



THERMAL CARE

PiovanGroup



Temperature Controllers

OPERATION,
INSTALLATION AND
MAINTENANCE
MANUAL

Oiltherm ROH

Where water
means business.



Instructions

ROH 300

Serial number _____

Enclosed this instruction manual are separate instructions for Microprocessor for temperature control units

Documentation ROH 300

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Foreword

This owner's manual, prepared by the manufacturer, provides detailed instructions for the installation, operation, and maintenance of an Oiltherm ROH unit. Prior to installation, it is strongly recommended to thoroughly read the entire owner's manual.

The temperature controller must be installed in a well-ventilated room and is not suitable for outdoor installation.

Only piping that have been approved for use with the temperature controller and are rated for the maximum temperature and pressure of the unit should be used. Additionally, the electrical installation must be carried out correctly and in accordance with relevant standards.

The manufacturer bears no responsibility for any issues related to piping and electrical installations outside of the temperature controller.

The back plate of the temperature controller displays important information such as the serial number, voltage, frequency (Hertz), and current consumption (Ampere).





If there are any questions, do not hesitate to contact Customer Service. When making an inquiry about the temperature control unit, please provide the model number and serial number of the unit in question.

Upon receipt of the temperature controller, it is important to inspect it for any damage that may have occurred during transport. Carefully check the housing for dents and the electric box for any loose components or wires.

IF ANY DAMAGE IS FOUND, PLEASE CONTACT CUSTOMER SERVICE FOR FURTHER ASSISTANCE.

GENERAL SAFETY INFORMATION

SAFETY SYMBOLS

	An immediately hazardous situation. If the hazardous situation is not avoided death or serious injury will occur.
	A potentially hazardous situation. If the hazardous situation is not avoided, Death or serious injury could occur.
	A potentially hazardous situation. If the hazardous situation is not avoided, minor or moderate injury could occur.
	A property-damage-only hazard, meaning no personal injury is possible.

RANGE OF APPLICATION

The following comprehensive safety guidelines hold universal applicability across all ROH temperature controller units.

INTENDED USE

The Oiltherm ROH temperature control system is meticulously designed in accordance with contemporary industry standards and universally recognized safety engineering principles. This temperature control apparatus is exclusively intended for standard applications involving the regulated heating and/or cooling of injection molds, die casting dies, extruders, calenders, mixers, and other associated equipment in environments devoid of explosive hazards.

Any usage beyond these specified parameters will be construed as improper and in violation of intended usage. The manufacturer disclaims liability for any consequential damages resulting from unauthorized applications, placing the onus on the user for such risks. The temperature control system must not be utilized under alternative operational circumstances and/or with different mediums, differing from the prescribed specifications, without prior explicit consent from manufacturer.

Furthermore, the stipulated usage also mandates strict adherence to the operational, servicing, and maintenance directives prescribed by the manufacturer. All activities involving the operation, servicing, and maintenance of the temperature control unit should exclusively be performed by personnel well-versed in these tasks and adequately trained in risk mitigation strategies.

SAFETY INFORMATION

The Oiltherm ROH temperature control unit assures secure operation, yet the potential for hazard arises when it is employed improperly or diverted from its designated function. It is imperative to recognize that such misapplication or disregard for the specified usage parameters can engender perils to the operator's well-being and that of others, induce deleterious effects on associated equipment, other possessions under the user's ownership, and jeopardize the seamless functionality of the equipment.

The initiation of operations (specifically, the commencement of the intended usage) is strictly proscribed until a comprehensive verification process confirms the meticulous setup and precise wiring alignment, adhering to the guidelines enshrined within the Machinery Directive (2006/42/EC).

Furthermore, strict adherence to EN 60204-1 (Safety of Machinery) is essential.

The forthcoming operating instructions necessitate thorough perusal before engaging the temperature control unit. This encompasses a comprehensive understanding of the intended utilization as well as foreseeable deviations from it. Concurrently, all pertinent local safety regulations warrant strict observance.

In scenarios where the temperature control unit is integrated with products originating from alternative manufacturers, due regard to the instructions and safety protocols stipulated by these respective manufacturers is also obligatory.

GUIDANCE FOR OPERATORS AND PERSONNEL:

Both the operator and individuals entrusted with the handling of the temperature control unit are mandated to adhere uncompromisingly to foundational regulations governing occupational safety and accident prevention. The operator assumes the pivotal responsibility of ensuring that exclusively those personnel who have familiarized themselves with these comprehensive operational directives, specifically emphasizing the safety section, are sanctioned to engage with the temperature control unit.

Employment of any work methodologies that might impede the technical integrity of the temperature control unit is categorically proscribed. The operator bears the onus of guaranteeing that the temperature control unit is subjected to operation exclusively under impeccable conditions. Should circumstances necessitate, the employing company is compelled to mandate the utilization of protective attire for all personnel involved.

In the execution of tasks encompassing installation, commencement of operations, operation itself, adjustments to operational parameters and methodologies, maintenance, inspections, and rectification procedures, meticulous adherence to any shutdown protocols stipulated within the operational instructions is obligatory.

REMAINING THREATS

Unauthorized modifications or alterations to the temperature management system, as well as unauthorized adjustments to the control system's parameters, are strictly forbidden due to safety considerations.

In the event of damage to the temperature control apparatus, it should not be continued in operation; instead, promptly replace or repair the faulty component. Solely authentic manufacturer replacement parts are permissible for use. Any use of third-party components resulting in damage will nullify all warranty claims.

Immediate rectification is essential for any leaks detected within the temperature control circuit, including the device, connecting conduits, and associated equipment.

For temperature control units utilizing oil as the heat transfer medium, it's important to recognize the flammable nature of oil under specific conditions. As a result, positioning the temperature control unit in proximity to heat sources is prohibited. Sustaining clean thermal insulation within the device is imperative, as insulation saturated with thermal oil escalates fire risk.

In the event of ignited thermal oil, suppression can be achieved through the use of AFFF spray foam fire extinguishers, powder fire extinguishers (though cautioned against for dust-sensitive environments encompassing plants, control systems, EDP, etc.), or CO2 fire extinguishers. The appropriate extinguishing apparatus must be provided by the operator, taking into consideration room equipment and obligatory safety regulations.

Operation of the temperature control unit is permissible only when all safety systems are fully operational and unimpaired.

Safeguarding the temperature control unit against splashes and cleaning agents is mandatory.

Before disconnecting connecting lines from the temperature control circuit and contingent on outlet temperature, ensure the temperature control unit cools down and subsequently power it off. Confirm that the pump is no longer in operation.



Risk of Electric Shock!

Prior to opening, the temperature control unit should be disconnected from the electrical power source (unplug the main plug and, if available, deactivate the main switch on the temperature control unit).



Important - danger of injury in the event of escaping water or oil!

MAKING USE OF THIS MANUAL

This documentation comprises vital data essential for the secure and cost-efficient functioning, as well as the accurate upkeep, of the apparatus. Adherence to the directives outlined within this documentation serves to avert potential hazards, curtail expenses related to repairs, mitigate operational disruptions, and enhance both the reliability and longevity of the device or system.

SUPPLEMENTARY DOCUMENTATION

The enclosed documentation is entirely accurate for the fundamental iterations of the devices. Components outside the scope of the fundamental hardware are indicated as supplementary equipment. The relevant supplementary documents accompany specialized editions of the devices. These supplementary documents either enhance or supersede the explanations found in this documentation, rendering the latter either obsolete or contextually valid.

INTRODUCTION

Within this instructional document, an exhaustive exposition is presented regarding the Oiltherm ROH temperature control units, accompanied by crucial insights pertinent to secure utilization and optimal maintenance.

These operational directives are mandated to remain in close proximity to the temperature control unit, ensuring consistent availability to both operational and maintenance staff.

OPERATING RANGE

The operational scope and utilized medium of the Oiltherm ROH temperature control units are comprehensively outlined in the subsequent tabular representation (for further details, refer to the section titled "Technical Data" within the service documentation).

Temperature Control Unit Type	300-ROH	350-ROH
Temperature range	up to 300 °C	up to 350 °C
Heat transfer medium	Oil	Oil








The technical data and information for installation, start-up and maintenance of the temperature control unit can be found in the maintenance section of these operating instructions. The operating instructions should be kept near the device/system and always be accessible to operating and maintenance personnel!

SETTING UP THE TEMPERATURE CONTROL UNIT

The temperature control unit is engineered to operate within an ambient temperature range of 50°F to 108°F (10°C-42°C). It is imperative to ensure adequate ventilation during the installation process. A minimum distance of 6 inch (15 cm) between devices and/or between the temperature control unit and a wall is required, and the ventilation openings should remain unobstructed.

- Inspect the temperature control unit to verify its unimpaired and comprehensive condition.
- Avoid tilting the temperature control unit, as residual heat transfer medium from prior testing could spill, potentially saturating the insulation.
- Position the temperature control unit on a horizontal surface and engage the wheel brake.
- Arrange the temperature control unit to prevent direct access to connection fittings. If necessary, employ a dedicated protective mechanism like a perforated plate or thermal insulation to deter inadvertent contact.

 	<p>Danger of injury due to release of hot thermal oil!</p> <p>Before detaching connecting lines in the temperature control circuit, the temperature control unit must first be allowed to cool down. The cooling time will depend on the outlet temperature. The shutdown procedure is initiated by pressing the ON/OFF button. The pump continues to run. The temperature control unit cools down until the temperature of the heat transfer medium has reached the programmed cool down temperature (factory default 122°F (50°C)). The pump and the control system are then switched off!</p> <p>Check that the pump is no longer running (indicator in the display = OFF)!</p>
	<p>Risk of injury from elevated temperatures and temperature control unit connectors – Manufacturer advises the installation of appropriate protective mechanisms.</p>

 	<ul style="list-style-type: none"> • Always ensure that the side panels and housing are in place before starting the temperature control unit. • Avoid operating the temperature control unit in potentially explosive environments and shield it against sprays and cleaning agents containing solvents. • Position the temperature control unit away from heat sources, such as furnaces in die-casting plants. • Promptly address any detected leaks in the temperature control circuit (including the unit itself, connecting lines, and components). • Maintain the cleanliness of the thermal insulation within the temperature control unit at all times, as thermal insulation saturated with thermal oil poses a fire hazard. • Adhere to local regulations during the setup process.
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EXAMINATION OF CONSUMABLES

Prior to the installation of connecting lines linking the consumer to the temperature control unit, a series of assessments must be conducted on the consumer as follows:

- Confirm unobstructed channels.
- Employ compressed air to eliminate residual fluids and contaminants (foreign objects such as shavings can potentially harm the pump).
- Eliminate rust, scale deposits, and oil residues, as they significantly hinder the heat exchange process between the consumer and the heat transfer medium, causing increased pressure drop in the consumer.

COOLING WATER QUALITY

Ensure the adequacy of all connections in the cooling source water lines, verifying their compatibility with water under a pressure of 50 PSI at 248°F (3.5 bar at 120°C). Given that oil temperatures generally exceed the boiling point of water, it is conceivable that the return cooling source line may momentarily emit minor amounts of steam upon the opening of the cooling valve. This occurrence is considered standard and expected. We strongly advise that the cooling water supply and return lines be constructed from metallic materials (such as black steel, galvanized steel, or copper).

Please take note: A cooling source inlet filter is provided separately within the unit's crate. Install this filter at the inlet point of the chilled water line before connecting the cooling source line.

It is imperative to confirm that the cooling source aligns with the requisite temperature and pressure specifications for your particular application. In most instances, the cooling source falls within the temperature range of 41°F to 86°F (5°C to 30°C). Moreover, the cooling source fluid pressure must surpass the predetermined threshold of the pressure switch for unit activation. Typically, the designated supply pressure for the cooling source in standard applications falls between 25 PSI to 51 PSI (1.7 bar and 3.5 bar).

