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## Multi Flow Control Cube

Betriebsanle... Manual de  
instruccion... ale de d'uso  
· 사용 설명... нструкция  
по эксплуа... 说明书

Betriebsanle... Manual de  
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· 사용 설명서 · Manual de instruções · Инструкция по эксплуатации · Kullanım talimatı · 操作说明书

**This documentation does not contain a device-specific technical appendix.**

You can request the full installation guide from [info@huber-online.com](mailto:info@huber-online.com). Please give the model designation and serial number of your temperature control unit in your e-mail.

# huber





OPERATION MANUAL

# **Multi Flow Control Cube**



# Multi Flow Control Cube

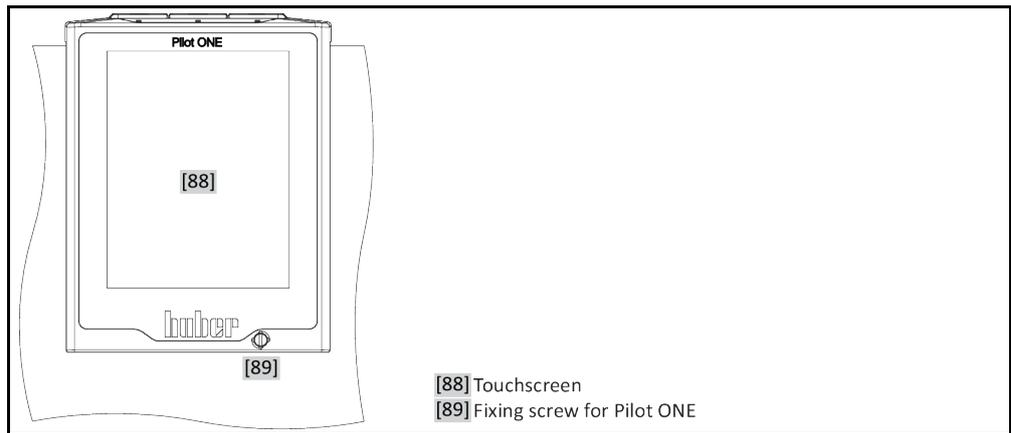
## Pilot ONE®

This operation manual is a translation of the original operation manual.

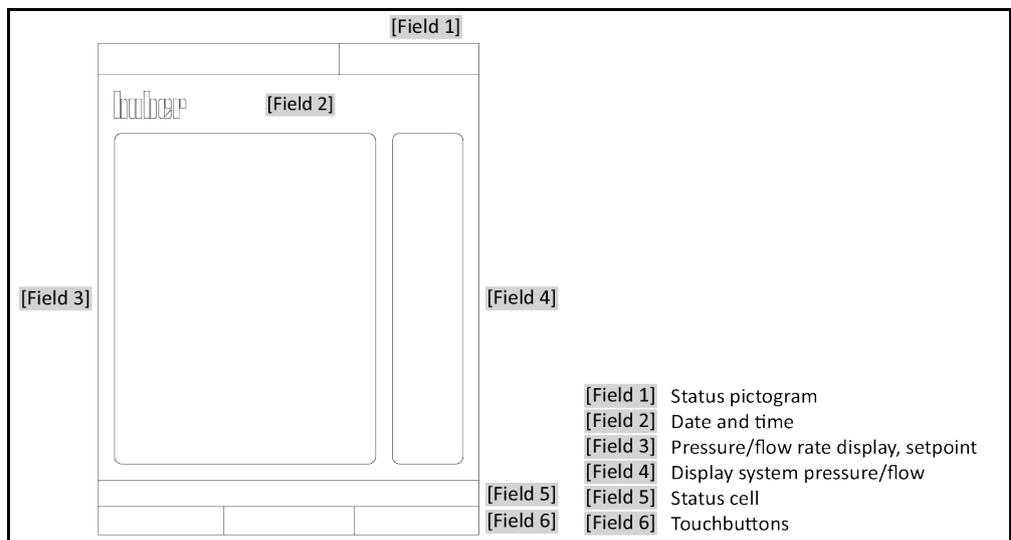
### VALID IN CONJUNCTION WITH:

HUBER temperature control units  
with Pilot ONE®  
in conjunction with a  
process control system (PCS)

„Pilot ONE“



Layout of the "Home" screen



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V1.0.0en/19.05.22

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## Foreword

Dear Customer,

Thank you for choosing accessories from Peter Huber Kältemaschinenbau SE. You made a good choice. Thank you for your trust.

Please read the operation manual carefully before putting the unit into operation. Strictly follow all notes and safety instructions.

Follow this operation manual for transport, start-up, operation, maintenance, repair, storage and disposal.

We fully warrant the accessory for the specified normal operation.

In this operation manual, the component listed on page 5 is referred to as accessory, and Peter Huber Kältemaschinenbau SE as Huber company or Huber.

Liability for errors and misprints excluded.

The following trademarks and the Huber logo are registered trademarks of Peter Huber Kältemaschinenbau SE in Germany and/or other countries worldwide: BFT®, CC®, Chili®, Com.G@te®, Compatible Control®, CoolNet®, DC®, E-grade®, Grande Fleur®, Huber Piccolo®, KISS®, Minichiller®, Ministat®, MP®, MPC®, Peter Huber Minichiller®, Petite Fleur®, Pilot ONE®, RotaCool®, Rotostat®, SpyControl®, SpyLight®, Tango®, TC®, UC®, Unical®, Unichiller®, Unimotive®, Unipump®, Unistat®, Unistat Tango®, Variostat®. The following trademarks are registered in Germany to DWS Synthesetechnik: DW-Therm®, DW-Therm HT®. The following trademark is a registered trademark of BASF SE: Glysantin®.

# 1 Introduction

## 1.1 Identification / symbols in the operation manual

The following identifications and symbols are used in the texts and illustrations.

| Overview | Identification / symbol | Description   |
|----------|-------------------------|---|
|          | →                       | Reference to information / procedure.   |
|          | »TEXT«                  | Reference to a chapter in the operation manual. In the digital version, the text is clickable.    |
|          | >TEXT< [NUMBER]         | Reference to the wiring diagram in the annex. The designation and the search digit are specified. |
|          | >TEXT< [LETTER]         | Reference to a drawing in the same paragraph. The designation and the search digit are specified. |
|          | ▪                       | List, first level   |
|          | –                       | List, second level  |

## 1.2 Information on the EU Declaration of Conformity

The equipment complies with the basic health and safety requirements of the European Directives listed below:

- Machinery Directive
- Low Voltage Directive
- EMC Directive

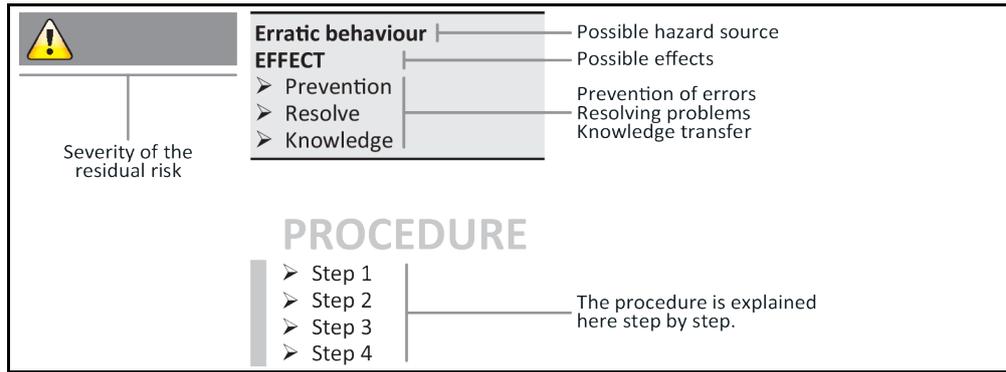
## 1.3 Safety

### 1.3.1 Symbols used for Safety Instructions

Safety instructions are marked by the below combinations of pictograms and signal words. The signal word describes the classification of the residual risk when disregarding the operation manual.

|                    |   |
|--------------------|---|
| <b>DANGER</b>      | Denotes an immediate hazardous situation that will result in death or serious injuries. |
| <b>WARNING</b>     | Denotes a general hazardous situation that may result in death or serious injuries.     |
| <b>CAUTION</b>     | Denotes a hazardous situation that can result in injury.                                |
| <b>NOTE</b>        | Denotes a situation that can result in property material damage.                        |
| <b>INFORMATION</b> | Denotes important notes and usable hints.   |

Safety information and procedure



The safety information in this operation manual is designed to protect the operating company, the operator and the equipment from damage. First inform yourself about any residual risks due to misuse before you start an operation.

### 1.3.2 Representation of safety identifiers on the accessory

The following pictograms are used as safety identifiers. The table gives an overview of the safety identifiers used here.

Overview

| Identifier            | Description  |
|-----------------------|--|
| <b>Mandatory sign</b> |  |
|                       | - Observe the instructions                           |
| <b>Warning sign</b>   |  |
|                       | - General warning sign<br>- Observe the instructions |
|                       | - Warning of electrical voltage                      |
|                       | - Warning of hot surface                             |
|                       | - Warning of flammable substances                    |

### 1.3.3 Safety during commissioning

The following chapters are relevant for accessories in connection with a Huber temperature control unit, and apply in addition to the operation manual of the temperature control unit used here. If you have any questions, please contact our Customer Support. → Page 54, section »Contact data«. Keep this operation manual for future reference.

### 1.3.4 Extension of specified normal operation



**The accessories are operated in a potentially explosive area**  
**DEATH FROM EXPLOSION**

- Do NOT install or start up the accessories within an ATEX zone.



**Improper use**

**SEVERE INJURIES AND MATERIAL DAMAGE**

- Keep the operation manual easily accessible in the immediate vicinity of the temperature control unit and/or the accessories.
- Only adequately qualified operators may work with the temperature control unit and/or the accessories.
- Operators must be trained before handling the temperature control unit and/or its accessories.
- Check to ensure that the operators have read and understood the operation manual.
- Define precise responsibilities of the operators.
- Personal protective equipment must be provided to the operators.
- Be sure to follow the safety rules of the responsible body to protect life and limb and to limit damages!



**Modifications to the accessory by third-parties**

**DAMAGE TO THE ACCESSORY AND THE TEMPERATURE CONTROL UNIT**

- Do not allow third parties to make technical modifications to the accessories.
- Any modification that is not approved by Huber invalidates all EU Declarations of Conformity for the accessories.
- Only specialists trained by Huber may carry out modifications, repairs or maintenance work.
- **It is imperative to observe:**
- Only use the accessories in a fault-free condition!
- Have the start-up and repairs carried out by specialists only!
- Do not ignore, bypass, dismantle or disconnect any safety devices!



**A pressure-sensitive external application is run with the accessory without an overpressure protection device being installed**

**MATERIAL DAMAGE TO THE EXTERNAL APPLICATION**

- To protect a pressure-sensitive external application (such as a glass apparatus), use an overpressure protection device in the supply line.
- Do not use accessories as an isolating valve. The outputs cannot be completely closed due to the design.
- The external application can be damaged by excessive pressure if the return is locked.

The accessory is intended for volume flow control (with or without max. pressure limit) or for pressure control of an **externally closed application**. For this, the accessory must be properly installed on the temperature control unit. The accessory must be used only in combination with a Huber temperature control unit. The accessory can **not** be used without being connected to a temperature control unit. The temperature control unit and accessory **must** be controlled/monitored by a process control system. Otherwise the intended use applies as described in the operation manual of the temperature control unit. For the technical specification, refer to the datasheet. → From page 55, section »Annex«. Install, set up and operate the accessory according to the instructions in this operation manual. Any failure to comply with the operation manual is considered as improper operation. The accessory was manufactured according to the state of the art and the recognized safety rules and regulations.

The accessory is not a safety device for the unrestricted protection of a pressure-sensitive external application (e.g. a glass apparatus). The maximum pump pressure may be applied to your external application if the accessory is defective. A sufficiently dimensioned overpressure protection device must be installed in the supply line (pressure side) to protect your external application. The installed overpressure protection device is destroyed in the event of a fault and thus protects the external application against damage. The approved temperature range is indicated on the nameplate of the accessory.

### 1.3.5 Reasonably foreseeable misuse

Use with medical devices (e.g. in Vitro diagnostic procedure) or for direct foodstuff temperature control is **NOT** permissible.

The temperature control unit / accessory **must not be used** for any purposes other than temperature control in accordance with the operation manuals.

The manufacturer accepts **NO** liability for damage caused by **technical modifications** to the temperature control unit / accessory **improper handling** or use of the temperature control unit / accessory if the operation manuals are **not observed**.

## 1.4 Responsible bodies and operators – Obligations and requirements

### 1.4.1 Obligations of the responsible body

Keep the operation manual easily accessible in the immediate vicinity of the accessories. Only adequately qualified operators (e.g. machine operators, chemists, chemical technical assistants, physicist etc.) are allowed to work with the accessories. Operators must be trained before handling the accessories. Check that the operators have read and understood the operation manual. Define precise responsibilities for the operators. Personal protective equipment must be provided to the operators.

- The responsible body must install a condensation water / thermal fluid drip tray below the temperature control unit (including accessories).
- The use of a drip tray may be prescribed by national legislation for the installation area of the temperature control unit (incl. accessory). The responsible body must check and apply the national regulations applicable for it accordingly.
- The temperature control unit (including accessory) complies with all applicable safety standards.
- Your system, which uses our temperature control unit (including accessory), must be equally safe.
- The responsible body must design the system to ensure it is safe.
- Huber is not responsible for the safety of your system. The responsible body is responsible for the safety of the system.
- Whilst the temperature control unit (including accessory) provided by Huber meets all the applicable safety standards, integration into a system may give rise to hazards that are characteristic of the other system's design and beyond the control of Huber.
- It is the responsibility of the system integrator to ensure that the overall system into which this temperature control unit (including accessory) is integrated is safe.
- The **>Mains isolator<** [36] on the temperature control unit/accessory can be locked in the off position to facilitate safe system installation and maintenance of the temperature control unit (including accessory). Accessories with own power supply must be **additionally** disconnected from the power grid connection! It is the responsibility of the responsible body to develop any lock-out/tag-out procedure for the energy source in accordance with local regulations (e.g. CFR 1910.147 for the US).

