrigerant side*
• *Flow rate fault, water side*
• *Excessive temperature alarm sensor fault wire crack (sensor)*
• *Low-temperature alarm fault (sensor short-circuit)*

Other faults which might occur only occasionally for technical reasons:

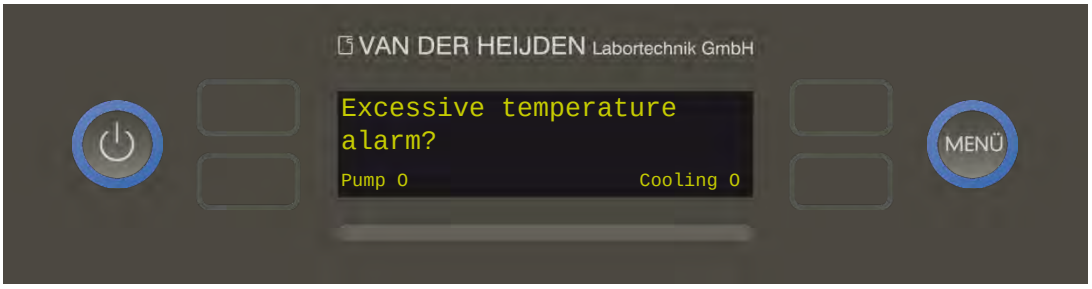
• *Low-pressure fault, refrigerant side*
• *Fault thermocontact pump*
• *Alarm flow monitor*
• *Check fluid level*
• *Motor protection relay has triggered*
• *E4 alarm*

Information!

Possible causes and proposals for their removal can be called on the troubleshooting menu using the function buttons.

If troubleshooting is not possible, contact Huber Inc. Other information to it are on the information display below the device data.

Fault: Excessive temperature alarm *(example)*



-Figure: Fault: "Excessive temperature alarm"

The following changes appear on the display:

- The controller beeps, and the status indicator flashes red.
- Active symbols stop

Troubleshooting:

- A fault can be acknowledged by the function key, and the menu can be called for troubleshooting.
- Follow the instructions.
- When the fault is removed, the status indicator brights yellow, and the inquiry on the display can be acknowledged.
- The displays switch to trouble-free operation.
- The active symbols turn again, and the status indicator is blue again.

6.9 Faults without direct information

Fault	Origin	Explanation / troubleshooting
No fluid delivered by the pump	*Air in system*	– Bleed circulating pump (See 4.5.1).
	Motor defective	– Inform manufacturer
	Condenser defective	– Inform manufacturer
	Prolonged shutdown	– Inform manufacturer **Caution!** **Damage to the delivery pump of the refrigerant cycle.** **The delivery pump must be switched on at least 5 minutes weekly (precondition is that the cooling circuit is filled with coolant).**
Intensifier is operating but no cooling	*Lack of refrigerant Only on devices with compressor*	– Inform manufacturer.
	Starting relay defective	– Inform manufacturer.
	Internal capillary crack	– Inform manufacturer.
	Performance regulation not functional	(Option) Inform manufacturer.

6.10 Display information on the individual options

(See technical data)

6.10.1 Two pumps

If a second (optional) cooling circuit is installed with an additional circulating pump (circulating pump 2) is installed, this is indicated by an additional function key when switching on.

For the operation of the COOL STATION it is sufficient, if one of the two pumps is switched on.

6.10.2 External activation module

The external activation is also indicated on the display. If it is active, the COOL STATION cannot be controlled via the display.

After deactivation of the external activation module, the display is released again.

6.10.3 Lag time after external activation

The lag time after external deactivation is also indicated on the display. If it is active, the COOL STATION cannot be controlled via the display.

Only after the lag time has expired, the display is released again.

6.10.4 Lag time

The lag time after deactivation is also indicated on the display. If it is active, the COOL STATION cannot be controlled via the display.

Only after the lag time has expired, the display is released again.

6.10.5 Flow indicator

If the COOL STATION is equipped with a flow meter (option), the flow rate in l/min is indicated on the display.

The display is activated with the installation of the flow meter.

7 Maintenance

7.1 General

The *Maintenance* chapter includes service, visual check (inspection) and maintenance by the operating personnel.

