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Operating Instructions

Temperature Control Unit P140M/P160M/P180M P160MD/P180MD

Zertifiziertes Qualitätssystem SQS ISO 9001 Reg. Nr. 11265

SWISS MADE

REGLOPLAS

MASTER OF TEMPERATURE CONTROL



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V 05/2013

Documentation Temperature Control Unit P140M/P160M(D)/P180M(D)

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General Safety Information

Safety Symbols

DANGER	
	**Denotes imminent danger. Failure to heed the information can result in death or grave personal injury (disability)!**

WARNING	
	**Denotes a dangerous situation. Failure to heed the information can result in death or grave personal injury (disability)!**

CAUTION	
	**Denotes a potentially dangerous situation. Failure to heed the information can result in property damage as well as minor or moderate personal injury!**

NOTE	
	**Denotes general information, useful advice to users and work recommendations, which, however, do not have any influence on the safety and health of personnel.**

Range of Application

This general safety information is generally valid for all temperature controllers and control systems from Regloplas.

Intended Use

The Regloplas temperature control unit is built according to the current state of the art and the generally accepted principles of safety engineering. The temperature control unit is intended solely for the normal use for heating and/or cooling of injection moulds and die casting dies, extruders, calenders, mixers and other consumers in areas where there is no risk of explosion.

Any use beyond this shall be deemed to constitute improper use. The manufacturer is not responsible for damage resulting from improper use; the user is solely responsible for such risks. The temperature control unit may not be used under other operating conditions and/or with other media, in deviation from our specifications, without the prior consent of Regloplas AG.

The intended use also entails compliance with the operating, servicing and maintenance conditions stipulated by the manufacturer. The temperature control unit may only be operated, serviced and maintained by personnel who are familiar with these tasks and have been instructed as to the risks.

Safety Information

General Information

The Regloplas temperature control unit is safe to operate but can cause danger if it is used incorrectly or for a purpose other than its intended use. It should be noted that any such incorrect use or non-compliance with the intended use can cause risks to the life and limb of the user or third parties, adverse effects on the equipment and other material assets belonging to the user, and risks to the efficient operation of the equipment.

Start-up (i.e., commencement of intended use) is prohibited until it has been determined that the temperature control unit has been set up and wired in accordance with the Machinery Directive (2006/42/EC).
EN 60204-1 (Safety of Machinery) must also be observed.

These operating instructions must be read carefully before switching on and operating the temperature control unit. The information regarding the intended use and foreseeable misuse must be observed. Local safety regulations must also be obeyed.

If the temperature control unit is used in combination with products made by other manufacturers, the notices and safety regulations of these manufacturers must also be obeyed.

Process Monitoring

In plants in which a malfunction of the temperature control system leads to endangerment of the operating personnel or destruction of the plant,

an independent process monitor that reliably shuts down the plant must be used.

Information for Operators and Personnel

The operator and all persons who are tasked with working on the temperature control unit must obey the fundamental regulations regarding work safety and accident prevention. The operator must ensure that only persons who have read and understood these operating instructions, in particular the chapter on safety, may work on the temperature control unit.

Any working methods that have a negative effect on the technical safety of the temperature control unit must not be used. The operator must ensure that the temperature control unit is operated only in flawless condition. If necessary, the company using the equipment must obligate the operating personnel to wear protective clothing.

For all tasks relating to set-up, start-up, operating, modification of operating conditions and operational methods, maintenance, inspection and repair, any shut-down procedures stated to be necessary in the operating instructions must be followed.

Changing the Parameter Settings

The parameterisation of the control system may only be carried out by personnel trained by Regloplas. In particular, no parameters in the device configuration may be changed without consulting Regloplas.

The relevant accident prevention regulations and the generally accepted principles of safety engineering, occupational medicine and structural engineering must be observed. The national safety regulations must also be obeyed.

Residual Risks

Any unauthorised modifications and changes to the temperature control unit as well as unauthorised changes to the parameterisation of the control system are prohibited for reasons of safety.

If the temperature control unit is damaged, it must not remain in use; the defective part must be replaced or repaired immediately. Only original Regloplas replacement parts may be used. Damage due to use of third-party parts voids any and all warranty claims.

DANGER

The temperature control unit must be disconnected from the electrical power supply before it is opened (unplug the mains plug and, if fitted, press the main switch on the temperature control unit). Danger of electric shock!

Any leaks in the temperature control circuit (device, connecting lines, consumers, etc.) must be repaired immediately.

In the case of temperature control units that use oil as the heat transfer medium, please remember that oil is flammable under certain conditions. For this reason, the temperature control unit must not be located close to heat sources. The thermal insulation in the device must always be kept clean. Insulation that is soaked with thermal oil poses an increased risk of fire.

Burning thermal oil can be extinguished using an AFFF spray foam fire extinguisher, a powder fire extinguisher (to be avoided in the case of dust-sensitive plants, control systems, EDP, etc.) or a CO_2 fire extinguisher. The appropriate fire extinguisher must be provided by the operator, taking into account the equipment located in the room and the mandatory safety regulations.

The temperature control unit may only be operated when all safety systems are completely installed and intact.

The temperature control unit must be protected against sprays and cleaning agents.

Before detaching connecting lines from the temperature control circuit and depending on the outlet temperature, allow the temperature control unit to cool down first and then switch it off. Check that the pump is no longer running.

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

Using This Documentation

This documentation contains important information for safe, economical operation and for proper maintenance of the device.

Compliance with this documentation helps to avoid danger, minimise repair costs and downtime, and increase the dependability and service life of the device/system.

NOTE	
	**The operating instructions should be kept near the corresponding device/system and always be accessible to operating and maintenance personnel.**

Additional Documentation

The included documentation is completely correct for the basic versions of devices. Components that do not belong to the basic hardware are noted as extra equipment. The corresponding additional documents are included with special versions of devices. Any additional documents supplement and/or replace the descriptions contained in this documentation, which are then either invalid or only conditionally valid.

Operating Instructions

General

Introduction

These operating instructions contain a detailed description of the Temperature Control Unit P140M/P160M(D)/P180M(D) as well as important information for safe operation and optimal maintenance.

The operating instructions must be kept near the temperature control unit and always be accessible to operating and maintenance personnel.

Operating Range

The operating range and heat transfer fluid of the temperature control unit are shown in the following table (in this regard, see also the chapter "Technical Data" in the Maintenance section).

Temperature Control Unit Type	P140M	P160M(D)	P180M(D)
Temperature range	up to 140 °C	up to 160 °C	up to 180 °C
Heat transfer medium	Water	Water	Water

NOTE

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!

Start-up

Setting up the Temperature Control Unit

The temperature control unit is designed for an ambient temperature range of 10-40 °C. Sufficient ventilation must be ensured during set-up. The distance between the devices and/or between the temperature control unit and a wall must be at least 10 cm. The ventilation slits must not be covered.

- Check the temperature control unit to ensure that it is undamaged and complete
- Do not tip the temperature control unit! Heat transfer medium remaining in the unit from the test run could spill, and there is a risk that the thermal insulation could become soaked with the fluid (medium)
- Position the temperature control unit on a horizontal surface and engage the wheel brake

⚠ WARNING	
	**The temperature control unit may be pressurised - danger of injury in the event of escaping hot water or steam!** **Never start up the temperature control unit without the side panels and housing!** **Never use the temperature control unit in potentially explosive environments and protect it against sprays and cleaning agents that contain solvents!** **Any leaks in the temperature control circuit (temperature control unit, connecting lines, consumers, etc.) must be repaired immediately!** **Observe local laws during set-up!**

⚠ CAUTION	
	**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 coastdown temperature (factory default 60 °C). The pump and the control system are then switched off!** **Check that the pump is no longer running and that the system pressure gauge reads 0 bar (display on the screen reads OFF)!** **The corresponding chapters of the operating instructions must be read before starting up the temperature control unit!**

Operating Instructions

The operating instructions for the temperature control unit belong in the hands of the personnel responsible for start-up and operation. Please ensure that the operating instructions are read. By doing so, you will avoid unnecessary expense and problems during start-up as well as production downtime.

Inspection of Consumers

Before installing the connecting lines between consumer and temperature control unit, the consumer must be subjected to the following inspections:

- Verify that channels are unobstructed
- Remove residual fluid and fouling with compressed air (foreign objects such as shavings etc. can damage the pump)
- Rust and scale deposits must be removed because they greatly interfere with the heat exchange between consumer and heat transfer medium and increase the pressure drop in the consumer. Descaling can be carried out using the Regloplas REG descaling unit (see the "Regloplas Temperature Control Technology" brochure, REG data sheet)

Water Quality

The water used must meet the following requirements to avoid damage to the cooler of the temperature control unit:

Criterion	Requirement
Appearance	clear/without sediment
Cloud	< 0.5 NTU (very light cloud)
Total hardness	< 10 °dH
pH-value	6.5-8.5
Conductivity	max. 500 µS/cm
Carbonate hardness	< 5 °dH

Addition of RK93 corrosion inhibitor is urgently recommended (see the "Regloplas Temperature Control Technology" brochure, RK93 data sheet).

Connecting Lines

The connecting lines must consist only of pressure-resistant and temperature-resistant hoses and screw fittings. The cross-section of the connecting lines may not be reduced (see maintenance section).

- Outlet and inlet - dimensioning for 140 °C (16 bar), 160 °C (16 bar) and 180 °C (25 bar) The connecting lines must be routed so that they are protected against unintentional contact. Thermal expansion must be taken into account in pipe joints
- Cooling water inlet - dimensioning for 100 °C (10 bar). When connecting to public water mains, the applicable laws and safety regulations must be observed (e.g., connection of the unit via circuit separator). The water mains pressure must be within the range of 2-6 bar
- Cooling water outlet - dimensioning for 160 °C (10 bar), must prevent reverse flow and must be always open. The hose must be fastened so that any escaping steam at the start of the cooling procedure does not pose a hazard
- For reasons of safety, the cooling system must always be connected

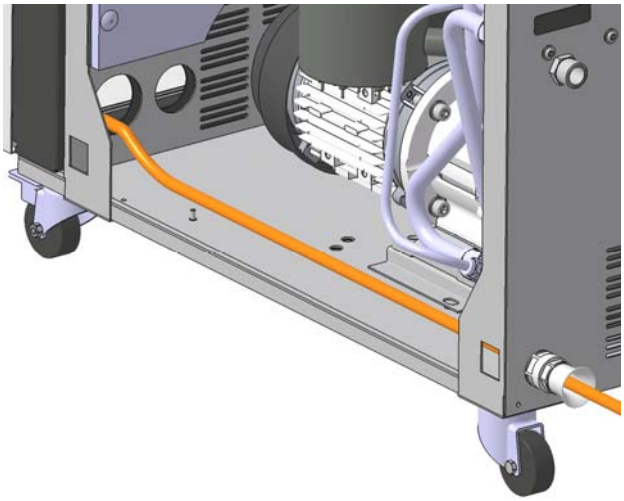
⚠ CAUTION	
⚠	**When escaping, the temperature of the cooling water can increase to the same temperature as the heat transfer medium!**

Electrical Connections

⚠ CAUTION	
⚠	**The temperature control unit may only be connected by a qualified electrician!**

Connection cable installation

The connection cable is installed through the cable gland in the back wall of the temperature control unit and passed through the grommet in the intermediate wall to the control cabinet.