#### 1.4.1.1 Proper disposal of resources and consumables

Do comply with all national disposal regulations applicable for you. Contact your local waste management company for any questions concerning disposal.

| Overview | Material / Aids                  | Disposal / Cleaning  |
|----------|----------------------------------|--|
|          | Packaging material               | Keep the packaging material for future use (e.g. transport).   |
|          | Thermal fluid                    | Please refer to the safety data sheet of the thermal fluid used for information on its proper disposal.<br>Use the original thermal fluid container when disposing it. |
|          | Filling accessories, e.g. beaker | Clean the filling accessories for reuse. Make sure that the materials and cleaning agents used are properly disposed of.   |

| Material / Aids   | Disposal / Cleaning   |
|---|---|
| Aids such as towels, cleaning cloths  | Tools used to take up spilled thermal fluid must be disposed of in the same fashion as the thermal fluid itself.<br>Tools used for cleaning must be disposed of depending on the cleaning agent used. |
| Cleaning agents such as stainless steel cleaning agents, sensitive-fabrics detergents | Please refer to the safety data sheet of the cleaning agent used for information on its proper disposal.<br>Use the original containers when disposing of large quantities of cleaning agents.        |
| Consumables such as air filter mats, temperature control hoses                        | Please refer to the safety data sheet of the consumables used for information on their proper disposal.   |

### 1.4.2 Requirements for operators

Work on the temperature control unit / accessory is reserved for appropriately qualified specialists, who have been assigned and trained by the responsible body to do so. Operators must be at least 18 years old. Persons under the age of 18 years may operate the temperature control unit / accessory only under the supervision of a qualified specialist. The operator is responsible for other people within the unit's working range.

### 1.4.3 Obligations of the operators

Carefully read the operation manual before you handle the temperature control unit / accessories. Always observe the safety instructions. Wear appropriate personal protective equipment (e.g. safety goggles, protective gloves, non-slip shoes) when operating the temperature control unit / accessories.

## 1.5 General information

### 1.5.1 Description of workstation

The workstation is located in front of the control panel of the process control system. The workstation is determined by the peripherals connected by the customer. It is the responsible body's responsibility to design it safely. The workstation design also depends on the applicable requirements of the German occupational health and safety regulations [BetrSichV] and the risk analysis for the workstation.

### 1.5.2 Further protective devices

#### INFORMATION

Emergency strategy – interrupt the power grid connection!

To determine the type of switch or switch combination your accessory is equipped with, please refer to the connection sketch. → From page 55, section »Annex«.

**Accessory with >Main switch< [36] (red/yellow or grey):** Turn the >Main switch< [36] to the "0" position.

**Accessory with >Main switch< [36] (red/yellow) and additional >Appliance switch< [37] (gray):** Turn the >Main switch< [36] to the "0" position. Then turn the >Appliance switch< [37] to the "0" position!

**Accessory with >Main switch< [36] (gray) and >Emergency stop switch< [70] (red/yellow):** Press the >Emergency stop switch< [70]. Then turn the >Main switch< [36] to the "0" position!

**Accessory with >Mains isolator< [37]:** Power supply via socket: Disconnect the accessory from the power grid. Then turn the >Mains isolator< [37] to the "0" position! Power supply via hard wiring: Disconnect the power grid supply by means of the building's circuit breaker. Then turn the >Mains isolator< [37] to the "0" position!

**Accessory without a switch or inside a protective housing:** Connection via socket: Disconnect the accessory from the power grid. Connection via hard wiring: Disconnect the power grid supply by means of the building's circuit breaker!

## 2 Commissioning

### 2.1 In-plant transport

#### CAUTION

Accessories are not transported / moved in accordance with the specifications in these operation manual

#### INJURIES DUE TO CRUSHING

- Always transport / move accessories in accordance with the specifications in these operation manual.
- Wear personal protective equipment during transport.

#### NOTE

Accessories are transported in a horizontal position

#### PROPERTY DAMAGE

- Only transport accessories in an upright position.

#### NOTE

Transport of filled temperature control unit and/or accessory

#### MATERIAL DAMAGE DUE TO OVERFLOWING THERMAL FLUID

- Only transport empty temperature control unit and/or accessory.

- If available, use the eyes on the top side of the accessory for transportation.
- Use an industrial truck for transportation.
- The casters (if present) on the accessory are not suitable for transportation. The casters are each symmetrically loaded with 25% of the total mass of the accessory.
- Remove the packing material (e.g. the palette) only at the place of installation.
- Protect the accessory from transport damage.
- Do not transport the accessory alone and not without aids.
- Check the load bearing capacity of the transportation route and the place of installation.
- The parking brakes at the casters (if present) must be activated and/or the leveling feet (if present) must be unscrewed/activated before the temperature control unit is put into operation.
  - Page 23, section »Unscrewing/activating the leveling feet (if any)«.

#### 2.1.1 Lifting and transporting the accessories

##### 2.1.1.1 Accessories with lifting eyes

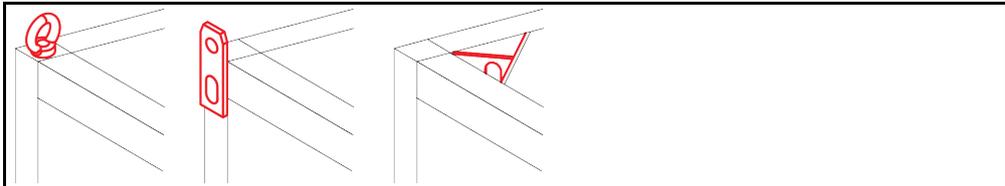
#### NOTE

The accessories are lifted at the lifting eyes without load handling equipment

#### DAMAGE TO THE ACCESSORIES

- Always use load handling equipment when lifting and transporting the accessories.
- The lifting eyes are only designed for a load **without** inclination (0°).
- The load handling attachment used must be adequately dimensioned. Take the dimensions and weight of the temperature control unit into account.

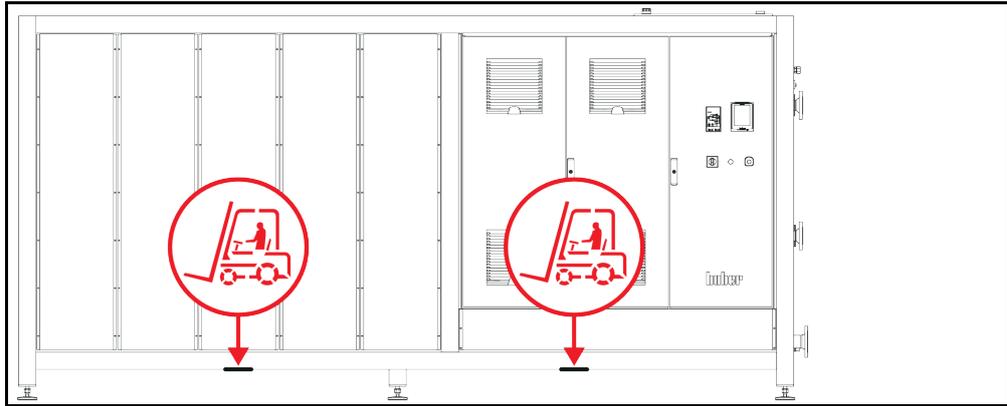
Example: lifting eyes (round, angular, and recessed (left to right))



- Never lift and transport the accessory on the lifting eyes on your own and without aids.
- Lift and transport the accessory at the lifting eyes only with a crane or an industrial truck.
- The lifting force of the crane or industrial truck must correspond at least to the weight of the accessory. You will find the weight of the accessory on the data sheet. → From page 55, section »Annex«.
- If the leveling feet have been removed for shipping: Only lower the accessory when all leveling feet have been installed. → Page 18, section »Mounting/removing leveling feet«.

2.1.1.2 Accessories without lifting eyes

Example: Supporting points for forklift arms for free-standing models from a certain overall size. For the exact position please refer to the wiring diagram in the annex.



- Do not lift and transport the accessory on your own and without aids.
- Lift and transport the accessory only with an industrial truck.
- The industrial truck must have a lifting force equal to or greater than the weight of the accessory. You will find the weight of the accessory on the data sheet. → From page 55, section »Annex«.
- If the leveling feet have been removed for shipping: Only lower the accessory when all leveling feet have been installed. → Page 18, section »Mounting/removing leveling feet«.

2.1.2 Mounting/removing leveling feet

Only valid if the leveling feet have been removed for shipping.

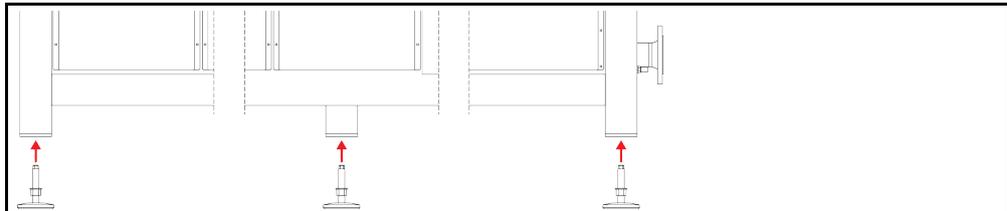


**WARNING**

**The temperature control unit/accessory is not secured against sliding and/or lowering  
DEATH OR SERIOUS INJURY DUE TO CRUSHING**

- Secure the temperature control unit/accessory against slipping and/or lowering before installing the leveling feet.
- Do not stand or lie down under the temperature control unit/accessory for installation.

Example: mounting the leveling feet



**INFORMATION**

The leveling feet were dismantled for shipping the temperature control unit/accessory. Before putting down / positioning the temperature control unit/accessory, all leveling feet must be mounted. If the temperature control unit/accessory is re-shipped: Dismantle all leveling feet prior to packaging.

- The leveling feet can only be mounted while the temperature control unit/accessory is lifted.
- Secure the temperature control unit/accessory against sliding and/or lowering.
- Do not stand or lie underneath the temperature control unit/accessory during installation of the leveling feet.
- Only lower the temperature control unit/accessory when all leveling feet have been installed.

## 2.1.3 Positioning the accessories

### 2.1.3.1 Accessories with casters

- Do **not** use the casters for transportation to the place of installation. → Page 17, section »**Lifting and transporting the accessories**«.
- Use the casters only for positioning at the place of installation.
- Only move the accessory on the casters when the surface is level, without gradient, non-slip and stable.
- Do not move the accessory on your own.
- **At least 2 persons** are required to move the accessory on the casters. **At least 5 persons** are required to move the accessory on the casters if the total weight of the accessory **exceeds 1.5 tons**.
- The parking brakes at the casters must be activated before the accessory is put into operation.

### 2.1.3.2 Accessories with casters including leveling feet

- Do **not** use the casters for transportation to the place of installation. → Page 17, section »**Lifting and transporting the accessories**«.
- Use the casters only for positioning at the place of installation.
- Only move the accessory on the casters when the surface is level, without gradient, non-slip and stable.
- Do not move the accessory on your own.
- **At least 2 persons** are required to move the accessory on the casters. **At least 5 persons** are required to move the accessory on the casters if the total weight of the accessory **exceeds 500 kg**.
- The accessory is equipped with casters without locking brakes. Prior to putting the accessory into operation, unscrew/activate the integrated leveling feet. → Page 23, section »**Unscrewing/activating the leveling feet (if any)**«.

### 2.1.3.3 Accessories without casters

- An industrial truck must be used for positioning the accessory.
- Do not move the accessory on your own.
- **At least 2 persons** are required to move the accessory.
- The industrial truck must have a lifting force equal to or greater than the weight of the accessory. You will find the weight of the accessory on the data sheet. → From page 55, section »**Annex**«.

## 2.2 Unpacking



### WARNING

#### Commissioning damaged accessories

#### DANGER TO LIFE FROM ELECTRIC SHOCK

- Do not start up damaged accessories.
- Please contact Customer Support. → Page 54, section »**Contact data**«.

## PROCEDURE

- Check for damage to the packaging. Damage can indicate property damage to the accessory.
- Check for any transport damage when unpacking the accessory.
- Exclusively contact your forwarding agent regarding the settlement of claims.
- Observe the proper disposal of packaging material. → Page 15, section »**Proper disposal of resources and consumables**«.

## 2.3 Ambient conditions

**CAUTION**

**Unsuitable ambient conditions / unsuitable installation**

**SERIOUS INJURY DUE TO CRUSHING**

- Comply with all requirements! → Page 20, section »Ambient conditions« and → Page 22, section »Installation conditions«.

**INFORMATION**

Make sure there is adequate fresh air available at the site for the accessory. The warm exhaust air must be able to escape upwards unhindered.

Use of the accessory is permitted only under normal ambient conditions in accordance with the currently valid DIN EN 61010-1.

- Use only indoors. The illuminance must be at least 300 lx.
- Installation altitude up to 2,000 meters above sea level.
- Maintain wall and ceiling clearance for adequate air exchange (dissipation of waste heat, supply of fresh air for the accessory and work area). Ensure adequate floor clearance for air-cooled accessories. Do not operate the accessory from within the box or with an inadequately dimensioned bath as this inhibits the air exchange.
- Ambient temperature values are provided on the technical data sheet; to ensure trouble-free operation, compliance with the ambient conditions is mandatory.
- Relative humidity max 80% to 32 °C and 40 °C decreasing linearly to 50%.
- Short distance to supply connections.
- The accessory must not be installed so as to hinder or prevent access to the disconnecting device (to the power grid).
- For the magnitude of the mains voltage fluctuations, refer to the datasheet. → From page 55 in the section »Annex«.
- Transient surges, as would normally occur in the power supply system.
- Installation Class 3
- Applicable degree of soiling: 2.
- Surge category II.