The classification of these fields into different maintenance intervals is to help you to plan the required maintenance intervals.

The instructions described in this chapter are to be understood as *minimum recommendations*.

According to the operating conditions, an increase may be necessary to maintain the production quality of the COOL STATION .

The given time intervals refer to a permanent operation of the COOL STATION

Warning!

Possible risks for persons and material assets.

As a consequence of improper inspections or maintenance, direct or subsequent damage to persons or material assets may be possible.

All maintenance jobs on the COOL STATION must only be performed by qualified personnel and under special observance of chapter 2, *Safety*.

Information!

Only use spare parts which have been released by ***Huber Inc.***

When using not released spare or replacement parts or operating fluids, ***Huber Inc.*** or the ***manufacturer*** shall not assume any liability.

Make sure that operating fluids and replacement parts are disposed of safely and environmentally correct.

Information!

If protective devices must be disassembled for maintenance measures, install and check the protective devices again immediately after completion of the work.

Information!

Observe the safety instructions and those for startup.

7.2 Maintenance and repair

Every COOL STATION must be subject to preventive maintenance measures according to the instructions of this operation manual.

The owner must ensure that the cooling unit is being checked, regularly monitored and serviced is a satisfactory manner.

7.3 Operating condition

Depending on kind and scope of the maintenance jobs, it may become necessary to shut down or disconnect the COOL STATION completely from the electric current.

Danger!

High voltage!

Causes death or life-threatening injuries.

For cleaning/maintenance work, pulling out the COOL STATION power cable is absolutely required.

7.4 Servicing and visual inspection

It is the operator's task to check the accessible areas of the COOL STATION daily for contamination and damage.

Remove contamination as far as accessible, and report damage to the maintenance personnel in charge or to ***Huber Inc***.

- Therefore, check the COOL STATION regularly before starting work (see also table *Visual inspection* on the following page).

Information!

As a consequence of unavoidable formation of contamination, inscriptions of operating elements of warnings may become illegible.

This can lead to improper operation which can cause damage to material assets and secondary damage.

When choosing the cleaning agent, make sure that no

- Surfaces
- Keyboards
- Parts of synthetic material or
- Seals

are damaged.

Water-based industrial cleaners can be used without restrictions.

- Therefore, clean all operating elements, displays and warning labels weekly from dust and other contaminants by removing them with a moist cloth.

7.4.1 Visual check

Kind of check	Activity/components	✓
Check of operational behavior	Check the COOL STATION for normal operational behavior: – Running noise – Heat formation – Odor development. If the COOL STATION behaves in a irregular way, deactivate it and inform the maintenance personnel immediately.	
Check for residues	Check the COOL STATION and its surroundings for residues of materials and operating fluids and remove them, if required.	
Remove contamination	– Walkways – Working surfaces – Markings – Liquefier	
Check for wear	– Movable supply lines – Movable discharge lines – Seals, etc. visible from outside – If required, renew parts.	
Check for damage	– Visible damage on the outside of all components.	
Check for leaks	– Coolant hoses – Fittings – Plugged connections	
Coolant check	– Remove visible sediments or contamination inside the tank – Flush circuit.	

7.5 Maintenance

7.5.1 General information

Carry out all maintenance jobs (if necessary) within the stated deadlines and with professional care.

The housing components of the COOL STATION do not require servicing.

The only exception is the liquefier:

If damage occurs, ship the COOL STATION to ***Huber inc.*** *or the manufacturer*.

In particular cases, consult ***Huber Inc.***

7.5.2 Adjusting the bypass regulating valve

The cooling circuit of the COOL STATION is equipped with a bypass valve which is accessible on the rear of the housing (blue handwheel), and located between water supply and return. Thus it is possible to regulate the cooling fluid supply pressure with the delivered quantity and, in this way, influence the delivery flow rate of the circulating pump.

The adjusted valve opening pressure can be read on the manometer on the rear when the water supply is closed.

- Adjust the bypass as follows:
  Turning counterclockwise reduces pressure
  Turning clockwise increases pressure.

Information!

Make sure that the coolant pressure always remains sufficient when adjusting the bypass regulating valve. Also make sure not to adjust an unnecessarily high pressure.

