

Operating manual

Unichiller in Desktop Housing

14.12.2009

**Valid for following versions:
with natural refrigerant, Advanced models, for
models with heating**

Valid for:

minichiller, minichiller w

UC006

UC007, UC010

UC012, UC012w

UC015, UC015w

UC022, UC022w

UC023w

UC025, UC025w

UC006Tw, UC009Tw

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Foreword

Dear Customer,

The Huber team would like to thank you for ordering this product. You have made a good choice. We thank you for your trust!

Please read and understand the instruction manual thoroughly before operating the unit. All instructions and safety information must be complied with.

Please read this manual before transporting, commissioning, operating, maintaining, repairing, storing or disposing of this unit.

Failure to comply with the instructions within this manual may invalidate any warranty for this unit.

Chapter 1: Safety

In this chapter is to be found the following sections:

- Description of safety and information symbols
- Intended use and General Safety Information
- Description
- Duties of the responsible person
- Operator requirements
- Machine operator duties
- Work area
- Safety Devices to DIN 12876 (applicable for units with heating)
- Additional Protection Devices (if provided)
- Environmental conditions
- Operating conditions
- Location
- Thermofluids

Description of Safety and Information symbols

Safety information is shown with a pictogram and keyword. The keyword indicates the level of the corresponding danger.



Danger!	Immediate risk to the life and health of personnel (Serious injury or death).
Warning!	Possible risk to the life and health of personnel (Serious injury or death).
Caution!	Possible dangerous situation (possible injury to personnel or damage to property).



Information!	User-tips and other useful information.
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Requirement!	Requirement to carry out a specific method, or action, for safe machine operation.
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Intended Use and General Safety Instructions



Danger!

Non-intended use can result in considerable personal injuries and material damage.

No third persons are authorized to make any changes to the machine. The device declaration becomes void, if any modification is carried out without manufacturers consent. Only personnel trained by the manufacturer may carry out modifications, repairs or maintenance work.

The following must be observed:

Always use the machine in a perfect working condition!

Only expert personnel may initially start-up and repair the device!

Do not bypass, bridge-over, dismantle or switch off the safety mechanisms!



The manufacturer is not liable for damages caused by technical changes to the temperature control device, inappropriate handling and / or use of the temperature control device without regard to the operating instructions.

The temperature control device is manufactured for commercial use only and may **only be used to maintain the temperature** within the internal bath (does not apply for chillers) and to **maintain the temperature** of reactors or other professionally expedient objects in laboratories and industry. Suitable thermal fluids are used throughout the entire system. The refrigerating or heating capacity is provided at the pump connections and in the bath itself (does not apply for chillers). The technical specifications of the temperature control device are determined in the data sheet. Operation must be prepared and carried out according to the operating instructions. Any non-observance of the operating instructions is considered as non-intended use.

The temperature control device corresponds to the state-of-the-art and the recognized safety-related regulations. Safety devices are built into your temperature control device.

The device is **NOT** approved for use as a medical product!



This temperature control unit is **NOT** built as explosion-proof and is **NOT** suitable for use in "ATEX" areas!

Foreseeable non-intended use:

- Activate the brakes for machines with rollers or roller support.

Description

Chillers are **temperature control devices** that ideally are used for carrying away of process heat and as economic alternative for cooling water (drinking water) i.e. for a reflux condenser, condensers, tools,...

Due to high **refrigeration performance** a **very short cooling time** can be achieved.
A pump is responsible for a good circulation of the thermal fluid.

For Chillers with a **pump** that can build pressure up to 3 bar, supply line pressure can be set by means of a **VPC-Bypass** and thus can be adapted for the required application. The pressure of the supply line is indicated via a **manometer display**.

Temperatures can be **easily read** via the **LED-display** screen.

An easy keypad (set point, arrow up and arrow down key) is used to set a set point.

Thermostats uses an **over-temperature protection in accordance with DIN EN 61010-2-010**, which is **independent** of the actual control circuits (**only valid for units with heating**)

Duties of responsible person



The operating instruction is to be kept easily accessible and in immediate vicinity of the unit. Only suitably qualified personnel should operate this unit. Personnel should be properly trained before operating the unit. Make sure that the operators have read and understood the instruction manual. Supply appropriate Personal Protective Equipment as required.

Operator requirements



Only authorised personnel should operate this unit. Personnel should be properly trained before operating the unit. The minimum age for operators is 18 years. Personnel under 18 years should only operate the unit under the direct supervision of qualified personnel. The operator is responsible for third parties within the working area.

Machine operator duties



Make sure that the operators have read and understood the instruction manual. Please observe the safety instructions. Appropriate Personal Protective Equipment (e.g. safety goggles, safety gloves) should be worn when operating the unit.

Work area

Work area is defined as the area in front of the machines control panel. Work area is determined by the peripheral equipment connected by the operator.