Wall clearances

| Side      | Distance in cm                           |                              |
|-----------|--|------------------------------|
|           | Air cooling                              | Water cooling                |
|           |  |                              |
| [A1] Top  | Air outlet on top of unit: free standing | –                            |
| [A2] Top  | can be located under a bench             | can be located under a bench |
| [B] Left  | min. 20                                  | min. 10                      |
| [C] Right | min. 20                                  | min. 10                      |
| [D] Front | min. 20                                  | min. 10                      |
| [E] Rear  | min. 20                                  | min. 20                      |

| Side      | Distance in cm (for operation in a tub)  |                              |
|-----------|--|------------------------------|
|           | Air cooling                              | Water cooling                |
|           |  |                              |
| [A1] Top  | Air outlet on top of unit: free standing | -                            |
| [A2] Top  | can be located under a bench             | can be located under a bench |
| [B] Left  | min. 20                                  | min. 20                      |
| [C] Right | min. 20                                  | min. 20                      |
| [D] Front | min. 20                                  | min. 20                      |
| [E] Rear  | min. 20                                  | min. 20                      |

### 2.3.1 EMC-specific notes

**INFORMATION**

**Connecting cables in general**

Prerequisites for a failure-free operation of the temperature control units/accessories incl. their connections with external applications: Installation and wiring must be carried out professionally. Related topics: “Electrical safety” and “EMC-compliant wiring”.

**Cable lengths**

For flexible/fixed cable routing of more than 3 meters, the following must amongst other things be observed:

- Equipotential bonding, grounding (see also technical data sheet “Electromagnetic compatibility EMC”)
- Compliance with “external” and/or “internal” lightning/overvoltage protection.
- Design protection measures, professional cable selection (UV resistance, steel pipe protection, etc.)

**Attention:**

The operating company is responsible for compliance with national/international directives and laws. This also includes the testing of the installation/wiring required by law or standards.

This device is suitable for operation in “**industrial electromagnetic environments**”. It meets the “**immunity requirements**” of the currently applicable **EN61326-1**, which are required for this environment.

It also meets the “**interference emission requirements**” for this environment. It is a **Group 1** and **Class A** device according to the currently applicable **EN55011**.

**Group 1** specifies that high frequency (HF) is only used for the function of the device. **Class A** defines the interference emission limits to be observed.

## 2.4 Installation conditions

**! WARNING**

**The accessory is put onto the power supply line**  
**DEATH FROM ELECTRICAL SHOCK BY DAMAGE TO THE POWER CABLE.**

- Do not put the accessory on power cables.

**! WARNING**

**The leveling feet are not unscrewed/activated before operating the accessory**  
**DEATH OR SERIOUS INJURY DUE TO CRUSHING**

- The parking brakes must be activated at the casters (if any) and/or the leveling feet must be unscrewed/activated before the accessory is put into operation.
- The accessory may move if the parking brakes of the casters (if any) are not activated and/or the leveling feet are not unscrewed/activated.

- Allow the accessory to acclimate for about 2 hours when changing from a cold to a warm environment (or vice versa). Do not turn on the accessory beforehand!
- Install upright, stable and without tilt.
- Use a non-combustible, sealed foundation.
- Keep the environment clean: Prevent slip and trip hazards.
- Wheels, if installed, must be locked after installation!
- Spilled/leaked thermal fluid must be disposed of immediately and correctly. Observe the proper disposal of thermal fluid and aids. → Page 15, section »Proper disposal of resources and consumables«.
- Observe the ambient conditions.

## 2.5 Recommended temperature control hoses

**! CAUTION**

**Use of unsuitable/defective hoses and/or hose connections**  
**INJURIES**

- Use appropriate hoses and/or hose connections.
- Check periodically for leaks and the quality of the hose and hose connections and take suitable measures (replace) as required.
- Isolate and protect temperature control hoses against contact/mechanical load.

**! CAUTION**

**Hot or cold thermal fluid and surfaces**  
**BURNS TO LIMBS**

- Avoid direct contact with the thermal fluids or the surfaces.
- Wear your personnel protective equipment (e.g. temperature-resistant safety gloves, safety goggles, safety footwear).

**! CAUTION**

**Uncontrolled formation of ice at the connections and hoses of the thermal fluid circuit**  
**RISK OF SLIPPING AND OVERTURNING**

- If the temperature is controlled in the minus range, ice forms at the hoses and connections of the thermal fluid circuit. This occurs by condensing and freezing of atmospheric humidity.
- Check the thickness of the ice formation. Too much ice increases the risk of the accessories tipping over. Secure the accessories against tipping over if this is the case.
- Check the ground below the ice formation for condensation water. Collect the condensation water with a suitable container or thoroughly remove it at regular intervals. You thus prevent the danger of slipping caused by condensation.

To connect applications, use only temperature control hoses that are compatible with the thermal fluid used. When selecting temperature control hoses, also pay attention to the temperature range in which the hoses are to be used.

- We recommend you use only temperature-insulated temperature control hoses with your accessory. The user is responsible for the insulation of connection valves.

## 2.6 Wrench sizes and torques

Observe the proper wrench sizes for the pump connection at the accessory. The following table lists the pump connections and the resulting wrench sizes, as well as the torque values. Always perform a leak test afterwards and re-tighten the connections if required. The values of the maximum torque (see table) must **not** be exceeded.

| Connection              | Sleeve nut wrench size  | Connector wrench size | Recommended torques in Nm | Maximum torques in Nm |
|-------------------------|---|-----------------------|---------------------------|-----------------------|
| M16x1                   | 19  | 17                    | 20                        | 24                    |
| M24x1.5                 | 27  | 27                    | 47                        | 56                    |
| M30x1.5                 | 36  | 32                    | 79                        | 93                    |
|                         | 36  | 36                    | 79                        | 93                    |
| M38x1.5                 | 46  | 46                    | 130                       | 153                   |
| G-thread (flat-sealing) | Adapt the torque to the material of the flat seal used. First hand-tighten the temperature control hose.<br>When using adapters, do not overtighten the G-thread on the pump connection when connecting a temperature control hose. When connecting a temperature control hose to the adapter piece, secure the G thread against overwinding. |                       |                           |                       |

Overview wrench sizes and torques

## 2.7 Preparations for operation

### 2.7.1 Unscrewing/activating the leveling feet (if any)

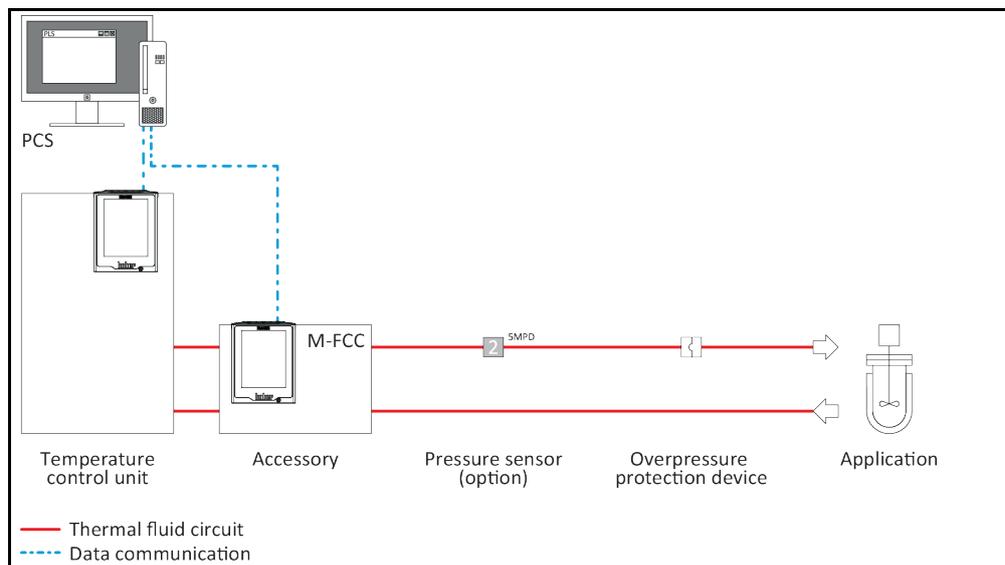
Ensure that the leveling feet are unscrewed/activated before you operate the accessories. Uneven floors can be compensated for by adjusting these leveling feet.

### PROCEDURE

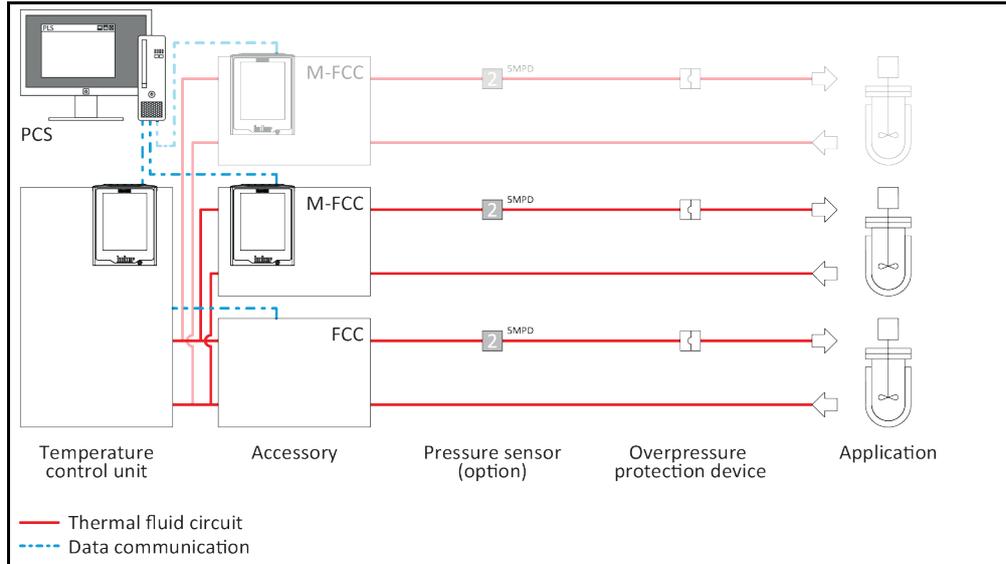
- Ensure that the locking brakes of the casters (if present) are activated.
- Turn the casters inwards so that you can easily reach the red setting wheels.
- Turn the red setting wheel on each caster clockwise. This extends the leveling feet. Rotate the red wheels counterclockwise to retract the leveling feet.
- Compensate uneven floors by adjusting these leveling feet, if necessary. Use a spirit level to level the accessory horizontally.

### 2.7.2 Connecting the accessory to the temperature control unit

Example: Single circuit control



Example:  
Multi-circuit control  
(max. 4)



**INFORMATION**

The temperature control unit and the accessory **must** be controlled by means of a process control system.

**INFORMATION**

Follow the operation manual of the temperature control unit when connecting the device. Only use temperature control hoses that match the specifications of the thermal fluid used. Avoid bending / squeezing the temperature control hoses. Use suitable angle pieces and lay the hose connections with a large radius. Take the minimum bending radius from the data sheet of the temperature control hoses used. Make sure the temperature control hoses are attached to the respective unit connections such that they cannot slip off. Secure the temperature control hoses with hose clamps.

**INFORMATION**

Option:  
Connect an external pressure sensor to the “**external pressure**” port of the accessory (otherwise the internal pressure sensor in the accessory takes control).

**PROCEDURE**

- Make sure that the temperature control unit has not yet been filled with thermal fluid.
- Disconnect the temperature control unit from the power grid connection.
- Remove the protective caps from the connections on the accessory.
- **Single circuit and multi-circuit control (only the first accessory):**
- Connect the >Circulation flow< [1] on the temperature control unit to the >Circulation return< [2] on the accessory.
- Connect the >Circulation return< [2] on the temperature control unit to the >Circulation flow< [1] on the accessory.
- **Multi-circuit control only:**
- Install each additional accessory with the aid of T-connectors in parallel in the thermal fluid circuit. Note the illustration “Multi-circuit control”.
- **Single circuit and multi-circuit control:**
- Connect the >Circulation flow< [1] on the accessory to an external application. For further information, please refer to the operation manual of the temperature control unit. The maximum pump pressure may be applied to your external application if the accessory is defective. An overpressure protection device must be installed in the supply line (pressure side) to protect your external application. In the event of a fault, the installed overpressure protection device protects the external application against damage. Ensure that the emerging thermal fluid can be collected and disposed of. → Page 15, section »Proper disposal of resources and consumables«. In case you use external pressure sensors:  
Install the external pressure sensor between each accessory and the external application.

- Connect the **>Circulation return<** [2'] on the accessory to an external application to close the thermal fluid circuit. For further information, please refer to the operation manual of the temperature control unit.
- Check the connections for leaks.
- In case you use external pressure sensors:  
Connect each external pressure sensor to the **>Signal external pressure sensor<** [66] on the accessory. The pressure sensor and the accessory must be connected in the same thermal fluid circuit.

### 2.7.3 Connecting the accessory and the temperature control unit to the process control system

The accessory and the temperature control unit must be controlled/monitored by means of a process control system. The process control system must ensure that the accessory cannot be switched on and off during an ongoing temperature control process. Various connections are available on the accessory and on the temperature control unit for this purpose.

- Ethernet (PB command, Modbus TCP, OPC UA)
- Analog RS interface (PB command)
- POKO and ECS (optional)  
Settings in the Pilot ONE on the accessory: POKO = "M-FCC ready" and ECS = "Status external pump"  
Settings in the Pilot ONE on the temperature control unit: POKO = "Unipump/PCS" und ECS = "Release"  
→ From page 40, section »Interfaces and software update«.

## PROCEDURE

- Connect the accessory and the temperature control unit to a process control system.

### 2.7.4 Connecting the functional earth

## PROCEDURE

- If required, connect the **>functional ground terminal<** [87] on the accessory with the building grounding point. Use a ground strap for this purpose. For the exact position and thread size please refer to the wiring diagram. → From page 55, section »Annex«.