Connection cable installation

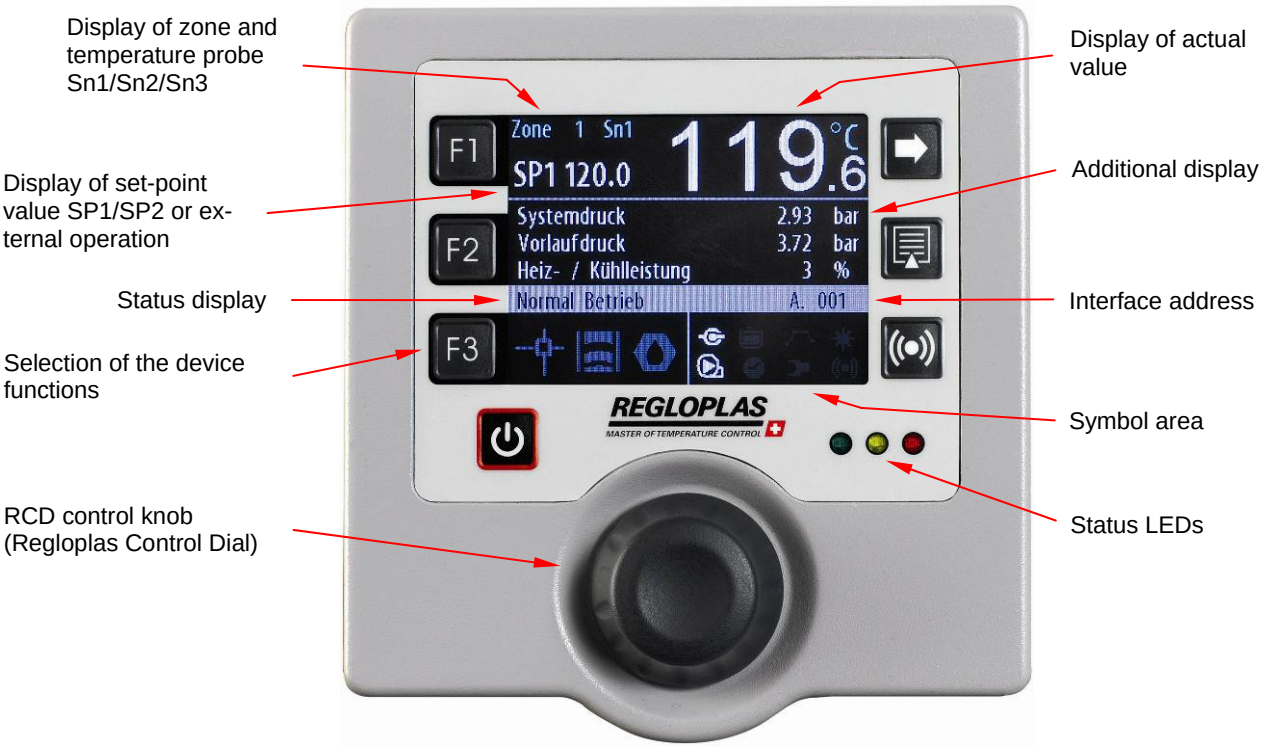
Connecting the Temperature Control Unit

- Compare supply voltage and frequency with the information on the rating plate of the temperature control unit
- Verify the rating of the preliminary fuse according to the information in the electrical diagram, and check that the power consumption conforms to the value on the rating plate of the temperature control unit
- Observe the applicable local laws and safety regulations when connecting to the mains

Operation of the Temperature Control Unit

The temperature control unit must only be switched on after inspecting the consumer, connecting the connecting lines and electrical connections, and opening the outlet/inlet shut-off valves. The vent valves on the consumer and the shut-off valves (if present) must be open.

RT100 Control System



RT100 Control System - front panel

Buttons

F1	Setting the set-point value		Scrolling through pages
F2	Setting the additional display		Setting the parameters
F3	Selection of the device functions (toggling SP1/SP2, drainage by suction, leak-stop)		Alarm reset and alarm history
	Button ON/OFF		

Status LEDs

	Normal mode		Warning		Alarm

Device Functions

	Set-point value toggling SP1/SP2		Draining (suction or blowing out)
	Leak-stop mode		

Symbols

	Interface operation		Level of the heat transfer medium (filled quantity) LOW
	Level of the heat transfer medium (filled quantity) OK		Heating
	Ramp program activated		Timer activated
	Cooling		Feed pump, counterclockwise rotation
	Feed pump, clockwise rotation		Alarm
	Maintenance due (flashes if maintenance is due)		

RT100 Operation and Status Displays



In the off state of the RT100 control system, the message **OFF** appears in the display area. Upon switching on with the **ON/OFF** button, the additional display is shown. The top left part of the display shows the set-point temperature **SP1** or **SP2** (SP = Set point). The top right part of the display shows the current outlet temperature (actual value of temperature sensor **Sn1**, **Sn2** or **Sn3**).

Sn1 = Outlet temperature

Sn2 = Temperature, external

Sn3 = Inlet temperature



Three other selectable values are shown in the middle part of the display. The additional display can be set by using the **F2** key and by turning/pressing the RCD control knob (turning selects a value, pressing confirms it).

The symbols for set-point value display, suction operation (draining) and leak-stop operation are shown in the lower left part of the display. The various operational and status displays of the temperature control unit are shown in the lower right part of the display.

Setting the Set-point values



The set-point values **SP1** and **SP2** are set by pressing the key **F1**. The set-point value is then coloured light blue and can be set with the RCD

control knob. This setting is also possible in the parameter positions. The set-point values can be selected through an external digital signal.



To toggle between set-point values **SP1** and **SP2**, press the **F3** button and select of the set-point toggling function. Set-point toggling is only possible if there is no alarm pending.

Parameter Menu



The parameter menu is activated by pressing the Parameter button. In this menu, all the parameters can be configured by turning/pressing the RCD control knob.

RT100 Control System - Functions

Switching on the Temperature Control Unit



Upon switching on the main switch, the message **OFF** appears in the display. The RT100 control system is now ready for operation and is switched on by pressing the **ON/OFF** button, or by the timer, through a digital input or an interface.

Depending on the programming, the set-point and actual values, as well as information on the operational state of the control system or the temperature control unit are displayed.

Rotational field detection / Direction reversal

The rotary field detection of the RT100 control system detects a wrong phase sequence and reports this in the display or corrects the direction of rotation automatically.

Emptying

The consumer device can be drained using the delivery pump (suction) or by means of compressed air (blowing out); (setting in the parameter menu).

Drainage by Suction with Pump



The suction program allows the draining of the consumer connected at the temperature control unit and is activated by pressing the **F3** key and selecting the suction symbol. The pump is switched off, and after the pump run-down time has elapsed the pump is switched on again in the opposite direction. The consumer is drained by suction during the defined period (draining time).

Draining is only possible if the temperature of the heat transfer medium is below the programmed coastdown temperature value. If that is not the case, the heat transfer medium is first cooled to this value.

Blowing out with Compressed Air

The blowing out program enables the user to drain the consumer connected to the temperature control unit by means of compressed air. Blowing out is activated after the pump run-down time has elapsed and directs compressed air through the consumer. The temperature control unit switches off automatically after the set period (draining time) has elapsed.



The suction or blowing out program can be aborted by pressing the **ON/OFF** button. When the **ON/OFF** button is pressed again (wait until the display reads **OFF**), the unit switches back to normal operation.

NOTE	
	**In the case of pressurised water units, the pressure release valve (Y8) closes at 5 °C above the coastdown temperature (max. 85 °C) and opens at the programmed coastdown temperature during the cooling process!**

Operation with Code/Password

In order to prevent the values that have already been set or programmed from being unintentionally reset/adjusted, the use of a code/password is urgently recommended. The code is defined in the parameter **Code**.

The RT100 control system has three password levels that are organised hierarchically:

- User password - Default **0000** (switched off)
- Technician password - Default **0100**
- Service password - only for personnel trained by Regloplas

NOTE	
	**It is strongly recommended that an operator password should be set up when commissioning the temperature control unit!**

Operation with Timer

The RT100 control system has an integrated real-time clock. If the **Timer** option is available, the device can be switched on and off with this option.

Alarm Reset and Alarm History

Alarm Reset



If an alarm has been triggered, the signal horn can be switched off by pressing the **Alarm Reset** button. After the malfunction has been remedied, the alarm can be reset by once again pressing the **Alarm Reset** button.

The **Alarm Reset** button also allows manual acknowledgement of the automatic switchover (toggling) from consumer temperature control **Sn2** to outlet temperature control **Sn1** if sensor **Sn2** is defective or removed from the consumer.

Alarm History



If there is no alarm pending, the **Alarm Reset** button can be used to view the alarm history.

Save/Reset of the Setting Values

The RT100 control system provides the facility to load the factory settings or user settings at any time in a simple manner. Two different customer-specific settings can be loaded afresh (user setting 1 and 2).

RT100 Control System - Activating and enabling Options

The RT100 control system can be equipped with different hardware and software options.

The software options must be activated with a file via USB stick. This requires the serial number of the control system, which is displayed in the parameter **Options** and can be seen on the base module next to the barcode.

The serial number consists of 6 letters (e.g. AALASF).

Shutdown



The RT100 control system is switched off by pressing the **ON/OFF** button, by the timer, via a digital input or an interface.

Depending on the temperature of the heat transfer medium, the shutdown program runs as follows:

- The pump and the control system are switched off. The RT100 control system will then be in standby mode and the message **OFF** appears on the display
- The pump continues to run. The unit cools down until the temperature of the heat transfer medium has reached the programmed coastdown temperature. On reaching this temperature, the pump and the control system are effectively switched off. In the case of pressurised water units, the pump then continues running for a further few seconds in the opposite direction (pressure release). The RT100 control system will then be in standby mode and the message **OFF** appears on the display

Changing Consumers/Decommissioning

Before detaching the connecting lines, it is necessary to verify that the temperature control unit is turned off and that all circuits are depressurized (see the chapter "Switching off the Temperature Control Unit"). The temperature control unit must be drained completely and stored in a dry place at 10-40 °C when not in use. To restart the unit, proceed as instructed in the "Start-up" chapter.