It is the customer's responsibility to ensure a clear, safe working area around the temperature control unit. The arrangement of the work area should be made after considering access to, and risk assessment of, the area and application.

Safety Devices to DIN12876

- Low level switch
- Adjustable over-temperature switch (also valid for units with heating)

Classification of Laboratory Thermostats and Baths

Classification	Thermal Fluid	Technical requirement	Designation ^d
I	non-flammable ^a	Over-temperature cut-off ^c	NFL
II	flammable ^b	Adjustable over-temperature cut-off	FL
III		Adjustable over-temperature cut-off and extra low-level switch	

^a Normally water; other fluids only when they are non-flammable in the event of a single failure.

^b The thermal fluid must have a flame point ≥ 65 °C, this means that ethanol can only be used under constant supervision.

^c The over-temperature protection can for example be provided by a fluid sensor or a suitable over temperature switch.

^d Determined by the manufacturer.

Your temperature control unit is designated a Class III FL.

Mechanical Over-temperature Switch

This temperature control unit is equipped with a mechanical over-temperature switch. For setting the over-temperature protection refer to chapter **setting the over-temperature switch**.

Environmental Conditions



This unit, and operations, will comply with DIN EN 61010-1:2001, only when it is located in suitable environmental conditions.

- for indoor use only;
- installation site \leq 2000 m altitude;
- installed on a level, even, non flammable surface;
- maintain a clearance above and around the unit of 10 cm for water-cooled units, and 20cm for air-cooled units, to allow air to circulate around the unit;
- for ambient temperature conditions please refer to the technical data sheet; remaining within these ambient conditions is imperative in ensuring accurate operation;
- maximum relative humidity of 80% up to 32°C, decreasing linearly to 50% relative humidity at 40°C
- use only as long a power cord as necessary;
- the unit should be located so as not to restrict access to the mains power switch;
- mains voltage should be $\pm 10\%$ of the rated value;
- avoid voltage spikes;
- transient voltage surges as they occur normally in the supply grid;
- clean rating 2;
- overvoltage category II

Operating conditions



Please make sure that the application and system performance is dependent upon the temperature range, viscosity, and flow rate of the thermal fluid:

- Please ensure that the power supply connections are correctly dimensioned.
- The temperature control device should be located so, that sufficient fresh air is available even when working with water cooled units.
- Please note that hose connections should be compatible with the thermal fluid used and the working conditions.
- When choosing the thermal fluid, not only minimal and maximum temperatures have to be complied with but also have to be suitable regarding burn point, viscosity and / or freezing. Furthermore the thermal fluid has to be compatible with all the materials used in the unit.
- Pressure changes with the length of hoses (keep as short as possible). Choose as large a diameter of hoses as possible (the width of the pump connections are considered as a point of reference) and may negatively affect temperature control results. Flow restrictions may occur if a too narrow connector is selected for corrugated hoses.
- The use of unsuitable hoses or hose connections may cause thermal and toxic injury to personal and environment. Temperature control hoses and their connections have to be insulated / secured against contact / mechanical damage.
- Non-suitable thermal fluids can negatively affect temperature control and be the cause of negative temperature results and damages. Therefore only use the thermal fluids recommended by the manufacturer and only in the intended temperature and pressure range. The application should be located on approximately the same level or lower than the temperature control device, if temperature control is to be carried out near to the boiling temperature of the thermal fluid. The thermal fluid should have room temperature when filling. Fill in the thermal fluid slowly, carefully and steadily. At the same time make sure that no thermal fluid overflows (back pressure); it is thereby necessary to wear personal protective equipment, e.g. safety goggles, thermally and chemically resistant gloves, etc.
- After filling and setting all necessary parameters the thermoregulation circuit has to be degassed. This is a requirement for proper operation of the device and thus its application.
- In the case of pressure-sensitive applications, e.g. glass reactors, observe the maximum inlet pressure of the temperature control device for cross section reduction or shut-off (see data sheet). Take suitable precautions (e.g. pressure limitation for temperature control devices with pressure control, bypass).
- In order to avoid danger of overpressure in the system, which could damage the temperature control device or the application, the thermal fluid must always be adapted at room temperature before turning off and a possibly available shut-off valve must be left open (pressure compensation).
- Temperature and dynamics within the reactor are determined by the outlet temperature. A differential temperature is created (ΔT) between outlet temperature and the temperature within the reactor. This difference in

temperature has to be adapted, depending upon type of glass application. As the differential temperature may exceed the admissible limit values and bursts may occur. Delta T value has to be adapted to the corresponding application. Therefore please see chapter **Comfort menu**.

- Do not kink the hoses.
- Check hoses in regular intervals for material fatigue (e.g. cracks).

With water cooled units please pay special attention to the maximum operating temperature and differential pressure requirements for the cooling water. Therefore please refer to the technical data sheet.



Danger!