## 2.8 Connecting to the power supply

### INFORMATION

Based on local circumstances, it may be that you need to use an alternative power cable instead of the supplied original power cable. Do not use a power cable that is longer than **3 m** to be able to disconnect the accessory from the mains at any time. Have the mains cable only installed by a qualified electrician.

### 2.8.1 Connection using socket with protective earth (PE)



**DANGER**

#### Connecting to a power socket without protective earth (PE)

#### MORTAL DANGER FROM ELECTRIC SHOCK

- Always connect the accessory to safety sockets (PE).



**DANGER**

#### Damaged power cable/power cable connection

#### MORTAL DANGER FROM ELECTRIC SHOCK

- Do not start up the accessory.
- Isolate the accessory from the power supply.
- Have the power supply cable/power supply connection replaced and inspected by an electrician.
- Do not use a power cable that is longer than **3 m**.

**NOTE**

**Incorrect power supply connection**

**DAMAGE TO THE ACCESSORY**

- Your building's existing power supply voltage and frequency must match the data provided on the rating plate of the accessory.

**INFORMATION**

In case of uncertainties about an existing protective earth (PE), have the connection inspected by an electrician.

2.8.2 Connection via hard wiring

 **DANGER**

**Connection/adjustment to the power supply not carried out by an electrician**

**MORTAL DANGER FROM ELECTRIC SHOCK**

- Have the connection/adjustment to the power supply carried out by an electrician.

 **DANGER**

**Damaged power cable/power cable connection**

**MORTAL DANGER FROM ELECTRIC SHOCK**

- Do not start up the accessory.
- Isolate the accessory from the power supply.
- Have the power supply cable/power supply connection replaced and inspected by an electrician.
- Do not use a power cable that is longer than **3 m**.

**NOTE**

**Incorrect power supply connection**

**DAMAGE TO THE ACCESSORY**

- Your building's existing power supply voltage and frequency must match the data provided on the rating plate of the accessory.

## 3 Function description

### 3.1 Function description of the accessory

#### 3.1.1 General functions

The accessory is intended for volume flow control (with or without max. pressure limit) or for pressure control of an **externally closed application**. With the parallel installation of up to 4 accessories into the thermal fluid circuit a multi-circuit control can be achieved. The accessory was developed for Huber temperature control units which are **not** equipped with any sensors for this control. The accessory permits sensitive external applications (e.g.: glass reactors) to be operated with a lower flow rate or pressure in normal operation. The accessory ensures a soft startup. It regulates and limits the flow rate or pressure that acts on the external application.

To avoid power losses, evaporator and heater are sufficiently circulated by the primary circuit (temperature control unit – accessory). The secondary circuit feeds the external application.

The accessories come with one of two measuring methods (TURB (turbine) or MID (magnetic-inductive flow meter)). The installed flow meter is specified on the data sheet. → From page 55, section »Annex«. The "TURB" flow meter permits conductive and non-conductive thermal fluids to be used. The "MID" flow meter, in contrast, can **only** be used with conductive thermal fluids.

The accessory can detect pressure in two ways:

- Internal pressure sensor: Measuring point in accessory (standard).
- External pressure sensor: Measuring point is external, e.g. directly at the external application. This requires an additional pressure sensor.

#### 3.1.2 Other functions

Your temperature control unit can be easily integrated into many laboratory automation systems. This is provided for by the existing **standard interfaces Ethernet, USB device and USB host at the "Pilot ONE"**. The optionally available Com.G@te allows you to expand your accessories by **digital interfaces (RS232 and RS485), an analogue current interface (0/4 - 20 mA or 0 - 10 V) and various digital control options (In/Out)**.

The **removable control panel ("Pilot ONE")** can also be used as a **remote control**. Please contact your dealer or Huber Sales Department if you need an extension cable. → Page 54, section »Contact data«.

The **connection jack for Pt100 process sensors** permits the connection of a **temperature sensor** to display the temperature.

## 3.2 Information on the thermal fluids



**CAUTION**

**Non-compliance with the safety data sheet for the thermal fluid to be used**

#### **INJURIES**

- Risk of injury to the eyes, skin, respiratory tract.
- The safety data sheet for the thermal fluid to be used must be read prior to using it and its content must be respected.
- Observe the local regulations/work instructions.
- Wear your personal protective equipment (e.g. temperature-resistant safety gloves, safety goggles, safety footwear).
- Danger of slipping because floor and work area are contaminated. Clean the workplace; observe the proper disposal of thermal fluid and aids. → Page 15, section »Proper disposal of resources and consumables«.

**CAUTION**

**The temperature range of the accessory is exceeded**

**BURNS OF LIMBS**

- The temperature range of the employed temperature control unit is limited by the use of the accessory.
- Do not exceed the temperature range of the accessory (see data sheet). → From page 55, section »Annex«.
- Select the upper temperature limit on the temperature control unit. To do this, adjust the maximum setpoint in Pilot ONE.
- Wear your personal protective equipment (e.g. temperature-resistant safety gloves, safety goggles, safety footwear).

**NOTE**

**Non-compliance with the compatibility between the thermal fluid and your accessories**

**MATERIAL DAMAGE**

- Take note of the thermal fluid that is preselected in the accessories (see rating plate on the accessories).

**NOTE**

**Mixing different thermofluids in a thermal fluid circuit**

**PROPERTY DAMAGE**

- Do **not** mix different types of thermofluid (such as mineral oil, silicone oil, synthetic oil, water, etc.) in a thermofluid circuit.
- The thermal fluid circuit **must** be rinsed when changing from one type of thermal fluid to another. No residues of the previous type of thermal fluid may remain in the thermal fluid circuit.

**INFORMATION**

For thermal fluids we recommend the media listed in the Huber catalog. The name of a thermal fluid results from its working temperature range and the viscosity at 25 °C.

The "TURB" flow meter can be used with conductive and non-conductive thermal fluid! The thermal fluid is preselected at the factory. For example: Water-ethylene glycol mixture, DW-Therm, etc. The "MID" flow meter can **only** be used with conductive thermal fluid! The flow meter adjusts automatically to the currently used thermal fluid. For example: Water, water ethylene glycol mixture, etc.

The flow meter your accessory is equipped with and the temperature range in which it can be used are specified on the data sheet. → From page 55, section »Annex«.

The thermal fluid preset in the "TURB" flow meter is indicated on the rating plate on the accessory. These presettings must be changed when you change to another thermal fluid. To do this, call Customer Support. → Page 54, section »Contact data«. After you have changed to a different thermal fluid, attach a clearly visible note to the accessory that indicates the newly selected thermal fluid!

### 3.3 To be noted when planning the test

**INFORMATION**

Please also note: → Page 14, section »Extension of specified normal operation«.

The focus is on your application. Bear in mind that system performance is influenced by heat transfer, temperature, thermal fluid viscosity, volume flow, and flow speed.

- Make sure that the electrical connection is adequately dimensioned.
- The place of installation of the accessory should be selected so as to ensure adequate fresh air.
- A cross-section reduction or shut-off in the thermal fluid circulation must be avoided.
- To prevent the danger of over-pressure in the system, the thermal fluid must always be brought to room temperature before switching off. This will prevent damage to the temperature control device, accessory, or the application. Any isolating valves must remain open (pressure equalization).
- Select the thermal fluid to be used in such a way that it not only permits the minimum and maximum working temperature but is also suitable with regard to fire point, boiling point, and viscosity. In addition, the thermal fluid must be compatible with all the materials in your system.

- Avoid bending the temperature control and cooling water hoses (if required). Use suitable angle pieces and lay the hose connections with a large radius. Take the minimum bending radius from the data sheet of the temperature control hoses used.
- The selected hose connections must be resistant to the thermal fluid, the working temperatures and the permitted maximum pressure.
- Check the hoses at regular intervals for any material fatigue (e.g. cracks, leaks).

### 3.4 “Pilot ONE®” controller

Please note the figure “Pilot ONE”. → Page 6.

#### 3.4.1 Functional overview of “Pilot ONE®”

Overview of the E-grade variants

| Accessory/E-grade   | E-grade Basic | E-grade Exclusive | E-grade Professional |
|---|---------------|-------------------|----------------------|
| Multi Flow Control Cube   | X             | O                 | O                    |
| <b>E-grade “DV-E-grade”</b><br>– All interface commands are enabled.<br>– Temperatures in 0.001 C, volume flows in 0.001 l/min possible (cf. E-grade Explore)<br><b>Note:</b> Only the interface commands are enabled, not the corresponding menu items in Pilot ONE! | O             | O                 | O                    |
| <b>E-grade “OPC-UA”</b><br>– OPC-UA interface via Ethernet.<br>This E-grade additionally includes DV-E-grade functionalities.   | O             | O                 | O                    |
| X = Standard equipment, O = optional, – = not possible  |               |                   |                      |

Overview of E-grade functions

| Function   | E-grade Basic | E-grade Exclusive | E-grade Professional |
|--|---------------|-------------------|----------------------|
| <b>Temperature control</b>   |               |                   |                      |
| Sensor calibration for external sensor <sup>1</sup> : x -point           | 2             | 5                 | 5                    |
| Ventilation program  | X             | X                 | X                    |
| <b>Display &amp; operation</b>   |               |                   |                      |
| Temperature display: 5.7" Touchscreen                                    | X             | X                 | X                    |
| Display mode: graphically / numerically large / Explore                  | –/X/–         | –/X/–             | X/X/–                |
| Display resolution: 0.1 °C / 0.01 °C                                     | X/–           | X/X               | X/X                  |
| Graphic display for temperature curves: Window, full screen and scalable | X             | X                 | X                    |
| Calendar, date and time  | X             | X                 | X                    |
| Language: CZ, DE, EN, ES, FR, IT, JP, KO, PL, PT, RU, TR, ZH             | X             | X                 | X                    |
| Temperature format switchable: °C, °F and K                              | X             | X                 | X                    |
| Display mode (screen) can be switched by swiping                         | X             | X                 | X                    |
| Favorites menu   | X             | X                 | X                    |
| User menu (administrator level)  | –             | –                 | X                    |

<sup>1</sup> External Pt100.

| Function  | E-grade Basic  | E-grade Exclusive | E-grade Professional |
|---|----------------|-------------------|----------------------|
| <b>Connections</b>  |                |                   |                      |
| Digital interface RS232   | X              | X                 | X                    |
| USB interfaces: Host and device   | X              | X                 | X                    |
| Ethernet RJ45 interface   | X              | X                 | X                    |
| Pt100 external sensor connection  | X              | X                 | X                    |
| External control signal (ECS STANDBY <sup>1</sup> )   | X              | X                 | X                    |
| Programmable potential-free contact (ALARM <sup>2</sup> )   | X              | X                 | X                    |
| AIF (analog interface) 0/4–20 mA or 0–10 V <sup>3</sup>   | X <sup>4</sup> | X                 | X                    |
| Digital interface RS485 <sup>5</sup>  | X              | X                 | X                    |
| <b>Comfort &amp; other</b>  |                |                   |                      |
| Visual / audible alarm signal   | X              | X                 | X                    |
| Plug & Play technology  | X              | X                 | X                    |
| Technology glossary   | X              | X                 | X                    |
| Remote control / data visualization via Spy software  | X              | X                 | X                    |
| E-grade evaluation versions available (valid for 30 days)   | X              | X                 | X                    |
| Copying settings  | –              | –                 | X                    |
| Service data recorders (flight recorder)  | X              | X                 | X                    |
| PB commands <sup>6</sup>  | X              | X                 | X                    |
| Communication watchdog  | –              | –                 | X                    |
| Process data recording directly to a USB stick: Setpoint, Actual Value Internal and Actual Value Process / Heating Capacity %, Cooling Capacity %, and Pump Pressure / Pump Speed, and VPC Pressure | –/–/–          | X/X/–             | X/X/X                |

## 3.5 Clock/event function

### 3.5.1 Rechargeable accumulator

“Pilot ONE” is equipped with a clock that continues to run even when the accessory is switched off. The energy required for this is provided by a rechargeable battery, which is automatically charged when the accessory is switched on. The rechargeable battery has been dimensioned so that the clock can continue to run even if the accessory is switched off over longer intervals (up to several months). If the accessory was off for a very long time and time and date have been deleted, it is usually sufficient to leave the accessory on for several hours (no temperature control/control is necessary for this). During this time you can already reset time and date.

If after switching the unit off and back on again, the previously set time and date re-appear, it can be safely assumed that the rechargeable accumulator is defective. In this case, please contact Customer Support. → Page 54, section »Contact data«.

<sup>1</sup> Via optional Com.G@te or POKO/ECS interface.

<sup>2</sup> Via optional Com.G@te or POKO/ECS interface.

<sup>3</sup> Via optional Com.G@te.

<sup>4</sup> Restricted, see entries under “Temperature Control”.

<sup>5</sup> Via optional Com.G@te.

<sup>6</sup> See Data Communication Manual. Anything controllable via the graphical user interface of the Pilot ONE can be controlled by PB commands. Even without DV- or Explore-E-grade, the PB commands “vFluidFlow” and “vFluidFlowSet” can be used with the accessory.

### 3.6 Operation via the touch screen

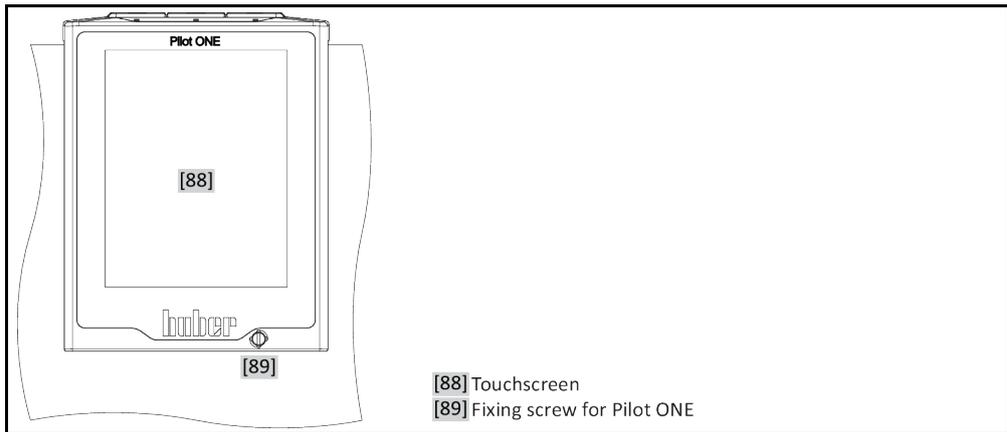
The entire operation is via the **>Touchscreen<** [88]. These functions can be activated by tapping the displayed text boxes/icons once. This also changes the display.