REQUIREMENTS FOR WATER CHEMISTRY IN THE SYSTEM

The inherent properties of water render it ideal for heat transfer applications, as it is safe, non-flammable, non-toxic, easily manageable, readily available, and cost-effective in most industrialized regions. However, when employing water as a heat transfer medium, it is crucial to maintain specific chemical parameters to avert undesirable repercussions. Water is recognized as a "universal solvent" due to its ability to dissolve numerous solid substances and absorb gases. Consequently, it can induce corrosion in metals utilized within a cooling system. Frequently, water operates in an open system exposed to air, and when water evaporates, the dissolved minerals remain in the process fluid. When the concentration surpasses the solubility threshold of certain minerals, scaling occurs. Moreover, the properties of water that foster life can also promote biological growth, which can foul heat transfer surfaces.

To forestall the undesirable consequences associated with water cooling, the implementation of proper chemical treatment and preventative maintenance is essential to ensure ongoing plant productivity.

Adverse Effects of Inadequate Water Quality:

- Corrosion
- Scaling
- Fouling
- Biological Contamination

Properties of Cooling Water Chemistry:

- Electrical Conductivity
- pH Levels
- Alkalinity
- Total Hardness
- Dissolved Gases

The intricate nature of water chemistry mandates the involvement of a specialist to assess and implement the necessary sensing, measurement, and treatment procedures required for optimal performance and longevity. Recommendations from such specialists may encompass filtration, monitoring, treatment, and control devices. Keeping pace with the ever-evolving regulations governing water usage and treatment chemicals is typically ensured when industry specialists are engaged. The table below provides a comprehensive list of water characteristics and quality thresholds.

Table 1 - Fill Water Chemistry Requirements

Water Characteristic	Quality Limitation
Alkalinity (HCO ₃ ⁻)	70-300 ppm
Aluminum (Al)	Less than 0.2 ppm
Ammonium (NH ₃)	Less than 2 ppm
Chlorides (Cl ⁻) Electrical	Less than 300 ppm
Conductivity	10-500µS/cm
Free (aggressive) Carbon Dioxide (CO ₂)†	Less than 5 ppm
Free Chlorine(Cl ₂)	Less than 1 PPM
HCO ₃ ⁻ /SO ₄ ²⁻	Greater than 1.0
Hydrogen Sulfide (H ₂ S)	Less than 0.05 ppm
Iron (Fe)	Less than 0.2 ppm
Manganese (Mn)	Less than 0.1 ppm
Nitrate (NO ₃)	Less than 100 ppm
pH	7.5-9.0
Sulfate (SO ₄ ²⁻)	Less than 70 ppm
Total Hardness (dH)k	4.0-8.5

† Dissolved carbon dioxide calculation is from the pH and total alkalinity values shown below or measured on the site using a testkit.

Dissolved Carbon Dioxide, PPM = TA x 2^[(6.3-pH)/0.3] where TA = Total Alkalinity, PPM as CaCO₃

Table 2 – Recommend Glycol Solutions

Chilled Water Temperature	Percent Glycol By Volume
50°F (10°C)	Not required
45°F (7.2°C)	5 %
40°F (4.4°C)	10 %
35°F (1.7°C)	15 %
30°F (-1.1°C)	20 %
25°F (-3.9°C)	25 %
20°F (-6.7°C)	30 %



Ethylene Glycol is flammable at higher temperatures in a vapor state. Carefully handle this material and keep away from open flames or other possible ignition sources.



When your specific application necessitates the incorporation of glycol, it is imperative to employ industrial-grade glycol that is expressly formulated for heat transfer systems and equipment. Under no circumstances should glycol intended for automotive purposes be utilized. Automotive-grade glycols typically contain additives engineered to cater to the unique demands of automotive engines. However, these additives have the potential to coagulate and obstruct heat exchange surfaces, thereby causing a decline in performance or, in more severe cases, failure of the chiller. Furthermore, these additives can initiate adverse reactions with the materials constituting the pump shaft seals, potentially leading to leaks or premature pump malfunctions.

THERMAL OIL RECOMMENDATION

For operating temperatures up to 392°F (200°C), mineral oil or synthetic oil (Houghto-Therm 617) should be used. For operating temperatures between 390°F and 650°F (200°C and 350°C), only synthetic oil (Houghto-Therm 617) should be used as the heat transfer oil.

CHANGE OF OIL

Different loads on the oil means different oil life. Experience has shown that oil changes are often neglected, this will lead to poor performance and possible damage of the unit.

The below table concerning the changing of oil is a recommendation and the question should be discussed with the oil supplier.

Working temperature	Mineral oil - number of working hours	Houghto-Therm 617 - number of working hours
176-230°F (80-110°C)	2,100	6,500
230-284°F (110-140°)	1,700	6,000
284-338°F (140-170°C)	1,300	5,500
338-392°F (170-200°C)	900	5,000
392-482°F (200-250°C)		4,500
482-572°F (250-300°C)		4,000
572-662°F (300-350°C)		3,500



When changing oil the used oil must be collected in a suitable container for removal.

When changing oil type the whole system must be carefully cleaned by, for instance, diesel oil.

CONNECTING LINES

The connecting lines should exclusively employ hoses and screw fittings that demonstrate resilience to both pressure and temperature. It is imperative that the cross-sectional area of the connecting lines remains unaltered, as outlined in the maintenance section.

Outlet and Inlet: Employ solely hoses and screw fittings capable of withstanding pressure and temperature for the inlet and outlet. These lines should be strategically routed to mitigate inadvertent contact and must accommodate thermal expansion in pipe joints.

Cooling Water Supply: When establishing connections to public water mains, strict adherence to applicable laws and safety regulations is essential (e.g., unit connection via a circuit separator). The water mains pressure should fall within the range of 29 PSI to 87 PSI (2 bar to 6 bar), with the use of pressure-resistant and temperature-resistant hoses and screw fittings.

Cooling Water Outlet: The cooling water outlet should remain unobstructed, ensuring the prevention of backflow, and must remain open at all times. Securing the hose in a manner that averts potential hazards from escaping steam during the initial stages of the cooling process is crucial.

Overflow Tube: The overflow tube should always be in an open state.



Electrical connection

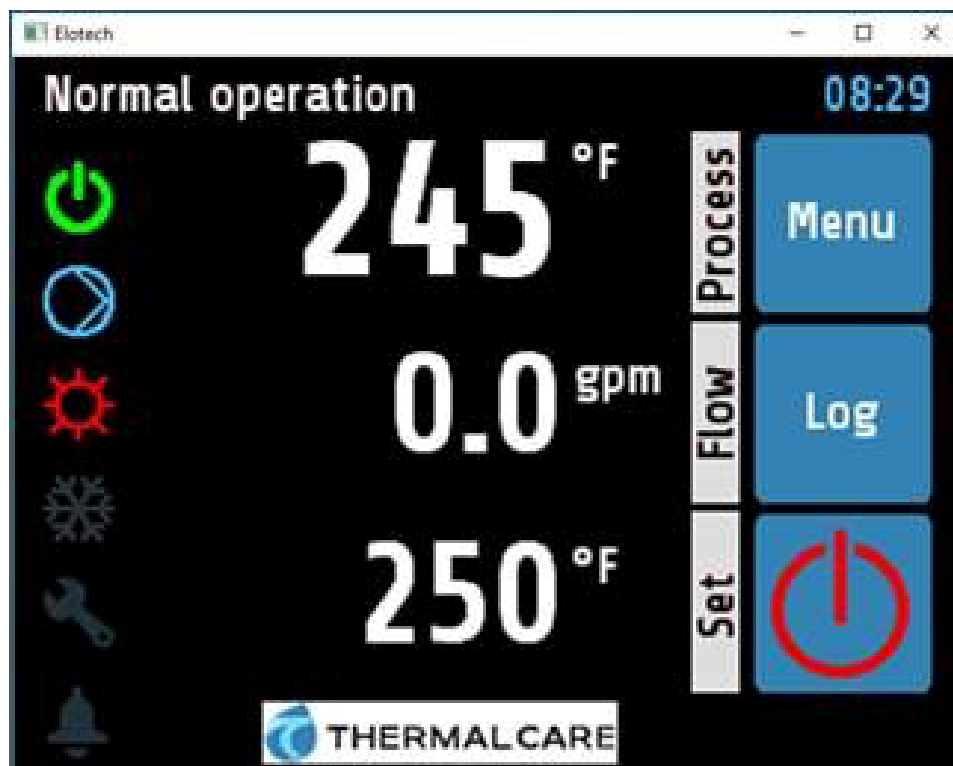
- Mount the hoses in a correct way before the unit is connected to the power supply.
- The unit is delivered with a connecting cable.
- When starting the unit, the direction of rotation must be as stated on the pump motor. The direction of rotation can be altered by interchanging 2 phases.
- The unit must not be part of a permanent installation, but it must be possible to switch off/separate the unit from the power supply by a plug connection.
- Ground connection is essential.
- The unit must be protected through a residual current circuit breaker.
- It must be ensured that the supply cable does not touch hot pipes and hoses.
- The unit can be equipped with a socket for mounting of an external temperature sensor. The socket is mounted on the back cover of the unit - regarding mounting of the sensor in the plug see under circuit diagrams.

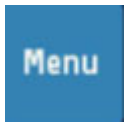

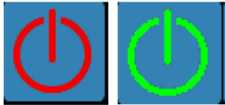



START THE UNIT

OPERATION OF THE TEMPERATURE CONTROL UNIT

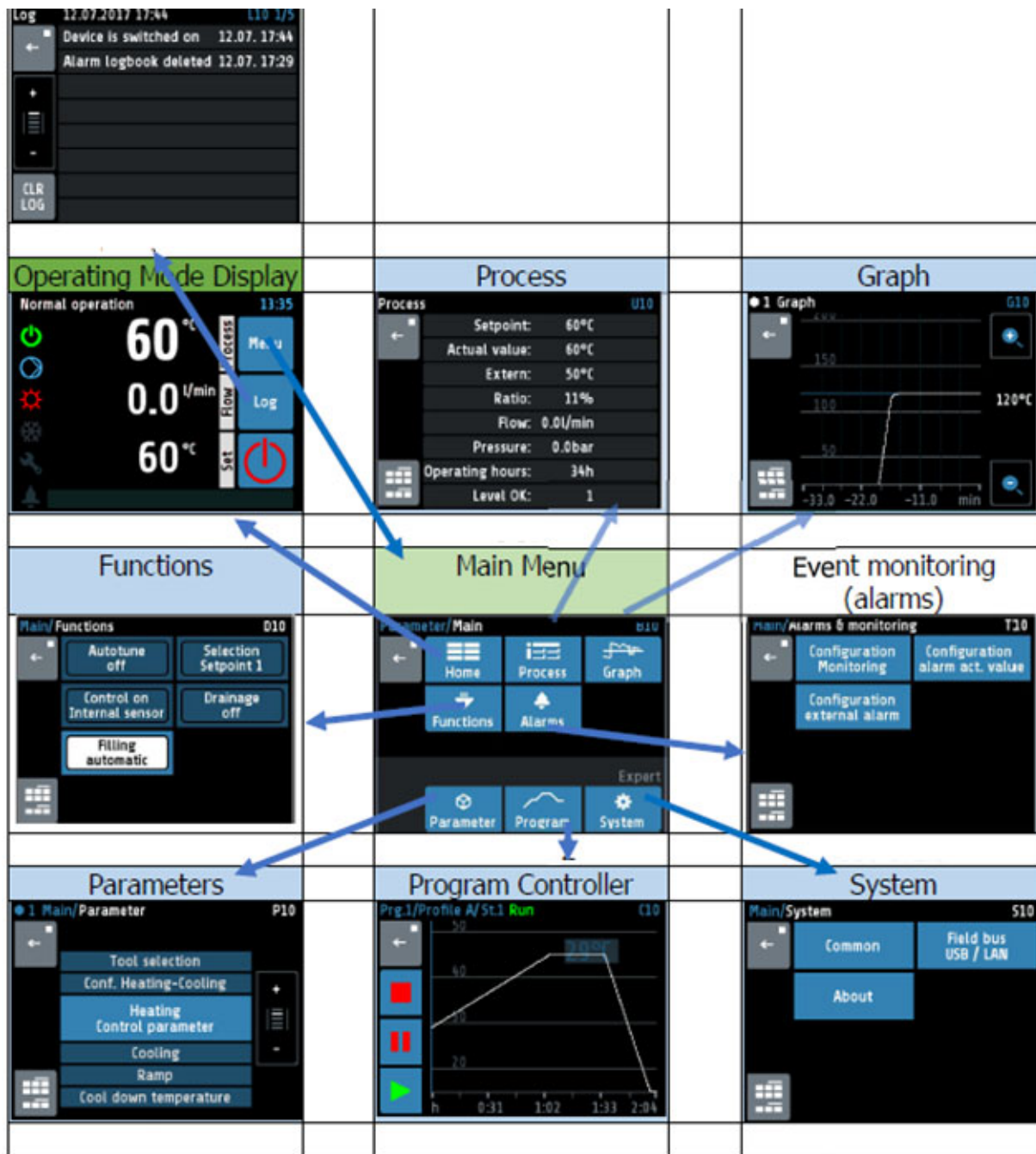
Before activating the temperature control unit, ensure that you have completed the following steps: inspected the consumer, connected the necessary lines and electrical connections, and opened the outlet/inlet shut-off valves. Additionally, make sure the vent valves on the consumer are open, and if applicable, ensure that the shut-off valves are also in the open position.