If the cooling water contains high levels of minerals, e.g. chloride, bromide then suitable water treatment chemicals should be used. Use only recommended materials to maintain the unit warranty. Further information on corrosion, (appearance and avoidance) can be found on our website www.huber-online.com under "Download / Safety data sheets thermofluids / Characteristics of water".



Please refer to the sections on **Intended use and general safety instructions**.

Location



Caution!

- Transport the unit upright.
- The unit should be mounted in an upright and secure position, on a solid, stable surface.
- Place on a non flammable surface.
- Keep the area around the unit clean, to avoid slip and trip hazards.
- Set the brakes on the castors once the unit is in position.
- Place suitable absorbent material under the unit to catch any condensate and thermal fluid spills.
- Any spillage of thermal fluid should be immediately cleaned up.
- For large units, check the weight / load capacity for the flooring

Thermofluids



We recommend the thermal fluid shown in our catalogue. The name of a thermal fluid is derived from the working temperature range and the viscosity at 25 °C.

Examples of thermal fluids in our catalogue:

M40.165.10:

- Lower working limit -40 °C
- Upper working limit 165 °C
- Viscosity at 25 °C: 10 mm²/s

The data sheet for the thermal fluid used is of utmost importance, and must be read before use. This data sheet should be followed.

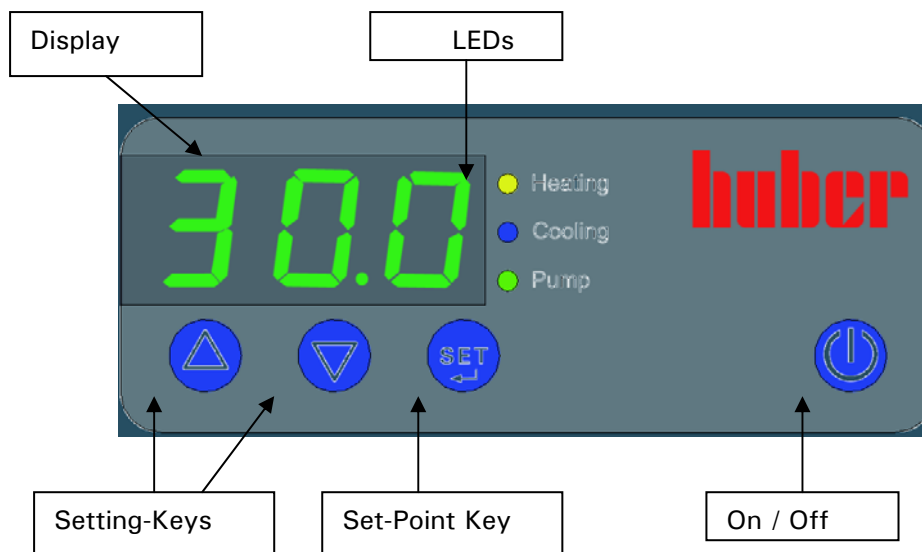
- Please note the classification of your machine according to DIN 12876
- The chosen thermal fluid must be compatible with stainless steel 1.4301 (V2A) and FKM!
- The maximum viscosity of the thermal fluid may not exceed 50 mm²/s at the lowest temperature reached!
- The maximum density of the thermal fluid may not exceed 1kg / dm³
- For chillers we recommend as thermal fluid a mixture of water and glycol (a mixture is recommended that permits a temperature down to -25°C). Information on water quality can be found on our website (www.huber-online.com) under "Download / Safety data sheets thermofluids / Characteristics of water".

Chapter 2 : Electronics and operation

The following sections are to be found in this chapter:

- Information displays and operation
- Advanced functionality

Display and operation



As a standard, internal temperature (e.g. temperature of the bath for thermoregulation units and outlet temperature for chillers) is displayed. By pressing the **SET-Key** a switchover to the actual set point temperature takes place. Keep the **SET-Key** pressed to change of the set point. Via the two arrow-keys you may select the set point. To **START / STOP** thermoregulation press the key **ON / OFF**. LEDs (Heating, Cooling and Pump) give information on the actual operating status (e.g. Pump is working and Cooling or Heating is on)

Advanced Functionality

Advanced Models contain, in comparison to standard models, of following possibilities:

1. Possibility of sensor relocation via an external sensor connection (Pt100)
2. An RS232 interface for controlling the machine.

Sensor relocation:

Keep the external Pt100 in a safe place!

A sensor relocation permits to control the temperature according to an external Pt100. To activate this function, switch off the temperature control unit and connect the external Pt100 to the designated Pt100 socket. Switch on the temperature control unit. No switch over will take place (sensor relocation) when connecting the Pt100 if the machine is operating. Please note, that within the internal and external sensor there is a simple delta-T limit. This delta-T limit complies with the actual set point and the internal sensor value. The internal sensor value lies always within a band of 5 K to the actual set point.

RS232 interface:

Therefore, please see description on chapter 4.