**INFORMATION**

You can cancel the current dialog or dialog sequence at any time by pressing the “ESC” touch button. When canceling a dialog or dialog sequence, it may be necessary to confirm the cancellation again. When canceling a dialog sequence, settings made earlier in the dialog sequence are discarded. Check your already carried out settings and re-enter as needed.

### 3.7 Display instruments

Display instruments



The following meters are available:

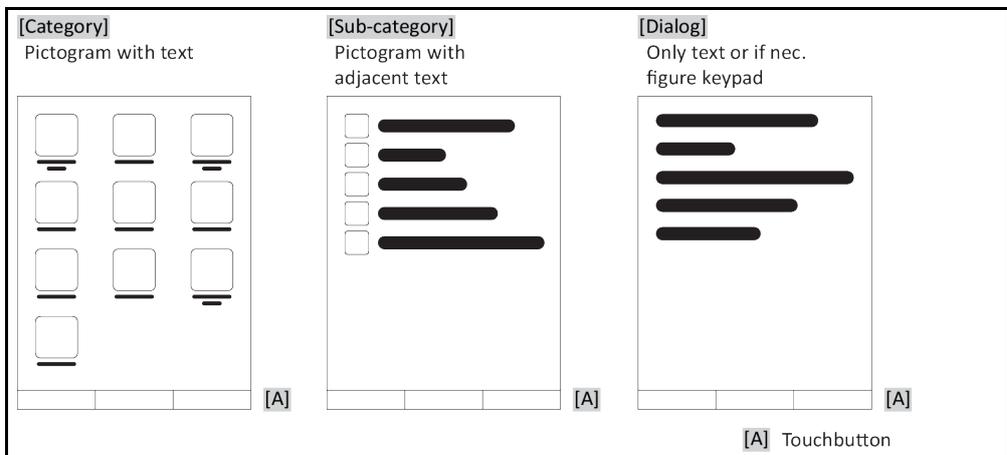
- **>Touchscreen<** [88]

#### 3.7.1 The touchscreen [88]

The most important display and operating instrument. Shows both standard variables (setpoint, actual value, setpoint thresholds...), and also menu guidance, error information output and operation.

### 3.8 Control instruments

Example “Control instruments”



**INFORMATION**

To exit the “Categories Menu”, sub-categories, menu items, press the “Home” touch button (house) or the arrow. After 2 minutes of inactivity, the category/ sub-category or the Favourites menu is automatically closed and you return to the “Home” screen. Dialogs are **not** canceled/closed after 2 minutes of inactivity.

### 3.8.1 The touchbuttons

Depending on the situation, the touch buttons can be assigned different functions. For example:

- Select the “Home” screen (house)
  - Back (arrow to left)
  - Favourites (star)
  - Add to favorites (star with a plus sign)
  - Select the “Categories menu” (menu)
  - Confirm entry
  - Start/stop
- etc.

### 3.8.2 The categories

For clarity we have grouped the Operation and Setting of Pilot ONE in various categories. A category is selected by tapping it.

### 3.8.3 The sub-categories

The sub-categories are parts of a category. This is where you will find the entries that we have grouped together for you in the selected category. Not all the categories also contain sub-categories. Tap on a sub-category to select it.

### 3.8.4 The dialogs

Tapping on a category or sub-category displays its dialogs. Dialogues may appear e.g. as text, a numeric or an alphanumeric keyboard. Dialogs allow you for example to enter settings or start created temperature control programs. Within a dialog, selection must always be confirmed with the “OK” touch button. When cancelling a dialog with the “ESC” touch button it may be necessary to confirm the cancellation again.

## 3.9 Function examples

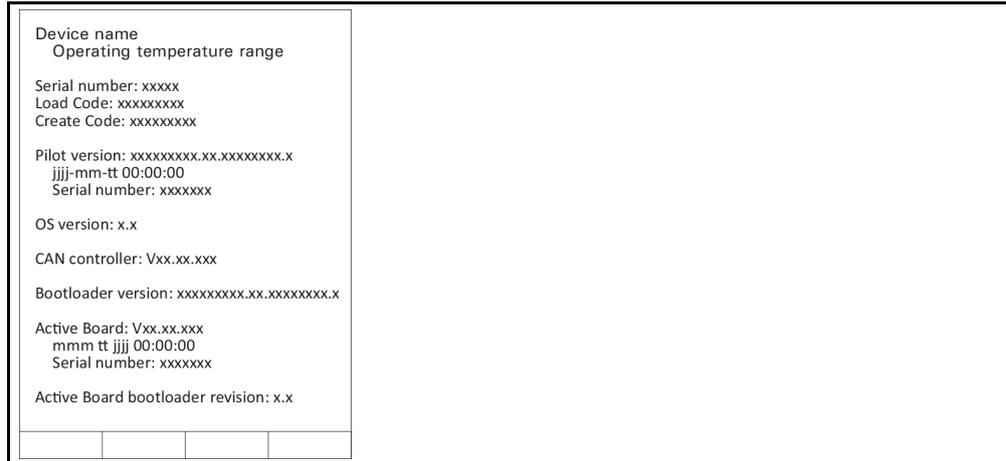
### 3.9.1 Display of software version

#### PROCEDURE

- Go to the “Categories Menu”.
- Tap on the category “System Settings”.
- Tap on the category “System Info”.
- Tap on the sub-category “Software Version”.

The software versions of the electronics will be displayed:

Display of software versions



- Tap either the “ESC” or “OK” touchbutton. You will be returned to the previous screen.
- Tap on the “Home” touchbutton (house) to return to the “Home” screen.

### 3.9.2 Adjusting control mode

#### PROCEDURE

- Go to the “Categories menu”.
- Touch the category “System settings”.
- Touch the category “FCC settings”.
- Touch the sub-category “Control mode”.
- Select the desired control mode by touching the corresponding dialog entry. The following are available: “Pressure control”, “Flow control” and “Flow control (pressure limit)”.
- Touch “OK” to confirm your selection.

### 3.9.3 Setting the setpoint

#### INFORMATION

Depending on the control mode set, different setpoints must be adjusted.  
 Control mode: “Pressure control” = setpoint: “Pump pressure VPC”  
 Control mode: “Flow control” = setpoint: “Flow setpoint”  
 Control mode: “Flow control (pressure limit)” = setpoint: “Pump pressure VPC” **and** “Flow setpoint”

These setpoints can be adjusted using two different methods.

- **Via the “Home” screen:**  
 Touch the value next to “ $V_{\text{setpoint}}$ ” and/or “ $p_{\text{setpoint}}$ ”. Depending on the control mode set, both fields or only one field are activated for input.
- **Via the category “System settings”:**  
 Go to the category “FCC settings” and enter the setpoint “Pump pressure VPC” under “Pressure (VPC)” and/or the “Flow setpoint” under “Flow control”. Depending on the control mode set, both setpoints or only one setpoint need to be entered.

#### PROCEDURE

- Go to the “Categories menu”.
- Touch the category “System settings”.
- Touch the category “FCC settings”.
- Touch the required sub-category. It is possible to select “Pressure (VPC)” and “Flow control”. Depending on the selected control mode, different setpoints can be set.
- Enter the new setpoint using the number keypad that appears.
- Touch “OK” to confirm your entry.

### 3.9.4 Restore factory settings

**INFORMATION**

You can reset to factory settings **only** when the temperature control unit and/or the accessory do **not** perform any tasks. If any tasks are active, only switch off the temperature control unit and/or the accessory after the sequence of the switch-off process has been considered. Resetting to factory setting parameters cannot be revoked.

Resetting to factory settings resets the flow rate value to a default value. If the thermal fluid has been changed, it is **not** reset to the delivery values.

## 4 Setup mode

### 4.1 Setup mode

**CAUTION**

**Moving the accessory during operation**  
**SERIOUS BURNS/FREEZING OF THE HOUSING PARTS/ESCAPING THERMOFLUID**  
 ➤ Do not move the accessory when in operation.

**NOTE**

**When the accessory is switched off, the thermofluid temperature is higher/lower than the room temperature**  
**DAMAGE TO THE ACCESSORY**  
 ➤ Use the temperature control unit to temper the thermofluid in the accessory to room temperature (20 °C).  
 ➤ Do not close the shut-off valves in the thermofluid circuit.

**NOTE**

**A pressure-sensitive external application is run with the accessory without an overpressure protection device being installed**  
**MATERIAL DAMAGE TO THE EXTERNAL APPLICATION**  
 ➤ To protect a pressure-sensitive external application (such as a glass apparatus), use an overpressure protection device in the supply line.  
 ➤ Do not use accessories as an isolating valve. The outputs cannot be completely closed due to the design.  
 ➤ The external application can be damaged by excessive pressure if the return is locked.

**NOTE**

**The accessory is switched on or off while temperature control is ongoing**  
**MATERIAL DAMAGE TO THE EXTERNAL APPLICATION**  
 ➤ A system test is run when the accessory is switched on. If temperature control was active, this would cause the uncontrolled pressure to be applied to the external application. This must be avoided at all cost!  
 ➤ Do not switch the accessory on or off while a temperature control process is active at the temperature control unit.  
 ➤ The accessory may only be switched on or off if **no** temperature control is active at the temperature control unit.

**INFORMATION**

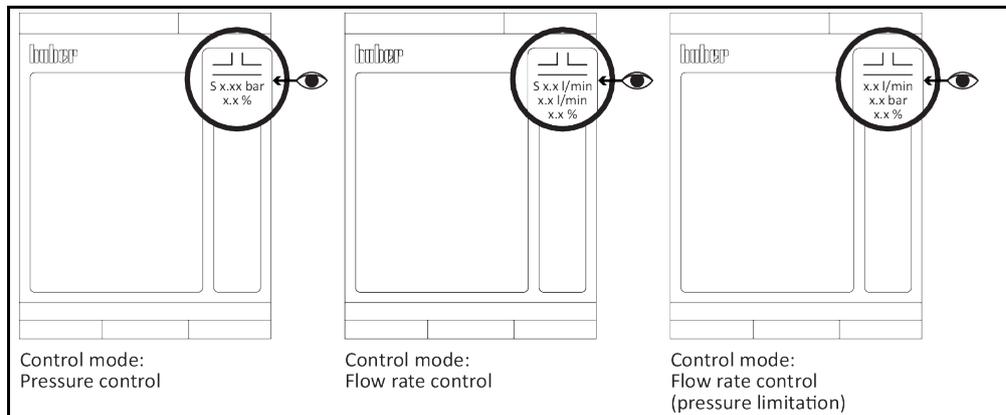
The accessory is only operated via the >Touchscreen< [88] in setup mode. In normal mode, temperature control unit and accessory must be controlled by means of a process control system.

#### 4.1.1 Turning on the accessory

**NOTE**

**The control is started at the accessory before filling**  
**DAMAGE TO THE ACCESSORY**  
 ➤ Dry running can damage the accessory if the temperature control unit and the accessory are not filled.  
 ➤ Start the control at the accessory **only after** filling.

Display of the set control mode



## PROCEDURE

- Check whether all operation preparation steps have been taken. → Page 23, section »Preparations for operation«.
- Connect the accessory with the building power grid connection.
- Switch on the accessory using the >Mains switch< [37].  
After the accessory has been switched on, a system test/initialization process takes place to test the full functionality of the accessory. A message appears on the >Touchscreen< [88] in case of an error or if a warning is issued. In case of doubt, please contact Customer Support. → Page 54, section »Contact data«.

### INFORMATION

The following data entry is required only for:

- a.) Initial start-up
- b.) Resetting the temperature control unit to the factory settings. → Page 34, section »Restore factory settings«.

- After switching on the accessory, tap on the required system language.
- Touch "OK" to confirm your selection.
- Read the information and confirm by touching "OK".
- Tap the time zone that is applicable to you.
- Touch "OK" to confirm your selection.
- Enter the current date and time.
- Touch "OK" to confirm your entry.
- Tap on the thermal fluid used.
- Touch "OK" to confirm your selection.
- Set the desired control mode. → Page 33, section »Adjusting control mode«.
- Set the required setpoints. → Page 33, section »Setting the setpoint«.
- Continue with switching on/setting up the temperature control unit. Follow the instructions in the enclosed documentation.

### 4.1.2 Switching off the accessories

## PROCEDURE

- Control the temperature of the thermal fluid to room temperature.
- Stop the control at the accessory. This closes the output. However the output cannot be completely closed due to the design.
- Check whether the >Touchscreen< [88] at the accessory displays the value "0.0 %" during control mode. If the value is higher, the accessory may **not** be switched off via the >Mains switch< [37]!
- Switch off the accessory using the >Mains switch< [37] only when the value "0.0 %" is displayed during control mode.

## 4.2 Filling and draining the accessory



CAUTION

**Extremely hot / cold surfaces, connections and thermal fluids**

### BURNS/FREEZING OF LIMBS

- Surfaces, connections and tempered thermal fluids can be extremely hot or cold depending on the operating mode.
- Avoid direct contact with surfaces, connections and thermal fluids!
- Wear your personnel protective equipment (e.g. temperature-resistant safety gloves, safety goggles).