MARK VI CONTROLLER



	Button “Menu”: Jump to Main Menu
	Button “Alarm Log”: Jump to the record of events including the temperature alarms
	<p>Button “on / off”: By means of the button represented on the right hand side the temper device will be switched on / switched off. The color indicates the actual result of pressing the button:</p> <p>Green: The device will be switched on</p> <p>Red: The device will be switched off.</p>
	Actual temperature value Touch on this section: Jump to setpoint menu
	Setpoint Touch on this section: Jump to setpoint menu
	Example of status display <ul style="list-style-type: none"> · device on, controller running · pump is running · heating output is on

OVERVIEW OF THE CONTROLLER



TURNING THE MACHINE ON

Upon switching on the main switch, the Mark VI control will start up, and you will see the light in the display, and after a few seconds the control is ready to be operated. Depending on the established programming, the display will provide information such as set-points, current values, and operational status details of the control system or the temperature control unit.

WHEN YOU FIRST POWER ON THE MACHINE, FOLLOW THESE STEPS:

- Access and select the parameters you intend to use.
- Press the "Start" button.
- Upon doing so, you may receive an alarm notification in the log, accompanied by an audible beep, indicating a low oil level in the machine.
- Begin adding oil to the machine.
- Once the pump starts, there should be sufficient oil in the machine, and there's no need for further refilling unless the same error appears again in the log.

Check the temperature control circuit for leaks.



Danger of burn injuries when coming into contact with components in contact with the hot oil!

REGULAR INSPECTIONS AND MAINTENANCE PROTOCOLS.

Regarding maintenance, we recommend performing an annual maintenance after approximately 2,500 operating hours. You can easily monitor the operating hours on the display, and you also have the option to configure this setting in the control system.

Please be aware that the following instructions assume an 8-10 hour daily operational period. In multi-shift operations, inspections and maintenance procedures should be performed at appropriately reduced intervals. Any defective components must be promptly repaired or replaced.

- Expert supervision is necessary for temperature control unit inspections and maintenance procedures.
- Maintenance procedures related to electrical equipment should only be executed by certified electricians.
- The replacement of the control system unit should only occur when the mains plug is disconnected.



Caution: Magnetic Field Hazards Associated with Magnetic Drive Feed Pumps!

- Individuals with pacemakers or surgically implanted metallic objects should maintain a safe distance and should not engage in maintenance and repair tasks related to these pumps.
- During the assembly of the magnetic drive system, it is imperative to firmly secure the motor to prevent potential finger entrapment between components due to magnetic forces.
- Ensure that all electronic devices such as computers, data storage media, credit cards, electronic watches, etc., are kept at a safe distance to avoid magnetic interference.

DAILY INSPECTION AND MAINTENANCE PROCEDURES

- Examine the complete temperature control circuit, encompassing the temperature control unit, connecting lines, and consumers, for any signs of leakage. Swiftly address and repair any identified leaks.
- Inspect filters and perform cleaning as needed.

MONTHLY INSPECTION AND MAINTENANCE PROCEDURES

- Examine the cooling air inlet port of the pump motor to verify it is unobstructed. Use compressed air to clean the port by directing it from the inside to the outside.
- Perform cleaning of the level switches.
- Inspect filters and perform cleaning as necessary.

SEMI-ANNUAL INSPECTION AND MAINTENANCE PROCEDURES

- Examine the electrical equipment, including grounding wires and the secure connection of power supply cords and connecting lines.
- Disassemble solenoid and inspect membranes for lime deposits and damage. Ensure the core and spring bolt move freely and clean or replace components as needed.

- Inspect the cooler and descale if necessary. Exercise caution when tightening the screwed connections on the heat exchanger.
- Verify the pump's capacity, ensuring that the flow rate and final pressure align with the pump characteristic.
- Examine the thermal oil for signs of breakdown or carbon buildup.


ANNUAL INSPECTION AND MAINTENANCE

- It is advisable to replace the thermal fluid (comprising water and anticorrosive) after roughly 2,000-2,500 hours of operation, which is approximately equivalent to one year of operation in a single shift. However, this figure serves as a general guideline. Depending on specific operating conditions, more frequent oil changes may be necessary.

CLEANING

The power supply to the device must be disconnected prior to cleaning. Do not rinse with water or pour water over the device during cleaning.

Wipe the cover plates, backplate and the instrument plate with all-purpose cleaner. Do not use products containing solvents. Remove accumulations from the level sensor at regular intervals.

	<p>Risk Associated with Temperature, Fire, and Explosion!</p> <ul style="list-style-type: none"> • Ensure the temperature control unit is allowed to cool down before any action. • Turn off the temperature control unit by pressing the main switch and disconnecting it from the power source. • If using a solvent for cleaning, avoid blowing out the tank and cooler. Instead, flush them, as blowing out can pose an explosion hazard. • When employing a solvent, strictly adhere to the manufacturer's usage instructions. Solvents can be flammable under specific conditions; hence, cleaning activities must never occur near heat sources.
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In the event of unfavorable operating conditions, the procedures listed below must be carried out correspondingly earlier.

- Drain the temperature control unit by suction or blowing out
- Clean the filters in the circuit.
- Inspect the cooler for scale deposits and clean.
- Level control - remove and clean the level switches. Caution - level switches must be refitted correctly.
- Dismantle solenoid valves, inspect diaphragms for scale deposits and damage. Check the core and spring bolt for free movement. Clean or replace parts if necessary.
- It is also advisable to inspect the consumers for contamination. Impurities lead to a sharp reduction in heat exchange between consumer and heat transfer medium. Deposits increase the pressure drop in the consumer, so that, over time, the pump capacity of the temperature control unit is no longer sufficient to handle the necessary heating or cooling load.

REPAIR

To



Risk Associated with the Use of Inappropriate Spare Parts!

- **Utilize exclusively authentic manufacturer spare parts!**
- Using non-original parts can void the warranty in the event of any damage.



Risk of Hazards Arising from Incorrect Repairs!

- **Repairs should exclusively be conducted by technically trained specialists.**
- **Prior to any repair, ensure the temperature control unit has cooled down and, if required, drain it.**
- **Turn off the temperature control unit by pressing the main switch and disconnecting it from the power source.**
- **Disconnect all hose couplings from the temperature control unit.**

Ensure a prompt and accurate supply of spare parts, it is essential to provide the following information without exception:

1. Unit type
2. Unit number
3. Voltage and frequency

You can locate this information on the rating plate attached to the temperature control unit. For component item numbers, refer to the relevant diagrams in the provided operating instructions and the electrical circuit diagrams of the temperature control unit.

DISPOSAL

Prior to disposing of the unit, it is crucial to disassemble it and recycle various materials to uphold environmental standards. When dismantling the unit, a specific procedure must be adhered to in order to prevent water-related damage:

1. Cool down the water within the machine before initiating the dismantling process.
2. Turn off the unit.
3. Shut off the valves connected to and from the process and allow them to cool.
4. Disconnect the electrical connections.
5. Subsequently, remove the tubes from the machine.



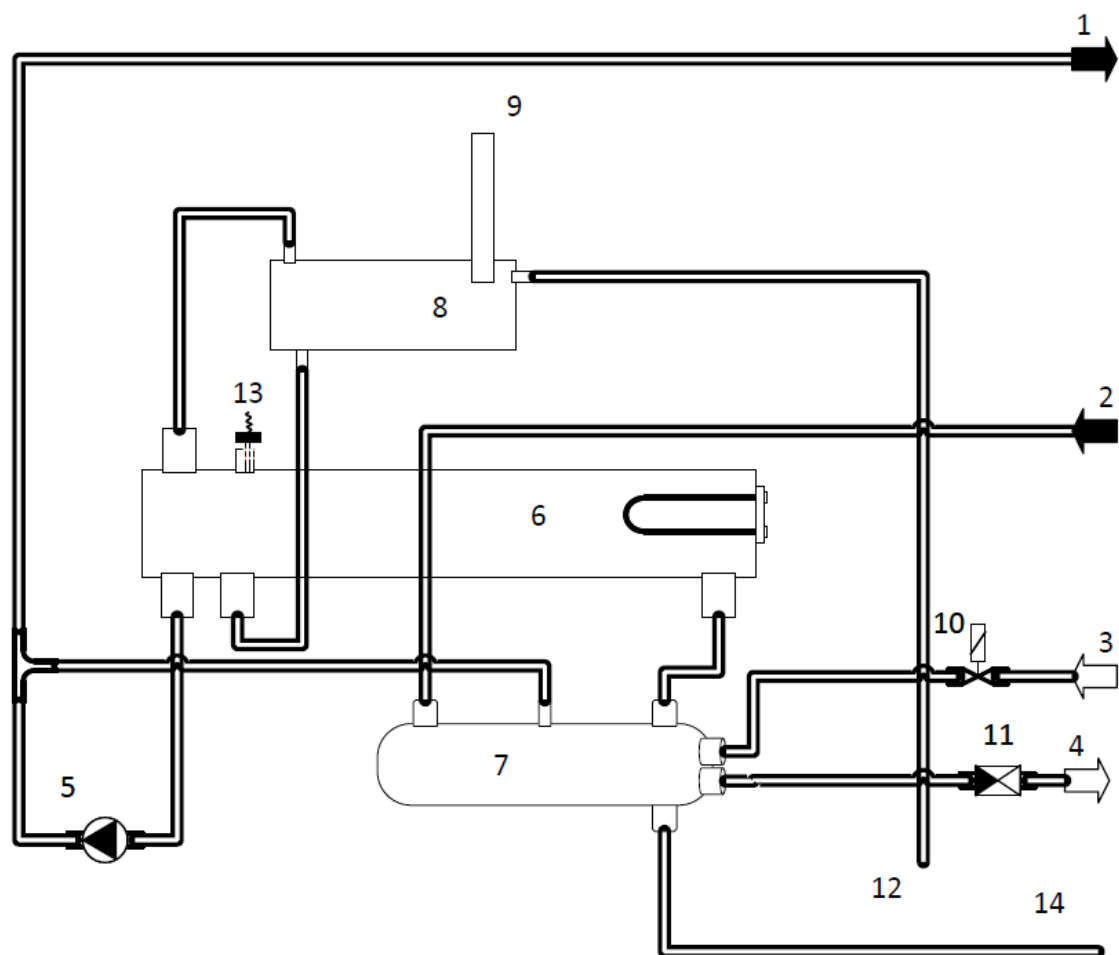
The temperature control unit comprises valuable raw materials, including metals, plastics, electrical components, and more, which can be recycled individually.