Chapter 3: Connect the machine, fill and prepare for the required application

- Power connection
- Start up
- Connecting an externally closed application
- Switching on the temperature control unit
- Setting the over-temperature switch
- Setting set point limits
- Entering a set point
- Starting temperature control
- Ending temperature control
- Filling and air purging an externally closed application
- Draining an externally closed application
- Thermofluid change / internal cleaning

Power connection



Danger!

Check to make sure that the line voltage matches the supply voltage specified on the identification plate or data sheet.

We disclaim all liability for damage caused by incorrect line voltages!

Safety instructions



Danger!	Only connect the unit to a power socket with earthing contact (PE – protective earth)!
Caution!	Do not move the unit from its location while it is running.
Danger!	Never operate equipment with damaged mains power cables.

Start up



General

All models must be moved and installed in an upright position. Provide for a stable installation and make sure that the thermostat cannot tilt. Ensure that sufficient fresh air is available for the circulation pump and compressors at the installation site. The warm exhaust air must be able to escape unhindered upwards.

Freezing protection (only valid for temperature control units with the option freezing protection)

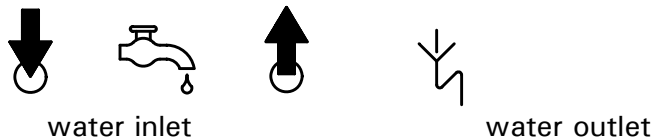
Temperature control devices (especially unichillers) with the option freezing protection are capable of using water as thermal fluid. An additional freezing protection may be activated for temperature control devices with the option freezing protection under the main menu point **Protection functions / Freezing protection** to avoid critical situations such as temperatures $< 5^{\circ}\text{C}$ at the internal heat exchanger and the risk of freezing of the heat exchanger. A green flashing ice crystal indicates the activated freezing protection under the main menu **Display modes / Large display**.

Water-cooling (valid for units with water cooling)



A cooling water controller is used in Huber tempering devices with water cooling, in order to reduce the cooling water consumption. This only allows as much cooling water to flow as is required by the current load situation of the tempering device. Only little cooling water is consumed, if the required refrigerating capacity is low. No cooling water flows in the OFF state. Only use pressure-resistant hoses in the cooling water circuit.

Connection diagram:



draining / water



Caution!

Depending upon mode of operation and available cooling water pressure, a cooling water pressure of > 2 bar can build up in the cooling water supply line. In order to avoid flooding of the premises, check the leak tightness and quality of the hoses, hose connections in regular intervals, and if necessary take appropriate measures (Replacement). Close down the cooling water supply to the tempering device even during shorter shutdowns (e.g. over night).

Reinforced hoses must be used for increased safety requirements.



Preparation of devices with water-cooling:

Establish the hose connections for the cooling water. The filter screen has to be inserted into the cooling water inlet. Please infer the position of the cooling water connections from the connection diagram in the appendix. Cooling water connectors Drainage with seal cap held closed and /or close. Open all stop valves. Please infer the minimum / maximum differential pressure in the cooling water circuit and the recommended cooling water inlet temperature from the data sheet.

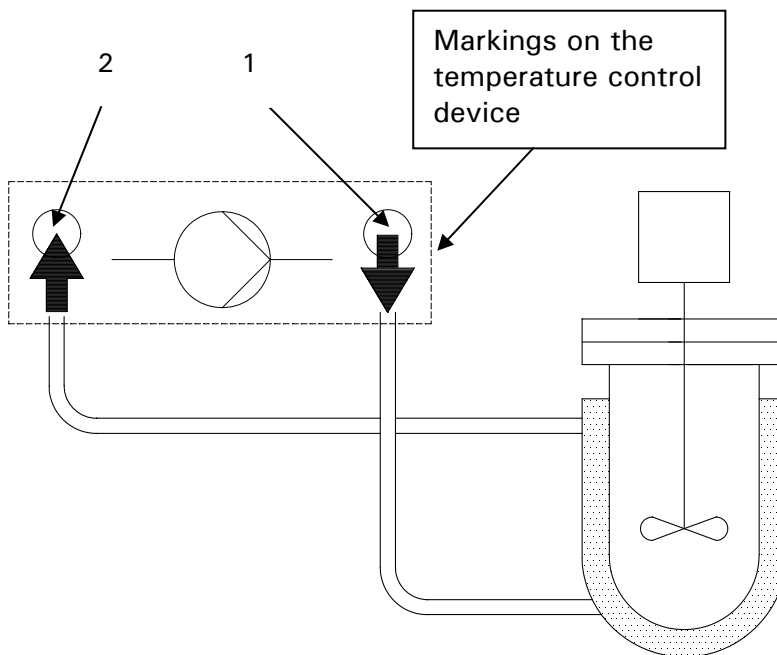
Information on water quality can be found on our website (www.huber-online.com) under "Download / Safety data sheets thermofluids / Characteristics of water".

Connecting an externally closed application

Remove the thread covers from the Fluid outlet (1) and Return (2).