Adjust the required amount of liters for the device to be cooled, but do not necessarily adjust more.

The deeper the pressure is displayed on the manometer at a sufficient delivery rate, the better for the coolant pump.

7.5.3 Liquefier (if air-cooled)

According to the place of installation and the dust purity of the ambient air, the liquefier lamella must be checked for contamination, and cleaned, if necessary, at major intervals or immediately, if the cooling performance becomes weaker.

- Remove the front cover panel for this.
- After that, blow the liquefier with a powerful jet of nitrogen or oil-free compressed air from the rear to the front.
- Finally, install the cover panel again.

7.5.4 Plate-type heat exchanger primary circuit

The primary circuit must be checked for contamination, and cleaned, if necessary, at major intervals, or immediately, if the cooling performance becomes weaker. If cleaning the filter * in the water inlet is not sufficient, flush the internal circuit.

- Remove the primary supply hoses for this (water inlet/water outlet).
- After that, flush the primary circuit with cleaning agent which has been diluted with hot water, using the external circulating pump, and for approximately 30 minutes.
- Install the primary supply hoses again (water inlet/water outlet).

Finally, install the cover panel again.

In the event of a leakage at the cooling circuit, an uncontrolled water outlet can be caused by the primary water cooling. Therefore, the corresponding area of the COOL STATION, of the connecting hoses, and the unit to be cooled must be monitored by moisture sensors.

To avoid further damage in the event of a leakage, make sure that all water supplies and the COOL STATION are switched off immediately and are secured against restarting.

7.5.5 Leakage test

“Leakage tested” means that the device has been tested with direct and indirect measuring methods, principally those parts of the device at which leaks are most likely to occur.

Units with a refrigerant filling of more than 3,5 kg R134a or 3,9 kg R449A must be tested for leaks at least yearly .

If there is suspicion of a leakage during the test, locate the leakage with an appropriate detector, remove it and perform a new test according to the national regulations.

Tightness tests can be performed with various procedures, for example by subjecting to pressure with inert gas (nitrogen).

Test connections with a detector or a bubble test with proof sensitivity at maximum operating pressure.

According to the directive of the European Parliament and EN, tightness must be tested within one month after the repair of a leakage to make sure that the repair was successful.

7.5.6 Coolant in secondary circuit

Check the coolant quality in the COOL STATION tank every four weeks.

Remove chemical or biologic contamination immediately.

For this, remove the tank cover by removing the four screws.

Clean the coolant circuit by flushing the hose connections, and wipe out the tank.

Replace the contaminated coolant.

8 Disposal

The operation of the COOL STATION produces waste and used replacement parts which must be disposed of properly and in accordance with the legal regulations.

8.1 Environmental protection

Caution!

Keep the legal obligations for waste prevention and proper recycling/removal during all jobs on the COOL STATION .

In particular, during repairs and maintenance jobs, water-hazardous substances such as:

– Lubricating oil and grease as well as

– Cleaning fluids containing solvents

must not impact the ground or get into the sewerage system.

Store, transport, catch and dispose of such substances in appropriate containers.

8.2 Refrigerants

Caution!

Destruction of the refrigerant circuit from escaping refrigerant.

Opening the refrigerant circuit without reason and without a suitable workshop for this work is forbidden.

Opening the refrigerant circuit can cause that the COOL STATION can no longer be operated afterwards.

– Jobs on the refrigerant circuit of the COOL STATION must only be performed by **Fehler! Verweisquelle konnte nicht gefunden werden.**.

– Skilled personnel can perform such jobs only in exceptional cases with a compelling reason.

– Always inform Huber Inc.

– Properly evacuate the refrigerant. It must not get into the environment!

– Observe the refrigerant data sheet.

8.3 Final taking out of operation

If the COOL STATION is finally put out of operation, observe the laws and disposal regulations for the disposal of the components and operating fluids, which will be applicable at that point in time.