TECHNICAL DATA

SPECIFICATIONS

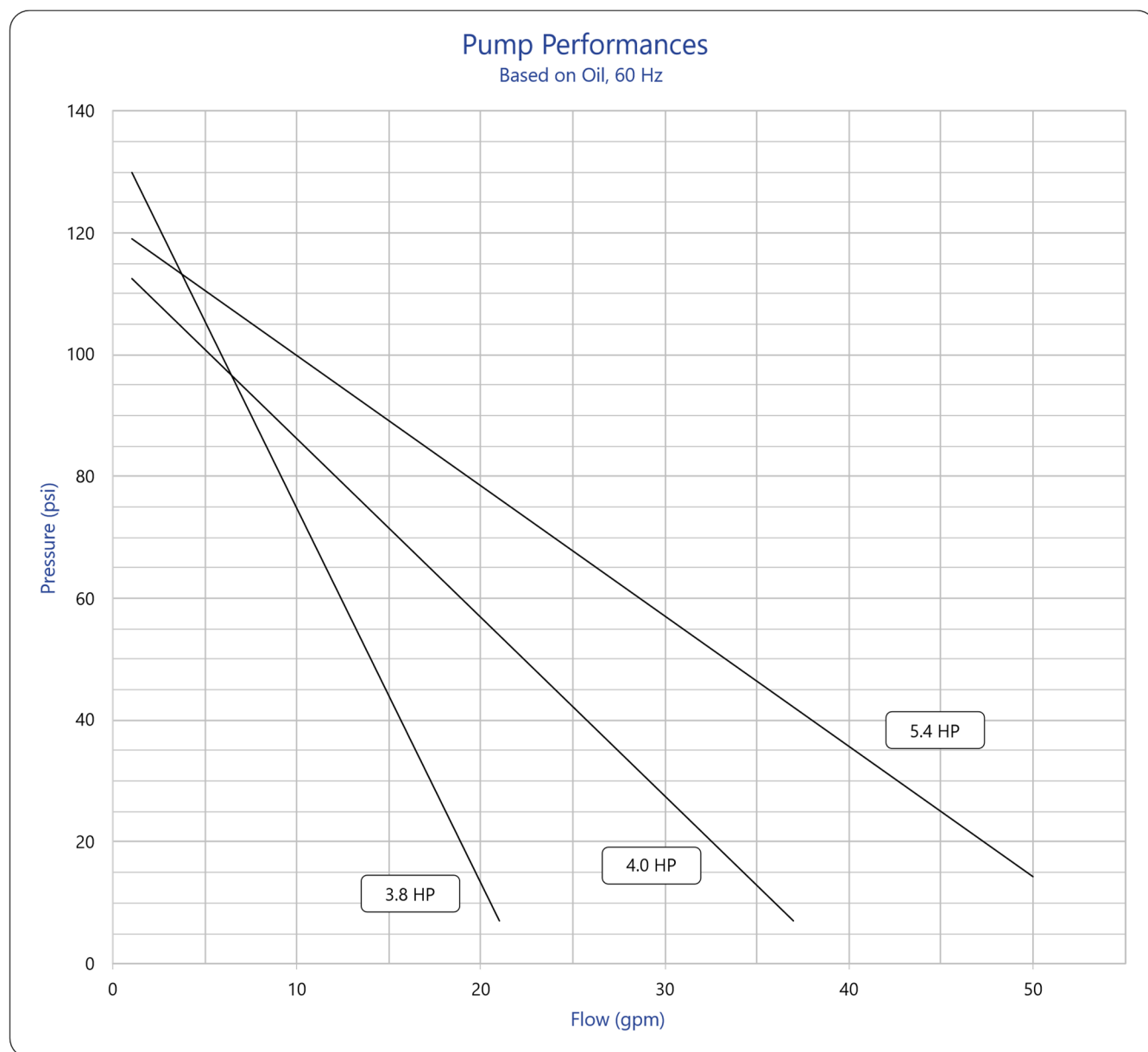
Maximum Outlet Temperature	572°F (300°C)			
Thermal medium	Oil			
Capacity for Filling	5.5 gal (21 L)			
Maximum Expansion Volume	4.5 gal (17 L)			
Heating Capacity	12 kW	24 kW	36 kW	48 kW
Cooling Capacity I2: DeltaT = 260 C	160 kW			
Pump	Pump, Speck, CY-6091-MK-TOE			
Power Consumption pump	2.8 kW		3 kW	
Maximum Flow Rate	21/gpm (80L/min)		39/gpm (150L/min)	
Max. Pressure. Bar	145 psi (10 bar)		127 psi (8.8)	
Control System	Mark VI			
Measurement Method	PT100			
Voltage for Control	460 V 60 hz			
Total power	See specification plate on the back of the machine			
Hose connections, oil:	1"			
Hose connections, water:	1/2"			

BLOCK DIAGRAM

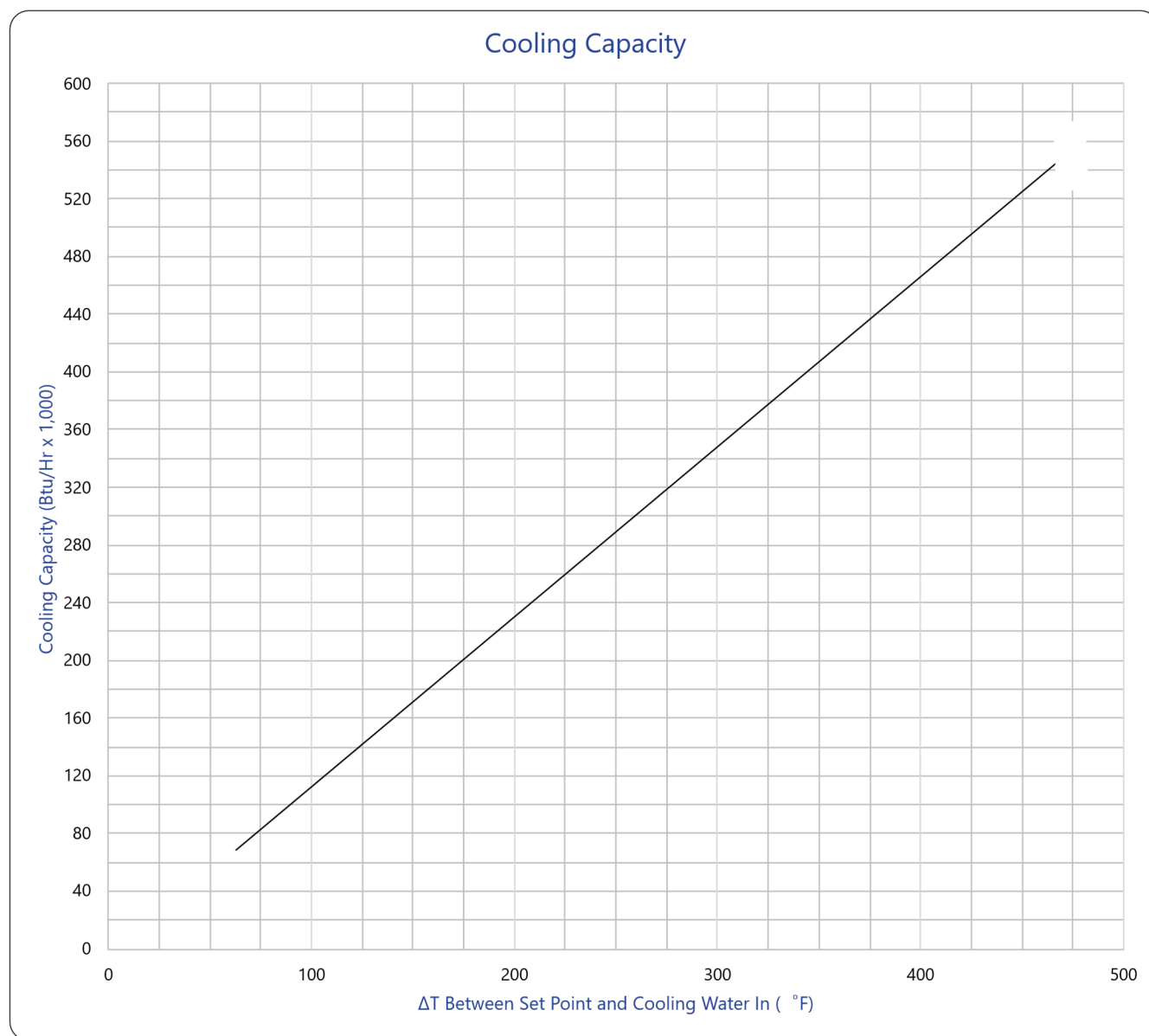


1. To process
2. From process
3. Cooling water in
4. Cooling water out
5. Pump
6. Tank
7. Pipe cooler
8. Expansion tank
9. Manual filling
10. Solenoid valve cooling
11. Check valve
12. Overflow
13. PT100
14. Drain

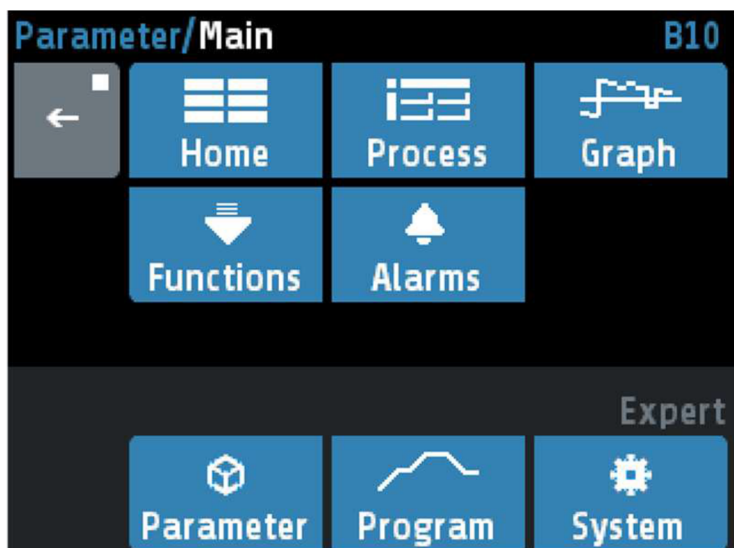
PUMP CURVES







COOLING CAPACITY








MAIN MENU

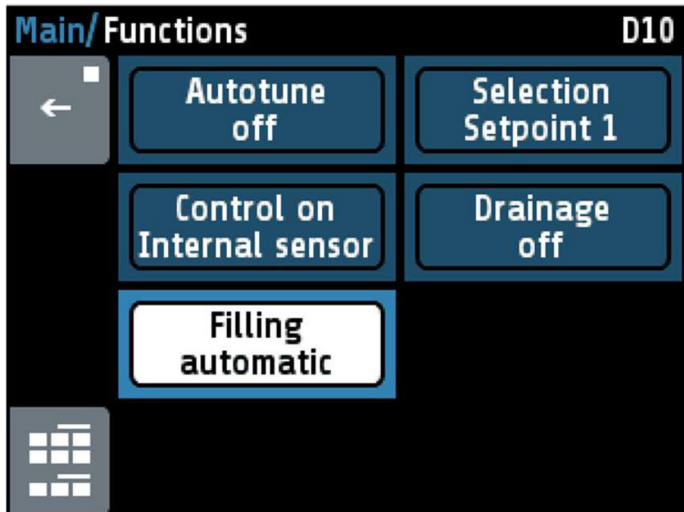


This menu provides access to the menus and displays.