Make sure that the hose material is compatible with the thermal fluid and temperature range being used. In order that the application can be driven correctly, and that no air bubbles remain in the system, ensure that the unit fluid outlet (1) is attached to the lowest connection on the application, and the unit fluid return (2) is attached to the highest connection on the application.

Please note the markings for the hose connections on the housing



Switching on the temperature control unit

The temperature control unit can be switched on using the mains switch (36).

Circulation and thermoregulation are switched off.

Setting the over-temperature switch

(also valid for chillers with heating)

General Information

The over-temperature switch is an independent function of the temperature control unit. The over-temperature tripping value of the heating and circulation may be set by using a tool (e.g. screwdriver). The constant monitoring of the internal temperature provides safety for the connected application. It should be set immediately after having filled the device with the thermal fluid.



Warning!

The over-temperature switch should be tested at least monthly, and after changing the thermal fluid.

The over-temperature switch should be set at least 25 K below the flame point of the thermal fluid.

When received, the cut-off will be set to 35 °C.

If the temperature of the thermal fluid is higher than this value when filled the machine switches off (**STOP to DIN EN 61010**) and an alarm will be given after a short time.

After removing cause of the error (e.g. by using a thermal fluid with a higher burning point and the correct setting of the over-temperature protection) start the device again.

Entering a set point

You can enter a set point by pressing the **SET-Key** and **ARROW UP** or **ARROW DOWN Key** simultaneously.

Starting temperature control

Temperature control and circulation may be started / stopped via the **ON / OFF** key. Any air trapped in the system may be vented via the bath / sight glass (if available) or via the opening at the filling nozzle with external closed applications. After filling and fully air purging the temperature control unit can be started.

Ending temperature control

The temperature control can be ended at any time by pressing the **ON / OFF** key.

Filling and air purging an externally closed system



Caution!

- For additional protection of a fragile application (e.g. glass reactor), chillers with pumps, which are able to build pressures up to 3 bar, are equipped with a VPC Bypass. Outlet pressure can be set via a valve which is next to the inlet nozzles (Check the manometer display on the front of the chiller). Before operating the machine, turn the valve to the left endstop (Anticlockwise). Then on starting the pump, the smallest possible pressure will be produced.
- Fill to the unit to the minimum level necessary.
- Please refer to local regulations and internal procedures.
- When filling the unit, extra precautions such as earthing the expansion tank, fluid container funnel and application may be necessary.
- Personal Protection Equipment (PPE) should be worn as required by the fluid MSDS sheets, and local regulation.
- Please note the temperature of the thermal fluid. The fluid should be left a room temperature for a few minutes before draining.



Warning!

Overflowing thermal fluid will create a film on surfaces, which should be cleaned up and properly disposed of as soon as possible in accordance with the MSDS information. If thermal fluid is spilled over the unit, the unit should be immediately turned off, and Huber-trained personnel consulted.

Failure to observe the above precautions may mean that the unit will not comply with all of the requirements of DIN EN 61010-2-010.

Filling and air purging

- Lift the bath cover / lid from the bath / inlet connections
- Carefully pour a suitable thermal fluid into the expansion tank, filling hole (17) with help of appropriate accessories such as a funnel and / or beaker. The thermal fluid flows via the expansion tank (18) into the machine, then through the hoses into the external application.
- Then start the temperature control device and fill in thermal fluid as required.
- The filling process / air purging process is finished when the fluid level is stable and the bath is filled sufficiently. Fill only half of the sight glass with thermal fluid. Start temperature control and fill in thermal fluid as required.
- Note the volume change of the thermal fluid (especially with oils) in connection with the operating temperature. At the lowest temperature required, the fluid must be above the **minimum** mark in the sight glass, and it must not overflow at the highest temperature required. In case of over filling, drain off the excess fluid into a suitable container via the expansion tank drain (8) or machine drain
- With the help of the bypass on the machine top, set the permissible pressure that your application can carry (direction +). the pressure is displayed on the manometer.

Draining the machine and an externally closed application



General

- Before draining the unit, the heat transfer fluid should be at ambient temperature (approx. 20 °C). If not, let the machine run with a set point of approx. 20 °C for a few minutes until the thermal fluid is at a safe temperature.
- Connect one end of a suitable drain hose to the drain of the unit (8), and place the other end into a suitable container (make sure the hose and container materials are compatible with the heat transfer fluid being used).



Draining

- Open the drain valve (4) if available.
- The heat transfer fluid should flow through the pump case, and drain port into the container.
- Disconnect the hose from the unit's outlet (1).
- Disconnect the hose from the inlet to the unit (2).
- Leave the temperature control device open to dry out for some time (without sealing caps and open drain valve (4)).