CAUTION

**Non-compliance with the safety data sheet for the thermal fluid to be used**

### INJURIES

- Risk of injury to the eyes, skin, respiratory tract.
- The safety data sheet for the thermal fluid to be used must be read prior to using it and its content must be respected.
- Observe the local regulations/work instructions.
- Wear your personal protective equipment (e.g. temperature-resistant safety gloves, safety goggles, safety footwear).
- Danger of slipping because floor and work area are contaminated. Clean the workplace; observe the proper disposal of thermal fluid and aids. → Page 15, section »Proper disposal of resources and consumables«.

**NOTE**

**During an active circulation, the thermal fluid circuit is shut off by shut-off valves**  
**MATERIAL DAMAGE TO THE CIRCULATING PUMPS INSTALLED IN THE TEMPERATURE CONTROL UNIT**

- Do not close the thermal fluid circuit during an active circulation by means of shut-off valves.
- Warm the thermal fluid to room temperature before stopping the circulation.

## 4.2.1 Filling the accessory

**NOTE**

**The control is started at the accessory before filling**

**DAMAGE TO THE ACCESSORY**

- Dry running can damage the accessory if the temperature control unit and the accessory are not filled.
- Start the control at the accessory only **after** filling.

**PROCEDURE**

- Check whether all the steps were implemented. → Page 23, section »Preparations for operation«.
- For filling, venting and degassing of the temperature control unit, proceed as described in its operation manual.
- After successful initial filling, additionally start the venting process at the accessory. The venting process takes into account the setpoints set at the accessory beforehand (depending on the control mode set). → Page 35, section »Turning on the accessory«.
- Go to the "Categories menu".
- Touch the category "M-FCC".
- Touch the category "Start/Stop".
- Touch the dialog entry "Start venting".
- Touch "OK" to confirm your selection.
- Proceed as described in the operation manual of the temperature control unit.
- After adequate filling, additionally stop venting at the accessory.
- Go to the "Categories menu".
- Touch the category "M-FCC".
- Touch the category "Start/Stop".
- Touch the dialog entry "Stop venting".
- Touch "OK" to confirm your selection.

## 4.2.2 Draining the accessory

**CAUTION**

**Hot or very cold thermal fluid**

**SERIOUS BURNS/FREEZING OF LIMBS**

- Before draining, ensure that the thermal fluid has room temperature (20 °C).
- If, at this temperature, the thermal fluid is too viscous to be drained: Control the temperature of the thermal fluid for a few minutes until the viscosity will allow drainage.
- Danger of burns when draining thermal fluid at temperatures above 20 °C.
- Wear your personal protective equipment when carrying out the drainage operation.

**PROCEDURE**

- Proceed as described in the operation manual of the temperature control unit when draining it. The accessory is drained via the temperature control unit. Follow the instructions for the proper disposal of thermal fluid. → Page 15, section »Proper disposal of resources and consumables«.
- Additionally start the draining process at the accessory.
- Go to the "Categories menu".
- Touch the category "M-FCC".
- Touch the category "Start/Stop".
- Touch the dialog entry "Drain".
- Touch "OK" to confirm your selection.
- Wait until the temperature control unit, the application and the accessory have been drained.
- Stop the draining process at the accessory.
- Go to the "Categories menu".
- Touch the category "M-FCC".

- Touch the category "Start/Stop".
- Touch the dialog entry "Drain".
- Touch "OK" to confirm your selection.
- Proceed as described in the operation manual of the temperature control unit.
- Remove the temperature control hose from the accessory's >Circulation flow< [1].
- Remove the temperature control hose from the accessory's >Circulation return< [2].
- Remove the temperature control hose from the accessory's >Circulation flow< [1].
- Remove the temperature control hose from the accessory's >Circulation return< [2].
- Leave the accessory open for a while to allow it to dry out and the residue to drain.
- Re-connect the temperature control hose to the accessory's >Circulation flow< [1].
- Re-connect the temperature control hose to the accessory's >Circulation return< [2].
- Re-connect the temperature control hose to the accessory's >Circulation flow< [1].
- Re-connect the temperature control hose to the accessory's >Circulation return< [2].

## 5 Normal operation

### 5.1 Automatic operation

#### CAUTION

**Extremely hot / cold surfaces, connections and thermal fluids**

#### BURNS/FREEZING OF LIMBS

- Surfaces, connections and tempered thermal fluids can be extremely hot or cold depending on the operating mode.
- Avoid direct contact with surfaces, connections and thermal fluids!
- Wear your personnel protective equipment (e.g. temperature-resistant safety gloves, safety goggles).

#### NOTE

**During an active circulation, the thermal fluid circuit is shut off by shut-off valves**

#### MATERIAL DAMAGE TO THE CIRCULATING PUMPS INSTALLED IN THE TEMPERATURE CONTROL UNIT

- Do not close the thermal fluid circuit during an active circulation by means of shut-off valves.
- Warm the thermal fluid to room temperature before stopping the circulation.

#### INFORMATION

In normal mode, temperature control unit and accessory **must** be controlled by means of a process control system.

#### 5.1.1 Temperature control

##### 5.1.1.1 Starting the temperature control process

Temperature control by the temperature control unit and control by the accessory are started by means of a process control system. Prerequisite: The temperature control unit and the accessory are connected with a process control system, are switched on (initialization process for the accessory is completed) and are filled/vented.

### PROCEDURE

- Start the temperature control process as described in the operation manual of the temperature control unit.
- Start the control on the accessory only once temperature control is active. While temperature control is active, the accessory may not be switched on and off using the **>Mains switch< [37]!**

##### 5.1.1.2 Ending the temperature control process

#### NOTE

**When the accessory is switched off, the thermofluid temperature is higher/lower than the room temperature**

#### DAMAGE TO THE ACCESSORY

- Use the temperature control unit to temper the thermofluid in the accessory to room temperature (20 °C).
- Do not close the shut-off valves in the thermofluid circuit.

The temperature control process by the connected temperature control unit continues to run after the accessory has stopped the control. The temperature control process by the temperature control unit must be stopped separately.

### PROCEDURE

- Bring the thermal fluid up to room temperature using the temperature control unit.
- Stop the control by the accessory. The control has only stopped completely if the control mode outputs the value "0.0 %". Only when this value is reached may the temperature control be stopped at the temperature control unit.

## 6 Interfaces and software update

**NOTE**

**Connections with the interfaces are established during operation**

**DAMAGE TO THE INTERFACES**

- Interfaces may get damaged if devices are connected with the interfaces during operation.
- Before connecting, ensure the device to be connected is turned off.

**NOTE**

**The specifications of the interface used are not being met.**

**PROPERTY DAMAGE**

- Only connect components that meet the specifications of the interface used.

**INFORMATION**

The use of PB commands is described in our manual "Data communication PB". You can download this manual under [www.huber-online.com](http://www.huber-online.com). The PB commands "vFluidFlow" and "vFluidFlowSet" can also be used with the accessory without activated DV- or Explore E-grade.

### 6.1 Interfaces at the "Pilot ONE®" controller

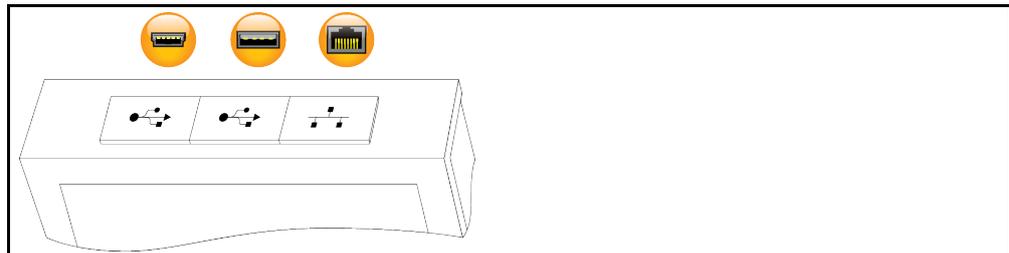
**NOTE**

**The Pilot ONE controller is not operated behind a firewall**

**PROPERTY DAMAGE**

- Operate the controller Pilot ONE exclusively behind a firewall, if the local subnet is connected to the Internet or another risk-prone network.
- The best available technology is to be applied in order to provide sufficient security for the LAN!

Standard interfaces at the "Pilot ONE" top side



#### 6.1.1 10/100 Mbps Ethernet for RJ45 network sockets



This is a fast and flexible interface. Standard 10/100 Mbps interface (Fast Ethernet), can be connected to any existing Ethernet network. Because this interface can also be connected to very large networks, the IT "Best Practices" (firewall) must be observed.

**Usage:**

Also - to be able to communicate with the "Pilot ONE" controller - the communication enable must be issued. This is an additional safety feature that prevents persons - possibly unintentionally - connecting to the wrong machine and implementing incorrect temperature control specifications. The following restrictions are possible:

- Deactivated
- Always on (PLC)
- 12h Inactivity Timer
- 10min Inactivity Timer

If, for example, "10min Inactivity Timer" is selected, the connection must be made within 10 minutes after confirmation at the control. If this does not happen, the connection is refused.

**INFORMATION** Communication with the Pilot ONE is via TCP (Transmission Control Protocol), Port 8101. The interfaces used must meet the specifications of the generally accepted standards.

### 6.1.2 USB-2.0 interface

**INFORMATION** The interfaces used must meet the specifications of the generally accepted standards.

#### 6.1.2.1 USB-2.0 interface, host



USB-2.0 connection (for connector A), e.g. for data memories.

#### 6.1.2.2 USB-2.0 interface, device



USB-2.0 connection (for Mini-B connector) for communicating with a computer.

## 6.2 Interfaces on the accessory

### 6.2.1 Connection jack for external pressure sensor



This interface is used to connect an optional external pressure sensor. Once the external pressure sensor has been recognized, these measured values are used for the control. For the appropriate external pressure sensor, please refer to the Huber catalog under Accessories.

### 6.2.2 Connection jack for Pt100 process sensor



A temperature sensor located in the connected application (Pt100, 4-wire technology, Lemosa connector) is connected to the Pt100 port. It records and displays the external actual temperature.

**INFORMATION** Depending on the operating temperature, isolation losses and exothermic heat, the operating temperature (flow temperature) of the application can be significantly less than the setpoint of the application. In this context, safety-critical thresholds for the temperature control fluid must be strictly observed.

The control results contained in the data sheet can only be achieved with **shielded** sensor leads. We recommend the external Pt100 process control sensor from the Huber accessories program.

Pin assignment (front view)



Pin assignment

| Pin | Signal |
|-----|--------|
| 1   | I+     |
| 2   | U+     |
| 3   | U-     |
| 4   | I-     |

### 6.2.3 Service interface



This interface is exclusively used by Huber service engineers for service purposes. An adapter cable makes this interface a RS232 serial port.

### 6.3 Interfaces at the Com.G@te® (optional)

**NOTE**

Establishing a connection with the interfaces on the accessory during operation

**DAMAGE TO THE INTERFACES**

- When devices in operation are connected with interfaces of the accessory, interfaces may get damaged.
- Before connecting, ensure the accessory and the device to be connected are turned off.

Com.G@te external interfaces:  
LEVEL, POKO, AIF, ECS, RS232/RS485 (left to right).



Com.G@te internal interfaces:  
POKO, AIF, ECS, RS232/RS485 (left to right).



If the >Com.G@te< [46] is not connected, proceed as follows.

### PROCEDURE

- Switch off the accessory.
- Plug the >Com.G@te< [46] into the slot provided.
- Switch on the accessory. The >Com.G@te< [46] is ready for operation.

**INFORMATION**

Please note that you may only change the >Com.G@te< [46] when the accessory is switched off. In the category “Interfaces” you can change the settings of each function such as POKO, analog interface and RS232/RS485.

You may order the >Com.G@te< [46] with Order-No. 6915. You can extend an existing >Com.G@te< [46] via a connecting cable (Order-No. 16160).

#### 6.3.1 Jack LEVEL (Com.G@te® external only)

For level monitoring in the >Sight glass< [23].



This connection enables you to connect an external float switch (Order No. 6152), which is positioned in the >Sight glass< [23], for monitoring the level of your externally closed application. Activation via a potential-free contact.

**INFORMATION**

The interface is specified as a digital input. Do not apply voltage or current.

Pin assignment (front view)



Pin assignment

| Pin | Description                                   |
|-----|---|
| 1   | Level test (bypass via contact 2 → “absence”) |
| 2   | Level – (GND)                                 |
| 3   | Level + (normally open contact)               |

### 6.3.2 Connector POKO (floating contact) alarm

Signal contact for external monitoring.



Notice the functions provided by POKO in the category “Interfaces”. The floating contact (POKO) signals the state of the accessory via the contact position. A closed normally open contact means readiness for operation. If a fault or an error occurs, the normally open contact is opened (this applies to the make contact between pin 1 and pin 2).