Alarm Messages

The RT100 control system can display various error messages (warnings and alarms). Attention must be paid to these error messages without fail. Otherwise, malfunctions of / damage to the temperature control unit and production downtimes may result.



Pressing the **Alarm Reset** button allows you to acknowledge/reset an alarm (e.g. switching off the horn). Only after the malfunction has been

rectified can the alarm display be cleared by once again pressing the **Alarm Reset** button.

The **Alarm Reset** button also allows manual acknowledgement of the automatic switchover (toggling) from consumer temperature control (or cascade control) **Sn2** to outlet temperature control **Sn1** in the event that sensor **Sn2** is defective or removed from the consumer.

Alarm list



Pressing the **Alarm Reset** button opens the alarm list, as long as there is no active alarm. The last ten alarm messages are displayed in this list, complete with date and time .

Warnings

Error message	Rectification
Service is due	Carry out maintenance procedure according to the operating manual. Increment the parameter **Next Maintenance** by 1000 hours
Clean filter	Clean the corresponding filter or if required, replace it
Current data lost, load factory settings	The RT100 Control System has lost the parameters and had to load the factory settings
Outlet pressure sensor faulty	Replace outlet pressure sensor
Heating contactor 1 failure	The contactor Heating 1 does not get actuated correctly any more - replace
Heating contactor 2 failure	The contactor Heating 2 does not get actuated correctly any more - replace
Illegal or broken characteristic curve F1000	Switch the main switch off and on again. If the fault is still present, re-load characteristic curve F1000
Pump power too low	Check/inspect the pump or in the menu F1000 reduce the parameter pump tolerance (default 50%)
Deviation set-point value/outlet underrun	Adjust the outlet temperature and acknowledge the fault
Deviation set-point value/outlet exceeded	Adjust the outlet temperature and acknowledge the fault
Deviation set-point value/external underrun	Adjust the external temperature and acknowledge the fault or error
Deviation set-point value/external exceeded	Adjust the external temperature and acknowledge the fault or error
Deviation set-point value/inlet underrun	Adjust the inlet temperature and acknowledge the fault
Deviation set-point value/inlet exceeded	Adjust the inlet temperature and acknowledge the fault
Deviation outlet/inlet underrun	Adjust the inlet temperature and acknowledge the fault
Deviation outlet/inlet exceeded	Adjust the inlet temperature and acknowledge the fault
Level 1 underrun	Refill heat transfer medium
Level 2 underrun	Refill heat transfer medium
Pressure balance not possible	Check water inflow pipe and water pressure (min. 2 bar)
Leak stop not possible	Reduce the temperature
Leak stop not allowed	Unit is not allowed for leak stop

Error message	Rectification
Suction not possible	Switch the unit to normal operation mode

Alarms

Error message	Rectification
Toggling of heat transfer medium - unit must be re-started	Switch the main switch off and on again
External set-point value signal interrupted or not present	External set-point value signal must be present (if required, check external control system)
Analog option missing or defective	Connect analog option or switch off in the parameter **Hardware Options**
Digital option missing or defective	Connect digital option or switch off in the parameter **Hardware Options**
Current monitoring option missing or defective	Connect current monitoring option or switch off in the parameter **Hardware Options**
Rotation reversal option missing or defective	Optionally, turn off the rotation reversal option or switch off in the parameter **Hardware Options**
Profibus option missing or faulty	Connect Profibus option or switch off in the parameter **Hardware Options**
CANOpen option missing or faulty	Connect CANOpen option (Euromap 66) or switch off in the parameter **Hardware Options**
AD converter failure	Replace base module
Attention - temperature control cabinet too high	Place the temperature control unit in a place with low ambient temperature
Maximal operating time boost pump exceeded	Check the hose couplings to the consumer, rectify leaks if found
Flow switch act	Check the outlet pressure (min. 0.7 bar must be present)
Min. flow rate underrun	Min. Check the minimum flow rate (the given minimum flow rate must be present)
Flow rate deviation too high	Large variation in the flow (there may be a leak in the circuit)
Max. temperature exceeded	Max. temperature of the heat transfer medium may not exceed the maximum device temperature (if required, check the tool temperature)
Heating thermostat triggered	Temperature control unit has become too hot - allow to cool and look for the cause
Current monitoring heating activated	Check heating element(s) and if required, replace them
Motor current underrun	Check the pump/pump motor (with Ohmmeter) and if required, replace them
Phase sequence failure	Correct the phase sequence (interchange 2 phases)
Phase sequence unidentified	Switch off phase sequence monitoring
Phase missing	Check the mains, input conductor and pump motor
Motor contactor malfunction	Check motor contactor and if required, replace it
Temperature sensor Sn1 failure	Replace temperature sensor Sn1
Temperature sensor Sn2 failure - switched to outlet control	Replace temperature sensor Sn2
Temperature sensor Sn3 failure	Replace temperature sensor Sn3
System pressure sensor failure	Replace the system pressure sensor
Outlet pressure sensor failure	Replace the outlet pressure sensor

Error message	Rectification
System pressure sensor inactive	Activate the system pressure sensor
Motor current exceeded	Check the pump/pump motor (with Ohmmeter) and if required, replace them
Power failure	Failure of the power supply or temperature control unit not switched off properly
Safety thermostat triggered	Temperature control unit has become too hot - determine the cause and reset the thermostat
Temp. monitor cooling act, cooling disabled	Check the cooling and cooling water flow
Alarm frequency converter	Remedy the frequency converter fault
Min. pump pressure underrun	Check the outlet pressure
Turn on time refill exceeded	Check the cooling water circuit and the cooling circuit for leaks

System Errors/System Notes

Error message	Rectification
Memory stick missing	Insert memory stick
Incompatible data on stick	Load current software version
Communication failure	Check the connection between the front panel and the base module
Software version error	Re-load software (applies to front panel and base module)
Data corrupt on stick	Insert new memory stick and re-load device parameters
Current settings lost / factory settings loaded	Carry out a new client-specific settings parameterise
Settings defect / data not loaded	Replace the memory stick
No data on USB stick or wrong file extension	Load the correct data on USB stick
More than 1 file on USB stick	Load the correct data on USB stick
Data failure - no data loaded from USB stick	Load the correct data on USB stick
Option not activated	Activate the option
DEMO MODE / Pump current measurement inactive	System message without remedial action
Saving data	Data saving in progress
Data saved	Data saving finished
Data error - no data saved to USB stick	Replace the USB stick
Pump is off or has wrong direction	Adjust the pump rotating field
Please close tap	Close the tap on the outlet
Calibration done - Please open tap	Open the tap on the outlet
Clean the filter	Clean the external filter
External set-point signal disconnected or not available	Connect the external set-point value signal
RTC Error or empty battery - Time and date settings lost	Set the correct date/time and/or replace the battery on the front panel
Rotation can not be changed	---
USB Slave Mode operation not possible	Switch on the temperature control unit again
Save/Load not possible in USB Slave Mode	Switch on the temperature control unit again
Save/Load not possible during device is on	Switch the temperature control unit to OFF
Switch over heat carrier - reboot of the machine required	Switch on the temperature control unit again with the main switch
Error, password not reset	Enter he reset code correctly

Error message	Rectification
Password reset	Password has been reset
Hardware option not installed	Install the hardware option
No alarm	System message without remedial action
Illegal operation	Observe the operating sequence
Zone 1 missing	Connect Zone 1, check address of Zone 1
Zone 2 missing	Connect Zone 2, check address of Zone 2
Software version option Profibus incompatible	Update the software
Software version option CANOpen incompatible	Update the software
Software version analog option incompatible	Update the software
Software version digital option incompatible	Update the software
Software version option current monitoring incompatible	Update the software
Software version option rev. of rotation incompatible	Update the software

Maintenance

WARNING

The temperature control unit must be switched off before carrying out any maintenance work - press the main switch and disconnect from the mains!

The temperature control unit may still be pressurized - Danger of injury from escaping hot cooling water or steam!

Before disconnecting the feed lines to the temperature control unit/consumer, first allow the temperature control unit to cool down!

Periodic Inspections and Maintenance Procedures

The RT100 control system has a service interval display to simplify temperature control unit maintenance procedures. We recommend entering the corresponding maintenance interval (e.g., 2000 hours, see the RT100 control system programming instructions).

Please note that the instructions below are based on a daily operating time of 8 hours. In multi-shift operation, the inspections and maintenance procedures must be carried out at correspondingly shorter intervals. Defective parts must be repaired or replaced immediately.

- Temperature control unit inspections and maintenance procedures must be carried out by an expert
- Maintenance procedures involving electrical equipment may only be carried out by qualified electricians
- The RT100 control system unit may only be replaced when the mains plug is unplugged
- The safety valve should be vented from time to time by brief activation (blow off)

⚠ WARNING	
	**Danger of magnetic fields in the case of feed pumps with magnetic drive!** **Persons with pacemakers and surgically implanted metal parts must remain at a safe distance or not be required to perform maintenance and repairs on these pumps!** **When assembling the magnetic drive, the motor must be securely retained to prevent any possibility of fingers being crushed between components due to the magnetic forces!** **All computers, data media, credit cards, electronic watches etc. must be kept at a safe distance!**

Daily Inspections/Maintenance Procedures

- Check the entire temperature control circuit (temperature control unit, connecting lines, consumers, etc.) for leakage and repair any leaks immediately
- Check filters and clean if necessary

Monthly Inspections/Maintenance Procedures

- Inspect the cooling air inlet port of the pump motor to ensure that it is free of obstructions. Clean the port by blowing compressed air from inside to outside
- Clean the level switches
- Check filters and clean if necessary

Semi-annual Inspections/Maintenance Procedures

- Inspect the electrical equipment such as grounding wires, secure connection of power supply cord and connecting lines, etc.
- Dismantle solenoid valves (see maintenance section), inspect membranes for lime deposits and damage. Check the core and spring bolt for free movement. Clean or replace parts if neces-sary
- Descale cooler - exercise caution when tightening the screwed connections on the heat exchanger (max. 170 Nm)!
- Check pump capacity (the flow rate and final pressure must comply with the pump characteristic)

Annual Inspections/Maintenance Procedures

- Replace the heat transfer medium (water and corrosion inhibitor) after approx. 2000 working hours (equivalent to approx. one year in single-shift operation). In the event of poor water quality or multi-shift operation (contamination, etc.), the medium must be replaced correspondingly earlier

Cleaning

CAUTION	
	**Always allow the temperature control unit to cool down!** **Switch off the temperature control unit: press the main switch and unplug from the mains!** **When using a solvent for cleaning - do not blow out the tank and the cooler, but flush them instead (explosion hazard)!** **When using a solvent, the manufacturer's instructions for use must be observed. Solvents are flammable under certain conditions. For this reason, cleaning must never take place near heat sources!**

In the event of unfavourable operating conditions, the procedures listed below must be carried out correspondingly earlier.