9 Attachment

9.1 Technical data

	Manufacturer		
		Van der Heijden Labortechnik GmbH	
		Tramsmeiers Berg 2	
		D - 32694 Dörentrup	
		Tel. +49 (0) 5265 94 55 20 Fax +49 (0) 5265 94 55 210	
		Email info@vdh-online.com Internet www.vdh-online.com	
	General data		
☒		Product designation	Type:
☒			Huber CS 35
☐		Performance control	proportional
☒		Performance control	without
☐		Temperature stability	± 0.1 K under constant load
☒		Temperature stability	± 1.5 °C Hysteresis (3 K)
☒		Cooling type	Air cooled
☒	**Guarantee period:**		2 Years
☒	**Housing:**	Size	08
☒		Width	580 mm
☒		Height	825 mm
☒		Depth	660 mm
☒		Housing material	Steel sheet, epoxy-resin coated
☒		Color	RAL 5003 (Frame) / RAL 7035

	Type-specific data:		
☒		Coolant tank, content	approximately 13.0 liters
☒		Weight	approximately 124 kg
☒		Sound pressure level *	≤ 63 dB (A)
		* Measurement on the front side at a distance of 2 m, without reflexion.	
	Coolant:		
☐		Fluid	purified water
☐		Fluid	deionized water
☒		Fluid	HKF 10.1
☒		Fluid	HKF 15.1
☒		Fluid	purified water with sodium hydrogen carbonate
☒		Fluid	water glycol mixture
☐		Fluid	---
☒	**Secondary connections:**		As 1-fold distributor
☒		Supply	Ball valve with
☒			½ " External thread
☒		Return line	Ball valve with
☒			½ " External thread
☐	**Primary connections:**		
☐		Water inlet	--- -- ---
☐			---
☐		Water outlet	--- --- ---
☐			---
☒	**Refrigerant:**		R449A
☒		Filling amount	1,2 kg

☒	**Pressurestat:**		
☒		High-pressure failure	≥ 26,0 bar
☐		Low-pressure failure	≤ --- bar
	Ambient conditions:		
☒		Ambient temperature	+5 °C to +32 °C
☒		Relative air humidity	max. 85 %
	Performance data:		
☐	**Voltage switch:**		
☐		Voltage **S3 = 1**	110 VAC / PH / N / PE
☐		Voltage **S3 = 0**	230 VAC / PH / N / PE
☒	**Fixed voltage:**		
☒		Voltage	208V/2PH/PE
☒		Frequency	60 Hz
☒		Current consumption	18,0 A
☐			
☒		Power consumption	4,0 KW
☒		Cooling performance	3.500 Watt at +10 °C water supply temperature
☒		Operating gage pressure, max. 26,0 bar	
	Circuit 1:		
☒		Pump capacity, max.	3,0 bar
☒		Pump capacity, max.	27 l/min
	Circuit 2:		
☐		Pump capacity, max.	--- bar
☐		Pump capacity, max.	--- l/min

	Fan:		
☒		Air volume flow rate	1.700 m³/h
	Thermostat parameters:		
☐		Performance control	proportional
☐		Performance control	thermostat-controlled tank heating
☒		Performance control	without
☒		Voltage	~ 230 V / 50 / 60 Hz
☒		Setpoint (ex works)	-10 °C
☒		Adjusting range	-20 °C to +15 °C
☐		Lower deactivation value	1,5 K below setpoint
☒		Excessive temperature alarm	+30 °C
☒		Low-temperature alarm	-25 °C
	Primary data:		
☐	**Water-cooled devices:**		
☐		Water inlet temperature	+5 °C to +25 °C
☐		Pressure loss	0.4 bar
☐		Max. static pressure	8.0 bar
☐		Max. pressure difference	3.0 bar
☐		Min. pressure difference	0.5 bar
☐		Required amount of water	See diagram
☐	**Water-water-devices:**		
☐		Water inlet temperature	--- °C
☐		ΔT	--- K
☐		Required amount	--- l/h
☐		Pressure loss	--- bar
☐		Max. static pressure	6.0 bar
☐		Max. differential pressure ΔP	3.0 bar