	<p>Jump to the Operating Mode display.</p> <p>Shows actual temperature, setpoint, activity of heater and cooler outputs</p>
	<p>Jump to menu “Process”</p> <p>Listing of setpoint, actual values of forward circulation temperature and circulation return temperature, output ratio of heater (if leading sign is positive) respectively output ratio of cooler (if leading sign is positive).</p>
	<p>Jump to menu “Graph”</p> <p>Diagram of the actual temperature value of the controlled temperature</p>
	<p>Jump to menu “Functions”</p> <ul style="list-style-type: none"> · Activation of autotune · Activation of cooling down and switch off · Activation of tool (equipment) drainage · Selection of setpoint 1 or setpoint 2 · Selection of target of temperature control (supply or return) · Selection of filling mode (manual filling or automatic filling)


	<p>Jump to menu “Alarms” (Configuration of event monitoring)</p> <p>By means of this menu the automatic signaling of events (generally out-of-band signaling) can be determined.</p>
	<p>Jump to menu “Parameters”</p>
	<p>Jump to menu “Program”</p> <p>By means of this menu temperature-time-profiles, which are more complex than simple temperature ramps, can be set up.</p>
	<p>Jump to menu “System”</p> <p>System configurations: date, time, data rate, authorizations</p>
	<p>Touch < 2 seconds = jump to preceding display</p> <p>Touch > 2 seconds = jump to operating mode display</p>

MENU FUNCTIONS



	<p>Function “Autotune”</p>
	<p>Selection of setpoint 1 / setpoint 2:</p> <p>Dependent on the current selection the controlled temperature follows setpoint 1 or setpoint 2.</p> <p>If setpoint 2 is selected the operating mode display shows “SP2” at the headline.</p>
	<p>Function “Drainage” (of tool equipment). This function makes the pump run and opens the drainage valve.</p> <ol style="list-style-type: none"> 1. Cooling down to “cool down temperature” 2. Drainage: Wait delay “drainage time” 3. Switch off device <p>The stage “Cooling down” can be aborted by switching off the device. The stage “Drainage” cannot be aborted. The device shows error message.</p>
	<p>Function “manual / automatic filling”:</p> <p>If the button “Filling” is toggled to “automatic”: The filling valve will be activated if the filling level drops below maximum level.</p> <p>If the fluid level is on max level (both contacts closed) the pump will be released.</p> <p>If the fluid level is in between max and min level the pump remains released.</p> <p>If the fluid level drops below minimal level (tank empty) the pump will be locked.</p> <p>When filling (tank is empty) was activated the pump will not be released until the fluid level exceeds maximum level.</p> <p>If the filling procedure lasts longer than “maximal filling time” the alarm output is activated.</p>

AUTOTUNE

Autotune	off	Switches off autotune <Default>
	on	Activates autotune

The tuning algorithm determines the characteristic values within the controlled process and calculates the valid feedback parameters (P, D, I) and the cycle time. ($= 0.3 \times D$) of a PD/I controller for a wide section of the range.

The autotune mode works during start-up shortly before the setpoint is reached. If activated after the setpoint has already been reached, the temperature will first drop by approx. 5% of the measuring range.

The tuning algorithm can be activated at any time by selecting the parameter

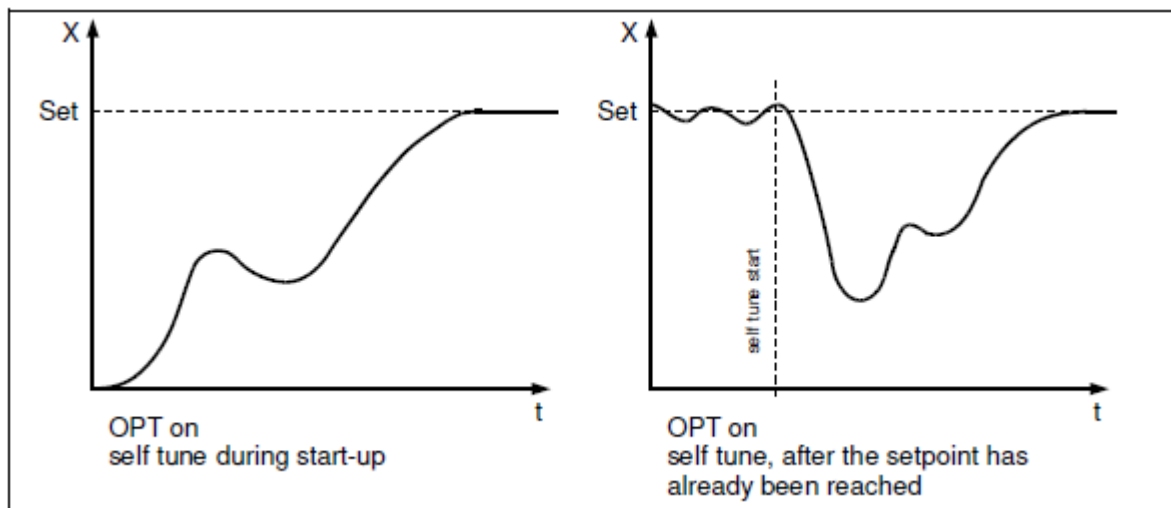
Autotune = "on". After having calculated the feedback parameters, the controller will lead the process value to the actual setpoint.

Selecting **Autotune = "off"** will stop the autotune function.

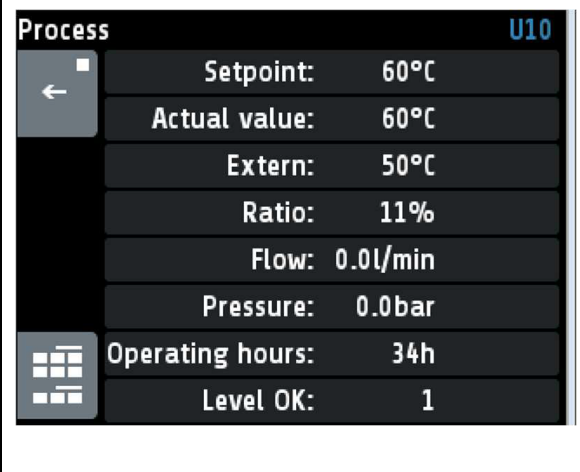
Autotune duration > 2 hours: autotune stops with an error message.

Conditions for starting the autotune algorithm:

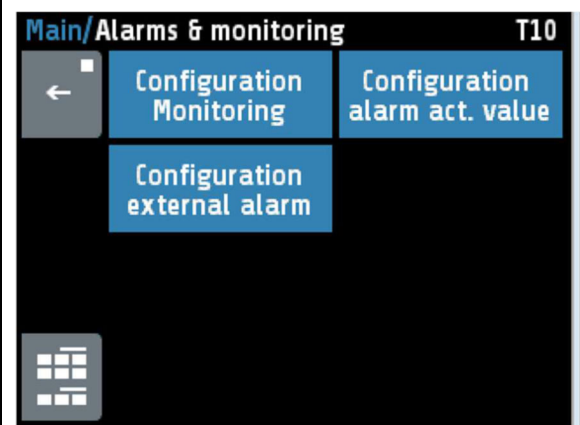
- The setpoint must amount to at least 5% of the measurement range
- The sensor must not have a failure.
- The soft start function must not be active



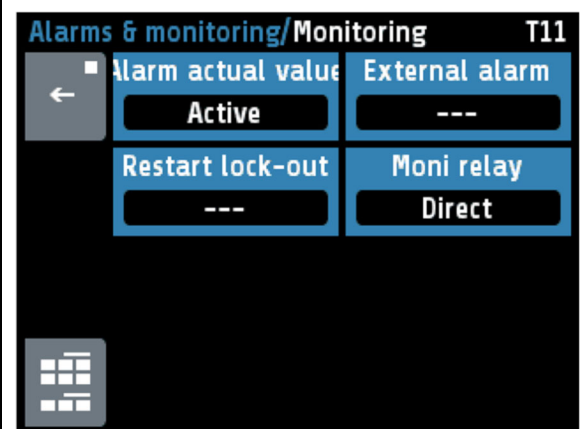
MENU PROCESS

	<p>This display shows the fundamental current process values</p> <ul style="list-style-type: none"> · Setpoint of the controlled temperature · Actual value of the controlled temperature · Actual value of the external temperature(optional) · Actual output ratio · Actual flow value (optional) · Actual pressure value (optional) · Hours of operating · Level max level 1=OK 0=Low
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MENU ALARMS

	<p>Explanations to the submenus pictured on the left hand side please find as follows in paragraphs 3.3.1</p>
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MENU „CONFIGURATION MONITORING“

	<p>By means of this menu the events can be determined which shall generate signals and messages:</p> <ul style="list-style-type: none"> · out-of-band of the actual temperature · out-of-band of the ext. temperature · restart was locked after power-on <p>Furthermore, the switching behavior of the event monitoring relay can be determined:</p> <ul style="list-style-type: none"> · “Direct”: the contacts are closed when event is active · “Inverse” the contacts are open when event is active
---	---





CONFIGURATION OF TEMPERATURE MONITORING

	<p>The device provides the monitoring of the following temperature readings:</p> <ul style="list-style-type: none"> · actual temperature · externally measured temperature optional
	<p>The monitoring of the readings listed above can be adjusted as follows:</p> <ul style="list-style-type: none"> · lower limit value · upper limit value · absolute limits: if “absolute” is activated the limits are not dependent on the set point · relative limits: if “relative” is activated the limits are dependent on the set point value. The complete limit values are then figured out, e.g.: Upper limit = 176°C (80 °C) Setpoint +18°F (+10 Kelvin) (upper limit value) = 194°F (90 °C) Lower limit = 176°F (80 °C) Setpoint - +18°F (+10 Kelvin) (limit value) = 158°F (70 °C) · the alarm signalization is delayed about the entered time (1...8000 s) · start-up suppression: If activated the [icon] -

Alarm is not released until the temperature will have attained once the innerband sector.

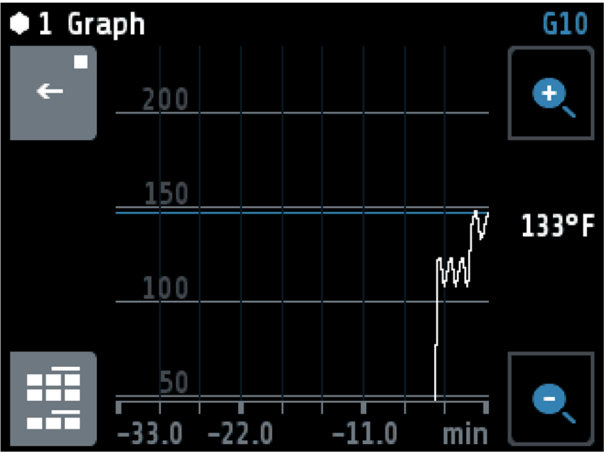


MENU ALARM LOG

	<p>This listing saves significant events (Power On, temperature alarms, lock on restarts)</p> <p>The headline shows the current date, time and current page of log listing.</p> <p>If you push and hold a particular entry it will appear in full length.</p> <p>If you push the underpart of the listing the log is scrolled on.</p> <p>The log listing is able to save up to 40 event entries. The most recent entry is listed on page 1/5. If there are more than 40 entries the first input will be deleted.</p> <p>The log listing is stored, if the unit has a failure.</p>
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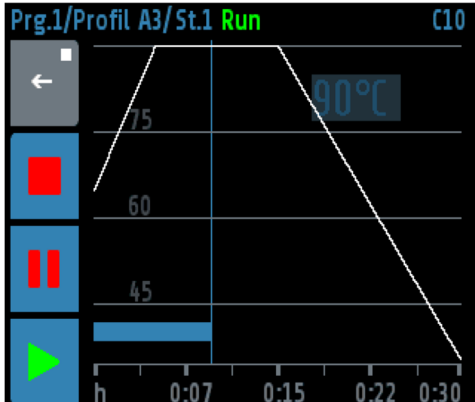
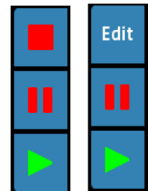

	Jump from operating mode display to the log listing
	Page up / page down “+” preceding page; “-” next page
	Jump back to the operating mode display
	Clear log listing

MENU GRAPH

This window shows the temperature curve. In the case of a technical incident the actual process value can still be examined afterwards.