1) Drain the temperature control unit by suction or blowing out
2) Clean the filters in the circuit
3) Inspect the cooler for scale deposits and clean using the REG Descaling Unit if necessary
4) Level control - remove and clean the level switches. Important - reinstall level switch correctly (**NO** marking must be on top, see Maintenance section)
5) Dismantle solenoid valves (see Maintenance section), inspect diaphragms for scale deposits and damage. Check the core and spring bolt for free movement. Clean or replace parts if necessary
6) Inspect pump for corrosion and replace if necessary
7) 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

Repairs

CAUTION	
	**Allow the temperature control unit to cool down and, if necessary, drain it before any repair!** **Switch off the temperature control unit, press the main switch and unplug from the mains!** **Disconnect all hose couplings from the temperature control unit!**

For fast, error-free supply of spares, we need the following data without fail:

- Device type
- Device number
- Voltage and frequency

This information is given on the rating plate on the temperature control unit.

The item numbers of the components can be found in the corresponding drawings in these operating instructions and the electrical circuit diagrams of the temperature control unit.

⚠ CAUTION	
	**Only original Regloplas spare parts may be used!** **In case of damage from the use of non-original parts, the warranty will be rendered null and void!**

Transport

⚠ CAUTION	
	**Allow the temperature control unit to cool down; switch off - press the main switch and disconnect from mains (see chapter on "Switching off the temperature control unit")!** **Disconnect all hose couplings from the temperature control unit!**

Before shipping, the temperature control unit must be drained through the discharge port on the delivery pump (see maintenance section). Because of the danger of freezing (bursting of the cooling pipes) at low temperatures, the cooler must be blown out as follows:



1) Switch on the temperature control unit - press the main switch and press the **ON/OFF** button
2) Set the set-point value on the controller to 0 °C
3) Check that the cooler solenoid valve (**Y6**) is open
4) Blow out the cooler with compressed air (max. 6 bar)
5) Empty the medium circuit by blowing through the inlet, empty the cooling circuit and the SK circuit

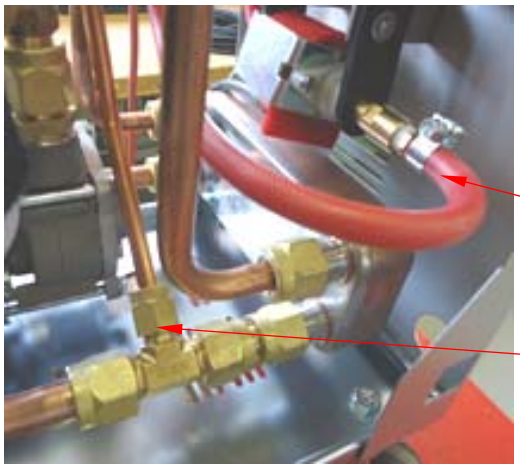


6) Switch off the temperature control unit with the **ON/OFF** button, and then press the main switch and unplug the mains plug
7) Do not tip the temperature control unit - heat transfer medium remaining in the unit could spill out
8) Use the original packaging and mark the top side clearly

Emptying the SK pump

Because of the danger of freezing at low temperatures, the SK circuit must be drained as follows:

1) Loosen the hose on the filling pump (**1**) and let drain off the heat transfer medium
2) Loosen the lock nut on the T-piece (**2**) and let drain off the residual heat transfer medium



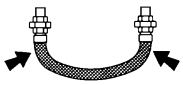
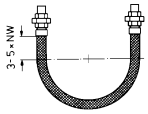
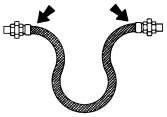
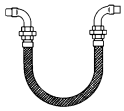
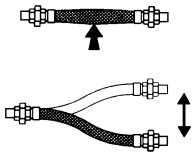
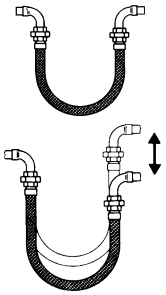
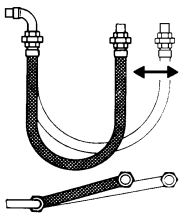
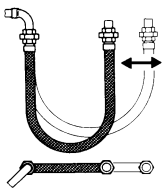
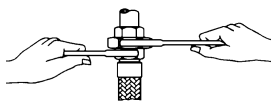
Disposal

The temperature control unit must be drained completely and disposed of in accordance with local regulations.

The temperature control unit can also be returned to Regloplas AG, Switzerland, for disposal.

Maintenance

Guidelines for Connecting Hoses

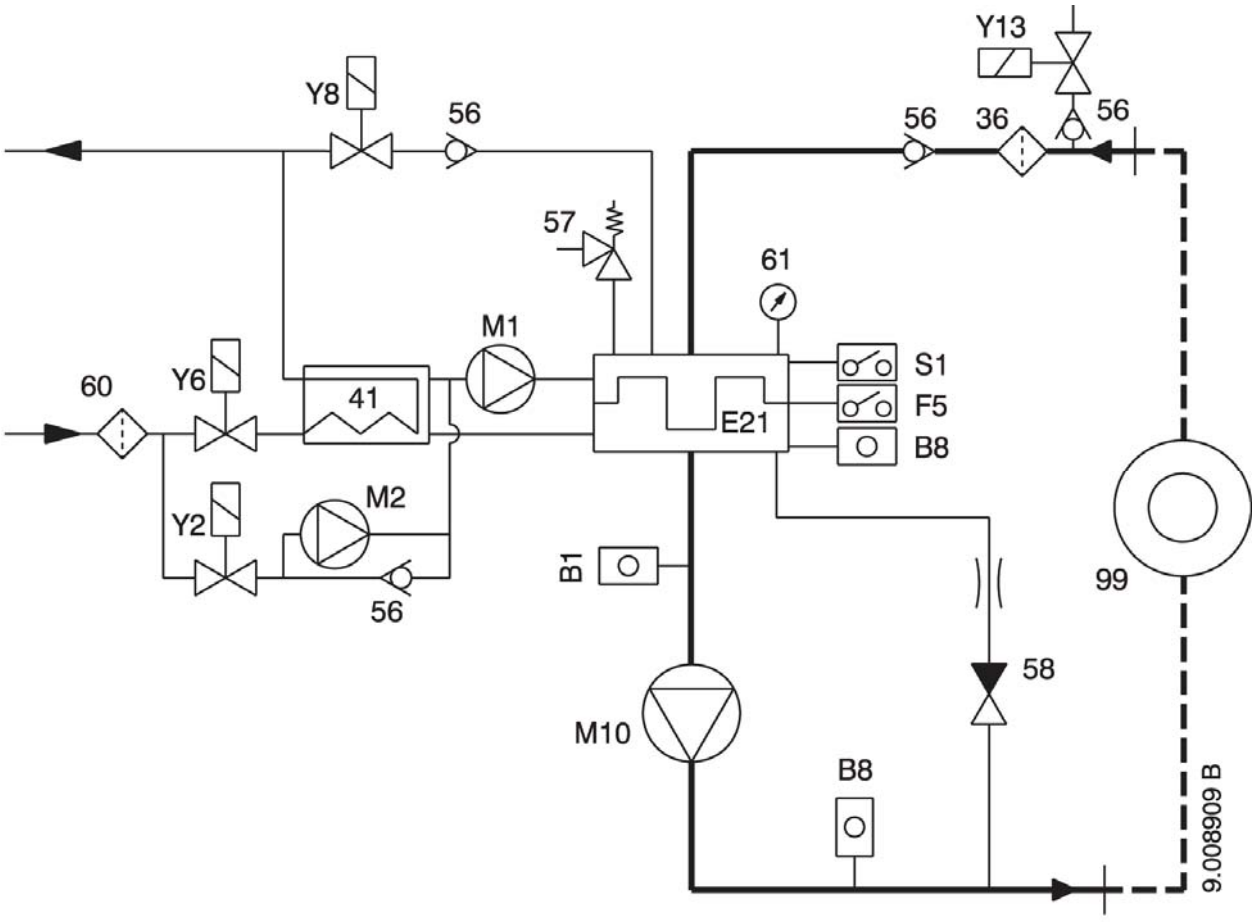
Wrong		Right	
	Hose too short - hose is bent at the connections		Provide sufficiently long neutral hose ends (3-5 x DN)
Wrong		**Right**	
	Excessive bending load at the connections		Pipe elbows fitted
Wrong		**Right**	
	Incorrect installation - compression along the longitudinal axis		Pipe elbows fitted
Wrong		**Right**	
	Torsion - hose axis and direction of movement not in the same plane		The pipe axes must be parallel and in the same plane as the direction of movement
	Important - the hoses may also be twisted during installation.		When attaching/detaching a hose, always hold it in place with a second wrench

Technical Data P140M/P160M(D)/P180M(D)

Temperature Control Unit Type	P140M	P160M(D)	P180M(D)
Max. outlet temperature	**140 °C**	**160 °C**	**180 °C**
Heat transfer medium	**Water**		
Filling capacity	1.0 l	1.0 l	1.0 l
Heating capacity	**8 kW/18 kW**	**8 kW/18 kW**	**8 kW/18 kW**
Heating switch	SSR relay	SSR relay	SSR relay
Cooling capacity	**56 kW (SK)**	**66 kW (SK)**	**76 kW (SK)**
	68 kW (2SK)	**78 kW (2SK)**	**90 kW (2SK)**
at outlet temperature	130 °C	150 °C	170 °C
Pump type	**SM72**	**SM73/SM75**	**SM73H/SM75H**
Motor power (pump)	1.0 kW	1.0 kW/1.5 kW	1.0 kW/1.5 kW
Max. delivery rate	60 l/min	SM73 - 60 l/min SM75 - 100 l/min	SM73H - 60 l/min SM75H - 100 l/min
Max. delivery pressure	6.0 bar	6.0 bar	6.0 bar
Magnetic drive	7 Nm	SM73 - 7 Nm SM75 - 10 Nm	SM73H - 7 Nm SM75H - 10 Nm
System pressure	**10 bar**	**10 bar**	**14 bar**
Outlet pressure	**max. 16 bar**	**max. 16 bar**	**max. 20 bar**
Control System	**RT100 Control System**		
Measurement type (standard)	Pt100	Pt100	Pt100
Control voltage	230 V, 50/60 Hz	230 V, 50/60 Hz	230 V, 50/60 Hz
Input supply voltages	**200-600 V 50/60 Hz**	**200-600 V 50/60 Hz**	**200-600 V 50/60 Hz**
Total power at 400 V	**8.5 kW**	**8.5 kW**	**8.5 kW**
Outlet/inlet connections (standard)	G 3/4"	G 3/4"	G 3/4"
Cooling water supply connections (standard)	G 1/2"	G 1/2"	G 1/2"
Degree of protection	IP54	IP54	IP54
Dimensions W/H/D	300/708/896 mm	300/708/896 mm	300/708/896 mm
Dimensions W/H/D Dual-circuit units (D)	----	416/1556/1037 mm	416/1556/1037 mm
Weight	approx. 84 kg	approx. 84 kg	approx. 84 kg
Weight Dual-circuit units (D)	----	approx. 170 kg	approx. 170 kg
Colour	RAL 9006/7016	RAL 9006/7016	RAL 9006/7016
Ambient temperature	max. 40 °C	max. 40 °C	max. 40 °C
Continuous sound pressure level	< 70 dB(A)	< 70 dB(A)	< 70 dB(A)

In the case of dual-circuit units, these specifications apply to each circuit!