Changing heat transfer fluid / internal cleaning

- After emptying the unit as described in the chapter **Draining the machine and an externally closed application** depending on the thermal fluid, it is possible that remnants of the oil remain in the machine.
- Connect a short hose between the inlet (2) and outlet (1) of the unit.
- When having used silicon oils as thermal fluid, use a suitable solvent (e.g. Mucosol) to clean the internal components such as pump housing, reservoir, etc. Depending on the amount of contamination, it may be necessary to drain the solvent off, and repeat the procedure a number of times with clean solvent.
- Afterwards, leave the temperature control device stand for some time (open all drain valves and have the connections opened).

Chapter 4: Interface and software update

This chapter concerns use of the RS232 interface for Advanced temperature control machines.

Data Communication

Transmission format:

Baud rate 9600
Process asynchronous
Star bit 1
Data bits 8
Parity none
Stop bit 1
Handshake no
Parameters are programmed and can not be changed!

Time behaviour (timing)

The software protocols shall have to be structured in such a way that very simple timing rules can be applied:

The data flow within a command should not be interrupted. Pauses of more than 100 ms between the characters of a command will cause the receiver to abort the command in the process of reception. The protocols have been set up in such a way that an „echo“ can always be received. If the echo has been received, the next command can be transmitted immediately.

The typical response time is below 300 ms.

If no echo is used, it is recommended to wait for 1 s between two commands.

The LAI command group

A number of bus-compatible commands are available under the protocol designation of LAI. The „General guidelines“ of the software protocols are applicable.

In addition, there are the following special features:

LAI command structure

A LAI command is structured as follows:

„[mssilld...dpp\r„

with:

[start character 5Bh	1 byte
m	transmitter identifier M (4Dh) for master or S (53h) for slave	1 byte
ss	slave address 01	2 bytes
i	identifier of the data group	1 byte
ll	length of the data field	2 bytes
d...d	data group	0...50 bytes
pp	check sum	2 bytes
\r	rogue indicator CR (0Dh)	1 byte

The transmitter identifier indicates the direction of the data traffic. All characters in front of the check sum are referred to as **data field**. The **data group** are the characters after the seventh byte up to the check sum. The actual data are contained in the data group. The significance of the data is determined by the identifier and the transmitter identifier. Below the commands will be referred to according to the identifier of the data group.

In order to increase the data safety, a check sum is transmitted.
 The check sum is the 1 byte sum of all hex values from the start character to the last character in front of the check sum.

Example: The Master sends : „**IM01V07C6**\r„

	ASCII	Hex	Meaning
1.Byte	[5Bh	Start signal
2.Byte	M	4Dh	Transmitter identification M = Master
3.Byte	0	30h	Slave address
4.Byte	1	31h	Slave address
5.Byte	V	56h	Identifier data group
6.Byte	0	30h	Length of the data field (0)
7.Byte	7	37h	Length of the data field (7)
8.Byte	C	43h	Check sum
9.Byte	6	36h	Check sum
10.Byte	\r	0Dh	End-character CR

A checksum is built up from the bytes in the data field.

$$5Bh + 4Dh + 30h + 31h + 56h + 30h + 37h = 1C6h \rightarrow 1 \text{ Byte Summe} = C6h$$

In order to be able to query variables without changes, it is possible to set the „*“ character instead of a variable in the master command. The receiver, thus the thermostat, will not change the variable at this position. In this case, **all positions** which the variable takes, have to be rendered with the „*“ character. In the examples, the thermostat is always addressed with the identifier (device address) 01.

‘V’ Verify - Command

Provided to check the presence of a slave.

Master query:

„**IM01V07C6**\r“ The master queries whether the slave 01 is connected to the bus.

Slave answer:

„**S01V0EMINI CCAD**\r“ Slave 01 (temperature control device) is connected. The device is a MINI CC (Example). The slave command has the „MINI CC“ data group, which is 7 bytes long. These 7 bytes plus the 7 bytes in front of the data group produce a data field length of 14 bytes = 0Eh byte.

‘G’ General Command

This command transmits the most important temperatures and the status information. A modified set point value is not saved to the permanent memory, i.e. this value is lost when the mains is switched off.

Master query: „[M01G0Dsatttpp\r“

s = Control mode:

- ‘C’ = Circulation, switch on the circulation.
- ‘I’ = Switch on the internal control mode.
- ‘O’ = Off, standby mode.
- ‘*’ = Make no change of the current condition.

a = Cancelling the alarm:

- ‘0’ = No Alarm cancellation.
- ‘1’ = A possible alarm is being canceled.
- ‘*’ = Make no change of the current condition.

tttt = Set point value with 16 bit resolution (1 Byte of 4ASCII characters, LSB is 0,01K, max 7FFF or 327,67°C)
Example: +4°C is displayed as 0190
-4°C is displayed as FE70

‘*****’ = No change of the set point value.

pp = Check sum

\r = End-character CR.