**The following settings are offered:**

- **“Off”**: The POKO displays the OK state whenever the temperature control unit is ready for operation. The unit is ready for operation about 30 seconds after switching on, once the internal controller check has been completed. The OK status is terminated by switching off the unit or in case a fault occurs.
- **“Internal temperature relative”**: Set the upper and lower limit of a temperature range around the setpoint by using the POKO “min. value” and the POKO “max. value”.  
The floating contact indicates the state that the setpoint differs from the actual value by a smaller difference than was defined by the temperature range. Exceeding the set range only results in the floating contact to switch (away from the OK state), but does not result in further reactions of the temperature control unit. The contact returns to the OK state if the actual value is once more within that range.
- **“External alarm”**: The POKO relay becomes active (OK state) in this function only if the temperature control unit is switched on and is in “Fault” mode. The advantage is that the alarm will not be triggered if the temperature control unit is switched off. Please use the POKO function **“OFF”** if you desire to use the alarm function together with the operating current principle.
- **“Unipump/PCS”**: This POKO function and the enable contact of the pump guarantee that the external pump runs synchronously with the pump in the temperature control unit if an external pressure booster pump is used in your temperature control circuit / cooling water circuit, i.e. the POKO assumes the OK state as soon as the internal pump is started up.  
PCS: The POKO is used to communicate the state of the temperature control unit to the process control system.  
POKO state **ON** means the pump is running.  
POKO state **OFF** means the pump is not running, the temperature control unit is in stand-by mode.
- **“External control”**: The PB commands “vPoKoExtMode” and “vPoKoState” use an external interface (Ethernet, RS232, TS485, USB device) to switch the POKO on and off. Please also refer to the software offered by us and the Data Communication Manual.
- **“Process temperature relative”**: Set the upper and lower limit of a temperature range around the setpoint by using the POKO “min. value” and the POKO “max. value”.  
The floating contact indicates the state that the setpoint differs from the actual value by a smaller difference than was defined by the temperature range. Exceeding the set range only results in the floating contact to switch (away from the OK state), but does not result in further reactions of the temperature control unit. The contact returns to the OK state if the actual value is once more within that range.
- **“Unipump with Echo”**: This function is used to check whether the Unipump controlled by the POKO runs synchronous with the Unistat pump. For this purpose, the operating mode of the Unipump is applied to the “LEVEL” socket via a make contact. A fault is generated if asynchronous. This mode is useful if a Unipump is to be monitored - either to guarantee the desired circulation or to prevent an unintended heating of the thermal fluid.
- **“Programmer”**: This activates the individual segments associated during program creation with the POKO switching states.
- **“Internal temperature absolute”**: This enables you to set a temperature range relative to the internal sensor (absolute temperature). The POCO is active outside of this range; the POCO is inactive inside of this range.
- **“Process temperature absolute”**: This enables you to set a temperature range relative to the process temperature (absolute temperature). The POCO is active outside of this range; the POCO is inactive inside of this range.

- **“Solenoid valve flow / return flow”**: This function is used to control a connected solenoid valve. It takes 60 seconds before the POKO switches on after you have started the pump in the temperature control unit. For example, when the temperature control process / circulation is stopped, the POKO is switched off before the pump has been completely stopped. Thus, the POKO is switched on only as long as the full pump pressure is applied.
- **“Cooling”**: This function is used to open the cooling water supply with a solenoid valve only when the temperature control unit requires cooling water. The POKO is switched on when the temperature control unit is cooling.
- **“Message present”**: The POKO switches on when a message is present at the Pilot ONE. This message can be a fault, warning or general message.
- **“Automatic filling”**: The POKO switches on when the level has dropped below the minimum value. The POKO is switched off after 20 seconds when the level has risen above the minimum value. The POKO switches off immediately when the maximum value has been reached.
- **“Setpoint reached”**: The POKO switches on when the control temperature has reached the setpoint once (+/- 0.1 K). The POKO only switches off again when the temperature control is switched off.
- **“M-FCC ready”**: The POKO switches on when the M-FCC is ready (the first VPC initialization was completed). Note: This function is only available for the accessory “Multi Flow Control Cube” (M-FCC).

**INFORMATION**

With the floating contact, use only sheathed lines! The interface is specified as a digital output.

Pin assignment (front view)



The connection is designed as a floating changeover contact.  
Closing contact between pin 1 and pin 2.  
Opening contact between pin 2 and pin 3.  
Maximum contact load: 0.3 A at 30 V DC.

**6.3.3 Jack AIF Reg-E-Prog**



The analog interface has a programmable input channel and 3 output channels.

The analog interface of Com.G@te® is programmed in the category “Interfaces”.

Pin assignment (front view)



Pin assignment

| Pin | Description                         | Signal                                 |   |
|-----|-------------------------------------|--|---|
| 1   | Current output, T external          | 0 <sup>a)</sup> /4 - 20 mA or 0 - 10 V | If using 0 - 10 V, integrate a 500 Ω resistor.                                  |
| 2   | Current output, setpoint            | 0 <sup>a)</sup> /4 - 20 mA or 0 - 10 V |   |
| 3   | GND for analog outputs              | GND                                    |   |
| 4   | Analog input (programmable)         | 0 <sup>a)</sup> /4 - 20 mA or 0 - 10 V | Power input: 200 Ω working resistance<br>Voltage input: 100 kΩ input resistance |
| 5   | Current output, freely programmable | 0 <sup>a)</sup> /4 - 20 mA or 0 - 10 V | If using 0 - 10 V, integrate a 500 Ω resistor.                                  |
| 6   | GND for analog input                | GND                                    |   |

<sup>a)</sup>Consult with our Customer Support.

### 6.3.4 Jack ECS (External Control Signal) standby

Enable signal **ECS** (external control signal) for starting/stopping the temperature control process.



Activation via a potential-free contact. Contacts 1 and 3 are internally bypassed. **ECS** is energized when E1 and E2 are connected by an external floating contact. Contact specification: min. 0.1 A / 24 V DC.

The functionality of the **ECS** is determined via the “Interfaces” category.

**The following variants are offered:**

- **“No Action”**: Switching the contacts open/closed or closed/open has no effect.
- **“Switching to second setpoint”**: A change from a closed to an open contact replaces the set setpoint with the value of the second setpoint. This altered setpoint is not fixed to the second setpoint but can be changed by the operator at the temperature control unit at any time. A change from an open to a closed contact does not cause any change and the temperature control process is not reset to the original setpoint.
- **„Second setpoint selective”**: An open contact causes a temperate control to the original setpoint. A closed contact causes a temperature control to the second setpoint.
- **“Internal / Process”**: If the contact is open, the device-internal temperature sensor is used for control. If the contact is closed, the additionally connected external temperature sensor is used for control. Switching the contacts open/closed or closed/open switches between these two temperature sensors.
- **“Temperature control on/off”**: The temperature control process starts when switching from an open to a closed contact. The temperature control process switches off when switching from a closed to an open contact.
- **“Release”**: The temperature control process switches off if the temperature control process is active and the contact is switched from closed to open. The temperature control process is **not switched on** if the contact is further switched from open to closed!
- **“Reset Messages”**: All messages in the Pilot ONE are reset (if possible) if the enable signal changes from “open” to “closed”. Resetting is delayed in the event of a fault until the temperature control unit is in stand-by mode. Messages can be reset as often as required, but faults can be reset only 3 times.
- **“Program 1 Start/Stop”**: The temperature control program 1 is started if the enable signal changes from “open” to “closed”. The temperature control program is stopped when changing from “closed” to “open”.
- **“Fill level alarm”**: When switching from closed to open contact, an alarm is triggered if the fill level is too low. For this purpose, a level sensor must be connected and placed in the **>Sight glass< [23]** or in the external application.
- **“Fill level warning”**: When switching from closed to open contact, a warning is generated if the fill level is too low. For this purpose, a level sensor must be connected and placed in the **>Sight glass< [23]** or in the external application.
- **“Status external pump”**: If the external pump is running, the input is closed. The accessory can only be started when the signal is closed. Note: This function is only available for the accessory “Multi Flow Control Cube” (M-FCC).

**INFORMATION**

The interface is specified as a digital input. Do not apply voltage or current.

Pin assignment (front view)



Pin assignment

| Pin | Signal |
|-----|--------|
| 1.3 | E2     |
| 2   | E1     |

### 6.3.5 Jack RS232/RS485 serial



A PC, a SPS or a Process Control System (PCS) can be connected to this jack for remote control of the controller electronics. Alternatively, a connection to a RS485 bus is possible. Before plugging in the cable, check the settings in the “Interfaces” category and adjust if necessary.

**INFORMATION**

The interfaces used must meet the specifications of the generally accepted standards.

Pin assignment (front view)



Pin assignment

| Pin          | Signal                            | Description   |
|--------------|-----------------------------------|---------------|
| Wiring RS232 |                                   |               |
| 2            | RxD                               | Receive Data  |
| 3            | TxD                               | Transmit Data |
| 5            | GND                               | Signal GND    |
| Wiring RS485 |                                   |               |
| 6            | A with 120-Ω terminating resistor | –             |
| 7            | A                                 | –             |
| 8            | B                                 | –             |

## 6.4 Firmware update

An instruction for running a firmware update can be found at [www.huber-online.com](http://www.huber-online.com).

## 6.5 Data communication

### 6.5.1 PB commands

Example: If several accessories are controlled/monitored by means of a process control system.

Cyclically query the accessory status (vStatus2, Bit6).

Start the temperature control of the temperature control unit as soon as the system test of each accessory has been completed (vTmpActive).

Query the status of the temperature control unit (vStatus1, Bit 4).

When the pump in the temperature control unit is running, the accessories can be started (e.g. with vTmpActive).

A “Locking” must be implemented in the operator control.

Possible reading commands

| Variable   | Description   |
|--|---|
| <b>Accessories</b>   |   |
| <b>vTE</b><br>(Process temperature (Lemos))                  | The current process temperature is returned. Strictly speaking, the measured value of the Pt100 sensor which is connected to the LEMOSA connector is returned. Typically the processor sensor is connected here. If no sensor is connected, the value -151 °C is returned.  |
| <b>vTmpActive</b><br>(Temperature control)                   | Start or stop temperature control of the thermostat or query current status.<br>0: Temperature control not active<br>1: Temperature control active  |
| <b>vStatus2</b><br>(Status of the thermostat)                | Bit 6: The VPC has completed its reference point approach and you can start the pump. Message -4137 is displayed on the Pilot ONE if an attempt is made to start the pump while bit 6 returns the value 0.  |
| <b>vpPSet</b><br>(Setpoint pump pressure)                    | Set and query the current pump pressure setpoint.<br>Please note that this function is only available with thermostats with speed-controllable pumps or VPC bypass.   |
| <b>vFluidFlow</b><br>(Thermal fluid volume flow)             | Current measured value of the thermal fluid volume flow.<br>Please note that this measured value is only available if a special volume flow measuring device is provided.   |
| <b>vFluidFlowSet</b><br>(Setpoint thermal fluid volume flow) | Current setpoint of the thermal fluid volume flow.<br>Please note that this function is only available if a special volume flow measuring device is provided. In addition, either a speed-controllable pump or a VPC bypass must be provided in order to allow control.   |
| <b>vpVPC</b><br>(VPC Bypass pressure)                        | Absolute pressure measured in the supply line of the VPC bypass. If an external pressure sensor is connected to the VPC bypass, the value measured by that sensor is returned, otherwise the value measured by the pressure sensor in the VPC bypass (at the output of the customer's application) is returned. The return value must be reduced by 1000 mbar if a relative pressure (the difference to the atmospheric pressure) is to be processed. |
| <b>vPumpCtrlMode</b><br>(Pump control mode)                  | Setting and querying the pump control mode.<br>0: Control of pump speed.<br>1: Control of pump pressure.<br>2: Control of the thermal fluid flow.<br>3: Control of the thermal fluid flow rate, but limited to a maximum pressure.  |
| <b>Temperature control unit</b>                              |   |
| <b>vStatus1</b><br>(Status of the thermostat)                | Bit 4: Circulating pump: 1: switched on / 0: switched off   |

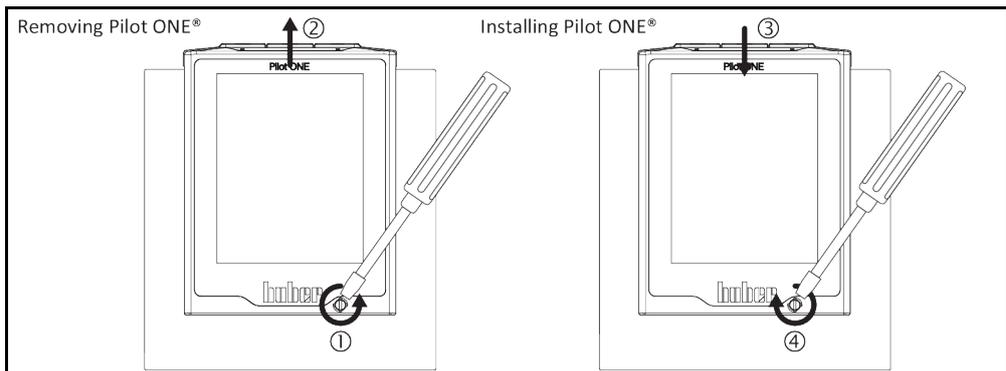
## 7 Service/maintenance

### 7.1 Electrical fuse

The overcurrent circuit breakers for all-pole breaking (L and N) are located on the accessory. In case of a fault (no function and no display) please first check if the overcurrent circuit breakers have tripped. If the overcurrent circuit breakers trigger again immediately after reversing, please unplug the power cord and contact Customer Support immediately. → Page 54, section »Contact data«.

### 7.2 Replacing the “Pilot ONE®”

Replacing the “Pilot ONE”



#### PROCEDURE

- Switch off the accessory.
- Disconnect the accessory from the power supply.
- Release the >Fixing screw for Pilot ONE< [89] at the front of the housing.
- Carefully pull the “Pilot ONE” away upwards.
- Carefully insert the replacement “Pilot ONE”.
- Close the >Fixing screw for Pilot ONE< [89] at the front of the housing.
- Connect the accessory to the power supply.
- Switch on the accessory.

### 7.3 Maintenance

**DANGER**

**Cleaning/maintenance while the temperature control unit/ accessory is operating**

**DANGER TO LIFE FROM ELECTRIC SHOCK**

- Stop an ongoing temperature control process.
- Adjust the temperature of the thermal fluid to room temperature after switching off.
- Disconnect the temperature control unit from the power supply.
- Also disconnect the accessories from the current supply.

**NOTE**

**Carrying out maintenance work not described in this operation manual**

**MATERIAL DAMAGE TO THE ACCESSORY**

- Please contact Huber for maintenance work that is not described in these operating instructions.
- Maintenance work not described in these operating instructions is reserved for qualified specialists trained by Huber.
- Safety-relevant components may only be replaced by equivalent components. The specified safety values for the respective component must be observed.