Block Diagram P140M/P160M(D)/P180M(D)



Block Diagram P140M/P160M(D)/P180M(D)

Item	Designation	Item	Designation
36	Main circuit filter	E21	Heating
41	Cooler	F5	Safety thermostat
56	One way check-valve	M1	Cooling pump (SK cooler)
57	Safety valve	M2	Boost pump
58	Bypass	M10	Pump
60	Cooling circuit filter	S1	Level control
61	Pressure gauge	Y2	Solenoid valve - automatic water refill
99	Consumer	Y6	Solenoid valve - cooling
B1	Internal temperature probe	Y8	Solenoid valve - pressure release
B8	Pressure sensor	Y13	Solenoid valve - suction

Diagram (Pump capacity)

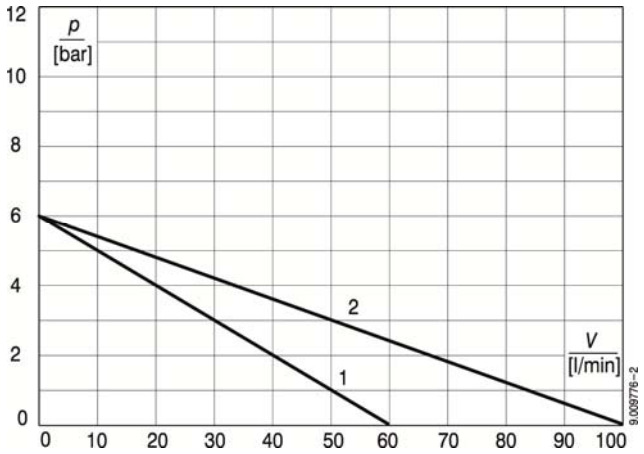
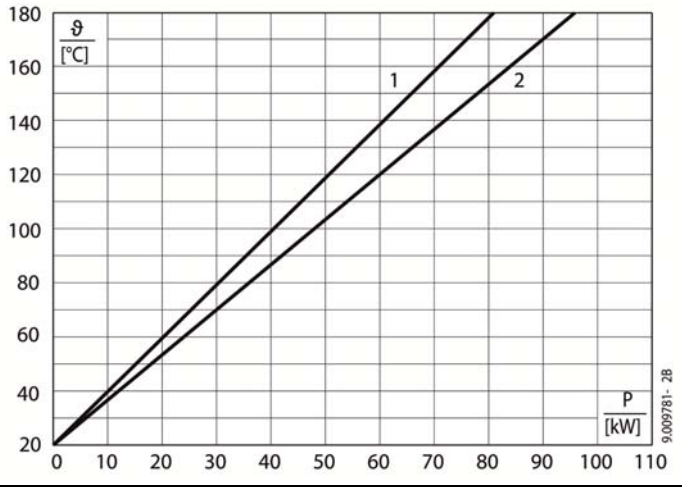
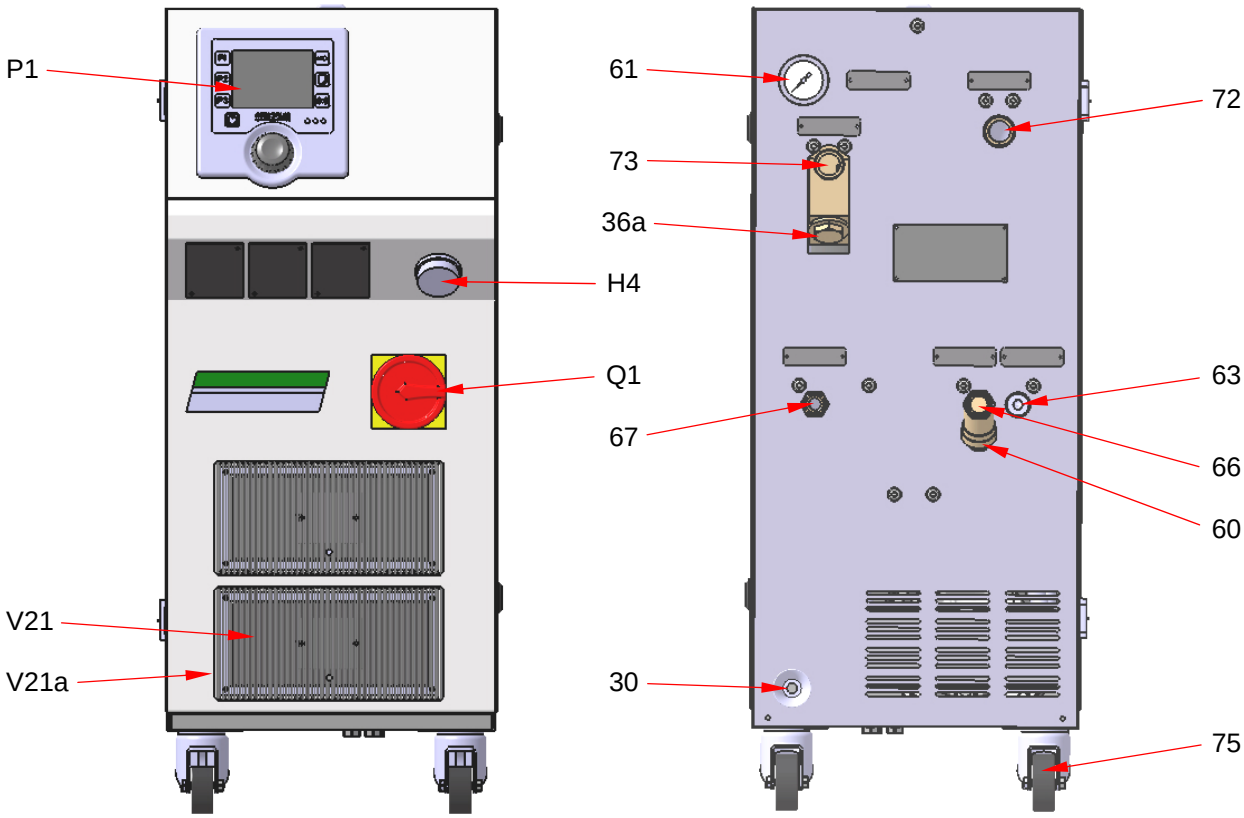
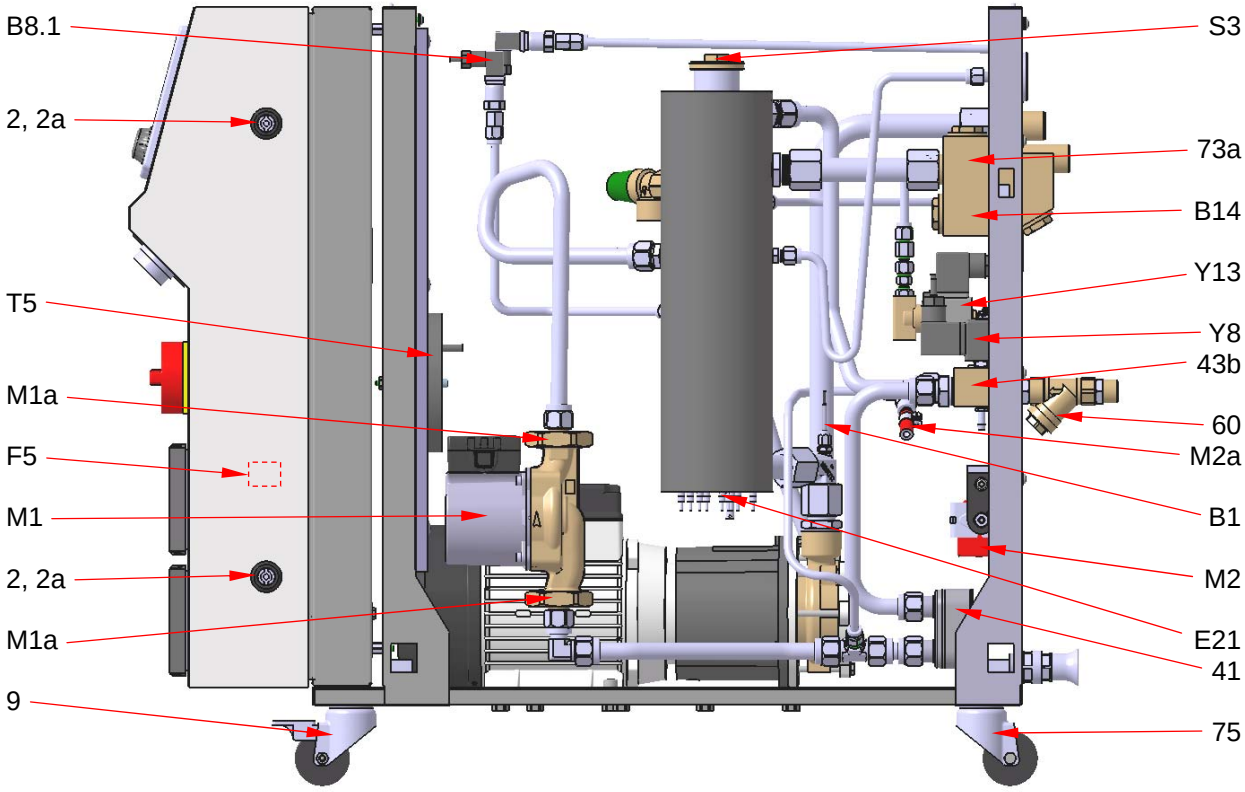
1 - Pump curve SM72/SM73/SM73H **2 - Pump curve SM75/SM75H**	
Pump capacity - Delivery rate (**V**) as a function of pressure (**p**), bypass not taken into account	