Slave response: „[S01G15satttiiiieeeepp\r“

s = Control mode:

- ‘C’ = Circulation, switch on the circulation.
- ‘I’ = Switch on the internal control mode.
- ‘O’ = Off, standby mode.

a = Alarm status:

- ‘0’ = No Alarm.
- ‘3’ = A number other than 0 means alarm.

tttt = Set point (Format see master query above)

iiii = Internal actual value (Format same as set point)

eeee = External actual value (Format same as set point but with no meaning)

pp = Check sum

\r = End-character CR.

'L' Limit – Command

This command transfers the set point value limits;

Master query: „[M01LOFllllhhhhpp\r„

llll = Low-Limit, lower set point limit (Format as above)

**** = No change of the lower set point limit.

hhhh = High-Limit, upper set point limit (Format as above)

**** = No change of the upper set point limit.

pp = Check sum

\r = End-character CR.

Slave response: „[S01L17llllhhhhuuuuooooopp\r„

llll = Low-Limit, lower set point limit (Format as above)

hhhh = High-Limit, upper set point limit (Format as above)

uuuu = Lower working-range limit. This limit is specific to the device and cannot be modified. The lower set point limit cannot be below the lower working range limit.

oooo = Upper working range limit. This limit is specific to the device and cannot be modified. The upper set point limit cannot be above the upper working range limit.

pp = Check sum

\r = End-character CR.

Chapter 5: First aid for a fault condition

The following sections can be found in this chapter:

- Display Error Messages
- Maintenance
- Decontamination / Repair
- Cleaning the surfaces
- Plug contacts

Display Error Messages

Alarms and Warnings



In case of malfunction alarms and warning messages are indicated through the display.

Display	Cause	Effect, measurement
flashing display (temperature value)	Warning: Over- undertemperature (limit value +/- 2K from set point).	Thermoregulation continues.
F1-flashing	malfunction sensor F1 broken or short circuit	Thermoregulation is inactive (Pump off, compressor off, heating off). Please check sensor.
E1-flashing	Inlet E1 indicates failure. No release-signal, level-alarm.	Thermoregulation is inactive (Pump off, compressor off, heating off). Check level. Reset only possible if level ok.
E2-flashing	Inlet E1 indicates failure. Pump is running and circulation is missing or Pump is running and water pressure is missing.	Thermoregulation is inactive (Pump off, compressor off, heating off). Reset only possible if disconnected from the power supply.
E3-flashing	Even though thermoregulation is off, inlet E1 is indicating circulation.	Thermoregulation is inactive (Pump off, compressor off, heating off). Failure is being reset if inlet E1 is open again in standby.
EP-flashing	Loss of data in parameter memory.	Thermoregulation is inactive (Pump off, compressor off, heating off).

Advice:

While error message is being indicated error and set point are displayed alternately.

Maintenance



Danger!

Prior to carrying out cleaning on the machine switch off the machine via the mains isolator (36) and disconnect it from the mains.



There are few user-serviceable parts inside the unit. Other than the items listed below, maintenance should be carried out by Huber-trained and authorised personnel.

Cleaning cooling fins (for air cooled machines with compressors only)

To ensure that the temperature control unit will give the maximum cooling power the unit has to be freed from dirt (dust) from time to time. Please provide for an unrestricted air supply (discharge from heat loss, fresh air supply). Keep a distance of 20cm to walls for air cooled units. Identify the position of the air outlet, normally it is to be found at the front, with some other units it can also be found on the side, the rear or under the temperature control unit. Remove the air outlet grill to gain access to the cooling fins. With the help of a brush or vacuum cleaner, you can clean the fins of the black condenser at the back of the cabinet. However, never use pointed objects. Please see that the condenser fins are not damaged or deformed, as this may impair the air current.

Cleaning the water filter (for water cooled machines with compressors only)

Depending on water quality, the filter at the cooling water inlet has to be cleaned regularly. Immediately after the cooling water connection there is the cooling water filter. Close the water supply lines and place a container below the cooling water outlet (27). Use a 17mm spanner (wrench) to remove the filter cover. The metal cooling water filter is underneath the cover, and can be removed and rinsed.



We are pleased to offer service training for users. Please contact Customer Support Team for further details.

Decontamination / Repair



The user is responsible for making sure that there are no hazardous materials either in or on the unit. The level of decontamination should be appropriate to the amount and type of contaminants on the unit. The user should refer to the appropriate MSDS information for advice.

The decontamination should be done **BEFORE** outside personnel come into contact with the machine, and **BEFORE** the unit is sent out for repair or testing. The unit should be clearly labelled that it has been decontaminated before it is sent.

We have prepared a document to simplify this process. This is available in the appendix, and at our website www.huber-online.com.

Cleaning the surfaces

A normal steel cleaning spray is suitable for cleaning the stainless steel surfaces. Painted areas should be carefully cleaned with a gentle detergent.

Plug contacts

Each socket has a protective cap belonging to it. If a connector is not required, then it should be covered with this cap.

Chapter 6: Taking the machine out of service

The following sections can be found in this chapter:

- Decommissioning
- Transport
- Disposal

Decommissioning

Safety notice and policy



Caution!