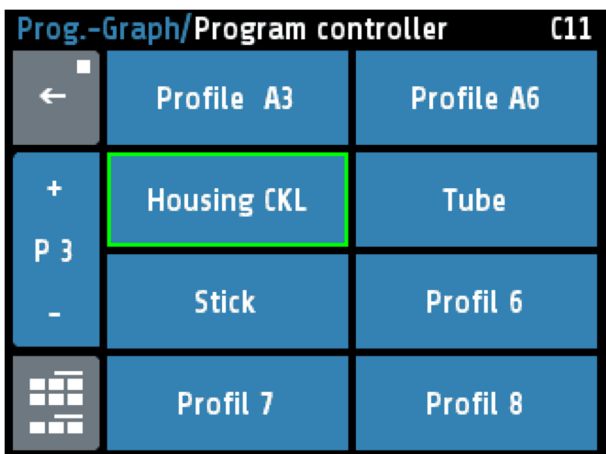
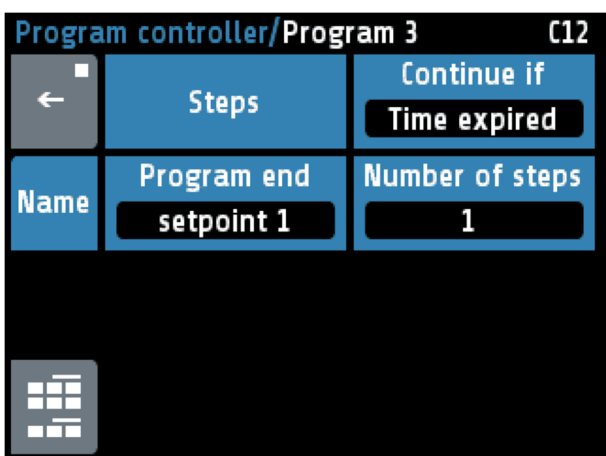
		<p>On the right the actual process value is shown, here 133°F (56°C).</p> <p>By pressing the zoom keys “+” and “-” the resolution of the temperature axis can be altered.</p> <p>The time axis can be determined by the parameter “Graph sampling time” in the window “System/Settings”.</p> <p>Turning off the device causes deletion of the values.</p>
	<p>Hold down < 2 sec. = Return to previous window</p> <p>Hold down > 2 sec. = Jump to window “Operating Mode Display”</p>	
	Jump to main menu	

MENU PROGRAM

	<p>The header displays the current program, the current step and the status.</p> <p>Right above the graph is the indication of the current program setpoint.</p> <p>At the bottom (x-axis) the time is shown in hours.</p> <p>The elapsed time is displayed as a blue ribbon.</p> <p>The current time is indicated by the thin vertical blue line.</p>
	<p>By means of these keys the program is controlled:</p> <ul style="list-style-type: none">• Start• Pause• Stop• Edit (only available in mode “Stop”)
	<p>Hold down < 2 sec. = Return to previous window</p> <p>Hold down > 2 sec. = Jump to window “Operating Mode Display”</p>

SETTING OF PROGRAM CONTROLLER

The button “Edit” opens the program set up menu:

Select the program		
Setting program properties		
		<p>The green frame shows the selected program.</p> <p>Select another program by pressing + and – keys.</p> <p>Press the respective program button branches to the setup menu of the program.</p>
		
Continue if	Time expired	All steps are executed according to the time grid entered in the appropriate step menu.
	Temp. reached	After the time has elapsed, the controller switches to the next step. The step setpoint must be reached up to + - 2K.
Program end	Setpoint 1	After completion of the last step, the current setpoint is set active. Normally setpoint 1.
	Last setpoint	After the last step has been completed, the temperature of the last step is further regulated.
	Repeat	After the last step has been completed, step 1 is started again.
Number of steps	1...8	Number of program steps
Name		Name of the program.

Setting step properties

Program controller/Program 3 C13

	Step 1	Step 2
Name	Step 3	Step 4

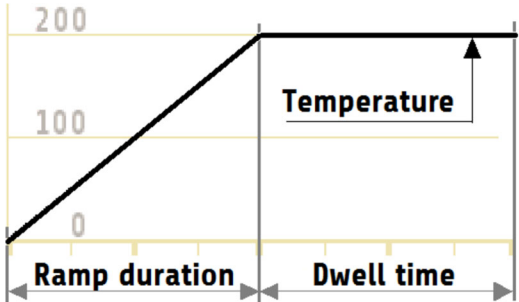
Here the set-up menu of the step can be activated.

Setting the step parameter

P- contr./Program 3/Step 1 C14

	Ramp duration	Temperature
	0:10h	80°C
+ S 1 -	Dwell time	
	0:45h	

In this figure, the ramp duration, the step temperature, and the dwell time can be set for the particular step.

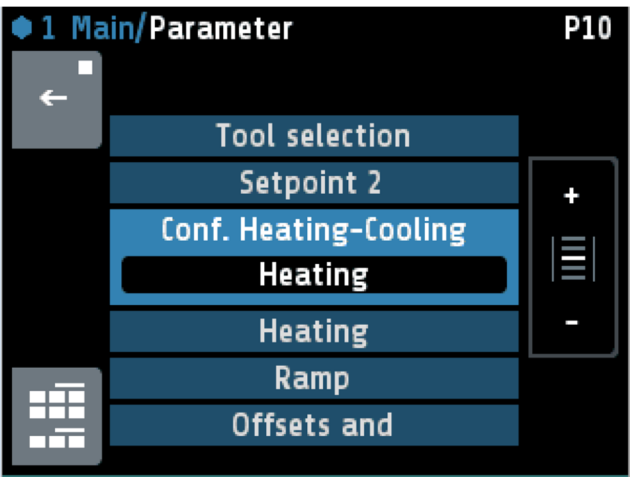




The key S1 + selects the next step.
The key S1 - selects the previous step.

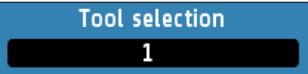
Ramp duration	0:00...99:59h	Time setting in which the setpoint shall move from the previous step temperature to the setpoint of the current step. In the first step, the actual value is set as the start setpoint. * If no ramp is desired, set this time to 0: 00h.
Temperature	-100...1600°C	Temperature (setpoint) of this step.
Dwell time	0:00...99:59h	Hold time of the current step temperature (step setpoint). The dwell time starts after the end of the ramp duration. If configuration is switched to "temp. reached", this time does not start until target temperature of the particular step is attained.

Program status in operating mode display (headline)			
Normal operation	↶ 2 ▶ 08:47	Program controller active, Step2 is running.	
Normal operation	↶ 2 08:48	Program paused or stopped	

MENU PARAMETERS

		By means of this menu the configuration of all controller-related parameters can be set up.
	Hold down < 2 sec. = Return to previous window Hold down > 2 sec. = Jump to window "Operating Mode Display"	
	Jump to main menu	

TOOL SELECTION

	<p>It is possible to store and to select 8 different sets of particular controlling parameters. Affected are the parameters being part of the submenus "Heating", "Cooling" and "Configuration Heating / Cooling".</p> <p>If tool no.4 is selected, e.g., the parameter set no.4 is applied to the temperature controlling. This parameter set is then also accessible for adjusting.</p> <p>If tool no. 2 – no. 8 is selected in the headline of the Operating Mode Display the no. of the current tool parameter set is indicated: „W.4“, e.g.</p> <p>If the standard parameter set (no. 1) is selected there is no tool identification displayed.</p>
---	--

SETPOINT 2

<div>Setpoint 2</div> <div>0°C</div>	<p>Setting the second setpoint. This value is used for control if the button selection in the "Functions" menu is set to setpoint 2.</p> <p>For example, setpoint 2 can be used to lower the regulated temperature during a break.</p>
--------------------------------------	--

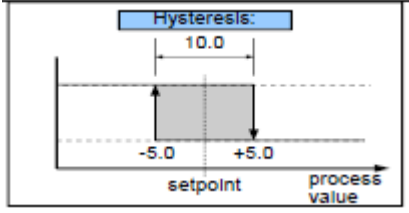
CONFIGURATION HEATING/COOLING

<div>Conf. Heating-Cooling</div> <div>Heating-Cooling</div>	Heating <Default>	Two-point controller: "Heating"
	Cooling	Two-point controller: "Cooling"
	Non-lin. Cooling	Two-point controller: "Cooling" , with non-linear characteristic curve for evaporation cooling
	Heating-Cooling	Three-point controller: "Heating–Off–Cooling"

CONTROL PARAMETERS

<p>By default the controller operates in PD/I control mode, i.e. controlling without deviation and with nearly no overshoot during start-up.</p> <p>The controlling behavior can be changed by adjusting the PID parameters listed in paragraphs 3.11 and 3.12:</p>	
no feed back	Setting P = off (then D and I are switched off as well)
P-controller	Setting D and I = off
PD-controller	Setting I = off
PI-controller	Setting D = off
PD/I-controller	Modified PID-mode (set: P,D,I)

HEATING CONTROL PARAMETERS

Heating Control parameter		This menu is only available if configurations Heating or Heating-Cooling is selected. Depending on the configuration, particular parameters are not visible.
P (xp)	OFF, 0.1 ... 400.0K <Default=10,0>	Proportional range Unit: Kelvin
D (tv)	OFF, 1 ... 200s <Default=30s>	Derivative time
(tn)	OFF, 1 ... 1000s <Default=150>	Reset time
Cycle-time	0.5 ... 240.0s <Default=10,0s>	<p>The switching frequency of the actuator can be determined through the cycle time. In this time interval the controller switches on and off once.</p> <p>Voltage outputs for solid state relays (SSR): Cycle time: 0,5...10 s</p> <p>Preferred settings for rapid control processes: 0,8s</p> <p>Relay outputs: Cycle time: > 10 s</p> <p>The cycle time should be adjusted to a time as long as possible in order to minimize wear of the relay contacts.</p>
Max. Output ratio	0 .. 100% <Default=100%>	<p>The limitation of the output ratio is only necessary if the heating energy supply is grossly over dimensioned compared to the power required.</p> <p>Normally it should be switched off (Setting: 100 %).</p> <p>The limitation becomes effective when the controller's calculated output ratio is greater than the maximum permissible (limited) ratio.</p> <p>Warning! The output ratio limiting does not work during autotune.</p>
Hysteresis		Only adjustable if "(xp)" = off (on-off action, without feedback)
		<div> <div> OFF, 0.1 ... 80.0 <Default=0.1> </div> <div>For measuring range without decimal point</div> </div>
		<div> <div> OFF, 0.01 ... 8.00 <Default=0.01> </div> <div>For measuring range with decimal point</div> </div>
		

COOLING CONTROL PARAMETERS

Cooling Control parameter	This menu is only available if configurations Cooling or Heating-Cooling is selected. Depending on the configuration, particular parameters are not visible.	
P (xp)	See 3.11	
D (tv)		
I (tn)		
Cycle-time		
Max. Output ratio		
Hysteresis		
Deadband	Switching point distance "heating" and "cooling" This parameter is available for "heating and cooling" operations only. (Configuration Heating-Cooling = Heating-Cooling)	
	OFF, 0.1 ... 80.0 <Default=0.1>	For measuring range without decimal point
	OFF, 0.01 ... 8.00 <Default=0.01>	For measuring range with decimal point

RAMPS

<div>Ramp</div> <div>1.0K/min / 0.1K/min</div>		
<p>A programmed ramp is always activated when the setpoint is changed or when the mains supply is switched on. The ramp starts at the actual process value and ends at the preselected setpoint. The ramp can be activated for both setpoint 1 and setpoint 2. By programming the second setpoint a setpoint profile can be obtained, accordingly (see example with external contact In 1 (K1) below).</p>		
Ramp rising	OFF<Default>, 0.1 ... 99,9	°K/min for measurement range without decimal point
	OFF<Default>, 0.01 ... 9.99	°K/min for measurement range with decimal point
Ramp falling	OFF<Default>, 0.1 ... 99,9	°K/min for measurement range without decimal point
	OFF<Default>, 0.01 ... 9.99	°K/min for measurement range with decimal point

COOL DOWN TEMPERATURE

<div>Cool down temperature</div> <div>50°C</div>	Function will be shut off when this temperature is attained.
--	--

14.3.12.3 DRAINAGE TIME

<div>Drainage time</div> <div>20s</div>	This time is applied to the function.
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14.3.12.4 TANK CLOSED

<div>Tank closed</div> <div>80°C</div>	Above this temperature the tank close valve will be closed, below it will be opened. If a boost pump is available, it will be active while filling if the actual value is above the tank closed temperature.
--	--

DEVIATION INT./EXT

<div>Deviation int./ext.</div> <div>5°C</div>	If the controller is controlling the external value, the heating will stop if the deviation between internal sensor and external sensor is more than the set value of this parameter.
---	---