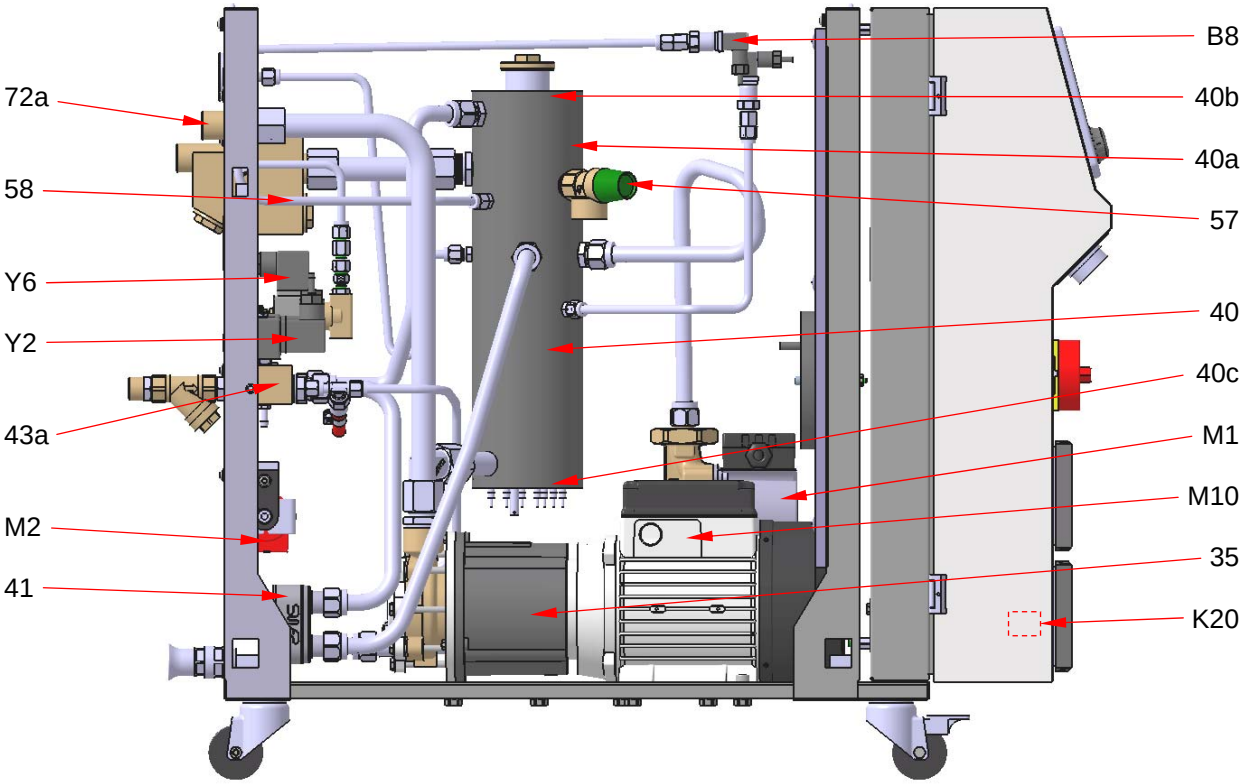
Diagram (Cooling capacity)

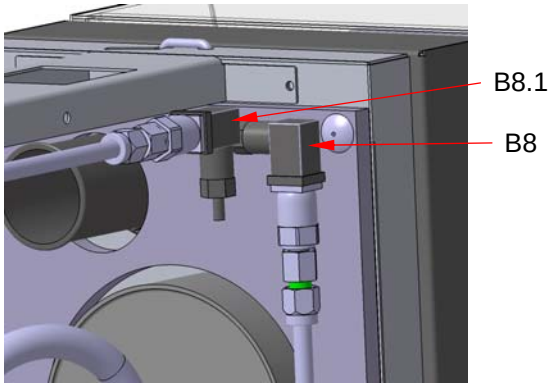
1 - Cooling curve with SK **2 - Cooling curve with 2SK**	
Cooling capacity (**P**) as a function of inlet temperature (**ϑ**)	
Cooling water temperature	20 °C
Flow rate	20 l/min

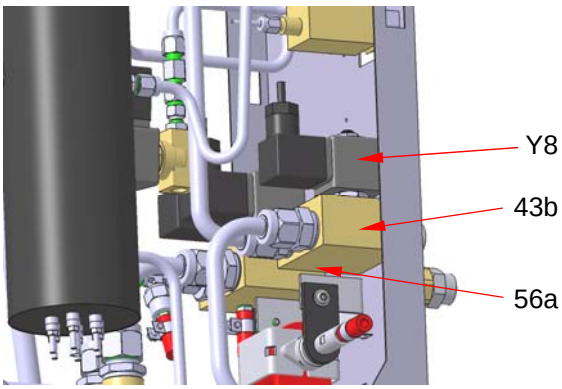
Components/Spare parts P140M/P160M/P180M