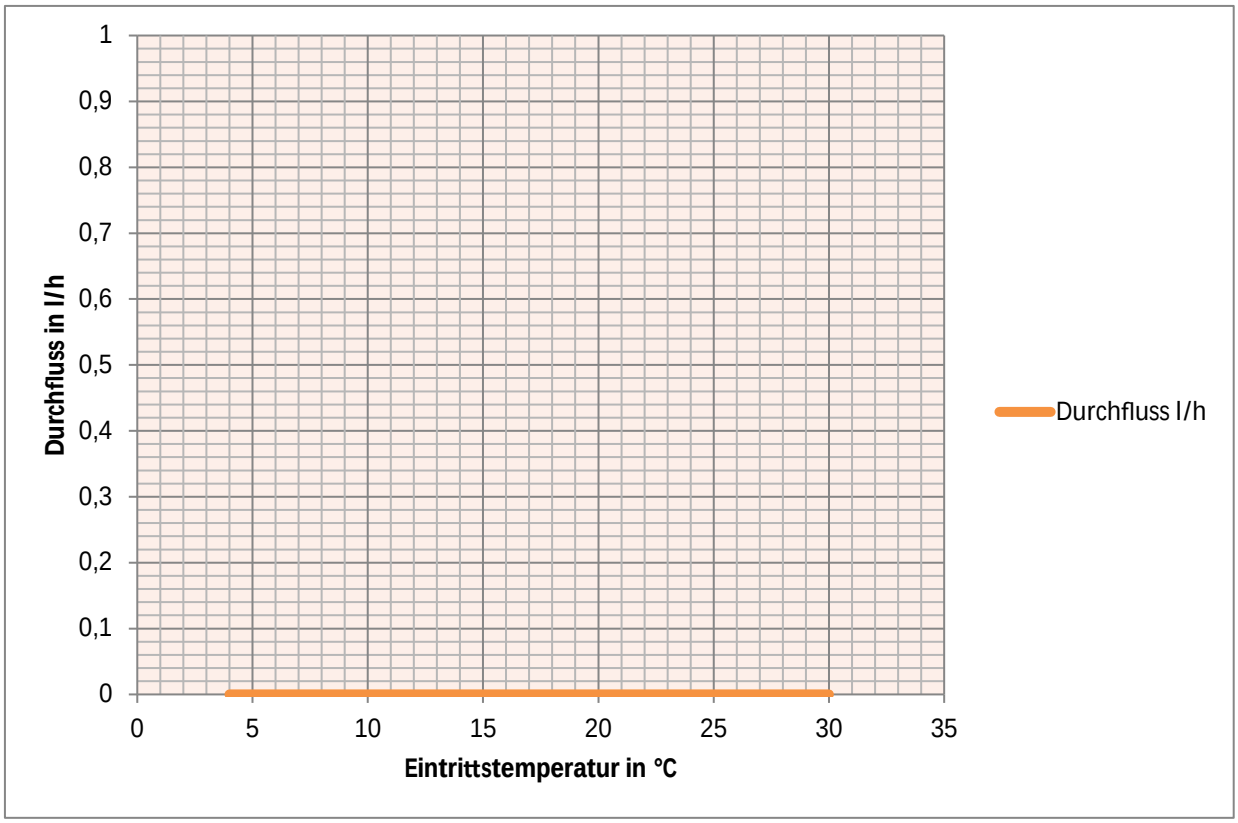
	Options:		
☐	**External activation module:**		
☐		Rated voltage	5 VDC
☐		potential-free	5 VDC switching voltage
☐	**Potential-free contact:**		
☐		Rated voltage	250 V AC/DC
☐		Rated current	10 A AC/DC
☒	**Bypass:**		
☒		Gate valve	manually adjustable
☐		Automatic	opening pressure --- bar
☐	**Remote control:**		
☐		Cable length	max. --- m
☐	**Flow indicator:**		
☐		Circuit 1	--- l/min
☐		Circuit 2	--- l/min
☐		Circuit 3	--- l/min
		Circuit 4	--- l/min
☐	**Operating hours meter:**		
☐	**Flow monitor:**		
☐	As pump guard:	Deactivation value	--- l/min
☐	As ice protection:	Switch-off value	--- l/min
☐	In the supply line:	Switch-off value	--- l/min
☐	In the return line:	Switch-off value	--- l/min