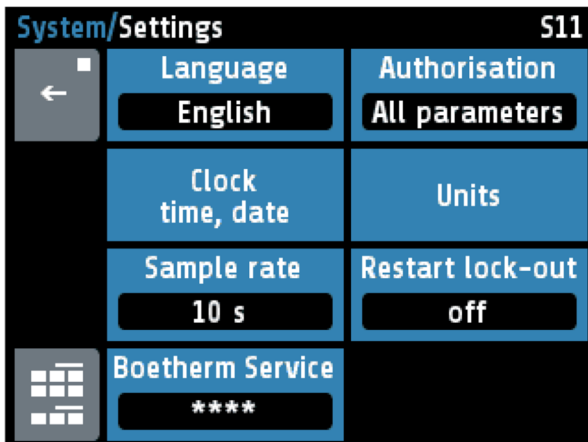
WATER EXCHANGE

<div>Water exchange</div>	<p>By means of this menu the following parameters are adjustable:</p> <ul style="list-style-type: none"> · Auto water exchange on/off. · Duration time. (How long will the water exchange be active) · Interval time (every x min. the water exchange will be active)
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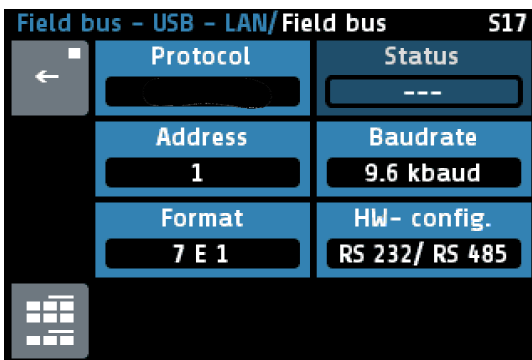
OFFETS AND SETPOINT LIMITS

<div>Offsets and setpoint limits</div>	<p>By means of this menu the following parameters are adjustable:</p> <ul style="list-style-type: none"> · minimal setpoint supported by menu · maximum setpoint supported by menu · offset to be added to the actual value · offset to be added to externally measured temperature
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MENU FOR COMMON SETTINGS(GENERAL SETTINGS)

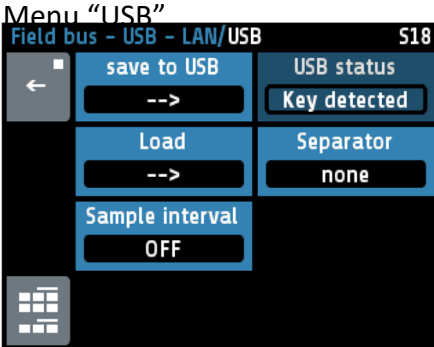
		
Language	English (English)	English
Authorization (LOC)	All Parameter adjustable	All parameters adjustable <Default>
	Setp. and ramps adjustable	Setpoints, alarm values and ramps are adjustable. All other parameters are locked.
	Only setpoint 1 adjustable	All other parameters are locked
	All parameters locked	No parameter is adjustable
	Change Lock code	Here the code (start value = 0000) can be changed to a different value.
<p>The previous code is requested before setting the new code. The new Code has to be entered twice. The parameters that have been locked can be displayed but not changed. This parameter cannot be changed if the logic input In_2 is active, or the lock code is not known. The value of the factory setting is <Default = 0000></p>		

Clock, time, date		
Time	Hours	Number value 0...23
	Minutes	Number value 0...59
Day/Month	Day	Number value 1...31
	Month	Number value 1...12
Year	2000...2150	Adjustment of calendar year
Units		
Unit	°C	
	°F	
Flow unit	l/min	
	gpm	
	m3/h	
Pressure unit	Bar	
	Psi	
Sample rate Scanning time for recorder function		Time interval between the current measurements of two successive samples. In brackets the complete time interval as shown on display: 2,5 s (Total time: 8,2 Min) 5 s (Total time: 16,5 Min) 10 s (Total time: 33 Min) <Default> 30 s (Total time: 99 Min) 1 Min. (Total time: 3,3 h) 5 Min. (Total time: 16,5 h) 10 Min.(Total time: 33 h) A maximum of 198 temperature points can be saved.
Restart lock-out		OFF No function <Default>
		ON After power-on the temperature controlling is switched off and a message is displayed. Switch on must be acknowledged. After acknowledgement the controlling will be started. In addition, the alarm "Restart lock-out" will be set and can be handled in the monitoring.

Menu "Fieldbus" 		Depending to the installed fieldbus module parameters are displayed or hidden.
Protocol	Off	No protocol selected
	Arburg	<SERIAL> Protocol for temperature control systems
	Modbus	<SERIAL> Modbus-RTU-protocol
	Profinet	<SERIAL> Profinet
	Profibus DP	Profibus
Status Display only	---	<SERIAL> No data communication
	Data Exchange	<SERIAL> Data communication is active <PROFIBUS> Data-Exchange-Mode
	Wait Param	<PROFIBUS> Controller waits for configuration / parametrisation
	No connection	<PROFIBUS> No master connected / Master not active
Baudrate <SERIAL>	1.2 kBaud	1.200 Bit/s
	2.4 kBaud	2.400 Bit/s
	4.8 kBaud <Default>	4.800 Bit/s
	9.6 kBaud	9.600 Bit/s
	19.2 kBaud	19.200 Bit/s
	38.4 kBaud	38.400 Bit/s
Address	1 ... 255	1 <Default>... 255 (xxx-Standard) 1 <Default>... 32 (Arburg-Protocols) 1 <Default>... 247 (Modbus-RTU-Protocol) At this address a master communicates with the controller. Each controller needs a unique address.
Format <SERIAL>	7 E 1	7 Data bits, 1 Stop bit, Parity Even
	7 O 1	7 Data bits, 1 Stop bit, Parity Odd
	7 E 2	7 Data bits, 2 Stop bits, Parity Even
	7 O 2	7 Data bits, 2 Stop bits, Parity Odd

	7 N 2	7 Data bits, 2 Stop bits, Parity None
	8 E 1 <Default>	8 Data bits, 1 Stop bit, Parity Even
	8 O 1	8 Data bits, 1 Stop bit, Parity Odd
	8 N 1	8 Data bits, 1 Stop bit, Parity None
	8 N 2	8 Data bits, 2 Stop bits, Parity None
The serial fieldbus module has three integrated interfaces.		
HW-config <SERIAL>	Select here the desired interface:	
	RS232/RS485	Signals see connection diagram
	TTY	Signals see connection diagram.
Remote <PROFIBUS>	ON	Profibus can read and write. Local operation is locked.
	OFF <Default>	Profibus can read only. Local operation is permitted.

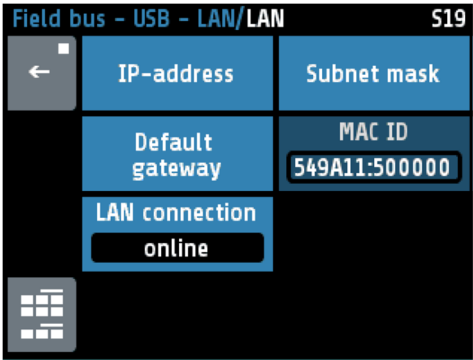
MENUS USB / LAN

		<p>Save controller data on an USB-Stick. (USB-flash drive)</p> <p>The data is stored as a text file in an adjustable CSV-format.</p> <p>The USB-flash-drive must be formatted with FAT. (FAT16/ FAT32) The file name contains the last 5 digits "xxxxx" of the MAC-ID.</p>
Save to USB	All parameters	Save all parameters Generates the file -> LogParaxxxxx.txt and LogPara.bin
	Al. Logbook	Save the entries of the Alarm Logbook. Generates the file -> LogBookxxxxx.txt
	Graph	Save the readings of the graph Generates the file -> LogGraphxxxxx.txt
USB status	- - -	Display of the USB-status: no stick detected.
	Key detected	USB-stick detected: Files can be saved or loaded from the USB flash drive.
Load	Load all Parameters	Loading a previously saved parameter set. The file "LogPara.bin" must exist on the USB flash drive.

Separator	none <Default>	Delimiter symbol between single data sets: Spaces
	comma	,
	semicolon	;
	colon	:
	Tabulator	<TAB>
Sample- Interval	OFF; <Default> 5...720s	Cycle time for writing an output line with time stamp on the USB stick. The values setpoint, actual value, output ratio and current actual value are written out.

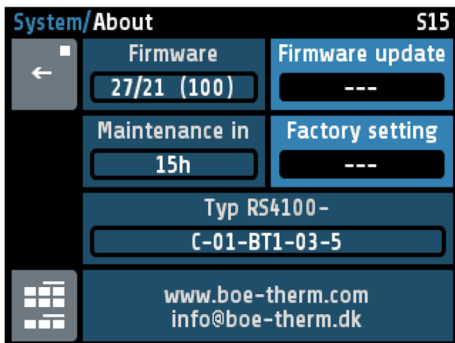
If the parameter "Log interval" is set to a numerical value, so a file named "LogR4000_XXXX_YYYY_MM_DD.txt" is generated on the USB stick. "XXXX" the last 5 digits of the MAC-ID. YYYY, MM and DD mean the year, month, day. After a change of date a new file is created.

With the included names MAC-ID "XXXX", the files can be assigned to different R4000 controllers. Each "Log interval" time a new row is added. The line includes a timestamp, setpoint, the actual value, the output ratio and the actual current value.

Menu "Lan" 		Ethernet interface for connection to <ul style="list-style-type: none"> • Web browser • Configuration tool EloVision 3 • PLC via MODBUS-TCP <p>Connect the device RS4100 to the LAN.</p> <p>The static IP address must be set to an address which is not allocated to another device being part of the same LAN.</p> <p>Please adjust the subnet mask as well and the default gateway according to the requirements of the LAN.</p> <p>In order to operate the device via web browser please enter the chosen static IP address into the address field of the web browser, for example: „192.168.100.100“</p>
Static IP address		192 . 168 . 100 . 100 Part 1 <Default>
		192 . 168 . 100 . 100 Part 2 <Default>
		192 . 168 . 100 . 100 Part 3 <Default>
		192 . 168 . 100 . 100 Part 4 <Default>

Subnet mask		
Subnet Mask 1 Subnet Mask 2 Subnet Mask 3 Subnet Mask 4		255. 255 . 255 . 0 Part 1 <Default>
		255 . 255. 255 . 0 Part 2 <Default>
		255 . 255 . 255. 0 Part 3 <Default>
		255 . 255 . 255 . 0 Part 4 <Default>
Default gateway		
def.-gateway 1 def.-gateway 2 def.-gateway 3 def.-gateway 4		192. 168 . 100 . 1 Part 1 <Default>
		192 . 168. 100 . 1 Part 2 <Default>
		192 . 168 . 100. 1 Part 3 <Default>
		192 . 168 . 100 . 1 Part 4 <Default>
MAC ID	549A11:5xxxxx	Display of the MAC-ID: 54:9A:11:5x:xx:xx
LAN connection	online / offline	For connection to other devices this parameter must be set to “online”

MENU ABOUT

	
Firmware	Displays the current firmware version and in brackets the language version.
Firmware up-date	<p>Start the firmware update by selecting the button "Start Update" and confirm with SAVE. A confirmation prompt opens. If this window is confirmed with YES, the unit turns into the loader mode.</p> <p>When the loader mode is accidentally turned on, you can switch back by a mains reset into the existing user program.</p> <p>If an update should be performed, a USB flash drive must be plugged in with the new firmware. After a short time, the firmware folder appears in the line "Folder". E.g. „BT4100.01_V20xx_xx.ELO“.</p> <p>Now you can start the loading process by touching the touch screen.</p> <p>The controller must not be disconnected from the power supply until the download is complete!</p> <p>After finished loading the new user program is started by a power interruption.</p>

Maintenance in	xh	The remaining time to the next maintenance.
Factory setting	Reset to factory delivery status. With the help of this parameter, all set-tings are deleted and reset to the delivery status. Choose “Reset”, then press “SAVE”.	
Type RS4100-C-01-BT1-03-5	Type key of the controller	
www.thermalcare.com sales@thermalcare.com	Homepage and E-mail address of the manufacturer.	

ERROR MESSAGES

Error message	Cause	Possible remedy
At actual process value maximum value flashes	Top range end has been exceeded, sensor defect	Check sensor and cable
At actual process value minimum value flashes	Bottom range end has been exceeded, sensor defect	Check sensor cable Check process value offset TC connected with inverted polarity
REMOTE: Parameter locked	Adjusting of parameters is not allowed. Unit is controlled by fieldbus	Profibus: The parameter “Remote” in the menu Field bus is set to “on”. The configuration-tool Vision is active.
Field bus module unavailable		The controller is not fitted with the correct hardware for the selected protocol
DfErr	Text display error	Please contact the manufacturer.
ERR0	System error	Please contact the manufacturer.
ERR8	System error	Quit error message. Check the parameters. If the error is still there, contact the manufacturer.