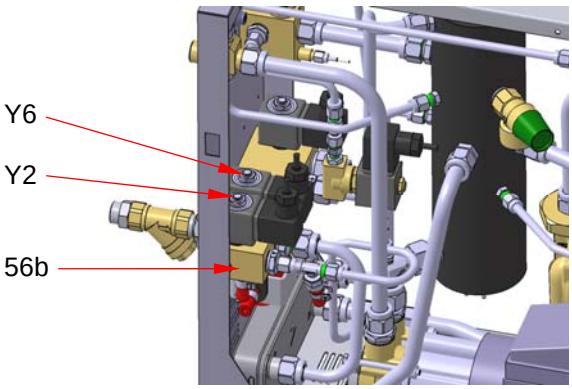


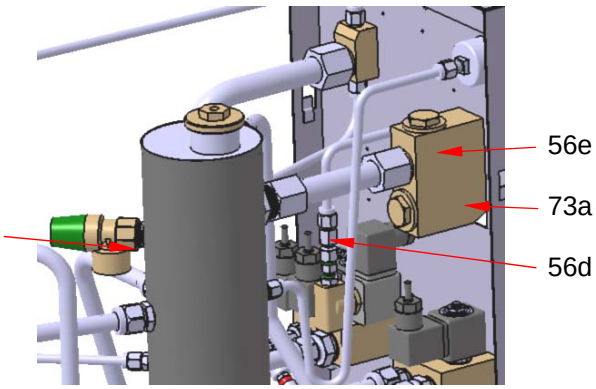



72a
58
Y6
Y2
43a
M2
41
B8
40b
40a
57
40
40c
M1
M10
35
K20

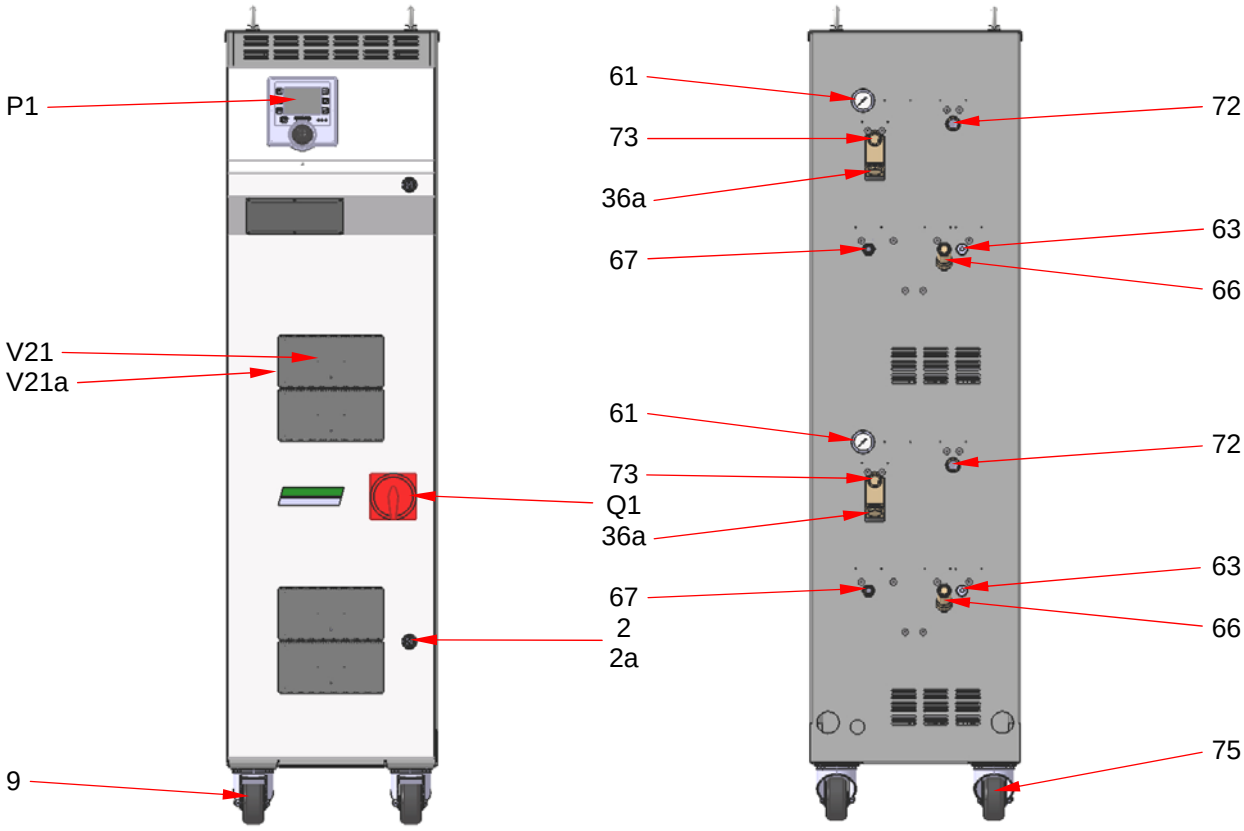

B8.1
B8

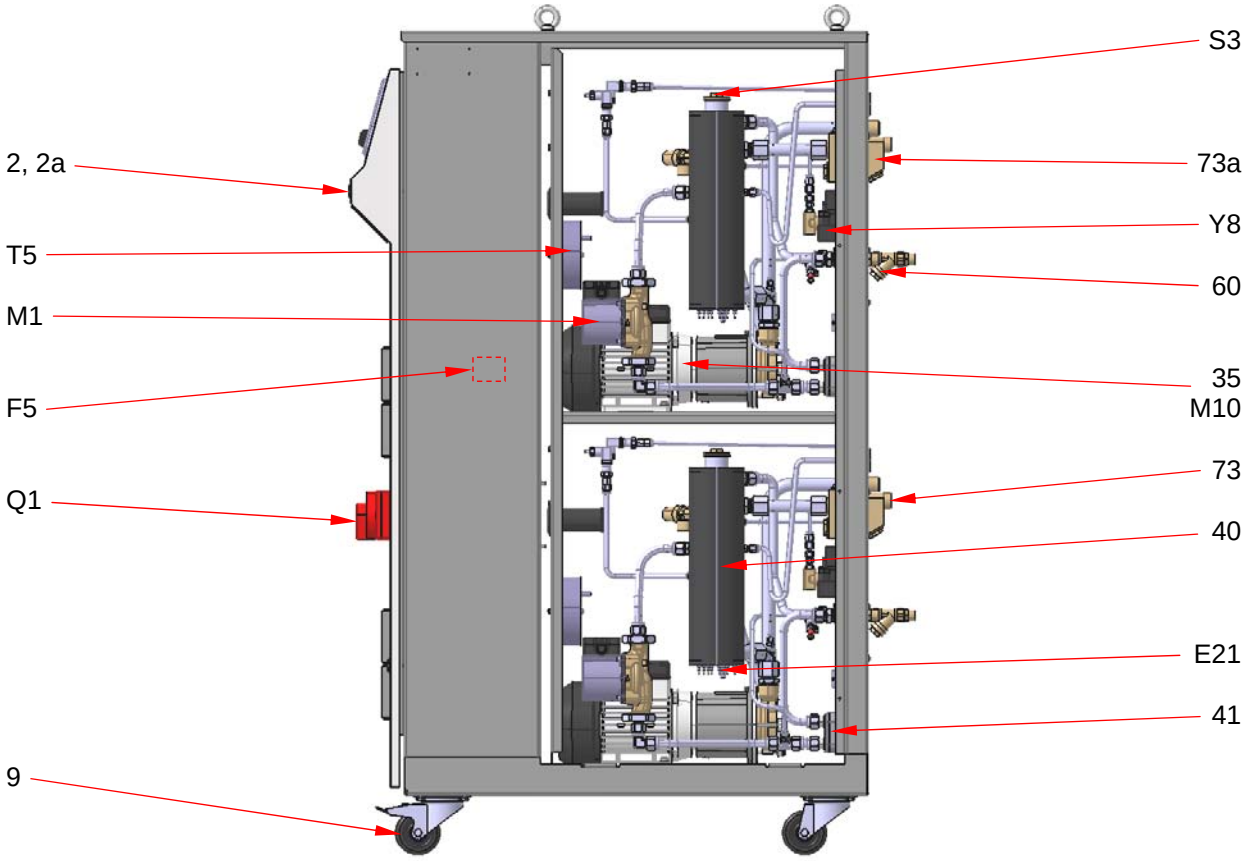

Y8
43b
56a


Y6
Y2
56b


56e
73a
56d

Components/Spare parts P160MD/P180MD





Item	Designation	Item	Designation
2	Lock	B1	Internal temperature probe
2a	Locking tongue	B8	Outlet pressure sensor
9	Castor with wheel lock	B8.1	System pressure sensor
30	Power cable	B14	Inlet temperature probe (option)
35	Pump	H4	Additional horn (option)
36a	Inlet filter sieve	E21	Heating
40	System with heating	F5	Safety thermostat
40a	Insulation (system)	K20	Main contactor - heating
40b	Insulation (cover)	M1	Cooling pump
40c	Insulation (base)	M1a	Cooling pump seal
41	Cooler	M2	Boost pump
43a	Valve block Y2/Y6 (see corresponding chapter)	M2a	Filling pump hose
43b	Valve block Y8 (see corresponding chapter)	M10	Pump motor
56a	One way check-valve (pressure release)	P1	Control system
56b	One way check-valve (water replenishment)	Q1	Main switch
56d	One way check-valve (suction)	S3	Level switch (see corresponding chapter)
56e	One way check-valve (inlet)	T5	Control transformer
57	Safety valve (see corresponding chapter)	V21	SSR relay with heat sink
58	Bypass	V21a	Seal for SSR relay
60	Cooling water filter	Y2	Solenoid valve (auto. water refill)
61	System pressure gauge	Y6	Solenoid valve (cooling)
63	System water (option)	Y8	Solenoid valve (pressure release)
66	Cooling water ON	Y13	Solenoid valve (suction)
67	Cooling water OFF		
72	Outlet		
72a	Outlet valve block		
73	Inlet		
73a	Inlet valve block		
75	Castor		

NOTE



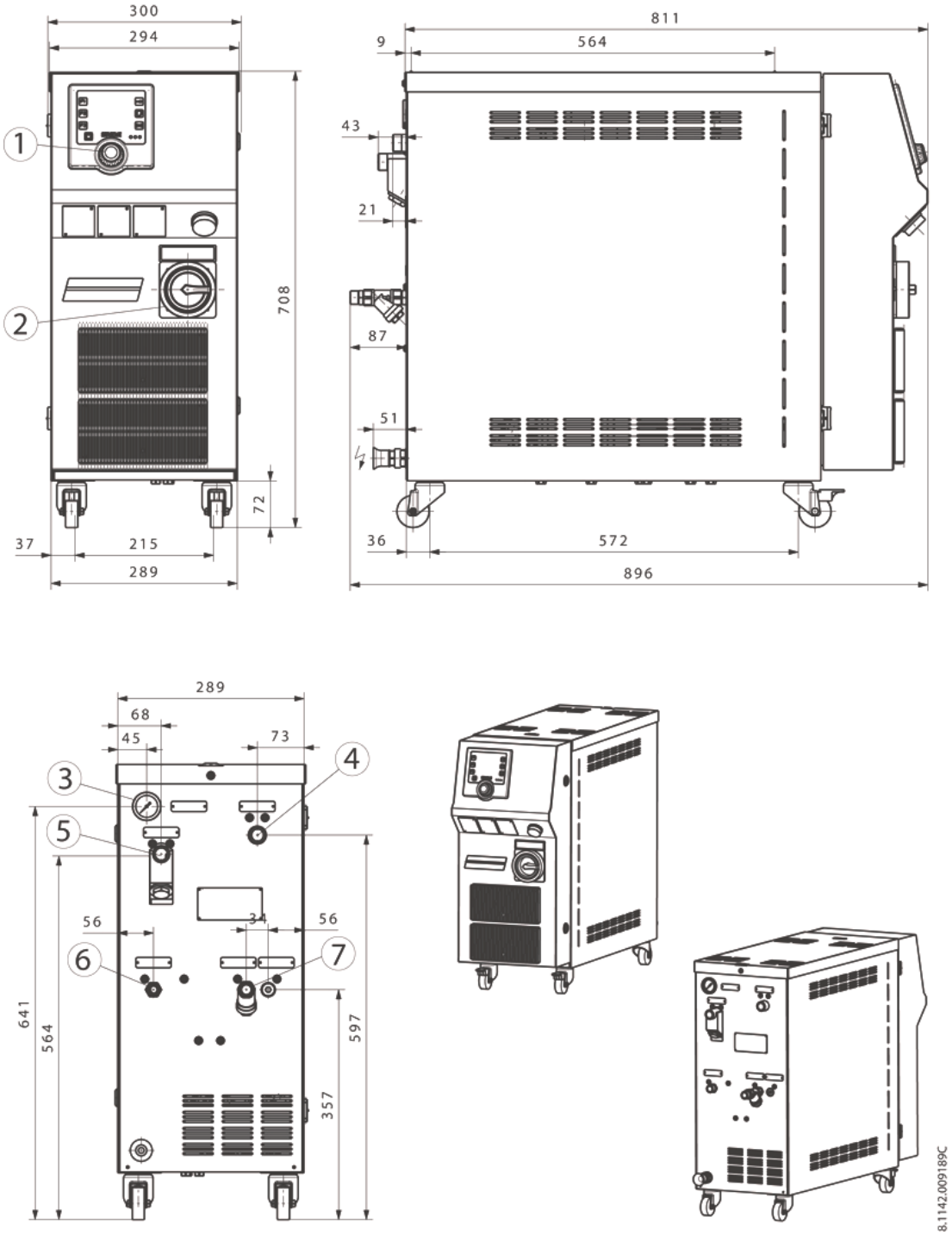
See electrical wiring diagram of the temperature control unit for additional electrical components!

⚠ CAUTION



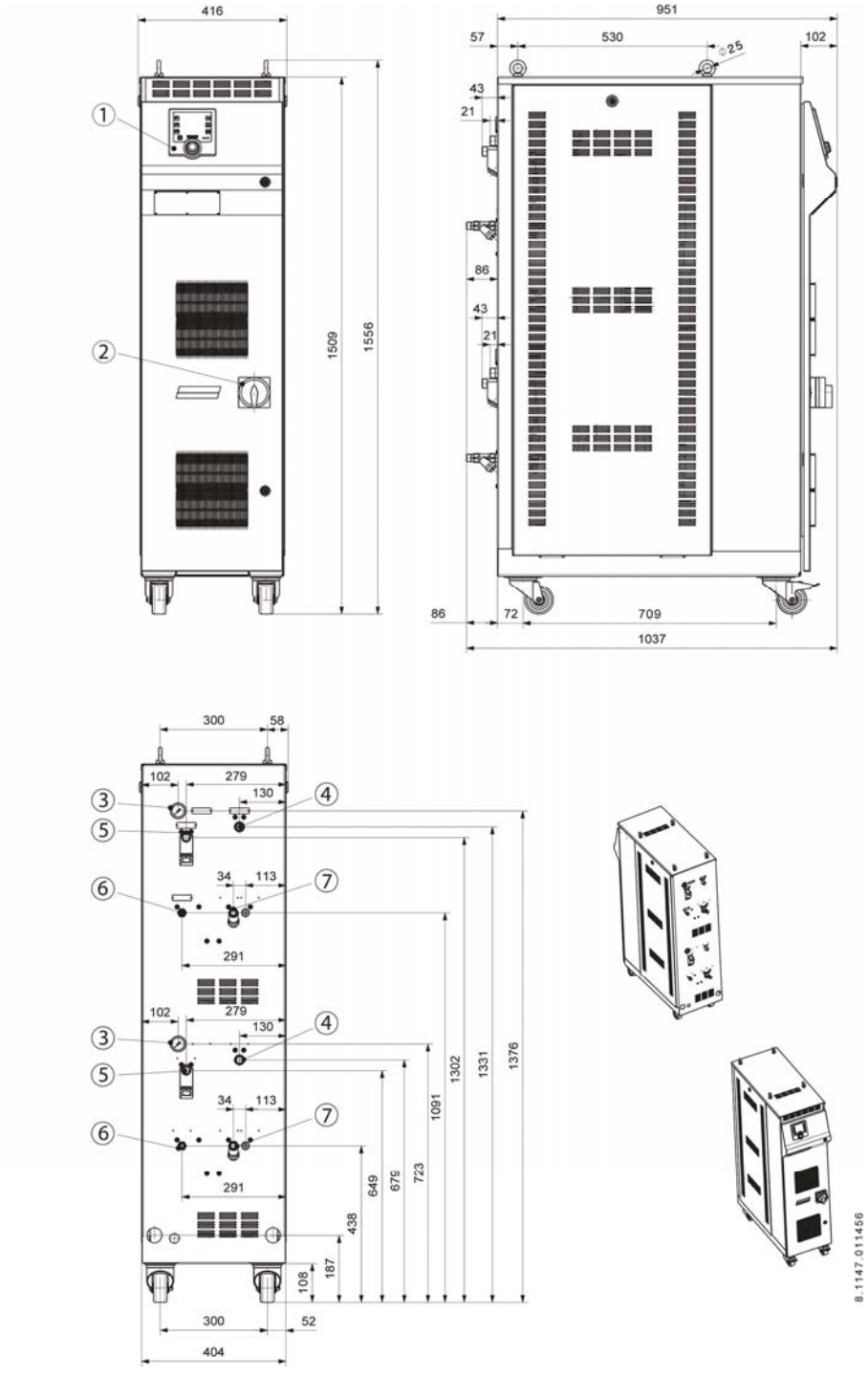
Only authentic (OEM) Regloplas spare parts may be used.
In case of damage from the use of non-OEM parts, the warranty will be rendered null and void!