- Injury to persons or property possible:
- Danger of slippage due to contaminated floor and working area.
- Danger of tipping due to insufficient stability.
- Danger of electric shock due to faulty power connection.
- Danger of burns at extreme temperatures if touched.
- Danger of chemical burns of the eyes, skin or airway due to emission of dangerous vapours (with the appropriate thermal fluid).
- Leakage of fluid remnants to be caught in a collecting vessel. Machine and floor contamination to be removed at once!



All safety notices are essential and must be considered when working according to the operating manual!

Switching off

Set main switch (36) to "0".

Disconnect the thermostat from the power supply.

Drain out cooling water (only with water cooled machines)

Draining procedure:

Customers drain valves to be closed so that no cooling water flows. Put a collecting vessel under the cooling water connections of the machine. Remove the closing cap on the cooling water drain. The water will begin to drain from the water connections. It is essential that the water is allowed to fully drain out to prevent danger of freezing during storage or transport!



The drained off cooling water can be tipped down the normal drains. The draining of the machine can be accelerated by blowing a compressed air pistol against the cooling water connections.

Transport

The unit is now decommissioned and ready for transportation. The original packing material should be used as far as possible, and the unit must always be transported in the upright position.

Items such as the controller and sight glass should be protected from transport damage. The unit should not be transported on its rollers, or mounting feet. Supports of rectangular wooden beams appropriate for the weight should be used even when transported on a pallet. When shipping the unit on a pallet, it should be braced on four sides using wood or other suitable materials. Extra bracing and banding should be made according to the weight of the unit. Extra materials such as plastic wrap / sheeting, cardboard, and banding should be used as necessary.

Disposal

Thermal fluid which has spilled or leaked must be correctly disposed of.

To minimise environmental pollution, please dispose of old temperature control machines only via suitably licenced and experienced disposal or recycling companies.

BESTÄTIGUNG / CONFIRMATION



An / To:

Huber Kältemaschinenbau GmbH
Werner-von-Siemens-Str. 1
77656 Offenburg

Von / from:

Firma / company: _____	Betreiber / responsible body: _____
Strasse / street: _____	Name / name: _____
Ort / city: _____	Funktion / function: _____
Tel.: _____	Gebäude / building: _____
Fax: _____	Raum / room: _____
Email: _____	

Hiermit bestätigen wir, dass nachfolgend aufgeführtes HUBER- Temperiergerät:
We hereby confirm that the following HUBER-equipment:

UNISTAT UNICHILLER MINISTAT CC _____

Typ / Type: _____
Serien-Nr. / Serial no: **S** _____

mit folgendem Thermofluid betrieben wurde
Was used with the below mentioned heat transfer fluid

Beachten Sie bitte bei der Verwendung fremder Temperiermedien:
Durch die Vielzahl unterschiedlicher Thermofluide sind wir gezwungen vor Beginn der Reparatur die Geräte zu spülen. Die dabei entstehenden Kosten müssen wir Ihnen in Rechnung stellen. Sie können die für Sie anfallenden Kosten niedrig halten, wenn sie das Gerät vor der Rücksendung mit Ethanol spülen. Vielen Dank!

Please note that if you're using none Huber heat transfer fluids we have to flush the system before we start with your repair. The resulting costs have to be added onto your bill. You can reduce your repair costs by flushing your system with ethanol before return. We appreciate your help!

Darüber hinaus bestätigen wir, dass das oben aufgeführte Gerät sorgfältig gereinigt wurde, die Anschlüsse verschlossen sind und sich weder giftige, aggressive, radioaktive noch andere gefährliche Medien in oder am Gerät befinden.

Additionally we confirm that the above mentioned equipment has been cleaned, that all connectors are closed and that there are no poisonous, aggressive, radioactive or other dangerous substances on or inside the equipment.

Stempel
Seal

Ort/ Datum
City/ date

Betreiber
responsible body

EU declaration of conformity

We hereby declare that the design of the appliance described below complies in the version sold by us with the relevant EU guidelines, also listed below. Implementing modifications not approved by us will invalidate this declaration.

Designation: Circulation Thermostat
Type:
Serial Number:
Order number:

Relevant EU directives:

2006/95/EG (Low-Voltage directive)

2004/108/EC (Electromagnetic Compatibility)

Relevant harmonized standards under the directives indicated above:

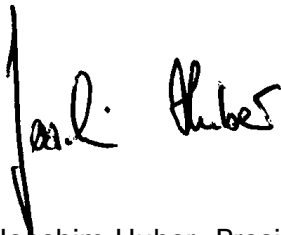
EN 61010-1: 2002
EN 61010-2-10: 2004
EN 61326: 2004

Further national standards:

DIN 12876-1
DIN 12876-2
DIN 12876-3

Offenburg, 28 Dezember 2009

Peter Huber
Kältemaschinenbau GmbH



Joachim Huber, President