TECHNICAL DATA

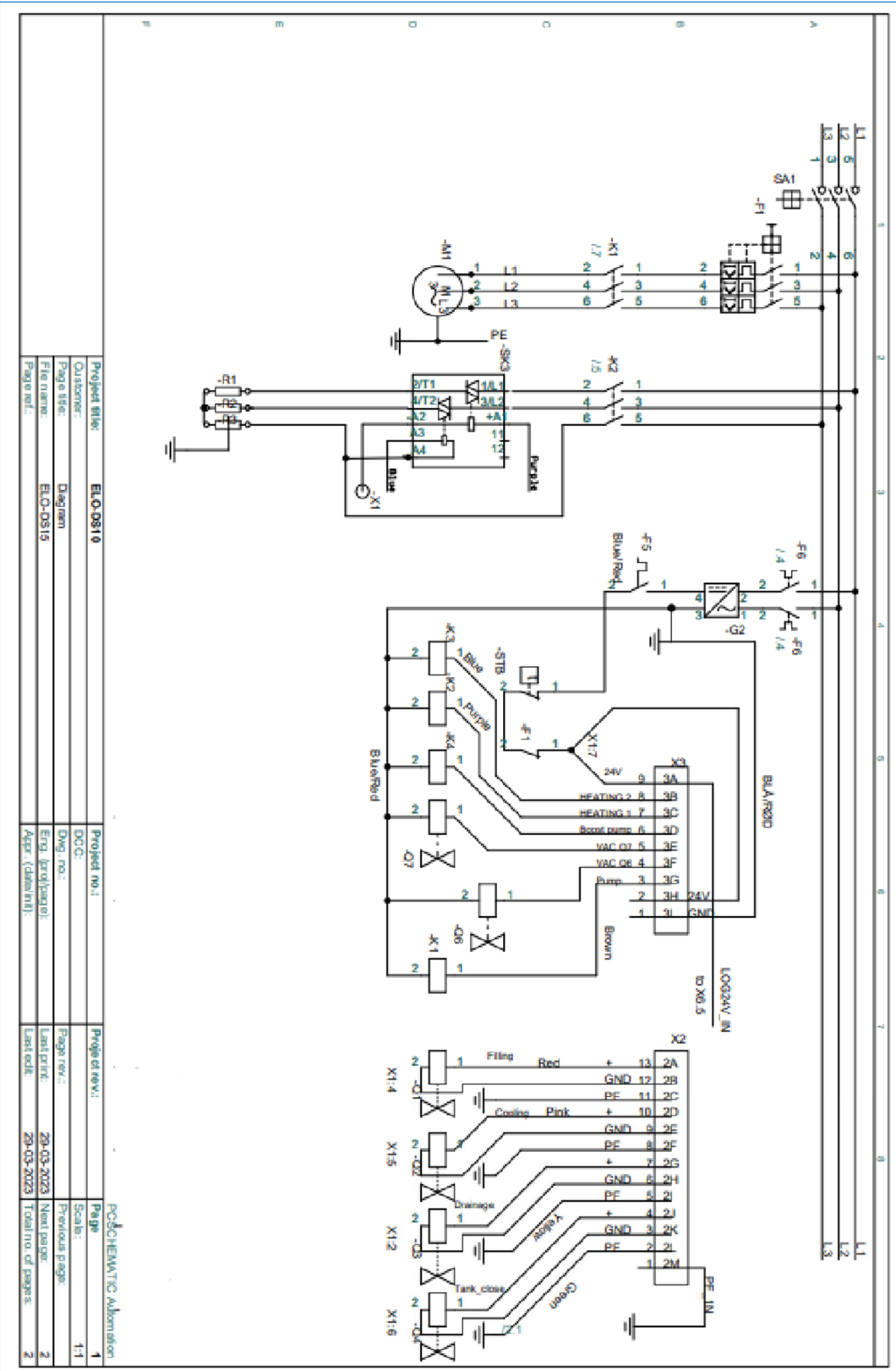
Input Pt100 / RTD -30....400°C	PT100-1 and PT100-2: 2- wire connection PT100-3 : 3- wire connection Built-in protection against sensor breakage and short circuit Sensor current: < 1 mA Calibration accuracy: ... < 0,2 % Linear error: < 0,2 % Influence of the ambient temperature: < 0,01 % / K	
Logic input	Internal resistance > 22k-Ohm Level 0 < 2V Level 1 > 9V; max 30V	
Logic outputs	Bist. voltage, 0/24 V DC, max. 500 mA, short-circuit proof	
Relay output	Relay changeover contact; max. 250V AC, max. 3A, resistive load	
Continuous outputs	0...20 mA maximal load 300 Ohm; 0...10V minimal Load 5kOhm. Automatic switching, depending on connected load.	
Hybrid Output	Optional plug-in module tri-phase contacts, two phases are operated by controller. max. 440V AC; max. 13A; max. 9kW total power Please note: These outputs have to be protected by separate 16 Ampere fuses of type FF (very fast acting).	
Fieldbus	Optional plug-in module: - Serial: RS232, RS485, TTY (20mA) - Profibus DP, according to EN 50170 All variants are equipped with optical insulation.	
Ethernet	Modbus TCP	
USB	Host for USB-Stick; max. 100mA	
Supply voltage	24 V DC, +/-25 %	
Power consumption	appr. 6W + Power of logic outputs	
LCD-Display	8,8 cm (3,5") RGB-display with LED-backlight. 320 x 240 pixel with resistive Touch-Panel	
Data protection	EAROM, Semiconductor storage When using a Fieldbus interface please note: Permissible writing operations per parameter must not exceed 1 000 000.	
Real time clock	Backup battery: Lithium CR2032	
Housing RS4100-C	Type	Unsealed frame to be covered by a front film
	Format	Ca. 90 x 90 mm; Mounting depth: ca.60 mm
	Display cut-out	78 +0,5 mm x 70 +0,5 mm
	Material	Sheet steel and Makrolon UL 94-V1
	Protection class	IP 10 (DIN 40050), Front side: IP 00
Housing RS4100-M	Type	to be mounted on cap rail TS35/7,5

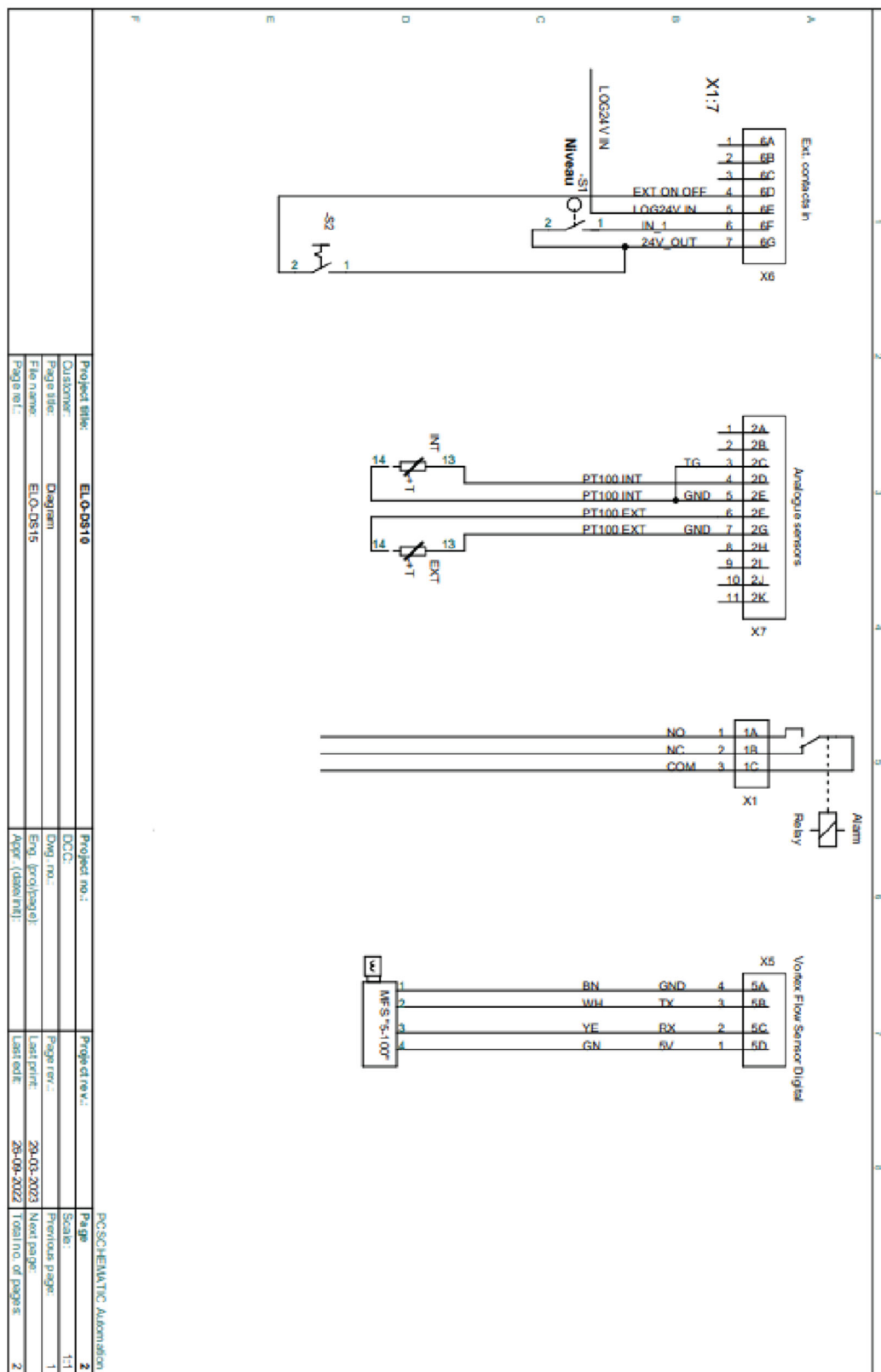
	Format	Width: Ca 130 mm Length: Ca. 90 mm Height: Ca 70 mm	
	Material:	PVC	
	Protection class	IP 10 (DIN 40050), Front side: IP 00	
Weight RS4100-C	Approximately 250 g, depending on actual model		
Weight RS4100-M	Approximately 250 g, depending on actual model		
Connectors	Service-Interface: Ethernet RJ45 USB-Interface: Type A Profibus: SUB-D 9 Others: Screw terminals, Protection mode IP 10 (DIN 40050) Insulation class C		
Permissible operating conditions	Operating temperature:	0...50°C / 32...122°F	
	Storage temperature:	-30...70°C / -22...158°F	
	Climate class:	KWF DIN 40040; equivalent to annual average. max. 75% rel. humidity, no condensation	
Harmonized standards	EN 61326-1:2013 / EN 61000-3-2:2006+A1:2009+A2:2009 EN 61000-3-3:1995+A1:2001+A2:2005 Electrical safety: EN 61010-1		

(Subject to changes without notification)

TROUBLESHOOTING MAINTENANCE

Fault:	Possible cause:
The unit does not fill the tank and the level indicator is lit:	No water supply -Solenoid valve defect
The unit does not fill the tank and the level indicator is not lit:	The level indicator is soiled. - The thermostat is defective loose connection
The unit overfills the tank and the level indicator is lit:	The level indicator is soiled. -The thermostat is defective
The unit overfills the tank and the level indicator is not lit:	Dirt in the solenoid valve
The Reset diode is lit (the thermostat is reconnected directly to the thermal release in the electric cabinet):	Fault in the installation, possibly only 2 phases - Motor protecting switch /thermo release defective - Motor defective - Thermal protection tripped
The device does not circulate water, but the motor is running:	The motor has incorrect rotation direction - The cooling channel in the process is blocked.
The pump motor does not start after connection, water filling and pressing the start button.	Faulty motor - Reset pump triggered - Motor protecting switch /thermal release defective
The device does not heat:	Faulty contactor Thermostat defect Heating element defect Overheating thermostat defect
The device is not cooling	Insufficient cooling water Solenoid valve defect Thermostat defect
The device is constantly cooling:	Dirt in the solenoid valve Thermostat defect





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ROH IOM 01