Dimension sheet P140M/P160M/P180M



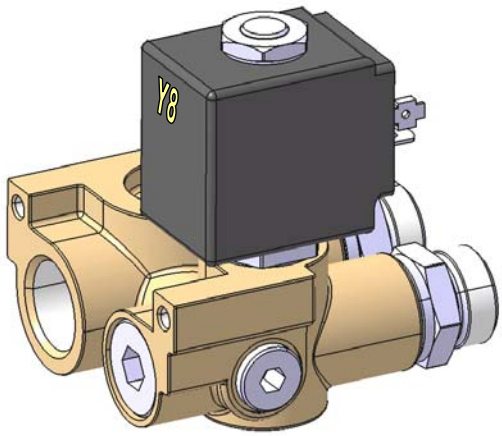
Item	Designation	Item	Designation
1	RT100 Control System	5	Inlet
2	Main switch	6	Cooling water ON
3	Pressure gauge	7	Cooling water OFF
4	Outlet		

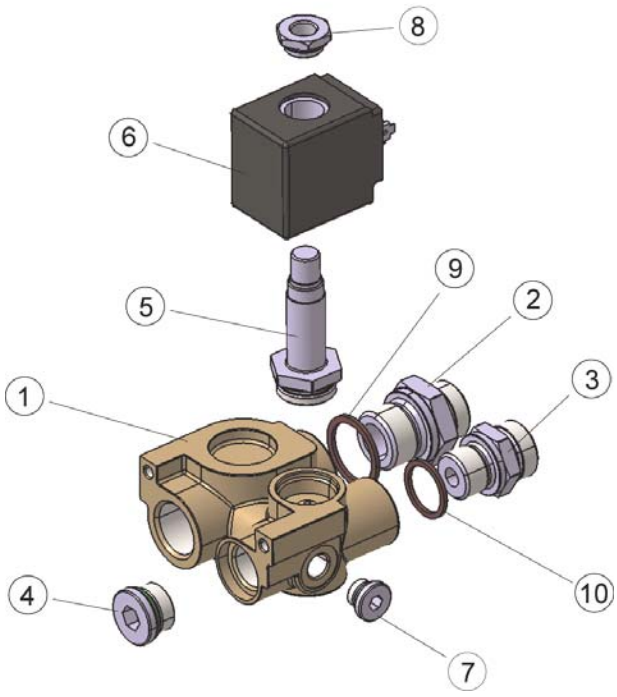
Dimension sheet P160MD/P180MD



Item	Designation	Item	Designation
1	RT100 Control System	5	Inlet
2	Main switch	6	Cooling water ON
3	Pressure gauge	7	Cooling water OFF
4	Outlet		

Valve Block Y8

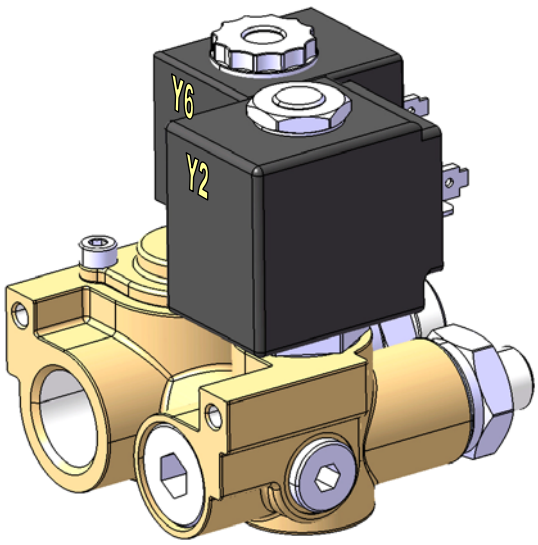


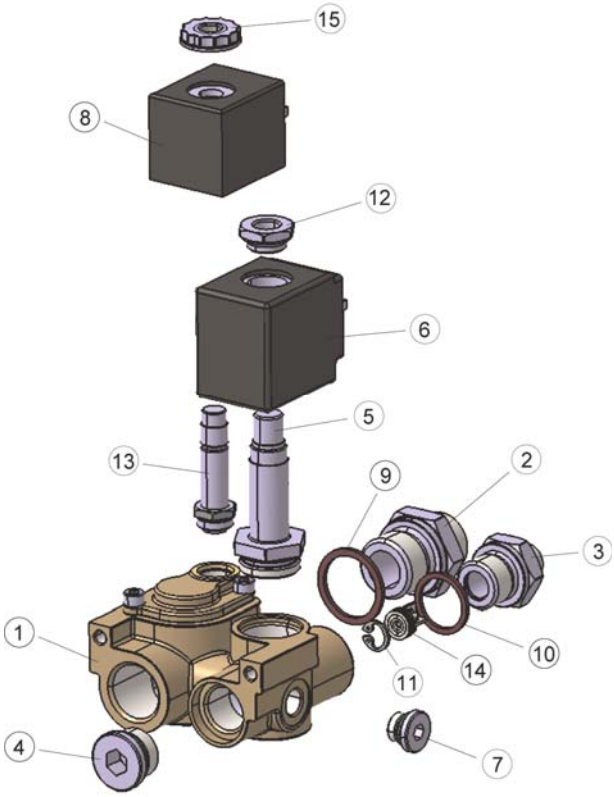


Valve block Y8

Pos.	Designation	Pos.	Designation
1	Valve block	6	Coil Y8
2	Double nipple G 1/2"-M20x1.5	7	Plug M5 with O-ring
3	Double nipple G 3/8"-M20x1.5	8	Nut
4	Plug 1/8” with O-ring	9	Sealing washer (copper) 1/2"
5	Control member Y8	10	Sealing washer (copper) 3/8"

Valve Block Y2/Y6



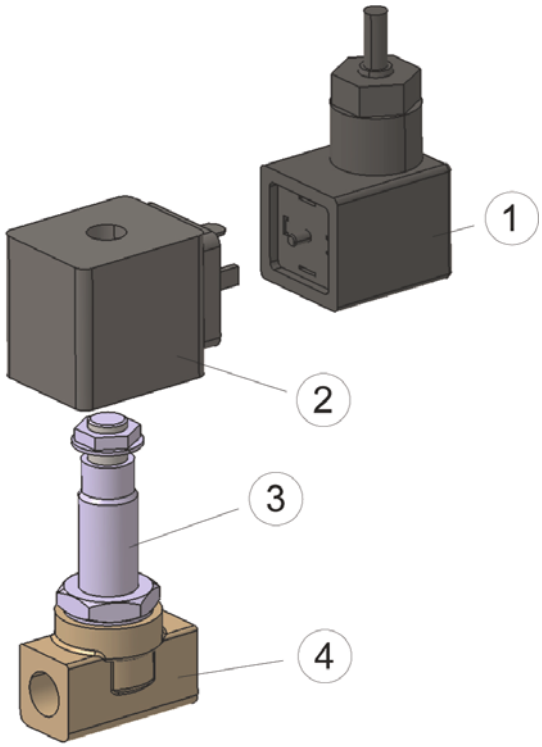


Valve block Y2/Y6

Pos.	Designation	Pos.	Designation
1	Valve block	9	Sealing washer (copper) 1/2"
2	Double nipple G 1/2"-M20x1.5	10	Sealing washer (copper) 3/8"
3	Double nipple G 3/8"-M12x1	11	Snap ring
4	Plug 1/8” with O-ring	12	Nut
5	Control member Y2	13	Control member Y6
6	Coil Y2	14	Check valve
7	Plug M5 with O-ring	15	Nut
8	Coil Y6		

Solenoid valve Y13 (Suction option)

Overview

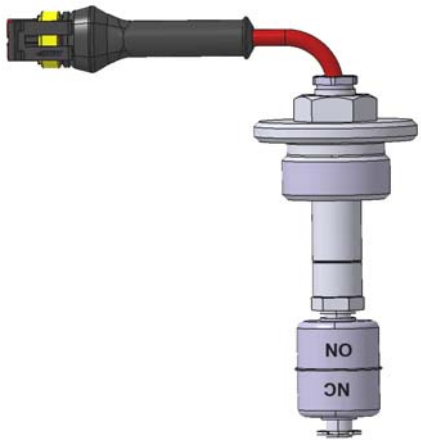


Solenoid valve Y13 - G1/4"	

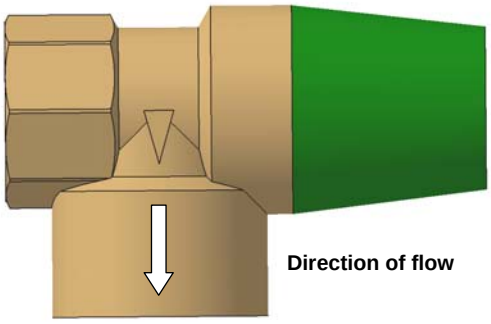
Pos.	Designation	Pos.	Designation
1	Connection plug	3	Guide with anchor and spring
2	Coil	4	Housing with membrane and O-ring

Level Switch

Dismantling/Replacement

When replacing the level switch, the **NO** marking must be on top as pictured, otherwise the level control will not function properly!	

Safety Valve

The safety valve is the final element of safety with regard to the permissible pressure in the unit. For this reason, it is necessary to verify from time to time that the safety valve is functioning correctly (interval dependent on water quality, e.g., level of contamination)! **Procedure** In the event of leakage (e.g., due to impurities between the sealing surfaces), the valve can be vented for cleaning by turning the cap counterclockwise with a max. system pressure of 2 bar in the unit. After it is turned further until it engages, the valve operates normally again with the set pressure. **Important:** Any safety valve malfunctions must be eliminated immediately! In the event of disassembly, make certain that the safety valve is not under pressure!	
	Safety valve - G 1/2"-G 3/4"