☒	**Flow meter:**		
☒	**To monitoring unit:**		
☐	As pump guard:	Switch-off value	--- l/min
☒	As ice protection:	Switch-off value	2,0 l/min
☐	In the supply line:	Switch-off value	--- l/min
☐	In the return line:	Switch-off value	--- l/min
☐	**To display:**		
☐	In the water supply:	Deactivation value	without
☐	In the water return:	Deactivation value	without
☐	The entire supplied quantity:	Deactivation value	without
☐	**To supervision + display:**		
☐	In the water supply:	Switch-off value	--- l/min
☐	In the water return.	Switch-off value	--- l/min
☐	The entire supplied quantity.	Deactivation value	--- l/min
☒	**Time relay for trail:**		
☐	After deactivation:	Trail interval	--- minutes
☐	After failure and deactivation.	Trail interval	--- minutes
☒	Fan trail:	Trail interval	1 minute
☐	Pump trail after deactivation:	Trail interval	--- minutes
☐	Pump trail after failure and deactivation:	Trail interval	--- minutes
☐	**Overflow:**		
☐	Connection:	Hose connector	---
☐		External thread	---
☐		With ball valve	---
☐	**Automatic refill:**		
☐	Connection:	External thread	---
☐		Hose connector	---

☒	**Manometer:**	Display	0 –10 bar
☐	**RS232 interface:**	Interface	
☐	**Strainer:**		
☐		Primary	in water inlet
☐		Secondary	in supply
☐	**Fine filter:**		
☐		Primary	in water inlet
☐		Secondary	in supply
☐	**Geodetic height difference:**	With solenoid valve and check valve	
☐	**Emergency cooling:**	Automatic switching to water line in the event of a fault	
☐	**Drain:**		
☐		Connection	---
☐	**Drainage:**	With ball valve	
☐	Internal connection:	Hose	---
☐	External connection:	Hose connector	---
☐		External thread	---
☒	**Max. filling level**		
☒		Tank up to 30 liters	2.5 cm below tank edge
☐		Tank 50 liters and more	7.0 cm below tank edge
☐	**Advance warning:**		Lack of water
☒	**Packing:**		
☒		Material	Wooden box
☐		Material	Pallet
☐		Material	Film
☐		Material	Cardboard

9.2 Water consumption of primary side

(Only for device with article no. beginning with 2-)



9.3 Accessory and spare parts list

Item	Quantity	Designation	Article No.	Designation with wiring diagram
01	2	Electrical cut out	00752	F2/F3
02	1	Fuse	03208	F10
04	1	Intensifier (unit)	00231	M1
05	1	Fan	18703	M2
05	1	Water pump	08319	M3
06	1	Magnetic valve	19254	MV1
07	1	Coil	19262	MV1
08	1	Coil	29000	MV2
09	1	E-Valve	29004	MV2
10	1	FSE-02S	19342	N1
11	1	PSE-N15	19343	N1
12	1	High-pressure switch	00198	P1
13	1	Level switch	14001	P2

14	1	Flow monitor	14117	P3
15	1	Temperature monitor	09212	PT100
16	1	Intensifier contactor	00725	Q1.1
17	1	Motor circuit breaker intensifier	00712	Q1.2
18	1	Motor circuit breaker pump	00708	Q3.2
19	2	Motor circuit breaker additional contact	00724	Q1.2/Q3.2
20	1	Transformer circuit breaker	00719	Q4.2
21	1	Oil sump heater	---	R1
22	1	Control unit	11515	S1/2
23	1	Transformer	00905	T1
24	1	Main filter	14232	X6
25	1	Interface	11511	X9

WARRANTY

Heidolph Instruments provides a 3 year warranty for the products described here (excluding glass and wearing parts) if you register using the warranty card enclosed or online (www.heidolph.com). The warranty period begins with the date of registration. The serial number is also valid without registration.

This warranty covers material and manufacturing defects.

In the event of a material or manufacturing defect, the device shall be repaired or replaced free of charge under the terms of the warranty.

Heidolph Instruments shall not assume liability for any damage incurred as a result of improper handling or transport.

Warranty claim?

- Please contact hello@heidolph.com if you have any questions or wish to make a warranty claim.

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