### 7.3.1 Function check and visual inspection

Control intervals

| Cooling* | Description  | Maintenance interval  | Comment   | Person responsible                   |
|----------|--|---|---|--------------------------------------|
| A/W      | Visually inspect hoses and hose connections                        | Prior to switching on the temperature control unit / accessory  | Replace leaking hoses and hose connections before you switch on the temperature control unit / accessory. → Page 49, section »Replacing temperature control hoses«. | Operating company and / or operators |
| A/W      | Check the power cable  | Prior to switching on the temperature control unit / accessory or when you change the installation location | Do not start up the temperature control unit / accessory if the power cable is damaged.   | Qualified electrician (BGV A3)       |
| A/W      | Thermal fluid inspection   | As required   | –   | Operating company and / or operators |
| A/W      | Inspect the accessory for damage and stability                     | Every 12 months or after a change of location   | –   | Operating company and / or operators |
| A/W      | Check air filter mats  | Determine according to ambient conditions.  | Check all air filter mats at the accessory. Clean or replace the air filter mats as required. → Page 15, section »Proper disposal of re-sources and consumables«.   | Operating company and / or operators |
| A/W      | Exchange safety-relevant electric and electromechanical components | 20 years  | Have the exchange only carried out by certified personnel (such as Huber service engineers). Please contact Customer Support. → Page 54, section »Contact data«     | Operating company                    |

\*A = Air cooling; W = Water cooling

### 7.3.2 Replacing temperature control hoses

Replace defective temperature control hoses **before** you switch on the temperature control unit / accessories.

#### PROCEDURE

- Exchange the temperature control hoses as described in the operation manual of the temperature control unit.

### 7.4 Thermal fluid inspection, replacement and circuit cleaning

#### PROCEDURE

- Do not disconnect the accessory.
- Proceed as described in the operation manual of the temperature control unit when performing the thermofluid inspection and changing and cleaning the thermofluid circuit.

## 7.5 Cleaning the surfaces

### CAUTION

#### Extremely hot / cold surfaces, connections and thermal fluids

##### BURNS/FREEZING OF LIMBS

- Surfaces, connections and tempered thermal fluids can be extremely hot or cold depending on the operating mode.
- Avoid direct contact with surfaces, connections and thermal fluids!
- Wear your personnel protective equipment (e.g. temperature-resistant safety gloves, safety goggles).

### NOTE

#### Exposed plug contacts

##### DAMAGE CAUSED BY FLUID INGRESS

- Protect unused plug contacts with the protective caps supplied.
- Clean surfaces only with a damp cloth.

A standard stainless steel cleaning agent is suitable for cleaning the stainless steel surfaces. Carefully clean painted surfaces (damp only) using a solution of sensitive-fabrics detergent. Observe the proper disposal of thermal fluid and aids. → Page 15, section »Proper disposal of resources and consumables«.

## 7.6 Plug contacts

### NOTE

#### Exposed plug contacts

##### DAMAGE CAUSED BY FLUID INGRESS

- Protect unused plug contacts with the protective caps supplied.
- Clean surfaces only with a damp cloth.

Protective caps are supplied for all plug contacts. Make sure that any plug contacts not required are protective with the caps.

## 7.7 Decontamination/repairs

### CAUTION

#### Returning an accessory for repair that was not decontaminated

##### PHYSICAL INJURY AND PROPERTY DAMAGE CAUSED BY HAZARDOUS MATERIALS IN OR ON THE ACCESSORY

- Carry out appropriate decontamination.
- The decontamination process depends on the type and quantity of the materials used.
- Consult the relevant safety data sheet.
- You will find a prepared return receipt at [www.huber-online.com](http://www.huber-online.com).

As the responsible body you are responsible for carrying out decontamination **before** third-party personnel come into contact with the temperature control unit / accessory. Decontamination must be carried out **before** the temperature control unit / accessory is returned for repair or inspection. Attach a clearly visible written notice stating that the temperature control unit / accessory has been decontaminated.

To simplify the process, we have prepared a form for you. This is available for download at [www.huber-online.com](http://www.huber-online.com).

## 8 Shutting down

### 8.1 Safety instructions and basic principles

#### DANGER

**Connection/adjustment to the power supply not carried out by an electrician and/or connection to a power socket without protective earth (PE)**

##### **MORTAL DANGER FROM ELECTRIC SHOCK**

- Have the connection/adjustment to the power supply carried out by an electrician.
- Always connect the accessory to safety sockets (PE).

#### DANGER

**Damaged power cable/power cable connection**

##### **MORTAL DANGER FROM ELECTRIC SHOCK**

- Do not start up the accessory.
- Isolate the accessory from the power supply.
- Have the power supply cable/power supply connection replaced and inspected by an electrician.
- Do not use a power cable that is longer than **3 m**.

#### WARNING

**Risk of tipping due to unstable accessory**

##### **SERIOUS INJURY AND PROPERTY DAMAGE**

- Avoid risk of tipping due to unstable accessory.

#### CAUTION

**Non-compliance with the safety data sheet for the thermal fluid to be used**

##### **INJURIES**

- Risk of injury to the eyes, skin, respiratory tract.
- The safety data sheet for the thermal fluid to be used must be read prior to using it and its content must be respected.
- Observe the local regulations/work instructions.
- Wear your personal protective equipment (e.g. temperature-resistant safety gloves, safety goggles, safety footwear).
- Danger of slipping because floor and work area are contaminated. Clean the workplace; observe the proper disposal of thermal fluid and aids. → Page 15, section »**Proper disposal of resources and consumables**«.

#### CAUTION

**Hot or very cold thermal fluid**

##### **SERIOUS BURNS/FREEZING OF LIMBS**

- Before draining, ensure that the thermal fluid has room temperature (20 °C).
- If, at this temperature, the thermal fluid is too viscous to be drained: Control the temperature of the thermal fluid for a few minutes until the viscosity will allow drainage.
- Danger of burns when draining thermal fluid at temperatures above 20 °C.
- Wear your personal protective equipment when carrying out the drainage operation.

#### **NOTE**

**The accessory is switched on or off while temperature control is ongoing**

##### **MATERIAL DAMAGE TO THE EXTERNAL APPLICATION**

- A system test is run when the accessory is switched on. If temperature control was active, this would cause the uncontrolled pressure to be applied to the external application. This must be avoided at all cost!
- Do not switch the accessory on or off while a temperature control process is active at the temperature control unit.
- The accessory may only be switched on or off if **no** temperature control is active at the temperature control unit.

#### **INFORMATION**

All safety instructions are important and must be followed accordingly during working operations!

## 8.2 Switch-off

### PROCEDURE

- Control the temperature of the thermal fluid to room temperature.
- Stop the control at the accessory. This closes the output. However the output cannot be completely closed due to the design.
- Stop the temperature control at the temperature control unit.
- Check whether the >Touchscreen< [88] at the accessory displays the value "0.0 %" during control mode. If the value is higher, the accessory may **not** be switched off!
- **Only valid for temperature control units and accessory with the function "Drain":**  
 .For the thermal fluid and/or cooling water circuit to be drained completely, the function "Drain" must be activated. For water-cooled temperature control units, this function also opens the control valve in the cooling water circuit, depending on the model. Skip the following instruction if the dialog entry "Drain" is not present:
  - Touch in succession "Category menu", "Temperature control", or "M-FCC", "Start/stop".
  - Touch the dialog entry: "Drain".
  - Confirm your choice by touching "OK".
  - Read the message and confirm by touching "OK".
  - Do **not** confirm the subsequent message by touching "OK".
- Turn off the temperature control unit. Please refer to the operation manual of the temperature control unit.
- Switch off the accessory.
- Disconnect the temperature control unit from the power supply. Please refer to the operation manual of the temperature control unit.
- Disconnect the accessory from the power supply.

## 8.3 Draining the accessory

### PROCEDURE

- Drain the temperature control unit and the accessory. → Page 37, section »Draining the accessory«.

## 8.4 Separating the accessory and the temperature control unit from the process control system

### PROCEDURE

- Disconnect the connection between temperature control unit and process control system.
- Disconnect the connection between accessory and process control system.

## 8.5 Separating the accessory from the temperature control unit

### PROCEDURE

- Drain the temperature control unit, the accessory and the external application **before** you dismantle the temperature control hoses.
- Switch off the temperature control unit and the accessory.
- Disconnect the temperature control unit and the accessory from the power grid connection.
- In case you use an external pressure sensor:  
 Disconnect the external pressure sensor from the >Signal external pressure sensor< [66] on the accessory.
- Disconnect the >Circulation return< [2'] on the accessory from the external application.
- Disconnect the >Circulation flow< [1'] on the accessory from the external application. Remove the overpressure protection device installed in the thermal fluid circuit, if present.  
 If you have used an external pressure sensor:  
 Remove the external pressure sensor from the thermal fluid circuit.
- Disconnect the >Circulation return< [2] on the temperature control unit from the >Circulation flow< [1] on the accessory.
- Disconnect the >Circulation flow< [1] on the temperature control unit from the >Circulation return< [2] on the accessory.
- Install the protective caps on the connections on the accessory.

## 8.6 Screw in/deactivate the leveling feet (if installed)

Ensure that the leveling feet are screwed in/deactivated before you pack the accessories.

### PROCEDURE

- Turn the red setting wheel on each caster counterclockwise. This retracts the leveling feet and activates the casters.
- Ensure that the locking brakes of the casters (if installed) are deactivated.

## 8.7 Packing

Always use the original packaging! → Page 19, section »Unpacking«.

## 8.8 Shipping

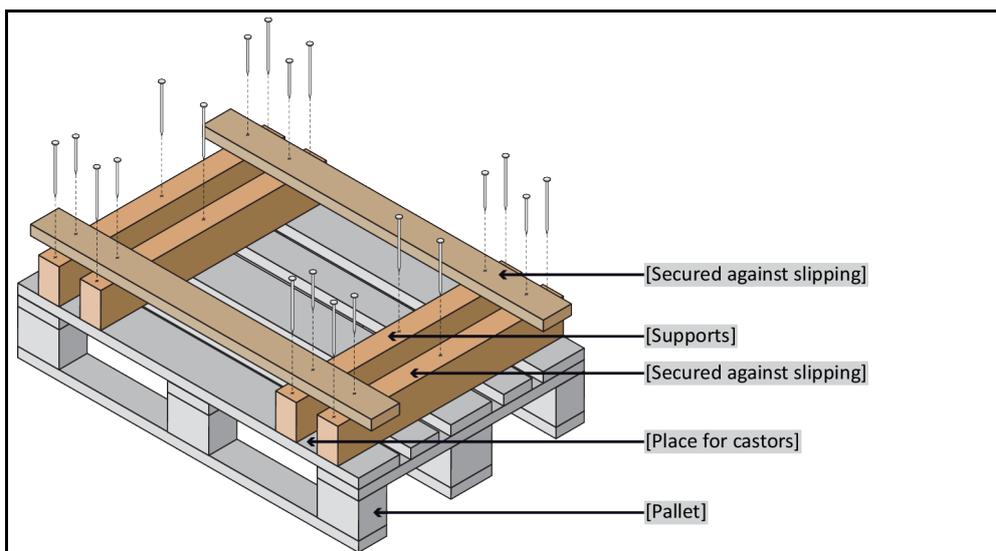
### NOTE

#### Improper transportation of accessories

#### MATERIAL DAMAGE

- Do not transport the unit in a truck when the unit rests on its casters or leveling feet.
- Comply with all requirements in this section to avoid damage to the accessories.

Pallet with squared timber for free-standing units



If fitted, use the lugs located on the top of the accessory for transportation. Do not transport the accessory alone and without aids.

- Always use the original packaging for transportation.
- Indicate the upright transport position with arrows on the packaging.
- Always transport the accessories upright on a pallet!
- Protect attachments from damage during transportation!
- During transportation, place the accessories on squared timber to protect the casters/feet.
- Secure with tensioning belts/lashing straps that are suitable for the weight.
- Additionally secure (depending on model) with plastic film, cardboard and straps.

## 8.9 Disposal

**NOTE****Improper disposal****ENVIRONMENTAL DAMAGE**

- Spilled/leaked thermal fluid must be removed. Observe the proper disposal of thermal fluid and aids. → Page 15, section »**Proper disposal of resources and consumables**«.

Huber temperature control units and Huber accessories are made of high quality, recyclable materials. For example: Stainless steel 1.4301 / 1.4401 (V2A), copper, nickel, FKM, Perbunan, NBR, ceramic, carbon, Al-Oxid, red brass, brass, nickel-plated brass and silver solder. Proper recycling of the temperature control unit and accessories can actively help reduce CO<sub>2</sub> emissions in the production of these materials. Follow the laws and regulations of your jurisdiction when disposing material.

## 8.10 Contact data

**INFORMATION**

Please contact your supplier and/or local dealer **before** you return your accessories. The contact information can be found "Contact" on our home page [www.huber-online.com](http://www.huber-online.com). Please have the serial number of the accessories ready. The serial number can be found on the rating plate of the accessories.

### 8.10.1 Telephone number: Customer Support

If your country is not mentioned in the list below: The responsible service partner can be found on our homepage [www.huber-online.com](http://www.huber-online.com) under the heading „Contact“.

- Huber Deutschland: +49 781 9603 244
- Huber China: +86 (20) 89001381
- Huber India: +91 80 2364 7966
- Huber Ireland: +44 1773 82 3369
- Huber Italia: +39 0331 181493
- Huber Swiss: +41 (0) 41 854 10 10
- Huber UK: +44 1773 82 3369
- Huber USA: +1 800 726 4877 | +1 919 674 4266

### 8.10.2 Telephone number: Sales

Telephone: +49-781-9603-123

### 8.10.3 Email address: Customer Support

Email: [support@huber-online.com](mailto:support@huber-online.com)

## 8.11 Certificate of Compliance

This certificate must be enclosed with the temperature control unit. → Page 50, section »**Decontamination/repairs**«.

## 9 Annex

# Inspired by **temperature** designed for you

Peter Huber Kältemaschinenbau SE  
Werner-von-Siemens-Str. 1  
77656 Offenburg / Germany

Telefon +49 (0)781 9603-0  
Telefax +49 (0)781 57211

[info@huber-online.com](mailto:info@huber-online.com)  
[www.huber-online.com](http://www.huber-online.com)

Technischer Service: +49 (0)781 9603-244

-125 °C ... +425 °C

**huber**